



## President's Report – February 2020

It was a lovely mild, partly sunny day last Sunday for our Friends' visit to Trott's and Broadfield Gardens. The day out was organised by Vicki Steven and I am sure that I can speak for the thirty strong group of members and Friends when I say that the day out was 'good for the soul'.

Trott's Garden near Ashburton was developed by Alan Trott, a notable plantsman. It is a renowned garden which has international acclaim and is considered outstanding for its horticultural value in plant material, design and construction. Two highlights for me were the under/over knot garden and the newly developed red garden.



1: Trott's Garden: 'under/over knot garden.'

The morning started with a good country style morning tea, served to us for only ten dollars a person and was followed by a leisurely hour to wander and enjoy the garden before having a relaxed picnic and time to chat.



*Veronica laudaiana*  
Sun Hebe  
Endemic to Banks Peninsula  
Christchurch



2: Trott's Garden: 'The red garden.'

Trott's Garden is now held in a charitable trust and run almost entirely by volunteers; it is a huge feat.

Broadfield Garden (near Rolleston) is a beautifully maintained, lush garden featuring New Zealand native and other plant varieties that have been raised in New Zealand. A stand-out feature is how natives have been used for clipped hedges and for an immaculate double border. David Hobbs, the owner gardener was our guide. He generously gave us some tubers of *Cyclamen coum* which comes from the Caucasus Mountains (at the intersection of Asia and Europe), and also seedlings of a tree peony, *Peonia delavayi* 'Franch' to propagate at our nursery.



3: Broadfield Garden: Part of the double native border.



4: Group photo at Broadfield Garden. David Hobbs, the owner/gardener is on the far left.

We have planned a variety of talks over the next few months which I hope many of you can attend. (Please see the attached Events sheet for details).

In addition to our regular speaker on Sunday the 8<sup>th</sup> of March, the Grow Ōtautahi Garden Festival is on at the Botanic Gardens from the 20<sup>th</sup> to the 22<sup>nd</sup> of March. Members of the committee and others are busy working on a display stand for the

Friends where we hope to recruit new members. The Botanic Gardens' Trust will be sharing our stand to alert festival visitors to their objectives and projects. If you come along, be sure to make yourself known to our volunteers at the stand.

During the Festival our Garden Guides will be taking a series of themed walks starting at our stand in the marquee. Our guides are a very dedicated group of volunteers who continually improve their knowledge in order to guide visitors through the Gardens, so be sure to avail yourself of these special walks.

### Timetable for the themed walks.

Those marked with an asterisk (★) are led by a Chinese speaking guide.

#### Friday March 20<sup>th</sup>

10.30 am	The Icon Native Garden
11.00 am	Big Trees
11.30 am	The Gondwana Section
1.00 pm	Commemorative Trees
1.30 pm	Conservatories
2.00 pm	The Rock Garden

#### Saturday March 21<sup>st</sup>

10.30 am	The Icon Native Garden
10.45 am	The Icon Native Garden ★
11.00 am	Big Trees
11.30 am	The Gondwana Section
11.45 am	Big Trees ★
1.00 pm	Commemorative Trees
1.30 pm	Conservatories
2.00 pm	The Rock Garden

#### Sunday March 22<sup>nd</sup>

10.30 am	The Icon Native Garden
10.45 am	The Icon Native Garden ★
11.00 am	Big Trees
11.30 am	The Gondwana Section
11.45 am	Big Trees ★
1.00 pm	Commemorative Trees
1.30 pm	Conservatories
2.00 pm	The Rock Garden

We are very lucky to have a number of newly qualified guides. I extend our thanks to Faye and Neil Fleming for their training sessions. Congratulations to all those new to guiding and thank you once again to all the guides for your continued support of our Botanic Gardens.

Our propagators are working hard to keep the plant sale stand stocked, and are preparing plants for the autumn sale on Sunday the 26<sup>th</sup> of April. A very big thank you to the two teams involved

and in particular to Jeannie and Vicki, for their extra work stocking the stand and banking the money.

Thank you to our increasing number of volunteers who are helping our busy garden curators. This is a very worthwhile and satisfying part of the Friends' core business and I know that your work is really appreciated.

Finally, thank you to my hard working committee, newsletter editor and webmaster.

I wish you, our members, a prosperous and healthy autumn season. Thank you for being part of our Friends and for your on-going support through your subscriptions and volunteering activities. Welcome to all those who have recently joined our society.

**Jeanette Christensen.**



Gardens News

### **From the Director of the Botanic Gardens.**

Welcome to this late summer newsletter.

As I am sure you will agree there is never a dull moment in the Botanic Gardens. No sooner were the Christmas events wrapped up than the excitement of a plant to flower for the first time in our Botanic Gardens was nearing — the *Amorphophallus titanum* — (as you will see in the article by Susan Lawrence in this newsletter), caused a large amount of interest from Friends as well as the wider visitors to the Gardens. In addition it also drew a good number of people that don't normally visit us and we hope this will be the first of many visits to come.

