FLRBG

August 2017

Newsletter of the Friends of Lismore Rainforest Botanic Gardens Inc.

President's Message

When looking back on the last six months the things that spring immediately to mind, and that for a while dominated our lives, were the big flood at the end of March and the threat of loss of basic funding from the Council in April.

The damage at the Gardens from the flood was limited – the entrance road and some minor damage to some of our tracks. There was however more erosion damage to our creeks and working at repairing and, we hope, reducing such damage in the future has been a big focus throughout the last couple of months. (See article later)

The flood and other big rain events we had this year did however slow down dramatically the progress on our building projects. Not only did we have a run of wet Wednesdays but also some of our key construction workers suffered serious property damage in the flood and so had to spend time getting their lives back together again. And others were cut off – just couldn't get in to Lismore for extended periods. However, recent weeks have seen progress increase dramatically and we hope to have our Cool Cubby and the Propagation Shed in use in the near future, thanks to Wil and Don and other volunteers who give them such great support.

The funding problem with Council has since been resolved. We seriously lobbied the Councillors by phone, email and face to face meetings. We had great support from our Council representative Vanessa Ekins, and at the final Council Budget Meeting in May the proposal that our funding be continued for the next four years at the same level we have had in recent years, was approved by a unanimous vote of the councillors. It was great to get the recognition of all the Council of the importance of the Gardens to Lismore and district. We all worked hard at this with the committee really pulling together as a team, and other members giving support for which we were very grateful. At their meeting on 20 June Council approved their budget, including Gardens' funding. We were very much relieved!

Florence, Susan and Nancy building the 'Girlin Wall' - part of our creek erosion control

Our working arrangement with Council is in process of changing with our direct connection moving from Waste to Civic Pride. Our Liaison Officer- still to be confirmed - is Angie Brace from Sustainable Development. We are hoping for clarification of the whole process in the very near future. Thanks to Kevin Trustum and Greg Buckler from Waste for their ongoing support over recent years. Greg will still be loosely connected with us and, as our site is adjacent to Waste, we will have an ongoing relationship with them via Charlie Crethar and staff. But the original arrangement where we were virtually part of Waste has ended. The end of an era that goes back to 1997!

Meanwhile, lots of things have been happening at the Gardens. We had a very useful Guiding Workshop in February with Kate Heffernan, and a meeting with representatives of Southern Cross University re future partnership. There was a successful Open Day in May. The Native Rice Garden is almost complete and Peter Gould has completed the tree audit. More trees have been planted and our Education team has continued with its successful programme with local primary and pre school children. The Nursery is functioning well - under less than ideal conditions until their shed is completed. And as from 30 July we plan to have a regular guided walk on the last Sunday of each month. Wednesday and Sunday Volunteer groups continue to work with their amazing dedication and enthusiasm. The Gardens prosper!

AGM happens on Saturday 16 September 9.30, at the Education Centre at the Gardens.

Marie Matthews

Species Jagera Profile *Jagera pseudorhus* Foambark

from Peter Gould

Family SAPINDACEAE

Foambark is a common, hardy, small tree found in warmer rainforest north from the Manning River to the Bloomfield River in far Northern Queensland and also Niu Guini.
While generally a small tree, it can grow up to 20m or more. Floyd gives the dimensions of one exceptional tree in Murray Scrub Flora Reserve as 30m in height and 50cm in trunk diameter.
Leaves are compound, pari-pinnate with 12 to 20 leaflets from 2 to 7cm long and 6 to 20mm wide. The leaflets vary in shape from oblanceolate to narrow-elliptical and are often falcate. Leaf margins are asymmetric and usually toothed.
The creamy yellow- brown flowers appear in panicles in Autumn – March to May. The petals are 5 in number and ca. 3mm long.
The fruits are obovoid capsules, 15-20mm long by 10 – 18mm wide, covered in skin penetrating, irritant hairs. They are quite showy, beginning as a deep salmon pink in colour and turning a golden brown as they age. The dark brown or black seeds mature from August to November and are eaten by King Parrots, Eastern Catbirds and Brown Cuckoo Doves.
The bark is smooth, light to dark grey with narrow horizontal bands.

The typical neat, dense and rounded crown of Jagera pseudorhus

Foambark is a highly attractive, neat, fast growing and hardy tree well suited to ornamental horticulture.
Most parts of the plant contain high levels of saponin and Aborigines used this plant as a fish poison.

Mature fruit and foliage. Note the dense irritant hairs. (P. Gould)

Saponin produces soapy foam that deoxygenates pools, stunning fish.
The timber is soft, light in colour with little figure and does not polish well. It would seem to have little value but in the past it was used for small work such as brush handles, and was favoured for brake blocks for wagon and drays as it does not go smooth, but remains rough when abraded, giving a better grip on the wheels.

