

Newsletter

*For Friends of the Christchurch Botanic Gardens Inc
To Promote, Protect, & Preserve*

No 76, Autumn 2009

President's Report

Preparations for the Ellerslie International Flower Show are already underway in Hagley Park. Many of us who are interested in horticulture and gardening are looking forward to this major event to be opened to the public during the second week of March. There will no doubt be a certain amount of glitz and glamour associated with such an event. However, looking beyond Ellerslie 2009, I really hope that this event will reinforce the greater need to maintain and enhance the city's public garden areas so as to keep Christchurch as the country's leading garden city.

In regards to our own Botanic Gardens I am also hopeful that the Ellerslie Flower Show will have some spin-off benefits. What a wonderful opportunity we have to show off our gardens to the visitors going to the Ellerslie Show and within such a short walking distance from it.

The architectural competition for the design of the new Botanic Gardens Centre is currently being considered by the Council and a decision should be made soon. This will be great asset for the gardens and is long overdue. Without doubt, a facility of this standard will help raise the gardens international rating. It goes without saying of course, that the staff especially will appreciate the new building as well as the Friends plus the numerous visitors who come to the gardens throughout the whole year.

Please make sure you visit the Friends exhibit at the Ellerslie Show. It is going to be a most interesting and fascinating display and will manned by members of the Friends who are going to give out promotional material and answer any questions from the general public. A special thanks goes to Charles Graham, David Moyle and staff member Darren Tillet who organised and designed our exhibit and to those members who will be helping during show time.

Don Bell.

Editor's note

We continue to distribute the Newsletter by email to those members who have given us their email addresses and who have not requested otherwise. If you would prefer to receive the Newsletter by mail, rather than electronically, please contact Bill Whitmore – phone 339 8356 or billpauline@ihug.co.nz

Gardens' News

Jeremy Hawker reports –

With the summer months here the Gardens currently has a range of activities to enhance the visitor experience and complement the plant collections and displays. The regular perennials of summer theatre, Sunday bandstand and lazy weekend, now in its second year, provide opportunities to relax and visit the Garden over the summer period. To follow is the Festival of Flowers and then Ellerslie to be held in Hagley Park.

It is a busy period for visitors within the gardens and the new Caterpillar tour has been operating for over one month, taking visitors on a tour around the grounds. This addition is a result of the public consultation process through the management plan review, and is but one of many projects to be rolled out over the next ten years.

There is in place a tree replacement program to enhance the tree stock and replace diseased and unhealthy specimens and to increase the diversity of our collections without altering the character of the grounds. Work is progressing on the new visitor and staff facilities, collection reviews undertaken and revitalising plant collections planned.

Along with the planning and progressing of the Gardens development are a number of assets that require continual inspection and maintenance. The Peacock fountain has been out of commission for a period of months and will be operational again in a

few weeks, the small stone bridge by the water garden has cracking and requires remedial strengthening, the Armagh street bridge while complying to the building code when constructed, has vertical bars that now do not comply with the revised code and we have had reported cases of children getting through the bars, fortunately without falling into the river, and again remedial action is planned to reduce hazard risk to the public.

These features add a significant amount to the gardens and require ongoing operational spending to maintain them in a safe and functioning manner. A maintenance programme for the glass houses has seen strengthening and repairs undertaken. Just like built structures the trees and plant collections too need to be maintained and enhanced to provide quality of collection and display, and revitalising the collections is an opportunity to enhance the material on display. A recent example is the revitalisation of the fernery, with several new species now clearly labelled and displayed within the building. Such improvements will occur across the grounds over a period of several years as material is propagated, sourced and grown to a size that will allow its inclusion in the Gardens.

Events in the Gardens

Sunday Bandstand 1 February – 22 March. Various times and locations.

Festival of Flowers 20 February - 16 March.

Six established sculptors will be exhibiting their work in the Christchurch Botanic Gardens in a new Festival of Flowers event set to inspire, challenge and amuse.

Practical Demonstrations for Gardeners

The Friends of the Botanic Gardens will be providing a series of practical demonstrations for gardeners through four seasons, starting in Autumn this year. The first of these will be on "The care of herbaceous perennials".

When: Saturday, 2 May at 2 pm

Where: Herbaceous Border, Christchurch Botanic Gardens

A sales table will be available.