Some of you came each day to check on progress. At the height of flowering we had queues of up to one hour and 15 minutes with an estimated three to four thousand visitors on one day alone. Thank you to the many of you that helped with stewarding; it made it so much more special for the visitors as they could chat to the steward, learn more about the plant, the Gardens and the team.

March will see a new addition to the Botanic Gardens. I am delighted to say that we are working with the New Zealand Alpine Garden Society to add a crevice garden to the rock garden/heather garden. A crevice garden expert from North America will be coming for three days. He will work with the team to develop this garden area; ready to later on receive a range of alpine plants that enjoy this specialist environment. It won't be many square meters but it is the quality that counts.

Thank you to each and every one of you for your continued support and for spreading the word about these wonderful Gardens, the plant collection and the work the team of staff and volunteers do at the Gardens. You are our ambassadors and often a new Friend will sign up to support us as a result of having spoken to one of you.

Thank you and enjoy the coming autumn.

With my kindest regards

**Wolfgang Bopp.**

## The Titan of Flowers

*Amorphophallus titanum*  
(titan arum, corpse flower)

Family: *Araceae* Genus: *Amorphophallus*

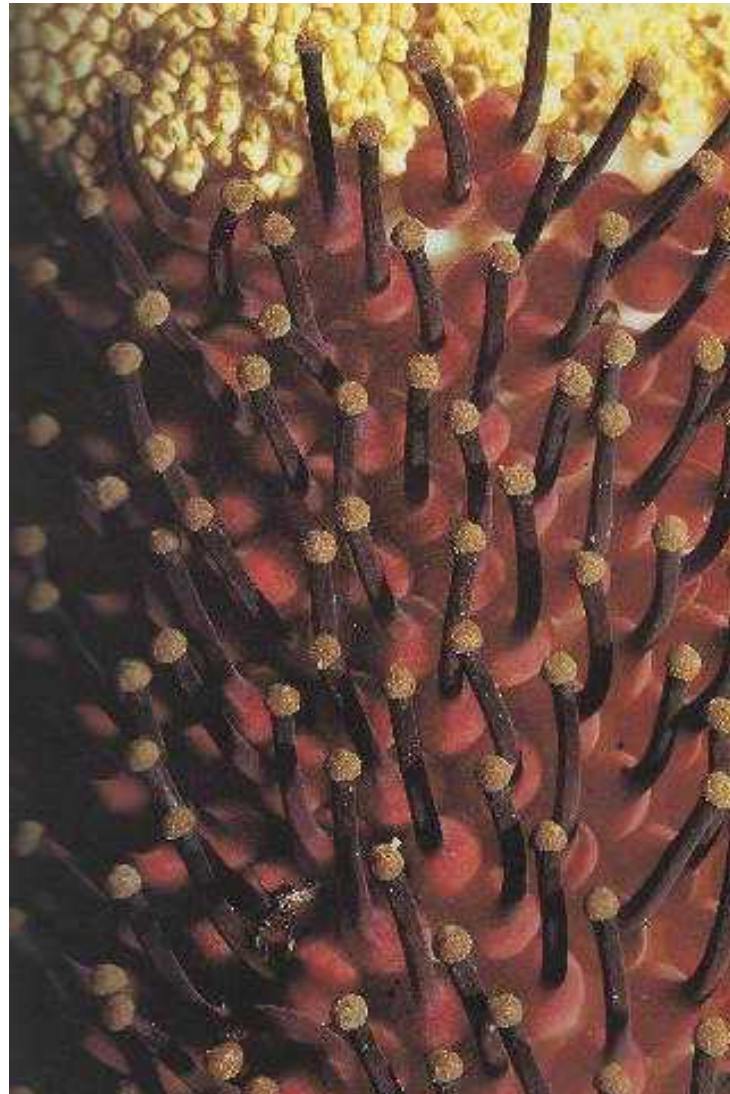


5: The titan arum flowering at the Christchurch Botanic Gardens January 2020. Photo supplied by Christchurch Botanic Gardens.

Native to the equatorial rainforests of Sumatra, Indonesia, growing on steep limestone hillsides, *A. titanum* has the largest inflorescence in the world and is cultivated by botanical gardens and private collectors around the world, but is increasingly endangered in the wild because of encroachment of its native habitat.

The titan arum grows from a tuber or corm. It can take 7-12 years before it produces a flower. The specimen on display in Cuninghame House during January came to the Christchurch Botanic Gardens in 2008 as a small tuber and when it was re-potted in 2019 it weighed 14.3kg. It is still considered a juvenile. The titan arum tuber is the largest in the world averaging about 50kg in weight. A tuber at the National Botanic Garden of Belgium at Meise weighed 130kg in 2013, while the current record is held by the Royal Botanic Gardens in Edinburgh with a tuber weighing 153kg after seven years growth from an initial tuber the size of an orange.

The Inflorescence of the titan arum is a single unbranched flower in the form of a spadix (a spike with small flowers borne on a fleshy stem). The largest in the world reached up to 3m in height. The spadix is typically sheathed by a leaf-like curved bract known as a spathe. The spathe of the titan arum is a deep green on the outside and dark burgundy red on the inside, with a deeply furrowed texture. The spadix is hollow, and in its depths, hidden from view inside the sheath of the spathe, it bears two rings of small flowers. The upper ring bears the stamens (male flowers); the lower ring is spangled with bright red-orange carpels (female flowers).



