

Newsletter

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

No 96, Winter 2014

From President Charles Graham

New Visitors Centre

Well, the long awaited Visitors Centre is now open for business. It was formally opened by Prince William and his wife Catherine, the Duchess of Cambridge, on 14 April. Forty eight members of the Friends turned up on Saturday 17 May to have a look around the building. Andrew, the architect, just happened to be there and talked to us about the design concept. It was a good chance to see behind the scenes and gain a sense of the hidden workings of the buildings such as automatic ventilation, shading, irrigation and thermal covering of the growing areas - even a machine that automatically washes the glass roof! Some of us enjoyed a coffee in the cafe after the tour, and it was nice to view the nursery area behind the glass walls.

Guiding

Another guiding season is over for our volunteer guides, but they will continue to meet through the winter months to add to their considerable knowledge of plants and the Botanic Gardens. Next month they are visiting the Allan Herbarium to see how the plant specimens are prepared, stored and used for research. They will also see some of the early collections of New Zealand.

Conservatories

Management are awaiting the final sign off for the Cunningham and Townend Houses. This is likely to happen by Spring. Staff are quietly preparing to move plant stock into the Cunningham House. This will help alleviate the strain on space in the nursery area

Plant Propagation Groups

The propagation groups are concentrating on the winter work such as potting up, and potting on plants. We are negotiating with management the best way to sell the plants produced by our volunteers from outside the new Visitors Centre.

Trust

The inaugural meeting of trustees is to be held in the coming week. The first major fund raising project has been identified as the Gondwana Garden. I will be in a position to enlarge on this in the next newsletter.

Submission on the Three Year Plan

We made a submission to the Council on the Three Year Plan for the City – see page 14. Our submission focused on the aspects of the Draft Plan that were associated with the Botanic Gardens. Because of the financial restraints of the CCC due to earthquake costs we did not want projects removed from the plan that our new Trust could possibly find funding for. We also suggested uses for the old tea rooms and Information Centre. I thank Alan Morgan for preparing this submission while I was away.

Garden News

From Curator John Clemens

Botanic gardens have been on a learning curve when it comes to growing plants for conservation. If I can paraphrase, the often stated reasons for cultivating plants that are threatened with extinction in the wild are these: as an insurance against extinction, to prevent genetic erosion, for research and study of their use, for display and education, and to reintroduce plants to the wild. David Given gave these reasons in 1985, citing authors of the previous decade who had “spelt out on many occasions” this role for botanic gardens. He was making a presentation to the Botanic Gardens and the World Conservation Strategy. So where do we stand today? What progress has been made along this learning curve in the last 30 years? Do botanic gardens have a role to play today?

In situ / ex situ

Let's look at the big picture. Target 7 of the Global Strategy for Plant Conservation (GSPC) is to have 75% of world's threatened plant species conserved in their natural habitats (in situ conservation) by 2020 [<http://www.cbd.int/gspc/strategy.shtml>].

Although in situ conservation might be preferable, it is not always practicable to conserve threatened plants in this way – along with all the common plant species and their associated above and below ground biodiversity. Complementing Target 7 is Target 8. This aims to conserve 75% of threatened species out of the wild (ex situ conservation), and to have genetic material of 20% of these species available for recovery and restoration programmes.

As set out by Offord & Meagher in their 2009 book *Plant Germplasm Conservation in Australia*, ex situ conservation can be achieved by seed banking, tissue culture, or very low temperature cryopreservation (storage at -130°C or lower), as well as by growing live plants. Of these ex situ options, seed banking has many advantages, provided the seed can be banked safely (prepared for storage without loss of viability).



Lords Bush, a valuable remnant for the in situ conservation of plants as described in Native Plant Communities of the Canterbury Plains published by the Department of Conservation

Seed banks

Michael Way from the Kew's Millennium Seed Bank Partnership attended the New Zealand Plant Conservation Network meeting in Auckland this time last year. He spoke about the “most ambitious plant conservation project ever”. This is to safely store 25% of the world's bankable flora at the Millennium Seed Bank and at partner facilities by 2020. The world might have in excess of 400,000 plant species, a fifth of which are estimated to be threatened with extinction.

Although the indigenous New Zealand flora is small compared to the floras of, for instance, Australia and China, which are over ten times larger, banking its seeds in a professional and useful way is a big task. In 2006 a local group proposed to take on this challenge in association with the Millennium Seed Bank. The partners of the New Zealand Indigenous Flora Seed Bank (NZIFSB) are AgResearch, the Department of Conservation, Landcare Research and Massey University. The developing native seed bank is based at the Margot Forde Germplasm Centre in Palmerston North

[http://www.nzpcn.org.nz/page.aspx?conservation_seedbank].

