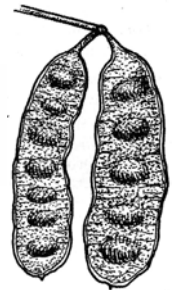
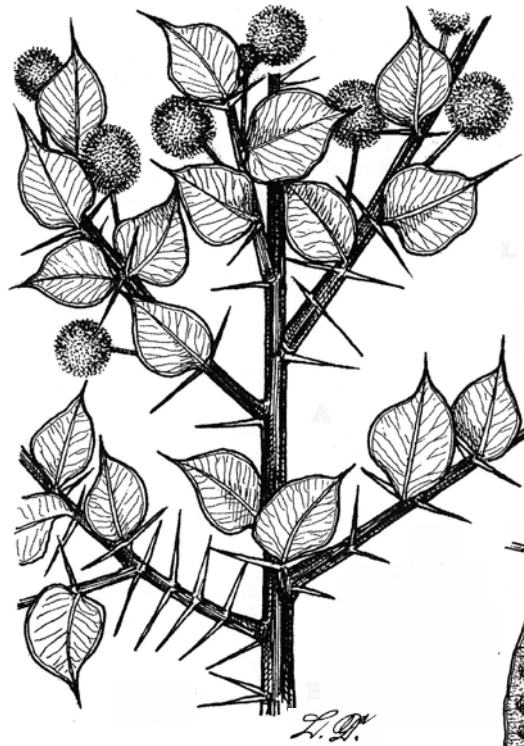


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Grant application closing dates

Hansjörg Eichler Research Fund:
on March 14th and September 14th each year.
Marlies Eichler Postdoctoral Fellowship:
on July 31st each year.

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Papua New Guinea Botanical Society

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Ad hoc adviser to Committee: Bruce Evans
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Web presence

ASBS Facebook Group

Viewable currently to any member of Facebook;
permission to join by application to administrators.

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Mike Bayly, email: mbayly@unimelb.edu.au

Cover image: *Acacia strongylophylla* F.Muell. Branch surrounded by (clockwise from top) phyllode, legumes, and seed with funicle. Artist: Ludwik Dutkiewicz.

From: D.J.E. Whibley & D.E. Symon, *Acacias of South Australia*, 2nd edn (1992), with permission of Board of the Botanic Gardens and State Herbarium (South Australia).

Publication dates of previous issue

Australas. Syst. Bot. Soc. Newslett. 178 (March 2019)
ASBS Web site: 6 May 2019. Printed version: 16 May 2019.

From the President

A new President

As Darren Crayn mentioned in his final President's report in the last newsletter, after a slightly longer process than usual, we had the handover to a new ASBS council in March. However, it did not really affect business as we had our experienced and focussed treasurer, John Clarkson, raring to go (and actually already going behind the scenes). The new Committee handover took place at a Workshop at RBG Sydney on plant traits organized by our newest council member Hervé Sauquet, so there was not a cost implication for the society in getting people together for the short reconvened AGM. We now have the new committee in place and have had our first council teleconference and business continues at a pace.

As President, a role I am very honoured and somewhat daunted to take on, I should introduce myself and my interests. Firstly though, I would like to thank the previous committee, and in particular Darren Crayn, who has been so easy to work with and always dedicated and engaged in any council business. I will personally miss him on council as he is an excellent role model, but I will, of course, continue to pester him as required. Although I have spent a shorter time working with our former Treasurer, Matt Renner, it was always enjoyable and I commend him for taking on that tough role.

I am looking forward to continuing work with our excellent and committed council team of Secretary, Jen Tate, new Vice-President Heidi Meudt and Councillor, Ryonen Butcher. I look forward to continue meeting members and please approach me and introduce yourself if we have not met, as I know at the ASBS conferences in the past couple of years I may have appeared very

focussed – it is just me trying not to forget the thing I am supposed to be rushing to do. I really enjoy being interrupted from that and I am very keen to get to know as many members as possible and I especially want to welcome our early career researchers and anyone new to the ASBS. I am also very interested to hear what I (we) could do better and your ideas for the society, so please come and talk to me (and I will endeavor to approach members more too).

I am currently writing this from the 11th *Flora Malesiana* conference in Brunei, and it has given me some opportunity to reflect on some things that I would like to achieve during my term as President.

For those who don't know me, I am an herbarium-based researcher working at the Royal Botanic Gardens Victoria. My interests range across the spectrum of Australasian flowering plant evolution and systematics, focussing primarily on legumes (mostly Mimosoids: *Acacia* and relatives), monocots and other largely Australian arid zone clades. I also am very interested in biogeography and coevolution and plant-animal interactions. I have been editing the CSIRO Publishing journal, *Australian Systematic Botany*, for about seven years. I try to keep up with what is going on in botany of our neighbouring countries to the north, often so relevant for understanding the evolution of clades in Australia – hence my being in Brunei.

When I nominated for a position on Council my main interest was to work towards taking on the role of Vice-President, and the more research-focussed aims of that role. However, from that role and my interactions with students and postdocs and other researchers, a major focus for

Australasian Systematic Botany Society Inc.

Annual General Meeting

Council advises members of
the ASBS annual general meeting
to be held in conjunction with the conference in Wellington, New Zealand.

**The AGM will be held on Tuesday 26th November 2019 at 3:45 pm at
Museum of New Zealand Te Papa Tongarewa in the Rangimarie room.**

Jen Tate, Secretary

me has turned towards helping students and early career researchers in their careers. Given that, as President I would like to continue keeping an eye on whether our grants serve the membership and hope to get feedback and assess that (in conjunction with our new Vice-President, Heidi Meudt). To do this we plan to consult with the Grants Policy Advisory Standing Committee in order to assess the funding schemes that the Society administers, especially the relatively new Marlies Eichler Postdoctoral Fellowship. This Newsletter will come out after the due date for the 2019 Marlies Eichler Postdoctoral Fellowship, but I will be curious to see the level of interest in that grant scheme after the relatively small number of applications (although I note that those submitted have been of high quality) in the first two years.

Our botanical neighbours, are a focus for which I would like our *Australasian* society to dedicate some potential resources and attention, or at least start these conversations. I noted that there was relatively little overlap between ASBS's membership and the attendees of *Flora Malesiana* conferences in recent years, despite the geographical overlap and connections of the two regions. One notable exception was the recently "retired" Barry Conn who has just produced three major book volumes of the *Trees of Papua New Guinea*. Since the next *Flora Malesiana* conference will be held in Manokwari in West Papua in 2022, it would be good to turn our attention more towards that region, which is actually also a part of Australasia, and provide as much support as we can to our colleagues in New Guinea and beyond. Our immediate past President, Darren Crayn, is already working closely with colleagues in that region and he is now on the board of the *Flora Malesiana* endeavor, so this will assist ASBS engagement with the region, I think.

The Wellington ASBS conference

Our annual conferences are something that ASBS does very well and it is at these conferences that I feel a big part of the friendly and welcoming nature of our Society is on best display. There is usually a great mix of old hands and newer members and that never fails to create a great atmosphere. I really encourage you to attend. I must admit it is what brought me (back) into the ASBS fold after a quite a few years of membership, but of not attending the conferences.

Planning for our coming conference in Wellington, New Zealand, is well under way with exciting reports of planned events from Heidi Meudt, her co-chair, Rewi Elliot from the New Zealand Plant Conservation Network, and their organizing committee. I commend them for their efforts and in keeping the council up-to-date. There is a strong focus on inclusion at the ASBS conference, and in making the conference a safe and inviting place for all our members, which is a priority of the council.

Early bird registration closes on August 23. For further details see the conference web site (Web ref. 1) and in this Newsletter (p. 18)

ASBS funding

Congratulations to the two recent successful applicants for funding for Hansjörg Eichler round in March 2019.

Raees Khan, School of BioSciences, University of Adelaide. Biogeography, genetic diversity and evolution of the Australian endemic *Podocarpus lawrencei* Hook.f.

Weixuan Ning, Institute of Fundamental Sciences, Massey University. Phylogenomic analysis of New Zealand polyploid *Azorella* (Apiaceae)

Australasian Systematic Botany Society Inc.

2019–2020 Council nominations

**Nominations for the 2019-2020 Council are welcomed
and are due by Monday 9th September 2019.**

Council consists of the following positions:

President, Vice-President, Secretary, Treasurer and two (2) Councillors.

The nomination form is available on the ASBS website

(www.asbs.org.au/council/2019-20_Council_Nominations_Web.pdf)

and should be sent to the Secretary no later than 5 pm September 9th.

Jen Tate, Secretary

Genomes for Australian Plants (GAP)

I will endeavor to keep the ASBS membership up-to-date with the latest goings on for this exciting, recent initiative. There is a detailed report about GAP later in the newsletter (p. 14).

Some housekeeping.

Please be aware that our most industrious treasurer, John, may contact you regarding your membership. I certainly encourage you to renew your membership! Another important date to consider is for nominations for the 2019–2020 Council, which are due by Monday 9th September 2019. Council consists of the following positions: President, Vice-President, Secretary, Treasurer and two (2) Councillors. The nomination form is available on the ASBS website (Web ref. 2) and should be sent to the Secretary no later than 5 pm September 9th. I am very happy to discuss what being on council involves with anyone who may be interested in putting a nomination in.

Postscript

In tragic news, I learned on my return to Australia that long-time *Flora Malesiana* contributor, editor of *Blumea* and good friend and valued colleague to many in the botanical community, Peter Hovenkamp, had died in a flash-flood at Mulu Caves while on holiday in Sarawak after the Brunei Flora Malesiana conference. This comes as a terrible shock after just spending time with Peter during the conference, and my heartfelt condolences go out to our colleagues in Leiden, and especially to Gerda van Uffelen, Peter's wife. You can learn of Peter's life and career on the web (Web ref. 3).

Web references

1. <https://systematics.ourplants.org/>
2. www.asbs.org.au/council/2019-20_Council_Nominations_Web.pdf
3. <https://science.naturalis.nl/en/people/scientists/peter-hovenkamp/>

Dan Murphy

Taxonomy Australia report

At the last meeting of the Taxonomy Australia Steering Committee in mid-July 2019, we discussed the issue of how best to craft the messaging around a bid to substantially increase funding for taxonomy and biosystematics in Australia. I prepared a Discussion Paper to set out ideas generated through many conversations over the period since we first commenced the decadal plan project, to the present.

For this report, I'd like to share that Discussion Paper. The Steering Committee endorsed its recommendation: that Taxonomy Australia and the Australian taxonomy and biosystematics sector work together to adopt the program described below as the core, unified message for the sector at all levels, and to determine a way to budget this program.

Discussion paper: Key messaging for taxonomy and systematics in Australia, Taxonomy Australia, July 2010

Context

The first strategic action of the taxonomy and biosystematics decadal plan¹ is:

Strategic action 1.1. We will significantly increase the rate at which new species in

Australia and New Zealand are discovered, resolved, named and documented.

This is the most important of the decadal plan's strategic actions; all other actions and recommendations support it.

A significant increase in rate is necessary if we are to document the estimated 70% of Australian species that have not yet been discovered or named, at a rate commensurate with accelerating global change and the extinction crisis. At the current rate it will take four centuries to discover and name the estimated 400,000 species currently undiscovered, during which time many will either never be discovered and named – they will become invisible extinctions – or they will be named from museum or herbarium specimens long after they have been driven to extinction.

There are two core and inter-related reasons for the mismatch between taxonomic need and taxonomic capability. Firstly, there are too few taxonomists in Australia. Many large and important taxonomic groups, such as fungi and many insect groups, have very few or no active taxonomists. Others, such as many marine and terrestrial invertebrates, effectively have none. This is the result of inadequate investment over

¹ <https://www.taxonomyaustralia.org.au/our-plan>

many decades from government, industry and society in taxonomy and taxonomic institutions.

Secondly, taxonomic work practices are too slow. Taxonomy has a deep and rich tradition, and while this is a strength it can also be a weakness. While taxonomists are always early adopters of new technologies, the combination of tradition and inadequate resourcing means that taxonomists have not yet fully deployed opportunities from new technologies, available today and that will develop further in the near future, that could increase the rate of discovery and documentation.

An appropriate metric for strategic action 1.1 is to bring the current estimate of four centuries for a full documentation of Australia's biodiversity down to 25 years—an appropriate timeframe given the urgency of the extinction crisis. This will require a 16-fold increase in the rate at which new species are discovered, documented, and named.

This discussion paper:

1. seeks consensus that a key message from the whole Australian taxonomy and biosystematics community should be that we have the needed technologies and skills to launch, with appropriate investment, a generational and internationally important science program – to document the rest of Australia's biodiversity in a generation,
2. discusses how we can scope and budget such a proposal, for advocacy to government, industry, the philanthropic sector and the community to support the necessary reinvestment, and
3. discusses some of the work practice changes that may be needed to effect it.

Messaging

The recent Global Assessment by the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES)² provided a headline figure that 1 million species are currently threatened with extinction. Less reported is the fact that more than 70% of those species have not yet been discovered and named. This means that they are effectively invisible—unknown and un-noticed. If these species are invisible, their extinction will also be invisible. We won't even know what we've lost.

The IPBES report, and expected increased

reporting of extinction and global change in the future, provides an opportunity to make the case that the taxonomic documentation of our biodiversity is an urgent task. Amongst the 'invisible extinctions' will be species that will lead to cures for serious and emerging diseases, help sustain our ecosystems and agriculture, enable new industries and help support existing ones, or emerge as new threats, pathogens, pests or diseases as our environment changes. While we cannot make the case that taxonomic documentation is a solution to the extinction crisis, we can describe it as a necessary part of a solution. With 70% of species currently invisible, extinction cannot even be quantified, let alone addressed.

One reason why taxonomy and biosystematics has a low profile, particularly amongst decision-makers and among other scientists, is that we are often regarded essentially as hobbyists. We slowly work through our specimens, describing new species at a slow (and arguably slowing) rate, without adequately justifying either our work or our work practices. Most species we describe are of interest only to other taxonomists. And with four centuries of work ahead of us and only incremental progress towards full documentation, it's hard to argue that we're on a trajectory for meaningful, at-scale impact. And while taxonomists and biosystematists have always been early adopters of new technologies, these do not seem to have had an impact on the overall rate of progress.

A break-through message must involve a big-picture program. Arguing for more investment and resourcing for business-as-usual taxonomy and biosystematics is unlikely to cut through. We need to stress the urgency of the task, the achievability of significant progress, and the possibility of meeting a meaningful target in a reasonable time frame. The only target that the public and government are likely to understand is 'full documentation'. And the best timeframe is 'in a generation' (a round number like 25 years is likely to suffice for this).

Crucially, if we agree that this should be our key message, and our chance to break through the current inertia in funding taxonomy and biosystematics, we will need to make it a consistent and whole-of-sector message. We are not very good, as a sector, at 'hunting as a

² <https://www.ipbes.net/news/ipbes-global-assessment-preview>

pack' – agreeing on a target and unifying and cooperating to reach it. The astronomy sector, for example, discovered many years ago that this was a necessary precondition for successful advocacy, and have successfully managed the coordination necessary to do this.

An important aspect of the message – that we need to launch a generational program to document all our biodiversity in a generation – is that it is more or less scale-independent. If such a message will work, it will work at both national and state and territory levels. It makes as much sense to aim to fully document the biodiversity of Tasmania or the Northern Territory in a generation as it does to aim to fully document the biodiversity of Australia in a generation. This is important, as it allows us to target both levels of government with the same message. Documenting the biodiversity of Australia is not, nor should be seen as, the sole responsibility of the Commonwealth, nor of any single department at either level of government. This provides an opportunity for a highly inclusive, unified approach, and crucially one that provides strong incentives for all collections institutions to be equally involved.

How do we scope and budget such a program?

The need for simple messaging necessarily involves an approximation in the core message that we aim to 'fully document the biodiversity of Australia in a generation'. Clearly there will be a diminishing rate of return of new taxa as we approach full documentation, meaning that we are very unlikely ever to reach a point where every species has been discovered and no more will be discovered.

Nevertheless, there are milestones that can approximate for 'full documentation'. Two important ones are (1) to resolve and name all un-named species currently recognised in our collections, so that all or almost all new taxa derive from newly-collected specimens, and (2) to reach a threshold in documentation such that every new specimen collected can be quickly and efficiently determined as either a known or a new species. In many hyperdiverse groups, newly collected specimens are in effect added to a taxonomic backlog, because documentation is so incomplete that nothing better can be done. There are likely to be critical milestones in documentation at which a 'phase change' in taxonomic practice will occur. Modelling such phase changes will be

an important task for scoping this program.

To begin budgeting the program, we will need improved documentation of what we currently know and don't know, what resources we have, and what technologies are most appropriate, for different taxonomic groups. A starting point would be to improve our estimates of the numbers of known named species, known un-named species, likely total species, and specimens in our collections, at finer taxonomic resolution than we have at present. Existing resources (e.g. the estimates for numbers of species in Australia and the world assembled by Arthur Chapman for ABRS and updated by Cassis and others, and the estimate for the total number of specimens in Australian biodiversity collections assembled for the decadal plan) are too coarse-grained for effective budgeting. Refreshing these statistics at least to the level of family will be important.

A key enabling technology for increasing the rate of species discovery will be to build a substantially complete molecular phylogeny of all named (and known, un-named) species in Australia. This will provide one of the phase-changes in our ability to deal with new specimens – if new specimens can be sequenced and added to the phylogeny it will be possible to more quickly determine if they are new or not and to know what to compare them with. A better, more finely resolved understanding of named and known, un-named taxa will allow a budget to be developed to build such a phylogeny. Note that the development of a more complete phylogeny for Australian taxa is the focus of Strategic Action 1.3, and the development of a comprehensive sequence library is the focus of Strategic Action 4.3.

A 16-fold increase in the rate of species discovery and naming can be achieved through a package of strategies. Most taxonomists spend a minority of their working week doing taxonomy; taxonomic work practices could be enhanced to increase the productivity of taxonomists per unit time; and we need more taxonomists. These factors are all multipliers: hence if, for example, taxonomists were able to double the time they are able to spend doing taxonomy and double their productivity per unit time, and we could increase the number of taxonomists four-fold, these together would result in the necessary 16-fold increase in overall rate of species documentation.

With these considerations, it will be feasible to develop an indicative budget for a program to document the remainder of Australia's biodiversity in a generation, considering both the costs of the developing the sequence library and phylogeny, and the cost of employing more taxonomists.

How would taxonomy change?

Substantial changes to taxonomic work practices will be needed if we were successful in obtaining the necessary investment to launch this program. Most of these changes are likely to be entirely positive, including increasing the work time allocated to taxonomy for existing positions, increasing the number of taxonomists and filling gaps in taxonomic expertise, and increasing the scientific output of taxonomists. Other changes are likely to be corollary to the main drivers, including the science advances that will be possible in biosystematics from a substantially complete phylogeny.

Some changes are likely to impact on day-to-day taxonomic activities compared with current business-as-usual. These may include a renewed focus on alpha taxonomy (naming and describing new species), and changes to publication practices to enable an accelerated rate of naming.

Challenges

A serious challenge that we need to address as a sector in rolling out this message is that we will be competing in a space increasingly occupied by similar but different messaging around the documentation of biodiversity. The International Barcode of Life Consortium has just launched its BioScan program³, which seeks to generate 10 million CO1 barcodes, to 'discover' 2 million 'species'. It has attracted significant international investment towards this goal, and has Australian partners. At another scale, the EarthBioGenome project⁴ has launched as a global consortium, again with Australian partners and again with substantial initial investment, to generate a full genome of every species (at least, of every currently-named species).

Both these projects claim that they will result in a substantial acceleration in our documentation of biodiversity, and of course both use the urgency of the extinction crisis to make their pitch. Both

have the advantage that they are heavily focused on genetics, which is generally regarded as cool science, and both provide an attractively simple (or simplistic) solution. From our perspective, both have the potential to divert substantial funding from what I believe we broadly agree is 'real' taxonomy (whatever that is).

We need to work in the context of this challenge, while crafting and promoting a more scientifically rigorous, and hence necessarily more complex, solution. And of course we will need to work with all the new technologies, from pure barcoding to genome sequencing, to achieve our goal. Our challenge will be to both compete and cooperate with initiatives such as these.

A second challenge relates to competing needs and drivers within our sector. Some taxonomic groups, such as fungi, some insect orders, nematodes, and some marine invertebrates, are hyperdiverse and very poorly documented. Others, such as plants, vertebrates, and some insect groups such as butterflies, are significantly less diverse and significantly better-documented. We need to carefully balance the competing needs for taxonomy across the whole spectrum of these groups to ensure that this grand initiative benefits all taxonomists, all taxonomic groups, and all our users.

Next steps

Taxonomy Australia is currently seeking funds to roll out a series of national meetings to discuss and workshop this proposal. How on Earth do we even begin this task? And three, more specific, questions – how can we budget it, what technologies will we need, and how exactly will we deploy those technologies? There are many questions to answer before we can effectively deploy this message and begin advocating seriously for its implementation.

In the meantime, we need to begin a national conversation, and to think deeply, about the challenges in rolling out this generational program, what it means for our sector, and how we can most effectively cooperate towards a goal that will be of benefit to all. This Discussion Paper is a first step.

Kevin Thiele

³ <https://ibol.org/programs/bioscan/>

⁴ <https://www.earthbiogenome.org/>

Articles

Databasing of the global collections at the National Herbarium of Victoria

D. Rita Macheda & Luke J. Vaughan

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The National Herbarium of Victoria (MEL) holds an estimated 1.5 million specimens. Approximately 400,000 of these—designated the ‘global collection’—were collected overseas (Web ref. 1) from various geographic areas (Fig. 1), dating from the late 1600s to the present day. MEL’s global collection contains some of the earliest known botanical collections from regions such as India, North America, South America, China, Southern Africa and the Pacific.