6: The carpels (female flowers) of the titan arum clustered around the base of the spadix. Above are the yellow stamens (male flowers). Photo from David Attenborough's book, 'The Private life of plants', p.136.

**History:** The first European to record seeing the titan arum was Italian botanist Odoardo Beccari who in 1878 was exploring and collecting plants in Sumatra. He tried to dig up his extraordinary discovery and found that the giant flower had sprung from a corm, a food storage organ formed from its hugely swollen underground stem. This

was roughly spherical with a circumference of nearly five feet and was so heavy that the two men who had dug it out had to struggle to lift it. One of them slipped and the gigantic corm broke. This is not surprising, for the titan's corm consists almost entirely of vegetable fat and has minimal internal structure. Once its delicate skin is broken, as it can easily be if it is handled roughly, it will rot into a mound of mush in a matter of days.

Beccari did, however, succeed in finding others that presumably were smaller and more manageable for he was able to send them to botanic gardens in Europe. One reached Kew and flowered a year later (1889). It has flowered over 100 times since this initial flowering.



7: The titan arum starting to open at the Cunningham House in the Christchurch Botanic Gardens, January 2020. Photo by Susan Lawrence.

The arum's growth cycle is vegetative. A leaf bud emerges from the corm which forms a small tree dividing at the top into three branches which bear smaller leaflets forming a wide umbrella. A fully

grown leaf/stem may stand six metres tall and form a canopy four metres across. Every year the plant manufactures food in the huge leaf and adds to the food store in its swelling corm and every 12 – 18 months the leaf withers and then grows again. The time sequence varies but eventually the leaf decays for the last time and the plant rests for some six months. Then at any time of the year, a giant bud emerges. It may pause, unopened, for several days and then suddenly, at great speed, grow several centimeters a day until the bloom develops to its full height. The spadix pushes up through the folds of the spathe and the spathe itself unfurls.

This flowering sequence is unpredictable both in the wild and in cultivation, where it generally takes between seven and twelve years of vegetative growth before blooming for the first time. After its initial blooming, there can be considerable variation in blooming frequency. Some plants may not bloom again for another 7 – 10 years, while others may bloom every 2 – 3 years. There have also been documented cases of back-to-back blooms occurring within a year and corms simultaneously sending up both a leaf or two and an inflorescence. There has also been an occasion when a corm produced multiple simultaneous blooms.

The spathe generally begins to open mid-afternoon to late evening and remains open all night. At this time the female flowers are receptive to pollination. Although most spathes begin to wilt within 12 hours, some have been known to remain open for 24 – 48 hours. As the spathe wilts the female flowers lose receptivity to pollination.

As the spathe gradually opens, the tip of the spadix is approximately human body temperature and powerful odours are released to attract pollinators; carrion beetles and flesh flies which feed on dead animals or lay their eggs in rotting meat. The potency of the odour gradually increases from late evening until the middle of the night when the pollinators are active, then tapers off towards morning.

The whole flowering structure collapses during the wilting stage. The tall spadix which is filled with cobweb-like support fibres becomes flaccid, topples forward and droops over the margin of the spathe.



8: The wilting 'corpse flower' in Cuningham House. Photo by Susan Lawrence.

When pollination takes place, the spathe itself contracts inwards and its upper margins start to twist around the lower part of the spadix, claspng it so tightly that a huge water-tight bag is created. Safe inside it, the ovaries of the fertilized female flowers begin to swell. The basal stem supporting the whole structure, however, continues to grow, increasing in girth and lifting the great pear-shaped bag higher and higher into the air. After some time, the bag decays and falls away, unveiling several thousand huge berries, each up to six inches long that form a band around the tall pillar. They then turn a brilliant scarlet. In the wild hornbills come to feast on the fruit and deposit seeds through the forest.



9: A six ft. tall fruiting stem of the titan arum in the Sumatran forest. Photo from David Attenborough's book, 'The Private life of plants', p.138.

### The Christchurch Botanic Gardens Experience:

Four tubers were gifted to the Gardens in 2008, all the same age. The Dunedin and Auckland Botanic Gardens also received donated tubers at this time. Interestingly, our flower started to open on Monday the 6<sup>th</sup> of January, not long after the Auckland one in 2020. The latter was bigger, probably because it was growing in its winter garden directly over the heating pipes.

Over this eleven year period the tubers were kept in slightly damp potting mix with sheep pellets and given a fortnightly application of liquid nitrosol. After the leaf buds appeared they were followed by large speckled stems of about 15cm in diameter. At this point feeding and watering were stepped up. The stems with their branches reached quite a height before going into their dormant phase. There was great excitement when the first of the four tubers sent up a flower bud.

Once the flower bud appears, the full flowering process generally takes two weeks.