The scale of the challenge can be appreciated when considering how many seeds of each species might need to be collected. To capture the genetic diversity that exists in the wild, it could be necessary to collect from 50 or more different wild populations within a species, and from 50 or more individual plants within each of those populations. A total in excess of 10,000 seeds might be collected per species. Of course, these are approximate guidelines and might not be achievable, especially for highly threatened species that might have only a few individual plants in the wild.

Seed and live plant stores

Typical procedures for targeting, collecting, cleaning, drying, testing and storage for re-use of New Zealand species have been described in the proposal by the local Seed Bank group [<http://www.nzpcn.org.nz/publications/NZPCN-seed-bank-060616.pdf>]. Collectors, including Dean Pendrigh from our own Botanic Gardens, have attended a workshop to be trained in the necessary techniques and documentation.

Most (possibly as high as 90%) of the world's plants are estimated to have seeds that can be dried and stored for long periods, and that can be used for restoration as required. These seeds are said to be "orthodox" and are typically able to be dried to 4-7% moisture content (MC) and stored at low temperatures (e.g. -18°C). However, seeds of some species might have "intermediate" storage characteristics (damaged at <10-12% MC) or be "recalcitrant" (damaged at <15-25% MC) (Offord & Meagher 2009).

It is likely or very likely that two thirds of the New Zealand indigenous flora has seeds with orthodox storage characteristics. However, the situation is uncertain for the remainder with possibly 5% having recalcitrant seed. Ex situ measures other than seed storage will be needed to conserve species with recalcitrant seed. These measures could include growing ex situ populations of live plants in places where the plants will not hybridise with related species in cultivation (or other rare plants being conserved ex situ). The latter has been identified as a problem when it is intended to use cultivated rare plants as a seed source for restoration projects.

As documented by de Lange *et al.* [<http://www.nzpcn.org.nz/publications/NZTCS-Vascular%20Plants%20-%202013.pdf>], 289 species or 11% of the indigenous New Zealand flora was threatened with extinction in 2012 (Nationally Critical, Endangered or Vulnerable), and a further 29% were "at risk". In Canterbury, we have a good proportion of these threatened species (60 or more), some of which might not have orthodox seeds.



A relatively new systematic garden at the oldest botanic garden in The Netherlands, the Hortus botanicus in Leiden, where a few plants of selected species are grouped and displayed according to the order (group of families) to which they belong.

A changing role for botanic gardens

So where do botanic gardens stand today in their conservation efforts? The number of botanic gardens has more than doubled worldwide in the last 30 years. There were "1,400 or more" according to David Given in 1985 and a total of at least 3,100 in 2013 as reported at last year's Botanic Gardens Conservation International meeting in Dunedin. Many of the more recently established ones have plant conservation for human wellbeing as their primary function (along with the display of native habitats, education and research).

Older botanic gardens have expanded, spawned native plant satellites, or adapted to include natural vegetation for in situ conservation and to help visitors understand conservation messages. Ex situ conservation projects have also become a feature in the last 30 years as we realise just how vulnerable our

native plants and communities are (as well as some of the exotic plants in our plant collections).

Plant collections built up in botanic gardens in previous decades or centuries have traditionally sampled only a very limited proportion of the genetic diversity growing in the wild, tending to conserve and display only a very few plants of each species. This focus is changing as larger natural areas are taken into botanic gardens and greater attention is paid to the more comprehensive sampling of natural variation in the wild.

As circumstances and resources permit, botanic gardens have made good progress on the conservation learning curve, while at the same time attending to more traditional functions. Working alongside those who manage other open spaces in cities and natural areas, botanic gardens definitely have a role to play. At the national level, the partners of the New Zealand Indigenous Flora Seed Bank have identified New Zealand botanic gardens as repositories for duplicate collections of native plant seed (satellites of the Margot Forde Germplasm Centre “to complete the package” of the seed banking group). Locally, several of the New Zealand botanic garden and the organisations to which they belong can and do engage in the conservation of indigenous plants either by in situ methods, or as ex situ seed collections and live plant populations.

In closing

Collections of rare plants present great opportunities for showing and telling the public about the plight of these species and the places they grow naturally. They are also useful and convenient ways for people to study the plants. Properly documented and representative of the genetic diversity in the wild, they also serve to enhance the restoration and continuing evolution of wild populations.

Restoring plants to the wild depends on knowing the origin of the plants. In the past we might have held to a “local is best” approach with ecosourcing holding sway to minimise what has been termed genetic pollution. However, in some circumstances at least *“Acceptance of local is best ... is likely to contribute to*

significant restoration failure over the coming years”. ‘Composite provenancing’ of local and more distant populations within a species is likely to be better for restoration success as described in recent papers. Whichever way the seed is used, we still need to have the documented collections, something botanic gardens can do very well.

