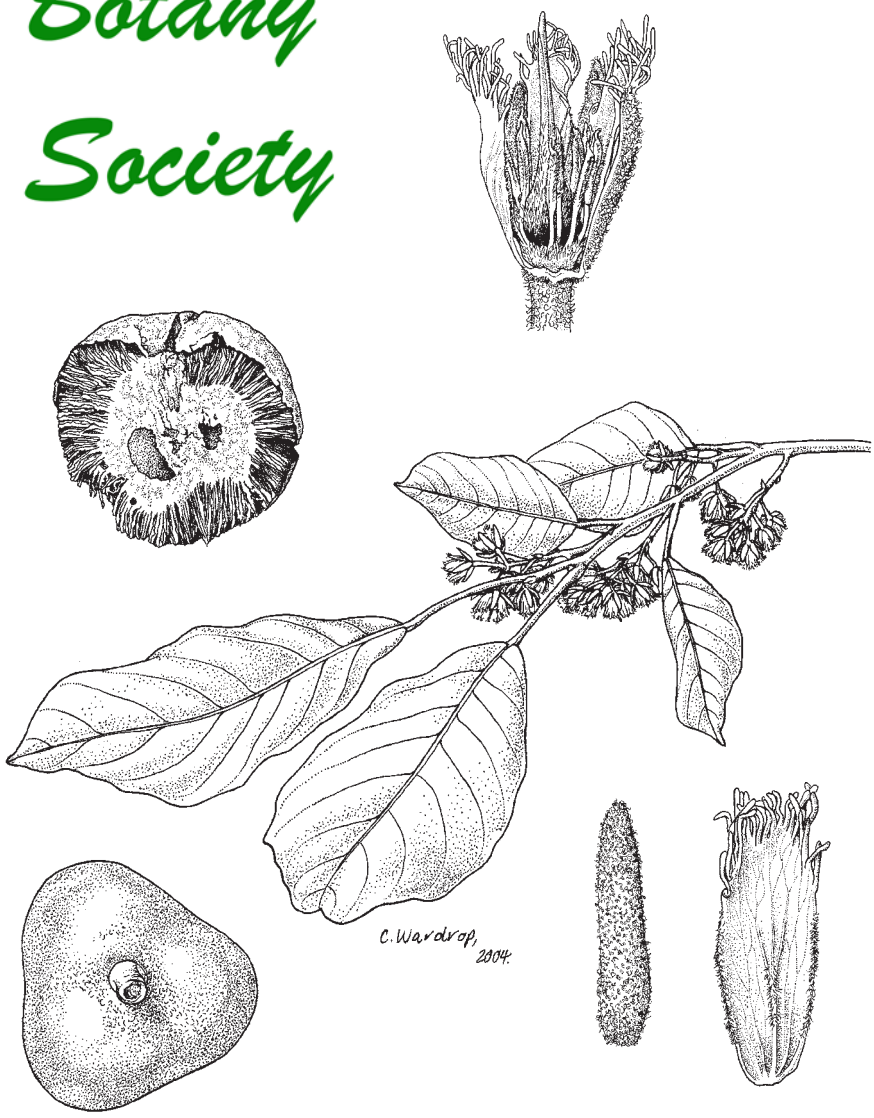
ASBS

Australasian Systematic Botany Society



Newsletter

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AUSTRALASIAN SYSTEMATIC BOTANY SOCIETY INCORPORATED

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ASBS Facebook Group

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Cover image: *Elaeocarpus sedentarius* Maynard & Crayn. Leafy twig with clockwise from top: open flower, petal, sepal, proximal end of fruit, longitudinally sectioned fruit. *Artist*: Catherine Wardrop (NSW). *With permission of* CSIRO Publishing.

Publication dates of previous issue

Australas. Syst. Bot. Soc. Newslett. 166 (March 2016)

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From the President

Sadly, this Newsletter comes soon after the passing of another giant of Australasian systematic botany – Ian Brooker. This, and the obituary and associated articles in this issue on Lyn Craven who died in 2014, reminds us of the loss to our science and our community when luminaries shine no more. Vale Ian and Lyn.

But onto much happier things ...

ASBS 2016 Conference – 26–29 September, Alice Springs

Planning and preparations for the 2016 ASBS Conference – 'Systematic Botany: a view from the centre' – are entering the final phase. Excitement is building. Be sure to organise your travel early to get the best deals.

Abstracts have been called for and are due 15th August. Early bird expired by the time you read this. Nonetheless the full rate is only AU$50 more so if you haven't already done so please register as soon as possible via *www.asbs2016.ourplants.org*. Information on the conference venue, schedule and associated events are also available on this website. I am confident it will be a wonderful conference in a special part of Australia and I strongly encourage you to be part of it. The systematic botany community in Australasia is strong, diverse and globally highly productive (see next paragraph) and the 2016 meeting is an opportunity again to showcase all we are and all we do.

Australia a global centre of plant species discovery.

In case you missed it, Kew Gardens recently released a report titled 'State of the World's Plants' (Web ref.). Among the many valuable insights into global plant biodiversity and the threats it faces contained in this report was a remarkable fact: Australia is one of the top three nations globally for plant species discovery. The report estimates that about 140 new Australian plant species were described in 2015, exceeded only by Brazil with about 240 and China with about 160. These three countries have topped the annual new species tallies since the 1990s. What unites these three countries is their rich biodiversity, but also their recent strong investment in science relative to other mega-biodiverse countries. In Australia however, this investment has significantly declined over the last few decades. Preparation of the Decadal Plan – an initiative of ASBS, CHAH and a number of individuals – is an attempt to highlight and address this.

Web ref. *http://science.kew.org/strategic-output/state-worlds-plants*

Nominations for Council

The term of positions on the ASBS Council are one year. A call for nominations for all positions was recently circulated, with those elected to take office from the next Annual General Meeting (to be held 26th Sept. at the ASBS 2016 conference). The Secretary has received a nomination for each position except one Councillor position. Mike Bayly and Leon Perrie are stepping down from Councillor and Secretary roles respectively, and Jennifer Tate relinquishes her Councillor position to take up the Secretary role. The incumbent President (me), Vice President (Dan Murphy) and Treasurer (John Clarkson) have all re-nominated in their roles and Matt Renner (NSW) has nominated for Councillor. Since only one nomination was received for each position, these people are elected unopposed. Matt is warmly welcomed to Council and I very much look forward to working with him, as do the other Council members I am sure. Dan and John are congratulated on their re-election. They've been excellent officeholders and I am pleased we can continue to work together for another term.

