CALEYI

Australian Plants SOCIETY NSW

NORTHERN BEACHES GROUP

austplants.com.au/northern-beaches

May 2021

Australian Plants Society Northern Beaches
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CALENDAR

Thursday May 6, 2021 APS Northern Beaches Meeting at Stony Range Regional Botanic Garden, Dee Why.
7.15 pm Lesser plant family Euphorbiaceae. Russell Beardmore.
7.30 pm Presentation Conny Harris & Russell Beardmore 'After the fire. North Head regeneration'.
Supper. Only tea & coffee. Please bring your cup.

Saturday May 15 APS Northern Beaches Group visit APS NSW Quarterly. Details page 5.

Sunday September 12, 2021 Stony Range Diamond Jubilee Spring Festival.

ANPSA Biennial Conference 2021 now scheduled for **2022**: **Australian flora - past present future.** The conference is being hosted by the Australian Plants Society NSW in the beautiful village of Kiama on the south coast. To register an expression of interest, click the 'https://austplants.com.au/event-3403188'

Many thanks to this month's wonderful contributors **Eleanor Eakins, Georgine Jakobi, David Drage** and **Penny Hunstead.**

Editor march@ozemail.com.au 0407 220 380

VISIT TO PENNY HUNSTEAD'S GARDEN SAT 10TH APRIL 2021

Eleanor Eakins

Penny's house and garden on Bungan Head Rd. Newport was an eye opener for members of the APS Northern Beaches Group and two visitors from the APS North Shore Group.

Being a professional landscaper, the multi-level house with its ocean views was hidden amongst an abundance of plants and trees of every kind. Luckily we were furnished with a comprehensive list of plantings to help us on our own self-guided walks.

Penny's maternal grandfather established the garden in 1949, originally clearing the land and planting exotics before Penny and her husband, Richard, moved in 1967. They then became the 'guardians' of the garden, gradually replacing many of the exotics with native species, establishing a garden with 'rooms' of plantings; vegetable garden, shady fern garden, sunny garden, rainforest garden and garden of potted exotics and natives called 'the orphanage'.


Exploring the jungle. pic: Georgina Jakobi

To encourage wildlife the garden contained a variety of plant communities, hides, water sources and a certain amount of messy piles of logs, rocks, pruning's and leaf mulch as well as a pond in each of the garden 'rooms'.


Jan, Judith and Pam in the orphanage.pic: ED

This has led to a great variety of birds visiting or residing in the garden as well as possums, skinks, water dragons, bandicoots, brush turkeys and green tree snakes. Indeed this was evident by the number of white cockatoos and rainbow lorikeets all visiting the water and seed dishes as we sat on the back deck to enjoy our own scrumptious lunch supplied by Penny.


Penny generous host. pic: Ed.

pic: Ed.

Many thanks were given to Penny for her hospitality and the preparation she had put into the day to make it a most interesting and fulfilling one for us all.

PENNY'S PLANT LIST

The following is a description of the garden from the streetside, to the northern boundary. The symbol (e) denotes an exotic species.

1. Nature Strip

Livistona australis, Hibiscus (e) *Myoporum insulare*, *Cassia* (e).The Cassia has not been removed because the neighbour likes the flowers and I prune it, after flowering. The piles of old twigs are left as habitat and hides for bandicoots and lizards.

2. Front Garden

Trees: *Ulmus parvifolia* (e) *Olea europaea ssp. cuspidata* (e). *Glochidion ferdinandii, Camellia sasanqua* (e), *Howea forsteriana.*

Shrubs: *Hibiscus rosa-sinensis* (e),

Other Plants: *Alocasia brisbanensis, Alpinia caerulea* (green form), tropical Banana (*Musa sp.*) (e)

Plantings of native ferns, *Adiantum formosum, Asplenium australasicum, Microsorium scandens*, *Doodia aspera*, have become somewhat overwhelmed by the *Nephrolepis exaltata* (e), which I am slowly removing.

3. Deckside, entrance to house.

Ferns (previously mentioned), *Banksia integrifolia, Hoya australis.* The *Alocasia* has been attacked by tomato hornworm caterpillars and in two nights, the finger-thick, 10 cms long animals reduced some leaves back to their veins !