Events in the Gardens

From Anna Hoetjes, Information Officer, Gardens and Heritage Parks Team, DDI 941 7595

Kidsfest event

The Christchurch Botanic Gardens present: **The Mysterious Fantasy Collection of Amazing Plants**. Enter a fantasy world of plants especially designed by the Christchurch Botanic Gardens staff for you, this winter holidays. These plants have been created out of the minds of some of the most creative botanists in the land. Come on a whirlwind journey around the globe and experience the plants that could, or maybe should, inhabit foreign lands. Please see www.kidsfest.co.nz for more details on the location of this exhibit in the gardens.

10am - 4pm daily from 5 July – 19 July. Entry free, caregiver required. Ages 3-10 years

Articles

Crops of the Incas in New Zealand – by Bill Sykes

For some years I have been interested in the edible plants of the Andean Region and have grown a number of the more unusual ones found in New Zealand at home and nearby in our little community garden in Packe Street Park, St Albans, Christchurch. My bible for Andean plants has been a very interesting book published in 1989 called *Lost crops of the Incas* written by several scientists of the National Research Council in Washington, DC¹. Many plants described in it I have never seen and probably most of these are not or are rarely grown outside South America.



Photo: Bill Sykes

Packe Street Park community garden, St Albans, Christchurch.

Anyone visiting Packe Street Park cannot fail to see the influence of the Mediterranean Region with our grape vines, olives, almonds, peaches and a fig tree because such plants grow well in our dry summer climate. But another part of the

world that contributes significantly, although less obviously, to the diversity of edible plants in our park is the Andes of South America.

Some of the plants mentioned below were not only known to the ancient Inca people but were amongst their staple crops. Since I have been interested in these edible plants for a long time it seemed a good idea to plant some that were available in New Zealand in Packe Street Park so that volunteer workers and visitors could try them too.

The Andes of South America (and to a lesser extent the mountains to the east) have long been known as a source of food plants, not only for the indigenous people but also for other peoples in more modern times. One needs only mention potatoes and tomatoes to make this point clear. It is surprising that tomatoes don't seem to have been used as a food crop by the Inca people but were instead taken to Mexico where the Aztec and other Indian peoples ate them. That happened well before the Spanish arrived on the scene.

Potatoes, *Solanum tuberosum* and *S. tuberosum* subspecies *andigena*

In Packe Street Park amongst the usual potato type of *Solanum tuberosum*, we grow the less common *andigena* potato with its small irregular dark purple tubers. This potato seems to have been the first type to have been introduced to New Zealand by early Europeans and it quickly became very popular amongst Māori people. Because the tubers are often formed on underground stems at a distance from the planted parent potato (unlike the ordinary potato) it is difficult to harvest them all properly. Thus we usually have a useful supply of emergency food for people who need something for the pot at short notice.

¹ *Lost crops of the Incas: Little-known plants of the Andes with promise for worldwide cultivation* (1989). Report of an Ad Hoc Panel of the Advisory Committee on Technology Innovation, Board on Science and Technology for International Development, National Research Council. National Academy Press, Washington, DC.



Drawing: Tessa Read.

Botanical illustration of the *andigena* potato, *Solanum tuberosum* subsp. *andigena*.

Oca, *Oxalis tuberosa*, and mashua, *Tropaeolum tuberosum*

These two tuberous vegetables, available to eat in autumn and winter, have been amongst the most important foods in the High Andes for centuries, especially oca. This latter vegetable is well known to everyone in New Zealand and needs no description because it is sold throughout this country as “yam”. This is a very unfortunate common name because it could hardly be less like a yam as the word is applied all over the rest of the English-speaking world. True yams are of the genus *Dioscorea* and are imported from the Pacific islands to Auckland but are rarely sold as far south as Christchurch. As their genus names indicate, true yams belong to the Dioscoreaceae (a monocot family), whereas oca is a member of the Oxalidaceae (dicots), which is also known for its weedy and ornamental species of oxalis. Interestingly, up to now New Zealand has been almost the only country beyond the Andean Region where oca is generally well enough known to have had the chance to become a commercial vegetable. Also, as many of us know, there are now several forms available with different coloured tubers.



Photo: R. Simpson, via www.ecoport.org.

Oca, Oxalis tuberosa.

Mashua, on the other hand, is a plant hardly known in New Zealand although it was also one of the most important crops of the Incas. This is a climbing or scrambling plant – as are most members of the genus *Tropaeolum* (Tropaeolaceae), including another Andean plant the garden nasturtium, *Tropaeolum majus*, which is a common and all too freely-seeding scrambling plant. The white tubers of mashua with their transverse grooves are so like those of oca that it is perhaps surprising that they belong in two separate families of plants although botanically these are not too distant. Furthermore they are cooked in the same way and the taste is somewhat similar. Another feature in common is that they are both short-day plants originating from low latitudes and so in New Zealand they don't form their tubers until late summer. Incidentally, potatoes introduced to Europe soon after the Spanish Conquest were also short-day plants but long-day varieties were later developed and replaced the early ones. As a result, modern potatoes, as well as the modern *andigena* ones, form their tubers from early in the summer onwards. Flowering is very spasmodic in oca but more predictable in mashua and, for both, flowering doesn't happen until autumn. Also the above ground parts of both are very frost-tender and thus often the leaves and flowers get killed in the Park by the first air frost. Despite their popularity in the High Andes this cold damage must occur there as well. Certainly it would boost production if long-day varieties could be developed like the potato.



