THE BOTANIC GARDENer

The magazine for botanic garden professionals

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Theme: Managing Change – BGANZ Congress 2017

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Feedback and comments on the newsletter and articles are welcome. Please email: secretariat@bganz.org.au

COVER: *Couroupita guianensis*, *Rhododendron coxianum*, growing in the upper section of Rhododendron Valley, at Mount Lofty Botanic Garden. The plant is of wild origin and the species is listed with a threat category rating of CR in The Red List of Rhododendrons.
Photo credit: Stephen Kingdon, Botanic Gardens South Australia.

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The theme of the May issue is ***Recovering from Disaster***. The deadline for contributions is Monday 2 April 2018. Please contact the Secretariat (secretariat@bganz.org.au) if you are intending to submit an article or have a contribution to other sections.

President's view

Paul Tracey, BGANZ President

Paul Tracey

Welcome to the latest edition of the Botanic Gardener Magazine.

This is my first column as BGANZ President, and I returned energised and refreshed from the BGANZ Congress held in Adelaide.

On behalf of BGANZ I would like to extend our thanks and appreciation to Dr Lucy Sutherland, John Sandham, Sophie Hastwell and the entire team at the Botanic Gardens of South Australia for their efforts in hosting a terrific BGANZ Congress.

The congress has once again shown through the presentations that, despite our Botanic Garden network being relatively small, as a collective we are achieving great things.

We come from gardens of different shapes and sizes. I really enjoyed learning that despite these differences, we are very similar in the way we all seem to be continually adjusting the way we do things, and being creative in the way we respond to funding constraints, staffing changes and restructures.

From our newest BGANZ member garden the National Botanic Garden, Lae in Papua New Guinea engaging creatively with business to fund Botanic Garden upgrades to make their visitors feel safe, through to the innovative design competition and creative fundraising undertaken that will shortly realise an architectural showpiece conservatory at the Australian National Botanic Garden. We are all progressing despite the challenges that we face.

The BGANZ Council has just gone through a significant change with a number of Council members completing their six-year term. I would like to thank John Sandham, BGANZ President, for his significant contribution to BGANZ over the last two years. I would also like to thank John Arnott, Lesley Hammersley, Brian Harty, phil Parsons and Kate Heffernan for their role in developing BGANZ.

I look forward to working with the new Council and to continue to build on the great work of past Council.

I hope you enjoy the magazine and I wish you all the best for the festive season.

Fond farewells

John Sandham, Immediate Past President

John Sandham

Time has been called and as I enter the last year on Council as Past President it's my pleasure to congratulate and welcome our new President Paul Tracey. It's been a real pleasure for me to have been part of the BGANZ Council for the last six years and to finish my term as President on such a high note, with the conclusion of the recent Congress. You can be assured that BGANZ is in good heart, and I know that Paul and the new BGANZ Council will continue to promote and grow our network.

There have been many other highlights during this last year, including the Botanic Garden Open Day where His Excellency General the Honourable Sir Peter Cosgrove AK MC (Retd) Governor-General of the Commonwealth of Australia, speaking as our patron at the launch of the Open Day on Thursday 11 May said, 'as Australians and Kiwis, we all love our botanic gardens; they are places where people come to be amongst nature. But what the vast majority of us ordinary folk don't realise is that gardens are playing a critical role in how we tackle the big challenges facing our future', a sentiment which we obviously share.

BGANZ Council and many individual members have been working hard with Strategic Membership Solutions to develop partnerships and strategies to secure long-term funding for BGANZ. As a result, proposals have been distributed to 70 companies from 12 business categories.

A new website has been developed, which provides a multi-level platform with a 'members only' section covering 80% of the site, and with 20% available for shared public access.

More recently, a short BGANZ media survey has gone to all members. The results will assist Council to develop and implement a new social media strategy.

I should also remind members of the opportunity for savings to be made if purchasing a new car. Not only are there savings available for individual members, but BGANZ also receives a payment from each purchase. Check it out at https://www.autotender.com.au/bganz/.

Finally, thank you for all the support given to me by other retiring Council members over the last 12 months, and all the best for the future to Paul and the new BGANZ Council.

The 8th BGANZ Congress Opening Ceremony. Outgoing BGANZ President John Sandham, with Katrina Powers (left) and Dr Lucy Sutherland. Photo: Jake Dean

Editorial insights

Alan Matchett, Managing Editor

Alan Matchett

Many of you will recognise the theme for November's BG GARDENer, Preservation: exploring and adapting is an echo of the 8th BGANZ Congress held recently in Adelaide. This alignment was purposeful, firstly to give the 'stand-in' editor some chance of delivering but more importantly to give those not able to attend some insight as to the flavour of the Congress. The feature articles herein are but a sample of the presentations offered; and activities, collaborations, works in progress described by the authors are a fair representation of themes delivered at the Congress. At each of the presentations I attended there were consistent messages being given - botanic gardens and other organisations represented are all positive about what is needed to be done; while there may be different drivers, all are actively participating and delivering effective conservation outcomes.

Preservation in a botanic garden sense conjures up thoughts of characteristics other than simply its plants, although they for the most part are integral. How do we manage the effects of time? Jessica Hood presents an interesting discussion around photographic records (and live cultural events) as archives, her article and presentation at the Congress led to some other interesting discussion around the use of photography. That encounter reminded me of the story that regularly features on the start-up page of my home computer; the photograph of four sisters, who for 40 years have reunited annually for a photograph. To me that delivers some powerful messages, not only one of discipline but also in terms of capturing and sharing of information and storing of archival material. For any who have reason to look at these photos beyond simple curiosity I am sure there is likely to be a wealth of information captured there for them.

Julia Watson also shares some of the highlights and proceedings during her attendance at the American Public Gardens Association Conference. Featured is only a snapshot of the full story but if you follow the link to Julia's full report her enthusiasm is obvious and she only has positive things to say about her experience, unsurprisingly she highly recommends that others should go and 2018 could be a real treat, the venue is Disneyland.

In a lighter moment during the Congress delegates were treated to a slice of adventure on board the HMS Endeavour during its travels to observe the Transit of Venus. This moment was aptly played out in pantomime fashion by the talented Michael Conner, Education Officer at Wollongong Botanic Garden ably assisted by a bunch of conscripts. However Michael's article featured herein is a much more serious account of the Endeavours journey and Joseph Banks successful (and not so successful) botanising adventures. The inclusion of this article is also a timely reminder to us all of the forthcoming 250th anniversary of the Endeavour's stopovers and the discoveries/observations made by Banks and his entourage in New Zealand, 1769 and Australia (New Holland) in 1770 while making their way home to England.

FEATURE INTERVIEW

Outstanding in the field

Alan Matchett interviews
Paul Tracey, President BGANZ,
Curator, Wollongong Botanic Garden

Thanks for agreeing to be our feature interviewee this issue. I am particularly interested in the role you see for professional botanic gardens networks.

Briefly, how did your career path lead you to working with botanic gardens? How long have you been at Wollongong Botanic Gardens, what is your current role at Wollongong City Council and what are you passionate about in your role?

I had spent the first 15 years of my career commuting from my home town in Wollongong to Sydney where most recently I had worked in a Parks Management role at the Centennial Park and Moore Park Trust.

I had always admired the Wollongong Botanic Garden and was really pleased to secure the Curator's role there in 2010 and have been there ever since.

My role as Curator of the Wollongong Botanic Garden is really rewarding; I manage a fantastic team of 25 Staff who work across Horticulture, Nursery and Maintenance functions and we have a small team covering Living Collections Management, Marketing and Events and Administration.

The Wollongong Botanic Garden is an interesting site and I guess I am passionate about all of it!

The 30 ha main garden contains many plant collections that reflect the Garden's establishment in the mid-20th Century

Paul Tracey, BGANZ President (left) Costa Georgiadis, ABC TV and Botanic Garden Open Day Ambassador, Jimmy Turner, Director of Horticulture Management,at Botanic Gardens & Centennial Parklands, Sydney, at the 2016 Botanic Gardens Open Day launch, RGB Sydney May 2016.

through to the current day – the garden has a mix of exotic collections that reflect horticulture from the 1960's with camellia and azalea displays, formal rose gardens and a woodland collection through to more contemporary collections based on habitat including the dominant East Coast Australian Rainforest, sclerophyll forests, and Australian dryland mound.

We currently have more than 500,000 visitors to the site and engage with our visitors through many events from community to commercial and of course, as many BGANZ readers will know, we have an award winning education program led by Michael Connor that draws in more than 30,000 per annum.

In addition to the garden, my role is responsible for the management of three natural areas known as 'Annexe' gardens: at the top of the escarpment at Mount Keira, Puckeys estate on the coast and Korrongulla, a wetland site adjacent Lake Illawarra.

The garden also operates the 'Greenplan' nursery which grows plants for all of Wollongong Council's natural area restoration projects, sells local natives at a subsidised rate to Wollongong ratepayers and of course manages the Botanic Gardens plant supply and *ex situ* collections.

The South East NSW Bioregion Working Group is also something I am very passionate about. The group is really making progress on *ex situ* plant conservation actions in a collaborative partnership within the SE Corner of NSW. The six partner gardens consist of volunteer-run gardens, local, state and federal agencies and the Office of Environment and Heritage all working together and using our strengths and resources to conserve threatened plant species. The group has volunteer groups and traditional custodians working with us. Importantly, from my perspective as a regional garden member, we are achieving plant conservation without having to contribute significant resources.

From my perspective as a regional garden member, we are achieving plant conservation without having to contribute significant resources.

And what about your role in BGANZ? What made you get involved?

Wollongong was the first (and only) Botanic Garden I have worked in. When I commenced in late 2010, I was obviously keen to learn as much about the industry as I could. I went to a regional BGANZ conference in 2011 held in Coffs Harbour and met a great bunch of people including Ian Corbett from North Coast Regional BG and Paul Scannell from Albury, who had been involved with BGANZ since formation. What I found in Coffs Harbour then, and have found ever since is that most of the people I meet in the network are very keen to share information and experiences and everyone is passionate about what they do – as an industry we are lucky in this regard.

Back in 2011, one of my performance indicators was to increase participation at the Wollongong Garden, so I thought one way to do that would be to put my hand up to hold a conference and use the conference as a way of promoting the garden to our local community.

Little did I know that putting your hand up for the Conference meant (unofficially) a nomination to Council also! But I have now had 4 years on Council, and have got to work with an amazing group of people who also volunteer time to make what is a valuable contribution.

You have worked in a Regional Botanic Garden, what are the things BGANZ is currently progessing, which benefits all Botanic Gardens.

I guess the most important role BGANZ is currently contributing to Botanic Gardens, especially to Regional Botanic Gardens, are fantastic opportunities for these gardens to participate in genuine networking. The BGANZ Congress and the Botanic Garden Open Day, provide an opportunity to collectively promote our agenda and Regional Gardens are gaining exposure as a result. Information exchange through the magazine, web and social media are also benefits. The various BGANZ Awards and Grants are further benefits for our members.

Regional – or Local Government Gardens, often struggle for relevance within their own organisations. Most Councils have an average 30 service streams they deliver to their communities and Botanic Gardens are often one part of these services, most commonly allocated in the Parks and Open Space section. Securing funding is difficult and I see an emerging role for BGANZ in advocating the role of Botanic Gardens at all levels, to ensure not only the community values our work, but our funding agencies also recognise our important role.

If you had to pick one, what would you give as the single most significant contribution (event or experience) BGANZ has provided to the botanic garden community or to the environment?

I can't pick just one!

I have just returned from the Adelaide Congress and I think the most important experiences for our members from the biannual congress is the learning networking that we all get through being together.

BGANZ has recently commenced an Awards program. It is great to hear members receiving financial support to attend BGANZ and American Public Gardens Association Conferences and also to see members gaining financial professional development opportunities from BGANZ.

I think the most important experiences for our members from the biannual congress is the learning networking that we all get through being together.

