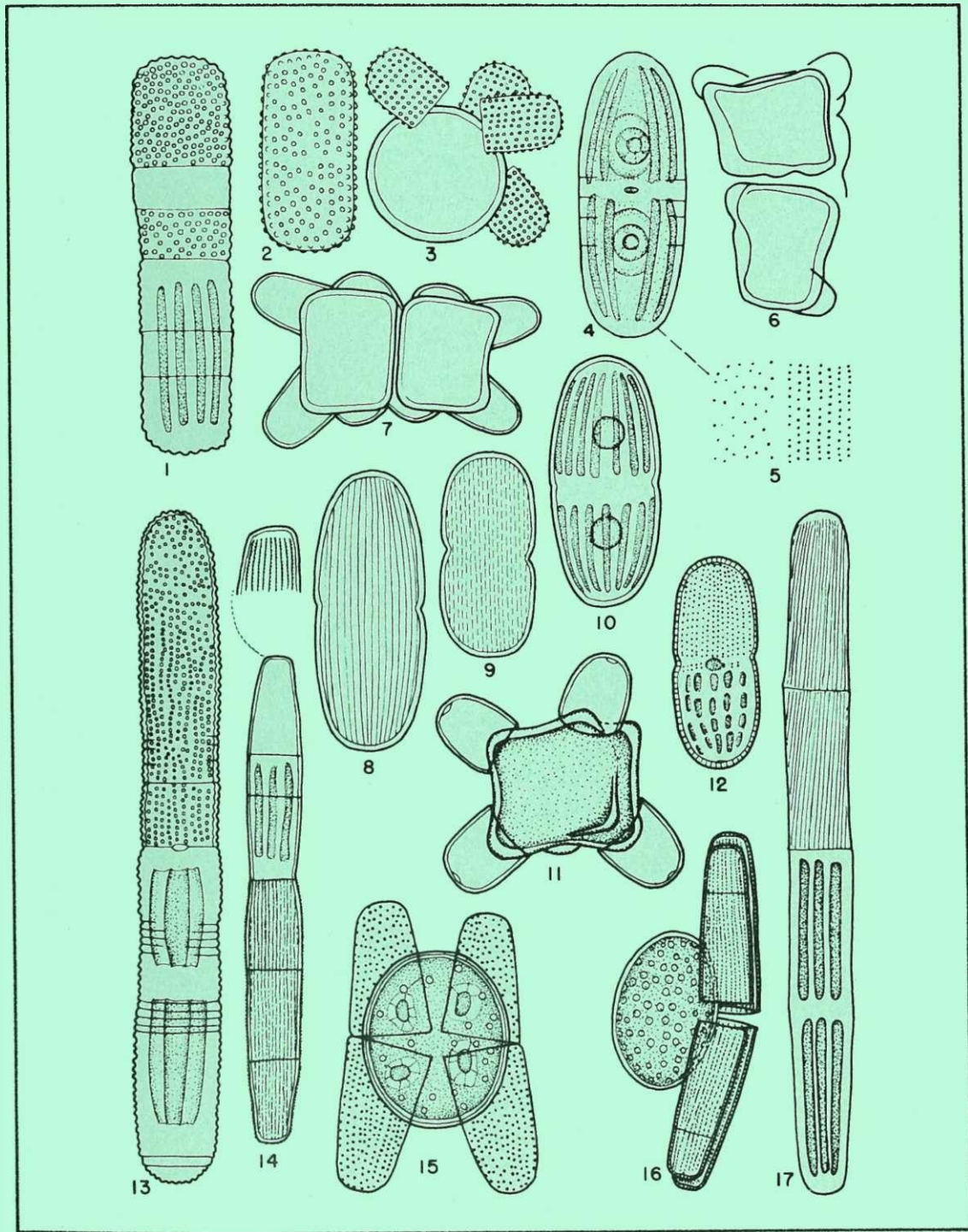


NEW ZEALAND BOTANICAL SOCIETY

NEWSLETTER

NUMBER 2

DECEMBER 1985



NEW ZEALAND BOTANICAL SOCIETY NEWSLETTER

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EDITORIAL

Where next?

The response to the first number of the Newsletter has been extremely heartening. Donations from some 50 individuals have almost covered the costs of printing and distributing 400 copies of Number 1 (c.\$690). Auckland Museum has underwritten the costs of the present issue, and it is hoped that further people will provide small donations to enable the Museum to be repaid.

The size of this issue clearly indicates the need for quarterly publication from next year. To finance this, a formal subscription is required; details can be found on p.2 and an invoice is enclosed.

Thus, in 1986 the New Zealand Botanical Society will rest on four issues of a newsletter. But what of the future - meetings and the formal setting up of the Society? I have a suggestion to make, and invite comment, criticism or alternative ideas.

The Auckland Botanical Society celebrates its Fiftieth Jubilee in 1987. The suggestion is that we use this occasion as a focus, holding an inaugural AGM, a two-day Symposium on a widely attractive botanical theme, followed by an Auckland Botanical Society one-day Symposium on local botany and a joint field trip. The events would be held during the May holidays, and *not* tied to any other existing biological organisation's meeting so that the New Zealand Botanical Society could be seen to stand alone. The obvious goal would be a meeting to match the Godley Gaudeamus.

Please write in with your views and a report on the response will appear in the March 1986 issue of the Newsletter. Clearly, a scheme such as this will only succeed with the support of an enthusiastic group of organisers - make an offer!

Once again, thanks to all who sent in donations, words of encouragement and copy for the Newsletter - these are greatly appreciated.

Anthony Wright, Editor
Andrew Thomson, Assistant Editor

Cover illustration: *Penium* spp. (Desmidiaceae)

This illustration is one of the plates prepared by Dr Hannah Croasdale, U.S.A, for "Flora of New Zealand Desmids" Volume 1 (*in press*). *Penium* is one of the simpler placoderm desmids found in bogs and in acid to nearly neutral waters. The plate shows vegetative cells and zygosporoes (zygotes) (Elizabeth A. Flint).

1986 SUBSCRIPTION

The current mailing list numbers 340 people. Assuming 250 of these will pay a subscription to continue receiving the Newsletter, and costs of \$600 per issue (more if we have to pay for typing), the subscription will need to be \$10 for four issues. An invoice for this amount is enclosed. A student subscription of \$5 is available to full-time students at New Zealand schools, technical institutes and universities. Others may like to sponsor a student subscription by paying an additional \$5. Donations towards the cost of this issue will be gratefully received from those who have not yet made a contribution.

CIRCULATION

From March 1986 this Newsletter will be sent only to those who have paid their annual subscription to the publication. Additions to the mailing list are welcome, and should be sent (together with subscription money) to the Editor. Additional copies of Number 1 are available at \$1 each.

INVITATION TO CONTRIBUTE

Contributions from all sources are welcome. A list of possible column headings can be found on p.2 of Number 1. Feel free to suggest new headings, and provide content for them!

DEADLINE FOR NEXT ISSUE

The deadline for the March 1986 issue (Number 3) is **14 February 1986**. Please forward contributions to:

Anthony Wright
Auckland Institute & Museum
Private Bag
AUCKLAND 1

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NEWS

Regional Bot Socs

■ Canterbury Botanical Society

The Canterbury Botanical Society was started in 1952 under the name of Canterbury Native Flora Society. In 1966 the present name was adopted. The original membership of about 50 increased and then dwindled and for a few years was at a very low ebb. Since 1969, membership has increased steadily and now stands close to 200, with many young people joining.

Current Activities:

1. On the first Friday each month except January, a meeting (usually illustrated with colour slides) is held in a lecture theatre at the University of Canterbury (8.00 p.m. - 10.30 p.m.).
2. Field trips or workshops on the second Saturday each month. Visits are made to reserves, forest parks and other areas of interest. Workshops have included coprosmas, hebes, raoulias, grasses and lichens. These workshops are conducted by experts on the particular topics.
3. Longer field trips - weekend camps and a summer camp for a week at the beginning of January. Show weekend (Canterbury Anniversary) field trip in November 1985 was held at Oaro using the field station of Lincoln College. Summer camp at Lake Ohau using Twizel High School Camp is planned for the period 3 - 11 January 1986. Places visited in previous years have been Cass, Kaikoura, Lake Kaniere, Bannockburn, Harihari. The Society uses university field stations, school or church campsites. Visitors to meetings, field trips and camps are welcome.

Publications:

1. A monthly newsletter which gives a synopsis of talks and field trips, and keeps members informed of forthcoming events.
2. An annual journal. This year's will be No. 19. Articles cover a wide variety of topics from both amateur and professional botanists.

Membership:

Prospective members are encouraged to attend any meetings and field trips. Newsletters are sent free of charge for 3 months.

Subscription rates: Single \$ 7.50
 Family \$10.00
 Student \$ 5.00

Officers for 1985-86: (AGM held in June)

President: Philippa Horn
 Vice-President: Ian Tweedy and Eugene McNeill
 Secretary: Valerie Lovis
 Treasurer: Tony Burnett
 Committee: David Crayford, Ross Lake, Howard Lintott,
 David Norton, Max Visch

Journal Editor: Ross Elder

Enquiries to:

Valerie Lovis, Secretary, P.O. Box 8212, Riccarton, Christchurch

■ Wellington Botanical Society

The Wellington Botanical Society was founded on Thursday, 18 July 1939 at the instigation of Dr W.R.B. Oliver, the then Director of the Dominion (National) Museum. Meetings were held in the Museum until its requisition by the Military in June 1942 and after several changes of venue moved to the current meeting place, the Botany Department of Victoria University.

The Society holds lecture evenings on the third Monday of the month from February to November, and field trips on the first Saturday of each month, with longer trips over New Year, mid-January, Easter and Queen's Birthday weekend.

Remaining activities in the current programme are: evening lectures - "Nature conservation in the Pacific Islands" by Dr Rod Hay (17 February), Members' Evening (17 March), "Scottish heather - its place in the ecosystems of Tongariro National Park" by Dr Hazel Chapman (21 April); and field trips - Mt Richmond Forest Park, Marlborough (27 December-4 January), car camp to NE Ruahines with option of a five-day tramp to Lake Colenso (14-22 January), south Wellington coast (1 February), Otaki Forks area (1-2 March), Kaweka Lakes and Kaweka Range (27 March-1 April), Ferry Road Stream, Days Bay to Fern Gully, Wainuiomata (3 May).

The *Bulletin of the Wellington Botanical Society* is the Society's main publication. Volume 42 of the Bulletin was published this year. A book on the botany of the Wellington District is presently being prepared to commemorate the 50th anniversary of the Society in 1989.

Current membership is 372 and the Society welcomes new members. Officers for 1985-86: President: Rodney Lewington

Vice-Presidents: Bev Abbott, Barry Sneddon

Secretary: Len Bruce

Treasurer: Kingsley Brown

Editor of the Bulletin: Colin Ogle

Subscriptions for the year to 30 June 1986 are:

Ordinary members	\$ 6.00
Country members	\$ 4.00
Student members over 16-years-old	\$ 3.00
Life membership	\$50.00 available only after 10 years membership.

Annual subscriptions are subject to a rebate of \$1 if paid by 30 November.

Secretary's address: 116 Korokoro Road, Petone

■ Rotorua Botanical Society

The society's inaugural AGM was held on the 18 May 1985. Before getting down to more serious business, the 28 assembled members tucked into a pot luck dinner which included such culinary delights as *Helianthus tuberosus* soup. The election of officers saw the re-election of Bruce Clarkson as President, Bev Clarkson as Secretary, Chris Ecroyd as Treasurer and Mark Smale as Editor of the newsletter. The committee gained several new members and it was decided to have district representatives to improve communication with members or prospective members in outlying districts. Those chosen were Mark Dean (Tauranga), Mark Heginbotham (eastern Bay of Plenty), Murray Boase (Waikato) and John Jordan (Taranaki).