According to clause 13(3) of the ASBS Rules, in the absence of a nomination for the second Councillor position, Council must make every effort to appoint to this position prior to the AGM. Therefore anyone who may be interested is strongly encouraged to contact the Secretary (secretary.asbs@gmail.com) or another Council member well prior to the Alice Springs conference. Council is building a shortlist of suitable candidates, several of whom may soon find themselves in receipt of an enquiring phone call.

I'd like to take this opportunity to heartily thank Mike and Leon for their contributions to the Society through their Council roles.

Mike has served continuously since 2012 as Vice President (2012-2015) then as Councillor (2015-2016) and during this time has very competently chaired the ASBS Research Committee, a role which inter alia oversees the Eichler and Conservation Taxonomy awards schemes. Thanks, Mike, for your hard work, good graces and great management and leadership.

Leon's tenure as Secretary (2014-2016) has been notable for the efficiency and competence with which he has discharged his duties. He has been great to work with and has managed to keep his suboptimally organised President abreast of critical issues and dates. Thanks Leon, you'll be missed. On behalf of Council and indeed the whole Society I would like to wish Mike and Leon well for the next stage of their careers. We look forward to their continued involvement in the Society at least as active members and perhaps more in the future.

Lastly, a note on succession planning for Council. The health of the Society is in part dependent on the quality and energy of Council. It is important that Council is representative, diverse, competent and committed. Its members give their time to the Society, but I think also are richly rewarded in return. For the early career members particularly, the opportunities provided by a role on Council are many and varied and can significantly boost careers through networking, committee experience, and leadership mentoring. Council and the Society in turn benefit greatly from the diversity and enthusiasm of younger members, which help keep Council responsive to all membership demographics. I'd encourage all members, but particularly women and early career members, to consider nominating for Council next time. Any current Council member would be happy to talk to you about the experience, so collar one at the conference or anywhere else they may be found lurking.

See you all in Alice Springs!

Darren Crayn
Director, Australian Tropical Herbarium
James Cook University

Annual conference

Alice Springs in September.
ASBS 2016 Annual Conference update!

Alice Springs 26–29th September 2016

***Conference* 26–28th September 2016**
***Theme:* 'Systematic Botany—a view from the Centre'**
***Venue:* Doubletree by Hilton in Alice Springs unless otherwise noted.**
***Local field trip:* 29th September 2016, MacDonnell Ranges**
Web site: http://asbs2016.ourplants.org

Due to the erratic climate in this central Australian location the plants might flower – or not, the weather might be warm – or not, and the Todd River is unlikely to flow – or maybe it will! However we can guarantee spectacular views across the MacDonnell Ranges and if you have never visited this part of the world it is sure to wow!

The conference venue is comfortably near town but not in town, with good views and plenty of botanising. We apologise in advance for anyone who has a room facing the golf course, the eastern arm of the MacDonnell Ranges makes up for the interruption it presents.

The overall conference program to orient your week is below, the highlights will be the Welcome function at a local art gallery, the conference dinner at Olive Pink Botanic Gardens, a sunset BBQ at the end of the last session of the conference at Simpsons Gap, and, of course, the Conference Field trip!

Overall program for ASBS 2016

The Conference venue is at the DoubleTree by Hilton Hotel in Alice Springs unless otherwise noted.

Sunday, 25th September

5 pm. Welcome function Yubu Napa Art Gallery and pre-conference registration

Note: also on Sunday the ASBS council business meeting will be held in Boardroom of conference venue.

Monday, 26th September

9 am. Conference Opening.

Keynote—Professor Mark Chase: 'A modern view on polyploidy: studies of *Nicotiana* section *Suaveolentes*.'

Conference sessions until 4 pm.

4.30 pm. ASBS 2016 Annual General Meeting.

Tuesday, 27th September

Conference Sessions 9am–5pm.

6.30 pm. Conference Dinner, Olive Pink Botanic Gardens and catered by the wonderful Kungka's Can Cook.

Wednesday, 28th September

Conference Sessions 9am–5pm.

After conference BBQ: Simpson's Gap at sunset.

Thursday, 29th September

Conference field trip: MacDonnell Ranges including Standley Chasm. All day, early-ish departure ...

For further details as they are finalised: see *ASBS2016.ourplants.org*. If you are registered you will received updates automatically.

More about the upcoming conference…

An interesting scientific program is emerging, led by the keynote speaker Mark Chase from Royal Botanic Gardens, Kew and University of Western Australia. A draft conference program will be out in the next week or so.

Our Conference Dinner will be held at the Olive Pink Botanic Gardens, just a short walk from the Double Tree Hilton and easily accessible from most of the nearby accommodation. We are excited to offer you a taste of the Outback with unique choices from local Indigenous caterer's Kungka's Can Cook.

We are also hosting an After Conference BBQ, and what better way to end this year's conference than to have an informal BBQ. It will be held at Simpson's Gap (20 km W of Alice Springs) which is a great site to relax and enjoy the end of the day. Price includes food and transport to and from the conference venue.

You are guaranteed seeing the local rock wallaby population (as the sun sets) and we have organised with the Park's senior ranger to show us some of the wildlife in the area.

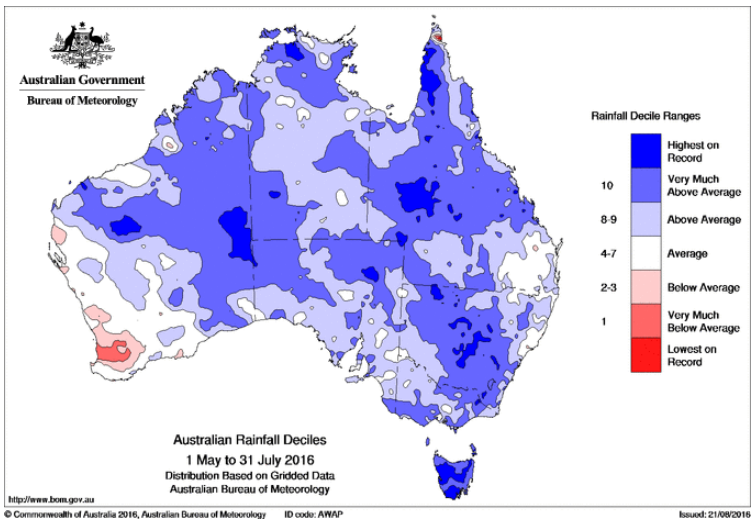
Finally, the Post Conference Tour will be along the MacDonnell Ranges. This region contains a staggering 750+ species including most of the endemics of the MacDonnell bioregion. This tour will give you a taste of some of the more easily accessible species. We will visit Standley Chasm and then climb up onto the ridge. This climb is strenuous and you will need to wear proper footwear and we recommend you carry water with you. A few of the less hearty will botanise the lower areas so don't worry if you are concerned about the hike. We also plan to visit Standley Chasm which is typical of a mesic gorge in the region. If time permits, we will also visit Ellery Big Hole to see a xeric gorge. This has a wonderful swimming hole, so bring swimmers and a towel just in case we have time and you think you might like a dip.