Council aims to continue to promote our awards, and non-BGANZ awards and opportunities, to all our members through our website.

Obviously I am passionate about the Botanic Gardens Open Day event as I see this as a real opportunity for BGANZ to make a significant opportunity in ensuring the public are more aware of the role and importance of Botanic Gardens. It has been a great success to date with over 75 gardens joining together to promote the work we all do. In 2018 Council hopes to get all members on board and grow the day further.

Networking opportunities are becoming easier with advances in social media and technology. Do you think this strengthens or weakens the role of professional associations?

I enjoy catching up in person with people from other botanic gardens so the biennial congress is the perfect and appropriate way to do this.

However, two years is a long time, and being spread over two countries, with very limited funding for travel we need to be creative with technology and social media to ensure more regular dialogue in between the Congresses. I think looking to the future webinars for example are a perfect way for us to interact more regularly and strengthen the role of BGANZ and our members.

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BGANZ remains resource poor – how can BGANZ overcome some of these challenges in the next two years.

BGANZ is resource poor in terms of our staffing establishment and current income base, but we have a wealth of resources in terms of the volunteers who give their time and expertise to make a valued contribution.

Brad Crème's volunteer contribution in leading our website redevelopment during the last 12 months has been exceptional, we have received nothing but positive feedback on the new look website. This is just one example, but it is this type of contribution from our members which will continue to be crucial to keep BGANZ and the industry moving forward.

I met with Paul Smith, Secretary General, Botanic Gardens Conservation International (BGCI) at the Adelaide Congress and BGCI is faced with similar issues, relying on expert industry volunteers to deliver their industry training around the world. BGCI and BGANZ are exploring future partnerships and please check the websites for developments through 2018.

We are currently working hard to secure partners who can contribute funding that will progress the member benefits BGANZ can provide – BGANZ needs more paid staff to coordinate for example, an even greater congress experience, better communication through various channels, more professional development opportunities and resources like the living collection toolkits for our members.

What are you involved in, or reading/watching/listening to at the moment that enriches your life?

I feel very lucky to have a fantastic and rewarding job to go to each day, but I am at a stage of my life where it is my family that really enriches me. My wife and I have three children aged 13, 10 and 6 so I love being involved in their lives with the never-ending homework help, taxi service to play dates and parties, talks at dinner and encouraging their sport activity.

Apart from that every spare minute left I spend in the ocean. I have lived my entire life near the beach and love ocean swimming, surfing, and stand up paddling. I get to share the ocean with my kids and get a huge kick out of watching my 6 year old son standing up and surfing!

Botanic news: from home and abroad

BGANZ Congress News

TORO manager Ben Hall drew the prize winner, Damian Wrigley, Australian Seed Bank Partnership, at the 8th BGANZ Congress Dinner in October in Adelaide.

Peter Byron, Australian National Botanic Gardens Manager and BGANZ Treasurer, receives on behalf of ANBG a fantastic lawn mower from BGANZ Congress Sponsor Ben Hall, TORO.

BGANZ Award Winners 2017

BGANZ Council is delighted to announce the BGANZ Award winners 2017.

BGANZ Council encourages all members to look out for these awards, and many other non-BGANZ annual awards each year. If you are looking for professional development opportunities, BGANZ has a list of awards and secondment opportunities on the BGANZ website, and we will aim to keep it updated in coming years.

BGANZ Professional Development Award 2017 (Value $2,000 AUD)

2017 recipient BGANZ member Megan Hirst, RGB Victoria. Read more about Megan's work and her award in her article in this magazine.

BGANZ/American Public Garden Association Scholarship (Value $800 USD)

2017 recipient BGANZ member Julia Watson, Auckland Botanic Gardens.

- Julia is the second BGANZ member to take advantage of our partnership with APGA. Julia went to Hamilton Gardens, located between Toronto and Niagara Falls. Her experience is reported in this edition of the *Botanic Gardener*.
- Next year the APGA conference will be held in California. Applications will be called for in February, so get planning.

BGANZ Volunteer of the Year 2017

2017 recipient BGANZ member Brad Crème, Bendigo Botanic Gardens.

- Brad drove the project to ensure BGANZ got a new website that reflects the pride members have in our botanic gardens.
- If you've had a look at the new website, take a moment to complete the short survey distributed via email this week and let us have your feedback.
- We'd love to know what you want from your BGANZ communications.

Emma Bodley, Auckland Botanic Gardens, BGANZ Young Member Award Winner 2017, with a Wollemi Pine

BGANZ Young Member Award 2017 (Value $500 AUD)

2017 recipient BGANZ member Emma Bodley, Auckland Botanic Gardens.

Do you have a passion to lead in the public horticulture environment?

Longwood Gardens is one of the largest public gardens in North America, located about 30 minutes from Philadelphia, Pennsylvania. Over the last year, we've launched a new fellowship program, the Longwood Fellows Program, which is a 13-month residential learning experience designed for those who have a passion to lead in a public horticulture environment. More details

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BGANZ member benefits: Get a great new car deal!

For the exclusive benefit of BGANZ members, BGANZ has entered into a partnership with Autotender. BGANZ members can now get great prices when purchasing their new car through Autotender

For more information on how members can get better car prices check out the information page here

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Pollinating great ideas

Planning for the future of threatened plants in New Zealand

Rebecca Stanley, Chair BGANZ-NZ

Threatened plants are only protected when they occur on a reserve; unfortunately, many of these plants do not occur in these protected areas. Managers of reserves and the owners of private land where threatened plants occur often work independently of one another with no formal coordination of their conservation work. Despite the lack of a formal process, many different groups have worked together successfully but there has been a desire for a new approach, something that signals to all agencies the need to make formal commitments, those that have visibility and longevity.

In support of protecting our threatened plants, botanic gardens offer permanently protected land, have nationwide coverage, expert staff including plant propagators, horticulturists and botanists, nursery facilities, databases and research programmes. We also have networks, volunteers, experts at interpretation and advocacy and a range of education programmes and relationships with schools and community groups. Our gardens are well situated within our cities and are generally easily accessible to large numbers of residents and visitors alike, therefore are well-positioned to reach people and stimulate the way they think about and understand our environment.

We also have networks, volunteers, experts at interpretation and advocacy and a range of education programmes and relationships with schools and community groups.

In May this year New Zealand botanic gardens through BGANZ-NZ formally partnered with the Department of Conservation in an effort to work together to recover and protect threatened plants. This partnership is supported by a Memorandum of Understanding (MOU) signed by the Minster of Conservation, Maggie Barry and the Chairperson of BGANZ-NZ, Rebecca Stanley.

This document provides a framework whereby DOC and BGANZ-NZ, and participating botanic gardens either individually or as a group *'… will seek to co-operate over a range of mutually important plant conservation matters to improve coordination, achieve more research, increase conservation capability and reduce transaction costs by increasing efficiency and effectiveness'*.

Underpinning the MOU are several key principles, which are supported by a series of protocols for engagement that will be applied to areas of particular interest to either or both parties. It is intended that a separate MOU or plan of mutual benefit will be developed and agreed to allow for specific outcomes to be achieved.

Signing of MOU. The signatories (left – right) Bec Stanley, Chair BGANZ – NZ; Jack Hobbs, Manager Auckland Botanic Gardens; Lou Sanson, Director General Department of Conservation; The Right Hon Maggie Barry, Minister of Conservation. Photo Sandra Jack

The signing of this document coincided with the release for consultation of the first ever Threatened Species Strategy for New Zealand. In comments made to this draft BGANZ-NZ advocated for the inclusion of the global framework for threatened plant conservation and the Global Strategy for Plant Conservation (GSPC), and reiterated our commitment to and support for plant conservation.

At the recent 6th Global Botanic Garden Congress in Geneva Paul Smith (BGCI) appealed to Botanic Gardens worldwide to turn the skills and capacity of horticulturalists worldwide to conservation, so for us these are very timely events.

Our first project to align with the MOU is the hosting of a series of workshops at four of our botanic gardens. It was agreed that our botanic gardens are well-positioned to engage with our local communities and interest groups to introduce and discuss thoughts around a national approach to threatened plant conservation. As botanic gardens we are able to provide significant resources and commitment useful to the partnership as we have connections with local growers, Iwi, restoration groups and enthusiasts. Successful workshops have already been held in Auckland and Wellington.

Our first project to align with the MOU is the hosting of a series of workshops at four of our botanic gardens.

Discussion and resolutions from the workshops will be used in the development of an Ex situ Plant Conservation Strategy, which we hope will be adopted as the agreed national standard and guideline to drive and support a safe future for our threatened plants.

The hort. section

Compiled by **Brad Creme**, Curator, Bendigo Botanic Gardens

Brad Creme

First word

This section of the magazine is an opportunity for horticulturalists to highlight their work in curating and developing living collections throughout botanic gardens in Australia and New Zealand. We can learn from each other's site-specific knowledge and practices.

In this bumper edition of the Hort. Section, I'm thrilled to present two fascinating and very different articles from our members.

Liz Caddick, the Curator of the Gold Coast Regional Botanic Gardens, discusses practical methods of wetland restoration and shows us how to turn a barren lake edge into a living strip of riparian vegetation. These kinds of challenges require garden staff to create solutions that are aesthetically pleasing, ecologically valuable, realistically achievable and ultimately low maintenance. Not an easy task!

Tim Uebergang, Horticultural Curator of the System Garden, University of Melbourne, then invites us into the bizarre world of cycad enthusiasts, where he explores this ancient and intriguing group of plants, which have outlived the dinosaurs and captured his imagination.

If your garden has a horticultural story to tell, please drop me a line at media@bganz.org.au. As our network grows across Australia, New Zealand and beyond, remember that what your garden takes for granted may be extremely unusual and informative to other readers of the *Botanic GARDENer* magazine. I hope to hear from you soon!

Cheers, Brad

Planting a wetland garden at gold coast regional botanic gardens

Dr Liz Caddick, Curator, Gold Coast Regional Botanic Gardens Parks and Recreation Services City of Gold Coast and **Wendy Lamp**, Horticultural Supervisor of the GCRBG

Introduction

For years we've been looking at our bare-sided lagoons, with anxiety building every summer as the water warms up and the water quality gets worse. So when an opportunity arose for a Green Army project at Gold Coast Regional Botanic Gardens (GCRBG), installing plants around one of our wetlands was an obvious choice.

But wetland restoration is not a simple process. Pitfalls along the way include sourcing suitable plants, floods and droughts, weeds, hazards associated with working near water, plus voracious plant eating water birds. And on top of all that there is the garden aesthetic – how do you plant an artificial wetland with native plants and make it look like a formal garden?

What exactly is wetland restoration?

Frog gully August 2015 (left) and August 2016 (right), Gold Coast Regional Botanic Gardens

The basic idea behind wetland restoration is that native wetland plants (including sedges, rushes and water lilies) are a natural, aesthetic and cost-effective way of improving water quality, not to mention providing fauna habitat and other ecosystem services. Wetland plants slow the flow of sediments into water bodies and also facilitate the formation of biofilms, which are highly effective in breaking down excess nutrients. Larger plants, i.e. trees, also shade and cool a water body, reducing the warm conditions needed for blue-green algae growth.

Most wetland restorations in the south east Queensland region are done in, or to replicate, natural systems. Bush regenerators and ecologists select a mix of macrophytes to provide species diversity, but with a strong emphasis on plants that have been demonstrated to do well in similar situations, so that ultimately the wetland can become a self-sustaining system.

Our approach at GCRBG was slightly different. As a regional botanic garden, we aim to showcase the native plants of the region, but we also have a strong focus on including the lesser known, and harder to grow plants in our collection. So rather than planting a mix of the hardiest macrophytes around our wetland, we tried to include some less commonly used species.

We also had the objective of trying to create a 'garden' out of our wetland. Whilst gardens may include a mix of all sorts of plants, dramatic effect can be achieved by planting in discrete blocks. Block planting also facilitates easy labelling and identification of plants, which is helpful when the site is being used for education and training.