The *Rotorua Botanical Society Newsletter Number 5* was published in August 1985. It contains articles on field trips to Ohiwa Harbour, Rapurapu and Otanewainuku; native myrtles of the Rotorua Lake District; *Myriophyllum robustum*; and Pourewa Island. The Society is to be congratulated on the production of such a well presented and interesting newsletter. Notice is given of the second annual expedition of the Society to Egmont National Park on 2-6 January 1986. Contact:

The Secretary, Rotorua Botanical Society, C/- Mourea Post Office, Rotorua

■ Auckland Botanical Society

Remaining field trips in the current programme are:

Tongariro National Park, 20-24 January 1986. Leader: Dr Jack Rattenbury. The main party will be accommodated at the Ruapehu Ski Club Chalet (access just before the Bruce Road crossing of the Whakapapanui Stream above the camping ground). Numbers will be limited to 32 persons (adults or children) who will occupy the four eight-bed bunkrooms. Accommodation costs are \$7 per person per night for the four nights. Food will be bulk-catered and cooking/housekeeping done entirely by members of the party. Food costs will be kept as low as possible. Transportation will be by private car, car pooling where possible. Members, if they prefer, may arrange their own accommodation and food and join the main party daily. Those intending to come should notify Jack Mackinder (Scenic Drive, RD Henderson, Auckland 8, telephone 814-9310) not later than January 1986 and details will be forwarded by mail. Visitors welcome, space permitting.

Matuku Reserve, Te Henga, 15 February 1986.

Volume 40, Number 2 of the Society's newsletter was published in August 1985. The contents were:

Mosses of Whangaruru North Head	Jessica E. Beever
Easter Weekend on Mayor Island	R.E. Silvester
<i>Caladenia lyallii</i> - an error corrected	E.D. Hatch
Mosses of Omahuta and Puketiti State Forests	J.E. Beever, P.J. Brownsey, M.D. Whitehead, F. Barnes
Vascular Plants of the A.R.A. Regional Park Waharau	J.C. Smith Dodsworth
Vascular Flora of Kakepuku Historic Reserve, Te Awamutu	A.E. Wright
<i>Nestegis cunninghamii</i> in the Waitakere Ranges	Sandra Jones
<i>Melicytus macrophyllus</i> at Middlemore	R.E. Silvester
<i>Pseudowintera</i> in Northland	P.J. Bellingham & E.K. Cameron

Naturalised Vines of Urban Auckland	A.E. Esler
<i>Pterostylis brumalis</i> in Waipoua Forest	Katie Reynolds
1985, The Year of the Coral Stinkhorn	Katie Reynolds
<i>Pterostylis nutans</i> - The Case of the Wandering Gunpost	E.D. Hatch
Odd Extracts from The Esculentis	E.D. Hatch
Six Plants whose Nativity to New Zealand has been doubted	R.O. Gardner
<i>Fuchsia</i>	Katie Reynolds

The Secretary, Auckland Botanical Society, 14 Park Road, Titirangi, Auckland 7

University Departments

■ Botanical news from the University of Otago

The Botany Department at Otago is arguably the smallest autonomous botany department in any New Zealand University. In 1983 we underwent an Academic Review that considered the possibility of amalgamation with Zoology, but which came out in favour of continued independence (it is interesting to note that our students, in particular, had a strong sense of identity as *botanists* rather than biologists or even plant scientists!). Our current academic staff is six.

Ann Wylie is our longest established member and we are wondering how we can possibly manage when she retires at the end of 1987. Perhaps the computerized National Bibliographic Network will be working properly by then because up until now we have only needed to ask Ann to keep us up-to-date. We also anticipate that the racial purity and genetic diversity of *Drosophila* in New Zealand will plummet when she retires, and who can possible cover her teaching?

Alan Mark is almost as long-established and well-known to you all. He maintains his high profile in the public arena, despite the slings and arrows of outraged landowners. It is rumoured that Air New Zealand is able to justify its Dunedin-Wellington service only because of his frequent visits (his most recent commitments including the Land Settlement Board and the National Parks and Reserves Authority). He had leave in 1983, visiting South America and Alaska, and abandoned *Chionochoa* for a while for cyperaceous tussocks (*Eriophorum* spp.). One of his most recent concerns has been the native forest at Waitutu and he has helicoptered in with everyone from Dr David Bellamy to our own undergraduates. The result has been the first good survey of the area. Interests in survey have also brought (as recently as September) our first post-doctoral fellow **Katharine Dickinson** from Tasmania, who is working on an ecological survey in the Umbrella Mountains. Only two weeks later our second post-doctoral fellow, **Stephan Halloy** from the University of Tucuman in Argentina, arrived. He

has interests in the evolution of morphological adaptations of plants in alpine areas and will be working in the local ranges. **Brian Rance**, a recent graduate, is working alongside both post-doctorate fellows in the field.

(John) **Bastow Wilson** has newly returned from leave in Britain (Aberystwyth - his alma mater), where he has been picking holes in various cherished ecological theories such as niche limitation and island biogeography and supplementing data accumulated in New Zealand with that from Britain. Null models are in, one chundered for hours on the main-frame, and it is significant (most of the results from null models aren't or are in the wrong direction) that he now has access to both the main-frame and his own micro-computer from his own room. (Another interest in Britain is rumoured to have been campanological, but unrelated to *Campanula* spp.). **Gillian Rapson**, one of John's (sorry Bastow's) research students had just completed the requirements for the award of Ph.D. with the successful examination of her thesis on vegetative strategy in *Agrostis capillaris* (*A. tenuis* to most of us), while **Martin Sykes** is writing up his work on the ecology of native sand dunes. **Michael Heads** has finished most of his work on the taxonomy of *Drapetes* (or perhaps I should now say *Kelleria*), but his interests are unlimited and track over the whole of field of botany and biogeography.

Paula Jameson has achieved some notoriety recently by association with Maxicrop, MAF and "Fair-Go", but the same interests in plant growth substances have also taken her to recent conferences in Heidelberg and Rimini by way of the U.S.A. and Britain. Her investigation of plant growth substances in algal "fertiliser" supplements is being followed up by research student **Kevin Sanderson** and honours students **Tony Lough** and **Julia Priest**; while another honours student, **Michelle Curtis**, has been looking at the interaction of plant growth substances and carbohydrate in *Lemna*. **Barbara Horrell**, an M.Sc. student, is looking at juvenility in native plants and is using plant growth substances and tissue culture in her investigations.

Murray Brown is the most recent staff member, joining us in late 1983. He carried out his Ph.D. on metal tolerance in mycorrhizal birch at Birmingham, and an honours student, **Sharon Quinn**, has looked at zinc tolerance in various mycorrhizal fungi this year. He was, however, appointed because of his first love, for macroalgae, and since his arrival he has carried out research on desiccation tolerance and (with honours student **Allen Frazer**) frost resistance in littoral algae and examined seasonal growth in *Macrocystis*. **Anita Pillai** has recently commenced a Ph.D. study concerned with the physiology and ecology of *Gracilaria* with an ultimate aim of facilitating its mariculture.

As for myself, **Peter Bannister**, I work on physiological ecology when not weighed down with the responsibilities of Departmental Chairmanship. Recently I have been examining the frost, drought, heat resistance and water relations of a range of native plants. I am looking forward to a sabbatical in 1986, when I will spend six months in hiding in Dunedin and writing. Then I shall work with various physiological ecologists of renown, firstly spending three months with Prof. O.L. Lange in Würzburg (effects of acid rain - what else?), visiting Britain and returning via North America, spending some time at Stanford with Prof. Hal Mooney. My research students are all near finishing or finished. **Hazel Chapman** completed her study on heather in New Zealand almost a year ago and has

since been working on vegetation survey. **Bob Woodman** has been working on aluminium toxicity in pasture legumes and **Jake Keogh** has been investigating matagouri.

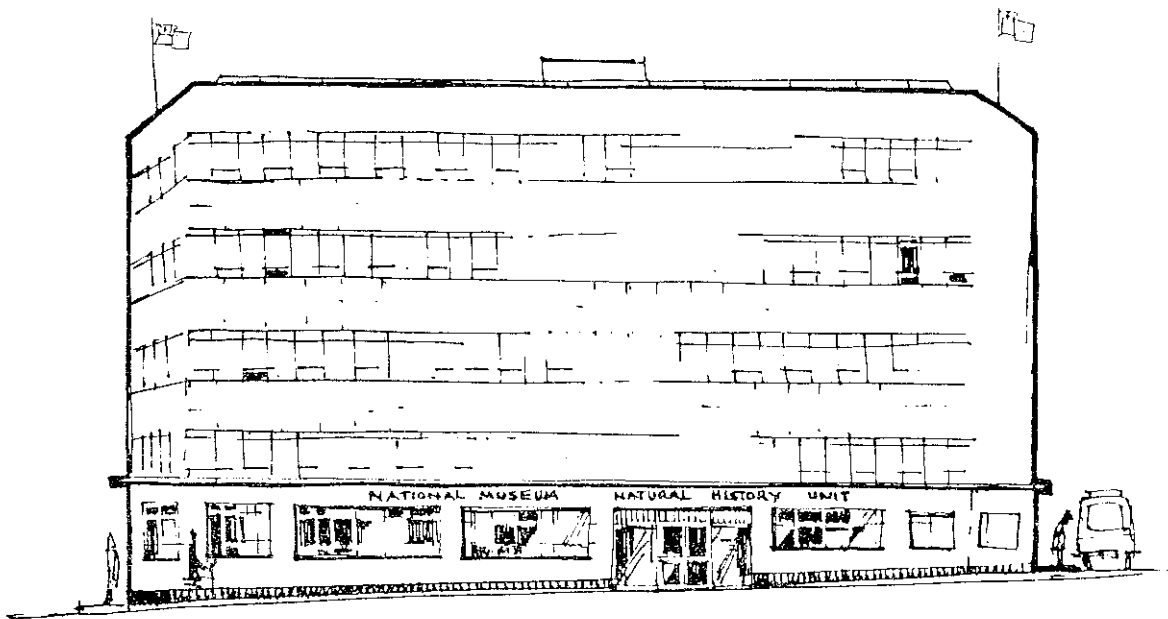
Our part-time lecturing staff give us connections with MAF and DSIR. **Ian Hall** (Invermay) is our honorary lecturer in mycology and **Michelle Sloane**, postgraduate diploma student, has looked at the effects of root-infecting fungi on the establishment of lucerne.

Peter Johnson (DSIR), who lectures in bryology, has just moved with his unit into new buildings on campus (next door to where the mythical new Botany building is supposed to be). He has been planting the site with native species with a fervour and flair that has been unmatched since the early days of the botany garden around the current Botany Department (which owes so much to the interest of **Geoff Baylis**. At DSIR, **Bill Lee** is newly returned from leave during which he has been investigating woody shrubs with Peter Grubb at Cambridge (U.K.) and **Ralph Allen** is back in full harness with his Ph.D. study on beech invasion in the Catlins being successfully examined earlier in the year.

I hope this convinces our colleagues further north that botanical activity in the Deep South is possible despite the frequent reversions to periglacial conditions (we work during them too!).

Peter Bannister, Department of Botany, University of Otago, P.O. Box 56,
Dunedin

Other Botanical Research Establishments



■ National Museum Natural History Unit, Wellington

As of 1 October 1985, the National Museum has occupied a building at 135 Taranaki Street, Wellington. This is the former "Croxley House" which until recently housed the Government Printer's Stationery Branch. The new premises are known as the National Museum's NATURAL HISTORY UNIT, and by early 1986 it will contain most of the Museum's natural history collections plus curatorial and research staff. The following sections will be housed in the NATURAL HISTORY UNIT:

Floor 4 - Reception; Department of Botany; Department of Crustacea.