4. LHS of house

Trees: *Podocarpus elatus, Angophora bakeri, Banksia integrifolia,*

Other plants: Ferns, *Pollia crispata*, Cardamom (e), potted Hydrangea (e), (gift), *Lomandra longifolia, Passiflora herbertiana*, (potted) Atherton raspberry…*Rubus probus*.


Cockies. pic: GJ

5. Western side of the drive (above the chookyard)

Bee hotel (gift of the children next door) attached to *Banksia integrifolia*. Bromeliads (e), the only low plants that will grow next to that part of the drive.

Hibiscus (e), *Justicia* (e), Exotic vine that provides a "roof" over the chookyard.

Big old *Corymbia maculata* has died, after root disturbance and severe pruning as a result of neighbours' building works and elevation of the ground level .

Ficus carica (e), *Isabella var.* planted in 1950. Another *C. maculata*, dying, from next door pool construction. *Cordyline stricta*, Hibiscus (e).

6. Fruit tree and vegetable gardens, either side of drive

LHS. Papaya, Sugar cane, *Backhousia citriodora, Melaleuca linariifolia* "Snow in Summer" var., *Glochidion sp. Graptophyllum excelsum*, Citrus species, *Notelea venosa*,

RHS. Raised garden beds with random vegetables and herbs. Citrus. *Diospyros nigra* (e), black sapote tree, after many years' growth, suddenly being eaten by possums.

7. Below the shed

Acacia (species, unknown), *Rhaphiolepis indica* (e), *Backhousia citriodora*, *Macadamia integrifolia*

8. Across the drive, from 7.

Trees: *Syzygium australe, Schefflera actinophylla, Backhousia citriodora, Acronychia oblongifolia.*

Shrubs, etc: *Melaleuca nodosa, Graptophyllum ilicifolium, Bursaria spinosa, Themeda australis, Carpobrotus glaucescens, Dianella revoluta, Lomandra hystrix, Rhagodia spinescens*.

Note…. An exotic plant, *Asclepias curassavica*, with orange and yellow flowers is left in the garden, as it is the food source for the beautiful Wanderer butterfly.

9. Garden on East, adjacent to 8.

Grevillea "Sandra Gordon", *Leptospermum laevigatum, Callistemon rigidus, Doryanthes excelsa, Syzygium australe*, large stand of *Cordyline stricta, Persoonia arborea.*

10. Up the hill, towards the shade garden.

Trees : *Pisonia umbellifera,* rhs, *Planchonella australis*, *Ficus coronate*, lhs, large Hibiscus (e), *Olea sp*. (e).

11. "Rainforest " garden

Trees: *Cupaniopsis parvifolia, Alloxylon flammeum, Leptospermum petersonii, Eupomatia laurina, Capparis arborea, Howea forsteriana, Archontophoenix alexandrae, Coffea arabica (e), Pittosporum undulatum, Ficus coronata., Diploglottis australis.*

Other plants: Five species of bananas (*Musa*) (e), *Eupomatia laurina, Alpinia caerulea , Linospadix monostachyos, Monstera deliciosa* (e), *Cordyline stricta, Syzygium moore*i, (previous) species of ferns,

12. Level area, below lower deck.

Rulingia dasyphylla, Lomandra hystrix. Bananas (Musa) (e), Murraya koenigii,(e) Olea sp. (e) Laurus nobilis (e), Bambusa sp (e), on E.side of house… Banksia integrifolia, Acacia sophorae, Nephrolepis cordifolia, (previous) ferns.

My "orphanage" of potted natives and exotics, waiting for homes.

RAMSAR: 50th ANNIVERSARY. David Drage

Australia was one of the signatories of the 'Ramsar Convention on Wetlands of International Importance' when it was initiated on 2nd February 1971. If you are wondering about the name 'Ramsar', it is not an acronym but the small town in Iran where the convention was signed.

This Convention holds the unique distinction of being the first modern treaty between nations aimed at conserving natural resources, with its broad aim being to halt the worldwide loss of wetlands and to conserve, through wise use and management, those that remain. The initiation of the Convention in 1971 was important and it remains important today.