Friends funds helping the Gardens

Once again the Gardens staff wish to thank the Friends for their annual library grant which enabled us to make the following purchases:-

1. *Sir Joseph Dalton Hooker, Traveller and Plant Collector*, Ray Desmond.
2. *Plant Names, A Guide to Botanical Nomenclature*, 3rd Ed., Spencer Cross Lumley.
3. *Journal Kept by David Douglas During His Travels in North America, 1823-1827*.
4. *Managing Pests and Diseases*, Rob Lucas.
5. *Treasures of Botanical Art*, Shirley Sherwood and Martyn Rix.
6. *Botanical Riches, Stories of Botanical Exploration*, Richard Aitken
7. *The Great Sacred Forest of Tane; a Natural Pre-History of Aotearoa New Zealand*, Alan Clarke.
8. *The Propagation of New Zealand Native Plants – Revised*, Lawrie Metcalf.
9. *Ceanothus*, David Fross and Dieter Wilken.
10. *Monkey Puzzle Man, Archibald Menzies, Plant Hunter*, James McCarthy.
11. *Forest Lore of the Maori*, by Elsdon Best.
12. *The Emerald Planet, How Plants Changed Earth's History*, David Beerling.
13. *Botanic Gardens, a Living History*, Black Dog Publishing.
14. *Banks Peninsula, Cradle of Canterbury*, 3rd Ed., Gordon Ogilvie.
15. *The Naming of Names*, Anna Pavord.
16. *The Natural History of Canterbury*, 3rd Ed., edited by Michael Winterbourn, George Knox, Colin Burrows, Islay Marsden

Sue Molloy
Botanical Resources Co-ordinator

Articles

Anzac Day remembrance in the gardens

For several years prior to 1946, Botanic Gardens staff made the main Anzac wreath for the RSA and a further wreath of remembrance was given to the Chairman and members of the Christchurch Domains Board for ceremonial laying. In 2005 staff decided to again make wreaths, this time to be laid at our own WW1 memorial being the Bandsmens' Memorial. Three wreaths were created: one for peace, featuring acanthus and olive leaves; the second for *lest-we-forget*, with poppies; and the third an ANZAC wreath, interwoven with foliage native to Australian and New Zealand. We have since had an annual remembrance at the memorial on the last working day before ANZAC Day, although we now buy one wreath instead of making them. As a staff we assemble at the memorial for 10 am, lay the wreath, observe a one minute silence and then have morning tea there which of course features Anzac biscuits!

The Bandsmens' Memorial is a dedication to the Canterbury bandsmen killed in WW1. The eventual siting of the memorial was thought to be fitting as it

was surrounded by Turkish oaks, an appropriate reminder of Gallipoli.

In 1919 Miss E.A Rout, the Hon. Secretary of the NZ Volunteer Sisters at Villers Bretonneux, Somme, France, wrote to the Curators of the Melbourne, Sydney and Christchurch Botanic Gardens saying –

“Gentlemen, I have sent each of you a cigarette box (cardboard) filled with poppy seeds gathered in the Somme Valley by the school children of Villers Bretonneux. The box was sown up in a towel and marked with indelible pencil, the name and address of yourselves and myself. The poppy pods were gathered rather late in the season but I think you will get sufficient for a good sowing and we ask that you give a few of the seeds that you harvest, or the ‘originals’, to the relatives of the Australian and New Zealand soldiers who fell fighting on the battlefields of the Somme and convey to the recipients the deepest gratitude and loving sympathy of the school children of Villers Bretonneux.”

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It is not known what happened to the Christchurch seeds.

Many staff including trainees, were active in the Armed Forces in both World Wars. Morris Barnett served in WW1 with the 1st N.Z.E.F. in Egypt, Gallipoli and France and was twice wounded. He was invalided home in 1917. Barnett became Director of the Botanic Gardens and Reserves.

In WW2, of the many trainees who saw active service, two were killed. One was Barnett's son Ted and the other was W. Lauder. Another trainee John Taylor enlisted in the navy and was sent to Britain for officer training towards the end of the war.

James McPherson was Curator at this time and in 1943 he was sent to the Pacific Islands to supervise vegetable production for the NZ servicemen there. At this stage in the war rationing of imported items was being felt. New Zealand followed the British campaign called "Dig for Victory" which encouraged people to turn flower-beds into vegetable gardens. Nurses from Christchurch Hospital were granted an allotment in the Gardens for this purpose. Several informative articles appeared in the Journal of the Royal NZ Institute of Horticulture on crop rotation and how to deal with garden "casualties".

As staff numbers were low during WW2 the likes of bedding was kept to a minimum. Cuningham House was closed for the winter of 1943 to save on coal and running expenses.

Such was life for the Gardens during wartime.
Sue Molloy, Botanical Resources Coordinator

The new Demonstration Native Gardens in the Christchurch Botanic Gardens

Why demonstration native gardens?

The lowland NZ native flora is especially threatened because of introduced competitors, browsers and urban development, and it is just not around for people to see and identify with. Consequently there is little knowledge of it (apart from the familiar cabbage tree, *Pittosporum* and kowhai) among the general public, teachers and even gardeners, let alone politicians. So what can we do, and how does one get the community and decision-makers to recognise the significance, uniqueness and beauty of our special plants and wildlife?

There has, nevertheless, been a growing interest in NZ plants over the past 15 years reported by nurseries, and it is now time to break into the lesser-known species – they have to be available for people to see and buy them. On the other hand, there is a dilemma for nurseries that can't afford to hold and experiment with stock without a certain market.