For the nursery team workers Greg Salton and Darren Tillett it was a novel experience with many decisions to be made for optimum public viewing. In retrospect they wondered whether the plant needed more light, but they will be better prepared for the next flowering probably in 2023 / 2024 according to Darren.

Titan arum plants are registered on a site in the USA where information records are kept with flowering height, tuber size and other details.

There are 3 different ways of reproducing the plant:

**Vegetative:** With a leaf cutting. (The nursery team's attempted leaf propagation but were unsuccessful, probably because it was an afterthought and a bit late in the season and so the leaf was not far off going into a dormant stage.)

**Pollination and subsequent seed production:** (not very successful in cultivation with a very small time window available), pollen can be collected and kept in a freezer and is viable for up to two years.

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## Taxonomy for Plant Conservation.

### **Ruia mai I Rangiatea.**

#### **The New Zealand Plant Conservation Network Conference.**

In 2019 I was privileged to receive funding from the Friends of the Botanic Gardens to attend the New Zealand Plant Conservation Network (NZPCN) biennial conference. This year it was a joint conference with the Australasian Systematic Botany Society (ASBS) and drew a good crowd of people.

This is the fourth NZPCN conference I have attended, with the previously held conferences in Auckland, Dunedin and Hokitika. It was held in Wellington at Te Papa over four days and included field trips to various places in the Wellington region plus workshops held at both Te Papa and at Otari-Wiltons bush, New Zealand's native botanic gardens and the final resting place of Leonard Cockayne.

I took part in the workshop on Ferns which I found very helpful and managed to identify several species new to me. I tried to get my head around what happened to *Polystichum richardii* — turns out it was pulled apart into different species and subspecies: *Polystichum oculatum* (which has smaller and darker leaves and occurs only on

**Tissue culture:** There have been successful attempts to propagate the titan arum with this sophisticated method.

A titan arum hybrid has been produced in Singapore by crossing *Amorphophallus variabilis* with the parent *Amorphophallus titanum*. The hybrid was named 'John Tan'

### **Susan Lawrence.**

Susan is a volunteer guide for Friends of the Christchurch Botanic Gardens.

The sources for this article are:

- 1) David Attenborough's book "The Private Life of Plants" (BBC books 1995)
- 2) Wikipedia.
- 3) The Christchurch experience was taken from an interview with nursery workers Greg Salton and Darren Tillett.

Banks Peninsula) and two subspecies of *P neozelandicum*.



10: NZPCN Fern workshop.

I also attended the field trip to Coastal Parangarahu Lakes and the Lowland Forest of Eastbourne with Carlos Lehnebach (Te Papa Botany) and Barrett Pistol (Greater Wellington Regional Council). The first stop on the trip was Pencarrow lighthouse, which although windy, provided stunning views over the Wellington Harbour entrance. After walking up a reasonably steep rugged track and following the farm path back down we came to the Parangarahu Lakes area, a fresh water lake system surrounded by rushes and sedges. Back out on the coast there were plenty of interesting plants adapted to the rare shingle beaches in the area such as

*Eryngium vesiculosum*, *Muehlenbeckia ephedroides* and a native *Crassula sp.* Following this walk we went to Eastbourne to George Gibb's (renowned entomologist) private property with interesting mixed lowland beech/tawa forest, home to native mistletoes and a range of orchids. It was a great day and I saw a number of species I had not seen in the wild before including *Drosera auriculata* and *Libertia edgariae*.



11: NZPCN field trip.

There were a number of great talks over the four days which, as we were combined with the ASBS, included some pretty hefty DNA analysis of LARGE Australian genera! Some of the talks that stood out and had the most relevance to me were as follows:

**Zoe Lunniss:** studied *Tupeia antarctica* in the Dunedin town belt. She found that the mistletoe could experience long periods of dormancy when under stress from drought or when completely browsed off, but could recover quickly when pressure was removed.

**Peter Heenan:** "Taxonomic novelties, restoration opportunities and conservation of limestone ecosystems in eastern South Island."

**Jon Sullivan:** "Crowd-sourcing the discovery of new plant naturalisations in Canterbury using iNaturalist NZ." Jon discussed how citizen

scientists can be used to record new incursions of weedy species in urban areas using the App. iNaturalist NZ.

**Kate Roud:** "Some don't like it hot: Safeguarding the New Zealand collection at Melbourne Gardens, Royal Botanic Gardens Victoria." Kate gave an interesting talk to the Friends of the Botanic Gardens the week before, and was grateful for the dress rehearsal leading into the conference.

**Kelly Shepherd:** Gave a great talk on "Forensic botany: An under-utilised tool for crime scene investigation due to plant blindness." She discussed how there are many forensic clues to be found in plant matter, but they are not recognised by many forensic investigators. Examples included a hydrangea leaf being found at a crime scene in the bush — indicating the crime had in fact occurred in a home garden and the evidence then dumped in the bush.

**Debra Wotton:** of Moa's Ark Research gave a talk on "Why is recruitment so rare in dryland floodplains?" looking at recruitment of *Olearia adenocarpa* and other species.