Floor 3 - Department of Molluscs; Department of Fishes.

Floor 2 - Department of Birds; Departments of Echinoderms and Marine Mammals.

Floor 1 - Department of Birds; Staff Room.

Ground - Spirit Collection and Preparation Laboratories.

Entrance to the building is only by way of a passenger lift to 4th floor reception area. The telephone number is 846 019 (the National Museum's main building remains 859 609).

The new NATURAL HISTORY UNIT is a major step forward for the National Museum. For the first time in 50 years, the national collections will be housed in satisfactory conditions, with space to expand into. Working conditions for staff and visitors are of a high standard, and the museum is confident that it will now be able to conduct its business of looking after

and researching the collections with efficiency and pride. We look forward to seeing you there.

At 1 October, the museum's Departments of Crustacea and Molluscs were installed in the NATURAL HISTORY UNIT, to be closely followed by the Departments of Botany, Birds, Echinoderms and Marine Mammals. Department of Fishes will move to Taranaki Street in the New Year. Our entomologist colleagues will remain in the Buckle Street building. All correspondence should continue to be addressed to National Museum, Private Bag, Wellington.

Alan Baker, Acting Director, National Museum, Private Bag, Wellington

■ National Museum Herbarium (WELT)

Although 1985 has been a difficult year for the National Museum, devoted almost entirely to moving 6 of the 7 natural history departments into a new building, there are now good reasons for being more optimistic about its long-term development.

An interdepartmental Government committee has been established to consider the development of a "Pacific Cultural Centre" serving the needs of both the National Museum and National Art Gallery on a waterfront site. This committee will report to the Minister in December, and is expected to recommend the development of a complex of "national museums" over an extended period. One idea is to treat natural history, man, Maori art and other subjects in complementary buildings, but whether New Zealand has the resources to carry through such an ambitious project remains to be seen.

Meanwhile, because of an acute lack of space for collections in the existing National Museum, the Department of Internal Affairs has now leased for 15 years an additional building in Taranaki Street about 1/4 mile from the present Buckle Street site (p. 10). It comprises a 5-storey office block combining office accommodation and large open areas suitable for biological collections, together with an adjoining warehouse block which will be suitable for the Conservation Unit and for storing large technological and historical items. In all, some 6000 m² will eventually become available.

During the current year, work on refurbishing the office block has been proceeding and should be complete by early next year. More extensive re-strengthening work is required in the warehouse block before it will become available, perhaps towards the end of next year.

Six departments (Botany, Marine Mammals, Birds, Fish, Marine Invertebrates and Molluscs) will move into the office block. Botany, Birds and Molluscs are already moving and Botany is now operating effectively in its new quarters. The other departments will complete their moves as soon as refurbishing is carried out. Movement of collections and furnishings is being done by the Ministry of Works at weekends after packing by Museum staff during the week.

The Botany Department occupies most of the top floor of the office block and, although the amount of storage space for collections is not greatly increased, the amount of working space is significantly improved. We anticipate that visitors will be more comfortable, have more ready access

to the collections, and have a better view of the city! Peripheral collections (e.g. fossils, timber samples and other specialised collections) will have to be stored away from the main herbarium, but there should be adequate room for expansion of the principal collections over the next 15 years. What happens after that is a question nobody is prepared to answer at present.

Meanwhile, some research work continues to emanate from the Department. A comprehensive synonymic check-list of New Zealand pteridophytes will appear in the next issue of the *N.Z. Journal of Botany* (a joint publication with David Given and John Lovis), whilst Nancy Adams together with Cameron Hay, Wendy Nelson and Murray Parsons, is about to publish the third of a series of floristic lists of seaweeds covering the Kermadecs, Three Kings and Subantarctic Islands (*National Museum of New Zealand Miscellaneous Series Nos 10, 11 and 13*).

Patrick Brownsey, National Museum, Private Bag, Wellington

■ Botany Division Regional Station, DSIR, Nelson

This office was re-opened for the third time last year, with a staff of one. Ecologists, pedologists and geologists abound in the immediate vicinity though, and the town supports several "self-employed" botanists. The first field season will centre on a study on pakihi vegetation on the West Coast, staffed by Shannell Courtney of PNA fame, and David Glenny, with support from Lincoln Botany Division staff and myself. The aim is to understand the diversity of pakihi vegetation and to learn something of its dynamics, and as an aid to making recommendations for reserves and management.

Peter A. Williams, Botany Division Regional Station, DSIR, Private Bag, Nelson

■ Auckland Institute & Museum Herbarium (AK) 1984-1985

The past year has seen major improvements in the standard and amount of storage facilities and furnishings in the herbarium. Approximately two-thirds of the collection is now housed on mobile shelves; there is new lighting throughout the Botany Department; and a new workbench with modular storage cabinets beneath runs the entire length of the herbarium. The increased shelving has eased problems with overfull boxes, but allows no room for further expansion once the boxes have re-filled. The installation of a further and final bank of mobile shelving will be required to cope with this expansion in the future. The alterations required the shifting of the whole collection: it has now been returned to the shelves and the task of re-labelling some 4000 boxes is well underway.

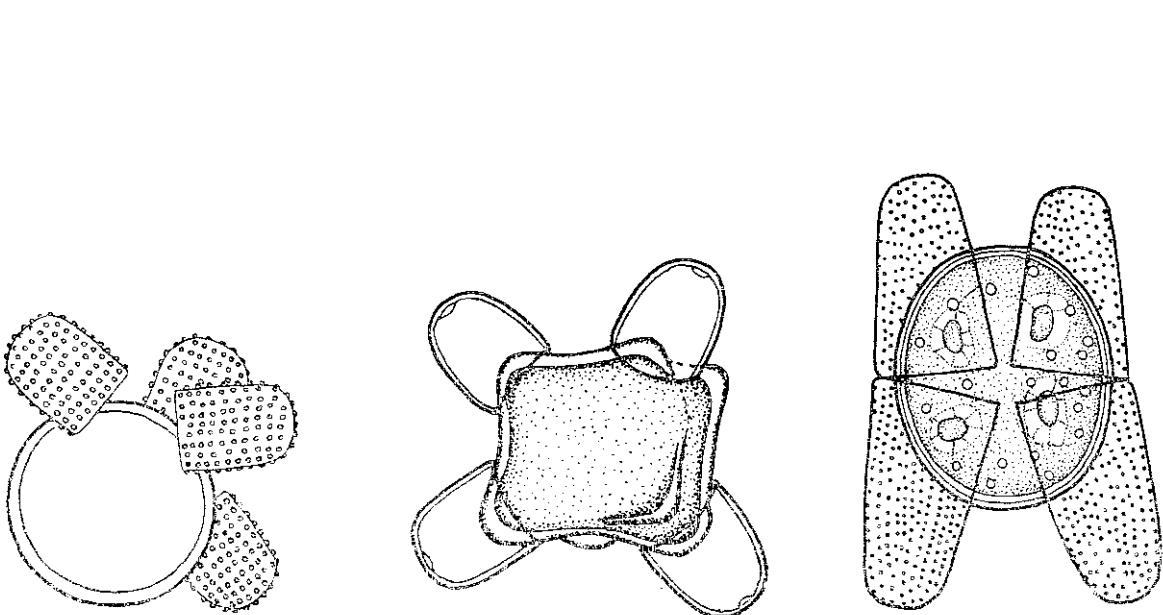
A new electronic typewriter (Canon AP550) with 15K internal memory and attached mini-floppy disk drive has been purchased, and is primarily used for label generation. The use of stored formats and repeated label

data have more than halved the time required for label production. The resulting labels are of a very high quality.

Curatorial work has been concentrated on the cryptogams. Mosses, liverworts, hornworts and lichens have been curated to a high standard, and use of these parts of the collection has increased markedly. A new wood store has been acquired, and detailed documentation of the large type collection has begun. It is intended that types will be housed in a purpose-built fire-proof cabinet, and publication of lists of presumptive type material will continue.

As at 31 March 1985, AK held 168 539 numbered herbarium sheets, an increase of 3475 on the previous year. Approximately 500 exchange specimens were received and sent out, well down on the year before levels of *c.*1500 specimens. Twenty-three loans were sent to 15 herbaria, with a marked increase in algal and lichen loans.

A.E. Wright, Curator of Botany, Auckland Institute & Museum, Private Bag, Auckland 1



NOTES & REPORTS

Current Research

■ Flora of New Zealand Desmids

The large group of freshwater unicellular green algae, the Desmids, is represented in New Zealand by about 30 genera (about 700 taxa). Desmids are widespread in New Zealand especially among water-logged mosses of mires; some are common in lakes, ponds and flowing water and others grow in moist rock and soils. Formerly their value was academic, now it is also economic, in that the presence or absence of species that are intolerant of changes in their environment give information about the quality of water in their habitat.

Three volumes in the series "Flora of New Zealand", will deal with Desmids and the first of these, describing 218 taxa in 14 genera, is now *in press* as page proof, and will be published in 1986 by the Government Printer. The authors of "Flora of New Zealand Desmids" are Dr Hannah Croasdale, Professor Emeritus of Dartmouth College, Hanover, Vermont, U.S.A., a world authority on Desmids, and Dr Elizabeth Flint, formerly of DSIR, who has specialised in the ecology of freshwater and soil algae.

With the exception of the monograph on the Characeae of New Zealand by R.D. Wood and R. Mason, published in the *New Zealand Journal of Botany* in 1975, this account of the Desmids is the first flora for any group of New Zealand freshwater algae and apparently is the first for the Desmids in the Southern Hemisphere. The manuscript for the second volume is almost complete and this volume will be submitted for publication in 1986. Dr Flint has visited Dartmouth College three times in the last three years to work with Dr Croasdale on the text of the Flora. The volumes of "Flora of New Zealand Desmids" will include keys for the identification of all taxa. Genera are arranged systematically but the arrangement of taxa within each genus is alphabetic. Synonyms are included. Each description is followed by a list of places where the taxon was found in New Zealand, its geographical distribution in other parts of the world, and some ecological comments. The introductory chapters include an annotated list of the places where the desmids were collected and tables with ecological data about some localities. There is a comprehensive bibliography in each volume.

A feature of the Flora is the large number of plates. There are one or more line drawings for each taxon, all prepared by Dr Hannah Croasdale. In addition each volume has a number of colour plates showing characteristic localities in which desmids are found in New Zealand.

Volume 1 covers the saccoderm desmids and some placoderm desmids e.g. *Closterium*. Other placoderm desmids are dealt with in Volumes 2 and 3. Volume 2 is mainly occupied by the large genus *Cosmarium* (227 taxa) and

Volume 3 deals with the planktonic forms e.g. *Staurastrum* and filamentous forms.

Elizabeth Edgar, Botany Division, DSIR, Private Bag, Christchurch,
for Dr Elizabeth A. Flint, Christchurch

■ Manawa - *Avicennia marina* var. *resinifera*

Species of *Avicennia*, like those of the mangrove genera in the Rhizophoraceae (*Bruguiera*, *Ceriops*, *Kandelia*, *Rhizophora*) are unusual in that germination of the embryo occurs whilst it is still attached to the parent tree. Although vivipary is often cited as an adaptation to the mangrove habitat, the other successful mangrove pioneer genus, *Sonneratia*, manages to establish itself with apparently normal seeds. Vivipary means, amongst other things, that there is no seed bank in the substratum to tide the population over a series of poor establishment seasons, and that seedling establishment commences immediately after the propagule is shed from the parent. Consequently the maintenance of a population is under greater stress from adverse conditions than a population producing seeds. over the past few years I have been looking at various aspects of the biology of *Avicennia*, including factors affecting population establishment.