References:

Floyd, A.G. 1990, ***Australian Rainforests in New South Wales, Vols 1& 2,*** Surrey Beatty & Sons, Sydney NSW.
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Harden, G.J. (ed) 1993, ***Flora of New South Wales,*** **Vol 2**, New South Wales University Press, Kensington, NSW.
Harden, G., McDonald, B. and Williams, J. 2006, ***Rainforest trees and shrubs: a field guide to their identification,*** Gwen Harden Publishing, Nambuccca Heads, NSW

School Holiday event great fun

Thursday 13th July was a perfect warm, sunny winter's day for the recent school holiday event at the Waste Facility adjoining the Gardens. It was organized by LCC Waste Education Officer Barb Jensen.

Stalls were set up along the sidewalk beside the Revolve Centre from 9:30 – 1:30pm. Waste Education were decorating reusable shopping bags; making shopping bags from old tee shirts and potting up seedlings in paper pots with LCC mulch made from green waste collection. They were also studying native bees, even tasting the native bee honey.

Our Education Team was represented by myself, Tracey Whitby and Graeme Patterson. We used palm fronds to build cubby houses which proved very popular! As well we had many of our regular education activities - seeds and sand trays, black felt mats for plant art works, plants with magnifying glasses, touch and guess basket. We had· Big Scrub maps, Botanical Charts, Butterfly and Bee Charts to study, FLRBG plant leaflets to give away and FLRBG cards and books for sale.

There was a Bike Repair team for those buying bikes from the Revolve Centre and nine bikes purchased were repaired on the spot!

LCC Rainwater Catchment Trailer was on display - a miniature landscape of the waterways from the forest, through Rocky Creek Dam, and Lismore down to the ocean. This is always a favourite as children are able to watch the progress of water they have "polluted" with mud as it flowed down the miniature rivers. The big LCC Dump Truck was another favourite as children can climb in and see how the controls work. All the morning there were Waste Facility Bus Tours - three tours were planned but another two tours had to be run to cater for the demand

Tracey, Graeme and I all enjoyed the morning - it was so busy and the kids were so obviously enjoying themselves. Naturally we would prefer to set up in our Botanic Gardens but we enjoyed the contact with other education groups and wholeheartedly support the LCC Waste Education program.

It was such a good day not just for the children but also for the parents, grandparents and the stall holders. We lost count of the numbers who came and all stall holders reported the same in their reviews.

One grandmother wrote on our Facebook page*: "I would just like to thank your volunteers at the open day yesterday at the tip. We took 3 of our grandchildren there and they had a great day. Such a great facility. Cheers Linda."*

Margaret Hildebrand

Pat Offord recently received an invoice re a purchase for the Gardens and it was addressed to

Lismore <u>ROYAL</u> Botanic Gardens

Maybe not yet!!

Cool Cubby

Original sketch of planned Cool Cubby by Ros Little

The Cool Cubby hasn't quite become a reality yet but it is nearly there!

Graeme and kids setting up first 'palm cubby'

Battling erosion at the Gardens *from Florence Treverrow*

Placing logs in creek – early days

EARLY ATTEMPTS

Erosion in the creek that flows through Fern Gully first came to our notice in 2014 but it was not until early 2016 that we finally got around to trying to do something about it. Our first attempts centred on building low walls from logs. These dams did work to a certain extent, however some were too high and water was flowing around the area on both sides leading to more erosion of banks and bridge support. In addition, every time there was a big rain event silt built up against the first of the dams. Early on, there were two rain events that tested these dams - the first in June 2016 and another in August 2016. This event also washed away the crossing in Discovery Trail 2, which the council helped to repair. Piles of logs and branches which had been placed in the gully in a number of places in attempt to slow down water flow, were mostly washed away.

THE PROBLEM ESCALATES

Further down the gully the erosion problem near 'Betty's seat (hereafter known as 'The Crater') was widening and deepening with every major rain event and threatening to swallow up specimen plants. Ros asked if I could work out what to do. Having almost no experience in this whatsoever I talked to people who did, and took to the internet for ideas.

The first thing we did in December 2016 was to try to prevent The Crater from getting worse by putting rocks and some wire netting in where the water had caused a waterfall, and used hay bales in attempt to help to stabilise one of the banks.

This lasted quite well for a few weeks - probably because there was so little rain in December! Then along came the heavy rain in January and February 2017 and with each rain event The Crater moved a metre further up the gully.

Fortunately, the hay bale wall held but obviously something had to be done. We decided to get serious.

John placing sandbags

We acquired some sandbags, sand and cement and on the Wednesday workday 8 March 2017 we filled up sandbags with a mix of sand and dry cement and placed them where we thought they would help the most – the idea being that over time the bags would get wet and set the cement helping the bags to withstand strong water flow.

However, on Wednesday morning the following week the Gardens received about 90mm in a couple of hours. This was before the bags had got wet with the lighter rainfall we had hoped for, and most of our work was obliterated - including the hay bale wall.