Photo: Bill Sykes

Mashua, *Tropaeolum tuberosum*, growing up a holly tree in the authors' garden.



Drawing: Tessa Read

Mashua, *Tropaeolum tuberosum* botanical illustration.

Ulluco, *Ullucus tuberosus*

For several years I have grown this root crop after getting a few tubers from Plant & Food Research, Lincoln. The tubers are smaller than those of the oca and mashua. Ulluco is a very famous plant in its region of origin; it was also a staple food for the Incas like oca, mashua and potato. Also, like oca and mashua, ulluco only forms its tubers in late summer and early autumn and has frost-sensitive leaves. It belongs to a quite different and uncommon family, the Basellaceae, that is mainly only known otherwise in this country by the ornamental but very weedy vine, *Anredera*

cordifolia, Madeira vine or mignonette vine, that originates from Central America – despite its common name. In the tropical Pacific however, there is also to be found the climbing Asian vine *Basella alba*, Malabar spinach, that is a popular leaf vegetable.



Photo: Bill Sykes

Ulluco, *Ullucus tuberosus*, small plant growing in pot.



Image courtesy Missouri Botanical Garden, www.botanicus.org.

Ulluco, botanical illustration from *Curtis's Botanical Magazine*, Vol. 77 [Ser. 3, Vol. 7], Tab. 4617 (1851) [W.H. Fitch].

Yacon, *Smallanthus sonchifolius*

In New Zealand probably the rarest of the Andean plants to be mentioned here is yacon, *Smallanthus sonchifolius* (syn. *Polymnia sonchifolia*) although it is well known in parts of the Andes. It is a relation of the sunflowers and also belongs to the Asteraceae (Compositae).

Like many sunflowers yacon is a tall herbaceous plant resembling Jerusalem artichoke, *Helianthus tuberosus* (this being a species of sunflower from North America and at Packe Street Park is another community garden emergency food). Also like it, the edible parts of yacon are the underground tubers, these being rich in fructose. Yacon tubers are thus quite sweet, as well as being crunchy, and can be eaten raw or cooked. A point to remember is that the outside skin is unpalatable. Another fact in common with these other tuberous plants is that the above ground parts are very sensitive to frost in Christchurch. I have grown yacon at home for several years but haven't yet had enough stock produced to plant it out in the Park and also I have not seen it flower, presumably because it doesn't get time before the onset of cold weather in late autumn. Yacon is another plant almost unknown outside South America, but despite its rarity in New Zealand this is still the most likely country to find it in outside its homeland.



Image courtesy Missouri Botanical Garden, www.botanicus.org.

Botanical illustration of yacon, *Smallanthus sonchifolius* (as *Polymnia sonchifolia*) from Poeppig, E., *Nova genera ac species plantarum*, Vol. 3, Tab. 254 (1845).

Cape gooseberry, *Physalis peruviana*, and pepino, *Solanum muricatum*

We often grow these two well-known Andean species in Packe Street Park but they are short-lived herbaceous plants and usually don't

survive the winter. If seed is sown in the spring they can produce their edible fruits before the autumn frosts if kept in the warmest possible place. Along with potatoes discussed previously, both cape gooseberry and pepino are in the very large solanum family (Solanaceae) that is so diverse in South America. Cape gooseberry, sometimes known as Inca berry, has a yellow-orange, cherry-sized, globular berry that is enclosed in a papery brown jacket (hence the cape is really the enlarged floral calyx), the main difficulty being to know when the berries are ripe without opening the jacket. There is no trouble in this way over the pepino because its large pendulous creamy-yellow and usually purple-streaked and more or less sub-globular fruits are very conspicuous and can grow to 15 cm long or more although are usually only about 8 to 10 cm in our garden. In the late 1970s and early 1980s there were efforts to commercialise pepino in New Zealand, and several cultivars were developed, but this venture did not succeed. Both fruits are mostly eaten fresh but those of cape gooseberry are sweeter than those of the pepino. Also, cape gooseberry makes very good jam.



Image courtesy Missouri Botanical Garden, www.botanicus.org.

Botanical illustration of pepino, *Solanum muricatum* (as *Solanum variegatum* Ruiz & Pavon) from Ruiz and Pavon, *Flora Peruviana, et Chilensis*, Plates 153–325, Vol. 2, Tab. 162 (1798–1802).