Whilst tidal movement is a convenient vehicle for propagule dispersal to other sites, it can result in movement of the establishing propagule at a time when it needs to be stationary to put its roots down. Overall there is a correlation between establishment success and wave action. *Avicennia* is normally confined to sheltered areas, but even here establishment success varies from year to year. In years when severe tropical disturbances hit northern New Zealand in January to March (the time of seedling establishment) establishment has been poor. Interestingly, in experimental planting in the Manukau harbour seedlings exposed to wave action were broken off 3-5 cm above the mud surface rather than being uprooted.

I have measured the force necessary to move a propagule over the mud at various stages of establishment and find that this increases with time before it becomes anchored by the roots. This is because, under calm conditions which do not cause the propagule to move, the tide deposits a protective rim of mud around the propagule, making it relatively harder to move.

One other feature which has a bearing on establishment is the size of the propagule. In one experiment propagules were sorted into three size classes based on fresh weight. After six months 60% of the propagules in the largest class size (9-12 gm) remained, compared with 30% in the middle group (5-6 gm) and 20% in the smallest group (1.5-2.5 gm). After ten months the corresponding percentages were 60% (no change), 15% and 0%. There was also a direct relationship between propagule size and growth rate and performance, bearing out the old adage about a good big un.

The shed propagule size, even from a single tree, is very variable. Under normal conditions a propagule continues to grow on the tree until it splits

the propagule coat, when it falls off. Smaller propagules, with intact coats, may fall off the tree prematurely for various reasons (e.g. storms or physiological factors). It is therefore reasonable to assume that propagules shed with intact coats are premature, though this does not necessarily mean that they are not viable.

It seems likely that most of the variation in propagule size is due to physiological variability between branch systems. It is possible that mutations or periclinal chimaeras could account for some of the variation, but this would require an exceptionally high mutation rate to account for all the variability.

However, ploidy seems to play a part in variation between trees. Random collections of propagules in the Whangateau Harbour, near Leigh suggested a bimodal distribution of size. E.J. Beuzenberg of Botany Division counted the chromosomes in a number of seedlings from this population and found one from a large propagule to have $2n = 96$ (hexaploid) compared with $2n = 64 + 1$ or 2 (tetraploid) for the rest, and also for a west coast population from Hokianga Harbour. The only other counts in the genus were $2n = c. 66$ and 60 . The hexaploid seedling also grew faster and was more vigorous than the tetraploids, though too much reliance cannot be placed on the results from one seedling. The probable parent tree of the hexaploid seedling is also unusual in that it produces chlorophyll-less propagules which segregate as a recessive in a 3:1 Mendelian ratio.

Many *Avicennia* populations produce aerial roots, which can be simple or repeatedly branched, from their branches. However, branching appears to be truly dichotomous in these aerial roots - a very rare phenomenon in the Dicotyledons. Apparently dichotomously branched pneumatophores can be found in most populations - up to 3% in some populations. Although these are usually said to be the result of damage to the growing tips (e.g. by crabs), I am sure that some at least are natural dichotomies.

F.J. Taylor, University of Auckland Marine Laboratory, R.D., Leigh

■ *Nassella tussock* - *Stipa trichotoma*

Nassella tussock has the dubious honour of being the only plant for which a special Act of Parliament has been passed, in 1946, for its control and eradication. Subsequently this Act was replaced by the Noxious Plants Act of 1978.

Nassella tussock was accidentally introduced from Argentina around the turn of the century, probably in lucerne seed, to Marlborough and North Canterbury. It has since become a persistent weed of farmland of these regions, although there are sites throughout the country from Whangarei to Central Otago.

In the 1950s and 1960s *nassella tussock* reached such densities in the fields of North Canterbury that the stock carrying capacity of the land was severely reduced. This was due to: (1) the unpalatable nature of the foliage; (2) its ability to produce over 100 000 seeds per tussock per

annum which are dispersed mainly by the wind; and (3) the presence of a deep root system which enables it to grow in the dry areas. Today dense infestations are only a memory, although the potential for it to re-establish remains.

To the uninitiated nassella tussock can be hard to distinguish from other similar grasses. The two main distinguishing features are that the blades of nassella tussock are rough to the downward stroke and that it has a hairless, membranous ligule.

A research programme is currently being conducted by Botany Division of DSIR, funded by the Noxious Plants Council, to investigate: (1) the factors that control germination; (2) its phenology; and (3) factors controlling the emergence and establishment of nassella tussock.

So far the results obtained indicate that the seed has a short dormancy period (1-2 months) and can remain viable in the soil for a considerable period of time. The main season for germination in the field is in the spring, although germination can occur during autumn. Nassella tussock tends to become established in depleted pasture or bare areas. Once established it can quickly grow and dominate the area. Further research is concentrating on the effect of drought and competition on the establishment and growth of nassella tussock.

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New Plant Records

■ The distribution of some rare and uncommon vascular plants in the western Waikato - Part 1: Ferns

The western Waikato comprises the area where the Tainui Maori tribes first settled. This area, which starts from Port Waikato and ends at the mouth of the Mokau River, has a flora which has received little attention from botanists and field workers over the years. This series of articles is intended to make known some of the older (but unpublished) and some of the more recently discovered plant distribution patterns within the area. Voucher specimens for most of these records are held in the following herbaria: AK, CANU, CHR, WAI, WELT and the private herbarium of the Hamilton Junior Naturalists' Club at Te Kauri Lodge ('T.K.L'). Please note that not all specimens have as yet been incorporated by herbaria.

Ophioglossum pedunculatum

adder's tongue fern

This endangered species is known from three localities in the western Waikato, at one of which it hasn't been seen in recent years. In the Kawhia district, it is known from a colony of 15 or so plants growing in tall grass in rough pasture on Tiritirimatangi Peninsula (AK 170424). This colony was discovered in 1982 and has increased in size over the last 2 1/2 years. It is, however, in a very vulnerable position. The other recent record is from a single plant observed growing in swampy ground near Makaka Road, Aotea Harbour. Here the specimen was found growing in a dense clump of maru (*Sparganium subglobosum*). Despite searching, no other specimens were seen. The last locality is based on a collection made by M.C. Gudex (undated) recently discovered in a private herbarium. The specimen was mis-identified as *O. coriaceum*. This has been corrected and the specimen forwarded to CHR.

Ophioglossum coriaceum

adder's tongue fern

Although widespread throughout the southern North Island and South Island, this fern is rather rare in the western Waikato. At present, specimens are known from the summit of Mt Kakepuku Historic Reserve (WAI 4819) and a single individual was noted in Te Kauri Scenic Reserve, Kawhia. More recently it has been found in large numbers near Whatawhata by University of Waikato students. It is especially abundant on the ridges of Mt Pirongia (WAI 1569) where it is a common plant of open grassed areas.

Botrychium biforme

Known from Mt Pirongia (WAI 1565) where it is abundant. More recently it has been discovered in large numbers in the Awaroa Scenic Reserve (WAI 1255). It is also known from the Te Kauri Scenic Reserve ('T.K.L.') where it is rather local, and at Ruakuri Caves Reserve, Waitomo.

Hymenophyllum cupressiforme

Plants answering the description of this species were recently discovered on shaded cliffs and rocks along the Pirorua Stream in the Awaroa Scenic Reserve. Specimens have been forwarded to Professor J.D. Lovis for confirmation.

Cyclosorus interruptus

One of the more amazing finds was several plants of this fern (which normally inhabits geothermal areas) on a remote part of the west coast near Ruapuke. The plants were found in dense raupo swamp with *Gratiola sexdentata*. Although not growing on heated soil, the locality is on the Ruapuke Fault of Briggs (*N.Z. Journal of Geology and Geophysics* 26: 47-55, 1983) and is roughly in line with the extension of this fault which has caused the heated waters of Kawhia (AK 170317).

Asplenium lyallii

The distribution of this fern in the western Waikato was described by de Lange (*Rotorua Botanical Society Newsletter No. 2: 4-6, 1984*). Since publication of that article it has been found on the summit slopes of Mt Karioi (WELT P12213) and collected from near Port Waikato (specimen in WAI). It is also an infrequent component of karst vegetation around Te Akau - Waikaretu in Raglan County.

Asplenium obtusatum subsp. *northlandicum*

The only west coast locality for this fern given by Brownsey (*N.Z. Journal of Botany* 15: 39-86, 1977) was Karekare, West Auckland. Further south, it can be found in scattered colonies from Whale Bay to Taharoa, near Kawhia (specimen from latter locality sent to WELT). It is never an abundant fern on the western Waikato coastline, and is strictly confined to areas of rock exposed to salt-laden winds.

Asplenium trichomanes

Since the publication of de Lange (1984, *loc. cit.*) the distribution of this fern has been extended northwards to Port Waikato (WELT P12259) where two plants were seen on calcareous rocks. It has also been collected from Carter's Beach by J.K. Bartlett (pers. comm.) where several plants were found (Part 2: gymnosperms & monocots in next issue - editor).

Peter J. de Lange, 19 Cranwell Place, Hillcrest, Hamilton

■ Help from "amateur" eyes - *Gunnera hamiltonii* and *Nothofagus solandri*

Two snippets from my recent botanical investigations emphasize my debt to sharp-eyed local runholders in discovering interesting botanical details on wide-ranging vegetation surveys.

Several years ago I was in the middle of botanically exploring Stewart Island. As far as we know Stewart Island is the only place where a distinctive species of *Gunnera*, *G. hamiltonii*, survives in the wild, and as far as I knew then there was only one population there, some 100 m by 2 m in the Mason Bay dunes, all male, and probably all derived by vegetative spread from a single plant. My ears pricked up then when the Mason Bay runholder, Tim Te Aika, told me he had found another population while mustering. "If you can keep a secret I'll tell you where it is", he said. "Ah", I replied, "I doubt if I can keep it secret from my botanical colleagues". Tim smiled, and said nothing. Ngaire Te Aika smiled too and said "One day Hugh will come in with a huge grin on his face and then we'll know he's found it". But I never did.

Early next year the Te Aikas leave Mason Bay and the area will revert to Crown reserve. They promised to show me the second *Gunnera* colony if I could get to Mason Bay before they departed. Late in September my trusty compass led our party of three through the bush from Rakeahua Hut to the Island Hill homestead, and Tim and Ngairi led us off across the red tussock, dunes, and scrub. The second patch is indeed *Gunnera hamiltonii*, growing on an old sand ridge some 3 km inland, and now well vegetated with large red tussocks (*Chionochloa rubra*), and many species of lower stature such as *Pernettya macrostigma*, *Leucopogon fraseri*, *Blechnum penna-marina*, *Lycopodium fastigiatum*, *Acaena anserinifolia*, *Cotula traillii*, *Hypochoeris radicata*, *Coriaria sarmentosa*, etc. Presumably the *Gunnera* established when there was bare sand here, and its long term competitive ability against the matrix of other species is dubious to say the least. That it is also intermingled with another vigorous *Gunnera* of similar habit, *G. prorepens*, says a lot for Tim Te Aika's powers of observation. The patch was flowering heavily at the time of our visit - all male. A smaller patch some 30 m away had no flowers; this is being propagated at Lincoln just in case it is female. Female plants are in cultivation, originating from the now apparently extinct population at the Oreti river mouth in Southland.

The Te Aikas led us to a third patch in the dunes north of Duck Creek, near where *Euphorbia glauca* still thrives. This patch, now measuring about 3 square metres, results from 3 or 4 rosettes transplanted from the colony south of Duck Creek by Tim Te Aika, three or four years ago. *Lupinus arboreus* threatens the colonies on both sides of Duck Creek, but is not difficult to control.