"We were knocked down but we got up again": PROGRESS AT LAST

Early on in my investigations I had come across 'coir logs' as an aid for erosion control; coir logs are made of a netting of coconut fibre and fill and are thus fully biodegradable. They come with their own hard wood stakes to hold them in place.

At the meeting in March I suggested that we should consider buying some - the idea being that we really needed to slow the water coming down the

gully. Some members of the committee thought the cost was too great.

However, by the following Sunday workday, March 26, enough members had decided that we really needed to try the coir logs and it was agreed to order 15 of them - each 3 metre long and 30cm diameter. Fortunately, the generous donations from Dr and Mrs Binns meant that we had the funds available to do this important work.

By the end of the week ex-cyclone Debbie was upon us - according to BOM 395 mm of rain fell on Friday 31st March - a total of 806 mm for the month. The Crater widened and lengthened significantly and there was more damage up and down the length of the gully.

The coir logs arrived, after the flood fortunately, and most of the Wednesday work group helped to place them in the gully on Wednesday 3rd May. Most of the coir logs were placed across the gully but three were placed along the bank. Toward the top of the gully (end of main path) it is quite rocky so we had a lot of trouble getting the stakes in to hold the logs in some places.

Ros and Nick positioning a coir log

The following week the gang got together again and we did a mass planting down the gully as far as the start of the Crater. This was followed up by further planting in the next couple of weeks. The plants were surplus from the nursery and some lomandras I had 'rescued' from where they were not needed in the Gardens.

One of our dedicated workers, Graham, took it upon himself to fix the Discovery Trail crossing once and for all, and did a fantastic job.

One of our big concerns was the widening of the Crater; by this time we had lost some specimen plants and a couple were just hanging on - quite literally.

Under a tree near the old tool shed there was a pile of materials left over from previous jobs. Among this collection were a number of treated pine logs which Susan and I collected and placed near the Crater. The next week, with the help of some long star pickets, Susan, Nancy and I built the 'Girlin Wall' - surely one of the greatest constructions ever in the Gardens!

'Girlin Wall'

It all looked marvellous - until! - you guessed it - heavy rain from the 10 to 13 June .However ... while some of the coir logs moved (mostly only one end), some of them did stay in place and they did, as hoped, slow the water down. In addition, most of the plants we had put in survived. 'Graham's Crossing' (as the Discovery Trail crossing was renamed) held up really well and the 'Girlin Wall' emerged triumphant.

One of the coir logs holding against the strong water flow

Once the water had subsided we got to work putting the coir logs back in place - with star pickets as extra supports to hold them in position. Then we collected some of the extra sediment that had washed down, along with other fill, placed this behind the logs and put in more lomandras.

Unfortunately, the success of the 'Girlin wall' may have contributed damage on the other side of the Crater. When the gully had dried up a bit it was decided to tackle this. Nick searched the Gardens for suitable logs while John, Graham and I dug out the middle of the trench to fill in the pool. The coir log was put back along the edge and fixed in place with long star pickets. The guys then constructed a wall almost as good as the 'Girlin Wall'. We are thinking of naming it the 'Manly Wall'! We hope to add fill and will plant it with lomandras.

We will continue to add more plants as they become available and with any luck the next time there is a deluge there will be minimal damage.

Mother Nature - we await your next move!

The 'Manly Wall'

Human Sundial for Sensory Garden *from Denis Mathews*

We are planning to build Human Sundial (or Solar Clock)in the Sensory Garden. In order to tell the time a person stands at a specific place marked on the ground and their shadow falls on a hour stone or marker which indicates the time of day. See photo above of such a structure at Mount Stromlo which I saw when visiting the ACT recently, and I found a second one in a park in Bathurst.

I have been in touch with Margaret Folcard of Sundials Australia whose firm produced both these Solar Clocks, and after talking to both Don and Wil am confident that we can create our own professional quality model with the skills already available in our group.

Over the last several months I have been working on the design. This has been quite a challenge because of the continual movement of the earth around the sun. We know that the earth is not stationary but it seems to us as though it is and that all else in the heavens is moving around us - as though the sun rises in the east each day and sets in the west.

As the earth rotates on its axis each day it maintains a remarkable regularity. But as the earth revolves around the sun each year, the movement is far from steady. The orbit of the earth is not circular but an ellipse, and the closer the earth is to the sun the faster it travels. This means that the solar day varies in length from day to day. The length of the mean (or average) solar day is 24 hours. However, there are only four days in the year when solar time matches clock time!

Normally a sundial does not tell the time as shown by a clock. We need tables to reconcile the two different times, but this calculation is to be built into the sundial we plan to establish. Our "date scale" is actually in the shape of an analemma, calculated to allow for the variation in the position in the sun from day to day. If the position of the sun is plotted at the same time every day for a year it is found that the sun traces out a "figure of eight" shape. The ancient astronomer Ptolemy was aware of the irregular movement of the sun.