More than half of the specimens in the global collection originate from the vast private herbarium of Otto Wilhelm Sonder, a German pharmacist and botanist who, during the course of his life, accumulated an enormous botanical collection (Web ref. 2). Sonder sourced specimens from prominent plant collectors and botanists working around the world and the collection is incredibly broad, containing representatives from all major plant groups across a huge range of geographies. Evidently Sonder’s herbarium grew too large for him to manage and he agreed to sell it to his long-time friend, Ferdinand von Mueller, founder of the National Herbarium of Victoria, first government botanist for Victoria (1853–1896), and director of the Royal Botanic Gardens (1857–1873). Mueller spent 24 years convincing the Victorian Government to provide the funds to make the purchase, which was not finalised until 1883, two years after Sonder’s death (Short, 1990). The collection arrived without an inventory, so it is only through curation and databasing, almost 140 years later, that we are discovering exactly what this collection holds.

MEL’s global collection also includes at least 5,000 specimens from the private herbarium of Joachim Steetz, purchased by Mueller in 1863. Mueller received many thousands of specimens from around the world thanks to his extensive network of collectors and correspondents. In many cases there is no information on the sheets or labels to indicate where the specimens at MEL came from, and even Steetz and Sonder’s herbarium material is intermixed with specimens from other sources. Discovering the source of these specimens with little or no information may become possible once the specimens are mounted and databased. Another source of specimens in the global collection is material received on exchange from other herbaria (Table 1). Botanical specimens from Australia were highly sought after in the 19th century and Mueller received large numbers of specimens through exchange (Short, 1990), a practice which MEL continues today.

The Foreign Collection Project commenced in June 2014 as a three-year project with one Database Officer. The aim of the project was to capture label information and make it electronically accessible via The Australasian

Fig. 1 Georeferenced MEL global collection records from Atlas of Living Australia spatial portal. Each dot is one specimen.

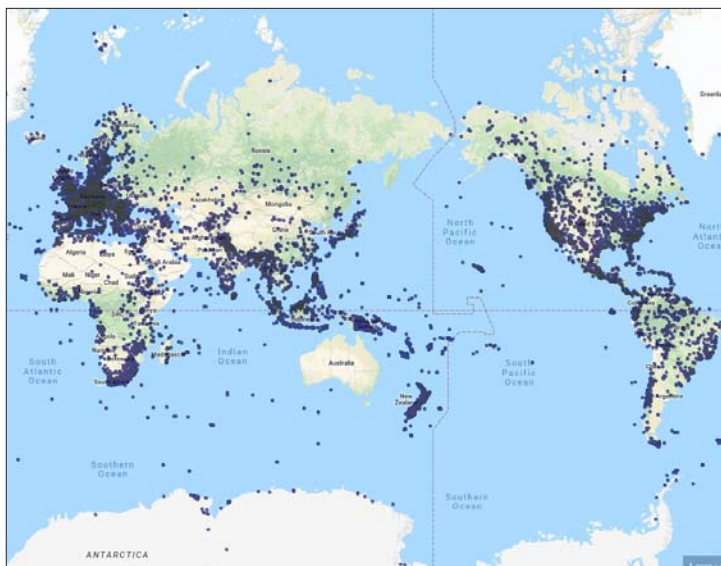


Table 1. Collections and herbaria: historical exchange

Herbarium/Collection	No. databased
Botanischer Garten und Botanisches Museum Berlin-Dahlem (B) exchange	588
Herbarium Bogoriense, Bogor (BO) exchange	643
Botanical Survey of India, Kolkata (CAL) exchange	1727
Natural History Museum, Florence (FI) exchange	94
Royal Botanic Gardens, Kew (K) exchange	675
Herbarium of the Komarov Botanical Institute, Saint Petersburg (LE) exchange	1396
Herbarium J.G.C. Lehmann (1792-1860) (Boraginaceae not databased)	184
Muséum National d'Histoire Naturelle, Paris (P) exchange	401
Herbarium J. Petiver (1658-1718)	31
F.W. Sieber collections (1789-1844)	770
Herbarium O.W. Sonder (1812-1881)	2810
Herbarium J. Steetz (1804-1862)	1541

Virtual Herbarium (AVH) (Web ref. 3). All known type specimens, including those discovered while databasing, have been imaged in a separate project and delivered to Global Plants on JSTOR (Web ref. 4). With generous donor support, the duration of the project has been extended and the team now comprises four Database Officers: Miranda Boyle, Hanna Kapuscinski, Rita Macheda and Luke Vaughan.

In order to be able to database label information, update plant names to reflect current taxonomy, and curate the specimens so that they can be incorporated into the collection, the project requires the specimens to be mounted. The unmounted material in the global collection is mostly stored in original paper sleeves in strawboards (Figs. 2, 3), organised by family and stored with the rest of the collection. Some of this material may not have been looked at since it arrived at MEL. Erin May, Team Leader Collections Volunteers, is responsible for overseeing the extraction, sorting and mounting of this material by a team of herbarium volunteers. The Volunteer Mounting Program is working through the 150,000–200,000 unmounted specimens that are still stored in strawboards. At the end of 2018, the volunteers were mounting approximately 5,000 specimens from the global collection per year. To keep up with the rate of databasing, the volunteer program will need to increase the mounting output to approximately 15,000–19,000 specimens per year.

To date, 45,904 specimens have been databased



Fig. 2. Strawboard of unmounted material.



Fig. 3. Specimen before mounting.



by the Foreign Collection Project team, of which 5,725 are type specimens. MEL's collection of vascular plants is organised according to the Cronquist System, and of the 384 Cronquist families in the global collection at MEL, 123 are databased. The largest databased families in the collection include Ranunculaceae (8,454 databased, 142 types), Fagaceae (2,062

databased, 45 types), Myrtaceae (3,672 databased, 523 types), and Fabales (20,050 databased, 625 types), work which is still in progress.

As the Project progresses, the breadth of specimens collected from around the world is becoming apparent. The project continues to reveal specimens collected by a number of significant botanists and explorers (Table 2).

Some of the remarkable finds include a specimen of a red alga, *Amphiroa exilis*, collected in 1832

by Charles Darwin in Rio de Janeiro, Brazil (Fig. 3)¹. This is one of only three specimens held at MEL that were collected by Charles Darwin on the voyage of *HMS Beagle* (1831–1836),

¹ This specimen, a syntype of *A. exilis* W.H. Harvey, formed part of a recent monographic study of *Amphiroa* and was a significant element in its maintenance as a distinct species. (See Harvey, A. S., Woelkerling, W.J., Huisman, J.M. & Gurgel, C.F.D. (28 June 2013). A monographic account of Australian species of *Amphiroa* (Corallinaceae, Rhodophyta). *Australian Systematic Botany* 26(2), 81-144. <https://doi.org/10.1071/SB13010>). Ed

Table 2. Significant collectors

Collector	Specimens databased	Types	Geography
O. Beccari	285	78	Indonesia, Malaysia
C.F. Ecklon	1536	437	Europe, South Africa
H.O. Forbes	345	155	Papua New Guinea
R. Fortune	52	4	China, Japan
J.D. Hooker	647	83	Caribbean, South America, Indian Subcontinent, New Zealand
J. Kirk	91	3	Comoros, Malawi, Mozambique, Tanzania, Zambia
J.W.K. Moritz	474	90	Colombia, Venezuela
R.A. & F. Philippi	265	19	Argentina, Chile
C.G. Pringle	557	88	Mexico, United States
G.H.K. Thwaites	565	225	Sri Lanka
N.S. Turczaninow	238	16	China, Iran, Kazakhstan, Mongolia, Russia, Siberia
F.M.J. Welwitsch	340	156	Angola, Portugal
C.L.P. Zeyher	1961	630	South Africa



Fig. 4. Types of *Podophorus bromoides* (Poaceae) (MEL 26530 on left, MEL 26531 right) collected by P. Germain, Juan Fernandez Islands, Chile in 1854, with label on the latter.

all of which were only recently discovered in the collection through databasing the global collection. Darwin's specimens and other significant collections demonstrate the historical

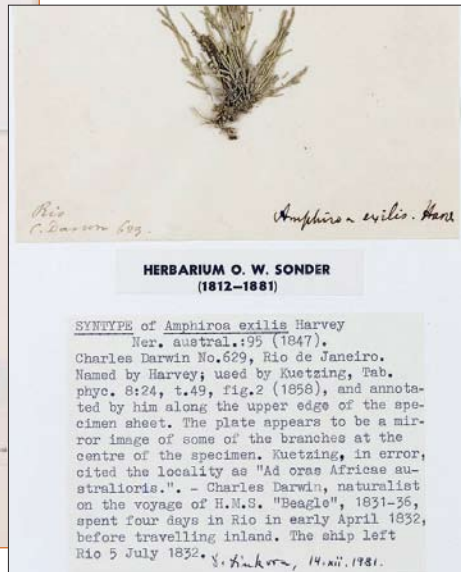
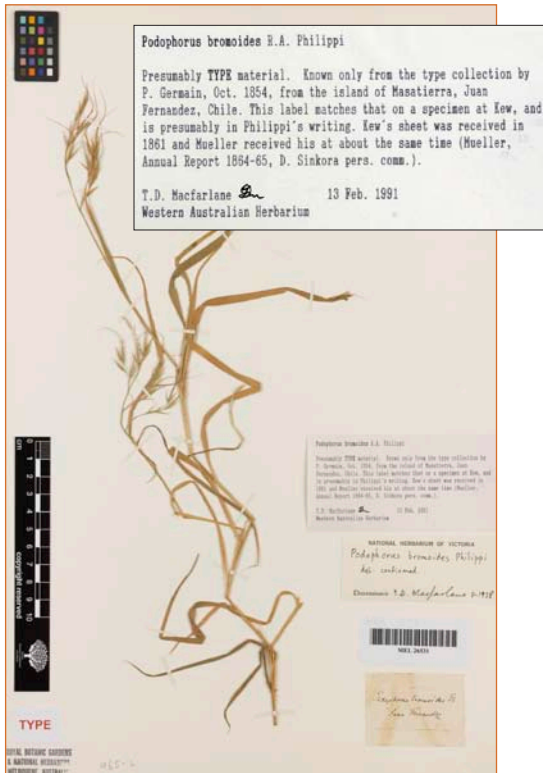


Fig. 3. Specimen of *Amphiroa exilis* collected by Charles Darwin No. 629, [Apr - 5 Jul 1832], Rio de Janeiro, Brazil (MEL 594504), with labelling magnified.



value of the global collection as a precious record of 19th century flora. The global collection is also particularly rich in type specimens, which comprise almost 5% of the collection. Two type specimens, of *Podophorus bromoides* (Poaceae), were collected in 1854 by P. Germain in the Juan Fernandez Islands, Chile (Fig. 4). These specimens, along with duplicate specimens held at various herbaria around the world, represent parts of the only collection of *Podophorus bromoides* ever made, as the species is known only from Germain's original collection in 1854 and is presumed extinct (Baeza et al., 2002).

Digitising and expanding electronic access to the global collection at MEL will provide an invaluable resource for researchers globally, as the specimens are a verifiable record of the past and present distribution of species. The historical significance of the specimens collected by Darwin, in Brazil, and Germain, in Chile, demonstrate how databasing the global collection will continue to unearth additional rare and unique specimens.

For any enquiries regarding the Foreign Collection Project or Global collections at MEL please contact Wayne.Gebert@rbg.vic.gov.au

Acknowledgements

We would like to thank our reviewers for their comments and all our donors who make our work possible.

References:

- Baeza, C.M., Stuessy, T. & Marticorena, C. (2002). Notes on the Poaceae of Robinson Crusoe (Juan Fernández) islands, Chile. *Brittonia* 54 (3): 154–163.
- Short, P.S. (1990). Politics and the purchase of private herbaria by the National Herbarium of Victoria. In P.S. Short (ed.) *History of systematic botany in Australasia*, pp. 5–12. Australian Systematic Botany Society Inc., South Yarra.
- Web ref. 1. <https://www.rbg.vic.gov.au/science/projects/collections/foreign-collection-project>
- Web ref. 2. <https://www.rbg.vic.gov.au/science/herbarium-and-resources/national-herbarium-of-victoria/otto-sonder-herbarium>
- Web ref. 3. <https://avh.chah.org.au/>
- Web ref. 4. <https://plants.jstor.org/>

The strange case of the stolen butterflies

Robyn Barker
State Herbarium of South Australia

Braby & Eastwood (2019) have just sorted out one of the legacy problems created by possibly Australia's greatest taxonomic fraud. In this case the type specimen of an Australian butterfly species was stolen and replaced with a specimen of a different species, painted to resemble the original.

Englishman Colin Wyatt has been long known in the Australian butterfly world for his theft of specimens from the Sydney, Melbourne, and Adelaide museums between 1939 and 1946 (Web ref. 1). Just after he returned to England in January 1947, after being in Australia from 1939, the absence of butterfly specimens from the Victorian museum was noticed and when Wyatt was visited at his home in Farnham, England, by police, they found cases containing more than 3,000 butterflies. Entomologists at the British Museum identified most of them as having come from Australia, also indicating that it was the best private collection they had seen – Wyatt only stole rare specimens! Wyatt was fined £100 at West Ham Court, London, for unlawful possession of the butterflies.

The stolen specimens were packed up by the British Museum and sent to Adelaide where Norman Tindale of the South Australian Museum, Alex Burns of the National Museum of Victoria and Anthony Musgrave of the Australian Museum, Sydney sorted the collection as best they could given that “Wyatt had removed, rewritten, altered, or transposed the labels on many specimens” (Web ref. 1). Dates and localities had been altered as well as the collector's identity, attributed either to himself, “J.B.,” or “G. Purcell”. All up, it would appear that the Victorian Museum had 825 specimens stolen, the Australian Museum c. 1500 and the South Australian Museum c. 600. As a warning the specimens returned to the Australian Museum had a label added to them reading “Passed through C. Wyatt Theft Collection, 1946-1947” and the entry in their card index of collectors reads:

WYATT, Colin. Visited Australia August, 1939-January, 1947. Collected butterflies (under the pseudonyms of 'J.B.' and 'G. Purcell') from many localities in the various museums of Australia.

Fig. The headlines at the top of p. 2 of the *Sydney Morning Herald*, Saturday 6 September 1947.

From Trove (National Library of Australia)



Whether the South Australian and Victoria Museum collections have been similarly identified in this way is not known.

Bearing out all of this are the statements in Braby & Eastwood's paper with respect to the holotype of *Pseudalmenus chlorinda barringtonensis* Waterhouse, 1928. The first statement relates to the fake type specimen left in place of the one stolen by Wyatt, the second statement to the stolen type specimen. Images of the two with their labels are produced in the paper.

This specimen is not the holotype of *Pseudalmenus chlorinda barringtonensis* Waterhouse, 1928. It is a fake, most likely *P. chlorinda chloris* Waterhouse & Lyell, 1914 that has been painted with red paint to resemble *P. chlorinda barringtonensis*. The original labels have been removed from the true holotype and placed with this specimen. (AM).

'HOLOTYPE *Pseudalmenus barringtonensis* stat. nov.' [on red card]; 'This specimen is almost certainly the true holotype of *Pseudalmenus chlorinda barringtonensis* Waterhouse, 1928 collected dead from Edwards Hut, Barrington Tops, NSW on 30th October 1922 by J. Hopson. The specimen is part of the C. Wyatt Theft Collection, has a fictitious label, and has been repaired with glue. (AM).

The 1947 account in the *Sydney Morning Herald* referred to Wyatt as having removed or exchanged the labels of many type specimens and it is not clear whether this is just one of many problems to be resolved with more to come or whether many have already been addressed. Whatever the situation, as plant taxonomists we often see some small parts of these problems in label mix-ups, wrong localities, dates or collectors or sometimes

different species mounted together on the same sheet but these are generally curatorial problems, not ones deliberately undertaken to conceal thefts or confuse botanists. As part of his research for this paper Michael Braby asked around about hoaxes in other fields of taxonomy but the closest that plant taxonomy comes to this seems to be in the well-known case of the description of the monotypic genus *Papilionopsis* by van Steenis in 1960, later shown by Verdcourt (1977) to be an inflorescence of a legume, *Desmodium repandum*, inserted into a leafy rosette of *Burmannia disticha* (Burmanniaceae). In this case whether this was actually an attempt to deceive or just an accident in collecting or in the mounting room is unclear.

We would be interested to hear of any further examples that are known from the plant world.

References

- Braby, M.F. & Eastwood, R. (2019). Revised taxonomic status of *Pseudalmenus barringtonensis* Waterhouse, 1928 stat. rev. (Lepidoptera: Lycaenidae): uncovering Australia's greatest taxonomic fraud. *Invertebrate Systematics* 33: 530-543. <https://doi.org/10.1071/IS18071>
- Kitching, R.L., Scheermeyer, E. & Jones, R.E. (1999). *Biology of Australian Butterflies* (CSIRO Publishing: Melbourne). pp. 16-18.
- Verdcourt, B. (1977). The identity of *Papilionopsis styliidioides* (Legum.). *Kew Bull.* 31: 845-846.
- Web ref. 1: *Sydney Morning Herald* 6 Sep. 1947, p. 2 (see below).
- Web ref. 2: <http://collector-secret.proboards.com/thread/1241/colin-wyatt-butterfly-collecting-australia>
- Web ref. 3: <https://www.taxonomyaustralia.org.au/post/a-skullduggers-guide-to-taxonomy>

Iles Stériles or iles stériles: a location of varying precision in 19th Century collections

Robyn Barker
State Herbarium of South Australia

If you work on the taxonomy of Western Australian plants you will undoubtedly be familiar with the term "Iles Stériles" as a locality for Baudin's collections of plants (Fig.). The term was consistently used by Bentham in *Flora australiensis* to refer to plant collections from Baudin's Expedition and in vol. 6 (1873) he indicated that he thought it related to the islands of the Recherche Archipelago off the southern coast of Western Australia.

"Iles Steriles (Récherché Archipelago?)
Herb. Mus. Par. I am not sure which of the islands off the south or west coast are provisionally designated under the above name, which appears never to have been published. (Bentham in B.Fl. vi, 67). [Web ref. 1]

In volume 1, part 4, p.117 of *A critical revision of the genus Eucalyptus*, Maiden (1914) sought, in a footnote, information about localities used for collections by the Baudin Expedition.

"Iles Steriles." It is very important to trace the localities whence the old collectors obtained their plants.

The localities for the plants collected by Captain Baudin's Expedition that are available to me are labelled either "Iles Steriles", "Ile Decrès," (Kangaroo Island), or simply "Côté Occidentale." If by this is meant (in any instance) the west coast of Western Australia, I shall be glad of any information as to his collecting grounds. [Web ref. 2]

Maiden reproduced Bentham's quote and, having examined Flinders' charts he concluded that the Baudin specimens must have been 'from the south coast of Western Australia or from the South Australian coast.' It was Ludwig Diels who furnished the answer that we accept today and Maiden reproduced this in a later volume of his *Eucalyptus* revision

ILES STERILES.

I am indebted to Dr. L. Diels for the following note: –

As suggested by your remark on p. 117, Part IV, I avail myself of the opportunity to set forth my views about the locality "Iles

Stériles" recorded by Baudin's Expedition. Having gone through several of the old original books, I am satisfied (with you) that this name has never been used in published literature. At the same time, there is no doubt to me that it is a translation of the Dutch "Dorre Eylandt" (barren island), and means, in a broader sense, those three islands called nowadays Dirk Hartog Island, Dorre Island, and especially Bernier Island, in Shark's Bay. These islands, being discovered by Dirk Hartog in 1616, were more thoroughly explored, for the first time, by the expedition of Baudin. They are fully described in Perron's and L. de Freycinet's report of this voyage ("Voyage de découvertes aux Terres Australes," Paris). There is a quite detailed paragraph on their vegetation in this book. It is safe to suppose that several species have been collected on Bernier Island. I think the species labelled "Iles Steriles" came from there; for all of them we are aware of belong to the flora of sandy dunes on limestone formation, just as it is met with on these islands; for instance, *Eucalyptus foecunda*, which was collected again near Shark's Bay by Milne (v. p. 115 of your Revision); further *Beyeria cyanescens*, Bth. (*Flor. Aust.* vi, 66), this plant has been collected again on Dirk Hartog's Island by Naumann (in Herb. Berlin); and even more deciding, *Scholtzia leptantha*, Benth. We have this plant from "Iles Steriles" in Herb. Berlin, communicated by the Paris Museum, as to herb. R. Brown (vide Bth. *F. Aust.*, iii, 70). Now the same species was collected near Shark's Bay by Milne, on Dirk Hartog's Island by Naumann, on dunes near Carnarvon by myself. The whole evidence leads me to the conclusion that "Iles Steriles" are those (really exceedingly barren) islands in Shark's Bay. The name, then, is an extension of the old Dutch "Dorre Eylandt," which meant only one of them. That this informal, rather provisional naming has been retained on the labels, while the official report has only the valid names (Ile Dirk Hartog, Ile Dorre,

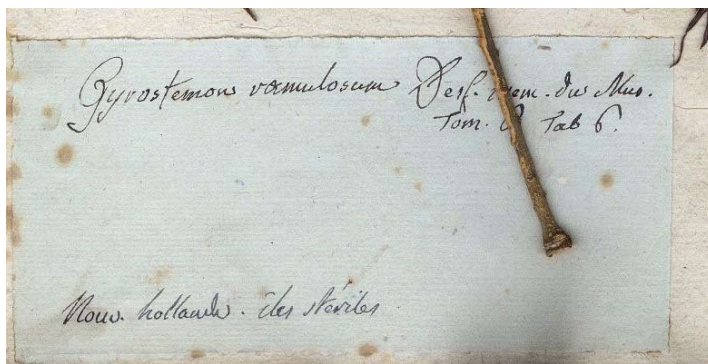


Fig. An image of the label of a Baudin collection from Iles Steriles in P (P00743995). From JSTOR at Web ref. 4.