Hope of an extant female population in the Mason Bay area is not dead yet! although the sharp-eyed Te Aikas have traversed the Mason Bay plains and dunes on foot over a period of 19 years and, wild and complex as the ground is, this tends to temper excessive optimism that more plants will be found.

The second snippet comes from my current forays on Banks Peninsula. While it is not hard to imagine that a ground-hugging *Gunnera* can stay concealed in the shaggy wilds of Stewart Island until recently, it is perhaps a bit more mind-boggling that trees can remain tucked away out of sight - or at least from the sight of botanists - on a place as modified, thrashed and bared as Banks Peninsula. During the second year of my Banks Peninsula survey a Le Bons Bay farmer, who called his farm "raukawa", led me to an ancient specimen of *Pseudopanax edgerleyi* which he had rescued from an entanglement of *Muehlenbeckia australis*. As far as I could find out, the species had never been recorded from the Peninsula, and I remained a bit sceptical, thinking that it could have been planted although nowhere near any existing building or sign of a vanished house. Later another farmer further up the valley led me into a wet bush gully, wondering if two wild trees in there were the same as the specimen down the hill. They were, and in my opinion clearly native there.

Two species of beech, red and mountain, have long been known on the Peninsula, although their presence there on a volcanic landscape which was an isolated island until some 5 000 years ago is something of a biogeographical puzzle; was there always land on this part of the Chatham Rise so that beech has had a continuous presence here since the breakup of Gondwanaland, even though the Akaroa and Lyttelton volcanoes are thought to be no older than 12 million years? Or did they establish unusually across

water from the South Island? Botanical literature records them only in the south-east corner of Banks Peninsula to the east of Akaroa Harbour and there seemed little doubt that this was their distribution in pre-European and pre-Polynesian forested times; upland forest elsewhere on the Peninsula was dominated by thin-bark totara. Most of the stands which remain are *Nothofagus fusca*. *N. solandri* var. *cliffortioides* occurs as scattered trees or as smaller stands on rockier ground with thin soils. Hybrids occur between the two.

I had not suspected the presence of naturally-occurring beech west of Akaroa Harbour until, while showing an interested landowner at Wainui where we had located a fine stand of umbrella fern (*Sticherus cunninghamii* - very rare on Banks Peninsula) - he casually asked if we knew about the beech in the next gully. Donald Gunn then led us there - to a fine stand of at least 40 trees, all *Nothofagus solandri* var. *cliffortioides*, and all, or at least those old enough to know how, bursting with red-tipped flower buds. There are young trees there, but others give the appearance of great age. Exploring the whole valley later in the week, I was tussling up a steepish pitch under the beeches and found my arms encircling a *Cordyline indivisa*, albeit a very sick one. Drought, or opossums? *Cordyline indivisa* is not common on Banks Peninsula, but in places it grows well still, against all the odds of summer drought, browsing, and the remnant nature of the upland forest patches. How this and other species will survive the increasing use and naturalisation of goats on this worried land, is a consideration full of anxiety and doubt.

Hugh D. Wilson, 160 Salisbury Street, Christchurch 1

■ North Hokianga coastline

Reading Peter de Lange's account of *Asplenium obtusatum* subsp. *northlandicum* on the western Waikato coastline (p. 19) brought to mind an earlier west coast record of this fern from much further north. In November 1979 I found a substantial population growing in crevices of volcanic rock outcrops above the beach at Moerewa Point, some 3.5 km north of Mitimiti on the coastline between the mouths of the Whangape and Hokianga Harbours (personal herbarium No. 1569 and AK 166402).

This stretch of coastline provided a number of other notable records. *Euphorbia glauca* grows on coastal talus slopes approximately 2 km north of Mitimiti (AK 143754). A small colony of one of our lesser known Scrophs, the endangered *Mazus pumilio*, was also found in 1979 amongst closely grazed kikuyu sward on a small coastal flat near the *Asplenium obtusatum* locality. When the site was revisited in March 1984, it had decreased in size considerably - a few plants scattered through c. 2 m² of turf (AK 143684, 166401).

More recently, Peter Bellingham, has found *Blechnum banksii* growing in a seepage point on steep coastal banks at the Ahoroa Rocks, immediately north of Moerewa Point (AK 168575). There are much earlier northern west coast collections of this fern in AK, made by T.F. Cheeseman (Waihi, 20 miles north of Ahipara, 1896), H.B. Matthews & H. Carse (near Herekino Heads,

1912), and J.P. Church (Maunganui Bluff, 1931).

Anthony Wright, Auckland Institute & Museum, Private Bag, Auckland 1

■ *Osmunda regalis* in the Karangahake Gorge

While working on a checklist of the native plants of the Karangahake Gorge near Waihi, on 24 October 1985, I was searching along the eastern bank of the river close to the water, and while climbing along the steep rock faces at river level, was surprised to come across several small plants of *Osmunda regalis* growing in rock crevices just above low water level. A little further downstream in a small boggy area where a small stream meets the main river, there were three or four larger plants, one of them fertile. Again in crevices of a rock face a few yards downstream, were a number of small plants just above water level, rather a different habitat from the swamps where this plant is usually found. Other interesting records from this stretch of river bank were a very large patch of *Hymenophyllum cupressiforme*, covering rock faces on the river bank; also a small patch of *Sticherus flabellatus*, possibly one of the most southerly records for the northern population of this species, and a small patch of *Adiantum aethiopicum*, usually a coastal plant on the Coromandel Peninsula.

J. Smith Dodsworth, P.O. Box 26, Coromandel

Phenology

■ Karaka (*Corynocarpus laevigatus*)

The botany texts describe the flower arrangement in karaka as occurring in terminal panicles. Yet cultivated karaka trees around Auckland have many smaller axillary panicles appearing from the old stems below the leaves as well as an abundance of larger terminal panicles. Frequently these panicles are as much as 25 cm below the leaves where the stem is up to about 1 cm thick (voucher specimen AKU 18942).

Ewen K. Cameron, Department of Botany, University of Auckland, Private Bag, Auckland 1

■ Monoecism In *Prumnopitys*

In response to Ewen Cameron's report of a monoecious miro (*Prumnopitys ferruginea*) in Waihaha forest (*N.Z. Botanical Society Newsletter No. 1:11*, 1985), I have recently inspected a total of 38 *Prumnopitys* trees felled near Horopito in Tongariro National Park for the main trunk railway deviation (NZMS 1, Sheet N 121:877557, c. 700 m a.s.l.).

The sex ratios found were:

	♀	♂	Monoecious	Total
Miro	15	8	2	25
Matai (<i>P. taxifolia</i>)	8	3	2	13

On the monoecious trees, ovules and male cones were usually segregated on different branches, and the female branches were generally lower down in the crown than the male branches. But one of the two monoecious matai had one mixed branch, with both male and female branchlets. This shows the need for thorough inspection when sexing *Prumnopitys* trees.

Tony Beveridge has earlier made brief reference to monoecism in miro (Beveridge A.E.: Regeneration of podocarp forests and maintenance of productivity. In Thompson K. *et al.* eds "Lowland Forests in New Zealand", University of Waikato, 1983, see appendix).

Ewen Cameron reports that Peter Bellingham has also found monoecious specimens of miro (and more rarely matai) in Puketi Forest, Northland.

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Projects

■ The management of two urban native forest remnants

Barton's Bush (c. 6 hectares) and Domain Bush (c. 2.5 hectares) are native forest remnants situated adjacent to the Hutt River on the valley floor in Upper Hutt. These forest remnants were acquired in 1950 as Public Reserves and together with the surrounding park land they form the Trentham Memorial Park. Prior to that time both forest remnants were subjected to logging activity. Over one hundred totara trees were extracted from Barton's Bush about 46 years ago - the remnant today is a heavily modified tawa forest as a result of this. Domain Bush, a tawa - kahikatea forest, is less severely modified presumably because the density of desirable podocarps was low in comparison to that for Barton's Bush.

Since 1950 the forest structure and health have deteriorated in the wake of the earlier logging activity. the major causes of this were:

1. Uncontrolled public usage.
2. Infestation by exotic weeds, particularly by old man's beard and wandering jew.
3. The lack of adequate natural regeneration throughout both forest remnants, especially in large canopy gaps and around the periphery.

4. The presence of large numbers of opossums and rabbits.

The Upper Hutt City Council was appointed to control and manage Trentham Memorial Park in 1978. A major objective in the Management Plan completed in 1980 pertaining to the two forest remnants is "To rehabilitate and preserve the two areas of remnant forest for their scenic, historical and biological significance". Active management of the forest remnants began about four and a half years ago.

So far, all of the "problems" with the forest remnants have been tackled. Proper fencing and tracking to control use by the public has been completed. The control and eradication of exotic weeds has been periodically worked at. Manual control of wandering jew has proven ineffective. A systematic spray programme using 'Roundup' has been carried out by Noxious Plants Authority personnel on this species, the results of which are being monitored. Old man's beard will be systematically removed by manual means, which although labour intensive is perhaps the safest and most effective means of eradicating this species. Some 27 000 seedlings of endemic shrub and tree species have been planted throughout the two forest remnants. It will be several years yet before these plantings become properly established, especially where shelter from both the wind and sun are required in the large canopy gaps and around the periphery. In the meantime these plantings will be manually maintained and further areas prepared for future planting. Seventy opossums were trapped in the forest remnants late last year and eight trapped in 14 trap-nights recently, suggesting there is still a large population of opossums present. The trapping of these is about to resume using Timms Kill Traps. No means of rabbit control has been decided upon.

As well as the actual work involved in rehabilitating the forest remnants a grid system dividing the bush areas up into 30 m x 30 m quadrats was set up four and a half years ago to enable the assessment of areas for urgency of attention and to monitor work completed. A survey for these means will shortly be undertaken.

There is also a campaign designed to create favourable public awareness of the forest remnants both through local schools as well as through community clubs and societies. As far as I am aware there is only one other piece of remnant forest in comparable habitat in an urban area in New Zealand - Riccarton Bush in Christchurch. Being so rare it is very important that the forest remnants be preserved in as near natural state as possible for the future generations to enjoy. Any comments on the management, both objectives and practices, would be most welcome.

Colin Macdonald, Parks and Reserves Department, Upper Hutt City Council,
Private Bag, Upper Hutt

■ **Rebirth of an Alpine Garden - Tongariro National Park**

During the early 1960s a mammoth effort was made to create an easily accessible Alpine Garden within the Whakapapa Village. Unfortunately the garden became run down over the years.

Last summer, a group of enthusiastic Park staff began shovelling, blasting, constructing and barrowing shingle to create a track. The area now boasts 330 m of brown asphalt track at a grade suitable for wheelchairs which winds through an open area and raised alpine beds. A metalled side track leading down to the Whakapapanui Stream passes through the mountain beech forest.

The walk has two objectives: (i) As an easily accessible "botanical" area for general interest educational groups and (ii) as an area where visitors, including family groups, the elderly or disabled may enjoy open spaces and forest and have access to the stream.

Old planted beds are either being upgraded into taxonomic areas where individual plants are identified or as community areas representative of tussocklands, shrublands, herbfield, the bush edge, beech forest and gravel-fields. On-site information interpreting these beds and the forest section is prepared with a "natural history" emphasis that will help explain natural communities and processes. For those interested in botanical details the common, scientific and Maori names will be included along with a line drawing of flowers and fruit.

The tracking system offers walks up to 600 m and is suitable all year round. Any further questions or suggestions for the garden area would be welcome at the Park Headquarters.

Neville Jones, Ranger, Tongariro National Park, Mt Ruapehu

■ Index Botanicorum Novae Zelandiae

The aim of this project is to assemble data relating to New Zealand botanists from all available sources and including photographs. overseas botanists who have an association with New Zealand are also included. It is hoped the Index will eventually include the complete publication records of most contemporary New Zealand botanists and I do hope botanists themselves will submit lists of their publications: all published items irrespective of the size or apparent significance. The term botanist is interpreted in the widest sense and includes amateur as well as professional botanists.