The analemma at the Mount Stromlo solar clock showing position to stand for each month of the year

To establish our sundial we begin by finding the direction of true north. We could use a compass which gives us the magnetic north, which in Lismore is 11.6° west of True North, but measuring angles is hardly accurate for most of us. It is easier to find the time of true noon on a given day, then to mark the shadow cast by a plumb line at true noon.

The hour markers lie on an ellipse. We intend to use a semi major axis of three metres and the semi minor axis of the ellipse will be a fraction of that, as determined by our latitude. The fraction is equivalent to the sine of our angle of latitude (0.4824). However Eastern Standard Time is determined at longitude 150° E and our longitude is 153.285° E, making a constant difference 13.14 minutes or 0.219 hours. We will compensate for that by displacing each hour marker accordingly. The coordinates for each point on the ellipse can be quickly calculated.

The date scale that is normally used is calculated using a formula involving our latitude and the declination of the sun for each date. **But this gives just one coordinate for** a point on our analemma. The difference between clock time and sun time (in minutes to three decimal places) is readily available on line for each day of the year. This allows us to calculate the other coordinate for the date point on our analemma.

When our sundial is established, a person need simply stand at the designated point for that day on the analemma and observe the position of his or her shadow. The error due to longitude will be "corrected" by the shift in the hour markers and the "equation of time" will be incorporated into our date scale.

Reference, Folkard Margaret and Ward John, "Sundials Australia" second edition, reprinted Adelaide May 2008 by Sundials Australia.

Derby Aboretum

Britain's first public park?

Derby Arboretum 1843 – The Telegraph

Derby Arboretum is a public park and arboretum in the city of Derby, England. It was opened in 1840, following the donation of the land by local philanthropist Joseph Strutt. It is reported that Strutt was grateful to the working people of Derby for the part they had played in helping him and his family amass their fortune, and wanted to convey his thanks by providing a much needed recreational facility for a rapidly expanding and urbanising area. He commissioned John Claudius Loudon to design the park.

Loudon adapted Strutt's original ideas for a botanical garden, incorporating landscaped walkways and raised serpentine mounds to break up the levels of the site.

It is often described as "Britain's first public park". Although green spaces and common lands had of course existed previously, as had private parkland and gardens. However, the park in Derby was the first to be deliberately planned as a place of public recreation in an urban setting. One of Strutt's aims was to educate the public about nature and botanical matters, and each of the trees was clearly labelled.

According to Michael Portillo in his TV Series, 'Great Railway Journeys of England', this process of individual tree labels was later copied by Kew Gardens.

In 1859 the Arboretum was visited by Frederick Law Olmsted while on a research tour of Europe, and it is thought that he may have incorporated some of its features into his design for Central Park in New York.

The park initially charged for admission, in order to pay for its upkeep. However, admission was free on Sundays and on Wednesdays (which had been adopted as half day closing in Derby). This meant that the working classes, who had limited leisure time and probably lacked the means to pay admission, could gain free access to the Arboretum when they actually had the time to do so. Free admission times continued to be extended until charging was finally abolished in 1882.

http://www.independent.co.uk/environment/nature/derby-arboretum

https://en.wikipedia.org/wiki/Derby_Arboretum

A Botanic Garden in Thailand…

Located 90 minutes drive southwest of Chiang Mai, Doi Inthanon is the highest mountain in Thailand. At 2,565m, the upper slopes are home to a highly diverse cloud forest community with pines, junipers and rhododendrons - a unique, isolated outlier of Himalayan type vegetation in tropical Thailand

The Royal Agricultural Station, Doi Inthanon, set up in 1979, is part of a nation wide program to lift the Hill Tribes out of poverty and isolation, integrate them into the national economy, and bring an end to the cultivation of opium. As well as its research and crop production functions, it is home to a botanic garden – a lush and eclectic plant collection integrating ornamental and productive plants, a restaurant utilising the local produce, productive fish ponds and variety of visitor accommodation from private chalets to backpacker dormitories.

The fern house is particularly impressive. Many of the ferns would be familiar to Lismore locals but seldom in such lush health or profusion . There are two Chedis near the summit of Doi Inthanon; one dedicated to the King and the other to the Queen of Thailand. Both are surrounded by colourful ornamental gardens. Chedi is an alternative term used in Thailand for a Buddihist stupa - a Sanskrit word describing a structure commemorating some event or marking a sacred spot. It is used as a place of meditation. Rhododendrons festooned with mosses, lichens and epiphytic ferns typify the subalpine vegetation on the summit of Doi Inthanon. And a well tended small shrine at the very summit of Doi Inthanon is testament to the Thai people's reverence for nature.