Ile de Bernier), is not surprising when one considers how very little care was taken about correct labelling by the old botanists. [Web ref. 3]

That Diels was correct in his assumptions can be seen in Peron's comment (p. 104) where Peron refers to a second sterile isle named Ile de Bernier by Freycinet. However there are two other references to "îles stériles" (non-capitalised) in the Peron account, one of these (p. 219) referred to near Bruny Island, Tasmania and another (p. 328) to the islands of the St Francis group in South Australia. If you happen to have a Baudin collection whose distribution does not fit a distribution we accept today, this may provide a solution.

Interestingly in the French translation of George Vancouver's *A voyage of discovery to the North*

Pacific ocean, and round the world... the formal name "Iles Steriles" [Volume 3, p. 97, April 11th 1794] was applied to what are now known as the Barren Islands in Cook Inlet in Alaska. The English version just refers to 'the barren ifles' [vol. 3:p. 92] with no suggestion of a formal name. There are also Iles Steriles (also known as Iles Barren and Nosy Barren) off the west coast of Madagascar. Neither of these relate to Baudin collections but the term was used

both formally and informally.

References

- Maiden, J.H. (1914). *A critical revision of the genus Eucalyptus* II, parts 11-20, p. 215 [Web ref. 2].
- Peron, M.F. (1807). *Voyage de découvertes aux terres australes : exécuté par ordre de Sa Majesté l'empereur et roi, sur les corvettes le Géographe, le Naturaliste, et la goëlette le Casuarina, pendant les années 1800, 1801, 1802, 1803 et 1804; Historique*, t.1. (Paris). [Web ref. 5].
- 1: <https://www.biodiversitylibrary.org/item/44539#page/73/mode/1up>
 - 2: <https://www.biodiversitylibrary.org/item/123248#page/179/mode/1up>
 - 3: <https://www.biodiversitylibrary.org/item/100166#page/299/mode/1up>
 - 4: <https://plants.jstor.org/stable/10.5555/al.ap.specimen.p00743995>
 - 5: <https://www.biodiversitylibrary.org/item/95867#page/5/mode/1up>

Genomics for Australian Plants (GAP)

Genomics for Australian Plants (GAP) project update

Mabel Lum, GAP Project Manager, Bioplatforms Australia
Darren Crayn, Coordinator, GAP Phylogenomics Project
David Cantrill, GAP Project Leader (herbarium community)

Establishment and aims of GAP

The Genomics for Australian Plants Framework Data Initiative was established by Bioplatforms Australia (Web ref. 1) in partnership with researchers from Australian Herbaria and Botanic Gardens. The intent of the Initiative is to develop genomics resources to enhance our understanding of the evolution and conservation of the Australian flora.

Broadly, the key aims are:

- Sequence and assemble representative Australian plant genomes across the plant tree

of life to enable better conservation, utilisation and understanding of Australia's unique plant diversity;

- Build genomic capacity across Australian Botanic Gardens and Herbaria to create networks collaborating in the collection, management, dissemination and application of genomic data for Australian plants;
- Provide tools to enable genetic data to be used to identify and classify biodiversity at a range of scales and to use these tools to inform conservation management and enable better decision making.

Activities

Activities are conducted within three broad projects:

- Reference genomes
- Phylogenomics
- Conservation Genomics

GAP was introduced to the membership in the President's report in the Sept. 2018 Newsletter, and formally launched at the ASBS meeting in Brisbane in December last year. An update was provided in the March 2019 Newsletter. This article covers progress on GAP and its seven projects in the period since.

1. Reference genomes (wet lab)

Through a competitive process, three proposals to generate an assembled genome of an Australian plant were selected (announced at ASBS 2018). This group of three – *Telopea speciosissima* (waratah), *Acacia pycnantha* (golden wattle), and *Areocleome oxalidea* – constitutes a pilot project designed to scope the costs and existing capability within the community required to sequence and assemble genomes. Further calls for additional proposals will be made in the future.

- *Acacia pycnantha* – The Acacia group (led by Dan Murphy, RBG Victoria – dan.murphy@rbg.vic.gov.au) has submitted samples for short read sequencing, and data have been generated (see below). Samples for long read sequencing have been submitted and are currently undergoing quality assessment.
- *Telopea speciosissima* – The Telopea group (led by Jason Bragg, RBG Sydney – Jason.Bragg@rbgsyd.nsw.gov.au) is currently optimising extractions for 10X, short read and long read sequencing. The DNA extracts are suitable for short read and 10X but not long read. The current plan is to complete optimisation for high molecular weight DNA suitable for long read sequencing and to submit all the samples for 10X and long read at the same time.
- *Areocleome oxalidea* – The Areocleome group (led by Russell Barrett, RBG Sydney – russell.barrett@rbgsyd.nsw.gov.au) is currently growing the plant material for sequencing.

2. Reference genomes (bioinformatics)

- Short read *Acacia pycnantha* sequence has been generated and is now available on the data portal for Consortium members. Link:

Web ref. 2.

- The Bioinformatics (pilot genomes) working group is meeting once a month with the Australian Bioinformatics Commons (BioCommons) to discuss the tools and compute requirements for the GAP reference genome pilot projects and beyond.

3. Phylogenomics (wet lab)

- After some months of discussion, the long term goals of the Phylogenomics project are now available at: Web ref. 3.
- The phylogenomics working group have initiated a pilot study to compare two available bait sets for target capture of low copy nuclear markers for phylogenetic reconstruction: the *Angiosperms353* set (Johnson et al. 2019), and a bespoke set developed by the Waycott lab (University of Adelaide and State Herbarium of South Australia). In response to a call, a number of Australian labs generously offered existing DNA libraries to use for this pilot study. Collectively, these libraries effectively cover the phylogenetic breadth of the Australian flora as well as sampling densely within a number of genera, an important factor for testing the utility of the bait sets for resolving both deep and shallow nodes in the Australian plant phylogeny.

4. Phylogenomics (bioinformatics)

A call for expressions of interest (EOI) in joining a working group dedicated to the bioinformatics requirements for phylogenomics has been circulated. The group will be set up shortly, led by Anna Syme (RBG Victoria).

5. Conservation genomics

Background

The Conservation Genomics project aims to provide genomic information to support conservation of the Australian flora. Conservation genomics covers a range of activities and approaches, dictated by the management questions being addressed. The type of study best fits GAP principles and objectives is resolution of species complexes consisting of suspected conservation-dependent species. This type of study:

- uses herbarium specimens;
- builds capacity in herbaria and botanic gardens;
- provides genomic resources that can be used

in future studies;

- improves knowledge of Australian plant diversity, and;
- has a direct conservation benefit and can be implemented across Australia with a common approach.

An EOI for participation in the Conservation Genomics working group was distributed and 10 interested candidates responded. All the EOIs were accepted. The group will be set up shortly, led by Margaret Byrne (Department of Biodiversity, Conservation and Attractions Western Australia)

6. Bioinformatics Engagement Officer

Bioplatforms has appointed Johan Gustafsson as the Bioinformatics Engagement Officer. This position is funded by Bioplatforms and hosted at Melbourne Bioinformatics, University of Melbourne.

The Bioplatforms Bioinformatics Engagement Officer will work closely with bioinformaticians and other relevant staff involved in each Bioplatforms Framework Data Initiative, to document the bioinformatics and data management methods, software, workflows and infrastructure used within each initiative, as well as any challenges faced. The role will develop an in-depth awareness of the tools and methods being utilised in each framework initiative and will identify and promote synergies between the various initiatives (e.g. opportunities for re-use of methods, approaches, tools or infrastructure), and also define structures/resources that can be adapted by bioinformaticians for use in new Framework Initiatives.

The role will also act as a bridge to the Australian BioCommons, which is building data and bioinformatics infrastructure for all Australian Life Scientists. This will ensure that the requirements from the Framework Initiatives inform the BioCommons architecture and processes, and that bioinformatics practitioners involved in the Framework Datasets can utilise any BioCommons infrastructure developed as first adopters.

These aims will be achieved through direct consultation and engagement with the bioinformatics community and computational resource providers. Examples of this engagement

may include identifying and supporting Framework Initiative project working groups, coordinating workshops focused on project and domain specific challenges, and webinars or other online formats that communicate the breadth and depth of bioinformatics across and within individual Framework Initiatives

To keep up to date with developments check out the GAP website (Web ref. 4).

7. Training

One of the key goals of the Initiative is to develop training in plant genomics for Australian researchers, based on topics that researchers would find useful, and with a focus around bioinformatics. Anna Syme at RBG Victoria is currently coordinating the bioinformatics training for the GAP initiative. In order to better understand the community's training needs, a survey has been circulated, but we have received limited responses so far. It would be great if you could complete the survey via the link below by Friday, 2nd August 2019 to assist us with planning over the next three years¹.

For more details about the GAP bioinformatics training, please contact Anna Syme at *Anna.Syme@rbg.vic.gov.au*. The GAP web page and twitter feed are also listed below.

References

Johnson M.G., Pokorny L. & 16 others (2019). A universal probe set for targeted sequencing of 353 nuclear genes from any flowering plant designed using k-Medoids clustering, *Systematic Biology* 68 (4), July 2019, 594–606, <https://doi.org/10.1093/sysbio/syy086>

Web ref. 1. <https://www.bioplatforms.com/projects/>

Web ref. 2. <https://data.bioplatforms.com/organization/pages/bpa-plants/data-access>

Web ref. 3. <https://www.genomicsforaustralianplants.com/phylogenomics/>

Web ref. 4. <https://www.genomicsforaustralianplants.com/>

GAP Survey: https://docs.google.com/forms/d/e/1FAIpQLSekSdHMBJCLRbh786hQpZrGP4qFL_b96luBJ_ndtW719Ddbdog/viewform (due 2nd August).

GAP Webpage: <https://www.genomicsforaustralianplants.com/>

GAP Twitter: <https://twitter.com/PlantsAus>

¹ Advertised recently on ASBS Facebook page on 29 July 2019.

ABRS report

The ABRS has been working hard over the last few months with the taxonomic community - to fund, undertake and support a wide range of research projects, publications, expeditions and other initiatives.

One exciting initiative is the redevelopment of *Euclid*, in partnership with the Centre for Australian National Biodiversity Research (Australian National Herbarium) and Identic P/L. This new version of the popular Lucid identification key will no doubt prove as popular as the *Wattle: Acacia's of Australia* Lucid key re-released as a smartphone app last year. The information within the updated *Euclid* will also importantly be used to update all of the *Flora of Australia's* eucalypt profiles.

ABRS has started developing the *Bryophytes of Australia* on the Atlas of Living Australia's eFlora platform. To date 717 taxa across 39 moss families have been transferred from the Australian Mosses Online website to the new platform. Some of these treatments were provided to ABRS as early as the 1980s, and are in much need of revision. We are currently negotiating revisions for Bryaceae, and the addition of the eFlora collection's first liverwort treatments, beginning with *Riccia* (Ricciaceae). We are excited to revitalise and expand our bryophyte taxonomic products on this new medium.

Flora of Australia

The *Flora of Australia* (FoA) continues to go from strength to strength, now well and truly established on its digital platform. A list of recently published treatments is maintained on the home page (Web ref. 1), and there are numerous individual profiles on families, genera and species also regularly being added and updated (e.g. *Acacia* taxa, family-level profiles and new taxa). Treatments added or revised since the launch of the digital Flora in late 2017 include *Agapanthus* (Agapanthaceae), Anarthriaceae, Apodanthaceae, *Avicennia* (Acanthaceae), Balsaminaceae, Berberidaceae, *Brunonia* (Goodeniaceae), Calophyllaceae, Calycanthaceae, Campynemataceae, Clusiaceae, Eriocaulaceae, Melianthaceae, *Muscari* (Asparagaceae), Nitrariaceae, Nothofagaceae, Ochnaceae, *Oryza*

(Poaceae), Pittosporaceae, Restionaceae p.p. (*Alexgeorgea* – featured in Taxonomy Australia (Web ref. 2), *Chordifex*, *Hypolaena*, *Lepyrodia*), Sphenocleaceae, Theaceae, Tecophilaeaceae, Tropaeolaceae and Verbenaceae.

The National Herbarium of Victoria (MEL) has been working with the ABRS to write FoA family-level profiles for 89 Australian vascular plant families; this work is now complete with contributions from Andre Messina, Daniel Ohlsen and Val Stajsic. As well as many new family profiles the project included the revision of families to bring them in line with currently accepted taxonomic concepts (e.g. Celastraceae, Goodeniaceae, Lythraceae and Salicaceae). Work on updating the remaining family-level profiles is likely to begin in the near future. In parallel to this work, the ABRS and the FoA Advisory Group identified priority taxa for profile development within the FoA. Following a call for expressions of interest, a number of botanists from AD, MEL, BRI and ATH have been commissioned to write (or update) treatments, profiles and keys including: Acanthaceae, Andropogoneae p.p. (several genera), Aspleniaceae, Cactaceae, Hymenophyllaceae, Lycopodiaceae, Nepenthaceae, Orobanchaceae, Oxalidaceae and Solanaceae p.p. (several genera).

We are currently further refining details on *State of the Flora*, including assessment of content, gaps, required revisions, contributors and grant-funded flora projects. Please contact the ABRS (address below) with any feedback about the FoA content and platform functionality, or if you would like to contribute new taxon profiles or update existing descriptions.

Bush Blitz

The first expedition for 2019 was held from 17–28 June in the Northwest Cape, W.A., which included the Cape Range National Park, the Royal Australian Air Force (RAAF) Learmonth Air Weapons Range, and the Exmouth Gulf. Teams from the W.A. Museum and W.A. Herbarium had a great time exploring terrestrial and marine environments for new species. Some highlights involved likely new species of trapdoor spiders, heteropteran bugs, sponges and nudibranchs. New

records and range extensions were made for some plant species, including *Daviesia pleurophylla* from the tip of the Cape south to the RAAF range, and monitoring of the relict population of the Millstream palm, *Livistona alfredii*. The botany team also collected specimens of putative new species of *Calytrix* (material currently being propagated) and *Hibbertia*, both endemic to the Cape Range National Park. Records made during the Bush Blitz will be used to develop a field guide for plants endemic to the Northwest Cape. The next expedition will be held in the Little Desert National Park, Victoria, in late 2019.

Grants

The ABRS is pleased to announce seven grants were awarded as part of the 2019–20 National Taxonomy Research Grant Program (NTRGP) grant round, including four focused on botany. The next NTRGP round will open to submissions in mid-October 2019. Seventeen Student Travel Grants were also awarded in June 2019, to help support the travel of students to conferences and workshops both in Australia and overseas. Six of these travel bursaries were awarded to students of botany; a number of which will be travelling to the November 2019 joint conference of the Australasian Systematic Botany Society and the New Zealand Plant Conservation Network in Wellington.

As part of a broader Australian Government

policy the ABRS has shifted administration of the NTRGP to the Department of Social Services. The transition of this administration in the next few months should not impact on those applying for research grants; any significant developments will be communicated well in advance. More information on the NTRGP is available at the ABRS website (Web ref. 3).

Strategic review

The ABRS has been undertaking a period of strategic review. As part of this ABRS commissioned Taxonomy Australia to lead a taxonomic community consultation to determine the ABRS's current and possible future strategic fit with the *Decadal Plan for Taxonomy and Biosystematics* (Web ref. 4) agreed priority actions. The ABRS will report more on this in the next *ASBS Newsletter*.

Web references

- 1: www.ausflora.org.au
- 2: <https://www.taxonomyaustralia.org.au/post/alexgeorgea-a-remarkable-australian>
- 3: www.environment.gov.au/science/abrs/grants/
- 4: <https://www.science.org.au/support/analysis/decadal-plans-science/discovering-biodiversity-decadal-plan-taxonomy>

ABRS
July 2019
abrs@environment.gov.au

Coming conferences

Taxonomy for Conservation – Ruia mai i Rangiatea ASBS-NZPCN 2019 Conference, Wellington update

Check out our conference website (Web ref. 1) where you can find all the info about this exciting joint botanical conference of the Australasian Systematic Botany Society and the New Zealand Plant Conservation Network.

Registration is now OPEN and is a three step process (Web ref. 2):

1. Register
2. Pay
3. Submit an abstract

The conference comprises three days of talks, one day of workshops (seven to choose from), one day of field trips (five options), a conference dinner,

and a welcome reception. We have three exciting keynote speakers, a jam-packed programme with up to 75 talks by attendees, a poster session, and even a silent auction.

The call for silent auction items is currently open; thanks to those who have already contributed (Web ref. 3). More items are needed; can you help? (See Web ref. 4).

Early bird registration and abstract submission closes on 23 August. A number of attendees from Australia and New Zealand have already registered and paid. We look forward to getting your registration next!



NZPCN

The Australasian Systematic Botany Society
and the
NEW ZEALAND PLANT CONSERVATION NETWORK

Taxonomy for Plant Conservation – Ruia mai i Rangiatea



24–28 November 2019, Wellington, New Zealand

Conference registration open now!

We invite you to register for the Taxonomy for Plant Conservation conference to be held at the Museum of New Zealand Te Papa Tongarewa in the last week of November.

Start planning now!

Spaces in workshops and field trips are limited, so register early to get your top choices.

Check out the *recently updated conference website* (see below) to get all the important details about conference dates, venue, accommodation, programme, keynote speakers, field trips, workshops, silent auction, and more!

The *conference theme*, ‘Taxonomy for Plant Conservation – Ruia mai i Rangiatea’ aims to capitalise on the vast expertise of our two societies. There will be multiple upskilling workshops, three days of symposia, and a chance to explore Wellington’s forests and rugged coastlines on our five different full-day field trips.

Feel free to *contact the organising committee* by email at plants2019nz@gmail.com if you have any queries, otherwise we will keep subscribers to the conference web site up to date with developments, or follow us on Facebook or Twitter for announcements.

We look forward to seeing you in Wellington in November!

Ngā mihi nui

Nā Rewi, Heidi and the Organising Committee

Sponsors

Thank you to our sponsors! Their commitment to plant conservation networking is evident in their support for our conference.

If you or your organisation is in a position to show your support please contact us for a sponsorship package today at info@nzpcn.org.nz



Manaaki Whenua
Landcare Research



Wildlands



OTARI
WILTON'S BUSH TRUST

Conference website: <https://systematics.ourplants.org/>

Facebook: <https://www.facebook.com/plants2019nz/>

Twitter: https://twitter.com/asbs_2016

Instagram: https://www.instagram.com/asbs_nzpcn2019/



Email contacts

Please email the conference organisers with any questions and the NZPCN Secretary Matt Ward with offers for the silent auction.

Conference organisers: plants2019nz@gmail.com

Silent auction: mattwardward@gmail.com

Web references

1. <https://systematics.ourplants.org/>
2. <https://systematics.ourplants.org/registration/>

3. <https://systematics.ourplants.org/programme/silent-auction/>

4. www.asbs.org.au/newsletter/pdf/19-march-178.pdf

Heidi Meudt & Rewi Elliot
2019 ASBS-NZPCN Conference co-organisers

Other coming conferences

SASB conference 2019

Registrations are now open for the combined conference of the Australian Entomological Society (AES), the Society of Australian Systematic Biologists (SASB) and the Australasian Arachnological Society (AAS). The conference will be held at the Brisbane Convention & Exhibition Centre at South Bank, Brisbane, from Sunday to Wednesday 1–4 December, 2019.

The conference theme, *Understanding the Australian Biota in a Changing World*, reflects the joint interests of the three societies as well as addressing the pressing challenges of climatic and biotic change in the Anthropocene. It is hoped that a significant proportion of the symposia and associated presentations will play a part in advancing our understanding of the significance and conservation of Australia's biota and in revealing the important functional aspects of both natural and modified ecosystems.

The call for abstracts is now open, closing on 1st September 2019. Applications for the annual round of SASB Student & Honorific Awards are also now open and all the information can be found on the SASB website.

Conference website: <https://www.aesconferences.com.au/> and the

SASB website: <https://www.sasb.org.au/awards>

2nd Australian Native Bee Conference

Note that the SASB conference in Brisbane will be immediately followed by the 2nd Australian Native Bee Conference on 5–7th December 2019. This conference will be held at St Leo's College, University of Queensland, St Lucia, Brisbane and will involve a local field trip on the afternoon of the 6th December. For further details see the

conference website. A half day bee identification workshop with Tobias Smith is available on Sunday 8th December.

Conference website: <https://australiannativebeeconference.com.au/>

BGANZ 2019 Congress

Registrations are now open for Plants from the past: plants for the future, the bi-annual Botanic Gardens of Australia and New Zealand (BGANZ) conference. It is to be held in Wellington, New Zealand, on 20–23 October 2019. The venue is the Museum of New Zealand Te Papa Tongarewa and the Congress programme is now available on the web site.

Early bird registration closes on 30 August 2019.