Causeway July 2015 (left) and July 2016 (right) Gold Coast Regional Botanic Gardens

The plants – the good, the bad and the ugly

With all this in mind, we set about sourcing an interesting and diverse selection of plants for the site. Once we had an idea of what was available, a design was laid out, with each species planted in small or large blocks around the wetland.

Locations of each plant were determined according to site conditions. For example the tall grey rush (*Lepironia articulata*) was planted at the base of a high, steep bank, and provides a stunning blue-grey screen. Woolly frogmouth (*Philydrum lanuginosum*) likes wet feet so was planted at the lower margins of the wetland, and *Gahnia* and *Carex* species were located on higher, less frequently inundated banks.

Some plants were definitely better performers than others. *Lepironia articulata, Philydrum lanuginosum*, *Carex appressa, Juncus usitatus* and *Carex gaudichaudiana* are all doing really well and look great. The poor Green Army team threw up their hands in horror when the *Bolboschoenus caldwellii* arrived – this species dies back in winter and in July all we got were a bunch of pots with a few withered leaves poking out. The bulbs were planted though, and come up very nicely in the spring, although we have to cut back the dead material in autumn.

We managed to get hold of a few less commonly grown, really pretty sedges, but unfortunately they haven't been such robust performers. *Chorizandra cymbaria* is a beautiful delicate sedge, but really struggled and eventually got out-competed by weeds. *Baumea rubiginosa* is a very attractive plant, with red margins to the dark green leaves. We still have a few left but it certainly wasn't vigorous where we planted it along an ephemeral waterway. *Schoenoplectus mucronatus* is also a striking looking plant, with erect, lime green, triangular stems. It did very well for a while but suffered when water levels went dramatically up and down during flood and drought, and probably does best in a more stable environment.

Table 1 summarises the plants used, with comments about their hardiness and visual amenity.

Table 1. Wetland plants, hardiness and amenity value

Species	Common Name	Hardiness	Amenity value
Acrostichum speciosum	Mangrove fern	Good in part shade as long as well watered.	Large dark green leaves contrast well with rushes. Rapidly goes brown and scrappy in dry conditions
Baumea articulata	Jointed twig rush	Not vigorous, easily out competed by weeds.	Attractive straight, dark green articulated culms. Best planted as a small clump.
Baumea rubiginosa	Flat leaf twig rush	Not vigorous. Struggles during dry periods and gets outcompeted by weeds.	Very attractive, red-edged, slightly twisted leaves.
Baumea teretifolia	Pointed twig rush	Not vigourous, struggles during dry periods.	Moderate.
Bolboschoenus caldwellii	Marsh club rush	Moderate. Dies back in winter, leaving site exposed to weeds.	Not very aesthetic due to seasonal die back.
Carex appressa	Tall sedge	Very vigorous. Tolerant of periodic inundation and dry conditions.	Attractive dense, weeping foliage.
Carex gaudichaudiana	Tea tree swamp sedge	Vigorous as long as planted densely.	Very attractive short grey-green foliage.
Chorizandra cymbaria	Heron bristle rush	Not vigorous.	Delicate. Best planted as a small clump.
Ficinia nodosa	Knobbly club rush	Vigorous.	Attractive for 2-3 years but starts to lie flat so cut back every 2-3 yrs.
Gahnia clarkei	Tall saw sedge	Vigorous. Can swamp other plantings so needs lots of space.	Good screen. Rough edged leaves discourage access to water.
Juncus usitatus	Common rush	Vigorous.	Attractive due to vigorous growth, but not spectacular.
Lepironia articulata	Grey rush	Vigorous.	Very attractive, tall grey foliage.
Philydrum lanuginosum	Woolly frogmouth	Does very well in right conditions but dies back with fluctuating water levels.	Attractive yellow flowers. Seasonal die back can look messy, cut back dead material after flowering.
Schoenoplectus mucronatus	Triangular club rush	Moderate-vigorous. Can do very well but prefers stable water levels.	Very attractive lime green triangular stems.
Schoenoplectus validus	River club rush	Not vigorous, susceptible to long periods of inundation.	Moderate.

Planting and maintenance – tips and pitfalls

One of the obvious difficulties with planting a wetland is the issue of planting in water. Particularly with a young, inexperienced Green Army team, the need to manage risks around working near water was paramount. Artificial wetlands are often planted before they are filled, or even drained to facilitate planting, but this was not a cost effective option for us, and would have impacted existing wildlife. The project was planned during a generally dry time of year when water levels were expected to be low, but dates were tied to the Green Army programme, and unseasonally wet weather saw the team planting in high water. Water levels at this particular site can fluctuate by around a metre between seasons, and the consequence of planting during wet weather was that some plants were left high and dry later in the year. Floods the following year also resulted in the loss of some plants.

Water birds can be a big problem, particularly the purple swamp hen. We'd been forewarned about this and all our plants came as 200mm pots, not tubes. Despite this, we had to net some areas, particularly in early spring at peak nest-building time. Once plants are fully established though, the water birds cause little damage. Dense planting can also help with quick establishment so plants are less vulnerable. We revised our original planting densities and instead used denser plantings over a smaller area. Most plants were planted at 3-4 plants per square metre, although for more vigorous, larger plants (*Carex appressa, Gahnia clarkei*) 1 or 2 per square meter is fine and for anything listed in Table 1 as not vigorous, a density of 5 or 6 plants/m^2 might be more effective. Higher densities would also be required for tubestock.

Weed management is an ongoing issue, and always will be in an urban wetland subject to edge effects. Jute mat was used during initial planting to stabilise the banks and inhibit weeds. Jute is effective in the short term (12 to 18 months), but it does make planting very labour intensive. We were able to accommodate this with a large Green Army team on site, but it would be slow progress for one or two people. We used Geofabrics Jutemaster Thick, pinned with 150mm u pins.



GA team laying jute matt; plants netted from water birds.

250m long rolls of jute were cut to workable sizes and sections were pinned with at least 100mm overlap. Planting holes were cut by making a 200x200mm cross in the jute, and lifting the flaps to insert the plant. Green Army WH&S required us to cut jute mat with scissors, but a knife would be much more efficient.

Long-term, grass and sedge areas are very difficult to maintain weed free. Our wetland plantings are maintained by GCRBG staff but we also employ experienced bush regeneration contractors several times a year to manage the site. Weeds are very obvious in block plantings so need constant maintenance to keep the site looking good.

Looking to the future

The new planting has transformed the site visually. Sedges and rapidly growing shade trees provide new habitat for the abundant gardens wildlife as well as a better outlook for visitors. It is hard to tell yet whether the planting is having any beneficial effect on lake water quality although long term we hope it will. Freshwater mussels have also been put in the lagoon, as they have been demonstrated to improve water quality elsewhere.

Sedges and rapidly growing shade trees provide new habitat for the abundant gardens wildlife as well as a better outlook for visitors.

Some sections of the lagoon need re-planting, and more hardy species will be used for this, although as the landscape matures, there may be opportunities to reintroduce smaller numbers of more delicate species.

The site is definitely a useful educational tool, for showing what wetland species grow well in the region, for learning how to identify wetland plants, and for local residents to get ideas for their own gardens.

In the future, we would like to incorporate similar plantings around our larger lagoons, and to use boardwalks, guided walks and interpretive signage to improve visitors understanding of and appreciation for the vital wetland ecosystems of the Gold Coast.

Cycadophilia

Tim Uebergang, Horticultural Curator, System Garden, Melbourne University

Since beginning work on the System Garden's plant collection at the University of Melbourne I have developed a profound appreciation of all species in the plant kingdom but especially those considered by most to be 'unusual plants'. Plant people everywhere are fascinated by monotypic marvels like *Ginkgo biloba* and *Welwitschia mirabilis*, the multiplicity within the Family Euphorbiaceae and the melange of plant families that can be found within the Dilleniidae subclass which includes wonders such as bottle trees (Malvaceae), carnivorous plants (Droseraceae), chocolate (Malvaceae) and watermelon (Cucurbitaceae).

The System Garden is essentially a garden of collections which includes 11 different subclasses of angiosperms combined with an extensive gymnosperm collection. This, in conjunction with some other significant garden areas like the Australian Rainforest collection, provides a valuable tool for teaching students of all age groups about the planet's land plant diversity.

The System Garden at Melbourne University with the 18th Century iconic tower

Rainforest collection panorama which contains both *Lepidozamia* species

There is one plant group though that I believe belongs in every botanic garden, and that is cycads. Call it a deep respect or some kind of perverse cycadophilia but, in the System Garden, like most botanic gardens, I believe cycads contain immense potential for the educational story of plants. Stories that offer all our visitors an interesting perspective, whether it's primary school students, academia, the public or horticultural professionals.

Encephalartos horridus, *Dioon spinosum*, *Cycas taiwaniana*, *Dioon edule*, *Encephalartos ferox* (clockwise from bottom right)

The family Zamiaceae is a contender for the species multiplicity ribbon to be sure. This vast cycad group contains a diversity of truly unique species which have adapted to nearly every different kind of land environment on earth. Within it you will find your monotypic marvels and sole members of their genus including South Africa's *Stangeria eriopus* which is closely related to Australia's two *Bowenia* spp and Cuba's *Microcycas calocoma*.

Cycads have an ancient lineage and an intriguing history of human use. They are one of the most threatened plant groups on the planet and have evolved interesting pollination methods to help them survive.

> Cycads have an ancient lineage and an intriguing history of human use.

Cycads are notorious for being extremely toxic due to high levels of neurotoxins and yet they have been a food staple for thousands of years to indigenous people across the globe including Australia. Different methods are employed to remove toxins and make the plants edible, particularly the seeds of cycads. One researcher studying cycads in Cuba told me that he observed the stem of *Zamia pygmaea* being served to children. He then told me that if you prepared it slightly differently, it was used as a rat poison.

Professor Irene Terry from the University of Utah conducted an interesting study on the Australian cycad *Macrozamia lucida* and discovered a very unusual technique the species employs during the pollination process. Professor Terry found that the thrips species *Cycadothrips chadwicki* can be manipulated between male & female plants by using a push and pull procedure with heat and odour.

First leaf of *Cycas debaoensis*

Macrozamia lucida pollen cone

Both thrips and cycads depend on each other for their survival, the pollen from these plants is the thrips's only food source and the thrips is the only creature that pollinates the plant. The thrips are enticed to the pollen cone via a mild scent and cover themselves in pollen during the feeding process before the cone heats up to around 38°C, (up to 12°C above ambient temperatures) emitting a toxic odour that drives the microscopic insects from their contentment. Following the thrips eviction, the female cone releases an alluring odour like the male pollen cone, enticing them with another food opportunity but instead they pollinate the seed cone.

Two thirds of cycads species around the world are threatened, one quarter of them are found only in Australia. Due to their toxicity, great numbers of plants were removed from Australian farm lands where livestock grazed adding to their threatened status. So threatened are some species in South Africa that new methods to prevent poaching are being trialled. Stable isotopes and minute microdots (invisible to the naked eye) are being attached and sprayed onto plants. These techniques are already being used to determine the origin of drugs and ivory and are now being applied to cycads. Isotopes and microdots act as tracers and allow authorities to identify if any mature plants discovered in either private collections or that are listed for sale have been collected illegally from natural habitats. This may just be the innovation needed to protect critically threatened plants.

Cycads are great when you need to ignite the imagination of fidgety pre-schoolers and one of the hardest audiences in my opinion. Mention the dinosaur plant, cycads, and that fragment of their attention is all that is needed for them to imagine giant beasts sauntering through vast lands with cycads abundant at their feet. Although the cycad species of today are not the same ones that prosauropods may have browsed on they are not that far removed and very close in appearance. Although cycads are spiny and highly toxic, the outside coating of the seed was edible and was probably part of larger herbivores' abundant diets. It could easily be argued that the land giants were necessary for the survival of cycads by assisting in the distribution of seed.