The erratic climate means we can't guarantee what might be flowering, but we can guarantee spectacular views across the Larapinta valley and across the higher peaks of the MacDonnell Ranges.

The conference organising committee – Michelle Waycott, Peter Jobson, Ainsley Calladine, Ian Cowie, Donna Lewis and Bill Barker – all look forward to seeing you in Alice Springs very soon.

Co-conveners: Michelle Waycott, Peter Jobson

Fig. Rainfall summary for the 3 months to end of July 2016. From Australian Bureau of Meteorology at *www.bom.gov.au/jsp/awap/rain/index.jsp*



Eichler Research Fund reports

Molecular phylogenetics of *Elaeocarpus* L. (Elaeocarpaceae) with a focus on New Guinea species

Janet Gagul
James Cook University, Cairns

Elaeocarpaceae Juss. *sensu lato* (including Tremandraceae R. Br. ex DC.) is a moderately large family of mostly trees and shrubs distributed in tropical and subtropical regions with a few temperate zone species (Rozefelds & Christophel, 1996; Baba & Crayn, 2012; Maynard *et al.*, 2008). The family is represented mainly in South America, Australasia and South, Southeast and East Asia with outliers in Madagascar, Mauritius and the Pacific islands (Crayn *et al*., 2006). Most Elaeocarpaceae are found in rainforests, although a few, especially the former Tremandraceae, are typically found in sclerophyll forests to arid areas (Crayn *et al.*, 2006).

Elaeocarpaceae comprises more than 600 species distributed in 12 genera (*Aceratium* DC., *Aristotelia* L'Her., *Crinodendron* Molina, *Dubouzetia* Brongn. & Gris, *Elaeocarpus* L., *Peripentadenia* L.S.Sm., *Platytheca* Steetz, *Sericolea* Schltr., *Sloanea* L., *Tetratheca* Sm., *Tremandra* R. Br. and *Vallea* L.f.) and occur from near sea level to over 3000 m (Maynard *et al.,* 2008). South America supports three genera: the endemics *Crinodendron* and *Vallea*, and the widely distributed genus *Sloanea* (Crayn *et al.*, 2006). Nine genera occur in Australia, four of which are endemic, namely *Peripentadenia*, *Platytheca, Tetratheca,* and *Tremandra*. Australia, therefore, has more genera of Elaeocarpaceae than any other region (Baker *et al.,* 1998). *Elaeocarpus* and *Sloanea* are the most widely distributed genera with *Sloanea* comprising about 180 species (Boeira *et al.,* 2012).

The genus *Elaeocarpus*

Elaeocarpus, the largest genus in Elaeocarpaceae, comprises c. 350 species with a mainly Indo-Pacific distribution (Phoon, 2015). The islands of New Guinea (c. 97 taxa) and Borneo (c. 70 spp.) have the greatest concentration of species (Coode, 2004). The Australian Plant Census (APC) lists 30 published species, two subspecies and four "phrase named" taxa for Australia. The majority of Australian *Elaeocarpus* species occur along the east coast with a few extending north-west to the Northern Territory (Baba and Crayn, 2012).

The genus is well defined morphologically by the distinct fringed petals and firm fleshy fruits, each with a single woody stone. These woody stones (mesocarps) are very hard, highly ornamented and vary in size and shape, providing useful characters to differentiate species. Furthermore, a number of fossil mesocarps have been assigned to *Elaeocarpus*; however, the relationships of these fossil species to extant lineages of *Elaeocarpus* are unknown.

Elaeocarpus **in New Guinea**

The New Guinea *Elaeocarpus* flora is represented by ten sections (*Lobopetalum* Schltr.*, Dactylosphaera* Schltr.*, Elaeocarpus* (including *Chascanthus* Schltr.)*, Blepharoceras* Schltr.*, Ganitrus* Brongn. & Gris (including *Fissipetalum* Schltr.)*, Monocera* Brongn. & Gris (including *Papuanthus* Schltr.)*, Oreocarpus* Schltr.*, Coilopetalum* Schltr.; Coode, 1978); *E. arnhemicus* F.Muell. is now considered grouped with *E. obovatus* G.Don, perhaps in a new section). Section *Elaeocarpus* also occurs in Borneo, Malaysia, Sumatra, Java and the Philippines while section *Ganitrus* occurs in India, Fiji and Australia. Sections *Monocera* and *Coilopetalum* are also widespread. The arrangement of taxa into sections is based on morphology, and their relationships are still very poorly understood. Inadequate material has made formal description, naming and classification difficult (Coode, 1978).

The most recent 'complete' account of New Guinea *Elaeocarpus,* in *Handbooks of the Flora of Papua New Guinea,* lists 68 species, 7 subspecies, and 2 varieties (Coode, 1981). At least 7 new species were suggested but insufficient material precluded their description,

and 21 names could not be resolved because the types were unavailable and the descriptions inadequate. A number of additional taxa from New Guinea have since been recorded (Coode pers. comm. 2014): *Elaeocarpus bilongvinas* Coode, *E. crassus* Coode, *E. miegei* subsp. *rosselensis* Coode, *E. timikensis* Coode, *E. gardneri* Coode, *E. avium* Coode, *E. ornatus* Coode, *E. osiae* Coode, *E. altisectus* subsp. *carrii* Coode, *E. amabilis* subsp. *piorae* Coode, *E. coloides* subsp. *ridsdalei* Coode, *E. myrtoides* subsp. *vinkii* Coode and *E. sericoloides* var. *diffusus* Coode. New Guinea species are currently under represented in molecular data sets.

Significance of the study

Although New Guinea harbours the greatest species diversity of *Elaeocarpus*, phylogenetic relationships of the species are poorly understood. Only a few species have been included in molecular phylogenetic studies due to unavailability of suitable material. This study aims to address the New Guinea sampling gap together with increasing taxon representation from other under-sampled areas such as Sulawesi. Plastid *trnL-F*, *trnH-psbA* and *trnV-ndhC* sequence data will be analysed using a range of phylogenetic tree reconstruction and biogeographical analysis methods to better understand the relationships, biogeography and evolutionary history of the genus.

Eichler Grant

My project kindly received $2,000 from Hansjörg Eichler Scientific Research Fund in the 2014 September round. It enabled taxa sampling in Papua New Guinea in January 2016.