Conference website: <https://www.confer.nz/bganz2019/>

Australian Garden History Society – 40th Annual National Conference 2019

The BGANZ conference is to be followed by the Australian Garden History Society Conference, also in Wellington, and at the same Te Papa venue, on 25–27 October 2019.

Conference website: <https://www.gardenhistorysociety.org.au/events-conference/agh-40th-annual-national-conference-2019/>

News

Queen's birthday honours list 2019

Congratulations to **Dr. Helen Patricia Ramsay**, Member of the Order of Australia "For significant service to plant science".

Long retired (1988) from her working life as a senior lecturer at the University of New South Wales, Helen has remained active and is an Honorary Research Associate in Bryology at the National Herbarium of New South Wales and still publishing. You can read more about her very significant contribution to Australian bryology, mosses in particular, on her Royal Botanic Gardens Sydney page (Web ref. 1) but better still find out much more by having a look at the special edition of the *Australasian Bryological Newsletter* (number 49; Web ref. 2), a wonderful tribute to Helen by her peers in recognition of her 75th birthday.

Another who received richly deserved recognition was **Bev Overton**, Kangaroo Island ecologist and significant collector for the State Herbarium of South Australia, who was also made a member of the Order of Australia (Web ref. 3) for her significant service to conservation and the environment.

Congratulations also to **Peter Copley**, awarded a Public Service Medal in South Australia for outstanding public service to conservation and the environment, and to biodiversity research and policy development, in South Australia. Peter is one of those plant systematists who got away. His Honours project was on the systematics of *Ixodia* (Asteraceae) but he then went into the threatened species world where his contribution to the restoration and recovery of both animal and plant species in South Australia has been significant. His father, Bruce, was a significant collector for The State Herbarium of South Australia (AD) in the 1960s and 70s and would have been extremely proud of Peter's award.

You can learn more about Bev and Peter and their awards (Web ref. 3).

Web references

- 1: <https://www.rbg Syd.nsw.gov.au/Science/Our-science-staff/Helen-P-Ramsay>
- 2: https://www.utas.edu.au/_data/assets/pdf_file/0009/316656/abn_49.pdf
- 3: <https://know.ourplants.org/news/queens-birthday-honours/>

Retirement and recognition

Karina Knight, collections manager at the PERTH herbarium, is retiring from her position (web ref. 1), but will continue her interest in slime moulds as a Research Associate of the herbarium in retirement. Kevin Thiele has given a background to Karina on the Taxonomy Australia website along with recognition of another quiet achiever in the PERTH Herbarium, Barbara Rye (web ref. 2). Coincidentally, the rare *Acacia karina* named for Karina, is the subject of one of the papers in a special issue of the *Australian Journal of Botany* dealing with the genetics and ecology of plants of the banded iron formations of the Yilgarn craton of southern Western Australia.

Web references

- 1: <https://www.taxonomyaustralia.org.au/post/karina-knight-s-red-boxes>
- 2: <https://www.taxonomyaustralia.org.au/post/the-amazing-dr-rye>

Funding for new NSW Herbarium included in budget

Marco Duretto posted on ASBS FaceBook a link to Channel 10 News indicating that the NSW Budget included \$27M for the new herbarium at Mt Annan. However the actual budget paper lists \$59.5 million to move the National Herbarium from its current location in the Royal Botanic Garden Sydney to Mount Annan, creating 350 new jobs. The new, purpose-built Centre of Innovation in Plant Sciences will be the nation's premier botanic science research facility (Web ref. 1).

This latter figure is repeated in a media release from Treasury (Web ref. 2) which includes concept designs for the building inspired by the seed pod of the NSW state emblem, the waratah.

You can also read (Web ref. 3), as well as see with video footage (web ref. 4), more about the impressive digitisation exercise which has started in NSW. A good insight is given into the importance of herbarium collections for taxonomic research.

Web references

- 1: <https://www.budget.nsw.gov.au/sites/default/files/budget-2018-06/NSW%20Budget%202018-19%20-%20Budget%20Overview-1.pdf>
- 2: <https://www.treasury.nsw.gov.au/sites/default/files/2019-06/20190615%20-%20Media%20>

Release%20-%20Perrottet%20and%20Stokes%20-%20NSW%20Budget%20-%20Waratah%20inspires%20Herbarium%20design.pdf

3: <https://www.rbgsyd.nsw.gov.au/About/Major-Projects/Digitisation-of-National-Herbarium-of-NSW>

4: <https://www.rbgsyd.nsw.gov.au/Stories/2018/Our-herbarium-specimens-are-going-digital>

Digitisation at the Allan Herbarium (CHR)

Manaaki Whenua - Landcare Research is also undertaking the digitisation of the Allan Herbarium in Christchurch. They have 660,000 specimens and objects at the Herbarium but only 45% have been digitised for researchers and biosecurity and biodiversity managers to access from anywhere in the world. At Manaaki Whenua they are using the citizen science approach and have called for volunteers from anywhere in the world to help them transcribe information from specimen labels. You can access the information and video on-line (Web ref.)

Web ref. www.landcareresearch.co.nz/about/news/events/techweek-2019/digitisation-expedition-citizen-science

The Great Weeds Hunt Aotearoa

Another way in which the Allan Herbarium has been involved in the community in 2018–19 is through their bringing together schools and communities in Auckland and Canterbury to help find and target weeds which align with the priorities and control initiatives of DOC and regional authorities. The Auckland project has focussed on the finding of *Tradescantia* populations with the schools then being involved in the release of *Tradescantia* beetles being raised as biocontrol agents by Manaaki Whenua. In the South Island the concentration has been on *Spartina* and purple loosestrife (*Lythrum salicaria*). Further details are available on their website (Web ref.).

Web ref. <https://www.landcareresearch.co.nz/information-for/citizen-science/weeds/about>

Foulden Maar fossil site under threat from mining

For the last few years ASBS members have been hearing presentations at their annual meeting of the exciting plant fossil finds from the Foulden Maar site near Dunedin and a plethora of papers have been published on the findings from the site.

The maar was formed 23 million years ago by a volcanic eruption and the shallow crater left behind was gradually filled

with layers of microscopic algae to form diatomite. This has preserved an exquisite and detailed fossil record spanning around 130,000 years that includes freshwater fish, flowers, fruits, seeds, bark and fungi, as well as beetles, ants, scale insects, termites and other invertebrates. It is also highly likely to contain moa fossils and possibly crocodiles. New Zealand led research is already studying the fossils that have been discovered in collaboration with experts from all over the world. [From petition to the New Zealand government et al. to save Foulden Maar – accessed through Web ref]

Now the site is under threat from an Australian mining company, Plaman Global, whose Malaysian subsidiary wishes to extract the diatomite deposit for use as a food supplement for stock. You can read more about this threat in an article in *The Conversation* (Web ref.).

Web ref. <https://theconversation.com/proposal-to-mine-fossil-rich-site-in-new-zealand-sparks-campaign-to-protect-it-118505?>

An official declaration of climate emergency

The national governments of the UK and Canada, and now the City of Sydney have officially declared a climate emergency (Web ref. 1). So too has Pope Francis. What does this mean for those various levels of government around the world, some 658, who are increasingly signing up? You can read more about the Climate Emergency Declaration (Web ref. 2) whose campaign goal is:

for governments to declare a climate emergency and mobilise society-wide resources at sufficient scale and speed to protect civilisation, the economy, people, species, and ecosystems.

Web references

1: <https://theconversation.com/sydney-declares-a-climate-emergency-what-does-that-mean-in-practice-119387>

2: <https://climateemergencydeclaration.org/about/>

Human responsibility for imminent extinction of one million species

There is usually one issue which grasps the attention in the three month span between newsletter issues. This time it was the global assessment of man's impact on nature compiled over three years by the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) (accessible through Web ref. 1). The report found that due to the

activities of man there are now a million animal and plant species threatened with extinction.

None of this is a surprise to biologists since the 6th great extinction event has been discussed for some time (Web ref. 2) but this report based on 15000 reference materials [papers] might have been expected to carry some more weight and cause more than a short-lived flurry of concern. The timing of its release with respect to the Australian election might also have been expected to have drawn some bipartisan response but despite some initial horror expressed in the media (Web ref. 3, 4) and a number of articles in *The Conversation* (Web ref. 5, 6) the report has generally disappeared. A summary editorial in *Nature Ecology & Evolution* (Web ref. 7) urged researchers to “seize this critical opportunity to engender change towards sustainability” while global biodiversity was being discussed in a way that it never has been before.

Sadly, while the report was prominent in the media for about 3 weeks in May, mention of it since then has all but disappeared. Noteworthy though are the “extinction deniers” who have mobilised against the findings and are now denying the facts presented in the report (Web ref. 8).

Web references

- 1: <https://www.ipbes.net/>
- 2: <https://theconversation.com/radical-overhaul-needed-to-halt-earths-sixth-great-extinction-event-68221> (Nov. 9 2016)
- 3: <https://www.bbc.com/news/science-environment-48169783>
- 4: <https://www.theguardian.com/commentisfree/2019/may/06/ecological-problems-environmental-crises-farmers-citizens-politicians>
- 5: <https://theconversation.com/revolutionary-change-needed-to-stop-unprecedented-global-extinction-crisis-116166> (May 7 2019) – a summary of the processes which went into the production of the report and of what they found
- 6: <https://theconversation.com/fixing-australias-extinction-crisis-means-thinking-bigger-than-individual-species-115559> (May 9 2019) – evaluation of some of Australia’s efforts
- 7: <https://www.nature.com/articles/s41559-019-0922-2>
- 8: <https://blogs.scientificamerican.com/extinction-countdown/rise-of-the-extinction-deniers/>

Global analysis of extinct plants

A global analysis from a database of extinct plants maintained by Rafaël Govaerts at Kew indicates that we have been losing 3 plant species

per year since 1900. The study, Humphreys et al. 2019, is not freely available but there is a popular article reporting on the findings (Web ref. 1). This article reproduces their global extinction map indicating that species are most at risk when they occur in areas of high biodiversity and high human populations. The paper also addresses the problem of when one decides whether a plant is really extinct and documents cases where they have been rediscovered.

Following on from this paper David Coates published an article on undocumented plant extinctions in Australia (Web ref. 2) and some of the reasons why these extinctions are not noticed. It was somewhat surprising to learn that only 38 species are considered by The Threatened Species Recovery Hub to have become extinct in the last 170 years but that number is open to question and probably an underestimate.

References

- Humphreys, A.L., Govaerts, R., Ficinski, S.Z., Lughadha, E.N. & Vorontsova, M.S. (2019). Global dataset shows geography and life form predict modern plant extinction and rediscovery. *Nature Ecology & Evolution* 3: 1043–1047. <https://doi.org/10.1038/s41559-019-0906-2> (not freely available)
- Web ref. 1: <https://www.nature.com/articles/d41586-019-01810-6>
- Web ref. 2: <https://theconversation.com/undocumented-plant-extinctions-are-a-big-problem-in-australia-heres-why-they-gone-unnoticed-118607>

Red Hot Plant List

The Threatened Species Recovery Hub has also come up with a list of Australia’s 100 most endangered plants from all of those species which appear in the Commonwealth (EPBC) and individual State listings. The species have been further sorted into 21 flagship groups, these groups being based on plant type (e.g. ground orchids), key threats (e.g. highly urbanised and growth areas; changed fire regimes/disturbance) and region (SW WA remnants). It is envisaged that species listed within a particular flagship group be used as champions to raise the profile of that group.

Web references

- www.nespthreatenedspecies.edu.au/news/a-red-hot-list-for-threatened-plants (initiation of the project in 2017)
- www.nespthreatenedspecies.edu.au/news/plants-red-hot-list-no-surprises-no-regrets (Results)

Putting a monetary value on collections

A means of valuing herbarium specimens has been operating for some time amongst Austral[as]ian herbaria associated with CHAH, probably first initiated by an article by Jim Armstrong in 1992. A review of this difficult topic was presented by Parnell (2001). Now the Museums are addressing this same task and have come up with their own recommendations (Web ref. 1, 2 & 3).

References

- Armstrong, J.A. (1992). The funding base for Australia's biological collections. *Australian Biologist* 5: 80-88.
- Parnell, J. (2001). The monetary value of herbarium specimens. In B.S. Rushton, P. Hackney & C.R. Tyrie (Eds). *Biological collections and biodiversity. Linnean Society Occasional Publications* 3. (Linnean Society of London).
- Web ref. 1: <https://camd.org.au/camd-collections-valuation-framework/> (background to CAMD valuation)
- Web ref. 2: <https://camd.org.au/files/2018/11/CAMD-Collections-Valuation-Framework-1-Nov-2018.pdf> (the document)
- Web ref. 3: <https://www.abc.net.au/radionational/programs/saturdayextra/collections-part-1:-valuing-museum-artefacts/10884032> (audio)

A monetary value on names for new species

Peter Wilson pointed to this post on the auctioning of names. The ethics of doing this are complicated and some of the names, amusing at the time, probably won't stand the scrutiny of history, but still an interesting read.

Web ref. <https://undark.org/article/nomenclature-auctions-bidder/>

Nation-wide assessment and photo competition for *Eucalyptus* s.lat.

Since European settlement many eucalypt species have declined dramatically. The Threatened Species Recovery Hub, under the leadership of Rod Fensham, is undertaking a nation-wide assessment of the conservation status of every Australian eucalypt, which includes the genera *Eucalyptus*, *Corymbia* and *Angophora*. The assessment will help conservation managers to understand which species are at risk and will also underpin a national conservation action plan for Australian eucalypts. To commemorate this achievement they are also holding a photo competition to celebrate the beauty and diversity of Australia's eucalypts with the best photos to be used in the National Action Plan. Entries close 22 July 2019, with details on their website.

Web ref.: www.nespthreatenedspecies.edu.au/projects/developing-a-national-action-plan-for-australian-eucalypts

Eucalypts genetics conference 2019

The proceedings of this conference, Eucalypt genetics: fundamental and applied research in a post-genome era, held in Hobart in February are now available through the web. Most presentations are available as videos and the use of a drone for documenting field trip and other activities is impressive.

Web ref. <https://www.eucalyptgenetics2019.com.au/program>

Bavarians for biodiversity

Bavarian citizens — increasingly concerned about the loss of natural areas, destructive farming techniques, and widely publicized reports that the populations of flying insects in Germany had plummeted — overwhelmingly supported a “referendum for biodiversity” that called for the state government to implement fundamental changes in nature conservation. State law required that 10 percent of Bavaria's 9 million registered voters support the referendum for it to become the basis for negotiations on a new nature conservation law. In fact, nearly double the required number of voters — 1.75 million Bavarians — showed up at their town halls to support what had become known as the “save the bees” initiative. [Web ref. 1].

Other German states, Brandenburg, Baden Wuerttemberg, and North Rhine-Westphalia, are proposing to follow suit and it is reported that information is being sought from other countries, including Sweden and Australia, on how they might also initiate similar referendum campaigns. You can read something of how the referendum came about (Web ref. 2). Note that though the referendum has been called a referendum for biodiversity above, its actual title was “Artenvielfalt Rettet die Bienen!” (Web ref. 3) which in English translates as “Biodiversity Save the bees!”, and so it may have been the bees which were the rallying point rather than biodiversity.

Web references

- 1: <https://e360.yale.edu/features/in-conservative-bavaria-citizens-force-bold-action-on-protecting-nature>
- 2: <https://globalchangeecology.com/2019/02/01/referendum-could-save-bavarias-biodiversity/>

3: <https://volksbegehren-artenvielfalt.de/>

Biocontrol moths to halt spread of horehound in New Zealand

Horehound (*Marrubium vulgare*) has long been recognised as a weed across southern Australia and a search for biocontrol agents began in 1990 culminating in the release of both the horehound plume moth and the horehound clearwing moth in the late 1990s (Weiss & Sagliocco 2012). Both moths have been effective as control agents in some parts of South Australia (Web ref. 1, 2). Now the moths have been introduced to New Zealand in an attempt to help control the spread of horehound there (Web ref. 3).

References

Web ref. 1: <https://www.naturalresources.sa.gov.au/adelaidemtoftyranges/news/171109-hungry-caterpillar-tackles-horehound-weed>

Web ref. 2: <http://caws.org.nz/old-site/awc/2012/awc201213491.pdf>

Web ref. 3: <https://www.stuff.co.nz/national/112477579/moths-may-be-the-key-to-controlling-spreading-infestations-of-horehound>

Weiss, J & Sagliocco J-L. (2012). *Marrubium vulgare* L. – Horehound, in M. Julien, R. McFadyen & J. Cullen (eds). *Biological Control of Weeds in Australia* pp. 360–367. (CSIRO Publishing; Melbourne)

New Lucid releases

Amongst the new plant keys to be released recently by Lucid and mentioned in their latest newsletter (Web ref. 1) are:

- *Plants of South Eastern New South Wales* (Betty Wood et al.)
- *Willow species and hybrids present in New Zealand* (David Glenny & Trevor Jones).

Associated with the Q-bank Invasive Plants website (Web ref. 2), which produces the fact sheets, are the following keys available in English, French and Dutch:

- A key to 10 *Pennisetum* species and their associated cultivars available on the European market.
- Invasive terrestrial plants in NW Europe (140 spp.)
- Invasive aquatic plants in Europe (78 spp.)
- Seedlings of invasive plants
- Seeds of invasive plants

There is also information in their newsletter

concerning a new seed identification website (Web ref. 3) launched by the International Seed Morphology Association to:

promote collaboration, knowledge sharing, resource development, and research among those who are interested in seed morphology and seed identification.

Alexander Schmidt-Lebuhn's Lucid key to the propagules of 102 biosecurity-relevant species of Asteraceae is included on the site as well as a key to the seeds of families. The latter is of limited use since the seeds or propagules of *Solanum carolinense* and *Malva pusilla* are hardly representative of the whole gamut of seed types found in the Solanaceae and Malvaceae respectively, but this is a work in progress.

Web references

1: <https://www.lucidcentral.org/mail/2019/may/index.html>

2: www.q-bankplants.eu/

3: <https://www.idseed.org/>

Archives in Britain now available through Trove

Alex George has drawn to our attention that the reels of the Australian Joint Copying Project have been digitised and are now available through Trove. Between 1948 and 1997, The Australian Joint Copying Project (AJCP) microfilmed more than 10,000 records of Australian archives held in Britain and dated between 1560 and 1984. Records also relate to New Zealand, the Pacific, SE Asia and Antarctica and come from such institutions as the Public Record Office, the Van Diemen's Land Company, East India Company, the Linnean Society of London and the papers of people such as Joseph Banks, Robert Brown, James Cook and Charles Sturt. Alex made use of this source in his compilation of *Australian Botanist's Companion* (2009, p. 26) and this new accessibility would surely have been very welcome to him then.

Web ref. <https://www.nla.gov.au/stories/blog/preservation/2019/06/06/australian-joint-copying-project-reimagined>

Points of view

Native vs naturalised

Fensham & Laffineur (2019) have re-proposed the year of European settlement, 1788, as the dividing line between native and naturalised flora for the entire Australian flora. They argue that

European settlement of the Australian continent represents a very sharp biogeographic event for the Australian flora and provides a straightforward criterion for determining the 'naturalised' species.

It was Bean's rejection of this concept which led to his paper (Bean 2007) suggesting a new system for determining whether a plant is indigenous or not. Whatever criteria are adopted it seems that there will always be some plants of disputed origin.

Some extra food for thought on this subject is provided by new evidence from archaeologists that there may well have been trade between Papua New Guinea and Australia for the past 2500 years (Web ref.), rather than the mere 300 years of Macassan trade for trepang which is usually cited.

An older paper dealing with plant exchanges in the Indian Ocean (Haripriya et al. 2012), may also be of interest.

It draws on recent interdisciplinary research in archaeobotany and palaeoclimatic studies to illustrate the plant transfers that took place between eastern Africa, southern Asia and mainland and Island Southeast Asia between 2500 BCE and 100 CE.

References

- Bean, A.R. (2007). A new system for determining which plant species are indigenous in Australia. *Australasian Systematic Botany* 20(1); 1–43. <https://doi.org/10.1071/SB06030>
- Fensham, R.J. & Laffineur, B. (2019). Defining the native and naturalised flora for the Australian continent. *Australian Journal of Botany* 67(1): 55–69. <https://doi.org/10.1071/BT18168>
- Haripriya, R., Carney, J. & Denham, T. (2012). Environmental history of botanical exchanges in the Indian Ocean world. *Environment and History* 18(3): 311–342. <https://doi.org/10.3197/096734012X13400389809256>
- Web ref. <http://theconversation.com/archaeology-is-unravelling-new-stories-about-indigenous-seagoing-trade-on-australias-doorstep-111528>

Slave trade

Causing controversy recently was an article on the debt that natural history collections owe to the slave trade. On the face of it, it probably seemed innocuous to many of us, but Rae Wynne Grant, a large carnivore ecologist in the US, took exception to the language and the Eurocentric views expressed. She provided an analysis of the paper from her perspective as a black woman scientist and we can all learn from her comments and hopefully not cause the same offence in the future.

Web references

- <https://www.sciencemag.org/news/2019/04/historians-expose-early-scientists-debt-slave-trade>
- <https://twitter.com/RaeWynnGrant/status/1116076320188981250>

Changing language with respect to climate change

You may have noticed some new terminology surrounding climate change. According to *The Guardian* its style guide has now been updated so that the term *climate change*, which is seen as passive and gentle should now be referred to as *climate emergency*, *crisis* or *breakdown* while *global heating* is preferred to *global warming* since it is a stronger term.