For inclusion in the Convention, wetlands can include swamps, marshes, billabongs, lakes, salt marshes, mudflats, mangroves, coral reefs, fens, peat bogs, or bodies of water whether natural or artificial, permanent or temporary. Water within these areas can be static or flowing; fresh, brackish or saline; and can include inland rivers and coastal or marine water to a depth of six metres at low tide. There are even underground wetlands.

The first wetland to be designated under Ramsar was on the Coburg Peninsular in the Northern Territory on 8th May 1974 and as of 2018 Australia had 66 sites listed as of international importance.Australia Post issued a set of four postage stamps on 22nd February 2021 to celebrate the 50th anniversary of the Ramsar Convention. Each stamp depicts a Ramsar wetland in Australia including the Coburg Peninsular and from NSW, the Blue Lake which is located within Kosciuszko National Park.

The Blue Lake site supports rare, endangered or vulnerable populations of animals and plants, including the mountain pygmy possum (*Burramys parvus*), the broad-toothed rat (*Mastacomys fuscus*), the alpine tree frog (*Litoria verreauxii alpina*) and the anemone buttercup (*Ranunculus anemoneus*).

R. anemoneus generally occurs in environments with late melting snow such as short alpine herbfields and subalpine woodland where there are alpine humus soils, peats and decomposing granite. The species has also been collected along watercourses in grassland (below snowpatches).

Ranunculus anemoneus Pic: earth.com

R. anemoneus is described as 'Vulnerable' by both State and Federal governments. It is at risk from grazing by cattle. There is a recovery plan dating from July 2001 in place for R. anemoneus and three other alpine species. I haven't read the plan and do not know what progress has been made.

You are not likely to see many of these postage stamps in your general mail as the issue does not include a $1.10 stamp.

WE FOUND METHANE-EATING BACTERIA LIVING IN A COMMON AUSTRALIAN TREE. IT COULD BE A GAME CHANGER FOR CURBING GREENHOUSE GASES

the conversation April 9, 2021 Luke Jeffrey, Southern Cross University, and Damien Maher and Scott G Johnston alsoSouthern Cross University

Paperbark forest in a wetland, where bark-dwelling methane-eating microbes were discovered. Luke Jeffrey, Author provided

Trees are the Earth's lungs – it's well understood they drawdown and lock up vast amounts of carbon dioxide from the atmosphere. But emerging research is showing trees can also emit methane, and it's currently unknown just how much.

This could be a major problem, given methane is a greenhouse gas about 45 times more potent than carbon dioxide at warming our planet. However, in a world-first discovery published in Nature Communications, we found unique methane-eating communities of bacteria living within the bark of a common Australian tree species: paperbark (*Melaleuca quinquenervia*). These microbial communities were abundant, thriving, and mitigated about one third of the substantial methane emissions from paperbark that would have otherwise ended up in the atmosphere.

Because research on tree methane ("treethane") is still in its relative infancy, there are many questions that need to be resolved. Our discovery helps fill these critical gaps, and will change the way we view the role of trees within the global methane cycle.

Wait, trees emit methane?

Yes, you read that right! Methane gas within cottonwood trees was first reported in 1907, but has been largely overlooked for almost a century.

Only in 2018 was a tree methane review published and then a research blueprint put forward, labelling this as "a new frontier of the global carbon cycle". It has since been gaining rapid momentum, with studies now spanning the forests of Japan, UK, Germany, Panama, Finland, China, Australia, US, Canada, France and Borneo just to name a few.

In some cases, treethane emissions are significant. For example, the tropical Amazon basin is the world largest natural source of methane. Trees account for around 50% of its methane emissions.

Likewise, research from 2020 found low-lying subtropical Melaleuca forests in Australia emit methane at similar rates to trees in the Amazon.Dead trees can emit methane, too. At the site of a catastrophic climate-related mangrove forest dieback in the Gulf of Carpentaria, dead mangrove trees were discovered to emit eight times more methane than living ones. This poses new questions for how climate change may induce positive feedbacks, triggering potent greenhouse gas release from dead and dying trees.

Treethane emissions most likely account for some of the large uncertainties within the most recent global methane budget, which tries to determine where all the methane in the atmosphere comes from. But we're still a long way from refining an answer to this question. Currently, trees are not yet included as a distinct emissions category.

So where exactly is the treethane coming from?