Tim Uebergang and arborist Virginia McNally taking a guided tour

System Garden with 160 year old palms

Cycads are extremely adaptable plants and deserve a place in all of Australia's botanic gardens. I have touched on only a fraction of their intrigue and stories that make them fascinating plants. So, if you see a space in the garden that requires a little marvel, multiplicity or melange may I suggest a 10-million-year-old link to human culinary, desire and intrigue in the form of a cycad.

Further reading material

https://archive.unews.utah.edu/news_releases/living-fossils-have-hot-sex/

http://www.abc.net.au/science/articles/2011/10/21/3344101.htm

Encephalartos, March 2015; Journal of the Cycad Society of South Africa.
http://cycadsociety.org/?page_id=623

https://www.instagram.com/system_garden/

http://sustainablecampus.unimelb.edu.au/key-areas/campus-grounds/system-garden

The science section

Compiled by **Brett Summerell**, Director, Science and Conservation, Botanic Gardens & Centennial Parklands

Brett Summerell

First word

In this section of the magazine we highlight some of the academic research happening both in Australia and internationally of relevance to botanic gardens. Those of us who work in botanical and conservation research hope to make our science more accessible to the community at large and hope what follows will help you communicate this core function in your work too.

If you have science information for inclusion in future issues or see something that you think should be highlighted (or needs clarification) please drop me a line at brett.summerell@rbgsyd.nsw.gov.au

How many threatened species are there in the botanic gardens of the world?

… and how can botanic gardens make a difference in their survival?

In a paper by Ross Mounce, Pula Smith and Samuel Brockington published in Nature Plants the authors were able to provide data that revealed that botanic gardens manage at least 105,634 species in their collections, which equates to 30% of all (known) plant species and conserve over 41% of known threatened species. At face value this is a particularly strong number however closer examination revealed that, not unexpectedly, botanic gardens are disproportionately temperate, with 93% of species held in the Northern Hemisphere. Consequently, an estimated 76% of species absent from living collections are tropical in origin. Furthermore, phylogenetic bias ensures that over 50% of vascular genera but barely 5% of non-vascular genera are conserved *ex situ*.

Despite this wonderful achievement the authors do point out that the proportion of botanic gardens collections dedicated to threatened species is approximately 10% and that there is scope for botanic gardens to increase this substantially. There are of course multiple reasons for housing species of plants in our collections (aesthetics, education, displaying diversity etc) and of course we do not know what the impacts of factors such as climate change, land clearing or disease will be on presumed "common" species in the future. Working out what is the balance in these scenarios will be a common dilemma for botanic gardens in the future.

More information: Ross Mounce, Paul Smith and Samuel Brockington (2017) Ex situ conservation of plant diversity in the world's botanic gardens. Nature Plants DOI: 10.1038/s41477-017-0019-3.

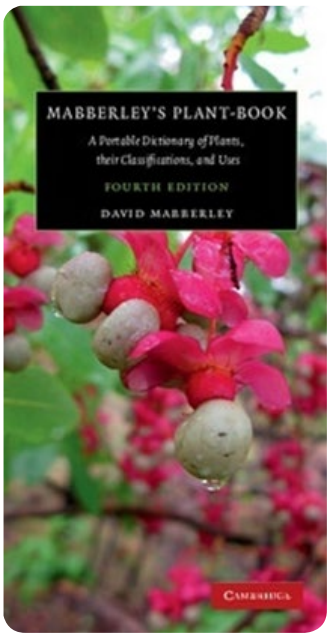
The ancestral flower of all angiosperms

The origin of flowering plants was famously described by Charles Darwin as an "abominable mystery". Angiosperm flowers are thought to have evolved somewhere between 140 and 250 million years ago, but there are no fossils of flowers older than 130 million years old. Consequently there is little on which to base what these flowers may have looked like – and hence little to base an understanding of their biology and ecology – i.e. how were they pollinated, how did they disperse etc. In a study by Hervé Sauquet (then at Paris-Sud University and now at RBG Sydney) and a number of collaborators mapped genetic data from 792 species against the floral characteristics of those species to provide a model of what the flower was most likely to look like. They then explored the structure of the flower at each branching point on the family tree and extrapolated back to explore what the blooms of the last common ancestor of all flowering plants would have looked like. The process was repeated using family trees produced using different methods to check whether the results were consistent across the different outcomes.

The end result is a flower that may have looked like the reconstruction below. Interestingly the flower has male and female parts and is more complex than some modern day species. This latter fact was explained by a likely reduction in numbers of organs – a process that has been seen elsewhere in biology. This may have been an evolutionary response to assisting pollinators such as bees.

More information: H. Sauquet et al. (2017)
The ancestral flower of angiosperms and its early diversification. *Nature Communications* 8, doi:10.1038/ncomms16047. http://www.nature.com/articles/ncomms16047#abstract

Mabberley's Plant-book, 4th Edition



Mabberley's Plant-book is generally accepted as an essential reference text for anyone studying, growing or writing about plants – that I think includes all of us reading this magazine. This new edition has approximately 26,000 entries and provides information on every family and genus of seed-bearing plant (including conifers), plus ferns and clubmosses, besides economically important mosses and algae. It is one of those books that rarely has time to sit on the shelf as it is typically open at the page of whatever I was previously looking up! Thankfully it combines taxonomic details of names and nomenclature with English and other vernacular names found in common use. In this new edition, each entry has been updated to take into consideration the most recent literature, notably the greater understanding resulting

from molecular analyses; over 1400 additional entries (including ecologically and economically important genera of seaweeds) have been included. This is a monumental work – and having seen the detail and amount of literature that goes into it I know that it is very comprehensive indeed.

See more at http://www.cambridge.org/gb/academic/subjects/life-sciences/botanical-reference/mabberleys-plant-book-portable-dictionary-plants-their-classification-and-uses-4th-edition#WiQddKWloSPCjjEm.99.

International Botanical Congress, Shenzhen, China

There were a number of notable outcomes from various sessions of the IBC recently held in Shenzhen in China. Although I was not able to attend I thought it was worth mentioning these in case you have not seen them yet.

The Shenzhen Declaration on Plant Sciences – this declaration outlines seven priorities for strategic action in plant sciences with the aim of allowing society to mitigate the impacts of human activities on plant species, habitats, and distributions, and to approach formation of a sustainable world for ourselves and those who follow us.

- To become responsible scientists and research communities who pursue plant sciences in the context of a changing world
- To enhance support for the plant sciences to achieve global sustainability
- To cooperate and integrate across nations and regions and to work together across disciplines and cultures to address common goals
- To build and use new technologies and big data platforms to increase exploration and understanding of nature
- To accelerate the inventory of life on Earth for the wise use of nature and the benefit of humankind
- To value, document and protect indigenous, traditional and local knowledge about plants and nature
- To engage the power of the public with the power of plants through greater participation and outreach, innovative education and citizen science

The full text of the declaration can be accessed at
https://phytokeys.pensoft.net/articles.php?id=20859

Nomenclature committee

The most substantial change in terms of nomenclature was the change to the governance of names of fungi. In the future all matters dealing with names of fungi will be referred to the International Mycological Congresses so that a greater cohort of mycologists can make decisions relating to fungal names.

American Public Gardens Association Conference 2017 – Hamilton and Niagara, Ontario, Canada

Celebrating Connections: Heritage | Partnership | Progress

Julia Watson – Recipient, 2017 APGA/BGANZ Congress Scholarship, Senior Gardener, Education and Partnerships, Auckland Botanic Gardens, BGEN Convenor

In June 2017 Julia Watson attended the American Public Gardens Association (APGA) conference in Canada. With the support of the BGANZ Executive Board and the reciprocal arrangement for conference attendance between BGANZ and the APGA this was an opportunity and experience that's comes highly recommended. The conference was a mix of practical field trips, detailed presentations and opportunity to meet and share ideas with people from the public gardens industry across North America and further afield.

Following the conference Julia stayed on for another three weeks visiting botanic gardens and urban parks in New York, Philadelphia and Chicago thanks to a successful application to the Staff Buchanan Award from the Friends of the Auckland Botanic Gardens.

Editor's note – This is an edited version of Julia's account of her attendance at the APGA Conference. The full report can be found by clicking on the attached link.

The APGA and public gardens in North America at a glance

The APGA membership consists of over 600 organisations including botanic gardens, arboreta, zoos, museums, colleges and universities, display gardens, and research facilities. These organisations stretch across America and 24 additional countries. The APGA serves a similar purpose to BGANZ, advancing the field of public gardens by supporting best practice, offering educational and networking opportunities and advocating for its members. While many North American public gardens share similarities to Australasian gardens in their purpose and outlook, two common elements set them apart; many charge an entry fee (anywhere from $8 to nearly $30 per person, or a charge for parking) and they often have a very strong philanthropic community supporting their development.

"Staff numbers at many of the American gardens are very large (e.g approximately 400 staff at the 100ha New York Botanic Garden, photo 1) although a huge range exists with smaller free gardens too".

Financially the philanthropic arms of public gardens provide much of the support for development, assisted by income derived from membership drives and well-subscribed membership programmes. Under the new political regime in the United States, many gardens are concerned about the alternative funding streams they have previously relied on, with many grant applications hanging in the balance. Pay-for-entry at gardens can provide a good source of income, but hand in hand with this strategy there is the expectation from visitors of value for money. To meet these expectations, sizeable teams are employed within many of the public gardens to support members and visitor experience to ensure they receive value for money.

New York Botanic Garden library building where many of the research staff are based, with beautiful sculpture 'Blue Polyvitro Crystals' by Dale Chihuly in the fountain.

"Overall there are many similarities with Australasian gardens and the public gardens that form part of the APGA, but it is in the differences between us that we can look for new ideas, inspiration for revenue streams and innovative programme models".

An opportunity to speak at the APGA conference

As a result of the partnership between BGANZ/APGA Julia was invited to speak at the International Session and afterwards to sit on a discussion panel. The topic was 'How gardens can push the limits of what true community engagement can mean'. Being the only female on the panel, and the only representative from our region it was described by Julia as *"somewhat nerve-wracking but an excellent experience"* this also helped initiate other conversations during the week. Themes from this discussion included conservation, pollination, and the future of the horticulture industry and role of genetically modified organisms.

Significant Themes and Messages of the Conference

Diversity and Inclusion: Public gardens around the world are examining their policies around diversity, not only for their own staff and volunteers but also visitors with a view of increasing diversity and inclusion to ensure that people connected to or those that come into contact with public gardens are representative of the broader population. There were various opportunities to be engaged in these discussions at meetings and during fieldtrips. A visit to a Mohawk chapel and garden demonstrated ways the stories of the indigenous people and that of the Five Nations in Canada have been developed and expanded.

Stained glass window telling the story of Haiawatha at 'Her Majesty's Chapel of the Mohawks' in Ontario Canada, erected in 1785.

They shared insights to progress being made such as full-immersion Mohawk kindergartens. Other sites visited included an indigenous conservation project called Kayanase, 'Restoring Mother Earth' and local prairie restoration projects.

Few public gardens appear to have all the solutions, but it was clear that ethnicity, age and gender diversity were at the top of the list for many with strategies in place for culturally diverse employment options, visitation and volunteer inclusion.

"My experience listening to and seeing what so many gardens were involved with also give me a sense of confidence that New Zealand and BGANZ as a whole is doing a lot of hard work in these areas, although we too are still at the early stages of this journey ".

Professional Sections: The establishment of Professional Sections within the APGA 'exist to promote networking among public garden professionals sharing a common interest and to help advance the mission of the Association'. For anyone attending an APGA conference, Julia would recommend going to as many of these Section meetings as possible suggesting that they added great meaning and depth to an already valuable experience. The Professional Sections are discipline-focused discussion groups (e.g. education, native plants, volunteers, sustainability) enabling professionals to connect, share information at events and network groups anytime throughout the year. Each day during the conference all the Professional Sections held a morning meeting which delegates could choose to attend. Julia joined various discussions including, volunteer management, marketing, education and diversity and inclusion.