Text and photos Peter Gould

Rainforest & Gondwanaland

Extracted from 'The Greening of Gondwana' by Mary E. White

Most people who have an interest in rainforests and have travelled in the far north of Queensland have noted the similarity of many of the plants that grow there to rainforest trees also found here in the Northern Rivers area. A walk in the Border Ranges north of Lismore will take you to a stand of Antarctic Beech *Lophozonia moorei, (*previously *Nothofagus antarctica*). This species is also found at Barrington Tops and *L.cunninghamii* is found in Tasmania and Victoria and fossils have been found in Antarctica itself.

With the exception of some species which came from South East Asia in relatively recent times, all Australian native plants and animals are descendants of the life forms that were present in Gondwana when Australia separated from New Zealand in the early Tertiary Period and later from Antarctica in the Cretaceous period, and so from the rest of the Gondwanan land mass.

At that time of the separation the southern ocean was warm and Antarctica was not glaciated. The climate in Australia was generally warm and wet with little zonation. Warm sea temperatures resulted in deep inland penetration of rain-bearing winds. Broad-leafed closed rainforest covered most of Australia. Even the Alice Springs area! And similar forests were found in Antarctica and South America.

Temperature gradients gradually increased between the Equator and the South Pole and over time, as Antarctica grew colder and the Australian land mass moved slowly north, the weather patterns changed.

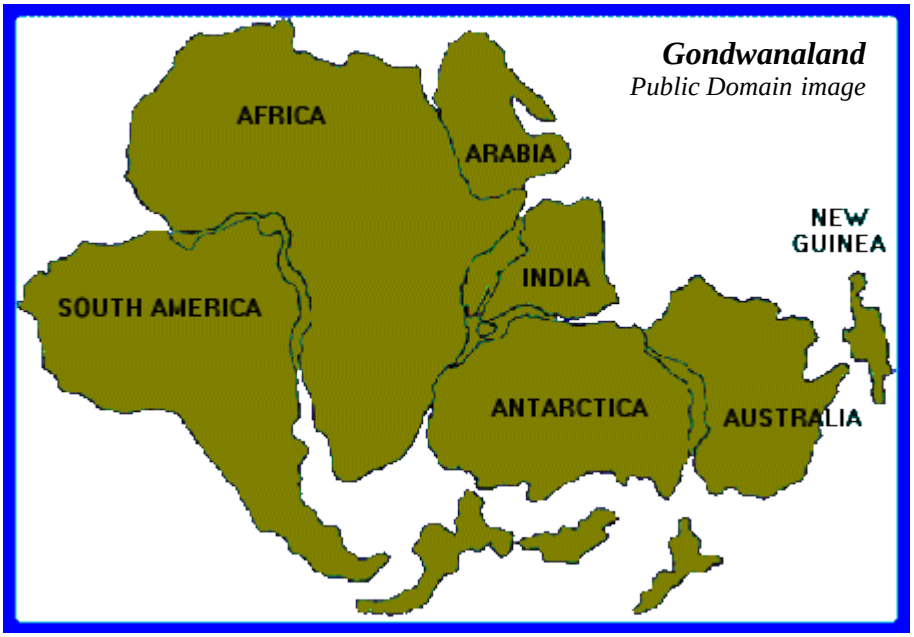
Over time reliable rainfall disappeared from many parts of the Australian continent. The closed rainforest shrank and retreated to more isolated patches where rainfall was adequate and reliable – mostly the east coast and the far north of Queensland and the west coast of Tasmania. To quote Mary E White, "In general the pockets of rainforest found in Australia occur on suitable soils in topographically fire-proof niches, in sub-coastal regions with a mean annual rainfall of 800 millimetres in the tropical north and of 600 millimetres in the north-east. They represent museums of ancient plants."

With the climatic changes and the onset of aridity that have occurred since then, Australian rainforest had shrunk to 1% of the total Australian land mass at the time of European settlement. The old rainforest areas were replaced by the newly developing sclerophyll woodlands (dominated by Eucalypts and Wattles), grassland and, in some places, deserts. This new growth was able to survive fire, whereas rainforest, generally, cannot.

Rainforests are described as 'Closed Forests' , a name well chosen for they are closed ecosystems which function because their components , living and physical, are totally integrated. Their dynamics are destroyed when they are violated, be it by clearing, fire or by putting roadways through them. And erosion on their margins allows the stored nutrients in the soil to be dispersed and not recycled. Also exotic plants and animals can move in and dominate the native species.

Mary White doesn't include the far north of Australia as truly Gondwanan because of the arrival of some plants from southern Asian about 4 million years ago. When the floating Australian ark came into contact with the island chain South East Asia - on the collision of the Australia plate with Irian Jaya, and more significantly with the Timor, there began complex plant interactions which, she felt, was another story. However, she is passionate about preserving the remaining rainforest pockets in Australia's east. Since his arrival just over 200 years ago European man has reduced the area of natural rainforest to 0.25%. "It is not difficult to see that rainforest is highly endangered and will be extinct in the near future if steps are not taken to preserve what is left. "

Adapted from 'The Greening of Gondwana" by Mary E. White pub. 1986 by Reed Books Australia.