**Jacqui Bond:** "Preserving our native Myrtaceae from myrtle rust: A germplasm approach."

**Karin van der Walt:** "Creating ex situ collections through biotechnology: Five case studies of threatened species conservation in New Zealand."

**Philippa Crisp:** "What is the regional threat status of Wellington's indigenous plants?" This was an interesting look at species that may not be threatened nationally but can be threatened regionally. Conversely, some plants that are common regionally may be threatened nationally. I found this an interesting talk and will be interested in looking into the regional threat status of some of Canterbury's plants.

There were a couple of book launches at the conference:

**"Seeds of New Zealand Monocotyledons" by Colin Webb,** This second volume of the "Seed Atlas" provides more than 700 illustrations, representing all the seed types in the monocotyledon plant group, as well as descriptions and keys to aid identification. This follows on from the first volume that covered the gymnosperms and dicotyledons, released in 2001.

**"Conserving the plants of eastern South Island limestone" by Peter Heenan and Geoffrey Rogers.** This book has been made



available for free through generous funding for printing from the Canterbury Botanical Society. It highlights the conservation plight of many limestone specific plants and their habitats and outlines a number of newly described species. This book will prove invaluable to me in the development of our Canterbury limestone garden here at the Botanic Gardens.

The evening after the conference I also attended a public panel discussion called “The politics of collecting — from Banks and Solander to today” in which a group of researchers and scientists discussed issues around collecting scientific material and consultation with Iwi. As is often the case, I left this discussion with more questions

than answers. This is definitely something we will need to work on into the future.

I thoroughly enjoyed my trip and got a lot out of it. I can't thank the Friends enough for their generous funding and I am already looking forward to the next conference in 2021.

Hopefully one day we will host it here in Christchurch.

### **Luke Martin.**

Luke is the Collection Curator of the New Zealand section of the Christchurch Botanic Gardens.

## **Extending the life of a Giant.**

### ***Eucalyptus delegatensis.***

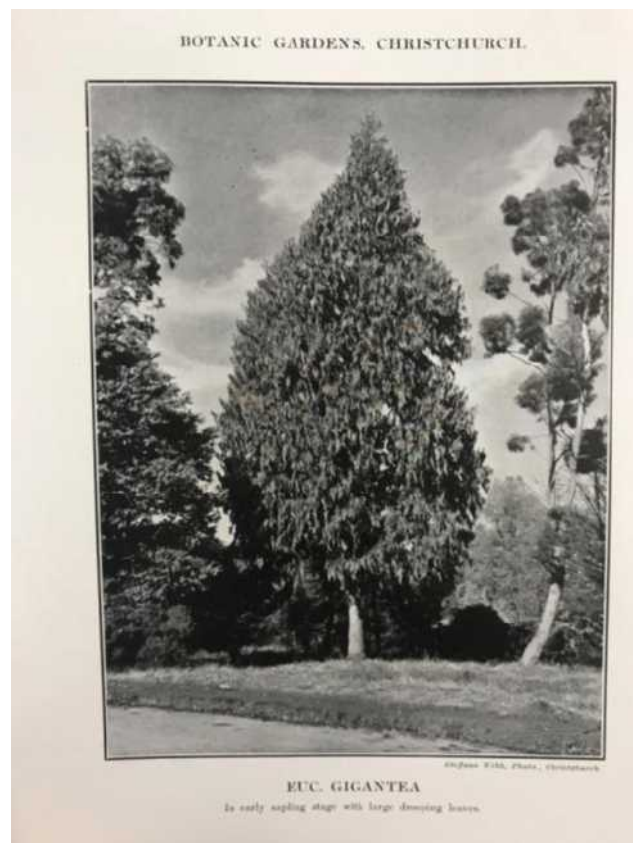
Many of you (if not all) will be familiar with the large dominating *Eucalyptus delegatensis* (alpine ash) with the large twisted trunk. A quick search on google of "large gum tree in the Christchurch Botanic Gardens" will return a number of images from visitors to the Gardens over the years showing just how iconic this tree has become.



12: *Eucalyptus delegatensis* (Alpine ash) ChCh Botanic Gardens.

Whilst the exact age of the tree is unknown a photo in "Trees from other lands in New Zealand: Eucalypts" by J.H. Simmonds (published in 1927) shows the tree was already well established during the time of publication. Based on this I believe it is safe to say that the tree is approximately 100 years old (or young when considered in the context of trees). How many more years it will be around for is anybody's guess but one thing which is certain is that the tree is a feature of the Botanic Gardens and

anything we can do to prolong its life here is well worth it. It is also listed as the largest specimen in the New Zealand Tree Register.



13: Image taken from “Trees from other lands in New Zealand: Eucalypts” by J.H. Simmonds 1927.

This leads nicely into the work that has recently been undertaken around the tree. Those of you who have visited the Gardens in the last few months would have seen a large area around the tree which has been mulched (I will talk more about this later in the piece). A few of you who

have been fortunate enough to come to the Gardens in the last few weeks would have seen the addition of a new platform which leads up to the base of the tree. The reason for this is to prevent compaction of the rooting environment around the tree.