The immediate basis of the Index was a collection of biographical items and newspaper clippings relating to New Zealand botany and botanists which I had retained over some 15 years. Added to this was material given to me by my Botany Division colleagues at the time of their retirement. Greatly supplementing these items was a large collection of old newspaper clippings etc. left with me by Dr Lucy Moore at the time of her retirement, and including the H.H. Allan botany scrapbooks (see *BD Newsletter* No. 47: 12-13, 1979; No. 72: 6-7, 1981). To bring some order to this potentially valuable resource I decided to establish the Index as a repository for items relating to botanists and our botanical heritage.

The object of the Index is to complement the resources of the Library and Herbarium at Botany Division. It is based to some extent on a proposal put forward by the late Franz Verdoorn for a world index (*Chronica Botanica* 8: 427-448, 1944) though the New Zealand Index will contain a component of

archival material. The arrangement of the Index is simple - information about botanists is retained in alphabetical order in folded Conqueror quarto paper in foolscap box-files. This is a continuing long-term project and it is hoped that botanists of all persuasion will donate archival material which otherwise may be lost. It is anticipated that it will be a number of years before the resources of the Index are substantial. *The immediate requirement is the complete publication records of contemporary New Zealand botanists.* Important accessions are noted in the *Botany Division Newsletter*; the complete record of accessions of publication lists up to the end of October 1985 is as follows (the date of accession is indicated in parenthesis): E.O. Campbell (17/11/83); J. Child, compiled by J.E.S. Parker (13/2/85); H.E. Connor (13/6/84); U.V. Cooper (2/6/83); J.W. Dawson (9/3/84); D.R. Given (31/7/85); E.J. Godley (17/10/85); E.D. Hatch (29/10/85); F.B. Sampson (5/3/84); A.D. Thomson (25/7/85); C.J. Webb (5/11/84). In addition, I have compiled bibliographies of the publications of A.J. Healy (18/5/81) and L.B. Moore (13/7/85).

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■ **Field Guide to the Threatened Plants of New Zealand**

In anticipation of a revision of the Native Plants Protection Act (1934) which will afford greater protection to threatened native plants, Cathy Brown and David Given of Botany Division DSIR have brought together text, photographs and drawings for an identification guide to native plants of New Zealand in the highest categories of risk. The project, which began twelve months ago and is now almost completed, was funded by a grant from the New Zealand Lottery Board.

It is hoped that the booklet, by assisting the public to identify rare New Zealand plants, will not only make the proposed legislation more effective, but also lead to the discovery of new populations - especially those in imminent danger of extinction. Increased public awareness and appreciation for our rare native plants may also result in wider garden cultivation of the species concerned and foster greater public support for the conservation of New Zealand's flora.

The Guide deals with plants in the Presumed Extinct, Endangered and Vulnerable categories of threat and features a total of 101 species from the North, South and Stewart Islands and their offshore islands, and also from the Kermadec Islands, Three Kings Islands, Chatham Islands, Solander Islands, and Snares Islands. Most of the information presented in the text is based on information in the threatened species database at Botany Division, supplemented and updated by comments received from regional botanists throughout New Zealand.

The format has not been finalised as yet, but a 1-2 page spread is envisaged for each species. This will include a full colour photograph and a brief description of the plant followed by notes on its distribution, habitat, and conservation. Notes on the distribution of each species will be supplemented by a small distribution map, but neither the text nor the map identifies specific site locations. The conservation section provides an estimate, where possible, of the species' relative abundance in the wild, identifies threats to the survival of the remaining populations, and notes measures already taken to preserve the sites where these

populations occur. This section also comments briefly on the relative abundance of the species in cultivation and indicates whether it has proved easy or difficult to grow.

The Guide to the Threatened Plants of New Zealand will be published by the DSIR's Science Information Publishing Centre at a moderately low cost and should be of interest to farmers, gardeners, tourists, rangers, land development agencies, schools and natural history enthusiasts.

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■ Conservation, information, communication: the Ecological Regions and Districts project at the New Zealand Biological Resources Centre

Origins of the project

The need for an ecological subdivision of New Zealand was recognised at the 1979 workshop at the Commission for the Environment which led to the establishment of the Biological Resources Centre. Within a few weeks of the Centre being set up, the manager participated in a workshop on ecological regions convened by the National Parks and Reserves Authority. The BRC was asked to coordinate the project.

Dr Philip Simpson was seconded to the BRC from the Commission for the Environment in 1982 to undertake Stage I of the project: the compilation of a provisional national set of Ecological Regions and Districts.

This resulted in a provisional system of 235 Districts within 82 Regions. Following the circulation of the provisional maps and an accompanying document (Simpson, P. "Ecological Regions and Districts of New Zealand", Biological Resources Centre Publication 1, Wellington, 1982) a series of meetings was held in regional centres to discuss and modify the system.

The original aim of this system was to provide a framework on which to organise biological and other information and to assess shortcomings in the national system of representative reserves of natural areas.

In the early days of plant ecology in New Zealand Leonard Cockayne subdivided the country into what he called "Botanical Provinces and Districts" and used these districts when stating plant distributions in preference to the "quite unnatural" political provincial districts of the time (Simpson, loc. cit.).

More recently a concept of "ecological regions and districts" was introduced by Mr John Nicholls of the Forest Research Institute, Rotorua. In the late 1970s the large region of North Westland was divided into a number of ecological districts to provide a basis for the Scientific Co-ordinating Committee in their selection of forest reserves (ecological areas). These districts were defined on the basis of a number of different ecological criteria which included significant differences in topography, geology, climate, soils and vegetation patterns. For different districts different criteria were more significant, e.g. in one district the geology might be the main criterion and the district boundaries would follow

changes in parent material, whereas another district might be defined on vegetational criteria and one or more of its boundaries would follow a change in forest type.

Thus the districts were named "ecological" rather than simply "botanical" or "biological" because they were defined on several different criteria, all of which relate in some way to the ecology of the district. However the criteria for a district often include the vegetation and sometimes the flora is mentioned as a minor criterion, for example where there is a lot of endemism. This was the basis for the subsequent division of the remainder of New Zealand into ecological regions and districts.

An "ecological region" is a single, very distinctive ecological district, or more commonly, a group of adjacent ecological districts which have diverse but closely related ecological components and relationships.

Ecological District boundaries

The definition of Ecological Districts is an ongoing process. Following modification of the first edition provisional maps, a second edition, this time in the form of a map overlay, was produced and distributed widely.

At present the BRC is working towards publication of the third edition of maps and further boundary modifications will be included. The BRC is not responsible for these boundary changes on its own. Dr Ian Atkinson assisted by Mr John Nicholls are responsible for deciding on boundary changes in the North Island while Dr Brian Molloy and Dr Peter Johnson cover the South Island. All are plant ecologists, John Nicholls with the Forest Research Institute and the others with Botany Division.

Most of the changes to be made between the second and third edition maps are relatively minor improvements to the existing lines rather than major alterations. It should always be remembered, however, that the lines drawn on the maps are not meant to represent distinct cutoff points on the ground. Nature does not work that way. Rather they represent zones of change: in some cases quite narrow zones; in other cases rather wide. The main reason for mapping the boundaries as lines is for purposes of management and planning.

The wider functions of Ecological Districts

While the Ecological Regions and District project began as a framework for a system of representative reserves, and this is still its primary function, it has evolved into something much wider than that. The concept has captured the imagination of a considerably wider spectrum of the New Zealand public than scientists and conservationists. Local body planners and others are readily adopting the system as one way of describing the natural identity areas of their part of the country.

The Ecological Districts of a particular area of New Zealand provide a local framework on which to describe such things as the landscape features, historical values and general character of that area. People develop a sense of place in relation to the ecological character of the area in which they live. By delineating the major changes in the landscape of New Zealand this subdivision should be useful in environmental planning, both locally and regionally.

Biological information

My job at the BRC over the last two years has been to compile a map series with an extended legend including ecological descriptions of the 269 Ecological Districts. In order to do this I have requested information from a large number of scientists from different parts of the country and covering several disciplines including plant ecology, botany, geology, soil science and zoology. Already I have had many requests for the descriptions from all sorts of people who are interested in any available information about particular Ecological Districts.

The descriptions cover topography, geology, climate, soil, vegetation and modifications caused by man or introduced animals or plants. They vary a little in content from one district to another because I do not have access to the same level of information about each district. The quality of the ecological description depends very much on the quality of the information provided by the scientists. My role and that of the BRC, is to gather, collate and disseminate ecological information: channelling it from the scientists to the people who need the information in order to make wise land use decisions. This is why I have adopted as my catch phrase "conservation, information, communication".

Mary McEwen, Biological Resources Centre, DSIR Head Office, Private Bag,
Wellington

MINI-PAPER

Exploiting hybrid cypresses for shelter

J.W. Sturrock, Crop Research Division, DSIR, Lincoln

In a search for shelter tree species with improved attributes, the Crop Research Division (CRD) of the DSIR has been evaluating several hybrid cypresses, including some specially imported from the U.K. Table 2 gives details of the hybrids and their parentage.

These hybrids arose naturally, except for clone 850/329 which may be the result of a deliberate cross but whose precise identity is still uncertain.

Leyland cypress is noteworthy in being a bigeneric hybrid between species very different in morphology and ecology. Its parentage was not established until 1925 when specimens were brought to the attention of Jackson and Dallimore of Kew, who published a botanical description in the *Kew Bulletin* of 1926 (No. 3: 113-115). Four of the more distinctive clones were given cultivar names by Ovens, Blight and Mitchell only in 1964 (*Quarterly Journal of Forestry* 58: 8-19) and whose paper also unravels the origins of all the various clones.

Alice Holt cypress originated much more recently (Table 1) at Leighton Hall, Wales (where the 1888 and 1911 Leyland hybridisations also occurred) when two seedlings from a sowing of *Cupressus glabra* seed were found to be atypical, one of which has subsequently been propagated. Oven's cypress arose in 1961 from a sowing of seed from a good specimen of *C. lusitanica* growing among trees of Nootka cypress in the Westonbirt Arboretum in Gloucestershire. Both these hybrids were described in 1970 by Mitchell (*Journal Royal Horticultural Society* 95: 453-454).

Although the earlier Leyland hybrids have existed for a considerable period and from time to time been propagated and used as specimen trees in estates and arboreta around Britain, interest in Leyland cypress for more utilitarian purposes is a comparatively recent development. With Oven's and Alice Holt cypress, scientific trials commenced independently in the U.K. and N.Z. only a few years ago.

The N.Z. trials are being conducted in collaboration with the Farm Forestry Association. The longest running Leyland cypress trials are on sites from Northland to Southland, all with cv. 'Leighton Green' and some with cv. 'Naylors Blue'. A more recent trial includes six clones of Leyland and two other hybrids (Table 1) propagated from cuttings raised at CRD.