Although rainforests now cover only about 0.3 per cent of Australia, they contain about half of all Australian plant families and about a third of Australia's mammal and bird species.
Http://www.environment.gov.au/heritage/

Medical plant almost lost in Borneo

The U.S. National Cancer Institute funded a 1987 plant collection expedition on the island of Borneo in the Malaysian State of Sarawak. Among the samples obtained were those from the tree *Calophyllum lanigerum var. austrocoriaceum*, an incredibly rare species. When extracts of this plant were discovered to show good antiviral activity toward the AIDS-causing human immunodeficiency virus (HIV), researchers returned to the site of the original collection to find that the tree was gone, cut down for firewood or building purposes. No more *C. lanigerum* could be located. Fortunately, however, an intense search finally led to the discovery of *C. Lanigerum* in the Singapore Botanic Garden. Over a century before, the British had planted several collected specimens.

Calanolide A, a complex natural product, is obtained from the bark and latex of *Calophyllum lanigerum var austrocoriaceum*, and it is now undergoing clinical trials for the treatment of HIV infection. Medical research narrowly escaped a major scientific loss.

From article by Paul Torrence, Emeritus Professor of Chemistry & Biochemistry at Northern Arizona University 2012

'Fontainea dude thinks he's a lady'

This heading of an article in the February 2017 APC Bulletin is in reference to some plants of the *Fontainea orari* species – one of the rarest of rainforest trees in NSW. Sometimes female flowers and fruit are produced on male trees of this species. It is believed that this happens when plants reach critically low numbers with issues of reduced genetic diversity and it is one of this species rescue strategies. Our Fontaineas are thriving but at least one male tree has produced fruit!

A view of our developing rainforest at the Gardens

PLANT PROFILE *from Mike Fulloon*

***Angiopteris evecta* - King or Giant Fern** **FAMILY MARATTIACEAE**

Angiopteris is a giant fern found growing in tropical and subtropical Australia, also it is found in Southeast Asia, Indonesia New Guinea, Madagascar and some Pacific Islands. In NSW it is found in one undisclosed area in the Tweed Valley it is also found in the Wet Tropics of North Queensland and as a relict population in the Carnarvon Gorge National Park in central Queensland. It is also an invasive species in Hawaii, Jamaica and Central America.

The huge bipinnate fronds can be up to 6 metres long arising from a large woody rhizome to 1 metre in diameter. The arching semi-weeping fronds are swollen at the base and enclosed by a pair of large ear-like fleshy stipules . The stipes and rhachises contain no strengthening tissues and each frond is supported by the turgor pressure of the sap within the cells. In dry weather they loose pressure and gradually collapse but rapidly straighten when water becomes available again. The fronds are reputed to be the largest in the world. The pinnules are a glossy green on both surfaces with the lower ones with an ear-like lobe at the base. The sporangia are in dense clusters of 5 to 8 opposite pairs, submarginal, each sporangium round and splitting along a central line. The fern grows in rainforest gullies and damp shaded places with a plentiful supply of water.

In cultivation it is easily grown and is propagated by cuttings of the fleshy stipules laid whole in sand and peat. There is no record of successfully growing them from spores.

Reference: D.L. Jones & S.C. Clemesha , Australian Ferns & Fern Allies.(Sydney: A. H. & A.W. Reed Pty. Ltd., 1981)

Our Angiopteris evecta

New shoot coming from fleshy stipule

Forest Bathing in Japan

Our Hoop Pine Forest on a foggy winter's morning… a place of beauty and peace

Forest Bathing – just being in the presence of trees – became part of a national health programme in Japan in 1982. The foresty ministry coined the phrase 'shirin-yoku', or forest medicine, and the idea was quickly adopted by the general population.

From 2004 to 2012 Japanese officials spent about $4million studying the physiological and psychological effects of forest bathing, designating 48 therapy trails based on the results. Qing Li, a professor at Nippon Medical School Tokyo, measured the activity on NK cells of the immune system before and after exposure to the forests. In a 2009 study Li's subjects showed significant increases in the activity of these cells in the week after a forest visit. And positive affects lasted a month following each weekend in the woods.

Experiments conducted by the Centre for Environment and Field Sciences in Japan's Chiba University also measured the physiological effects on 280 subjects in their early 20s. The team measured the salivary level of cortisol - which increases with stress - blood pressure, pulse rate and heart rate variability during a day in the city and compared those to the same biometrics taken during a day with a 30 minute forest visit. They found that forest environments promoted lower concentrations of cortisol, lower pulse rate and lower blood pressure than do city environments.