So what is compaction, how does it happen and why is it a problem? Okay so this is a big topic, which I will attempt to condense down to a single paragraph. First of all, compaction is the condensing of the soil structure due to a force being applied. This can be caused in a variety of ways from vehicles, pedestrians, or simply the natural force of gravity. The degree of compaction which can occur is largely related to the amount of force applied and the frequency (other factors such as soil type and hydrology also play a large part in this however for the purpose of this article we will be focusing on force and frequency). What happens when soil is compacted is that the soil particles are squashed together removing the pore spaces, which would ordinarily hold water and air (both of which are vital for tree root growth and development).

In the context of the alpine ash, this tree is literally visited by thousands of people every year and each of those people have played a part in compacting the soil, which the tree relies so much upon. Overtime this has led to an early decline in the tree's health, which is evident through some dieback within the canopy and the sparseness of leaves compared to a specimen in perfect condition. This circles back nicely to what we have done recently and why.

### **MULCH, MULCH and more MULCH.**

The first thing we did was apply a layer of mulch around the tree. This has two key purposes, firstly it helps to retain water in the soil and secondly it acts like a cushion to reduce the force applied to the soil from people walking on it. The mulch furthermore provides other benefits such as adding nutrients to the soil, habitat for insects,

regulating soil temperature, the list goes on. The mulch that was applied is eucalyptus mulch from other removals around the city. As this breaks down it will provide the nutrients that would naturally occur if the tree was in a eucalyptus forest environment. There is some evidence that using the same genus/species as mulch can have added benefit.

### **Interaction without the compaction.**

So whilst the mulch will go some way to reducing the compaction of the soil caused by pedestrians, overtime the mulch will be squashed and compaction of the soil below will continue. In order to prevent this while retaining the ability for people to interact with the tree (and keep the tree's popular Instagram profile going) a platform has been built leading up to the base of the tree. By installing this platform people can continue to walk up to the tree without compacting the soil below, resulting in a happy tree and many more photos to come. The next and final step will be to put up bollards and chain around the edge of the mulch to direct people to the platform.

Since the platform has gone in we have had positive feedback including from a couple of world renowned arborists, who recently visited to run a workshop. With the addition of the mulch and the platform it is hoped that the trees health will improve and we will be able to enjoy the tree for another 100 years. We will be adding interpretation to the area to tell our visitors.

### **Toby Chapman.**

Toby has recently joined the team as the City Arborist and is based in the Botanic Gardens. Toby brings with him over ten years of experience in the arboricultural field.



## A Quirky Individual.

### ***Sequoiadendron giganteum* 'Pendulum' Weeping Giant Sequoia.**

You may have noticed in the car park between the tennis courts and the Christchurch Botanic Gardens the pair of peculiar looking trees, one either side of an opening on to the grassed area of the Pinetum. These are specimens of *Sequoiadendron giganteum* 'Pendulum', a weeping cultivar form of *Sequoiadendron giganteum* (giant redwood).



14: *Sequoiadendron giganteum* 'Pendulum'  
Photo by Bill Whitmore.

There are a number of specimens of *S giganteum* in the Gardens; a magnificent specimen on the Armstrong Lawn adjoining Rolleston Avenue; a number along the edge of the Archery Lawn (across the path from the herbaceous border) and others near the tennis courts.

Whereas a fully grown *S giganteum* tree is truly majestic in the regularity of its shape and great size, no one would describe the weeping version, *S giganteum* 'Pendulum' in the same way. It can look like a tree that has had a bad-hair day.

How have other writers described it?

“This tree is an individual, a character.”

“The quintessential "Dr Seuss" tree.”

“One of the most animate of all trees.”

“May develop a "grotesque shape" to some eyes, but to others "very interesting" — as is said of a friend's home-made wine.”

No two plants of 'Pendulum' are alike, creating both delight and consternation for those who wish to grow it. If a tree's leader stays straight, as it may, the tree can be 5m tall and only 0.6m wide. But more often the leader will twist or lean in one or more directions creating a living sculpture. A leader that has decided to grow horizontally may later decide to resume vertical growth — in this case a weeping curtain of foliage falls from the horizontal section.

This cultivar 'Pendulum' originated as a seedling selected in 1863 at Lalande Nursery in Nantes, France. Élie-Abel Carrière, French botanist and leading authority on conifers described it and first published its cultivar name in 1867 in *Traité Général des Conifères*.

**Bill Whitmore.**

## A Southern States Beauty.

### ***Quercus virginiana* / Southern Live Oak.**

We were in the Southern United States in November last year — Orlando Florida and New Orleans Louisiana — where the Southern live oak trees (*Quercus virginiana*) with their large and complex trunks fascinated me.



15: *Quercus virginiana* with a covering of *Pleopeltis polypodioides* (resurrection fern). Photo by Amama Thornley.

My awareness of significant trees of this world was heightened by my training to be a botanical gardens guide in Christchurch. I kept seeing these magnificent trees all over inhabited and wild places.

The Southern live oak is an evergreen oak tree that is native to the Southeastern United States. The tree is a common sight in Virginia, Georgia, Florida, and Louisiana.