The recently established demonstration native gardens in the Christchurch Botanic Gardens is a response to the need to show, at a practical scale, how we can step up a level in the range of indigenous species that are suitable for gardens. It was designed and established by Lincoln University staff and advanced students, Landcare Research, Gardens staff and sponsors. We hope the garden illustrates the wonderful variety, form, colour, and texture of NZ plants, something about their importance to NZ ecosystems and to tangata whenua, and encourages their use in more places (to provide critical mass of foliage, flowers and fruits to attract wildlife) so they become viable populations. For some rare lowland plants this will even help to conserve them and bring them back from the brink of local extinction. Some of these small herbaceous native species and their associated fungi, insects and lizards are otherwise caught between a rock (intensive cultivated pasture or horticulture) and a hard place (tall, dense grass outside the farm fence). There is often no place left for them to go!

The goal

Three demonstration gardens are presented to inform the home gardener on the use of native plants for their aesthetic and biodiversity contribution to the urban environment. They showcase ways to apply native species in particular settings that ensure the best appearance, health and ecological function of the plants. In addition, these gardens display some principles of Low Impact Urban Design and Development (LIUDD) at an individual residential property scale to improve sustainability, biodiversity and cost efficiency. Most of the materials used for these gardens are recycled.

What is Low Impact Urban Design and Development?

Low Impact Urban Design and Development involves alternative, cost-effective designing with nature, creating community environments that aim to respect, conserve, and enhance natural processes while allowing land to be utilised for human activity.

LIUDD principles are being researched and applied as part of New Zealand's 'sustainable cities' programme, focusing on Auckland and Christchurch.

Appropriate native plants are well suited to local environmental conditions (rainfall, soil, light and temperature) of a particular site and are generally long-lived. Also, they commonly have inter-dependent relationships with indigenous wildlife (birds, butterflies and geckoes) providing nectar, fruits, pollen and habitat. Correctly selecting and establishing native plants according to site characteristics can significantly reduce the amount of ongoing maintenance required to achieve design goals.

The gardens are seen as a display of three different theme native gardens: The Rock/Scree/Beach Garden, Bush Garden and Formal Native Garden.

Because of the location of the Demonstration Gardens (as part of the Botanic Gardens) the character of the design garden addressed on one hand an educational and scientific goal (showing different collections of native plants) and on another - decorative and practical: how to attract and inform the public on using native plants in their front and back yards. The demonstration gardens have native plants as well as decorative elements such as sculpture, stepping stones, pavement, trellises, boardwalk, seats and water features (waterfall and fountain). The length of the site (46 metres long and 5 metres wide) dictated the size of each garden (15 by 5 meters). The demonstration Gardens celebrate opportunities for the local flora largely using Canterbury Plain, Port Hills and Southern Alps foothill plants. The plant associations are reminiscent of but not identical to natural communities. As such, they may be termed plant signatures.

Rock/Scree/Beach Garden with tussocks, herbaceous plants, mats (prostrate, branched closely-crowded plants) and shrubs

This garden displays opportunities for using different tussock grasses, sedges, and herbs from riverbeds, cliffs, mountains and coasts together with low trees and shrubs. For design principles the informal approach was the most appropriate, using a meandering pathway, gravel and pebble material (mimicking Canterbury floodplain landscapes), volcanic rock garden, braided 'dry' riverbed, sand dune and the subtle, intermittent presence of water, set off with characteristic growth forms – tussocks, divaricating shrubs, turfs, mats and cushions. The

main ecological message of this plant display is to portray some unique and threatened Canterbury landscapes and plant communities of dry floodplain, riverbed, sand dune, volcanic rock ledges, beaches and alpine zones. This garden also features native turf species that can substitute for traditional exotic lawn species in dry conditions, potentially requiring less resource inputs and management. A wide range of wildlife can be attracted to this garden: native butterflies utilise pohuehue mats and vines, skinks and geckoes hide among rocks and divaricating shrubs and take their berries, and birds will take seeds, insects and berries. Some of the main plants used for the rock garden were *Celmisia* spp, *Geranium sessiliflorum*, *Linum monogynum* and *Pachystegia insignis*. There are grasses, sedges and tussocks such as *Elymus solandri*, *Dichelachne crinita*, *Aciphylla subflabellata*, *Aciphylla aurea*, *Poa cita*, *Poa colensoi*, *Festuca actae*, *Carex buechananii*, *Carex comans* and *Cortaderia richardii*. The miniature sand dune in this garden is covered with *Desmoschoenus spiralis*, *Austrofestuca littoralis*, *Apodasmia similis*, *Coprosma acerosa*, *Libertia pulchella* and *Euphorbia glauca*. Among the local grey pebbles of Canterbury riverbeds are *Scleranthus uniflorus*, *Raoulia australis*, *Geranium sessiliflorum*, *Muehlenbeckia axillaris* and *Muehlenbeckia ephedroides*. This garden has no traditional lush green lawn, instead native plants such as *Zoysia minima*, *Microlaena stipoides*, *Leptinella minor* and *Acaena* spp can successfully replace exotic lawn grasses in dry urban locations. After one year all plants in the dry native lawn are doing really well and create a nice native "carpet". Small and medium shrubs such as *Sophora prostrata*, *Myrsine divaricata*, *Coprosma crassifolia*, *Coprosma propinqua*, *Coprosma virescens*, *Corokia cotoneaster*, *Cassinia (Ozothamnus) leptophylla*, *Olearia lineata*, *Olearia fragrantissima*, *Carmichaelia australis*, *Aristolelia fruticosa*, *Phormium cookianum* and *Helichrysum lanceolatum* are great additions to the garden's "Canterbury Plain" motif. The small trees of *Kunzea ericoides* (kanuka – which could be called the Canterbury Christmas tree!), *Cordyline australis* and *Pseudopanax ferox* give to the garden an important emphasis and texture.