Before leaving the Solanaceae family I must mention the well-known and popular capsicums and chilli peppers, *Capsicum* species, which we sometimes have in the Park in warm places. Capsicums are similar in respect to habit and cultivation condition needs to pepino. Again capsicums and chilli peppers have a long history in the Andes going back to the time of the Incas. The peppers at that time were small and very hot and by the time of Columbus they had been taken north at least as far as Mexico and were popular amongst the Aztecs too. Since then there have been extensive breeding programmes, especially in North America; the result being the great range of different peppers that are used across the world today with large and mild as well as hot peppers.

Ugni, *Ugni molinae*, and feijoa, *Acca sellowiana*

The main member of this duet of fruit crops to be discussed is ugni, *Ugni molinae*, because feijoa is not quite an Andean plant since it originates from the mountains of southern Brazil and was most likely unknown to the people of the Andes. Feijoa, *Acca sellowiana* (syn. *Feijoa sellowiana*), is very well known throughout New Zealand although not much elsewhere overseas outside South America. Also it is hardy enough to grow freely outside in Canterbury. Both species belong to the very large myrtle family (Myrtaceae) that is so abundant in the southern hemisphere. Ugni is sometimes called strawberry myrtle elsewhere and this is an acceptable English alternative to the Chilean name. But in New Zealand, as with oca, we unfortunately persist in calling it by a totally wrong name. In this case cranberry or New Zealand cranberry is erroneously used, but although the berries are roughly the same size and shape as true cranberries their taste bears no resemblance, let alone the appearance of the plants. True cranberries are closely related to blueberries and thus are in the very different and unrelated family Ericaceae. I enjoy the ugni berries in autumn and can hardly pass a bush without eating a few of these deliciously fragrant fruits. Ugni is quite hardy and the little round leathery evergreen leaves can stand up to wind and cold. In New Zealand it is sometimes grown as a hedge because of its dense habit. I remember seeing it obviously naturalised on the Chatham Islands where in

open and exposed, windswept boggy areas low ugni bushes are locally common. Again, ugni is scarcely known or grown outside its Andean homeland in Central Chile except for New Zealand.



Image courtesy Missouri Botanical Garden, www.botanicus.org.

Botanical illustration of feijoa, *Acca sellowiana* from *Curtis's Botanical Magazine*, Vol. 124 [Ser. 3, Vol. 54], Tab. 7620 (1898) [M. Smith].



Drawing: Tessa Read.

Botanical illustration of ugni, *Ugni molinae*.

Other Andean plants in Packe Street Park

We grow a few cucurbits, including pumpkins and marrows (Cucurbitaceae) in Packe Street Park, and the species of most of these originate in the Andes. The usual pumpkin grown is the grey 'Whangaparoa Crown' which is a cultivar

of the main pumpkin species *Cucurbita maxima*. This has a long history of cultivation in the Andes for it and other cucurbits were a mainstay of the Incas and other peoples there. Of course, as with all such plant species that have become popular world-wide, there has been so much breeding and selection in the last 500 years or thereabouts that usually today the modern cultivars derived from them are quite different from their progenitors of several thousand years ago. In the same way, the marrows and courgettes or zucchinis that we often grow in New Zealand has changed considerably from the species, *Cucurbita pepo*, that is originally from North or Central America.

A plant not usually associated with the Andes is the strawberry (Rosaceae). However there is an Andean strawberry, *Fragaria chiloensis*, and the result of crossing this with the North American scarlet strawberry, *Fragaria virginiana*, gave the world the modern strawberries of commerce. Thus all the large strawberries that we regularly eat are derived from this hybrid called botanically *Fragaria × ananassa*. The bringing together of these two species took place in France in the early 18th century. On the other hand that little alpine strawberry with its very small fruits that we also sometimes grow in our Park belongs to the European *F. vesca*.

I should make a brief mention of Andean plants that we cannot grow in Packe Street because it is too cold. Not surprisingly they come from lowland and thus subtropical and tropical parts of the central and northern Andes. Some are not well known beyond the Andean Region although again New Zealand has often been in the forefront of introducing them to the rest of the world. Some have an obvious economic potential, but one must go further north in New Zealand to see growing cherimoya, *Annona cherimola*, in the custard apple family (Annonaceae), and chamburo or mountain pawpaw, *Vasconcellea pubescens* (usually known as *Carica pubescens*). Incidentally, the usual pawpaw fruits sold here is the tropical species that is still botanically *Carica papaya* (Caricaceae). Some of the passion fruits, especially some of the banana ones, *Passiflora* species in the *Tacsonia* group (Passifloraceae), are from the Andes and were known to the

Incas. Although not very hardy in Christchurch itself these plants grow wild and can fruit prolifically on Banks Peninsula and in warm places on the Canterbury coast to the north, so much so that these vines can become a nuisance.