Table 1 - Details of hybrid *Cypress* species and their clones in CRD evaluation trials

Species	Cultivar or common name	Year of origin	Clone number	Year in which trials commenced
x <i>Cupressocyparis leylandii</i> *	'Green Spire'	1888	1	1983
	'Haggerston Grey'	"	2	"
	'Naylor's Blue'	1911	10	1973, 1983
	'Leighton Green'	"	11	1973, 1974, 1983
	Stapehill 20	1940	20	1983
	Stapehill 21	"	21	"
x <i>Cupressocyparis ovensii</i>	Oven's cypress	1961		1983
x <i>Cupressocyparis notabilis</i>	Alice Holt cypress	1956		1983
x <i>Cupressocyparis</i> <u> </u> ?		1948?	850/329	1973
Parentage				
x <i>Cupressocyparis leylandii</i> : <i>Chamaecyparis nootkatensis</i> ♀ x <i>Cupressus macrocarpa</i> ♂ (Clones 1-6) <i>Cupressus macrocarpa</i> ♀ x <i>Chamaecyparis nootkatensis</i> ♂ (Clones 10,11; Stapehill 20, 21)				
x <i>Cupressocyparis ovensii</i> : <i>Cupressus lusitanica</i> ♀ x <i>Chamaecyparis nootkatensis</i> ♂				
x <i>Cupressocyparis notabilis</i> : <i>Cupressus glabra</i> ♀ x <i>Chamaecyparis nootkatensis</i> ♂				
x <i>Cupressocyparis</i> <u> </u> ?: <i>Cupressus glabra</i> or <i>C. arizonica</i> x <i>Chamaecyparis nootkatensis</i> (clone 850/329)				

* In addition, demonstration plots of clone 3 and the cultivars 'Castlewellan', 'Robinson's Gold' and 'Silver Dust' are maintained. Clones 4, 5 and 6 and cv. 'Rostrevor' are in quarantine and will be propagated for eventual evaluation.

Leyland cypress inherits its vigour from macrocarpa and its hardiness from Nootka cypress. It exhibits fast, uniform growth with height gains exceeding 1 m annually in its first years on favourable sites and comparable with *Pinus radiata*. However, because it has also inherited a wide range of environmental tolerances, in many situations it is more suitable than radiata pine.

Leyland cypress succeeds on a very wide range of soils, including those of low fertility and unsuitable for many other tree species. Climatically Leyland exhibits exceptional tolerance of both drought and flooding, as sites in Gisborne and Southland have proved. The tree generally withstands salt winds better than macrocarpa, with 'Naylor's Blue' probably the best clone for coastal planting on account of its more glaucous foliage. Leyland also tolerates cold sites and is very frost-resistant as shown particularly at the frost-prone Tara Hills Station. The 'Leighton Green' clone has performed well at altitudes up to 600 m (the highest of current sites) and a further advantage for use in hill country is that the species is non-invasive being virtually incapable of producing viable seed.

On more favourable sites growth can continue all year. Unlike macrocarpa cypress, Leyland does not steadily defoliate at the base and even mature trees (in Britain) are well furnished to the ground. These attributes pertain even in quite shaded situations.

Leyland is not immune to cypress canker (*Rhynchosphaeria cupressi*), but natural levels of infection are lower than in macrocarpa. It frequently outgrows the disease but it should not be planted in districts where canker is endemic. Susceptibility to soil-borne fungi that cause white crown canker preclude its use in the Bay of Plenty region. Otherwise Leyland is very healthy and suitable for many localities.

For use in shelterbelts the tree requires management in order to reduce its dense habit either by pruning or by interplanting with more open-structured tree species. The habit tends to be more spreading in N.Z. than in England where the tree assumes an elegantly columnar shape leading to frequent use as a garden ornamental. However, within any genetically uniform clone, tree shape is strongly influenced by the growing site.

The Royal Horticultural Society in England gave the tree the Award of Garden Merit in 1969. Gardens overseas often use Leyland cypress for hedging because of its fast growth and tolerance of cutting. Hedges can be adjusted to almost any width and height.

In spite of fast growth, the wood is moderately dense with good working properties giving Leyland potential for commercial timber production.

Although experience with Owen's cypress and Alice Holt cypress is more limited, trials so far suggest that they establish quickly and will eventually produce adult trees of attractive form, well suited to cold regions subject to winter snow. Both species appear suited to inland sites with x *C. notabilis* tolerant of droughty sites because of its *C. glabra* parent. Neither species is likely to succeed in exposed coastal areas because of damage from salt winds which adversely affect the *C. lucitanica* and *C. glabra* parents of the respective hybrids. *C. lusitanica* is not too tolerant of very exposed conditions, so this may further limit the range of

sites best suited to x *C. ovensii*.

The mystery clone 850/329 was thought at one time to be a *C. arizonica* x *C. torulosa* cross of Australian origin, but morphological examination and chemical tests have virtually eliminated *C. torulosa* as a parent, and it appears very likely to be a *C. arizonica* (or *C. glabra*) x *Chamaecyparis nootkatensis* cross, in which case it may be similar to x *C. notabilis*. Further tests will be made to confirm its parentage. This clone has performed well in trials on inland sites of the South Island, showing moderate vigour, tolerance to drought, and generally excellent form.

To conclude, increasing recognition of the vigour and adaptability of Leyland cypress is greatly increasing its popularity and ensuring it a place for shelter in many districts, including sites less suitable for radiata and other tree species. Clone 850/329 and the more recently introduced hybrids appear promising for inland sites and moderately elevated hill sites away from the coast, and some of them will also make admirable specimen trees for gardens and parks.

ANNOUNCEMENTS

■ Subscription to *N.Z. Journal of Botany*

The N.Z. Botanical Society is recognised by the DSIR's Science Information Publishing Centre as a subscription agent for the concession subscription rate to the *N.Z. Journal of Botany*. The SIPC will take any number of subscriptions from the N.Z. Botanical Society. The 1986 subscription rate is \$50.00 and the concession rate \$22.50 plus \$2.00 for postage. Aside from collecting subscriptions and providing the names and address of subscribers, there is no other commitment required from the Society - SIPC distribute the journals to the individual subscribers. Anthony Wright has generously agreed to collect the subscriptions and botanists are urged to take advantage of the discount by sending \$24.50 to Anthony.

A.D. Thomson, Botany Division, DSIR, Private Bag, Christchurch

■ Royal New Zealand Institute of Horticulture Annual Journal 1985

The 1985 edition of the R.N.Z.I.H. Annual Journal will shortly be published. For the first time the Journal will be available to non-members of the Institute for \$8.00 (postage included).

The Journal is packed full of articles on horticulture, botany and the related sciences. This year's Journal sees the addition of a Garden History section.

Articles include:

Botanical Illustration in New Zealand. The Kew Connection

by

N. Adams, National Museum, Wellington

The Revegetation of Tiritiri Matangi Island

by

N.D. Mitchell, Department of Botany, University of Auckland

Trees and the Urban Landscape

by

M.A. Robinson, Department of Horticulture, Landscape and Parks,
Lincoln College***Trends in the Nursery Industry***

by

J. Amos, ex Horticultural Advisory Officer, Auckland

Some Garden History Impressions

by

J. Adam, Assistant Grounds Supervisor, University of Auckland

This is only a small sample of the Journal's content. Orders of 10 or more copies qualify for 10% discount. To order your copy, send a cheque for \$8.00 to:

Mr D.B. Cameron, National Secretary, R.N.Z.I.H., P.O. Box 12, Lincoln College,
Canterbury

DESIDERATA

■ **Distribution of *Ixerba brexioides* (tawari): information wanted**

Tawari, considered by some to be the most attractive of New Zealand's native trees, is a component of many lowland and montane forests north of latitude 39°S. It is most abundant in forest types such as the "cloud forests" capping and volcanic cones Maungatautari and Pirongia in the Waikato, the Kaimai and Mamaku Ranges; and the mid-altitude, sedimentary ridge crest forests of the Motu and Pukeamaru Ecological Districts.

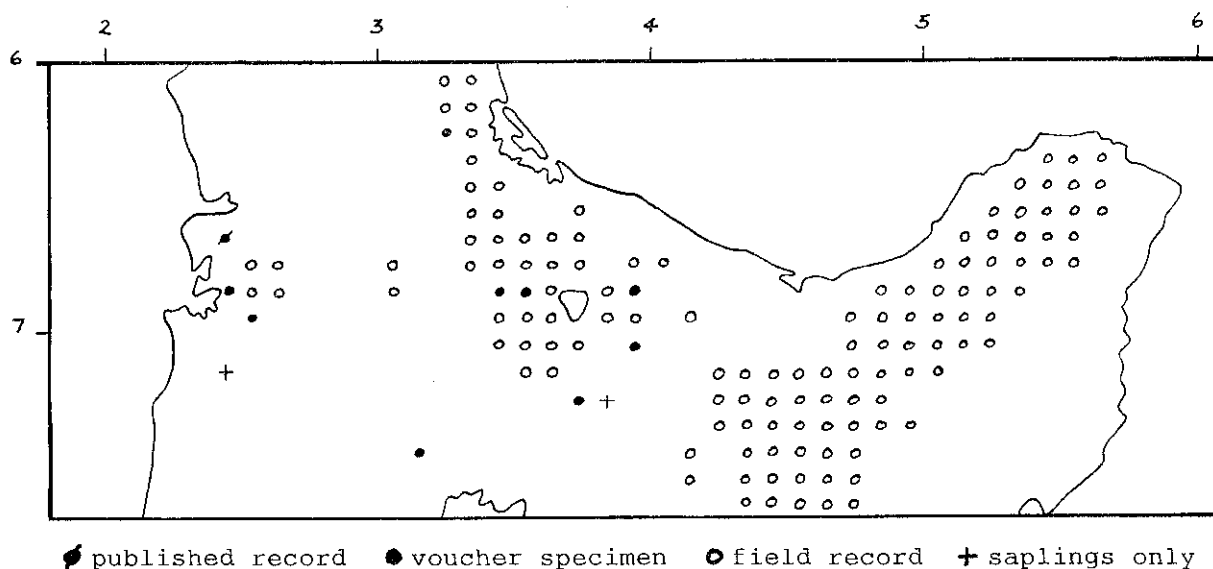
As tawari will soon be flowering (whakou), and will therefore naturally be a focus of attention on forthcoming botanical field trips, this seems an opportune time to ask for information on its distribution. To date records have been compiled for the middle North Island mainly from Field observations and specimens lodged at FRI (see map below). These data show that tawari skirts the region of relatively thick Taupo pumice deposits; avoidance of deep pumice soils is a feature of tawari distribution in the Rotorua district already noted by Nicholls (Vulcanicity and indigenous vegetation in the Rotorua District, *Proceedings of the N.Z. Ecological*

Society No. 10: 58-65, 1963). However tawari does not extend as far south on the west coast of the North Island as might have been expected and there is an only recently discovered notable outlier of tawari forest in the upper Waimonoa basin at the foot of Titiraupenga in Pureora State Forest Park.

If you have any information on tawari distribution, especially for the northern North Island or at its southern limit on the eastern side of the North Island, please complete as many of the following questions as possible and send to the author:

1. Observer's name.
2. Date of observation.
3. Map number.
4. Grid Reference.
5. Altitude.
6. Habitat.
7. Forest type.
8. Size classes represented: trees, small trees, saplings, seedlings.
9. Herbarium voucher number.
10. Other observations e.g. flowering? in bud? fruiting?

Distribution of *Ixerba brexioides* in middle North Island (symbols refer to presence in 10 000 yard grid squares).



Bruce Clarkson, Botany Division, DSIR, C/- Forest Research Institute,
Private Bag, Rotorua

■ Fertile fern material wanted

I am undertaking Ph.D. research into spore and gametophyte morphology of New Zealand Pteridophyta, with the objective of revising the work of W.F. Harris ("A Manual of the Spores of New Zealand Pteridophyta", 1955). The logistics of this work make the task of obtaining enough material a major difficulty; consequently, I should like to ask for help in obtaining good fertile material of any native ferns or fern allies.

Fresh, fertile fronds, or strobili (enough to allow clear identification and a voucher specimen to be made) should be packed in plastic bags. To

avoid contamination, one species per bag please. All contributions will be very much appreciated, and should be sent to:

Mark Large, C/- Department of Botany, University of Auckland, Private Bag, Auckland 1

MEETING/CONFERENCE REVIEWS

■ Fourth New Zealand Herbarium Curators Meeting

Since 1982 the curators of New Zealand herbaria have held an annual meeting to discuss ideas, problems and to initiate projects of mutual interest. The paper ("New Zealand Herbarium Resources") edited by A.E. Wright and published in the *N.Z. Journal of Botany* 22: 323-335, 1984 was the first of these projects. The current project is a compilation of handwriting samples of New Zealand botanists, concentrating initially on about 40 important collectors.