Bush Garden

This garden demonstrates opportunities for using various shade tolerant and shade providing native trees, shrubs and grasses. It is more typically what gardeners think of as the native garden – usually with a rimu and tree fern from the West Coast, cab-

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bage tree, kowhai and matipo! For the design, an informal principle was used with vegetation grading from dry to rain-forest setting, following a meandering boardwalk through native shrubbery and semi-shaded lawn towards a fernery with a grotto and “natural” water feature connecting to a miniature wetland below. The ecological approach in this garden is demonstrated by the delicate balance and transition between dry (left side) and moist types (right side) of native woody vegetation, forest herbs, ferns, wetland grasses and shade tolerant



native species that can substitute for traditional exotic lawn species. Planted vegetation will attract native bellbirds, kereru, grey warblers, fantails, silvereyes, and shining cuckoos which may all use this urban mini-forest. Similarly geckoes may live in the trees. Three existing mature native trees (*Plagianthus regius* and *Sophora microphylla*) were the core elements of the Bush Garden and were used in design. Shade tolerant groundcover species of dry microclimate are *Astelia fragrans*, *Microsorium pustulatus*, *Blechnum penna-marina*, *Pellaea rotundifolia* and *Anemanthele lessoniana* and are all doing well. For more protected sites groundcovers of *Polystichum richardii*, *Hypolepis ambigua*, *Dianella nigra*, *Fuchsia procumbens* and *Arthropodium cirratum* were planted. *Arthropodium cirratum* was in full bloom for almost a month. Attractive native ferns surrounding the mini water cascade include *Cyathea dealbata*, *Dicksonia squarrosa*, *Asplenium hookerianum*, *Asplenium flabellifolium*, *Asplenium terrestre*, *Blechnum minus*, *Blechnum novae zelandiae*, *Blechnum fluviatile* and *Polystichum vestitum*. The board walk meanders among plantings of small and medium shrubs (*Coprosma rhamnoides*, *Coprosma virescens*, *Myrsine divaricata*, *Meliccytus lanceolatus*, *Pennantina corymbosa*, *Carpodetus serratus* and *Melicope simplex*.

Formal Garden

This garden demonstrates that native plants can be adapted for traditional formal settings, including such elements as low clipped hedges, elaborate topiary and manicured, uniform native lawn. The green roofs showcase the versatility of native plant-

ing and a standard timber construction for implementing Low Impact Urban Design and Development principles, such as reducing the heat-island effect (a metropolitan area which is significantly warmer than the surrounding areas), insulation and retention and re-use of rainwater. The formal approach incorporates domination of straight lines, symmetry and geometric shapes, and planting balanced with hard surfaces. The garden design is a series of green rooms which provide different displays for native groundcovers and green

roofs. The water feature provides a sculptured focal point as well as the soothing sound of gently cascading water to soften the formality. Trellis and pergola structures accentuate the three dimensional aspect of the space while providing a supporting framework for climbing native vegetation (*Parsonsia heterophylla* and *Clematis paniculata*).

This display clearly demonstrates that particular native plants can be used to create the traditional classical and picturesque garden designs that maintain the English colonial character of Christchurch City. Several native species are suitable for formal hedging (*Olearia paniculata*) or as sculptural elements (*Coprosma propinqua*, *Coprosma crassifolia*, *Coprosma rugosa*, *Myrsine australis*, *Hebe topiaria*, *Hebe albicans*, *Hebe venustula* and *Podocarpus totara*), able to withstand clipping and pruning and yet provide food and habitat for wildlife and enhance biodiversity. A variety of native cultivars are also available to add an exciting range of sizes, forms, colours and textures for planting. Using native plants in a formal garden design provides opportunities to increase overall public familiarity with, and appreciation of, native species and challenges the perception that native plants are untidy or difficult to manage.

Lawns

Lawns typically require a lot of time, expense, and maintenance such as fertiliser, herbicide, and water, while disposing of clippings with accumulated herbicide may be detrimental to the environment. However, lawns perform an important function as a

place to relax, play sport and undertake household chores and projects. Visually they are a wonderfully smooth surface to contrast with the garden and to open up longer views.