The great value of Section meetings was the input of those delegates who actually work in these areas sharing and discuss the issues, best practice and exploring these themes even deeper.

Urban Parks and Botanic Gardens: 'What botanical gardens can learn from new urban parks', another interesting and provocative presentation. Maureen Heffernan from the Myriad Botanical Gardens presented a range of ideas where botanic gardens and urban parks could learn from each other. Many new parks in the USA have an adaptive reuse design element as demonstrated by The Highline in New York City. Spaces are used in the community to gather, recreate and socialise, with a special needs emphasis for our millennial generation who love to socialise. Events will often attract people to sites such as parks and gardens, but frequently they will return to enjoy them at a slower pace.

Spaces are used in the community to gather, recreate and socialise, with a special needs emphasis for our millennial generation who love to socialise.

"Maureen emphasised how we need to 'activate our spaces' – create programmes that bring people to your space, who then come back at a later date. Corporate sponsorship models can work very well, and should be considered. People are lonely - parks create programmes that bring people together, and provide space where you can be alone but amongst others. Urban farms and community gardens are becoming an important part of parks".

Connectivity in terms of how far and method of travel was another challenge raised for botanic gardens to consider - people do not want to drive, they prefer to bike or walk, millennials for example have clearly demonstrated they don't wish to own or drive cars.

Urban parks have taken over from museums as must haves for cities. From Julia's own observations following the conference she too recognised that these parks were important, popular and well-funded (in the large cities). There were some fantastic urban parks visited including Millennium Park in Chicago, Brooklyn Bridge Park and Governor's Island (both in New York).

Lurie Garden in Millennium Park, Chicago – meeting with Scott Stewart (director of Millennium Park) and the Lurie Garden team.

Pollination: Pollination was another of the themes mentioned repeatedly and discussed across the duration of the conference. In North America there is a drive to raise awareness of the plight of pollinators and to stress upon the horticulture industry and public gardens that they need to be working together to ascertain solutions. It was that this has been taken seriously as in many gardens visited the emphasis placed on the connecting the importance of pollination with the public was noticeable through the use of signage, education and events.

"The Niagara Falls was even lit up in black and yellow during pollinator week which fell during the time I was there".

Accessibility: Discussion around Accessibility was also of great value and interest. Two gardens making the greatest strides in their accessibility programmes are Brooklyn Botanic Garden and Naples Botanic Garden. Both delivering positive messages around their work on the physical infrastructure and programming for accessibility in their gardens.

At the conclusion of the conference, Julia spent an additional three weeks travelling and meeting with staff at botanic gardens and urban parks in New York, Philadelphia and Chicago. The sequence and value of having attended the conference first, then touring the botanic gardens she arranged to visit proved 'serendipitous'. The opportunity arising from of introductions and meetings with delegates at the conference was the prefect occasion to complete the planning of this final stage of the journey; setting up dates and times for meetings and finding out about other gardens to visit.

"If you want to expand your horizons, get inspired, ignite your imagination and confirm the direction you're heading in, I can't recommend attending the APGA conference enough. With over 1000 attendees, multiple streams and exciting themes, the experience will expand your network, enhance your knowledge and connect you with a range of like-minded people"

The American Public Gardens Association conference in 2018 is being held in Disneyland, California. Like Julia there are opportunities for garden staff and BGANZ members everywhere to seek out support and apply for grants to attend such events. Explore these now for next year's APGA conference – go talk to your manager.

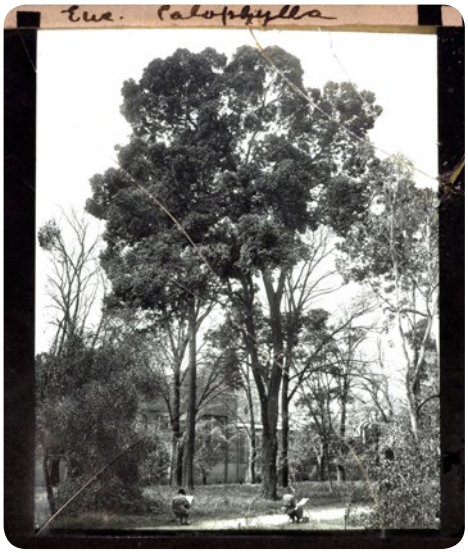
You can find an extended version of Julia's report here.

Creative engagement with botanic gardens and trees

Jessica Hood, Community Advocate Environmental Heritage, National Trust of Australia (Victoria)

During the period 2011 to 2013 I was fortunate to access the Adelaide Botanic Garden for my PhD research, *Garden/Archive Photographic Relation and Exchange*, a fine art practice-lead project. The garden provided me with a wealth of information with which to engage, concluding with a major exhibition at the Santos Museum of Economic Botany aimed at capturing and inspiring experiences of the garden. The generosity shown me by staff that allowed me access to the archival collection added a real depth to my project that I could never have anticipated at the projects initiation. The capacity of an institution to provide access to their archive is always contingent on the ongoing workloads of the staff that manage them. Artists often find it difficult to articulate exactly what it is that they are looking for in archival material, as we are often lead by ideas generated through the process of investigation itself.

The main collection I worked with for *Garden/Archive* was a collection of 67 black and white, glass mounted transparencies, or lantern slides. These photographs were of trees taken in the Adelaide Botanic Garden in the early 20th century and to which I refer to as the *Black and White Tree Series*. These lantern slides were only recently returned to the gardens by former director Noel Lothian's family. He had been an avid photographer and produced thousands of photographs during his directorship from 1948 to 1980. It took me some time to gather these images into a series as they were scattered amongst various boxes, and even more time to ascertain that they were all taken in the Adelaide Botanic Garden. This process was aided by the presence of landmarks and conversations with staff and volunteers.



Eucalyptus calophylla, circa 1919, black and white transparency in 8.2x8.2cm glass mount. Held in collections of the Adelaide Botanic Garden.

> Artists often find it difficult to articulate exactly what it is that they are looking for in archival material ....

As part of my research I visited the Royal Botanic Gardens, Kew, where a set of these photographs were sent in 1931. Following my interest in the use of photography within botanic garden archives I made arrangements to view them however it did take some time to locate them from their collections. This lead to a common question raised in my research, of where do photographs belong in the organisation of a botanic garden archive? They were photographs, not illustrations, so not considered art objects in their own right, a key attribute of the gardens' illustration collection. Likewise they were not artefacts such as those collected for the purposes of Economic Botany, nor scientific in nature such as the dried, pressed specimens of the herbarium. Furthermore they had been separated from the letter that they arrived with, so didn't belong in the correspondence collection. This lead me to consider how these photographs were used or valued at the time they were produced and the administrative and technical aspects of the archive that houses them.

The outcome of the project was influenced by the interactions that occurred across that process of archival access. Many of these extended beyond the walls of the library, to the horticultural staff, scientific staff, researchers, volunteers and finally to the audiences visiting the Adelaide Botanic Garden. This lead to an exhibition that put forward an alternative way of engaging with and interpreting the history, heritage, culture and memories of the garden. Also, for me a lasting question about the role of photography in recording experiences of the botanic garden into the future. I created a new series of photographs, *Locating the Tree*, which is now housed in the Adelaide Botanic Garden archive collection. This series of photographs taken in 2011-13 follows the footsteps of the original photographer, reproducing this collection of trees as 6×7 cm colour medium transparencies. This work was exhibited at the Adelaide Botanic Garden in the Santos Museum of Economic Botany. By exhibiting photographs of the garden in a location that was arrived at via navigating the garden, I aimed to alter visitors' perception of the garden itself. Perhaps the audience might view these photographs that I took, but out in the garden, away from my artwork. This possibility was created by partnering with the volunteer guides, who provided a specially curated tour of trees that were included in the exhibition. This engaged audiences to have an integrated experience of the garden between the traditional guided tour and the exhibition within the museum.

Jessica Hood, *Agathis robusta* "Queesland Kauri Pine" (G970787), photograph as part of series Locating the Tree, 2012-2013, 6x7 colour transparency in 8.5x8.5cm glass mount.

> ....where do photographs belong in the organisation of a botanic garden archive?

Since finishing my project in Adelaide I have moved into a role as Community Advocate Environmental Heritage at the National Trust of Australia (Victoria) in Melbourne. Here I am lucky to have the opportunity to work with a variety of stakeholders in our vision for the Australian community to understand, value and enjoy our natural, cultural and Indigenous heritage.

One part of my role is the coordination of the National Trust Significant Tree Register in Victoria, a register of over 20,000 trees in 1,200 places across the state. One program we find engages a wide audience is our weekly #trusttreetuesday social media post. Choosing a tree from our archives, we write up a short post to accompany a couple of great images of the tree. This regular post that shares key information from our archives with the public is a great way to engage and inspire audiences to value trees. From these posts we often get feedback and updates to our tree records, as well as gaining new audience interest in the advocacy work that is central to our organisation.

Trees have always been central to building sustainable communities, and this was echoed in the winner of our community vote for Victorian Tree of the Year in 2016—the Kalatha Giant in Toolangi Forest. A 400 year old Mountain Ash, this tree survived the 2009 Black Saturday fires and during the recovery become a symbol of bushfire resilience for the surrounding community. It now has a walking trail to tell the story of the tree and the surrounding forest. Another example is a public event held recently in Bullen, a suburb of Melbourne, organised by the Registered Aboriginal Party, the Wurundjeri Tribe Land & Compensation Cultural Heritage Council. I was incredibly lucky to be able to attend this event, where the living cultural practice of scarring a River Red Gum by cutting out a bark canoe was shared with the general public. This reclaiming of cultural practices demonstrates the ongoing need to see knowledge and archives as living cultural entities whose survival depends on embodied action passed through generations. The tree that had the bark removed was cared for with great respect, as with the resource that was taken from it. Both will exist as records of this event, and as tools of knowledge transfer in the future.

River Red Gum in preparation for Wurundjeri Tribe Land & Compensation Cultural Heritage Council Koorong Project, a scarring of the tree making a traditional bark canoe.

> Trees have always been central to building sustainable communities....

Archives of knowledge, whatever form they take, exist for the future not the past. We have a responsibility to encourage access to the archival repositories we care for, making as many aspects of them as possible available via a range of public interfaces. This public facing aspect of our collections may be as simple as a social media post, as complex as a digitalisation project or as intimate as a PhD project. Yet every engagement with an archival collection holds the possibility of creating new engagements, new interpretations and new collections for the future. For archives are not only produced by those that physically make them, in the past, but by those that access, interpret and make use of them in the future.

Plant evaluation and selection for conservation horticulture: improving the odds

Megan Hirst, Victorian Conservation Seedbank Officer,
The Royal Botanic Gardens Victoria

Megan Hirst, RGB Victoria, is the inaugural recipient of the BGANZ Professional Development Award Value $2,000.

Conservation horticulture aims to retain genetic and phenotypic variation present in natural populations, while commercial production seeks a uniform product, often through clonal propagation or the use of highly selected seed. While the efficiencies of large-scale commercial horticultural production may seem an obvious way to save rare and threatened plants, the use of plant material or propagules from a limited range of sources may further compromise at-risk species, especially if the impetus to conserve variability is not built in from the start. One solution is to enhance the profile of rare and threatened species by developing selected, commercially attractive forms that can be made available to commercial growers whilst maintaining separate, genetically diverse populations for use in species conservation. A key role for botanic gardens globally, is to make the public aware of the need for plant conservation (Convention on Biological Diversity). Two new projects funded by a Helen McLellan Research Grant and the Australian Flora Foundation are taking a research approach to meeting this strategy.