While the largest trees in the U.S. in terms of wood volume are a few conifer tree species like the giant sequoia and the coast redwood on the western side of the Rocky Mountains, the Southern live oak together with the bald cypress are the biggest tree species on the eastern side of the Rockies. The live oak is not a very tall species, but has a widespread canopy with heavy branches. Most of the wood is situated in these branches, as opposed to the conifer trees mentioned earlier, where most of the wood is in the trunk.

The City Park in New Orleans has the oldest grove of mature live oak in the entire world. Some trees are supposed to be between 750 and 900 years old.

The trunks and branches of these trees are covered with resurrection fern (*Pleopeltis*

*polypodioides*) and hanging Spanish moss (*Tillandsia usneoides*).

Resurrection fern and Spanish moss are both epiphytes that grow on the surface of other plants and trees, most often live oaks. Resurrection fern and Spanish moss are not parasitic. They grow using the moisture and nutrients from the surrounding environment, including the air and intermittent rain.

Spanish moss uses the tree for support and the only damage it causes, is when it absorbs so much moisture from the air that its weight increases sufficiently enough to break the bough it is on.

Resurrection fern is so called because it can survive long periods of drought by curling its fronds and appearing grey brown and dead until there is rain or moisture in the air. The fern uncurls and reopens 'resurrecting' to a vivid green colour in 24 hours.



16: *Q virginiana* with both Spanish moss and resurrection fern growing on the bark. Google image.

These epiphytes can last a hundred years without water and still revive after a single exposure.

Spanish moss, called 'tree hair' in Native American language, reminded the French of Spanish conquistador's long hair so they called it 'Barbae Espagnol' (Spanish beard). This name then changed to Spanish moss.

The fern and the moss were both used as fillers for mattresses, mulch, medicines, fire lighters and adornment.



17: *Quercus virginiana* with *Tillandsia usneoides*.  
Photo by Amama Thornley.

Whilst in Southeastern USA, I loved sitting under these trees and marvelling at all the plant and animal life they supported. In addition they breathe out oxygen for our benefit.

I hope that these trees will have space to grow in peace to the end of their life cycle.

### **Amama Thornley.**

Amana is a volunteer guide for Friends of the Christchurch Botanic Gardens.

**Editor's note:** Currently there are no *Q virginiana* trees in the Gardens. However the data base records show that we have had two specimens in the past.

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### **Learning How to See©**

#### **Pamela Niskanen's Reflections from a Practical Field Botany Course at Cass Mountain.**

I had the good fortune recently of attending the University of Canterbury's "Practical Field Botany" course held annually at the Cass Mountain Research Area in North Canterbury. Over 1775 hectares of mountain land ranging from 575m – 1350m, this area includes river terraces, alluvial fans, montane grassy shrubland, and black beech forest. On the first morning we were invited to take a seat outside on the ground near the hut. We were on rocky ground, surrounded by dry grasses and dominant clumps of matagouri (*Discaria toumatou*). It had been a dry summer to date, and the flora seemed overexposed, tired and barren. There were sand flies but not in great quantities, and hardly any birdsong.

Botanising in such an environment requires that you cast your eyes down away from the stunning views, turn your face from the summer's sunny breezes and stay your itchy feet from climbing the nearest peak or splashing through cool streams; for down there beside the toe of your hiking boot you will find a miniature world of plant-based treasures, all perfectly designed to survive in their particular landscape. In our handbooks we were provided with a "Spot ID" list, comprised of nearly eighty species that we could expect to encounter during our field work.



18: *Leucopogon fraseri*. Photo by Pamela Niskanen.

Our first introduction was to *Leucopogon fraseri* (patotara), a tiny but tough member of the Ericaceae family. Undeterred by stony soil, *L. fraseri* sometimes forms large patches and in January offered us distinctive orange fruits, the diameter of which can be up to 10 times greater than the width of an individual leaf. From standing height, the impression is of a disordered patch of green fading to brown with orange beads. On one's knees, however, with a hand lens, the true nature of the species is revealed. Leaves range in colour from a quite yellowy-green to grey, all have mucronate tips (terminating in a sharp point) and lighter hyaline (translucent) margins, which act as protection for the fleshy green part of the leaf to work on photosynthesis. White tubular flowers emerge from specialised axils along the

stem, and are somewhat hairy, which explains the common name 'white beard'.

Within centimetres of the first find on our list, several others were pointed out by our guides, with the result that without travelling from our seated spot we knocked off nearly ten percent of our Spot ID list within the first ten minutes. Over the next seven days we would identify the entire list and dozens of non-natives as well. Walking braided riverbeds, climbing ski fields, diving into beech forest and skirting bogs we learned not only what to look for but how to see and photograph species.

After spotting a plant and waiting for your mind to get past the inevitable "It's so pretty!" or "Can I eat it?" reactions, the next thing you should observe is the metadata around the find. Note the date and time, soil type, weather conditions, and the presence of neighbouring plants. What is it like to the touch? Does it have a scent? What are the measurements of the specimen? Record anything you can't capture in a photograph.