By avoiding excessively large areas of lawn and introducing native grasses and ground-hugging species, we can create areas that are just as visually pleasing and functional as traditional lawns while providing a safer, less wasteful, and more biodiverse environment for both ourselves, and our native micro-fauna. Locally sourced native species are particularly adapted to our environment and potentially require little fertiliser, water and mowing once established. This is not to say that we don't have a lot to learn about managing these species. There are species suitable for dry, moist or wet lawns.

Many lawns already include native species such as *Hydrocotyle* and *Leptinella*. Therefore a quick and easy way to increase biodiversity is to plant other native species such as *Pratias*, *Dichondras* and *Acaenas* straight into your existing lawn. Avoiding use of fertiliser will allow native grasses such as *Microlaena* to become established. Dense grass will tend to dominate well watered and fertile lawns whereas slightly more stressed (dry or shaded) lawns will allow a greater variety of species to coexist in a meadow or wildflower style. For lawns of the Formal Garden the following native species were used: *Acaena novae-zelandiae*, *Acaena microphylla*, *Microlaena stipoides*, *Pratia angulata*, *Dichondra repens*, *Poa imbecilla*, *Epilobium nummularifolium*, *Leptinella dioica* and *Leptinella minor*.

Green Roof Display

A green roof is a roof partially or fully covered by plants. Extensive green roofs feature drought tolerant plants grown in a thin layer (5-15cm) of light-weight soil. They are not designed to be accessible, other than for occasional weeding. Semi-extensive green roofs have deeper soil (15-30cm) and can support a greater variety of plants. However, their depth makes them heavy and they require relatively strong structural support. Intensive-green roofs consist of plants grown in deep soils, allowing the growth of shrubs and even small trees. Usually grown in irrigated containers, they require more maintenance than extensive and semi-extensive roofs. They are usually designed to provide an accessible amenity space. Because they require considerable structural support they are much more expensive than extensive roofs, and

impractical in most domestic situations, except as small borders, blocks or containers.

Green roofs offer a range of benefits not provided by conventional roofs, such as: stormwater reduction, retention and filtration; cost savings in heating and air conditioning due to the insulating effect of the growing medium and plants; protection of the roof from UV damage; habitat for insects, plants, birds, and even lizards; and moderation of the urban heat island effect.

The demonstration mini-green roofs allow us to trial a range of local, drought tolerant plant species. The pitched roof supports a semi-extensive green roof, with an assemblage of plants from grassland and dry rocky environments. The "flat" extensive green roof supports also a selection of coastal plants. The "flat" roof is situated in semi-shade conditions and experiences less stress from dry summers. The use of native species for green roofs in Christchurch is very much pioneering work so it will be a work in progress. Occasionally some mist irrigation may be applied to prevent complete loss during severe drought. Green roof displays have a very important function here; to help in the search for alternative green roof native plants. In the Northern Hemisphere the most popular green roof plants are *Sedum acre*, but this and other northern species are invasive in New Zealand. The list of potential native green roof plants is impressive; a few are listed below:

<i>Acaena buechananii</i>	<i>Hierochloe redolens</i>
<i>Acaena microphylla</i>	<i>Hypericum gramineum</i>
<i>Carex breviculmis</i>	<i>Lachnagrostis</i> spp.
<i>Calystegia soldanella</i>	<i>Leptinella minor</i>
<i>Convolvulus verecundus</i>	<i>Leptinella serrulata</i>
<i>Coprosma atropurpurea</i>	<i>Leucopogon fraseri</i>
<i>Coprosma petriei</i>	<i>Linum monogynum</i>
<i>Cotula australis</i>	<i>Microlaena stipoides</i>
<i>Dichelachne crinita</i>	<i>Microtis unifolia</i>
<i>Dichondra brevifolia</i>	<i>Muehlenbeckia axillaris</i>
<i>Dichondra repens</i>	<i>Muehlenbeckia ephedroides</i>
<i>Disphyma australe</i>	<i>Ophioglossum coriaceum</i>
<i>Epilobium brunnescens</i>	<i>Oxalis exilis</i>
<i>Epilobium cinereum</i>	<i>Poa colensoi</i>
<i>Epilobium nummularifolium</i>	<i>Raoulia monroi</i>
<i>Epilobium rostratum</i>	<i>Raoulia tenuicaulis</i>
<i>Geranium sessiliflorum</i>	<i>Rytidosperma clavatum</i>
<i>Gnaphalium audax</i>	<i>Rytidosperma unarede</i>
<i>Haloragis erecta</i>	<i>Stackhousia minima</i>
<i>Helichrysum filicaule</i>	<i>Zoysia minima</i>

For the green roof substrate, medium 50% horticult-

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tural grade pine bark with lime and 50% 1-10 mm grade pumice, 100-150 mm deep, were used. Construction elements of the green roof also included: drainage sheet with bonded filter cloth – extends full width of roof and under gravel edging; heavy-duty plastic sheeting extending up the side; sealed bitumen base and sides and corner drainage holes – additional drainage for larger roofs.