Other terms that have been updated, including the use of *wildlife* rather than *biodiversity*, *fish populations* instead of *fish stocks* and *climate science denier* rather than *climate sceptic*.

The return to the use of *wildlife* rather than *biodiversity* is almost certainly a backward step for those involved in the plant world since many people, even those in scientific bodies, do not consider plants to be wildlife (see for instance Web ref. 2 and Margulies et al. 2019, both of which discuss the lack of consideration of plants in the illegal wildlife trade).

References

- Margulies, J.D. et 9 other authors (2019). Illegal wildlife trade and the persistence of "plant blindness". *Plants, People, Planet* 00:1–10. <https://nph.onlinelibrary.wiley.com/doi/full/10.1002/ppp3.10053>
- Web ref. 1. <https://www.theguardian.com/environment/2019/may/17/why-the-guardian-is-changing-the-language-it-uses-about-the>

environment

Web ref. 2: <https://www.iucn.org/news/species/201810/illegal-wildlife-trade-endangers-plants-few-are-listening>

Graduation speeches

In 2019 science graduates of Otago University were urged to speak out against unscientific thinking and anti-vaccination propaganda while graduates from other faculties were challenged to avoid personal and social stereotyping (Web ref. 1). At Auckland University science graduates were urged to “step up and inform our future” since scientists are powerful and they are needed (Web ref. 2). On the web you can find a collection of the most inspiring graduation speeches of 2019 from American universities (Web ref. 3, 4). These are all good although Tim Minchin’s UWA address of 2013 on the awarding of an honorary

doctorate (Web ref. 5) still stands the test of time. However, this short address consisting entirely of questions (Web ref. 6) is close behind it.

Web references

- 1: <https://www.odt.co.nz/news/dunedin/campus/university-of-otago/call-challenge-privilege-and-unscientific-thinking>
- 2: <https://sustainable.org.nz/sustainable-business-news/rachel-brown-graduation-speech-the-university-of-auckland/>
- 3: <https://www.shondaland.com/inspire/a27558629/inspiring-graduation-speeches-of-2019/>
- 4: <https://www.timeshighereducation.com/student/blogs/best-celebrity-graduation-speeches-2019>
- 5: <https://www.timminchin.com/2013/09/25/occasional-address/>
- 6: <http://theconversation.com/this-commencement-speech-had-nothing-but-questions-117230>

Items of interest

Spend two hours a week in nature to feel well

According to a comprehensive British study (White et al. 2019) reported in *ScienceDaily* (Web ref.), those people who spend 120 minutes or more interacting with Nature are more likely to assess themselves with better health and well-being than those who spend 0-119 minutes. The study was based on a sample of 20,000 people in Britain and it found that this threshold applied independent of sex, age, ethnicity, income, occupation or health. The study does raise a lot of other questions however, such as what constitutes “Nature”, whether the same results are obtained if the visits are not voluntary and whether the participant’s own garden can be substituted for Nature.

References

- Web ref. <https://www.sciencedaily.com/releases/2019/06/190613095227.htm>
- White, M.P., Alcock, I., Grellier, J., Wheeler, B.W., Hartig, T., Warber, S.L., Bone, A., Depledge, M.H. & Fleming, L.E. (2019). Spending at least 120 minutes a week in nature is associated with good health and wellbeing. *Scientific Reports* 9 Article number 7730. <https://doi.org/10.1038/s41598-019-44097-3>

Call for relook at safety of plant biocontrol with arthropods

This overview article reassesses some earlier reviews concluding that biocontrol of weeds is effective (Clewley et al. 2012) and that non-target

impacts are rare and minimal (Suckling & Sforza 2014). The authors found these conclusions to be overstated since “most studies were either data deficient or were not designed to effectively assess biocontrol agent impact on fitness components of targeted weeds and on non-targeted plant species”. They have called for “more rigorous experimental design and monitoring for biocontrol projects in order to obtain the quantitative data needed to make informed decisions about the risks and rewards of invasive plant biocontrol.”

References

- Clewley, G.D., Eschen, R., Shaw, R.H. & Wright, D.J. 2012. The effectiveness of classical biological control of invasive plants. *Journal of Applied Ecology* 49: 1287–1295. <https://besjournals.onlinelibrary.wiley.com/doi/pdf/10.1111/j.1365-2664.2012.02209.x>
- Havens, K., Jolls, C.L., Knight, T.M. & Vitt, P. (April 2019). Risks and Rewards: Assessing the effectiveness and safety of classical invasive plant biocontrol by arthropods. *BioScience* 69(4): 247–258. <https://doi.org/10.1093/biosci/biz015>
- Suckling D.M. & Sforza R.F.H. (2014). What Magnitude Are Observed Non-Target Impacts from Weed Biocontrol? *PLoS ONE* 9(1): e84847. <https://doi.org/10.1371/journal.pone.0084847>

Nutritional enhancement by genetic modification – a review

Unfortunately this review of the nutritional enhancement by genetic modification of golden

rice and omega-3 fish oil crops is behind a pay wall. This is a controversial subject and it was hoped that this might be an unbiased assessment of a subject which can polarise communities. It evaluates “the progress, problems and pitfalls associated with the development of these traits. This includes not just the underlying metabolic engineering, but also the requirements to demonstrate efficacy and field performance of the crops and consideration of regulatory, intellectual property and consumer acceptance issues.”

Reference

Napier, J.A., Haslam, R.P., Tsalavouta, M. & Sayanova, O. (2019). The challenges of delivering genetically modified crops with nutritional enhancement traits. *Nature Plants* 5, 563–567.

Flora of Myanmar

A joint project with US National Science Foundation funding between Royal Botanic Garden Edinburgh (RBGE), New York Botanic Garden (NYBG), Wildlife Conservation Society, and the Myanmar Forest Department is producing the first botanical inventory of the highly diverse Northern Forest Complex (NFC) in the Hkakaborazi-Hponganrazi landscape, Myanmar.

Web ref. <https://stories.rbge.org.uk/archives/31297>

The complexities of *Salvia*

A phylogenetic study involving 528 of the estimated 1000 species of the genus *Salvia* underlies a historical biogeography and diversification of the genus. The authors support Drew et al.’s recognition of a broader *Salvia* with subgenera rather than breaking it up into to c.11 genera as proposed by Will & Claßen-Bockhoff (2017).

References

Drew, B.T., Gonzalez-Gallegos, J.G., Xiang, C.L., Kriebel, R., Drummond, C.P., Walker, J.B. & Sytsma, K.J. (2017). *Salvia* united: the greatest good for the greatest number. *Taxon* 66: 133-145. <https://doi.org/10.12705/661.7>

Kriebel, R., B. T. Drew, C. P. Drummond, J. G. Gonzalez-Gallegos, F. Celep, M. M. Mahdjoub, J. P. Rose, et al. (2019). Tracking temporal shifts in area, biomes, and pollinators in the radiation of *Salvia* (sages) across continents: leveraging anchored hybrid enrichment and targeted sequence data. *American Journal of Botany* 106(4): 573–597. <https://doi.org/10.1002/ajb2.1268>

Will, M. & Claßen-Bockhoff, R. (2017). Time to split *Salvia* s.l. (Lamiaceae) – New insights from Old World *Salvia* phylogeny. *Molecular Phylogenetics and Evolution* 109: 33-58. <https://doi.org/10.1016/j.ympev.2016.12.041>

doi.org/10.1016/j.ympev.2016.12.041

The desert raisin – hidden depths

There’s more than meets the eye when it comes to the desert raisin (*Solanum centrale*). Like a lot of Australian *Solanum* species this one is lignotuberos and what you may be looking at is a single plant over a considerable area – up to a quarter of a hectare in one case. The root system is capable of producing new plants

Web ref. <https://theconversation.com/the-tasty-weed-like-desert-raisin-plant-is-as-big-as-a-carpark-115121>

Duodichogamous flowers

Duodichogamy occurs when two periods of male flowering are separated by a single female flowering phase, with all flowers of a given individual in the same phase. According to Luo in 2007, duodichogamy was known only from a few species in four genera in unrelated families. He listed these as *Castanea* (Fagaceae), first documented by Stout, who also coined the term, in 1928, *Acer* and *Dipteronia* (Sapindaceae) reported by de Jong in 1976 and a species of sawgrass, *Cladium jamaicense* (Cyperaceae) reported by Snyder and Richards in 2005. Luo added to the list *Bridelia tomentosa* (Phyllanthaceae) in 2017. Since then, *Toona sinensis* (Meliaceae) (Lee et al., 2018) and most recently the commonly cultivated garden plant and street tree, *Koelreuteria elegans* (Sapindaceae) or golden rain tree (Avalos et al., 2019) have also been added.

References

Avalos, A.A., Lattar E.C., Ferrucci M.S. & Torretta J.P. (2019) Reproductive biology of duodichogamous *Koelreuteria elegans* (Sapindaceae): the rare case of a female–male–female flowering sequence. *Australian Journal of Botany* 67, 149–158. <https://doi.org/10.1071/BT18159>

Lee, H., Kang, H. & Park W-G. (2018). A rare duodichogamous flowering system in monoecious *Toona sinensis* (Meliaceae). *Journal of Ecology and Environment* 2018 42:7 <https://doi.org/10.1186/s41610-018-0067-2>

Luo, S., Zhang, D., & Renner, S. S. (2007). Duodichogamy and androdioecy in the Chinese Phyllanthaceae *Bridelia tomentosa*. *American Journal of Botany*, 94, 260–265. <https://doi.org/10.3732/ajb.94.2.260>

Water discovery in ancient underground valley in northern South Australia

A new water resource has been discovered

in central Australia's Anangu Pitjantjatjara Yankunytjatjara (APY) Lands in north-west South Australia. Existing water sources are located about 30 m below the surface but this water is located in a palaeovalley at about 90 m and is not saline. Flinders University and CSIRO are carrying out further investigations on the origins of the water.

Web ref. <https://www.abc.net.au/news/2019-05-25/ancient-desert-water-found-on-apy-lands/11080990>

Using goats in the battle against wildfires in California

Goats seem to be working as a way of reducing fuel load in California, and all of these reviews are positive, but what pressure does this put on rarer species?

Web references

<https://www.scientificamerican.com/article/earth-talks-no-kidding/?redirect=1>

<https://www.smithsonianmag.com/science-nature/using-goats-to-prevent-wildfires-51327045/>

<https://edition.cnn.com/2019/04/08/americas/goats-and-wildfires-intl/index.html>

Olive killer disease in Europe

In the last issue of the Newsletter the threat to the orange and apple industries was mentioned, the former from a disease known as huanglongbing, a bacterial disease, and the latter from an as yet unidentified cause. Now it is the turn of olives, threatened in southern Europe by *Xylella fastidiosa*, another bacterium, and another pathogen from which there is no cure for infected plants (Web ref. 1). It was first noticed in Italy in 2013 but is now also found in France, Spain and Portugal. The species is not recorded for Australia (Web ref. 2) or New Zealand but is on the list of those which are not wanted since it is capable of infecting many other species besides olives.

Web references

1: <https://www.bbc.com/news/science-environment-48269311>

2: <http://www.planthealthaustralia.com.au/pests/xylella-fastidiosa/>

The world's largest mangrove ecosystem is becoming homogeneous

Studies in 1986, 1994, 1999 and 2014 in the world's largest natural mangrove system, the Sundarbans mangrove forest in the Bay of Bengal, have revealed spatial and temporal changes in biodiversity as well as changes in the

species composition and geographic range of the mangroves. Some of the biodiversity hotspots are located outside the protected areas of the system. The study provides a baseline on which to plan further protection for this important area.

Web ref. <https://www.sciencedirect.com/science/article/pii/S0006320718314186>

Native plant species may be at greater risk from climate change than non-natives

It seems self-evident that native species would be adapted to tighter climate restraints than non-native species and therefore be at a disadvantage with climate change but here's some American research that documents this.

Reference

Zettlemoyer, M.A., Schultheis, E.H. & Lau, J.A. (2019). Phenology in a warming world: differences between native and non-native plant species. *Ecology Letters* 2019; <https://doi.org/10.1111/ele.13290>

The role of living collections in taxonomic research

This topic was George Argent's contribution (Web ref.) to the 10th Flora Malesiana conference held in Edinburgh in 2016. In it he describes how for 300 years living plants have been collected by Edinburgh botanists from around the world, sent back to the garden, grown to maturity and then described. Many of our earliest named Australasian plants were described in this way in the English and European magazines of the day. For a few Australasian botanists this remains possible today but for many this would not be normal practice since they are attached to institutions where there are no associated growing facilities. Even those systematists still in the fortunate position of being attached to herbaria in Botanic Gardens this is often no longer possible even though it was standard practice even thirty years ago.

It was sad to learn that George had passed away recently (Deaths, p. 36).

References

Argent, G. (2016). Waiting for the flowers: the role of living collections in taxonomic research at the Royal Botanic Garden Edinburgh. *Sibbaldia* 16: 155–167

<https://journals.rbge.org.uk/index.php/rbgesib/article/view/253>

What is a pleurogram?

A recent *Botany One* pointed to an article on the

function of the pleurogram. But what is it? Those who work in legumes or on seeds will probably know the answer immediately, but for the rest of you, see the reference below.

Reference

Rodrigues-Junior, A. G., Mello, A. C. M. P., Baskin, C. C., Baskin, J. M., Oliveira, D. M. T., & Garcia, Q. S. (2018). A function for the pleurogram in physically dormant seeds. *Annals of Botany* 123(5), 867–876. <https://doi.org/10.1093/aob/mcy222>

An analysis of emoji – we need more plant examples

Another article pointed to in the weekly email, *The Week in Botany* from *BotanyOne*, examines the existing plant emoji and calls for more. The article comes from Cassidy Moody, Senior Digital Media Specialist at the Missouri Botanic Gardens. An orchid emoji has been designed and submitted for approval (apparently a long process) and others are encouraged to add their input to this digital plant diversity.

Web ref. <https://discoverandshare.org/2019/07/16/the-case-for-more-plant-and-orchid-emoji/>

Mycorrhizal fungi influence global plant biogeography

Many plants have a symbiotic relationship with mycorrhizal fungi and their successful introduction to islands could be affected by this requirement. Delavaux et al. (2019) investigated the influence of the mycorrhizal association on global plant distributions.

While the paper is not freely available the first author has contributed an item (Web ref.) in “Behind the Paper” (see Websites of Interest, p. 34). There you can read about the motivation for this project and of the findings.

References

Delavaux, C.S. & 13 other authors (2019). Mycorrhizal fungi influence global plant biogeography. *Nature Ecology & Evolution* 3: 424–429. <https://doi.org/10.1038/s41559-019-0823-4> (not freely available).

Web ref.: <https://naturecoevocommunity.nature.com/channels/521-behind-the-paper/posts/44558-invisible-microbes-impact-global-plant-distribution-the-mycorrhizal-fungi>

Fungus accumulating gold

Fusarium oxysporum is a devastating pathogen causing root rots, damping-off and wilt diseases in more than 100 plants species, including a wide range of economically important horticultural

crops. A strain of *Fusarium oxysporum* from Boddington, southeast of Perth, has been discovered which accumulates gold from the environment. Studies are being carried out to see whether it can be used in the search for more gold.

Web ref. <https://www.theguardian.com/science/2019/may/24/fungi-that-draws-gold-from-its-surroundings-discovered-in-western-australia>

Fossil fungus means origin of fungi earlier than thought

The discovery of microscopic, fossilized specimens of a fungus, *Ourasphaira giraldae*, on 1,000- to 900-million-year-old shale rocks in Canada has pushed back the origin of fungi by half a billion years.

References

Loron, C.C., François, C., Rainbird, R.H., Turner, E.C., Borensztajn, S. & Javaux, E.J. (22 May 2019). Early fungi from the Proterozoic era in Arctic Canada. *Nature*. <https://doi.org/10.1038/s41586-019-1217-0>

Web ref. <https://theconversation.com/im-an-evolutionary-biologist-heres-why-this-ancient-fungal-fossil-discovery-is-so-revealing-117488>

Dead Sea fossils hint at earlier start for some ancient plants

The collection of fossils features the oldest example yet of a member of the plant family that includes modern conifers. The finds also include the remains of an ancient seed fern called *Dicroidium*, which could help to settle a debate over the species' history.

Reference

Blomenkemper, P., Kerp, H., Hamad, A. A., DiMichele, W. A. & Bomfleur, B. *Science* 362, 1414–1415 (2018). <https://www.nature.com/articles/d41586-018-07826-8>

She sells sea shells by the sea shore

In the early 1800s the subject of this familiar tongue twister, Mary Anning of Lyme Regis of the Jurassic Coast of Britain, and her family were selling souvenir fossils, ammonites and shells to tourists in order to make a living. But it wasn't only seashells and smaller items, Anning also uncovered larger items such as ichthyosaurs and plesiosaurs, at the same time developing techniques for their removal, preparation and presentation. Many of these items were sold to museums and were the foundation of their fossil collections. Her contribution as the

“greatest fossilist the world has known” has been recognised since 1995 and a film about her, called *Ammonite*, is in the making.

Web ref. <https://www.abc.net.au/news/2019-05-06/mary-anning-legendary-female-fossilist-inspired-seashell-rhyme/11055404>

The old university model is becoming obsolete

Universities of the future need to be very different from their past if they are to survive. This essay (Web ref. 1) is one of a series of thought-provoking articles on the future of education, the previous one (Web ref. 2) asking “What’s the point of education?” and a later one on what the VET sector and employers need to do to keep pace with the fourth industrial revolution (Web ref. 3).

Web references

- 1: <http://theconversation.com/the-three-things-universities-must-do-to-survive-disruption-117970>
- 2: <https://theconversation.com/whats-the-point-of-education-its-no-longer-just-about-getting-a-job-117897>
- 3: <https://theconversation.com/jobs-are-changing-and-fast-heres-what-the-vet-sector-and-employers-need-to-do-to-keep-up-118524>

Rethinking impact factors: better ways to judge a journal

Impact factors have been controversial for some time, particularly for those involved in the systematics field where a body of research work can be completely ignored when judging candidates for positions, tenure etc. But they are still widely used in the assessment of an individual and their work (Web ref. 1). It is heartening therefore to see that there are calls, following a workshop in Leiden in 2017, to find better ways of assessing journals, despite the recognised difficulties of the task (Web ref. 2). Those behind the call list the essential elements as “expansion of indicators to cover all functions of scholarly journals, a set of principles to govern their use and the creation of a governing body to maintain these standards and their relevance.”

Interested stakeholders are asked to contact the proponents to join this initiative and it would surely be useful to have someone representing systematics in the mix.

Web references

- 1: <https://www.nature.com/articles/d41586-019-01151-4>
- 2: <https://www.nature.com/articles/d41586-019-01643-3>

Fake paper accepted by four journals

Another problem with journals can be the peer review system which contributes to the impact factor. It does science no favour when the system is exposed by a fake paper, submitted to nine journals, accepted by four of them and published by three of them; the fourth journal accepted the paper but would not publish without payment of a fee.

Web ref. <https://www.sciencealert.com/a-neuroscientist-just-tricked-4-journals-into-accepting-a-fake-paper-on-midi-chlorians>

Preprints – for and against and the status of names published in them

Although this article (Web ref. 1) was published in 2017 it is still relevant as it addresses the advantages and disadvantages of preprints in biology, even though taxonomy and its unique requirements are not really covered. Early access articles in journals such as *Australian Systematic Botany* are not preprints since these have undergone all of the normal peer-review and editing processes. Martine et al.’s (2018) paper on the phylogeny of the Australian *Solanum dioicum* group is an example of a preprint which has not been peer-reviewed, but it does not contain any new taxa. However another paper on this site, *bioRxiv* which specialises in preprints (Web ref. 2) does. Wang et al. (2019), describe a new Chinese genus with two of the three species new to science. Question: are the names in this paper considered to be published?

Anna Monro has kindly supplied the following answer to the question.

The names are not effectively published; to be effectively published the paper needs to be in an online publication with an International Standard Serial Number (ISSN) or an International Standard Book Number (ISBN) (Art. 29.1).

Furthermore there cannot be any

evidence within or associated with the publication that its content is merely preliminary and was, or is to be, replaced by content that the publisher considers final... (Art. 30.2).

In this case the publisher *bioRxiv* has a statement at the top of each page indicating that this is a preprint meaning that it has

not been finalized by authors, might contain errors, and report information that

has not yet been accepted or endorsed in any way by the scientific or medical community.

References

- Martine, C.T., Jordon-Thaden, I.E., McDonnell, A.J., Cantley, J.T., Hayes, D.S., Roche, M.D., Frawley, E.S., Gilman, I.S. & Tank, D.C. (2018). Phylogeny of the Australian *Solanum dioicum* group using seven nuclear genes: testing Symon's fruit and seed dispersal hypotheses. *bioRxiv*. <https://doi.org/10.1101/462945>
- Wang, Z-H., Kilian, N. Chen, Y-P. & Peng, H. (2019). *Sinoseris* (Crepidinae, Cichorieae, Asteraceae), a new genus endemic to China of three species, two of them new to science. *bioRxiv* <https://doi.org/10.1101/680843>
- Web ref. 1: <https://www.sciencemag.org/news/2017/09/are-preprints-future-biology-survival-guide-scientists>
- Web ref. 2: <https://www.biorxiv.org/>

Women pioneers in freshwater ecology

The pioneering work of four women in freshwater ecology is covered in a review by Downes & Lancaster (2019). The women are placed in an historical context and the barriers to their progress discussed. This is followed by an account of the modern barriers faced by women in freshwater ecology, although the facts and figures come from across the sciences and would apply to other natural science fields as well. They further argue that the use of citation metrics discriminates against women.