Finally, although we don't grow any plants with edible seeds, there are several in two genera that should be mentioned to round off this discussion of Andean plants. The most important species in the region was (and probably still is) the quinoa, *Chenopodium quinoa* (Chenopodiaceae; or Amaranthaceae as it may now instead belong), a food that the Incas regarded to be so vital that it was considered sacred according to *Lost crops of the Incas* where it is stated that the Inca Emperor planted the first seed using a golden spade. Many forms of quinoa were and still are available. Quinoa seeds are said to be one of the best sources of protein in plants. They are ground to form flour and this is available from health food shops in Canterbury. In the same genus is our very common weed *Chenopodium album* or fathen from the Old World that I often cook the leaves of.



Image courtesy Missouri Botanical Garden, www.botanicus.org.

Botanical illustration of quinoa, *Chenopodium quinoa* from *Curtis's Botanical Magazine*, Vol. 65 [Ser. 2, Vol. 12], Tab. 3641 (1839) [W.H. Fitch].

The second genus with at least one important seed-producing species is *Amaranthus* (Amaranthaceae). *A. caudatus*, kiwicha or love lies bleeding, was also an important food crop for Andean people. Thus it seems to be indigenous to this region and not to Asia, although these days it is such a well-known crop plant in temperate climate areas like the Himalaya that it seems as if it must originate from there.



Image courtesy Missouri Botanical Garden, www.botanicus.org.

Botanical illustration of love lies bleeding, *Amaranthus caudatus* from Vietz, F.B., *Icones plantarum medico-oeconomico-technologicarum*, Vol. 3, Tab. 266 (1806).

Community gardens and small patches of common land are useful places to trial these non-commercial but useful food plants. They add variety to our local food larder and a back-up for people needing to augment their diet. These are plants that have sustained humans for thousands of years in their homeland. I can do no better than quote from the *Lost crops of the Incas* where the authors state "...one country outside the Andes already has had considerable experience and success with them – New Zealand".

Acknowledgements

I wish to acknowledge my gardening colleagues who have looked after the Packe Street Park and Community Garden for the last 17 years,

especially to Peggy Kelly who is the main organiser of planting activities there, as well as to people beyond who have provided me with Andean plants to grow there and at home. I also thank Tessa Read who is another volunteer at the Park and drew some of the plants illustrating this article.

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The Peacock Fountain

Biddy Pollard writes of the Fountain's history and restoration.

In 1910 a fountain was proposed for the Christchurch Domain, later named the Botanic Gardens, to honour the Hon. J.T. Peacock, former Lyttelton M.P., Mayor of St Albans and prominent businessman, who bequeathed money for it to the Christchurch Beautifying Association. A competition was held for its design which must not exceed £500. An elaborate three-tier structure decorated with dolphins, herons, lily leaves and bulrushes was chosen and imported; a fine example of Victorian design in cast iron from the famous Coalbrookdale Foundry in Shropshire, England where cast iron was invented, with the nameplate on its side.



Peacock Fountain in about 1920



Peacock Fountain in its second position

Originally sited in a concrete pool near where the McDougall Art Gallery now stands, in 1932 it was moved to the Archery Lawn to allow the gallery to be built. Here it was not contained in pool so a small lake formed round it. My first childhood recollection of the fountain was gazing curiously at the mysterious verdigris-covered intricate patterns trying to see the peacocks amongst the herons and dolphins. On a windy day one didn't venture too closely on that soggy lawn for fear of getting drenched. My husband John Pollard, as a boy, was also intrigued and took Box Brownie photos of it. Over the years maintenance problems built up with rusting pipes, cracks, blocked jets and water supply. Consequently in 1949 it was dismantled and stored at the Botanic Gardens.

In succeeding years restoration was suggested spasmodically but unsuccessfully and in 1984 the City Council gave the pieces they could find to the Ferrymead Trust for its Historic Park. There they lay until the early 1990s, when interest was again stirred by enthusiast Evan White and John Pollard, now a retired chemical engineer and Chairman of the National Heritage Committee, Institution of Professional Engineering. He now had time to urge the restoration of the beloved fountain of his childhood. By writing to *The Press* and various associations to gain their enthusiastic support, he, Malcolm Jones, Ivan Crosby and other retired engineering friends not only retrieved the Ferrymead pieces but found some still in the Gardens. Many pieces were broken and some lost, namely a dolphin, four herons and part of a lily pad, but with modern engineering techniques in internal piping design, blast

cleaning and various other processes together with an enormous amount of patience they were confident that restoration could be achieved. Coalbrookdale Foundry was contacted for help, but it had been taken over and were mainly casting cookers such as Aga. Archives in the Ironbridge Museum were unavailable for research due to "fear of industrial espionage".