In the picture (or pictures if you have time to take several), make sure that the diagnostic features of the species are visible. In the case of *L. fraseri* above, you would want to capture leaf colour (top and bottom), leaf tip and margins, and flowers and fruits if they are present. You can use a scale such as a small ruler or your hand or shoe to indicate the size of the plant, use a white card to shade or reflect light onto the plant for better exposure, and do a little gardening by moving debris or waving bits of grass from your frame.

Before moving on, have a glance at the surroundings. Stand up again and view the plant from standing height without magnification. See how many other individuals you can spot in the vicinity. Just as a good trumper turns around once in a while to see what the trail looks like when going the other direction, a good botanist learns to "see" species instinctually, by knowing where

they are likely to be growing, what size they would be, how their colour contrasts with other species in the system, and how they might display given the season.

Repetitive encounters with individuals of a single species will enable the botanist to understand when observed differences might be simple variation, or whether some form of hybridisation may have occurred.

I returned from the field trip with dirty laundry and blistered feet, desperate for the quiet of my uni-student-free home. But I also had a book full of reference samples and the newly acquired superpower of being able to see and discern NZ plant species that are never seen by the average human.



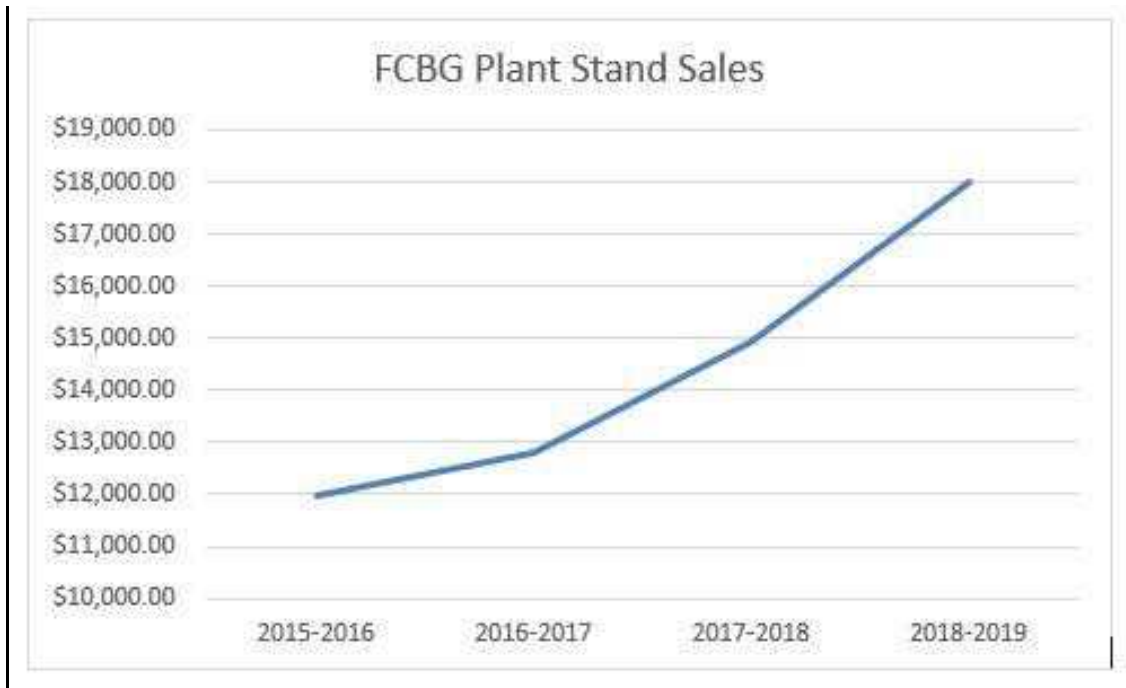
19: Group photo: Photo by Matt Walters. Pamela Niskanen, FCBG treasurer, top right. Tim Connolly, FCBG professional development grant recipient, second row from front, second from left.

**By Pamela Niskanen © 2020.**

Pamela Niskanen is a gardener, artist, University of Canterbury student, currently completing a Graduate Diploma in Biology (Plant Sciences) and Treasurer of Friends of Christchurch Botanic Gardens.



## Plant Stand Sales.



Over the last few years sales from our plant stand in the Gardens have steadily increased, and this year promises to break records — about \$13,000 in sales just from July to January! This does not include receipts from our spring and autumn sales. Increased visitor numbers and word-of-mouth have been driving numbers up and up; locals know they can enjoy a visit to the Gardens and pick up a great deal on the way back to the car.

Our propagating volunteers are working flat out to create products for the stand, keep it stocked and tidy, do the banking and more. At our nursery area we recently installed a brand-new tunnel house to pamper more plants under shelter, and workers can now enjoy their own shelter under a new shade umbrella at the outdoor workstation.

If you want something for a gift or for your garden don't forget to visit our stand which is open daily just near the footbridge to the Armagh carpark. All work is done by volunteers, costs are kept to <50% of sales and net proceeds benefit the Christchurch Botanic Gardens in so many wonderful ways.



## Contact Numbers

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