In a recent article in The House of Wellbeing magazine by Karen Shaw this subject is again addressed with slightly different focus . She found evidence that spending time in a garden can be a tonic to help reduce stress levels. Toni Salter, president of Horticultural Therapy society, Cultivate, is quoted as saying that Horticultural Therapy is a process in which plants and gardening activities are used to improve the body, mind and spirit of people of all ages, backgrounds and abilities.

She has seen how encouraging age care residents into a garden setting can improve their wellbeing. Studies have also shown that people in hospital with a garden view have shorter stays and need reduced medication. And for some on the autism spectrum, getting into the garden can help improve behaviour and social interaction. In the United Kingdom Horticultural Therapy is recognised in a similar way to art and music therapy as a form of alternative health intervention.

Extracted from articles in World Forum website & from The House of Wellness magazine 2017

Feel Blue, Touch Green

Over recent years acknowledgement of human dependence on nature for material need as well as for psychological, emotional and spiritual needs has been growing. Researchers across a range of disciplines, including psychology, environmental health, psychiatry, land use planning, horticulture, leisure and recreation, wilderness and public health policy, have contributed to an accumulation of evidence in support of the idea that contact with nature is good for human health …..

It is evident that volunteering, nature-based activities, conservation activities and community development activities, independently and interdependently, have the potential to enhance declining mental, social physical and ecological health across a range of settings including urban, regional and rural area. 'Feel Blue, Touch Green' offers a model for the provision of opportunities for Australian experiencing depression, anxiety and/or social isolation, to be involved as volunteers in nature - based conservation activities as a means of enhancing individual and community health and wellbeing.

Extracts from Final Report on 'Feeling Blue, Touch Green' by Deakin University et al.

FEEL BLUE, TOUCH GREEN in Lismore area

Later this year Lismore City Council is planning to launch its own Feel Blue, Touch Green Project at a special Mental Health Day at the City Hall on 27 October. Details of the programme are still being mapped out but it will concentrate on encouraging awareness of and activities at the beautiful green spaces in this Council area, and our Botanic Gardens is one of those sites .

The Medical Career of *Duboisia myoporoides*

Alkaloids derived from solanaceous plants were the subject of intense investigations by European chemists, pharmacologists and clinicians in the second half of the nineteenth century. Some surprise was expressed when it was discovered in the 1870s that an Australian bush, *Duboisia myoporoides*, contained an atropine-like alkaloid, 'duboisine'. A complicated and colourful history followed. Duboisine was adopted in Australia, Europe and the United States as an alternative to atropine as an ophthalmologic agent; shortly afterwards, it was also esteemed as a potent sedative in the management of psychiatric patients, and as an alternative to other solanaceous alkaloids in the treatment of parkinsonism. The Second World War led to renewed interest in *Duboisia* species as sources of scopolamine, required for surgical anaesthesia and to manage sea-sickness, a major problem in the naval part of the war. As a consequence of the efforts of the CSIR and of Wilfrid Russell Grimwade (1879–1955), this led to the establishment of plantations in Queensland that today still supply the bulk of the world's raw scopolamine. Following the War, government support for commercial alkaloid extraction waned, and it was the German firm Boehringer Ingelheim and its investment in the industry that rescued the *Duboisia* industry in the mid- 1950s, and that continues to maintain it at a relatively low but stable level today.

From paper by Paul Foley 2006

Prince of Wales Medical Research Institute, , Randwick. Email: pfoley@unsw.edu.au

Duboisia myporoides

- *a personal story*

My father, William Wilson, was a chemist with Drug House of Australia (DHA) and in 1944, during Word War 2, he was involved in research of *Duboisia myporoides*. As newly weds he and my mother moved from South Australia to live at the Gold Coast. My father had been given the task of plotting the occurrence and the amount of active drugs in Duboisia. DHA wanted to develop an anti-seasickness drug for the Navy.

My parents lived at Broadbeach for a year (where there were only a few shacks in those days) and he would go off on his motor bike with side-car up into the Springbrook area and Lamington National Park. He would bring back specimens in his sidecar for distillation in his makeshift laboratory under the house. (My mother was taken to Southport Hospital in this same sidecar for my birth. I don't think it was the most enjoyable trip she ever had!)

It must have been a very interesting job hiking through that rainforest with its rich and diverse ecosystem –very different from the bush Dad was used to in the Adelaide Hills and Flinders Ranges. And the fact that he was especially keen about botany and geology, must have added to that interest.

As my father is no longer alive, I cannot get him to expand on this story and I don't know the outcome of this research. Maybe it became less urgent as the war was coming to an end. According to Dad, a relative of *Duboisia myoporoides* , *Duboisia hopwoodii*, was chewed by aborigines as a mild narcotic.