Incidentally it was fascinating to read of some of the work of these authors in showing that the simple addition of garden stakes to degraded Victorian rivers is enough to cause an accumulation of debris which will eventually provide a new home for aquatic animals (Web ref.).

References

- Downes, B.J. & Lancaster, J. (2019). Celebrating women conducting research in freshwater ecology... and how the citation game is damaging them. *Marine and Freshwater Research*. <https://doi.org/10.1071/MF18436>
- Web ref.: <https://pursuit.unimelb.edu.au/articles/re-diversifying-our-waterways-a-garden-stake-at-a-time>

JSTOR Text Analyzer

Try this for yourself. Text Analyzer lets you upload files you've read or are working on, then uses the data in this file to provide additional reading recommendations. I did try loading several

articles, most of which did not return anything of relevance. However an item in preparation for the next newsletter on rubber producing plants did point to an article on a Desert Rubber Plant, albeit a different species from that being investigated. So it may be worth a try.

Web ref. <https://daily.jstor.org/how-to-teach-with-jstor-text-analyzer>

Dogs with increasing roles in conservation

Dogs are increasingly being employed outside their more familiar roles of the past and it is not uncommon to read of them detecting pests, weeds (Web ref. 1) or even protected species, such as endangered plants (Web ref. 2), insects (Web ref. 3) or birds, such as the kiwi (Web ref. 4). New Zealand has a longer history of involvement with dogs and conservation than Australia having used dogs for many years in finding kiwis, but it was impressive to read that their Department of Conservation (DOC) not only trains dogs to detect kiwis but also runs avian awareness and avoidance training programme for dogs and their owners (Web ref. 5). The University of the Sunshine Coast also has information on their pages (Web ref. 6) about the use of detection dogs in conservation.

Web references

- 1: https://theaustralionalps.files.wordpress.com/2018/01/0129-hawkweed_cherry_etal_2016.pdf
- 2: www.nespthreatenedspecies.edu.au/projects/using-detection-dog-techniques-to-serve-queensland-s-endangered-montane-species
- 3: <https://theconversation.com/sit-see-fly-scientists-train-dogs-to-sniff-out-endangered-insects-116517>
- 4: <https://www.doc.govt.nz/our-work/conservation-dog-programme/>
- 5: <https://www.kiwisforkiwi.org/what-we-do/how-were-saving-kiwi/avoidance-training-for-dogs/>
- 6: <https://www.usc.edu.au/research-and-innovation/animal-and-marine-ecology/detection-dogs-for-conservation/more-about-detection-dogs>

Running an inclusive scientific conference

A grassroots group called 500 Women Scientists whose aim is to build an inclusive scientific community (Web ref.) has produced a booklet *Inclusive Scientific Meetings; Where to start*. It addresses the problem of those who are isolated for various reasons when they attend conferences or workshops. The booklet provides interesting reading and suggestions for both organisers and attendees.

This booklet was mentioned in the *BotanyOne* email (*The Week in Botany* 104) and in *The Week in Botany* 106 they drew attention to an analysis of conference codes of conduct by Foxx et al. (2019) for American and Canadian biology conferences. Not surprisingly only a small number of conferences even had a code of conduct. Recommendations are apparently made to improve equity but the paper is not freely available.

References

Foxx, A.J. et al. (2019). Evaluating the prevalence and quality of conference codes of conduct. *PNAS* <https://doi.org/10.1073/pnas.1819409116>

Web ref.: <https://500womenscientists.org/>

The State of the World's Biodiversity for Food and Agriculture

Biodiversity is essential for food and agriculture but biodiversity is declining. That's the main message from this United Nations FAO report, but what is causing it to decline and how is this being addressed? You can download the whole FAO report from the website (Web ref. 1), but the beautifully presented summary with associated graphics of the findings should be sufficient to inform you, or you can read *The Guardian* summary (Web ref. 2). This is a global analysis based on information provided by 91 countries and 27 international organizations, analysis of global literature and datasets, and contributions from over 175 authors and reviewers.

Web references

1: www.fao.org/state-of-biodiversity-for-food-agriculture/en/

2: <https://www.theguardian.com/global-development/2019/feb/21/worlds-food-supply-under-severe-threat-from-loss-of-biodiversity>

Rediscovered plant illustrations by artist/botanist from 1800s Cuba

Treat yourself and have a look at this 'lost' 3 volume manuscript of exquisite scientific illustrations of Cuban plants rediscovered after 190 years (Web ref. 1, 2). *Specimens of the Plants & Fruits of the Island of Cuba* by Mrs. A.K. Wollstonecraft has 121 plates and 220 pages of text concerning the plants illustrated. After the death of her husband Charles in 1817, Nancy Anne Kingsbury Wollstonecraft moved to the Cuban province of Matanzas and began studying the island's plant life. Her work was apparently unfinished at the time of her death in 1828 in Cuba at age 46. Though the work was known and cited, it had not been seen, and a copy has only recently been found in Cornell University where it has now been digitised (Web ref. 3). A comprehensive account of the search and a background to the artist/botanist is available as a PowerPoint by the successful discoverer of the work, Emilio Cueto, at Web ref. 4.

Web references

1: <https://www.nationalgeographic.com/science/2019/04/lost-book-cuban-botany-found-illustrations-women-in-stem/>

2: <https://www.atlasobscura.com/articles/cuba-botanical-illustration>

3: <https://catalog.hathitrust.org/Record/102498751>

4: <https://ufdcimages.uflib.ufl.edu/AA/00/06/46/03/00002/>

Websites of interest

Threatened Species Recovery Hub

The Threatened Species Recovery Hub, one of six research hubs in the National Environmental Science Programme, brings together leading ecological experts to carry out research that improves the management of Australia's threatened species. Their research is divided into seven themes all of which are good for browsing to find out what is happening in this area.

You can read about the people involved and some of their research in their quarterly magazine *Science for Saving Species*, begun in 2016 and freely downloadable, although many of the stories are repeated in their News section.

Web ref. www.nespthreatenedspecies.edu.au/

Helping identify cultivated plants

Further to the identification keys and illustrations of European invasive plants mentioned amongst the new *Lucid* releases announced in the News (p. 25), Chris Brodie has recommended this Wespelaar Arboretum site for help in the identification of selected cultivated woody plants in Western Europe (Web ref.). The traditional keys, downloadable as pdf's, are to vegetative material, but perhaps of more aid are the illustrations of the taxa. Each taxon in a genus has a number of thumbnail pictures of various aspects of the leaves and branches allowing quick comparison with others, with further magnificent detail provided by the full-size scans of fresh material. For just

a few instances of genera that might well be of interest here see for example the six species of *Lavandula*, two subspecies of *Olea europea*, 44 species of *Salix* and of *Cotoneaster*, 120 species of *Pinus* and 136 species of *Rhododendron*.

Web ref. https://www.arboretumwespelaar.be/EN/Identification_keys_and_illustrations/

Behind the paper backgrounds Nature Research

Authors are being offered the chance by *Nature Research* to share the real story behind their research papers, from conception to publication, the highs and the lows in an adjunct series *Behind the paper*. While there are other themes such as sustainability, here is the page for the ecology and evolution community (Web ref.). Many of these appear to be an attempt to provide a popular account of an original paper, as might appear in *Science Daily* or *New Scientist*, the difference being that here it is the author of the paper who is providing the translation, not a third party interpreting it from the scientific paper.

For instance a paper titled:

- “Temperate airborne grass pollen defined by spatio-temporal shifts in community composition” transforms into “Using DNA to identify the grass pollen that gets up your nose”;
- “The origins and adaptation of European potatoes reconstructed from historical genomes” becomes “Most potato tubers come from Eurasian stems, but their “roots” are in South America”, and
- “Minimum founding populations for the first peopling of Sahul” becomes “Modelling reveals first Australians arrived in large groups using complex technologies”.

Web ref. <https://natureecoevocommunity.nature.com/>

The Society of Herbarium Curators

This group was recommended previously in *ASBS Newsletter* 177 when attention was brought to their membership drive. There is lots of information on their site (Web ref. 1) and they do produce a newsletter called *Vasculum* as well but this time it's *Herbaria Listserv* to which attention is being drawn. Similar to the *Taxacom listserv*, which by the way is still in operation and accessible through their archives (Web ref. 2), *Herbaria Listserv* (Web ref. 3) lists jobs and opportunities, coming meetings and workshops

and of course curation of herbarium specimens and matters involving their optimal storage.

Questions have arisen on the best way of preserving the needles of conifers given their propensity to drop off with time, how to deal with missing locality information in a database and one on the use of packing peanuts to fill empty spaces in boxes for loan transport. Packing peanuts, also known as polycell peanuts, are sometimes used nowadays rather than polystyrene or wadded up newspaper. They are a starch-based material and 100% biodegradable, but unfortunately herbarium beetle are partial to them.

Another question asked about the requirements for sending herbarium specimens to Japan and clearly if you just put specimens in the post without finding out what is required by regulation by the destination herbarium it may be that the specimens are destroyed (worst case scenario) or returned to you.

The Society is also sponsoring, together with iDigBio, a special symposium (Web ref. 4) on August 1st entitled “Early-career innovators in herbarium-enabled research”. The symposium, immediately following the Botany2019 meeting in Tucson, Arizona, will feature the work of current and recent NSF Postdoctoral Fellows and their use of herbarium collections in their research projects with a view to herbarium relevance in the future.

Web references

- 1: www.herbariumcurators.org
- 2: <http://mailman.nhm.ku.edu/pipermail/taxacom/>
- 3: <http://www.herbariumcurators.org/herbaria-listserv>
- 4: www.herbariumcurators.org/archives/3533

Papers and Proceedings of the Royal Society of Tasmania

Don't overlook this journal. Papers are freely and openly available on their website (Web ref.) after a one-year embargo. Examples of some which might be of interest to members include Macphail & Woodward's “Non-seasonal plant foods in the palawa (Tasmanian Aborigine) diet”, Bretag's paper on botanist Hans Hermann Behr, Dowe's on the 1878 botanical and zoological collections of Odoardo Beccari and Enrico D'Albertis in Australia and New Zealand, and Hansen's account of Joseph Dalton Hooker and his colonial correspondents.

Web ref. <https://rst.org.au/papers-and-proceedings/published-papers/>

Deaths

Arthur Weston (1932–2019)

It is with sadness that we learned of the recent passing of a former colleague and long-time friend of the Western Australian Herbarium, Dr Arthur Stewart Weston (1932–2019). Arthur was a botanist, ecologist and an indefatigable botanical explorer of remote places across the globe.

Arthur worked at the herbarium as a plant ecologist between 1971 and 1974, during which time he studied the vegetation of some of the most botanically diverse parts of the state, including the Fitzgerald River, Stirling Range, Kalbarri and Cape Le Grand National Parks. Among the Western Australian species discovered by Arthur are two now named after him, *Utricularia westonii* P.Taylor and the threatened *Acacia awestoniana* R.S.Cowan & Maslin, from Cape Le Grand and the Stirling Range respectively.

During botanical studies of the mountains of Costa Rica at an earlier stage of his career, Arthur made numerous discoveries, maybe the most significant of which was of a new group of daisies that were subsequently described as the genus *Westoniella* in his honour (see below). He was also an important collector of Western Australian plants with more than 2500 of his specimens lodged at the Western Australian Herbarium, many of these from remote and difficult-to-access localities.

Arthur will be remembered very fondly by the botanical community of Western Australia as a charismatic maverick, someone who was unfailingly enthusiastic, warm and encouraging of others. We will miss him.

Web ref. <https://www.facebook.com/WesternAustralianHerbarium/posts/2386900081353849>

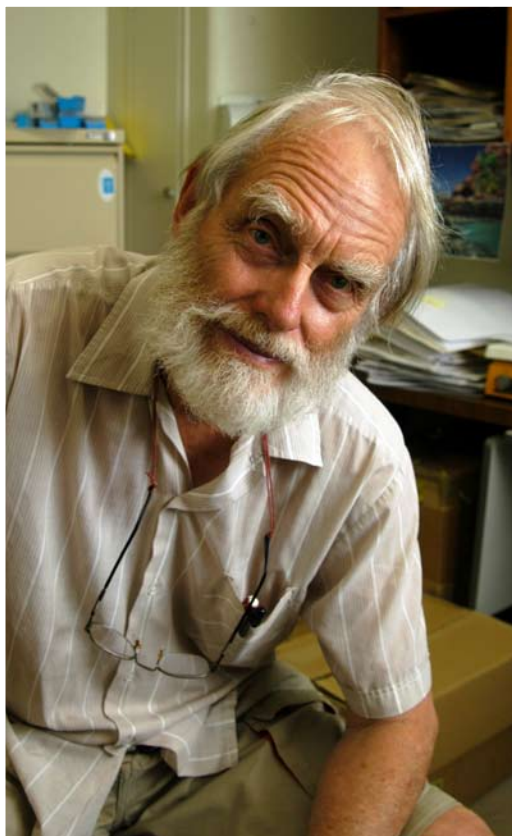
Western Australian Herbarium .
Posted on WA Herbarium Facebook Page
on July 17th 2019; reproduced with permission.

The significance of Arthur Weston's collections in Costa Rica at the time of publication of

Westoniella was expressed in the opening paragraph describing the new genus (Cuatrecasas 1977).

During several years exploration of the high mountains of Costa Rica for ecological research, many less accessible areas never visited before by botanists, have been botanically scrutinized by the intrepid Dr. Arthur S. Weston. He gathered several thousand collections from the Talamanca Cordillera, mostly representatives of the páramos. A part of the Compositae of his collections was turned over to me for identification. I found in it many novelties, which are not only significant for the

flora of the Costa Rican páramos, but also because of the various undescribed taxa which represent additions to the already known series of Costa Rican endemics. The most important novelty is a new genus in the Astereae described here as *Westoniella*, represented by five distinct species which were all collected by Weston in the páramos or subpáramos of the Chirripó massif and



Arthur Weston at the WA Herbarium

Ph. Bruce Maslin

Buenavista massif. Of these five species, one had been collected before (by Pittier) and published first by Klatt as a *Senecio*, and transferred later by Greenman, to *Erigeron*. The other four species are all first records.

On further investigation another new composite named in his honour, *Stevia westonii* R.M.King & H.Robinson, was found in this same issue of the journal. Further new composite species based on his collections, *Lagenophora* (as *Lagenifera*) *westonii* Cuatrec. and *Talamancalia westonii* H.Rob. & Cuatrec. and named for him were described in 1982 and 1994 respectively. His collections of *Lagenifera sakirana* Cuatrec. and *Rhynchospora oreoboloidea* Gomez-Laur. (Cyperaceae) are the types for these names. The area where the collections were made by Weston

is recognised as one of Central America's "most intact habitats" (Web ref. 1) with a very high degree of endemism and so it seems likely that his collections will continue to be extremely valuable for future documentation.

References

Cuatrecasas, J. (1977). *Westoniella*, a new genus of the Astereae from the Costa Rican Paramos. *Phytologia* 35: 471–487.

Web ref.: <https://www.worldwildlife.org/ecoregions/nt0167>

Information accumulated from IPNI and from searches of JSTOR and USJ
Robyn Barker

Harold Trevor Clifford (1927–2019)

Sadly, Trevor Clifford, long-time Professor of Botany at the University of Queensland, and more latterly an Honorary Research Associate of the Queensland Herbarium and an Honorary Fellow (Geoscience) of the Queensland Museum, died in May. Trevor was President of ASBS in 1981–83, at one time suggesting that it become the Botanical Society of Australia (*ASBS Newsletter* 31: 3) and he gave the Burbidge lecture in Adelaide in 1980. John Conran and Andrew Rozefelds have undertaken to write an account of Trevor's life for

a coming issue of the *Newsletter*. In the meantime Trevor's own account of his life, recorded in Oral History Interviews in November 2014 and March 2015 and a tribute from the Royal Society of Queensland can be seen at the web sites listed.

Web references

<http://trevorclifford.blogspot.com/>

<http://www.royalsocietyqld.org/2019/06/vale-professor-trevor-clifford-a-scholar-and-a-gentleman/>

George Argent (1941–2019)

George Argent's name will not be known to all Australasian botanists but chances are that if you have worked in the tropics, been involved with *Flora Malesiana* or *Rhododendron* then his name will be familiar. George's first job after obtaining his Ph.D. (on mosses) was as a Research Fellow for the New Guinea Biological Foundation from 1969 to 1973, based in Lae. The New Guinea Biological Foundation, begun in the 1960s, was a forerunner to today's Australia and Pacific Science Foundation (Web ref. 1). George's job was to collect and study the genetic diversity of bananas in Papua New Guinea which involved a lot of travel and then the propagation and study of these collections at the University of Technology, Lae. Following his appointment as Tropical Botanist at the Royal Botanic Gardens, Edinburgh, in 1974, he took up the study of *Rhododendron*, the vireyas (subg. *Vireya*) of Southeast Asia in

particular, an interest he maintained beyond his retirement from RBG Edinburgh in 2004. A more detailed account of his life can be found in a number of newspapers with links below.

Web references

1: www.apscience.org.au/index.html

2: <https://www.scotsman.com/news/people/obituary-george-argent-rhododendron-expert-nicknamed-edinburgh-s-indiana-jones-of-botany-1-4930462>

3: <https://www.heraldscotland.com/opinion/17675754.obituary-george-argent-rhododendron-expert-at-royal-botanic-gardens-of-edinburgh/>

4: <https://www.thetimes.co.uk/article/george-argent-obituary-0brjhgjbc> (not freely available)

5: <https://www.telegraph.co.uk/obituaries/2019/05/27/george-argent-botanist-veteran-hair-raising-expeditions-tropics/> (not freely available)

Peter Hans Hovenkamp (1953–2019)

After attending the recent Flora Malesiana meeting in Brunei from 30 June to 5 July and presenting a paper on Malesian *Diplazium* (Athyriaceae), Peter Hovenkamp of the Leiden Herbarium was part of a tour group visiting a cave in Gunung Mulu National Park when a flash flood hit unexpectedly, killing both him and the

guide. See these web references and from our President (p. 3).

Web references

<https://science.naturalis.nl/en/people/scientists/peter-hovenkamp/>

<https://www.universiteitleiden.nl/en/news/2019/07/peter-hovenkamp-65-died-in-malaysia>

Margaret Stones

Phillip Cribb's tribute to Margaret Stones in *Curtis's Botanical Magazine*, the journal for which she was principal contributing artist from 1958 to 1981, appear in a recent issue.

Reference

Cribb, P. (2019). Margaret Stones 1920–2018. *Curtis's Botanical Magazine* 36 (1): 2–6. <https://onlinelibrary.wiley.com/doi/epdf/10.1111/curt.12266>

H.B.S. Womersley (1922–2011)

Sara Maroske has recently published an account of the life of phycologist, Bryan Womersley, in the *Historical Records of Australian Science*.

1922–2011. *Historical Records of Australian Science* 30(2) 178–190. <https://doi.org/10.1071/HR19003>

Reference

Maroske, S. (2019). Hugh Bryan Spencer Womersley

Events

Flora of the Liverworts and Hornworts of New Zealand, volumes 2 and 3, launched in Lincoln

Volumes 2 and 3 of *A Flora of the Liverworts and Hornworts of New Zealand* by John Engel and David Glenny were launched in Lincoln on 19 June 2019.

About 50 people attended the celebration and heard speeches from Richard Gordon (CEO Manaaki Whenua Landcare Research), Geoff Ridley (Leader MWLR Biota Portfolio), Patrick Brownsey (Te Papa Tongarewa), Ilse Breitwieser (former Biota Portfolio Leader) and David Glenny. Speeches were followed by light food including a liverwort-themed cake.

Together with volume 1 of the *Flora* (published in 2008) the new volumes can be purchased directly

from Missouri Botanical Gardens Press at these links.

Volume 1: <https://www.mbgpress.org/product-p/msb-110.htm>

Volume 2: <https://www.mbgpress.org/product-p/9781935641162.htm>

Volume 3: <https://www.mbgpress.org/product-p/9781935641179.htm>

See New Books (p. 44) for families covered in each volume.

Two of the speeches presented are provided for Newsletter readers.

Part of Pat Brownsey's speech

Today we celebrate the release of two more volumes, with the final one still to come, treating in total around 600 species of liverworts. ...

Why is this important? We've published a vascular plant Flora on average every 40 years since Joseph Hooker completed New Zealand's first comprehensive Flora in 1867. Hooker

documented 935 species of indigenous seed plants, a number that has grown by roughly 250% to 2300 species. But the numbers for cryptogams have grown even more. Hooker's 200 liverworts have expanded to 600 – a 3-fold increase, with even greater increases in the number of genera. For mosses, 90 years transpired before Sainsbury

published his *Handbook of the New Zealand mosses* in 1955, and a further 65 years before Allan Fife and Jessica Beever started publishing moss treatments in the eFlora.

But for liverworts, a new Flora has had to wait over 150 years – the longest period between Floras for any group of New Zealand plants. They are perhaps the most challenging of all land plant groups to master, and few people have had the skill and energy to do so. A huge amount of overseas work has been done since Hooker's Flora, much of it in Europe and North America. The literature is extensive, widely scattered, often in foreign languages and, until recently, sometimes in hard-to-access journals. The collections, too, are widely dispersed, with most early collectors sending their material to overseas specialists, ending up in herbaria on the other side of the world.