We would like to especially thank the CCC Botanical Gardens Staff, led by Jeremy Hawker, for engaging with and supporting us in this endeavour (and reflecting on the sad passing of the late David Given, the last Curator who had great vision for the Gardens). And also especially to the Friends of Christchurch Botanic Gardens, one of the main sponsors of this project and to those who have sponsored plants (Jorge Santos, David Hobbs, Fern Factor, Birch Manor Nursery, Ouruhia Nursery, Petries Plants, Gough's Nursery, Trees for Canterbury, Waiora Trust, Broadleaf Nursery, Rangiora Nursery, Hurunui Natives, Southern Woods and Mataia Nurseries), masonry, building materials, etc., to James Rea and Jason Collett who translated our concepts into drawings and interpretation signs, to Sue McGaw who sourced and propagated plants and generally coordinated the logistics.

Maria Ignatieva (Lincoln University), Colin Meurk (Landcare Research) and Glenn Stewart (Lincoln University)

Gondwana Garden

In his master plan for the Christchurch Botanic Garden, four years ago, the Curator, the late Dr David Given, envisaged a Gondwana Garden. Until recently this new feature of the Garden lay dormant in his archives, but planning is erupting, like Gondwana itself, from a Sea of Ideas.

In July this year, interested parties from across the country were invited by the Friends of the Botanic Gardens and the Christchurch City Council to a Gondwana workshop. A geologist, botanist, landscape architect, horticulturalist, ecologist, museum director, geographer, social scientist, educator, palaeontologist, designer and one Press writer got together to discuss Dr Given's proposal. We were directed to discuss three questions: 1. Who is the audience for the Gondwana garden? 2. What is the story to be told? 3. How will we tell it?

Visitors to the Botanic Gardens range from pre-schoolers through primary, lower and upper second-

dary school pupils, to tourists and locals. We were reminded by Anthony Wright, Director of the Canterbury Museum, that the average age of a visitor to the museum is 11 years, so whatever the design, the story must be told clearly for young and old alike.

What was Gondwana?

Gondwana - some call it Gondwanaland - was a huge continent that included most of the land masses in today's Southern Hemisphere: Antarctica, South America, Africa, Madagascar, Australia, New Guinea and New Zealand. It also included Arabia and the Indian sub-continent, which have now migrated into the Northern Hemisphere.

The name Gondwana is Indian; the discovery of this great continent began in the Deccan region of central north India, an area west of Calcutta known in Indian history as the Land of the Gonds. Victorian geologists found a very distinctive sequence of rocks here in the 1870s. They described unique rock formations comprising sands, silts and muds originally deposited by rivers, laid down in the carboniferous era, 300-145 million years ago (MYA). A decade later, the same motif was found in Australia, Antarctica and South America. Each of these sequences contained floral fossils, the most consistent being the *Glossopteris flora*, the "Badge of Gondwana". This flora grew around the central ice-cap that became Antarctica, and each Southern Hemisphere region including New Zealand. It has not been found in Europe, Asia or North America.

East Gondwana began to break up as India separated and moved northward, about 120 MYA. New Zealand is a small chunk of East Gondwana that broke away from what became Australia somewhere between 130 and 85 MYA. An area about half the size of Australia, it carried a comprehensive biodiversity.

New Zealand's geology records the sea encroaching on the land, and indeed New Zealand did sink in the 60 million years, 83-23 MYA. There is continuing debate as to just how much land remained above the sea in that enormous time span. The *Encyclopedia of New Zealand* opines that "less than a third of the area of modern New Zealand remained above seal level as numerous islands." And then it rose again. About 8 MYA the Southern Alps began to push up along the Alpine Fault. New Zealand flora appeared, mostly by dispersal from

as far as the Northern Hemisphere. By 1.5 MYA, however, when the last Ice Ages began, any tender plant was extinguished. For 10,000 years glaciers carved out the landscape, forming lakes and moraines. Temperatures averaged about 4.5 degrees lower than today.

Discussions at the workshop were full of different ideas as to how Gondwana could be represented in a garden. Horticulturalist Alan Morgan, a driving force for the Gondwana Garden, who guides in the Gardens and is passionate about its presentation of native flora, likes the idea of a time-line as a teaching aid. He suggested we could begin by describing the flora pre-separation: the Araucaria family, including monkey puzzle and Norfolk Island pine as well as our kauri, whose fossilised remains can be found on the beach at Curio Bay in the Catlins. They have lain there for 176 million years. The great podocarps, ancestors of totara, miro, kahikatea, and rimu were growing in these primeval forests. *Nothofagus* (southern beech) was growing in the temperate climate of what is now Antarctica and South America and along the mountain range of what would later be inland from the east coast of Australia.

Then we could move forward to about 85 MYA, when New Zealand was separated from Australia, with the Tasman Sea a great widening rift. The separated land mass, now called Zealandia, included New Caledonia at its northern tip. We had araucarias, podocarps and *Nothofagus*, but we also had ferns, including tree ferns, bryophytes or mosses, equisetums or horsetails, lycopods or club-mosses, protea family, lily family, mistletoes, celery pines, heath family, buttercups and dracophyllums or grass trees.