A total of 29 taxa, including three outgroups (*Sericolea, Sloanea* and *Dubouzetia*), were collected on this trip. Among these, two especially important species were collected (*Elaeocarpus murukkai* Coode and *Elaeocarpus womersleyi* Weibel). Unavailability of suitable material of these species in the past for molecular analysis, especially *E. womersleyi,* has made its relationship to other species with fibrous mesocarp difficult. *Elaeocarpus womersleyi* resembles Australian *E. bancroftii* F.Muell. & F.M.Bail. in its fruit morphology, particularly the fibrous outer mesocarp. This feature is not restricted to these species however, and an objective for the next stage of this project is to determine if these and other species (both Australian and New Guinean) with fibrous mesocarps cluster together on the phylogeny.

Data analysis

Our phylogenetic framework is built on extensive recent studies (Baba, 2013; Phoon, 2015) to address questions on evolutionary history and species complexes. We used a sample of c. 30% of the known species diversity. The phylogenetic analysis combined new and existing sequence data from the plastid markers *trnL-F, trnH-psbA* and *trnV-ndhC*, and these data were analysed using Maximum Likelihood (ML) with the program RAxML v8.0.

Preliminary results

Preliminary results of these analyses show the phylogeny is congruent with recent studies, although with differences in the level of resolution. Overall, *Elaeocarpus* is monophyletic and is sister to *Aceratium* and *Sericolea* (Phoon, 2015).

Within *Elaeocarpus*, 12 major clades were identified, 9 of which broadly agreed with Coode's (1984) classification system (Fig. 1). They comprise species from Asia, Malesia, Australia and the Pacific Islands (Phoon, 2015). *Elaeocarpus holopetalus,* from south eastern Australian cool temperate rainforests (Fig. 2), was confirmed as sister to the rest of the genus.

The newly sequenced species from New Guinea are nested within the clades identified previously, and their relationships are congruent with the current informal groupings (Coode, 1984). However, many more representatives from New Guinea are needed to rigorously test the morphology-based classification.

The results show that *E. blepharoceras* is sister to the similar species from Australia, *E. sedentarius* (Maynard *et al.* 2008). Together these species are related to the other species that possess radially fibrous mesocarps (Fig. 3).

Acknowledgements

I thank the Australasian Systematic Botany Society (ASBS) for support through the Hansjörg Eichler Scientific Research Fund,

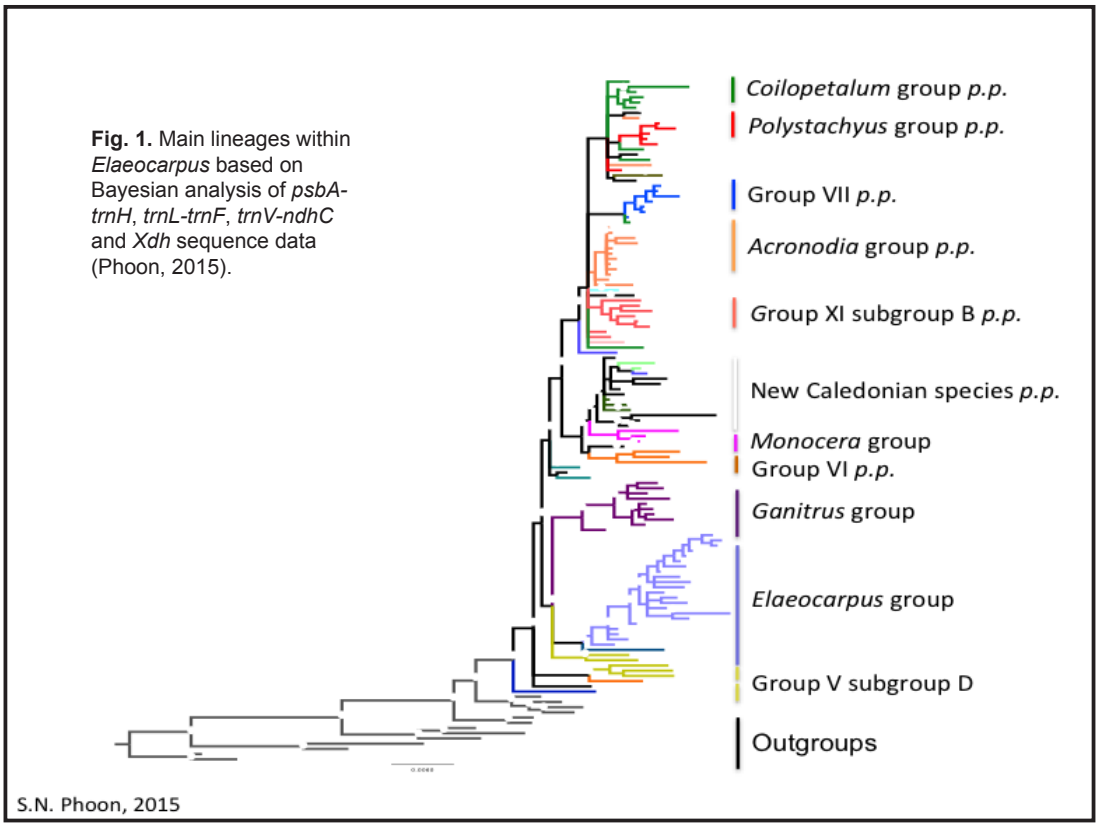


Fig. 1. Main lineages within *Elaeocarpus* based on Bayesian analysis of *psbA-trnH*, *trnL-trnF*, *trnV-ndhC* and *Xdh* sequence data (Phoon, 2015).

which enabled fieldwork in Papua New Guinea. I also thank my supervisors Darren Crayn and Lars Nauheimer, for help with molecular aspects of study; the staff of Australian Tropical Herbarium for administration, logistics and laboratory assistance; and field assistants and colleagues from PNG are acknowledged for various aspects of fieldwork and logistics.