Within wetland forests, scientists assumed most treethane emissions originate from the underlying soils. The methane is transported upwards via the tree roots and stems, then through to the atmosphere via their bark.

We confirmed, in other recent research, that wetland soils were indeed the source of methane emissions in lowland forest trees. But this wasn't always the case.

Some lowland forest trees such as cottonwood can emit flammable methane directly from their stems, which is likely produced by microbes living within the moist trees themselves. Dry upland forest trees are also emerging as methane emitters too — albeit at much lower rates.

Discovering methane-eating bacteria

For our latest research, we used microbiological extraction techniques to sample the diverse microbial communities that live within trees.

We discovered the bark of paperbark trees provide a unique home for methane-oxidizing bacteria — bacteria that "consumes" methane and turns it into carbon dioxide, a far less potent greenhouse gas.

Remarkably, these bacteria made up to 25% of total microbial communities living in the bark, and were consuming around 36% of the tree's methane. It appears these microbes make an easy living in the dark, moist and methane-rich environments.

This discovery will revolutionise the way in which we view methane emitting trees and the novel microbes living within them. Only through understanding why, how, which, when and where trees emit the most methane, may we more effectively plant forests that effectively draw down carbon dioxide while avoiding unwanted methane emissions.

Microbe sampling techniques have advanced within the last few decades, allowing us to understand the diverse microbial communities living within trees. Luke Jeffrey,

Our discovery that bark-dwelling microbes can mitigate substantial treethane emissions complicates this equation, but provides some reassurance that microbiomes have evolved within trees to consume methane as well. Future work will undoubtedly look further afield, exploring the microbial communities of other methane-emitting forests.

A trillion trees to combat climate change

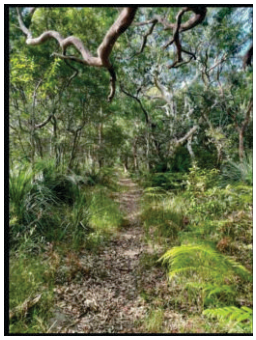
We must be clear: trees are in no way shape or form bad for our climate and provide a swath of other priceless ecosystem benefits. And the amount of methane emitted from trees is generally dwarfed by the amount of carbon dioxide they will take in over their lifetime.

However, there are currently 3.04 trillion trees on Earth. With both upland and lowland forests capable of emitting methane, mere trace amounts of methane on a global scale may amount to a substantial methane source.

As we now have a global movement aiming to reforest large swaths of the Earth with 1 trillion trees, knowledge surrounding methane emitting trees is critical.

APS NSW MAY QUARTERLY GATHERING AND AGM

Saturday 15 May



9 am to 12 noon: Banks–Solander walk, Kamay National Park
Meet at the Kurnell Visitor Centre, Kamay National Park for guided walks beginning between 9–10 am along the Banks–Solander track. This well-maintained track is an easy 700 m walk featuring many of the plants collected by Joseph Banks and Daniel Solander during their eight day visit to Botany Bay in April 1770. Take a virtual tour of the Banks–Solander track on Google Street ViewTrekker

12 noon to 1 pm: Lunch. Bring your own and enjoy it on the foreshore of Botany Bay . Food can be purchased at Kurnell Visitor Centre (limited), Silver Beach Cafe and Milkhouse Kurnell.

1 – 3 pm: Marton Community Hall, 92–94 Captain Cook Drive, Kurnell. Hall open from 12.30 pm. $5 entry fee covers afternoon tea and associated costs.

1 – 1.30 pm: APS NSW Annual General Meeting. Details below.

1.30 – 3 pm: Talk by Dan Clarke on the plants that Banks and Solander collected and described during their visit to Botany Bay in 1770. Dan is a well-known environmental consultant and the APS NSW Conservation Officer. Dan is a very entertaining speaker with an extensive knowledge of the flora of the Kamay National Park and surrounds.

2.30 pm: Afternoon tea provided by Sutherland Group.

AGM – Saturday 15 May, Kurnell
Our AGM will be held 1–1.30 pm at Marton Community Hall..

The agenda including the minutes from the previous AGM.

Our 2020 Annual Report summarises District Group activities – wonderful reading and a credit to the energy and dedication of the groups.

To send your apologies, please email: secretary@austplants.com.au
Please email any financial questions by Wednesday 12 May, and we will provide responses at the AGM.