The 1985 meeting held on the 27 August was hosted by Victoria University Botany Department. Several of the larger herbaria reported major problems with storage space, and staff shortages. Botany Division DSIR is currently mounting 1983 New Zealand collections. The National Museum collection is to be moved to temporary premises in Taranaki Street, Wellington, later this year or early next year, resulting in major disruptions to research and curation (but see p. 11).

Other problems discussed included the finding by Ewen Cameron that silverfish can survive 72 hours in a deep freeze; at least a seven day treatment is recommended for this method of controlling herbarium pests.

A continuing frustration to New Zealand botanists is the practice in which New Zealand taxa are described overseas and are based on type specimens held only in overseas herbaria. It was suggested that New Zealand authorities granting collecting permits (e.g. Department of Lands and Survey, N.Z. Forest Service) should stipulate that where newly described taxa are based on material collected under permit, at least some of the type material should be lodged in a recognised New Zealand depository.

Progress on computerisation of Plant Diseases Division and Botany Division herbaria was outlined. Anthony Wright reported on his attendance at the 1984 meeting of the Council of Heads of Australian Herbaria (CHAH) at the Western Australian Herbarium, Perth. He noted that Australian herbaria enjoy a much higher public profile than our New Zealand counterparts and it was agreed that every opportunity should be taken to publicise herbaria and their work in New Zealand.

The 1986 meeting will be held in August at Plant Diseases Division, DSIR, Auckland.

Chris Ecroyd, Forest Research Institute, Private Bag, Rotorua

■ Meeting of the Council of Heads of Australian Herbaria (CHAH) held in Adelaide, October 1985

The Council of Heads of Australian Herbaria (CHAH) is an association of the

Directors of all the State Herbaria in Australia who meet annually to discuss matters relating to the running of their institutions and research being done on the Australian flora. For the past 5 years a representative from one of the three main New Zealand herbaria (AK, CHR, WELT) and someone from the Lae herbarium in Papua New Guinea have been invited to attend as observers.

New Zealand herbarium curators have taken full advantage of this opportunity to develop better contacts with their Australian counterparts and to become better acquainted with the herbarium facilities in the different states. One direct benefit from the meetings has been gaining access for New Zealand botanists to the Australian Botanical Liaison Officer (ABLO) who is appointed annually by CHAH and who spends a year working at Kew in London, specifically to answer questions from Australian botanists about material in the BM and Kew herbaria. Requests for information from New Zealand botanists are sent through Botany Division (CHR) so as to monitor the number and type of requests being made. This year's CHAH meeting confirmed that the number of requests from New Zealand was not excessive and that the nature of the requests was "challenging". Whilst this situation continues, we can continue to enjoy free access to ABLO.

Items of interest on this year's agenda which occupied most time were:-

- i) Compilation of a census of Australian plants and the problems of reconciling the use of different names for the same plants occurring in different states.
- ii) The development of electronic data processing (EDP) facilities in the State herbaria and the consequent problems of financing such operations, the desirability of having locality data, especially that of rare and endangered plants, freely available on disc, and the need to standardise hardware and software in the different States.
- iii) The compilation of an index of published Australian plant names, the desirability of accumulating information about the location of type specimens and the need to routinely photograph all types loaned from overseas institutions.
- iv) The slow progress being made in publishing further volumes of the Australian Flora.
- v) Planning for a one week taxonomy training course to be run at the University of Queensland in mid-1986 for young botanists recently appointed to the State Herbaria which would provide a detailed refresher course in aspects of taxonomy thought to be lacking in existing University syllabuses.
- vi) The desirability of using couriers to deliver loan material rather than the apparently heavy-handed Australia Post.
- vii) Problems of limited staff and inadequate facilities at the Tasmanian Herbarium (HO).
- viii) Problems of combining the Northern Territory herbaria of Alice Springs and Darwin in one centre.
- ix) Ways of providing assistance to the Lae herbarium which is once again facing the prospect of demise through Government neglect.
- x) Quarantine regulations on importing live and dried plant material and the difficulty of reconciling different Federal and State lists of prohibited species.

Once again I was impressed by the spirit of co-operation between the institutional heads and, in particular, their desire and ready-willingness to provide material support to the smaller herbaria. Also impressive were the arrangements for the two-day gathering.

The meeting was opened by the Director-General of the South Australian Department of Environment and Planning, hosted by the Adelaide Botanic Garden, who provided generous lunches, an opportunity to meet the Botanic Gardens Board, and an evening meal with the local Australian Systematic Botany Society at Wittunga Botanic Gardens, and well supported by the State Herbaria who laid on transport for "local" field work. In my case, this involved a 750 km trip to the wet, fern-clad valleys of the Otway Ranges in SW Victoria! Such hospitality is hard to return, but at our suggestion, and provided the various directors can get travel funds from their departments, the 1987 meeting may be held for the first time in New Zealand.

P.J. Brownsey, National Museum, Private Bag, Wellington

■ Nature conservation : the role of remnants of native vegetation

This workshop at Busselton, Western Australia, 22-29 September 1984, was convened by CSIRO and the Western Australian Department of Conservation and Land Management. Half of the 100 participants came from Western Australia, the rest from the other states of Australia, U.S.A., South Africa and New Zealand (5 ecologists). The participants covered the whole range of personnel involved with the conservation of remnants - resource planners, managers, landscape architects, and scientists.

The spur for the workshop was the increasing part that remnants seem to be playing in the conservation of Australia's plants and animals. Often the remnants are the last remaining examples of the original indigenous vegetation of an area.

The aim of the workshop was to pool together relevant research and management information in an attempt to answer the question: "What role can these remnants play in the long-term conservation of regional biota and how should the remnants be managed to best enhance their conservation value".

Four of the five workshop days were organised with papers in the morning, discussion groups in the afternoon. Midweek, a day was spent in the nearby Whicher Range conservation area and parts of the Leeuwin National Park visiting forest remnants. I was constantly struck by the different structure of these forests compared to New Zealand; very open and obviously subject to wild fires. We were fortunate to see many of the weird and wonderful plants which have evolved in the extreme south-west of Western Australia, isolated as it has been for millenia by oceans and desert.

The 2 day post-workshop tour visited remnants in the Western Australian wheatbelt. Pockets of forest, woodland and shrubland are isolated in a sea of agricultural land. The effects of imprudent development in this saline country were plain to see where patches of land had become salinised subsequent to clearing and now lay bare and unuseable for agriculture/or conservation.

We observed some interesting management problems in some of the reserves we visited - for example a 90 ha nature reserve divided by a Rifle Range and a gravel extraction reserve. It had been damaged by gravel mining and rubbish dumping. Rehabilitation of the area was being achieved by ripping the compacted surface. This served two purposes; speeding up the otherwise slow process of re-establishment of native cover and reducing the urge of people to dump rubbish. Management of this area was as much about education as management techniques.

Some of the more important conclusions which flowed from the week's papers and discussion were:

1. Realistic objectives should be set for remnant reserves. Remnant reserves, particularly very small ones, are unlikely to meet *all* the functions which the one large reserve may/should achieve e.g. preserve representative sample, maximise species diversity, protect single species, protect scenic, aesthetic or recreation values. In a small reserve the different functions may conflict e.g. protection of a threatened species may compromise maximising species diversity. Some functions may be unattainable e.g. representativeness is probably an unrealistic objective for small reserves (except where biological/physical variation occurs on a very local scale). Also small reserves cannot meet the aim espoused in the world conservation strategy for nature conservation, that of being multiple-use. The *primary realistic* objective of each remnant should be identified.

2. Protected natural areas should be seen as part of a *system* of PNAs. Each protected area has its *own* part to play. The objective for a PNA should be selected on the basis of the contribution it makes in the context of the other PNAs.

3. The protected natural areas system must comprise both small and large reserves to ensure species diversity is maximised, the range of habitats is protected and to insure against disaster.

4. A remnant which, if protected, will link up existing reserves and create the one larger *viable* reserve from several, perhaps unviable fragments, has merit even if the remnant itself is not particularly biologically significant.

5. Research should be a part of management as well as a prerequisite to it. Every management act should include monitoring of its effect. Did the action achieve its goals:

- (a) short-term?
- (b) medium-term?
- (c) long-term?

To use an Australian example, a fire is purposefully lit in a remnant to reduce litter load. Monitoring should answer the questions:

- (a) Did the fire burn as desired?
- (b) Did the burn prevent wild fires from starting for 5 years as hoped?
- (c) What effect did the burn have on local biota long term?

6. Monitoring should involve planners, managers and researchers so that the experiment is scientifically sound and the information is ultimately of use to management. Ideally monitoring studies should be long-term which underlines the importance of designing the study well.

The workshop concluded with a challenge to scientists and naturalists who understand the values of native vegetation to spend a significant part of their time (say 10%) helping the public and politicians understand the role

of remnants of native vegetation in nature conservation so that these valuable repositories of the world's heritage will not be lost forever.

Susan Timmins, Department of Lands and Survey, Head Office, Private Bag, Wellington

■ Lichen workshop, University of Auckland

Fourteen participants from Auckland, Hamilton, Wellington and Christchurch took part in a lichen workshop held in the Botany Department of the University of Auckland from 1-4 November 1985. The organisers John Braggins and Anthony Wright were assisted by Alison Stewart and Ewen Cameron. Bruce Hayward from Wellington, was of great assistance in interpreting characters and keys, and confirming identifications.

Although all those attending had some prior knowledge of lichens, the first session consisted of an extensive, and for some of us, very necessary introduction to lichen characteristics and terminology. The very comprehensive series of demonstrations went far in helping to clarify most of the basic concepts involved in lichen identification. In the afternoon a brief sortie into the grounds produced a surprising number of lichens from trees, stonework, and even glass. Christchurch members were impressed by the richness of the lichen cover in a central city site, due presumably to the damper climate and lower pollution. Back in the laboratory the remainder of the afternoon passed in attempting identifications of the lichens collected.

Saturday started with a trip to Western Springs where the basalt rocks of a disused quarry provided interesting comparisons between the lichen floras of exposed and shaded surfaces. A bemused public watched the minute examination of old garden seats or jumbles of rocks. The very common orange *Xanthoria parietina* and the similar but much rarer *X. ligulata* were seen side by side, and *Punctelia borrieri*, also found in the University grounds and not previously reported from these areas, was not uncommon.

Sunday's activities consisted of an all-day trip to the Coatesville Scenic Reserve near Albany, an area of regenerating kauri forest with a dense understorey of nikau palms and tree-ferns, and much kanuka and *Hakea* in more open parts. A much greater variety of lichens was present, including such well-known ground dwelling genera as *Cladia* and *Cladonia*, and the green-black gelatinous *Collema*.

The final day was devoted entirely to identification. Most of us felt that we had gained considerably in knowledge and confidence by now, but still managed to become "stuck" or to take the wrong choice in our keys with monotonous ease. However, with Bruce Hayward's or Anthony Wright's always ready help most specimens were successfully named.

The main impressions left by this workshop were the friendliness, help and work so readily given by the organising committee, the camaraderie and enthusiasm of the participants, the confusion of trying to separate *Parmelia*, *Parmelina*, *Parmotrema*, *Pseudoparmelia* and *Xanthoparmelia*, and an even greater appreciation of Dr David Galloway's "Lichens".

Howard and Elizabeth Lintott, Department of Plant and Microbial Sciences, University of Canterbury, Private Bag, Christchurch

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