Fig. 2. *Elaeocarpus holopetalus*, Tallaganda National Park, Canberra. Photo J. Gagul

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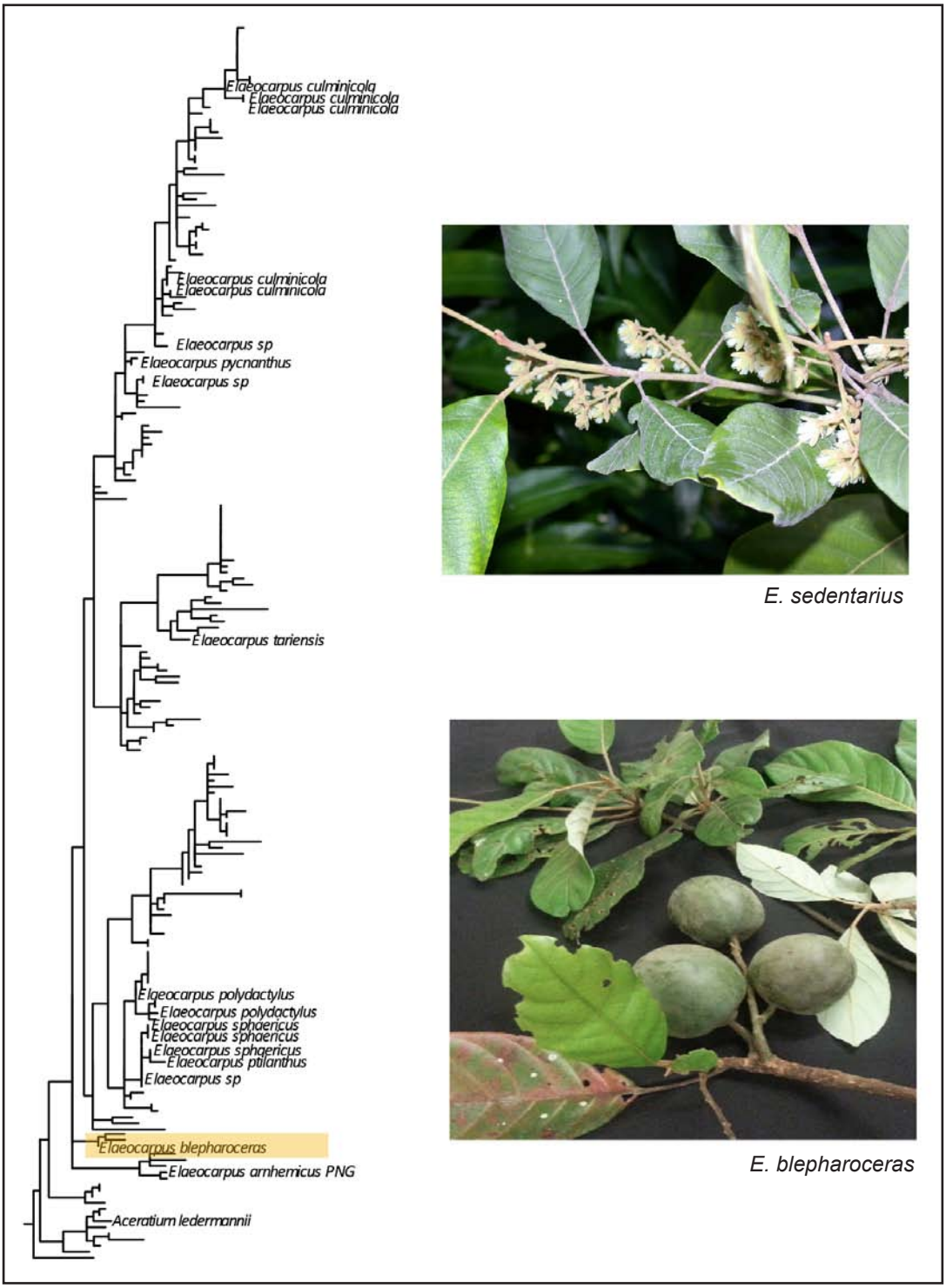

Fig. 3. Maximum likelihood analysis of plastid *psbA-trnH*, *trnL-trnF* and *trnV-ndhC* sequence data for *Elaeocarpus*. Species added by the Eichler funded study are named. The results show that New Guinea's *E. blepharoceras* (highlighted) is robustly grouped with *E. sedentarius* of Australia. They share characters such as very pale green to glaucous lower surface of the leaf and fruit mesocarp composed of dense radial fibres. Photos J. Gagul (*E. blepharoceras*), D. Crayn (*E. sedentarius*).

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Positions vacant

New herbarium positions

Along with retirements hopefully go advertisements for new positions, although this has been something of a rarity over the past few years. It is encouraging to see that there have been recent advertisements for new positions at the following herbaria, all closing in August. Unfortunately most of them will almost certainly have closed by the time the newsletter is out.

Allan Herbarium, Christchurch (CHR)

Plant systematist – closed 5th August 2016

http://www.seek.com.au/job/31437754

National Herbarium of New South Wales (NSW)

Two positions as systematic botanists – closing 25th August 2016

http://iworkfor.nsw.gov.au/viewjob/38360

One position for collections manager - closed 12th August 2016

http://iworkfor.nsw.gov.au/job/manager-collections-37805

National Herbarium of Victoria (MEL)

Volunteer Co-ordinator who can lead, manage and supervise a large group of volunteers in curating specimens – closed 4th August 2016.

https://jobs.careers.vic.gov.au/jobtools/jncustomsearch.viewFullSingle?in_organid=14123&in_jnCounter=222653025

TRH (Norway)

PhD position in Herbarium Evolutionary Genomics at Norwegian University of Science and Technology – closed 15th August 2016

https://www.jobbnorge.no/en/available-jobs/job/126872/phd-position-in-herbarium-evolutionary-genomics

Australasian Systematic Botany Society Inc.

Notice of 2016 Annual General Meeting

In accordance with with Section 25 of the Society's Rules, notice is hereby given that the annual general meeting of the Australasian Systematic Botany Society Inc. will be held on **Monday 26th September at the DoubleTree by Hilton Hotel in Alice Springs, beginning at 4.30 pm local time**. This is during the Society's annual conference.

The purpose of this meeting is to:

- confirm the minutes of the annual general meeting held on 30th November 2015 (see *ASBS Newsletter* 165: 4–24);
- receive reports from Council on activities of the Society during the preceding financial year;
- declare the results of the vote for membership of Council.

Articles

Preserved liquid transfer at the Queensland Herbarium

Gill Brown
Principal Botanist and Collections Manager, Queensland Herbarium

The Queensland Herbarium (BRI) has started the year 2016 with a cleaning frenzy. We have cleaned mould off more than 15,000 bottles of preserved liquid collections and transferred them to our brand new (bright yellow) flammable storage units. Unfortunately, our original preserved liquid collection room had accumulated considerable mould growth on the ceiling, shelving, boxes and bottles due to an air conditioning issue. The room was deemed not safe to work in and funding was secured to obtain two purpose built flammable storage units for our large collection. After much discussion, planning, risk assessment and safe work procedure writing the cleaning and transfer began on the 15th March; and was completed on the 19th April 2016. For six weeks we had a full roster of transporters and cleaners, including six casual staff, working from 8am to 5pm (sometimes later) to get the job done.