Nominations for board positions
We welcome new board members to assist with the strategic and operational activities of running our organisation. If you'd like to join the board (or Council as it is officially termed) or wish to nominate someone, please contact President John Aitken to discuss what's involved. The form here needs to be completed and returned by Saturday 1 May 2021.

Proxy voting
If you cannot attend the AGM, and would like to nominate a proxy for your vote, please complete the Proxy form here and return by Thursday 13 May 2021 to secretary@austplants.com.au

PUBLIC VERGE GARDENS AND COUNCIL POLICY

VERGE GARDENS

Councils have always had a variable approach to public verge gardens. Some adopt a view that they represent a public safety risk. Others require immediate neighbours to sign risk waivers or documentation that they will look after the verge and, upon their departure, return the verge to its previous state.

Landscape architects have long been in favour of vegetated public verges and see lawns as a poor option.

The relatively recent amalgamation of Councils has produced a more relaxed attitude to vegetating and native plantings on public verges. On the northern beaches, the former Manly Council was quite progressive with verging and there are many outstanding examples in the community. Likewise, in Pittwater LGA. Warringah Council, however, was quite antagonistic to verging. With the emergence of the Northern Beaches amalgamated Council, public verging is one area that has flourished.

As an example, Soldiers Avenue in Freshwater has a Master Plan to protect its heritage listed trees, which are predominantly Queensland Brush Box. These trees derive from the area embraced by Lamington National Park in QLD., and, in their native state, are all verged by native plantings. In Soldiers Avenue, the intention is to verge these trees to ensure their longevity.

Many urban landscapes would indeed benefit from native plantings on their native verges as a replacement for lawns.

Peter Harley OAM
President
Friends of Freshwater Inc.

Conny considers Penny's jungle. pic: Ed.

THEMEDA TRIANDRA
Australian Butterfly Conservation

Over a quarter of Australia's butterflies use native grasses as their host-plants – and at least 13 species use **'Kangaroo Grass'.**

Kangaroo Grass (*Themeda triandra*) used to be one of the continent's most widespread native grasses. Today, few native grasslands remain and even these native grasses are hanging-on in remnant patches. Can you help bring them back? They make great additions to gardens, verges, habitat corridors, parklands, regeneration projects...

..... at least 26 species use **'Tussock Grasses'.**
Tussock Grasses (Poa species) are a large group of native 'clumping' grasses that come in different sizes and shades of green. Some species support only a single butterfly – whilst others are used by many. Two of the most used are 'Slender Tussock Grass' and 'Large Tussock Grass'.
Few native grasslands remain and even these are hanging-on in remnant patches. Can you help bring them back? They make great additions to gardens, verges, habitat corridors, parklands, regeneration projects...

IT IS RISEN: THE STORY OF RESURRECTION FERNS AND MY LATE COLLEAGUE WHO HELPED DISCOVER THEM IN AUSTRALIA

The Conversation April 2, 2021 Gregory Moore, Doctor of Botany, The University of Melbourne

Rock fern, Cheilanthes austrotenuifolia Donald Hobern/Wikimedia, CC BY-SA

One afternoon in the late 1970s, my colleague and fellow student Helen Quirk handed me a brown, shrivelled fern frond. It appeared to be dead, and was so dry that when I crushed it between my fingers it disintegrated into a powder.

We placed another piece on a petrie dish and added water. Almost immediately, the piece began to unfold and, as though in time-lapse photography, it appeared to re-green. Within a few hours it looked like a normal, delicate fern.

This was my first encounter with a resurrection fern: remarkable plants that look dead and dry, but when provided with the right conditions — often just the addition of water — rapidly spring back to life.

Helen died a few short years later in 1982, but her botanical legacy of classifying and exploring the ecology of Australian resurrection ferns lives on. The resurrection fern she showed me turned out to be a new species, and her scientific description of it hooked me immediately. I was fascinated to discover more.

The remarkable ancient history of ferns

Plant enthusiasts often think of ferns as being simple and delicate plants from an earlier evolutionary time. Ferns predate all flowering and cone-bearing plants, often by millions of years.