Nearer in time, 65-15 MYA, our planet was bombarded with huge meteors and skies darkened by large-scale volcanic activity, which killed off half the flora and animal species, including the dinosaurs. The pohutakawa ancestor in the genus *Metrosideros* arrived in new Zealand, being spread by birds or wind, and 10,000,000 or so years later New Zealand had sub-tropical palms, cycads and members of the protea family.

Then came the apocalyptic sinking of Zealandia, when most plants died out, but there was active speciation on separate islands that remained above water, such as in the genera *Coprosma*, *Metrosideros*, *Fuchsia* and *Epilobium*.

How will this story be told? We don't know yet. But we do know that the Gondwana Garden will be encircled on three sides by the Avon to the north of the children's playground in the Botanic Gardens. Next to a playground is the best place to attract children to the astonishing story of New Zealand's primeval beginnings, as illustrated by our geology and our flora.

Diana Madgin

Look at that tree – *Eucalyptus delegatensis* or Alpine Ash, Big Gum

It is hard to overlook this giant tree located between the rock garden and rose garden. One often sees visitors having their photographs taken posing in front of it. This massive eucalyptus has the largest diameter of any tree in the Christchurch Botanic Gardens and is believed to be also the biggest of its kind in New Zealand. It is not known when and by whom this tree was planted but its size and rate of growth suggests that its planting dates from the 1860s.

In 1982 S. W. Burstall, author of "Great Trees of New Zealand", measured its trunk and obtained a diameter of 2.8 m. The tree didn't stop there. A later measurement in August 2002 taken at 1.4 m above ground level gave a diameter of 3.45 m which represents an increase of 65 cm in 20 years. It will be interesting to see how much larger the tree will get. To my untrained eye it looks as if it is far from showing signs of old age.

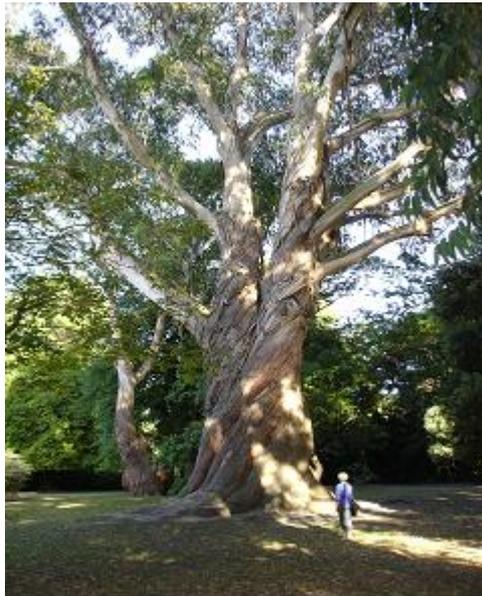
The Alpine Ash is a large hardwood of the cold climate areas of Tasmania, eastern Victoria and south eastern New South Wales. It commonly extends right up to the snowline. In the wild Alpine Ash normally achieves a height of 50-60 m and sometimes more and with a diameter of 1-2 m. It is obvious that the Botanic Gardens' tree grew in an open situation, which enabled it to develop a heavily branched trunk and wide spreading crown, quite unlike the tall, columnar trunks of forest or plantation grown trees.

The Alpine Ash like many "gums" sheds its bark annually in long strips which can be seen hanging down from the upper part of the trunk and its branches until they eventually drop to the ground. Only on the lower half of the trunk does there remain a "stocking" of persistent fibrous bark. Eucalyptus are members of the Myrtle family – and

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are not at all related to the common Ash, *Fraxinus excelsior* of Europe. The name "Ash" was probably given because of a superficial resemblance of their timbers. The species name of this tree comes from the town of Delegate in New South Wales.

Alpine Ash is one of the hardiest of Eucalypts introduced into New Zealand. It will withstand frosts to -12°C and has been found most suitable for shelter and timber pro-



duction. The heartwood has low durability and thus the timber is better reserved for internal use such as furniture, plywood, joinery, panelling and general construction. It has been much planted in former state forests and farmers' woodlots.

Bill Whitmore – taken from notes by Max Visch.

Friends Group Events

Plant Propagation Group - activities.

Members will be pleased to learn that the work of the Plant Propagation Group has been producing some very fine results. The seasonal Plant Sale on 25 October 2008 returned a good profit of \$2016 which was further supplemented by a profit of \$2752 by way of three month's sales from the trolley outside the Information Centre. Your Committee is extremely grateful to all members of the Propagation Group and other helpers on Sale Day for their work in this area of the Friends' activities. Funds resulting from these sales are being put to good use in helping meet the costs of the three recently developed Indigenous Plant Gardens and is being accumulated towards development of the Gondwana Project.

Plant Propagation Group – retirements.