The transfer process started with a staff suiting up in disposable coveralls, masks and gloves to load plastic crates ("Nally bins") with mouldy bottles. These were then taken outside to the breezeway where we had two to four cleaning stations set up. Here every bottle was individually cleaned and refreshed, including taking off the lid and replacing it when necessary, inserting seals into the tops of the bottles, topping up the Kew Mix, updating spirit only collection bottles and pulling out some type specimen bottles. A few specimens were mouldy inside the bottle and had to be deaccessioned. Once the bottles were clean and dry another group of staff turned up to check them against the register, add placeholders for specimens on loan and pack them into their new lunchboxes and home. Repeat!

Once all of the bottles were packed safely into their new home, their old, mouldy home was remediated and will now be used as a field store and fungi processing area. The transfer project was a huge job but a great way to get to know the systems and procedures of my new employer. Staff from all across the whole Herbarium pitched in and I cannot thank them enough. The collections team were essential in the smooth running of the project but we had botanists, vegetation mappers, zoologists and administration staff helping out over the project and it wouldn't have been possible without them. So next time you come to visit BRI, we look forward to showing off our bright yellow flammable storage units to you.

Fun facts about the BRI preserved liquid collection:

- The oldest specimen in our preserved liquid collection was collected in 1879 by J.H. Simmonds, an *Agathis robusta* (C.Moore ex F.Muell.) F.M.Bailey. This was a cultivated specimen from Brookfield in Queensland but Simmonds also collected the second oldest remaining specimen in the BRI preserved liquid collection, from Humpy Bong (Redcliffe), Queensland in 1888: *Thelymitra angustifolia* R.Br..
- The oldest type specimen in spirit is *Cyttaria septentrionalis* D.A.Herb., a fungus that was found growing on *Nothofagus moorei* at Mt Hobwee, Qld by D.A. Herbert.
- Our most prolific collector of preserved liquid specimens is Paul Forster (PIF) with 4,495 collections. We were not too surprised by this as PIF has lodged 42,433 specimens at BRI so far. Ralph Crane has the next highest number of specimens in the preserved liquid collection with 1,855 specimens of orchids, and John Clarkson comes in third with 1,306 specimens. We also have a significant collection of algae in the collection, including 836 specimens from AIMS (Australian Institute of Marine Science) and also some by Cribb.

Our collection continues to grow with new material being accessioned regularly.

Fig. The transfer in pictures, 1. A, The new flammable storage units being delivered; B, Dressed in all our PPE to pack specimens for transfer from the mouldy room; C, Cleaning stations in the breezeway.

Fig. The transfer in pictures, 2. D, Opening individual bottles to clean all mould, replace the lids and insert seals to prevent leakage and evaporation of Kew Mix; E, All clean and ready for transport to the new flammable storage units. Loving our new trolley!; F, Inside our new flammable storage units.

News

New Botanic Gardens Director in South Australia

Dr Lucy Sutherland, presently the National Coordinator of the Australian Seed Bank Partnership and based in Canberra, has been appointed to the position of the Director of the Botanic Gardens of South Australia. As well as her work in the Australian National Botanic Gardens she has had long and considerable experience in working in national and international organizations, having been involved in the editing and as an author of the International Agenda for Botanic Gardens in Conservation launched in 2000 and having served as a Guest Lecturer and Examiner for Kew Garden's International Diploma in Botanic Gardens Education. She will be the first female Director of the Botanic Gardens of South Australia in its 160 year history and will take up the position in October.

There is an interview with Lucy Sutherland in the July issue of the Botanic Gardens Australia and New Zealand (BGANZ) publication *The Botanic Gardener* (Web ref.).

Web ref. *http://files.ctctcdn.com/5e0f7c85201/c2d7031d-220c-4151-93a3-6ab3a4fd943d.pdf*

Retirement

Karen Wilson officially retired from her position as Senior Research Scientist at the National Herbarium of New South Wales on 13th July 2016. Karen has indicated that she will continue her research at the herbarium in retirement.

Special State Herbarium symposium at South Australian science conference

On 13-15th April the second biennial Natural Resources Management Science Conference – Sharing science for better outcomes - was held at the University of Adelaide. The conference is a showcase for natural science management research projects and partnerships across multiple South Australian Government agencies and research organizations and the research informs environmental policy and management decisions in the state. Presentations from 285 speakers on many topics were streamed live to the outside world. Topics covered by keynote speakers included the biodiversity offsetting debate (Martine Maron, University of Qld); synthetic plant biology (Prof. Birger Moller, University of Copenhagen); whether biodiversity suppresses the emergence of infectious diseases (Prof. Phil Weinstein, University of Adelaide); sharing science and the path to impact (Dave Johnson, Department of Environment); ecological impact on coastal systems (Prof Emma Johnston, UNSW); Experiences around the world (Dave Emmett, Asia-Pacific Division, Conservation International); rules for research partnerships (Prof Bob Hill, University of Adelaide & Sandy Carruthers, Department of Environment) and the grander view for "our" science (Prof Michelle Waycott, University of Adelaide and State Herbarium of SA).

A special symposium, *The past, present and future of Botanical research associated with the State Herbarium of South Australia*, was held as part of the symposium. All of the keynote presentations and almost all of the rest of the presentations can be viewed through the web page (Web ref.).

Web ref. *http://nrmscience.org/*

Top 10 species 2016

Amongst the Top 10 species list for this year is an Australian Seadragon, *Phyllopteryx dewysea*, which is red and about 24 cm long (Stiller et al. 2015). It was discovered by the WA Museum during a biodiversity assessment in the Recherche Archipelago. You can read about the other 9 species, including a new Giant tortoise from the Galapagos, a giant *Drosera* from Brazil (up to 123 cm high) where it is only known from the summit of a single mountain and a new genus of Annonaceae from Gabon, *Sirdavidia solannona*, named for Sir David Attenborough and the perceived resemblance of the plant's flower to some species of *Solanum* (Web ref.).

References

Stiller, J., Wilson, N.G. and Rouse, G.W. (2015). A spectacular new species of seadragon (Syngnathidae). *Royal Society Open Science* 2: 140458

Web ref.: *http://www.esf.edu/top10/2016/06.htm*

Self-constructing plants

Bob Parson's has highly recommended Professor Enrico Coen's 2016 Croonian Lecture at the Royal Society in London in May. Entitled "Picasso, pottery and plants: Hidden rules governing the development of natural forms", the lecture relates to Professor Coen's interest in understanding how complex shapes arise in plants and what rules govern their formation.

The lecture is available to view in its entirety through the Royal Society website and if that is not enough you can also access Professor Coen's lecture at the Edinburgh Science Festival in 2014 through the same site.