As a new resident of Lismore, and new volunteer at the Gardens, I am really pleased to have found such a friendly and knowledgeable group and am so impressed with the Gardens and the work that is being done there. Cheers,

Jenny Wilson

'It is to be regretted that scientific men in this colony have paid so little attention to the subject of Medicinal Botany. Surrounded, as we are, by shrubs and plants possessing medicinal properties, there is a wide field for investigation; and, no doubt, it will be found in time to come, that we have been sending to distant countries for expensive medicines, whilst remedies equally efficacious might be provided close at hand in all their native freshness.'

William Woolls, *A Contribution to the Flora of Australia* (1867), p. 94

Duboisia hopwoodii is a shrub native to the arid interior region of Australia. Common names include pituri, pitchuri, thornapple or pitcheri. It has an erect habit, usually growing to between 1 and 3 metres in height and has long, narrow leaves. *Wikipedia*

Growing wood

Last year as I was guiding a family through The Botanic Gardens, I paused to show the tall Hoop Pines and to explain that like aerials, these trees protruded high above our young rainforest. I was asked , "How do trees make wood? " Having given a vague answer I determined to find a better explanation.

So I am indebted to John Lloyd and John Mitchinson, who do the research for the Stephen Fry quiz, QI, recently viewed on our ABC TV.

They show that trees make wood from the air and sunshine rather than just from the soil. The photo-synthesis in the leaves (natural solar panels) combines with nutrients that are drawn up from the soil, and water, to make cellulose – the main component of wood.

This absorption of the sunlight shows why it is best for the leaves to be free of a dust coating.

So there we are in town making electricity from solar panels whilst out in the Botanic Gardens our tree leaves are going even further and making timber.

Geoff Walker

Open Day on 28 May

Our Open Day at the Gardens was a really enjoyable experience. The weather was perfect, there were lots of interested and enthusiastic visitors - adults and children.

The Native Bee Talk given by Peter Swain and Don Woodley attracted over 50 people and Graeme Patterson's walk in the Useful Plants Gardens was very popular. (We plan to repeat that walk on the last Sunday of August at 9.30am.) The Nursery Plant sale was very successful and the kids obviously enjoyed the special activities available for them. We opened the Cool Cubby programme. The new Viewing Platform in the Sensory Garden was also officially opened. With ramp completed and safety railings in place we were able to open it for public use. Thanks to Wil and Don and their helpers for their excellent construction job.

And special thanks to all who helped to make the day such a great success.

The Native Bee talk

Opening the Viewing Platform

Partnership with SCU

At present negotiations are underway with Southern Cross University re the formation of a partnership with the Gardens and the establishment of a Herbarium of our plants at the university.

Thanks to Sponsors

We would like to acknowledge Andrew and Jeni Binns and local firms Adrian Williamson, Ginger Blue Graphic Design and all who are supporting us in various ways. We are very grateful to them and to all who help financially or in other ways at the Gardens – some who have requested to remain anonymous.

AGM

9.30am 19 September
at EEC at the Gardens
ALL WELCOME

WORK MORNINGS: Sunday Group meets last Sunday of each month starting at 8.am in winter and with a change to 7.30 in October for Summer. Contact Marie 0428 895261.
Wednesday Group every meets Wednesday starting 8am Contact Ros 6628 2909 , 0412 317744, roslittle46@gmail.com
Propagation Group every Tuesday starting at 8.00am at the Nursery Contact Jan 6629 8244, jandenardi41@gmail.com

Guided Walks

on the last Sunday of each month starting at 9.30am
next walk
USEFUL PLANTS GARDEN
27 August
Later months will be advised on Facebook, Web Site and by email to members.

CONTACT DETAILS

Phone 0415 960284
Email:
secretary@friendslrbg.com.au
Facebook/FLRBG
Website:
www.friendslrbg.com.au

GPS readings at Gardens

Ever since we first started planting at the Gardens we have marked the position of each of our specimen trees tree using GPS, and recorded that information in our data base. This system was instigated by one of our pioneers Dr Calder Chaffey, and in the early days worked well.

When our original GPS machine died the replacement used a different system. Our old GPS readings were done with eastings and northings using reference frame WGS84 but the new machine, uses latitude and longitude. Mary McDermott, our data base officer, is currently working on converting the grid references. Another thing that is affecting accurate reading is the fact that since we started, Australia has moved by 1.6 metres towards the north east

Calder Chaffey taking a GPS reading at the Garden in 2006

GPS datum being updated

Australia's (GPS) datum is currently being modernised in two stages. Stage 1 begins this year and involves defining a new datum which on average shifts all coordinates in Australia by 1.8 metres to the northeast. Called GDA2020, this new continent-fixed datum will bring the coordinates of Australia's mapped features back into line with global systems. In 2020, Stage 2 of the change will establish a different kind of location reference system, similar to the global one, that will continually measure and model Australia's movement. Then the location information we rely upon will always be in alignment with the devices we use to access it.

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