Cheilanthes austrotenuifolia colonies growing beneath eucalypts. Gwen & Rodger Elliot/Royal Botanic Gardens Board Victoria 2020, CC BY-NC-SA

Their long evolutionary history has meant similar ferns are found on many continents. This is because they once existed on the supercontinent Pangaea around 300 million years ago, before it broke apart into Gondwana and Laurasia and its various components began the great continental drift to their current positions.

So, while ferns are indeed ancient, they are certainly not simple or delicate.

Many people are entranced by their resilience — just watch how they spring back to full and gloriously green canopies after bushfires.

They also have intricate anatomical and morphological structures, and their evolutionary histories are often complex and poorly understood. This is perhaps, in part, because they have continued to evolve and change right up to the present era.

The similarity of ferns in different parts of the world has provided fertile research ground for fern taxonomists trying to accurately distinguish one species from another. Sometimes they discover that ferns on different continents are a single species. On other occasions, ferns that look remarkably alike are distant relatives.

This has been the case with resurrection ferns, members of the genus Cheilanthes. At present there are about 15 known species of Cheilanthes in Australia.

Evolving to tolerate arid environments

There are many plants from unrelated families that fit the description of resurrection plants, which suggests their adaptation has evolved on several separate occasions in response to arid environments. Some can go without water for up to seven years and return to normal from a fully desiccated state within two days.

The fact that a number of ferns and other primitive plants are resurrection plants is a reminder that the ancient earth they evolved in could be a very inhospitable place. This was long before plants helped make earth the liveable planet we know today.

How resurrection plants tolerate such low internal moisture levels has wider biological and medical implications, too.

We're learning from these plants how to improve drought tolerance in crops. And understanding their tolerance of desiccation has been used to improve methods of storage and transport of vaccines and human blood products.

The notion of a resurrection plant growing under dry desert conditions was not unfamiliar to me in the 1970s. However, the idea of ferns being a resurrection plant seemed distinctly odd, as they are usually water loving and dependent. Resurrection ferns, on the other hand, can remain in a desiccated state for months or even years before they resume growth.

Rock ferns often grow in exposed rock crevices in southern parts of Australia. Loraine Jansen/Royal Botanic Gardens Board Victoria 2020, CC BY-NC-SA

Re-introducing the rock fern

The specimen of Cheilanthes I got to know came from the Grampians in Victoria. Helen and botanist Professor Carrick Chambers named it Cheilanthes austrotenuifolia, or "rock fern".

As its common name suggests, these small, delicate-looking ferns grow in exposed rock crevices, often in inaccessible places. They only occur in the southern parts of Australia. Rock ferns can reach about 45 centimetres high and their fronds will be 25cm or less in length. Like many ferns, such as bracken, they grow from an underground rhizome (stem).

It can be quite disconcerting when the fronds die back and disappear completely over summer, only to reappear again when it rains in autumn.

Rock ferns are among the first plants to recover after severe drought and, while they're really tough and hardy, they're quite particular about where they grow. This can be frustrating for those trying to propagate and grow one. You can grow it from pieces of rhizome and from spores, but it isn't always easy.

This means opportunities to play with a resurrection fern don't come along all that often. So, with Helen, a number of us disappeared into the laboratory to investigate further. Our laboratory tests showed it was already photosynthesising. The transition from powder to getting on with living was complete.

10 years and counting…

Years ago, I planted a piece of *C. austrotenuifolia* rhizome with a single frond in the heavy clay soil of our garden, between a couple of sizeable basalt rocks. It was never really happy and over its first summer, it disappeared.

Imagine my surprise when about five years later, a couple of ferny fronds appeared. It was back. I immediately thought of Helen. Over the summer, the fronds died back again and it was gone, until eight years later when another couple of fronds appeared.

It is now about 10 years since we last glimpsed a frond. I am not hopeful about its survival, but you never know.

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TRICKY *'PLANT'* QUESTIONS CORNER

If you have a plant question that has puzzled you for some time AND you think others may have the same query - email it with the subject TRICKY to: march@ozemail.com.au mid-month so that we can find you an acceptable answer which will be published in the next newsletter.

Yes! We do need it to be about native plants or related topics ie. cultivation, pests, habitat, etc.

You can send a question or an image in jpeg form.

We may not all be experts but we really know how to research.

ED. march@ozemail.com.au