Web ref.: *https://www.jic.ac.uk/news/2016/05/rico-coen-2016-croonian-lecture/*

Data archiving requirement for *Australian Systematic Botany*

Those submitting papers to *Australian Systematic Botany* will in future need to comply with their adoption of the Joint Data Archiving Policy (*JADP*). Data supporting the results of a paper will need to be archived in an appropriate public archive. The journal is recommending that the archiving is done prior to submission of the paper. You can read further about it in the latest issue (Cooper 2016) where this updating of the author guidelines is discussed.

Reference

Cooper, E.D. (2016). Data archiving – editorial. *Australian Systematic Botany* 29: i-ii. *http://dx.doi.org/10.1071/SBv29n1_ED*

Awards

Orchid award

The Royal Horticulture Society in the UK recently awarded their Westonbirt Orchid Medal to Mark Clements of CANB. The medal is awarded annually either for the growing of orchids or for any scientific, literary or any other outstanding personal achievement in connection with orchids.

Mark well and truly qualifies for the latter having been very productively and passionately involved with so many different aspects of orchid research for all of his working life.

A well-deserved award. Congratulations, Mark.

Web sites of interest

The Long Now Foundation

A tea-table discussion recently led to the recounting of the story of the oak beams at Oxford's New College and the value of thinking long term. If you don't know the story it is recounted at Web ref. 1 which is how the Long Now Foundation's pages are now being featured here. The Long Now Foundation (Web ref. 2) was established in 1996 to foster long-term thinking and responsibility in the framework of the next 10,000 years. There are some fascinating blogs such as: the account of the 10,000 year clock being constructed in a mountain in west Texas (Web ref. 3); a link to a visualization of the World's languages; the search for long-lived methods of storing information so that it remains accessible; and the thinking of safety case experts as they envision changes in the Finnish landscape over the next 10,000 years and how these might impact, as well as be impacted by, an established nuclear waste depository. Even cloning mammoths is discussed. Guaranteed to make you think even if some aspects of the pages seem more like science fiction.

Web references

1: *http://blog.longnow.org/02014/*
2: *http://longnow.org/*
3: *http://longnow.org/clock/*

GardenDrum

For those of you with a love of gardening some of the articles in GardenDrum will be of interest. For instance in April there was a story involving the development of a "Eucalypts for your home garden" trail at Cranbourne linked with an analysis of the Mueller type collection of *Eucalyptus cosmophylla* in MEL (Web ref.

1). In June Tim Entwisle had an article on the brilliant *Brillantaisia ulugurica* (Web ref. 2). It *is* fantastic, but gardeners do need to be aware that two other species of the genus (*B. lamium* and *B. owariensis*) are already weedy in Queensland and the Pacific respectively and there is no reason to think that this one would be any different. In October last year there was an item on some wonderful garden sculptures in metal and stone of the fruits of Australian natives (Web ref. 3).

The site covers all sorts of topics, travel, pets & wildlife, garden design and a news section. From the last I learnt that the floral clock at Kings Park has been restored and that the 17 metre tall "Hive" at Kew Gardens has been opened to the public.

Web references

1: *http://gardendrum.com/2016/04/04/eucalypt-trail-finds-stories-in-the-trees/*
2: *http://gardendrum.com/2016/06/04/brilliant-salvia-look-alike-tanzania/*
3: *http://gardendrum.com/2015/10/06/jamie-sargeant-sculptor-in-metal-and-stone-nsw-australia/*

The Conversation

The Conversation is an independent source of news and views, sourced from the academic and research community and delivered direct to the public. Our team of professional editors work with university, CSIRO and research institute experts to unlock their knowledge for use by the wider public.

The range of topics is very broad but amongst those which took my eye were the lack of field skills of biology students (Web ref. 1), the decline in the study of plants (Web ref. 2), stopping Australia's genetic heritage being lost to overseas interests (Web ref. 3) and the loss of the kelp beds in Western Australia as a result of a marine heatwave in 2011 and their replacement with tropical communities (Web ref. 4).

Web references

1: *https://theconversation.com/identification-of-animals-and-plants-is-an-essential-skill-set-55450*
2: *https://theconversation.com/botany-may-be-dying-but-somehow-the-plants-survive-62253*
3: *https://theconversation.com/we-need-to-stop-australias-genetic-heritage-from-being-taken-overseas-48895*
4: *https://theconversation.com/a-marine-heatwave-has-wiped-out-a-swathe-of-was-undersea-kelp-forest-62042*

Point of view

Sci-Hub – making academic papers behind paywalls freely available

Sci-Hub is a pirate website presently offering access to c. 51 million scientific papers normally only available by payment of a fee to the publishing journal. New papers are uploaded every day and you are able to make requests to the site for particular papers, including those published by JSTOR, Springer and Elsevier. The site was established by Alexandra Elbakyan from Kazakhstan in 2011 as a reaction to the c. US$30 cost per scientific paper, prohibitive to researchers in third world countries. However it is not only people in third world countries who are using the site – some of the biggest users are American scientists (Web ref. 1).

Predictably academic publisher Elsevier filed a complaint in the US in 2015 alleging copyright infringement by Sci-Hub and their website, Sci-Hub.org, was ordered to shut down in October 2015. While that site was closed Sci-Hub is still operating at alternative sites which can be found easily enough with a search (Web ref. 2). It is difficult to predict just how this will all end up since there are clearly problems with both the paid and free approaches, but for some further thoughts on this controversial matter see Web refs. 3–6.

Web references

1: *www.sciencemag.org/news/2016/04/whos-downloading-pirated-papers-everyone*
2: The site *http://sci-hub.bz/ was* operational at the time of writing
3: *www.sciencealert.com/this-woman-has-illegally-uploaded-millions-of-journal-articles-in-an-attempt-to-open-up-science*
4: *http://science.sciencemag.org/content/352/6285/497.full*
5: *www.slate.com/articles/health_and_science/science/2016/04/science_magazine_can_t_defend_its_flawed_business_model.html*
6: *https://americanlibrariesmagazine.org/2016/05/31/why-sci-hub-matters/*

ABRS report

Staff updates

Anthony Whalen joined ABRS on 23 June as the Taxonomy – Scientific Team Leader, and Assistant Director of the ABRS. Anthony has worked in various areas of the Department of the Environment including Species Information, Wildlife Trade Assessment, with World/National Heritage, and the National Landcare Programme. He previously worked as a curator at the Australian National Herbarium and National Herbarium of NSW. Anthony looks forward to re-engaging more directly with Australia's botanical and zoological communities over the coming years.

Thomas Wallenius left ABRS on Friday 22 July to take up the position of 'Senior Entomologist – CSIRO Liaison' with the federal Department of Agriculture and Water Resources. Thomas will be based within the Australian National Insect Collection.