Testing the Horticultural Potential of Rare and Threatened Australian Plants is a collaborative effort involving colleagues from the Royal Botanic Gardens Victoria and the University of Melbourne. Two projects, headed by Dr Susan Murphy and yours truly, aim to identify and grow endangered Australian perennials that we believe have excellent potential for use in ornamental horticulture. To begin, we must establish populations of plants from seed obtained from the Victorian Conservation Seedbank and later, produce clonal plant populations from

forms with ornamental horticultural merit. We will examine plant performance in container and field trials, ending with their public (and showy!) display in the research beds at the Royal Botanic Gardens Victoria, Cranbourne. The trial beds will be open for evaluation by the public and commercial growers alike.

> Ultimately this project seeks to engage the public with rare and threatened species and demonstrate the value of plant conservation by using some very engaging plant species.

The value of experienced allies should never be underestimated when establishing a new project, as being privy to their knowledge can improve your odds of success. Mr Richard G. Hawke is the Plant Evaluation Manager and Associate Scientist of the Chicago Botanic Garden's Plant Evaluation Program. This program has been running since 1982 and is the biggest and most diverse project of its kind in the United States, covering an extensive range of perennial species of the Upper Midwest. Long-term comparative field-based experiments, overseen by Richard, have provided a wealth of information on species performance and plant selection. Ultimately, this program benefits the local home gardener. Plants are evaluated for their ornamental qualities, cultural adaptability, winter hardiness and pest and disease resistance.

The BGANZ 2018 Professional Development Award gives me the opportunity to meet and spend time with Richard and his colleagues at the Chicago Botanic Gardens. I will witness a successful plant evaluation and selection program in operation and observe the approaches used for plant monitoring and data analysis, thereby benefitting our Victorian based program. We will undoubtedly need to tweak our plant assessments, acknowledging that there will be challenges ahead with using rare Australia flora. In keeping with the need to share knowledge and ever increase the odds for success with the network of botanic gardens, I will happily communicate the evaluation methods learned from Chicago and how my colleagues and I develop and apply these to our study species over our two year projects.

Follow this link to discover more on the Chicago Botanic Gardens Plant Evaluation Program: https://www.chicagobotanic.org/research/ornamental_plant_research/plant_evaluation

Care for the rare: a multi-site conservation collection of rare and threatened plants of Victoria

John Arnott, Care for the Rare Project Officer, BGANZ – Victoria

One of the major aims of botanic gardens worldwide is to play an active and meaningful role in the conservation of plant species.

Across the BGANZ network, plant conservation is practiced by botanic gardens of all sizes and capacity, from major capital city gardens through to smaller regional gardens. There are a number of approaches in the plant conservation 'toolkit' available to botanic gardens to participate in plant conservation activities. These range from *ex situ* conservation collections, or displays of rare and threatened plants, through to conservation seedbanks, seed orchards, research into plant production, conservation ecology and biology. A number of botanic gardens embrace these but go further still, actively participating in restoration ecology, reintroductions and translocation programs.

Plant conservation and Victorian regional botanic gardens

A survey of regional botanic gardens in Victoria in the late 2000's indicated that very few Victorian gardens had active plant conservation programs or conservation collections. This situation has not significantly changed in more recent times. Unlike most other states, plant conservation in Victoria is consistently viewed as an unattainable goal for regional botanic gardens, with anecdotal feedback suggesting that "that's what the big gardens do… it's not what we do".

Sale Botanic Gardens have recently established a collection of locally significant indigenous plant species but access to plant material and information about rare plants have been their biggest challenge.

There are likely a host of reasons why this perception is in place. Perhaps it has to do with the cultural history of the gardens? The majority of regional botanic gardens in Victoria were established in the late 1800's. By the 1870's there were over 20 regional botanic gardens gazetted in Victoria. Botanic gardens, alongside libraries, galleries, mechanics institutes and grand civic buildings or structures were a measure of the maturity and sophistication of bourgeoning townships and communities. The catalyst for the proliferation of botanic gardens in regional Victoria was the discovery of gold and its associated wealth. Establishing a botanic garden was a statement of civic pride.

While many regional botanic gardens established significant collections of largely exotic taxa and were impressive in scale and complexity, very few were founded as scientific institutions. The majority of the gardens were in essence established as 'pleasure parks'.

> By the 1870's there were over 20 regional botanic gardens gazetted in Victoria.

Throughout much of the 20th century a good number of these heritage gardens fell into various levels of disrepair. Only a handful of gardens were managed with continuity and on-going consideration to how living collections were maintained or curated. Throughout much of the century the majority of regional botanic gardens in Victoria were in reality best considered to be 'botanic' by name, not necessarily by nature, many being managed more in the realm of a high quality park or garden.

In more recent times, regional botanic gardens in Victoria have undergone something of a renaissance. With this, new masterplans have been developed and others reviewed, a large number of capital projects have been undertaken across the state and indeed a number of new gardens have been established. In 2000 the Victorian Regional Botanic Gardens Network was formed and more recently the incorporation of BGANZ – Victoria Regional Group. Yet through all of these positive developments, establishing indigenous plant conservation as a key role for Victoria's regional botanic gardens remains elusive.

In response to this, the BGANZ – Vic committee has been proactive. There have been attempts to have plant conservation added as a specific agenda item at meetings and workshops and to build capacity for regional botanic gardens to participate. This has included the development of the BGANZ Collections Planning Toolkit, a seminar in the Grampians themed around 'Plant Conservation: an attainable role for regional botanic gardens', the preparation of numerous papers and delivery of talks at network meetings across the state. Despite these opportunities for participation and encouragement there is still limited take-up in active plant conservation initiatives by the majority of regional gardens. One might ask why this is so.

> ..... there have been attempts to have plant conservation added as a specific agenda item.

Further to this a 2015 survey of Australian botanic gardens designed to determine the level of involvement and approaches taken to plant conservation, the results indicated there were a number of perceived impediments preventing in particular Victoria regional botanic gardens from participating fully in plant conservation activities.

Addressing the issue

In late 2015 BGANZ Vic Committee members undertook an informal phone survey speaking directly to each garden curator and manager, to discuss the plant conservation challenges and obstacles preventing them participating in plant conservation activities. Access to plant material, availability of plant cultural information and lack of cultivation protocols were cited as reasons for not participating. Interestingly landscape character and the 'constraints' of heritage landscapes were also referred to as potential impediment to developing conservation collections of indigenous plants.

On a positive note there was a consistent level of interest and indeed willingness to explore the topic further. With this in mind the BGANZ-Vic committee discussed options to support those interested gardens to become involved in plant conservation. A conservation working group was formed and a number of potential projects and approaches discussed. The main thread arising from these discussions was to look for a model that actively supported and built capacity for regional botanic gardens to participate.

Inspiration for this has come from the past. In 1996 to celebrate its 150th year, the RBG Melbourne sourced and propagated a range of interesting and significant tree stock. Plants from this project were ultimately distributed to most of the regional botanic gardens across the state. Perhaps too, this was the project that triggered/rekindled the interest at regional botanic gardens in Victoria as discussed earlier.

The conservation working group is now exploring something similar to the significant tree project of the 1990's, distributing plant material propagated and grown at the RBGV to regional gardens across Victoria. However in this instance the focus would be on the propagation and distribution of rare and threatened Victorian taxa to those participating gardens across the state.

Care for the rare

With the generous support of the Maud Gibson Trust, the Royal Botanic Gardens Victoria (RBGV) and BGANZ – Victoria is now exploring the feasibility of establishing a conservation collection of indigenous Victorian rare and threatened plant species at a number of regional botanic gardens across the State. The emphasis of the conservation collection will be placed on the threatened species from Victorian bioregions which are 'proximate' to each of the participating gardens.

The project has been branded 'Care for the Rare' and dovetails into an existing Botanic Gardens Conservation International (BGCI) program of the same name. The BGCI program provides free, easy-to-use interpretation resources that any garden can use to clearly communicate conservation stories of threatened plants in their collections. These resources can be accessed at https://www.bgci.org/usa/carefortherare

> The emphasis of the conservation collection will be placed on the threatened species....

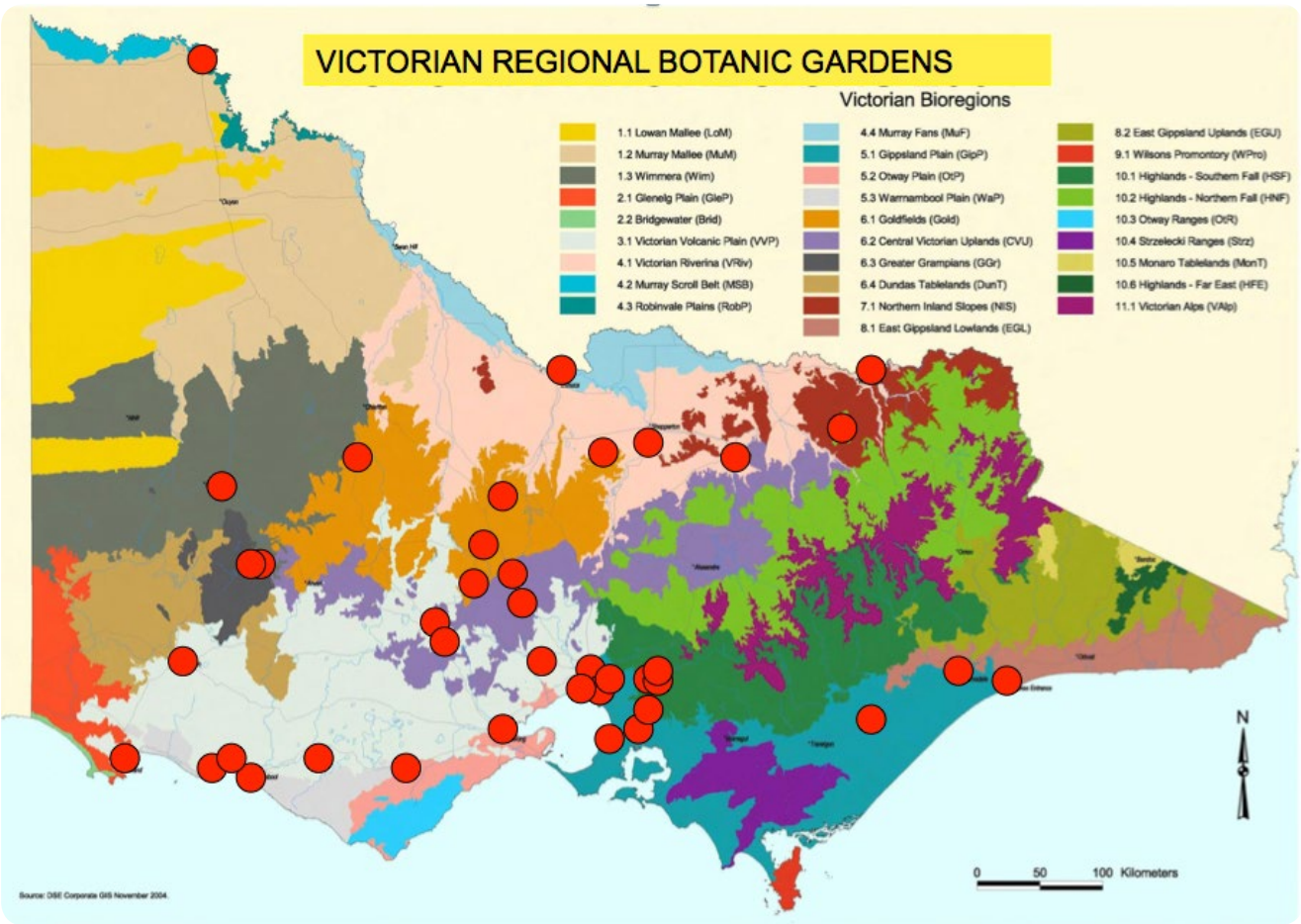
The first stage of this project, an assessment of the Victorian rare and threatened flora for inclusion in the project, was completed in 2016. This was a desktop exercise undertaken by Melbourne Gardens Horticulturist David Roberts using a number of specific criteria:

- Ornamental horticultural potential
- Cultivation protocols
- Propagation protocols
- Requirement for seed orchard production
- Held in RBGV living collections
- Held in Victorian Conservation Seedbank
- Plant bioregions and proximity to gardens
- Known provenance

Victoria's 'newest' botanic garden, Shepparton who are very keen to introduce plants with conservation significance into their collections. Photo Jenny Houlihan

Approximately 600 taxa were assessed and plants for inclusion were based on the 'best fit' to each participating garden.