Sorting out the collection of whole and broken pieces



Dolphin's head

However, by this time local enthusiasm was being whipped up; the City Council lent its Pages Road pumping station as a reassembly workshop for the patient volunteers to fit the broken jigsaw pieces together, and to add newly-cast replicas of the missing herons. Funds came from the Council, Friends of the Botanic Gardens, Historic Places Trust, the Beautifying Association, Rotary Club and a

lottery grant, as well as private bequests, totalling approximately \$180,000. After much deliberation a site by the museum was recommended by the Beautifying Association as a main feature to the Gardens entrance. Water supply was simple there and plans progressed smoothly, with architect George Lucking designing the foundations and surrounding pool to seismic specifications.

Finally, after artist Bill Sutton's debatable colour scheme had been agreed upon and triumphantly finished, on Sunday 26 May 1996 a "Recommissioning Ceremony" was held in front of the fountain with due ceremony; string quartet, Town Crier introduction to speakers Mayor Vicki Buck, and IPENZ Chairman, National Committee for Engineering Heritage, John Pollard. The Mayor unveiled the commemorative plaque, and in a moment of rare significance turned on the fountain. After three years of patient work aided by many elderly enthusiastic volunteers, my husband's dream had been fulfilled.

Earlier staff of the Christchurch Botanic Gardens

Stan Darling talks to Don Bell

Don Bell's mother died when he was three years old. From the age of five, he developed a small vegetable garden in the Karori hills. "I spent a number of years in Wellington with my auntie and uncle, a police officer" says the former Botanic Gardens apprentice.

He became an apprentice straight out of Christchurch Boys High School. "I was interested in agriculture, but going into agriculture at that time was not overly attractive. I think we were part of a lucky generation in the 1950s. Jobs were reasonable plentiful. I was working with people of a similar age and got a good variety of work. We used to be shifted to different locations every six months to learn different skills." Don enjoyed the nursery work at Linwood Avenue and spent about a year there. "We were fairly intent on getting our trade certificates."

At the time, New Zealand's largest pot plant nursery was in Napier. Its owner had visited the

Gardens to look at exchanging various indoor plants. "I finished my apprenticeship there with quite a lot of propagation work being in charge of a group of plant houses." He was 20 by then and worked there about 18 months. One day, the Director of Invercargill's parks and recreation department was visiting, buying plants for a conservatory that had just been completed. He asked Don to shift there to look after their winter garden.

"That was quite a challenge. I was probably the first person in Southland to grow *Victoria regia* (a tropical water lily). They managed to get the seeds from somewhere and had a tepid pond inside the garden." The water lily has a huge leaf which can be a metre wide: "You sometimes see photos of small children or babies sitting on them."

The job was virtually a sole charge position and combined with the last six months of his apprenticeship. He was about to be married to a newly trained teacher in Christchurch and applied to work for the Waimairi County Council. "I took the job as head gardener for the Council when they were just developing Jellie Park. It was hands-on and I was directing staff."

After five years, he moved to Lincoln College to join their horticultural department, first as nursery propagator. He became nursery manager and was in charge of the campus grounds.

While at Lincoln he completed the national diploma in horticulture. "I was probably looking at some sort of administrative position after more than six years there and applied to become deputy director of parks and recreation at Palmerston North." During his six years there, he did part-time study for a certificate in business supervision. "Palmerston North was known as the Invercargill of the North Island, but it had generous open spaces so was wonderful from that point of view."

Nelson came next as Bell was appointed superintendent of the city's parks and recreation in 1973. "My first six weeks there had frosty weather and brilliant sunny days." He was involved with establishing a golf course in the

Matai Valley and city forestry projects on mainly hill country.

“The old airport still had a steel wood-burning stove to heat the terminal.” His workers established gardens around the new building.

After nine years he became parks and recreation superintendent in Napier. “Perhaps in that kind of job you tend to become more of an accountant and manager of people.” There and in Nelson, he had become involved with the new system of preparing management plans and encouraging public input on new projects.



Don Bell

But he had always been a keen conservationist and got out with Forest and Bird people in the Hawkes Bay high country. The children had left home by then, and his wife was back teaching.

They shifted to Christchurch in 2002 to be closer to family. He is on the Canterbury Botanical Society committee now and guides with the Friends of the Botanic Gardens. He belongs to a propagation group with a small nursery at the Gardens, which sells plants through the Information Centre.

Don’s first retirement project was the writing of *Trees for New Zealand, Town and Country* (2001), published by David Bateman. It is a general guide for people interested in trees. During his research, he visited nurserymen, farmers and other people keen to help. “That is one of the most interesting parts about such a project.”

Submission on the Three Year Plan Review by the Friends of the Christchurch Botanic Gardens Inc.