For professional and amateur botanists alike, this has been something of a nightmare and, not surprisingly, liverworts have either been largely ignored or treated very superficially. Some years ago I vividly recall hearing an entomologist telling an audience that his group of insects "lived in the moss and other rubbish" that grew on tree branches. Perhaps if he had had access to the Liverwort Flora his observations might have been a little better informed, and he might have connected the occurrence of his taxa with the different habitats offered by mosses and liverworts. Even in the botanical community,

however, concentration on vascular plants has sometimes blinded us to the importance of bryophytes, and the fact that the relative proportions of liverworts and mosses can be an indicator of forest health.

But, for now, I want to commend John Engel and David Glenny very highly for their remarkable feat of scholarship. These Floras have all the information that one expects – names of taxa at all levels based on current concepts of liverwort taxonomy, identification of type specimens, comprehensive descriptions of individual taxa, extensive notes on distribution and ecology, wonderfully informative illustrations, excellent identification keys, and, above all, notes on how species can be distinguished from each other, and where further work is needed. In the first volume there are almost 60 pages of introduction with detailed insights on the biogeography, ecology and evolutionary origins of New Zealand liverworts, and a very extensive bibliography.

One of the great strengths of this Flora has been the collaboration between John Engel, who, as Curator of Bryophytes at the Field Museum, has spent his career studying the liverworts of austral regions, and David Glenny who has an extensive field knowledge of New Zealand liverworts. John has been the main author of the Flora, and without his expertise we might have been waiting a few more decades for its completion. But I know that in reviewing John's drafts, David's critical eye and local knowledge have greatly improved

the final output, and avoided some of the pitfalls that might have befallen a sole overseas author.

I want to stress just how limited our resources are when it comes to cryptogamic systematics, and to liverwort taxonomy



Fig. 1. David Glenny at the launch of the *Flora of the Liverworts and Hornworts of NZ* volumes



Fig. 2. David cutting the liverwort-adorned cake. From left, waiting expectantly are Ines Schoenberger, Peter Buchanan, Ilse Breitwieser, Aaron Wilton (rear), Mary Korver, Kerry Ford, Kate Boardman (rear), Paula Greer (rear), Geoff Ridley, and Pete Millard.

in particular. There are probably no more than a handful of botanists in New Zealand who could have made a significant contribution to this Flora, and several of them are unpaid, working from home. New Zealand has a long tradition of kitchen-bench bryologists – people such as Amy Hodgson, K.W. Allison, John Child, G.O.K. Sainsbury, Rodney Lewington and Peter Beveridge, to name just a few. Sadly, although three excellent liverwort specialists, Elizabeth Brown, Matt von Konrat and Matt Renner, were trained at Auckland University by John Braggins, they all had to go offshore to find employment in their chosen field. And hugely valuable though the unpaid contributions have been, especially when encouraged by experts such as David Glenny, Allan Fife, and Jessica Beever, New Zealand badly needs a new generation of professional bryologists to carry on their work. Publication of the Flora is not the last word on liverworts. Expertise is needed to interpret the intricacies of the Flora to other botanists, and to delve into those unresolved questions.

A Flora is the first step in understanding the plants of an area. It documents what species are present, it supplies means to identify those plants,

and, above all, it provides a currently accepted name, which is key to understanding everything else known about that species. It unlocks a treasure trove of information enabling ecologists, conservation and biosecurity managers, and many others, to do their jobs without having to spend time doing basic taxonomy. Very importantly, it makes the flora accessible to special interest groups, and to those with a passion for native plants. It provides base line information for citizen science groups, such as iNaturalist. Often, members of those groups become our eyes and ears in the field, making observations in a far wider area than we could do alone.

But all of this can only be achieved by an enduring long-term programme of Flora writing, and by a well-informed network of enthusiasts in the field supported by relevant specialists in collection-holding agencies. My congratulations to John and David, and to Manaaki Whenua, for bringing this Liverwort Flora a big step closer to completion. But I sincerely hope that there will be a similar long-term commitment to providing taxonomic expertise in bryology, and other plant disciplines, at the Allan Herbarium.

From Ilse Breitwieser's speech

I am Ilse Breitwieser, plant systematist here at the Allan Herbarium. During my time as programme leader for plant systematics and OBI leader, then portfolio leader of Characterising Land Biota, I was also responsible for our Flora projects. Since I was so closely connected with the Liverwort Flora project and facilitated it over so many years, David invited me to launch the *Flora of the Liverworts and Hornworts of New Zealand, Volume 2 and Volume 3*. Thank you, David, this invitation means a lot to me.

We launched Volume 1 in 2008, we are launching Volume 2 and Volume 3 right now, and there is one more volume to come. When completed, this will be the first Flora for these groups of plants since Joseph Hooker's 1864–1867 *Handbook of the New Zealand flora*.

New Zealand has been waiting for a Flora of the Liverworts and Hornworts for a long time. The Botany Division Triennial Report 1982–84; p 33 states

During the past two years discussions have been held with Prof RM Schuster (University of Massachusetts, Amherst) and Dr JJ Engel (Field Museum, Chicago) concerning the possibility of their preparing of a floristic treatment of the hepatics and hornworts of New Zealand within the *Flora of New Zealand* series. Prof Schuster and Dr Engel have extensive experience with Southern Hemisphere temperate hepatics, including those of New Zealand. Current plans call for an illustrated hepatic-hornwort flora to be completed in 1991.

However, although Schuster and Engel wanted to write the Flora, Schuster seemed to have realised the impossibility of him seeing this Flora through to completion and produced therefore a different work on biogeography and evolution of the New Zealand liverworts. So, the main gap of a Flora that would make the group accessible to biologists in New Zealand and around the world remained. In 1999 at the International Botanical Congress in St Louis I met John Engel, and got the feeling that John was considering continuing work on the Flora. I told him about David Glenny and his expertise, and John was interested. He contacted David and invited him to collaborate on the Flora.

And thanks to this collaboration we have now the first three of four volumes of the Flora in our hands. John Engel, the senior author is a world authority on liverworts in the Southern Hemisphere. He has devoted a significant proportion of his professional life and his retirement to writing this Flora. John Engel was funded by the Field Museum and since his retirement he still works full time just on this project.

David started to get interested in the liverworts already in the 1980s. He says he was encouraged in this interest by John Bartlett on one of his first Bot Soc field trips. Then, in 1992, after his return from his VSA time on the Solomon Islands, he decided to have a serious go at the liverworts. He thought that the liverworts are the plant group where he could contribute most. There was only very scattered literature, so in his free time, he started assembling his own handbook. Then he worked on a liverwort checklist which he published in 1998, also in his free time. The Lucid interactive key system was made available in the late 1990s, so David thought it would be most useful to produce an interactive key to liverwort genera. This key to genera was funded partly by CSIRO, therefore David didn't make only a key to New Zealand genera but developed it into a key to Australasian Liverwort and Hornwort genera. This key was published in 2004. Based on enduser requests, we considered bringing a handbook on liverworts into the Biosystematics of New Zealand Plants programme. However, these plans were superseded by John Engel's decision to write the Flora and his invitation to David to collaborate on it.

These Flora volumes are a great achievement. The data in a Flora are gained mostly from herbarium material, but for this Flora David did also numerous fresh collections and preparations for microscopic observations. David has collected and studied more than 14 000 specimens!

I remember, when David considered John Engel's offer to collaborate on the Flora, David was a bit worried of turning his hobby into an almost fulltime profession— because until then all his liverwort work was done in his free time. He was worried initially that it would take some pleasure out of it, but the transition happened smoothly. David says he ended up doing what he likes doing; and, looking through the microscope examining these liverworts and hornworts is still

one of the most interesting and enjoyable things to do for David.

... And now, finally, thanks to John Engel and David Glenny, we also have three out of four

volumes of a *Flora of the Liverworts and Hornworts of New Zealand*. Congratulations – John and David, you have produced two splendid Flora volumes!

Book reviews

Another book on orchids

Review by: Tim Entwisle, Royal Botanic Gardens Victoria



Bush Beauties: The Wild Orchids of Victoria, Australia

By Gary Backhouse, 2019

Self-published. Paper-back, 443 pp., \$60 plus postage and packaging, via bushorchids.weebly.com

¹Well, yes it is, *another book on orchids*. Another book on Victorian orchids at that. Author Gary Backhouse confesses as much in the very first line of his introduction. But from there, he takes no prisoners. This is a book for those who find orchids beautiful, beguiling and bewitching. It's my kind of book.

Let's start with the statistics cited, as close as Backhouse gets to saying this is a pretty bloody good book about a pretty bloody amazing slice of our Australian flora. There are 410 species photographed and described here, including 344

with proper scientific names (well, that's on page 1; by page 2 there are 345, which just goes to show how quickly things change in the orchid taxonomy world). Backhouse says 42% of these are endemic in Victoria, or 'nearly so' (that is they stray across a State border, but only a little).

Of Australia's 1900 or so orchid species, 22% are found in Victoria, a State including only 3% of the national land mass. This makes the geographical focus of the book 'one of the richest areas in the world for its diversity of temperate terrestrial orchids'. The qualifier here means my colleagues and friends in south-western Western Australia won't be too offended.

This is a busy book. Backhouse has crammed in as much as he can, with text running within millimetres of the page margins and introductory material minimal. That said the whole book is clearly and cleanly laid out, with big bold maps and three pictures of each species bordering the outer edge of each species page.

¹ This review first appeared in Tim's blog, *talkingplants.blogspot.com.au*, 23 July 2019

The classification largely follows *VicFlora* (Web ref. 1) but with the bluish spider orchids (*Cyanicula* and *Pheladenia*) kept within *Caladenia*, meaning that (based on the latest phylogeny) *Glossodia* has to return to this genus. We also have the little duck orchid (*Paracaleana*) kept apart from the large duck orchid (*Caleana*). I would have liked to see all synonyms in the index, but I'm sure Backhouse felt this was a little extravagant.

There are no authorities provided for the scientific names, which I like, and have often advocated for field guides. That said, now that a book is following my advice, I get curious about who described a species and when – wondering to myself whether it was a new or old name, good or bad... Anyway, sacrifices must be made, and authorities are ugly and cluttering.

While keeping things tight and constrained, there are a few bonus pages adding oxygen to the book. One has a selection of 'hyochromatic' *Caladenia* – pale, albino-like variants of the spider orchids – another a few hybrids, and at the end we get a brief summary of species assumed extinct or nearly so.

An e-version (currently on DVD) of this book – called *Bush Gems* (Web ref. 2) – has more photographs, which is both good and bad. Good because you get to see the variety within a species, reinforcing the point that all plant species exhibit variation, even in their flowers, and we shouldn't hive off as a species every plant with a wonky or odd-coloured petal. On the other hand, showing more variants tends to encourage the desire to split the species into the local variants illustrated... I'm happy with the decision in *Bush Beauties* to include three images for each species: at least you get sense of them not being Platonic ideals.

As mentioned above, Backhouse has chosen to

include variants yet to be proposed and published as new species, giving them informal designations and full descriptions. I have mixed feelings about this too. Taxonomists tend to discourage this generally in case species are inadvertently or deliberately catapulted into the scientific literature and accepted as 'good' species even when, as Backhouse does note, more study is needed to confirm their status. Conversely, providing this information encourages further research and field survey.

The way the book is organised will make sense to orchid enthusiasts. Genera are (mostly, with a few esoteric but practical exceptions) ordered alphabetically but within genera the species are grouped together on morphological similarity. Which does help with identification. You flip through for a for a photograph of something looking like what you have in front of you, then browse images and maps on nearby pages, settling in for a bit of read when you get close to your target. It works well.

I was excited in 1995 when Gary Backhouse and Jeff Jeanes published their book *The Orchids of Victoria*, an elegant production by The Miegunyah Press (Melbourne University Press) in 1995. This was a first for Victoria and set a high standard for orchid books around the country. Back then, there were 270 species, with hints of more to come, and a single portrait of each treasure.

Bush Beauties is a different kind of production, pragmatic and practical, entirely fitting for an age where information is largely electronic. It is another, very good, book on orchids. And I like it.

Web references

1: <https://vicflora.rbg.vic.gov.au/>

2: <https://bushorchids.weebly.com/bush-gems-ebook.html>

Tree titbits and treats from Hong Kong and southern China

Review by: Tim Entwisle, Royal Botanic Gardens Victoria

Portraits of Trees of Hong Kong and Southern China

Illustrations by Sally Grace Bunker, text by Richard M.K. Saunders and Chun-Chiu Pang

Published by Earnshaw Books Ltd, Hong Kong. 290 pp.

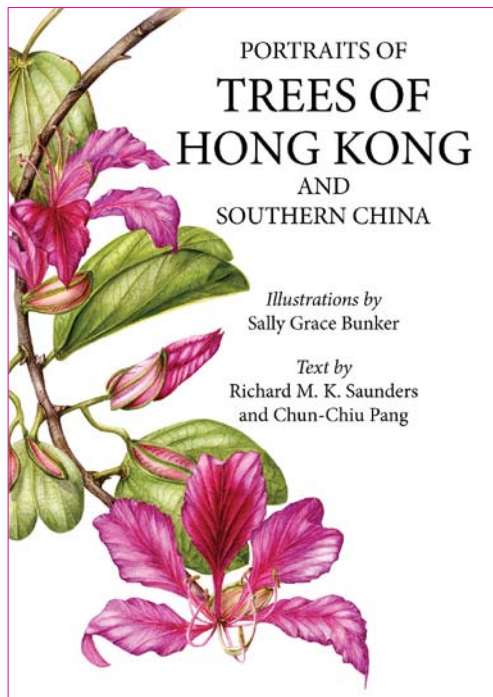
This is an enticing book. At first glance I was entranced by the 104 watercolour paintings, then intrigued to find out all kinds of fun facts about trees I've encountered in China. The vast majority are Hong Kong natives or from nearby China, but there is a smattering of planted exotics from Australia and elsewhere.

For the botanically curious there is plenty to discover (or be reminded of) in this book: maples with entire leaves (*Acer sino-oblongum*); an 'aquatic' strawberry tree (*Adina pilulifera*); the beautifully orange-barked camellia, with its less attractive species name (*Camellia crapnelliana*); an aluminium-eating plant (*Daphniphyllum calycinum*); a flower (of *Osmanthus matsumuranus*) whose perfume not only attracts pollinators but repels butterflies, stopping them from leaving caterpillar offspring to damage the leaves; and a tree (*Pavetta hongkongensis*) with nitrogen-fixing bacterial nodules in its leaves rather than roots. Now you may have known some, or all of this, but it's a nourishing meal for the phytophilous.

That said, the information provided is idiosyncratic, ranging from the latest DNA-driven classification through to medicinal uses, and how the flowers are pollinated or seed dispersed. The latter two connected topics get a lot of attention, often involving the Eastern Honey Bee (*Apis cerana*), various civets (who I only knew previously as spreaders of ginkgo seed and complicit in a racket to increase the cost of coffee beans), and the sad story of the 'scatter-hoarding rodents' (which I understand are mostly non-migratory birds and squirrels who no longer live in Hong Kong). The sugar composition of fruits also gets a good run, linked to which animals are attracted by the sugary solution on offer.

A few weird facts are missing, however, like *Annelsea fragrans* 'spitting' its pollen (you'll have to search for it on my blog (Web ref.); maybe the local variety (*hainanensis*) doesn't do this? Anyway I can't really complain about what is left out – it's a mighty effort to cover off all aspects of a plants classification, biology and ecology in a page. I did find the repetition of key ideas like dioecy a little repetitive, albeit a well-

intentioned desire to not have readers continually cross-reference. The addition of authorities for names I think is unnecessary in a book like this but I'm sure I'll be drawn and quartered by my ASBS colleagues for this view. In a similar vein, there is a little too much 'phylogeny' and classification for the average reader I think (but yes, I enjoyed it).



Over a hundred plates showing detail of leaves, flowers and fruits, as well as a sketch of the tree's habit, is an impressive accomplishment. Sometimes the detail is a little sketchy, perhaps not helped by the quality of reproduction which has removed some of the subtlety and lustre. The best are those of plants with big chunky flowers, fruits or leaves, such as *Bombacoeiba*, *Delonix regia* and *Pandanus tectorius*. The light and white flower trees, or those with small flowers, don't reproduce in print so well.

In addition to the botanical titbits and visual treats, I left the book knowing

more in general about the trees of Hong Kong and indeed the world. For example there are more genera in the camellia and tea family, Theaceae, than I had thought, and more Euphorbiaceae growing in Hong Kong that I had dreamed of. And the fruit I ate in China a few weeks ago was a longan (*Dimocarpus longon*), in the same family (Sapin-daceae) as the lychee and although a different genus, sometimes hybridising with that better-known fruit tree.

This book would be great for someone living in Hong Kong, to better understand the web of animals and plants in their city, or anyone curious about the tree life of Hong Kong and southern China. Beyond that it's a pretty book to browse, and does have some fascinating stories to tell: I noted down a few of them to weave into my blog...

Web ref. talkingplants.blogspot.com

New books

Printed publications

Tropical plant Collections: legacies from the past? Essential tools for the future?

**Ib Friis and Henrik Balslev (eds).
Det Kongelige Danske Videnskabernes
Selskab. Copenhagen. 2017
Scientia Danica. Series B, Biologica
vol. 6.**

**ISBN 978-87-7304-407-0. 320 pp. Price
300.00 DKK (c. \$65AU).**

<https://www.youreconomicwebsite.com/det-kongelige-danske-videnskabernes-selskab/lang-EN/series-b-biologica>

This volume reports on a symposium held in May, 2015, at the Royal Danish Academy of Sciences and Letters. The symposium overviewed the history of herbaria and botanical gardens with tropical collections and the changing conceptual frameworks behind their existence. Early tropical plant collections were gathered in the North in the 17th and 18th centuries, and during the 19th and 20th centuries, these collections grew rapidly. But now, contrary to common beliefs, collections of tropical plants are bigger and grow faster in the South than in the North. Nevertheless, there are now serious threats to these collections, both in the North and in the South, due to underfinancing, understaffing and general lack of understanding by decision makers. Botanical gardens are turned into parks with nothing but recreational purpose, and many herbaria are starved economically and staff-wise. Some have even been relegated to former warehouses, detached from other scientific activities. The symposium voiced its concern about this development and heard a report from the Netherlands about threats and decline, only broken by improvements due to a recent amalgamation of Dutch herbaria. On the positive side, the symposium heard reports of successful examples of North-South collaboration with regard to botanical collections, research and capacity building. The vast amount of tropical plants material now kept in the collections world-wide calls for the use for the data they represent with the

methods of 'big data' from other fields of research. Examples of such new applications were presented, but also warnings that a sound theoretical background for the use of 'big data' is needed. Studies in applied phyto-chemistry and molecular systematics using tropical collections were also part of the symposium, opening tantalising new possibilities. The symposium concluded with reflections on the roles botanical garden may have, both in the tropics and in the temperate zones, preventing humans from becoming completely detached from the natural world" [Publisher's blurb from dust jacket]

The contents of the volume have been reproduced as part of some of the papers being projected as pdf's on the web (see for example web ref. 1), an outline summary of the conference can be found at web ref. 2 and there is a review of the book by Pat Heslop-Harrison in *Annals of Botany* at Web ref. 3. We have a copy in our library in AD and it is packed full of information about collections, collectors and places we seldom hear about as well as the issues faced and the difficulties in maintaining these modern day herbaria, often a legacy of a colonial past, and their collections.

Web references

- 1: <https://pdfs.semanticscholar.org/8a39/13c1ab82da2bbc83069092b2f4bc0cf88035.pdf>
- 2: [https://greeinsect.ku.dk/publications/?pure=en%2Fpublications%2Ftropical-plant-collections\(51c7e792-e60d-4523-a94c-7dc22fd0c062\)%2Fexport.html](https://greeinsect.ku.dk/publications/?pure=en%2Fpublications%2Ftropical-plant-collections(51c7e792-e60d-4523-a94c-7dc22fd0c062)%2Fexport.html)
- 3: <https://academic.oup.com/aob/article/123/6/vii/5480999>

A Flora of the liverworts and hornworts of New Zealand, volumes 2 & 3.

**By John J. Engel and David Glenny
Missouri Botanical Gardens Press;
2019**

**ISBN: 9781935641162 (Volume 2);
HB; 760 pp.; \$95US**

**ISBN: 9781935641179 (Volume 3);
HB; 672 pp.; \$95US**

<https://www.mbgpress.org/product-p/9781935641179.htm>

Volume 2 covers the large leafy liverwort family Lophocoleaceae and the smaller families Geocalyceae and Brevianthaceae while volume 3 covers the larger Plagiochilaceae, Schistochilaceae and Acrobolbaceae and the smaller Mastigophoraceae, Ptilidiaceae, Chaetophyllopsidaceae, Herzogianthaceae, Jubulopsidaceae, and Lepidolaenaceae. Volume 1, published in 2008, has keys and descriptions to 211 of the 595 liverwort species as well as a key to all genera of the largest order, the Jungermanniales. Many of the species descriptions have black and white illustrations and almost all of the 60 genera have colour images. A detailed introduction includes a history of exploration of the New Zealand flora, a detailed overview of the climate, geology and vegetation of the region and includes a special contribution on endophytic fungi associates in New Zealand liverworts and their ecological and evolutionary significance.

Note that since volume 1 where the total number of species was given as 595, in volume 3 the number has risen to 652 species and this volume includes coverage of Tasmanian species as well.