The second stage of the project was to seek expressions of interest from regional botanic gardens wishing to participate in the program. This took the form of an online survey seeking information about each of the gardens which informed the working group about the capacity for individual gardens to participate.



There was a wonderful response to the project with 18 expressions of interest received from across the state. Even more pleasing was the intention to further explore the project requirements and outcomes which include site inspections at each of the 15 selected gardens. Those gardens not considered did not meet the required criteria such as capacity to demonstrate ongoing organisational/institutional commitment to the project. There was also an application from a private land holder but the site was not open to the public. Other gardens were still only development projects and not yet 'ready' to receive a collection of these rare and threatened plants.

The next stage of the project is to undertake the site inspections. This will provide the opportunity for key garden staff/volunteers/stakeholders to meet with members of the working group to discuss and explore specific factors to guide the approach to collections development for each participating garden.

The site inspection would aim to explore (but not be limited to) the following factors:

- Existing living collections
- Landscape character
- Relationship the project may have to site strategic planning documents/programs

- Exploring options for collection display/design (stand alone or integrated into existing garden areas)
- Amount of time/resources that can be dedicated to the project
- Capacity to keep detailed records
- Capture information about the site, including growing conditions

Based on the information gathered from this inspection and discussions, the gardens then deemed suitable to progress to the next stage will have a Conservation Collection Plan developed.

The Conservation Collection Plan would pull together information gathered during assessment of the expressions of interest and site inspections to establish broad aims and objectives of the conservation collection. In particular how the collection would be incorporated into the landscape and determination of the project scope and scale. The development of the Conservation Collection Plan would be a collaborative effort with the project team working in close association with staff at each participating garden.

Servicing this level of interest has provided the project team with some logistical challenges. There will be several rounds of site inspections and collections planning sessions necessary. The first site inspections are planned for November 2017 with completion of all the site visits by the end of 2018.

> The development of the Conservation Collection Plan would be a collaborative effort...

The final stage of the project is the plant production and distribution but is yet to be fully scoped. The working group will actively be seeking funding support to implement these stages.

Opportunities and constraints

The focus for this project is not limited to, but is clearly placed on the display of a broad selection of regionally significant rare and threatened plants across a number of sites. The working group and participating gardens are acutely aware of the limitations of *ex situ* conservation programs in contributing directly to conservation outcomes for any given taxa. The ultimate aim of plant conservation programs is to have evolving, self-sustaining and resilient populations of rare and threatened species in the wild. This project clearly cannot contribute to this objective directly, but contributes in spades through empowering botanic gardens to communicate to a broad audience about plant conservation for plant conservation. To this end the development of a communications plan is another critical element in the success of the project.

Main Lawn at the Bendigo Botanic Gardens who have expressed interest in participating in the Care for the eare program. Photo Brad Crème

To date the RBGV, BGANZ Vic and the Maud Gibson Trust have financially supported the initial stages of the project. However the funding for the final stage of the project, plant sourcing, propagation, production and distribution is yet to be secured.

Project timelines

The project working group have developed a project plan with key milestones and indicative dates for their completion. Some of the key dates are:

- Develop Communications Plan: Dec 2017
- First round of garden visits: Nov – Dec 2017
- Completion of first round of collection plans and planting schedules: Dec 2017
- Complete subsequent rounds of garden visits and collection plans: Dec 2018
- Establish funding model and raise funds: July 2018
- First round of plant production: July 18 – Dec '19
- First round planting: Autumn 2020
- Second round of plant production: Jan '19 – Dec '19
- Second round planting: Spring 2020

Sir Joseph Banks – A grand tour or serious expedition?

Michael Connor, Coordinator of Education, Wollongong Botanic Garden

When Joseph Banks joined Captain Cook on the Endeavour in 1768, was he simply another rich young English gentlemen going off on an adventurous grand tour, or was he a dedicated naturalist intent on revealing the wonders of unknown lands to the scientific world? In his own words Banks would tell you that those English gentlemen who embarked on the grand tour of Europe were 'block heads'. He wanted more, and rejecting the tour of 'drunkenness and debauchery' he instead sailed to Newfoundland and Labrador where he collected rocks, plants, animals and developed the taste for exploration and discovery. Banks was certainly a dedicated 18th century naturalist and his scientific efforts and achievements on the Endeavour trip can't be denied, but still there was something of the gent on holiday about his attitude and approach to this journey.

> He wanted more, and rejecting the tour of 'drunkenness and debauchery' he instead sailed to Newfoundland...

Joseph Banks was an amateur naturalist, never completing his university education although he did pay some attention to the classics because he needed some understanding of Latin and Ancient Greek to converse about his beloved plants. He was forced to hire a personnel botany teacher from Cambridge because this subject wasn't taught. Dropping out of university as soon as his father passed away he was free to devote his whole time to learning about the natural world. With the trip to Newfoundland under his belt, Banks jumped at the opportunity to join James Cook on his voyage to the Southern Ocean to study the transit of Venus across the Sun, a one in one hundred year event. He gathered a team of scientists and botanical/ anthropological illustrators to assist him in recording his discoveries of the natural world. This team was very well prepared ….John Ellis writes to Charles Linnaeus...

'*No people went to sea better fitted out for the purposes of natural history, nor more elegantly. They had a fine library of natural history; they have all sorts of machines for catching and preserving insects; all kinds of nets, trawls, drags and hooks for coral fishing; ...several sorts of salt to surround seeds; wax for preservation,...besides there are many people whose sole business is to attend them for this very purpose. They have two painters and draughtsmen and Solander assured me that this expedition would cost Mr Banks ten thousand pounds.*'

Daniel Solander a former student of Carl Linnaeus was a gifted botanist and mentor to Banks. Others in Bank's retinue included the artists, Sydney Parkinson and Alex Buchanan; H.D Sporing was a naturalist and there were various servants. Banks insisted on bringing along his favourite greyhounds, plus a plentiful supply of brandy and beer.

While well prepared for the voyage, Banks arrived on board the Endeavour with a terrible hangover; it took him several days to recover from this. In fact it took him weeks to get his sea legs and during storms he would tie himself to the ships canons for fear of being washed overboard.

During their first stop at Madeira his team was able to collect 330 plant specimens and another 320 specimens during their stopover at Rio de Janeiro. In Rio he and Solander were forced to sneak onto land like wayward teenagers, disguised as the ship's doctors and while on board they would go through the ships fresh salad to discover local herbaceous plants. Later in Tierra del Fuego Banks convinced Captain Cook, despite difficult landing conditions, to let his team go ashore to investigate the alpine flora. This resulted in the death of two of his servants and the rescue of the surviving team members. But none of this stopped them from single-mindedly sticking to the task and collecting another 148 plant species new to science.

> In Rio he and Solander were forced to sneak onto land like wayward teenagers, disguised as the ship's doctors...

It was during the next landing at Tahiti that Joseph Banks really let his hair down, taking advantage as did so many others on the ship favours from the women-folk, gaining some discreet tattoos and he dancing naked in a traditional ceremony. He also convinced the Captain to take a native priest named Tupaia on board for the journey home whom he decided would be a great talking point amongst London Society. Tupaia proved to be an excellent guide in the Pacific Ocean and a useful translator even in New Zealand but along with many of the ship's company he died later in Batavia, never fulfilling Banks aspirations. Banks was also the first European to describe the natives recreational activity of 'surfing' and he and his team were of great assistance to the ship's astronomer Charles Green while he was observing and measuring the Transit of Venus.

In New Zealand Joseph Banks generally behaved himself. This wasn't too difficult considering the fierceness of the Māori warriors, some of whom it was soon discovered were fond of eating their enemies. Banks was critical of Cook and the crew for shooting the first Māori they encountered without true cause. Banks would openly show his petulance with Cook whenever the captain refused to land to allow him to collect specimens in this land rich in flora. Nevertheless they still were able to collect 360 plant species here.

In New Holland (Australia) Banks and his team were in their element collecting hundreds of plant species new to science. They were also the first Europeans to record their observations of the strange new animal species they encountered such as the kangaroo. They had limited contact with the shy inhabitants of this land who simply wanted them to go away. However those they did encounter left an impression on Cook. His impression was they were indeed a happy people with no need for the understanding or use of modern European conveniences– they had everything they needed.

Banks was also impressed by the quiet determination of these people. In particular the way they were able to find so many uses for the local flora and fauna and how they managed the land. He observed them eating Warrigal Spinach, *Tetragonia tetragonioides* and sea food and even convinced the ships cook to use it to improve the taste of stingray caught at Botany Bay.

[Banks was also impressed by the quiet determination of these people.]

If there was any doubt before, Banks soon found out that this sea journey was not a simple holiday. The Endeavour was nearly shipwrecked on the Great Barrier and he and his men were required on deck to pump out the water and to throw heavy objects overboard to save the lives of the entire ship's company. Fortunately they survived and as a bonus also managed to save most of their valuable scientific collection. However in Batavia on the way to Cape Town they were not so lucky, a third of the crew and half of Bank's entourage died of malaria and dysentery, including Sydney Parkinson. In spite of this depleted company they collected 151 plants in Java and many others in South Africa. From here with an exhausted crew and scientific team the HMS Endeavour limped home.

So what off Banks' Grand Tour? Was it simply an adventurous tour for a young gentleman of means? Or were their serious scientific benefits. Banks and his men showed endeavour and enthusiasm for their tasks throughout their long voyage. It was no picnic with weather conditions ranging from freezing at Tierra del Fuego to very hot and humid in most other places. The scientists had to deal with disgruntled natives wherever they worked. There were the hostile experiences in New Zealand and they were often hampered by theft of their equipment in other countries. The sheer numbers of species collected during the three-year circumnavigation of the globe suggest that this was more

than a mere holiday for a wealthy amateur scientist. When the Endeavour reached England she brought with her 30,000 botanical specimens, records describing 110 new genera and 1300 new species, together with 1,000 scientific drawings.

Banks did take his finger of the pulse on his return to England. He never published a Florilegium of the voyage. There were extenuating circumstances of course, Sydney Parkinson his botanical artist not surviving the journey. However Solander gave him his full and undivided support as his secretary/botanist, and other artists were employed to complete the work that Parkinson had started, but still it was not completed in his life time.

Banks also fell out with the Royal Navy and so missed Cook's subsequent voyages of the Pacific and the chance of demonstrating his skills and talents as a botanist in the field. But none the less within the wider scientific community Banks did make a name for himself as an influential 'botanist'. The Royal Society made him their chairman for forty years. The King anointed him with a peerage and then asked him to establish Kew Gardens in London. As a result of this it is estimated that Banks was responsible for importing 700 species of plants to the UK making Kew one of the foremost botanic gardens in the world. He achieved this by using his wealth and influence to sponsor other botanists and plant collectors to travel the world searching for new genera and species in his name.

In conclusion I would suggest that this voyage of the Endeavour was a Grand Tour indeed.