The Friends of the Christchurch Botanic Gardens Inc. (FOBG) exists solely for the benefit of the Botanic Gardens. We are thrilled with the new building and production facilities and congratulate the Council for the foresight in completing the project. We recognise that future funding for capital projects will be heavily contested by other demands on the Council's resources.

However we submit that other projects already in the Botanic Gardens Master Plan 2007 should not be shelved as other avenues for funding may be available. The FOBG is in the final stages of launching the Botanic Gardens Trust with the objective of enhancing our fundraising capabilities beyond that of the existing avenues. (Master Plan Item 4, P29)

With the opening of the Visitor Centre two existing buildings have become vacant and provide exciting opportunities for development.

The FOBG (and the Trust in future) respect the current process where the Gardens staff propose the future projects and include them in the development plan and initiate implementation subject to available resources and priorities. The FOBG and the Trust will be encouraging the staff to make the decisions both of the content and timing of the proposed developments so that the vision for funding can be promoted to potential donors. Funding for design and development can be considered part of the project cost.

Submissions on projects proposed in the 2007 Master Plan

(reference number and page bracketed) include but are not limited to the following:

1. Visitor Centre: With the completion of the new Visitor Centre (for which we are very grateful) the vision of all that is needed for the completion of the information and interpretation facilities and for other facilities necessary to maximise its potential is detailed and discussed with the FOBG committee.

2. Pedestrian Bridge: (Item 6, p31) That the originally proposed pedestrian bridge that will allow the centre to fully function as the prime entry to the Gardens, be designed, costed and promoted as a future project and at an appropriate time, resource consent be sought for it.

3. Old Cafe Building: (Item 36 p84 Enhancement of an Educational Programme.....) The new building releases the old Cafe for other uses - (when the earthquake strengthening is completed). It has been proposed to house the "Botanical Discovery Facility" aimed at school groups but open to all and to provide an interim interpretive centre for the proposed Gondwana Garden. The temptation to turn it into a commercial function centre will be resisted with much vigour by the FOBG (although hire for functions compatible and not interfering with educational use would not be a problem).

4. Old Information Centre: This relatively young and beautifully sited building offers a great opportunity for further enhancing the activity of the Botanic Gardens. Ideas for its use have included:- desk space for research students, a studio for botanical artists; a base for the 'Friends' with meeting and workshop space for committees; a museum of horticultural tools and equipment.

5. Gondwana Garden: (Item 37, P85). The long-proposed Gondwana Garden should now proceed to a fully designed stage so that the project vision can be fully promoted. The development work and plant sourcing expected to be done within existing resources and budgets needs to be programmed and communicated to the FOBG committee so that resourcing beyond that can be considered. This project will greatly enhance the Gardens ability to tell the story of the unique origin and evolution of our flora and the relationship it has with our Gondwanan neighbours, Australia and South America. This would greatly enhance understanding and appreciation of Southern

Summer scholarships in recent years, mainly with the University of Canterbury, there is a need for funding to satisfy the "considerable

Hemisphere plants, which is the Primary Goal in the Management Plan (Part III p. 51).

8. Restoration of the Cockayne Garden and redevelopment of the associated New Zealand Section: (Item 43 p91) This work has started in part of the Cockayne Garden in the past year. However the telling of the story of our unique flora (80% endemic!) even that within our city boundaries (which includes Banks Peninsula) is still woefully inadequate. We look forward to this work continuing and within the existing management budget.

6. Children's Garden: (Item 33 P81) The proposed Children's Garden adjacent to the existing playground would also enhance the educational functions of the Gardens. There is a body of opinion that the existing playground is not within the usual scope of botanical gardens but the flow-on to a connecting learning space will enhance the experience for the majority who come just for the playground. The proximity of the Botanical Discovery and the Gondwana Garden will further complement the learning opportunity in that corner of the Gardens.

7. New Conservatory Complex: (Item 39 P87) The long term vision of a new conservatory complex (or "Biome Gallery") which will provide the opportunity to tell the story of some of our specialised habitats eg sub-Antarctic islands, true Canterbury alpine, and our indigenous subtropical plants, as well as exotic and ornamental displays should be further developed so that potential funders may become interested.

8. Science and Research Facility / programme: (Item 47 p96). Research is a key element contributing to the Vision of the Botanic Gardens (p 7). While the new Visitor Centre now houses an expanded library, and rooms for a herbarium, there is still a need for the equipment to go in the herbarium space (such as specimen cabinets, a freezer, and dryer for new specimens). Also, while the FOBG have been able to sponsor short-term (10 week potential" (p 96) for greater research activity centred on the plant collections.

The FOBG would like for two representatives to attend any hearing and speak briefly to these submissions.

Conclusion: The Trust will work on a project-to-project basis so that the vision, the detail and the budget of each project must be able to excite both the trustees and potential donors.

For the Committee of the Friends of the Christchurch Botanic Gardens.

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