News of the launch of these two volumes can be seen on p. 37. All three of the existing volumes are available through the website

Trees of Papua New Guinea (3 volumes)

By Barry J. Conn & Kipiro Q. Damas
Xlibris Australia; April 2019

Vol. 1: HB, ISBN: 9781984505088, \$96AU; PB, ISBN: 9781984505071, \$88AU; eBook, ISBN: 9781984505064, \$3:25AU

Vol. 2: HB, ISBN: 9781984505149, 406 pp, \$94AU; PB, ISBN: 9781984505132, \$86AU; eBook, ISBN: 9781984505125, \$4:99AU

Vol. 3: HB, 9781984505118, 354 pp., \$88AU; PB, ISBN: 9781984505101 \$80AU; eBook, ISBN: 9781984505095, \$3:25AU

<https://www.pngtrees.com/>

The three volume *Trees of Papua New Guinea*, published in April (Web ref. 1, ASBS FB), provides a comprehensive treatment of 675 tree species (vol. 1: Introduction and Gnetales to Fabales, 261 spp.; vol. 2: Rosales to Huerteales, 249 spp.; vol. 3: Malvales to Paracryphiales, 165 spp.). Author Barry Conn has provided a lot of background to this project on ASBS Facebook

pages and you can get a good indication of the content and format of the book thanks to Google's reproduction of a number of pages from volume 1 (Web ref. 2). We hope to be able to bring you a review in the near future.

Web references

1: <https://www.thenational.com.pg/new-books-tell-stories-of-papua-new-guinea-trees/>

2: <https://books.google.com.au/books?id=ZMCSDwAAQBAJ&pg>

Cephalotus – the Albany pitcher plant.

By Adam Cross, Nick Kalfas, Richard Nunn, John Conran

Redfern Natural History Productions Ltd; January 2019

ISBN: 9781908787323; HB; 205 x 270 mm; price \$60AU

Limited edition of 500 copies. All copies signed by the authors.

<https://cephalotus.redfernnaturalhistory.com/product/book/>

Another in the series of books on carnivorous plants published by Redfern Natural History Productions in the UK. This time the subject is *Cephalotus*, or Albany pitcher plant, first collected and illustrated by Robert Brown and Ferdinand Bauer in 1801.

This book was launched at the Adelaide Botanic Gardens on 27th June 2019. Further information can be found on the State Herbarium of South Australia blog site at Web ref. 1.

Web ref. 1: <https://know.ourplants.org/publications/pitcher-plant-book-launched/>

Flora Malesiana, series I, volume 23: Lamiaceae

G. Bramley (Ed.).

ISBN: 9789065190192; PB; 444 pages, 46 figures; £99.99 or SG\$75.00

Enquiries: the Library of Botany and Horticulture at Singapore Botanic Gardens (email: nparks_library_shop@nparks.gov.sg)

<https://www.nhbs.com/flora-malesiana-series-1-volume-23-lamiaceae-book>

This just released volume contains information on 50 genera and 304 species recognized as native or naturalized in the region; the largest genera are *Callicarpa* (55 species), *Clerodendrum* (54 species), *Teijsmanniodendron* (54 species) and *Vitex* (21 species). No further information or reviews have been found.

Flowering plants of Lower Eyre Peninsula. An illustrated tour of the native flora.

By Brian Saunders

Published by the author in association with Eyre Peninsula NRM Board; 2018.

Lane Print & Post: Camden Park

ISBN: 0648448207 (HB), 9780648448204 (PB); 200 pp; 560 colour photos; 26 cm.

\$25AU + postage, from Port Lincoln Visitor Information Centre (1300 788 378) or contact the author at coffinbay44@bigpond.com

Brian Saunders, co-author of an earlier book on the *Wildflowers of Lower Eyre Peninsula* (1994), has produced a glossy picture book of many of the more photogenic, and hence more commonly noticed plants, of the lower Eyre Peninsula region in South Australia (Web ref. 1, 2). Most of the plants featured flower between late winter and early summer (July–November), perfect for a spring visit. Species are arranged in modern families, but for those who have difficulty in remembering where their favourite plant now resides, there is an index. The book is available through the author or the Port Lincoln Visitor Information Centre (see above), or from shops in Coffin Bay and Port Lincoln. The author has produced previous books on the larger fungi of lower Eyre Peninsula, available through the Fungimap shop (Web ref. 3), the *Shores and Shallows of Coffin Bay* (Web ref. 4) and a history of Australian ichthyology, *Discovery of Australia's Fishes* (Web ref. 5).

Web references

- 1: <https://www.portlincolntimes.com.au/story/5832249/local-author-releases-new-botany-book/>
- 2: <https://know.ourplants.org/publications/eyre-peninsula-plants-book/>
- 3: <https://shop.fungimap.org.au>
- 4: <https://www.nokomis.com.au/product/new-books/shores-and-shallows-of-coffin-bay-an-identification-guide/>
- 5: <https://www.publish.csiro.au/book/6813/>

TreeFlip (2009); EucaFlip (2007) and FungiFlip (2018)

Rob Wiltshire and Greg Jordan (Tree); Rob Wiltshire and Brad Potts (Euca); Genevieve Gates, David Ratkovsky and

Rob Wiltshire (fungi)

University of Tasmania

Price \$9.95AU + postage

Order form at the web pages listed below.

These glossy foldaways, perfect for bushwalkers in Tasmania, have been around for some time. All three are apparently available through the University of Tasmania order form, accessible online (Web ref. 1–3), although *FungiFlip* does not appear in the list of books on the first two sites. The third site lists all three as well as another non-plant offering in this series which may be of interest - a guide to the scats of Tasmanian native mammals, published in 2018, called *PooFlip*.

Web references

- 1: <https://www.utas.edu.au/plant-science/resources/publications/treeflip>
- 2: <https://www.utas.edu.au/plant-science/resources/publications/eucaflip>
- 3: <https://map-centre.com.au/product/fungiflip/>
- 4: <https://map-centre.com.au/product/pooflip/>

Community-based control of invasive species

Edited by Paul Martin, Theodore Alter, Don Hine, Tanya Howard

CSIRO Publishing; June 2019.

ISBN: 9781486308873; Hardback; 288 pp.; 245 x 170 mm; \$99.99AU

ISBN: 9781486308880; ePDF; \$70-80AU, depending on provider.

www.publish.csiro.au/book/7809/

Invasive species are among the greatest challenges to environmental sustainability and agricultural productivity in the world. One of the most promising approaches to managing invasive species is voluntary citizen stewardship. However, in order for control measures to be effective, private citizens often need to make sustained and sometimes burdensome commitments. Community-Based Control of Invasive Species is based on five years of research by leading scholars in natural resource and human behavioural sciences, which involved government and citizen groups in Australia and the United States. It examines questions including, 'how can citizens be engaged in voluntarily managing invasive species?', 'what communication strategies will ensure good motivation and coordination?' and 'how can governing bodies sup-

port citizens in their efforts?'. With chapters on institutional frameworks, changing governance, systems thinking, organisational learning, engagement, communication and behavioural change, this book will be a valuable reference for researchers and practitioners involved in natural resources management. [Publisher's blurb].

You can access a considerable portion of this book on-line (Web ref. 1) and decide whether it is for you or your library. It does deal with invasive plants and animals but the initial collaborations were driven by the Invasive Animals Cooperative Research Centre which later morphed into the Centre for Invasive Species Solutions (Web ref. 2). Somewhat strangely there is no mention of this book on their web-site, even though in the Foreword to the book (Web ref. 1) it is claimed that the approach and tools documented "now underpin state and regional pest animal and weed community engagement programs" in a number of states.

Web references

- 1: https://books.google.com.au/books?vid=ISBN9781486308897&redir_esc=y
- 2: <https://invasives.com.au/>

Kindred: a Cradle Mountain love story

By Kate Legge

The Miegunyah Press; March 2019

ISBN: 9780522874518; 240mm x 162mm; 740g; RRP \$44.99AU; eBook \$22.99AU

<https://www.mup.com.au/books/kindred-hardback>

The story of naturalists and botanists Kate and Gustav Weindorfer, their establishment of the chalet Waldheim and their love of the Cradle Mountain area.

Reviews

- <https://www.smh.com.au/entertainment/books/kindred-review-kate-legge-on-the-lovers-who-opened-up-cradle-mountain-20190417-p51ezp.html>
- <https://www.theaustralian.com.au/weekend-australian-magazine/a-cradle-mountain-love-story/news-story/7953215e3d445bad0ca67056504f1964>
- <https://www.thesaturdaypaper.com.au/culture/books/2019/03/31/kindred-cradle-mountain-love-story/15532596007878>
- <https://www.abc.net.au/radionational/programs/lifematters/the-love-story-that-opened-cradle-mountain-to-tourism/10872966> (audio)

Who's minding the farm? In this climate emergency.

By Patrice Newell

Viking (Penguin Random House Australia); 2019.

ISBN: 9780143789390; PB; 304 pp; \$27.40AU

<https://www.penguin.com.au/books/whos-minding-the-farm-9780143789390>

<https://www.patricenewell.com.au/whos-minding-the-farm/>

Change is surely needed in our present way of farming the land and here are some suggestions by a long time farmer in the Hunter Valley which are thought-provoking and might help to persuade some. There are plenty of reviews in the media.

Reviews

- 1: https://www.amazon.com.au/Whos-Minding-Farm-climate-emergency/dp/0143789392#reader_B07QHJY6N2 (contents and introduction reproduced)
- 2: <https://www.abc.net.au/radio/programs/conversations/patrice-newell/11212930> (audio interview with author)
- 3: <https://www.readings.com.au/review/who-s-minding-the-farm-in-this-climate-emergency-by-patrice-newell>

'Cherry' Ingram: the Englishman who saved Japan's blossoms

by Naoko Abe

Chatto & Windus; April 2019

ISBN: 9781784742027; HB; 400 pp. RRP \$32.99AU

We usually have some reason for our passions but Collingwood Ingram, formerly an ornithologist, had an unusual reason for his change of direction.

When the editor of one of the world's premier ornithological journals deemed it of sufficient interest to publish a paper in which the author recorded the number of times a great tit defecated every 24 hours, I came to the conclusion that it was high time I occupied my thoughts with some other aspect of nature. I chose plants.

And the plant he chose for his next passion was the Japanese cherry tree with all its associated symbolism.

Reviews

- <https://www.theguardian.com/books/2019/mar/14/cherry-ingram-naoko-abe-review-englishman-saved-japans-blossoms>

<https://www.penguin.com.au/books/cherry-ingram-9781784742027>

<https://www.japantimes.co.jp/culture/2019/02/09/books/cherry-ingram-homage-british-savior-japans-cherry-blossoms/#.XQiVbGd2dMw>

<https://www.spectator.co.uk/2019/03/the-englishman-who-saved-japans-cherry-blossoms/>

Warndu mai (good food)

By Rebecca Sullivan & Damien Coulthard

Hachette Australia; 2019

Hardback; RRP \$45

<https://warndu.com/>

Warndu, a native-food label and food-education brand, has just released its first recipe book. As indicated in the subtitle, Warndu Mai translates as “good food” in author Coulthard’s Adnyamathanha language. The Adnyamathanha people are from the Flinders Ranges region of South Australia.

The aim of the “cookbook and compendium” is to encourage the use of the products of the Australian native food industry in the home. The book contains more than 80 recipes and a glossary of more than 60 ingredients with information about seasonal availability, flavour profiles and how best to incorporate these foods into your home cooking. Reviews can be found at the websites below. There are also a number of recipes freely available on the website where you can also learn more about the authors.

Reviews

<https://indaily.com.au/eat-drink-explore/the-forager/2019/05/13/cookbook-taps-into-growing-appetite-for-native-foods/>

<https://www.broadsheet.com.au/national/food-and-drink/article/your-native-australian-cooking-game-very-delicious-very-accessible-new-cookbook>

Weird plants

By Chris Thorogood

Kew Publishing, 2018

ISBN 978 1 84246 662 9; HB; 160pp.

246 x 189 mm; 40 paintings, 110 colour photos.

<https://shop.kew.org/kewbooksonline>

All types of weird and sinister are featured in this book, from carnivorous plants that drug, drown and consume unsuspecting insect prey; giant pitcher plants that have evolved toilets for tree shrews; flowers that mimic rotting flesh to attract pollinating flies, and orchids that duplicitously look,

feel and even smell like a female insect to bamboozle sex-crazed male bees. Familiar plants such as the Venus fly trap and bird of paradise are featured, along with a host of the un-familiar, such as the parasitic devil’s guts, the monkey-face orchid and a tropical tree with flowers that resemble a pair of ruby red lips.

The book is illustrated throughout with a unique collection of life-like oil paintings by the author, who has encountered these weird plants around the world. [Publisher’s blurb].

You can see examples of some of the illustrations in the book on the web (Web ref. 1).

Web references

1: <https://www.telegraph.co.uk/gardening/how-to-grow/10-illustrations-chris-thorogoods-weird-plants/>

2: <https://www.wheelers.co.nz/books/9781842466629-weird-plants/>

Semiosis

By Sue Burke

Tor Books. 2018

ISBN: 076539135X. HB, 336 pages, c. \$14AU; eBook c. \$8.90AU

A work of science-fiction in which intelligent plants and their relationships with man are central. There are several reviews available.

Reviews

<https://www.botany.one/2018/05/are-intelligent-plants-out-of-this-world/>

<https://www.tor.com/2018/02/06/book-reviews-semiosis-by-sue-burke/>

<https://www.theverge.com/2018/2/10/16994952/sue-burke-semiosis-first-contact-science-fiction-intelligent-plants-book-review>

The overstory

By Richard Powers

William Heinemann. 2018

ISBN 9781785151644; 512 pp; \$32.99 AU

As with *Semiosis* above, there is no shortage of reviews of this book (a selection listed below). Apparently somewhat controversial (Web ref. 3) it was short-listed for the Man Booker Prize of 2018 and has won the Pulitzer Prize for Fiction 2019.

The novel follows nine characters—among them a Vietnam veteran, a young coding prodigy, and the last descendant of immigrant pioneers—whose close relationships

with trees, lasting sometimes for generations, lead them to a deep appreciation of the world's threatened forests. Nearly all the characters become activists in some form—five of them eventually come together in protest against a timber company—and throughout their personal transformations, the trees around them are so exquisitely rendered that they seem like characters themselves. The result is what the Pulitzer committee praises as “an ingeniously structured narrative” that approaches trees and the threats facing them with wonder, reverence, and an urgency that could be enough to change minds. (Web ref. 6)

I particularly liked this example of plant blindness reproduced in the Chaffey review (Web ref. 5).

When the world was ending the first time, Noah took all the animals, two by two, and loaded them aboard his escape craft for evacuation. But it's a funny thing: He left the plants to die. He failed to take the one thing he needed to rebuild life on land, and concentrated on saving the freeloaders!

Downloadables

The Code decoded: a user's guide to the *International code of nomenclature for algae, fungi, and plants*
By Nicholas Turland
Advanced Books. July 2019
<https://doi.org/10.3897/ab.e38075>
<https://ab.pensoft.net/article/38075/>

A second edition, and an update of Turland's earlier 2013 version of this invaluable guide to the Code.

In preparing this second edition, my aims were as follows: (1) update the guide according to the Shenzhen Code; (2) correct any errors discovered in the first edition; (3) delete any obsolete content in the first edition; (4) add new content that would improve the guide; and (5) try to improve clarity and precision without adding too much complexity.
[From the preface].

A print version is to be released shortly.

What works in conservation 2019
Edited by William J. Sutherland, Lynn V. Dicks, Nancy Ockendon, Silviu O. Petrovan and Rebecca K. Smith Open-Book Publishers; June 2019

There is an extended interview with the author (Web ref. 7) where he discusses his motivation for the book and the background to some of the characters.

Reviews

- 1: <https://www.theguardian.com/books/2018/apr/08/the-overstory-richard-powers-review>
- 2: <https://www.theguardian.com/books/2018/dec/18/how-could-the-overstory-be-considered-a-book-of-the-year-richard-powers>
- 3: <https://sydneyreviewofbooks.com/our-root-problem-the-overstory-by-richard-powers/>
- 4: <https://www.smh.com.au/entertainment/books/the-overstory-review-richard-powers-latest-novel-is-the-mobydick-of-trees-20180917-h15guy.html>
- 5: <https://www.botany.one/2019/05/wood-wide-web-wins-world-renowned-writing-award/>
- 6: <https://www.theatlantic.com/entertainment/archive/2019/04/richard-powers-pulitzer-the-overstory/587245/>
- 7: <http://www.conjunctions.com/print/article/richard-powers-c70>

***What works in conservation series* | ISSN: 2059-4232 (Print); 2059-4240 (Online) ISBN Digital (PDF): 978-1-78374-764-1**
Downloadable as a pdf or html from openbookpublishers.com/product/1031 – also able to be purchased as hard-, paperback or eBook from this site.

This is the 4th edition of a book which is revised annually. It does involve global studies but there is a bias towards European conditions. However if you are seeking solutions to a produce problem whether on the farm or in the garden there are lots of suggestions for consideration, all of them based on scientific evidence, although this may be insufficient to make a recommendation.

The book provides an assessment of the effectiveness of 1389 conservation interventions based on summarized scientific evidence. The 2019 edition contains new material on bat conservation. Other chapters cover practical global conservation of primates, peatlands, shrublands and heathlands, management of captive animals as well as an extended chapter on control of freshwater invasive species, the

global conservation of amphibians, bats, birds and forests, conservation of European farmland biodiversity and some aspects of enhancing natural pest control, enhancing soil fertility and control of freshwater invasive species. It contains key results from the summarized evidence for each conservation intervention and an assessment of the effectiveness of each by international expert panels. The accompanying website (Web ref. 1) describes each of the studies individually, and provides full references.

When looking for evidence of what happens when a strip of pasture is left uncut in the hope that this might contribute to an increased biodiversity, as is happening in Europe, this site did come up, but I was rather confused as to its findings.

Web ref. www.conservativevidence.com

Annual costs of weeds in Australia
By Ross McLeod
Centre for Invasive Species Solutions,
Canberra. November 2018.

ISBN Print 978-1-925727-10-4; ISBN
Web 978-1-925727-11-1
Downloadable at <https://invasives.com.au/wp-content/uploads/2019/01/Cost-of-weeds-report.pdf>

The broad goal of this report is to estimate the current economic impact of weeds across Australia. This includes estimating the financial costs of control and lost production in agriculture, the loss of economic surplus for producers and consumers of Australian agricultural products, and financial costs of control to government agencies. [From the Report]

Whatever way you look at it a lot of money is spent on weed control each year. This is very much an economist's viewpoint and for those involved in broad-acre farming but there are figures in here that might be useful for grant applications or teaching or research purposes.

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The Society

The Australasian Systematic Botany Society is an incorporated association of over 300 people with professional or amateur interest in botany. The aim of the Society is to promote the study of plant systematics.

Membership

Membership is open to all those interested in plant systematics. Members are entitled to attend general and chapter meetings, and to receive the Newsletter. Any person may apply for membership by filling in a "Membership Application" form, available on the Society website (www.asbs.org.au), and forwarding it, with the appropriate subscription, to the Treasurer. Subscriptions become due on 1 January each year.

The ASBS annual membership subscription is AU\$45; full-time students \$25. Payment may be by credit card or by cheques made out to Australasian Systematic Botany Society Inc., and remitted to the Treasurer. All changes of address should be sent directly to the Treasurer as well.

ASBS publications

Australasian Systematic Botany Society Newsletter

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Back issues of the Newsletter are available from Number 27 (May 1981) onwards, excluding Numbers 29, 31, 60, 84–86, 89–91, 99, 100, 103, 137–139, and 144. Here is the chance to complete your set.

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Australian Systematic Botany Society Newsletter No. 53 **Systematic Status of Large Flowering Plant Genera**

Edited by Helen Hewson, 1987

This Newsletter issue includes the reports from the February 1986 Boden Conference on the "Systematic Status of Large Flowering Plant Genera". The reports cover: the genus concept; the role of cladistics in generic delimitation; geographic range and the genus concepts; the value of chemical characters, pollination syndromes, and breeding systems as generic determinants; and generic concepts in the Asteraceae, Chenopodiaceae, Epacridaceae, *Cassia*, *Acacia* and *Eucalyptus*.

Cost: Number 53: \$5, plus \$1.75 postage (in Australia)

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Evolution of the Flora and Fauna of Arid Australia (book)

Edited by W.R. Barker & P.J.M. Greenslade.

Peacock Publications, ASBS & ANZAAS, 1982

This collection of more than 40 papers will interest all people concerned with Australia's dry inland, or the evolutionary history of its flora and fauna. It is of value to those studying both arid lands and evolution in general. Six sections cover: ecological and historical background; ecological and reproductive adaptations in plants; vertebrate animals; invertebrate animals; individual plant groups; and concluding remarks.

Cost: \$20, plus \$10 postage (in Australia).

This book is almost out of print. There are a few remaining copies.

To order a copy of this book email Bill Barker at: bill.barker@sa.gov.au

History of Systematic Botany in Australasia (book)

Edited by P.S. Short. A4, case bound, 326 pp. ASBS, 1990

No longer available

Australasian Systematic Botany Society Newsletter

The Newsletter keeps ASBS members informed of Society events and news, and provides a vehicle for debate and discussion. In addition, original articles, notes and letters (not exceeding ten published pages in length) will be considered.

Every effort is taken to distribute the Newsletter quarterly; delays or rare combined issues are attributable usually to the availability of the Editors who act in a voluntary capacity rather than to lack of copy. As soon as possible after compilation of each issue a searchable pdf version (in full colour) is placed on the Society web site and announced to members by email, and printed copy (in grey scale) is produced and distributed to members who have requested it.

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