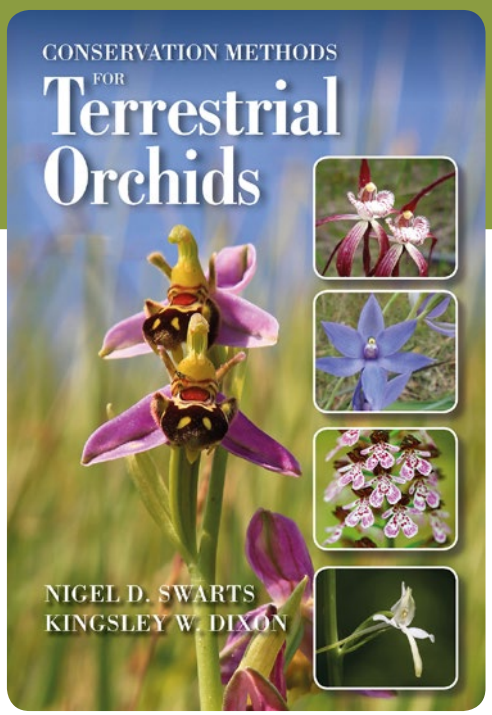
It has been nearly 250 years since this famous journey began in Plymouth and it will soon be appropriate for botanic gardens throughout the world, particularly those along the route taken by the Endeavour, to celebrate Bank's achievement. Wollongong Botanic Garden is sprucing up the Sir Joseph Banks plant house in preparation of this. The new face lift will be ready for April 2020 two hundred and fifty years after the Endeavour sailed past these shores on its way to Botany Bay. Wollongong is already running Joseph Banks theatrical tours in the Garden. These interactive tours are promoted as an opportunity to meet the famous botanist. They are proving very popular and this is a great way to interpret the plant collection for the public.

Join in the celebration of the Grand Tour as the ghost of the Endeavour heads towards your shore.

BOOK REVIEW

Conservation Methods for Terrestrial Orchids

By Nigel D. Swarts and Kingsley W. Dixon
J. Ross Publishing 2017
Researched and written by **Tom McCarter**



Terrestrial orchids, with their many complex ecological interactions, are among the most challenging plants to grow, manage and conserve. *Conservation Methods for Terrestrial Orchids* is an ambitious new book that sets out to demystify the many facets of orchid science in an accessible manner. It succeeds superbly.

Nigel Swarts and Kingsley Dixon, experienced orchid conservationists, have produced a remarkable book that will appeal to both specialists and non-experts alike.

A range of subjects from in-situ monitoring to seed storage are presented in a logical progression. The chapters on mycorrhizal interactions, orchid culturing and pollination were particularly enlightening.

Throughout the book, concepts are explained clearly in an engaging style with up-to-date orchid research efficiently summarised. Key points are supplemented by excellent illustrations and the book is punctuated by relevant case studies from around the world. The applied nature of the book is particularly helpful. There is an emphasis of practicality and pragmatism, with many tips, guidelines and protocols to aid practitioners. This helps to make the book adaptable.

Conservation Methods for Terrestrial Orchids would be an excellent starting point for anyone considering joining or starting an orchid conservation program in their local area. It has certainly inspired me.

FEATURE GARDEN

The Botanic Gardens of South Australia

John Sandham, Collections Development Officer, Botanic Gardens and State Herbarium, Department of Environment, Water and Natural Resources

The three botanic gardens which form the Botanic Gardens of South Australia are Adelaide, Wittunga and Mount Lofty. Geographically, each is well-positioned to benefit from the available microclimates. This has allowed the development of a large and diverse range of living collections. Collectively, these three gardens have over 1.6 million visitors each year. This positions them well to deliver on their mission to increase the knowledge and appreciation of plants and the significance of plant conservation for the ongoing benefit and enjoyment of the community.

These botanic gardens specialise in scientific and educational displays of both exotic and native ornamental plants. Some of the more notable collections are the palms, endangered cycads, rhododendrons, conifers and ferns, also the culinary and medicinal herbs. Of the visitors who come each year approximately 25,000 are school students who come to learn and gain a better understanding of the plant world and its importance to their future.

History

In 1837 Colonel William Light (South Australia's first Surveyor General) in his plan for Adelaide showed an area set aside for a botanic garden. It wasn't until 1854, after a public appeal to the Governor, that the Agricultural and Horticultural Society recommended the establishment of a 16-hectare botanic garden. Three years later in 1857 the garden opened to the public.

The original plan of the garden is said to have been influenced by the gardens at Kew in England and Versailles in France, together with some German and Dutch influences. Today the Adelaide Botanic Garden is described as having a northern European style, which can be seen reflected in its 19th century buildings.

Development of the Adelaide garden continued under the directorship of Dr Richard Schomburgk (1865–1891). This was a period of significant development with the planting of the Moreton Bay Fig Avenue, Araucaria Avenue and Plane Tree Ring. It was also during this time that the 30-hectare Botanic Park to the north of the botanic garden was acquired and added to the botanic garden portfolio. Its tree collection in this area still contains many of the early plantings, such as Plane Tree Drive.

In order to grow and display tropical plant collections glasshouses were necessary, and in 1868 the Victoria House was constructed especially for the Victoria Water Lily, *Victoria amazonica*. This plant species, with leaves almost two metres in diameter, was flowering in Australia this same year, proving the worth of the specially constructed house. Other significant buildings constructed during this time were the Palm House and the Museum of Economic Botany, both opened to the public on their completion.

Adelaide Botanic Garden, Murdoch Avenue.

The acquisition of two other botanic gardens, Wittunga, which opened to the public in 1975, and Mount Lofty, which opened in 1977 (and celebrates its 40th birthday this November) extended the range and richness of the living collections. Additions to the tropical collections at Adelaide Botanic Garden were made possible with the construction (1988) and opening (1989) of the Bicentennial Conservatory, the major Bicentennial monument of South Australia. This wonderful facility was also the venue for the recent opening ceremony of the 8th BGANZ Congress on 22 October 2017.

Adelaide Botanic Garden

Much loved by locals and visitors alike, Adelaide Botanic Garden is also the headquarters of the Botanic Gardens of South Australia. Located on the North Terrace, it is truly an historic garden of the Adelaide Plains, developed in what was already known as a challenging dry Mediterranean climate with alkaline soils. Native and exotic plant collections are displayed here, including palms, cycads, bromeliads and many spectacular mature trees and shrubs. Rainforest species are grown in the temperate Australian forest and tropical Bicentennial Conservatory. In addition, there is a collection of unique arid-climate plants from Madagascar in the Palm House.

The development of this dry Mediterranean climate garden started in 1855 in response to a public appeal made to the then Governor of South Australia, Sir Richard Graves MacDonnell KCMG CB. The garden was opened to the public in 1857 and is said to have been influenced by a mix of British, French, German and Dutch styles. These influences can be seen reflected today in the heritage of the European buildings, for example the Museum of Economic Botany, Palm House

and Victoria House. There is also accompanying statuary from the time and Victorian gardenesque landscapes, including avenues of mature trees particularly Araucaria and figs. The second director Dr Richard Schomburgk not only developed but added to the buildings and other infrastructure; he also trebled the number of taxa grown in the collections.

Cactus and Palm house at Adelaide Botanic Garden.

The Adelaide garden now grows varied living collections appropriate for the dry warm sunny climate. These collections include geographical representation from the Canary Islands and New Caledonia. Taxonomic and evolutionary plantings are represented by the endemic and exotic cycads, South American Bromeliaceae and the diverse and globally important Solanaceae. The biological and ecological themes allow the development of rainforest plantings in the temperate Australian Forest and lowland tropical environment of the Bicentennial Conservatory.

The local State flora is represented in the Mallee along with Australian plant cultivars in the Native Garden. The endangered xerophytic taxa from the south-west of Madagascar is housed in the in the historic Palm House. Modifications have been made to the original glasshouse, now known as the Amazon Waterlily Pavilion, where South American species complement the Giant Water Lily, *Victoria amazonica*. The recent construction of a wetland to harvest water from First Creek is part of a long-term water security program and has been a spectacular addition to the garden.

The endangered xerophytic taxa from the south-west of Madagascar is housed in the in the historic Palm House.

Area

Adelaide Botanic Garden 24 ha

Botanic Park 26.6 ha

Height above sea level 50 m

Weather

Mean daily min. 11.9 °C

Mean daily max. 22.4 °C

Lowest recorded min. 0 °C, 24 July 1908

Highest recorded max. 47.6 °C, 12 January 1939

Mean annual precipitation = 531 mm

Mount Lofty Botanic Garden

The development of this cool temperate Adelaide Hills garden came from the suggestion of the need for a higher rainfall area of botanic garden to grow a wider range of taxa. Approved by the Board of Governors in 1948 and purchased in 1952, Mt Lofty was eventually opened to the public 25 years later in 1977. It grows a wide selection of exotic taxa and many Australian natives suited to this climate, also taking into account some of the directives detailed in the Alan Correy Master Plan (1965). This is a spectacular large hills garden located on the eastern slopes of Mount Lofty. It features a range of cool temperate plants and in spring its massed displays of magnolias, rhododendrons, camellias and roses are magnificent. The garden is also renowned for its exceptional display of autumn colour.

Mt Lofty Botanic Garden – Autumn colour.

The cool moist climate of the Adelaide Hills is a significant factor in allowing so many valuable additions to be made to the living collections. Good examples are the biological and ecological plantings of the Fern Gully and the Woodland Garden. The success of the taxonomic and evolutionary representations demonstrated by the rhododendron, magnolia, camellia and viburnum collections is testimony to this. Large conifers also perform well, as do the smaller ornamental and landscape dwarf conifers. Geographical themes, such as Himalayan, New Zealand, South African, North and Southern American have also been established and have developed well. Large pockets of native flora divide the collections from one another and there are magnificent stands and backdrop of Stringy Bark (*Eucalyptus obliqua*), which add value in providing protection from the elements and a focus to each of the collections.

Area

0.97 ha

Height above sea level 670 m

Weather

Mean daily min. 8.1 °C

Mean daily max. 17.7 °C

Lowest recorded min. -3.9 °C, 24 June 1944 and 9 July 1944

Highest recorded max. 41.3 °C, 12 January 1939

Mean annual precipitation = 1191 mm

Wittunga Botanic Garden

Wittunga was the last of the trio to form the Botanic Gardens of South Australia. Handed to the State, and subsequently the Botanic Gardens in 1965, it was opened to the public 10 years later in 1975.

The garden was established by Mr Edwin Ashby in 1901. His particular areas of interest were in developing a native flora garden and a collection of South African taxa. A legacy that may be attributed to his passion can be seen in the brilliant displays of ericas in spring, and plants from Kangaroo Island and Fleurieu Peninsula, while the Sandplain Garden features a display of Western Australian wild flowers.

Wittunga Botanic Garden.

To advance the inherited theme of Gondwana from this early development, taxonomic and evolutionary collections are being developed as living resources to allow for ongoing observations and comparisons between the South African and Australian floras. Examples of this are the Myrtaceae collection, with over 150 species of eastern, southern and western Australian Eucalyptus species, and the South African Proteaceae and Ericaceae collections. South Australian flora is represented by the geographic Fleurieu Peninsula and Kangaroo Island collections. Interesting biological and ecological planting in the form of the Western Australian Sandplains and South African Fynbos also complement the comparative themes.

The historical and cultural value of the botanic garden is enhanced further by the presence of the Maluka beds and the Never Never, the original developed areas of the garden, adjoining the old Ashby residence and its garden.

Area

15.2 ha

Height above sea level 220 m

Weather

Mean daily min. 11.0 °C

Mean daily max. 19.6 °C

Lowest recorded min. -2.3 °C, 17 August 1933

Highest recorded max. 44.1 °C, 12 January 1939

Mean annual precipitation = 683 mm

Calendar of conferences and events

9th BGANZ Congress

Wellington, New Zealand, October (tbc) 2019

10th BGANZ/BGCI Congress

RBG Victoria, 2021 (dates tbc)

6th International Workshop on the Genetics of Host-Parasite Interactions in Forestry, Tree Resistance to Insects and Diseases: Putting Promise into Practice

August 5-10, 2018, MT. STERLING, OHIO USA

4th Pakistan Botanic Garden Conference

The 4th Pakistan Botanic Gardens Conference "Role of Botanic Gardens in Climate Change Adaptation and Mitigation"
February 21-23, 2018, BOTANIC GARDEN GCU, LAHORE, PAKISTAN

EUROGARD VIII

Eight European Botanic Gardens Congress: "Botanic Gardens, People and Plants for a Sustainable World"
May 7-11, 2018 LISBON, PORTUGAL

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