We have had a rather sad start to the year 2009. Three members of the Propagation Team have retired, all of them in the Perennials section. Max Visch has given very fair warning of his intention to quit and in fact is holding on until March. As he has been with the Propagation Section since its inception in 1989, this seems not unreasonable but he will be very much missed. His knowledge and skill is legendary. He will carry on with the Guiding Group for the time being, but be nice to him, we need him!

Unfortunately, when Max leaves us, Daphne McLachlan will also leave as she has no other transportation. Daphne is our oldest working member and I do mean working. She and Max have been a great partnership, filling the Propagation Pit regularly and turning out a never-ending supply of young plants for the Sales Trolley.



And Trudy Van der Weerden feels she now has other priorities. She has been acting as team leader since 2006 and doing a great deal of extra work at weekends, watering and refilling the sales trolley, no small chore especially in the heat of summer. She is entitled to sit in the shade of her charming garden with the lovely pots she has made over her 20 years at Risingholme Pottery. And perhaps crocheting baby clothes for grandchildren, another of her many skills.

The years spanned by these propagation workers have seen progress from the one sale a year, (under canvas on the Hall Lawn, remember) when everything depended on the weather on The Day, to our present system of a permanent sales trolley plus three sales a year round the phoenix palm. The propagation area is now enclosed and gated. The growing areas, once undefined, are now in designated locations and watered by dedicated sprinkler systems, not by rostered members as previously required. These technical advances are not without problems, as Don Bell could tell you, but they do help reduce the load.

I hope these reminiscences will prompt other members to tell us their memories of those days before 1989. Here is one recollection from Neil O'Brien: "Before Sale Days were held at the Hall Lawn we had our very earliest sales in the yard in front of Sue Molloy's office. I can recall seeing a large crowd of eager citizens straining at the double gates there, awaiting the 9 am, I think, start. All hell broke loose when the gates opened. Most of our propagating was done in the yard near the Hazchem store near the Nursery. Staff lifted about one third of the perennial border each year. Clumps of these were dumped in the yard. Over the winter months we split the clumps with spade and fork into much smaller sizes and potted them into plastic bags, which were labeled and stacked along the back of the Nursery wall. Here they stayed until the sale. By then they were in leaf and well rooted. I think some potting was done in our present yard later. But still just perennials." He thinks that prior to 1989 the Gardens staff ran an annual sale which the Friends took over.

We shall all miss their presence in the Gardens and hope they will visit us often.

Plant propagation group – call for volunteers

With long standing members Max Visch, Daphne McLachlan and Trudy Van der Weerden retiring the Perennials Team is left sadly bereft. We hope to entice other Members of the Friends to join us in producing plants for Sale. We need to earn funds for our special projects and to support the Gardens Staff in their good work. It is indeed a rewarding experience, witness the years of devoted service given by these three members now retiring. This is an interesting area of gardening; most of the summer colour in our gardens comes from the variety of perennials and everyone has favourites. If you have expertise in the production of perennials, here is an opportunity to develop it and to help the Friends at the same time. A large part of the funds provided for special projects in the Botanic Gardens come from the sale of plants grown by our four teams of volunteers. If you have no special knowledge, but simply enjoy growing plants, this is a good way to learn more. And the social aspect of the Friends' association is never neglected in the Perennials Sub-Group.

The Perennials Team meets on Thursday mornings at the moment. During the winter months they prefer to work an afternoon shift and quite often need only work alternate weeks. There are three sales a year, usually on a Saturday morning. Phone Helen Constable (980-9358) or email hrcon@paradise.net.nz if you are interested in this opportunity. Or come and meet us in the Propagating Area on Tuesday morning (Trees Shrubs & Natives) or Thursday morning (Perennials).

Helen Constable

Position of treasurer

Mimi Li who has been ably filling the position of our Society's Treasurer over recent months must now return to her own country and has regrettably been obliged to resign from that position. Alison Fox, a past Treasurer, has very kindly agreed to undertake the work of Treasurer until the Annual General Meeting when she wishes to step down so that a more permanent Treasurer can be appointed. Any member who would like to be considered for this important work is invited to contact either our President, Don Bell - tel. 343.6699 or Secretary, Jim Crook - tel. 358.5845.

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Contact Numbers

President	Don Bell	343-6699	Ex Officio	Jeremy Hawker	941-7580
Vice President	Alan Morgan	384-9976	Helpers		
Immediate Past President	David Moyle	358-8914	Plant Sale	Helen Constable	980-9358
Treasurer (acting)	Alison Fox	942-4989	Newsletter mail out	Jean Norton	383-9711
Membership Secretary	Ruby Coleman	355-8811	Botanist	Bill Sykes	366-3844
Minutes Secretary	Jim Crook	358-5845	Guided Walks	Max Visch	338-2273
Newsletter Editor	Bill Whitmore	339-8356	Guide Co-ordinator	Pat Whitman	384-3475
Programme	David Moyle	358-8914	Enquiries	Info Centre	941-6840 x 7590
Other Committee Members	Charles Graham	348-5896	Administrative Assistant	Sylvia Meek	
	Alan Hart	332-6120	Newsletter layout	Maria Adamski	

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