Flora of Australia **and an Australasian eFlora platform**

Progress continues on the development of an Australasian eFlora platform, in partnership with CHAH and the *Atlas of Living Australia*. Platform updates completed in the latest development sprint by the *Atlas of Living Australia* are currently being reviewed and tested. Results of this review will determine the work remaining to enable sufficient functionality for contributors to commence building floras on the platform.

Current gaps in the *Flora of Australia* and possible future priorities for new treatments are briefly outlined in an article to be published in A*ustralian Systematic Botany* (2015 ASBS Conference issue) (Knapp 2016). ABRS would appreciate any feedback about the paper and future priorities for new treatments to be emailed to *abrs@environment.gov.au*.

Grants

The 2017–18 National Taxonomy Research Grant Programme's Research and Capacity-building grant round will open for applications in September 2016. More information, including how to apply for funding, will be available from the ABRS website (Web ref.), once the round is released.

Bush Blitz

Recent expedition

June 2016 – Bush Blitz and the Parks Australia Commonwealth Marine Reserves branch partnered to undertake a voyage to the Coral Sea Commonwealth Marine Reserve for the joint purposes of species discovery and the survey and collection of marine debris. The Coral Sea expedition included expertise from the Western Australian Museum, Queensland Museum, and the University of NSW. This expedition also involved two science teachers from Victoria and Tasmania participating in a special additional Bush Blitz TeachLive. This was the first ocean-based Bush Blitz, which focused on the collection of terrestrial invertebrates, geckos and plants from the islands, and on marine invertebrates from the shallow waters around the islands or living on the marine debris.

Upcoming planned expeditions

August/September 2016 – Lake Torrens expedition in South Australia.

November/December 2016 – Croajingolong National Park expedition in Victoria. One of the Croajinalong NP expeditions will include the collection of some marine species including marine algae by Melbourne University.

References

Knapp Z.F. (2016) Gaps and priorities for the Flora of Australia: where to next? *Australian Systematic Botany*, in press.

Web ref. *www.environment.gov.au/science/abrs*

Zoë Knapp
ABRS
July 2016

Artists' corner

Margaret Flockton Award

While you have missed this year's Margaret Flockton Award it is not too late to view the meticulous work of the prize winners at the website (Web ref. 1).

This year as part of the 200 year celebrations of the gardens the *Sydney Morning Herald* produced a special feature on Margaret Flockton and they have also made available for sale prints of some of her works as well as those of other botanical illustrators, both modern and old.

Web references

1: *https://www.rbgsyd.nsw.gov.au/Science-Conservation/Botanical-Illustration/The-Margaret-Flockton-Award*

2: *http://www.smh.com.au/interactive/2016/garden200/*

Rare animal prints for SA Museum from BM

"Curious Beasts: Animal prints from Durer to Goya" is the title of an upcoming exhibition to be held at the South Australian Museum from October 21 2016 to February 5 2017. Featuring over 80 works on paper from the British Museum and rare items from the South Australian Museum's collections, *Curious Beasts* looks at how printmakers contributed to the knowledge of animals, but also at the wildly different ways in which the animal subject inspired graphic artists. The exhibition features prints by Albrecht Dürer, Francisco de Goya and George Stubbs, as well as other lesser known artists.

Web references

www.samuseum.sa.gov.au/explore/exhibitions/curious-beasts-animal-prints-from-duerer-to-goya

www.abc.net.au/news/2016-06-11/rare-animal-prints-to-go-on-show-at-sa-museum/7501864

Lesueur and Petit paintings from Baudin Expedition on display

Over 50 original sketches and paintings by the artists Charles-Alexander Lesueur and Nicola-Martin Petit of the Baudin Voyage of 1800-1804 are now on display at the South Australian Maritime Museum in Port Adelaide. The display is on until 11 December 2016 and from there will move to the Queen Victoria Museum and Art Gallery (Launceston) from 7 January to 20 March 2017; Tasmanian Museum and Art Gallery (Hobart) from 7 April to 9 July 2017; Australian National Maritime Museum (Sydney) from 31 August to 26 November 2017; National Museum of Australia (Canberra) from 15 March to 11 June 2018 and finally to the Western Australian Museum (Perth) from September to December 2018 (exact dates to be confirmed).

Web references

http://maritime.history.sa.gov.au/events/2016/art-science-baudins-voyagers-1800-1804

www.theaustralian.com.au/arts/review/treasures-from-french-explorer-nicolas-baudins-expedition-to-australia/news-story/3e1c1cc29cb3016229ce415fbcb95265

Coming meetings

Economic botany today: *plants and people* – a master class

Adelaide Botanic Garden
24-25 October 2016
Early Bird closes 31 August 2016

David Mabberley's two day *Economic Botany Today* master class will be offered by the Adelaide Botanic Gardens for the third time in October. Limited to 16 participants, the class explores that broad topic of the relationship between plants and people, including food, textiles, medicines, drugs, dyes, pesticides and perfumes and there is probably no better person to teach such a subject.

For more information download the flyer at Web ref. 1. For even more information you can read what wine writer Philip White experienced at the 2014 master class at Web ref. 2.

Web references

1: *www.environment.sa.gov.au/files/sharedassets/botanic_gardens/education/acohe/bgsa_acohe_economic_botany_0516.pdf*

2: *http://drinkster.blogspot.com.au/2014/11/amazing-days-with-david-mabberley.html*

Obituaries

Lyndley (Lyn) Alan Craven
3 September 1945–11 July 2014

B.J.Lepschi, A.M.Monro & K.J.Cowley
(with contributions from others as noted in the text)
Australian National Herbarium, Centre for Australian National Biodiversity Research,
GPO Box 1600, Canberra, ACT 2601

Australian botany and horticulture lost a significant figure with the passing of Lyn Craven in July 2014. A consummate taxonomist, Lyn's career encompassed herbarium-based taxonomy, extensive fieldwork and collections, insightful research into the systematics of his study taxa, and the practical application of taxonomic research to other disciplines. Lyn mentored a generation of botanists, both through formal post-graduate supervision and in-formal guidance in the herbarium, and he was an integral member of staff at the Australian National Herbarium (CANB) from the mid-1960s until his death (Fig. 1).

Fig. 1. Lyn in his office in the Australian National Herbarium (CANB), March 1999. Ph. M. Fagg

Possessed of a singular sense of humour and strong personal and scientific integrity, Lyn's contributions to Australasian systematic botany and horticulture were significant and wide-ranging. An early interest in horticulture, fostered by his father, Norman, during his childhood and teenage years in Melbourne, led to a professional career spanning 50 years, and an enduring legacy.

Scientific work

Early career

Lyn's professional botanical career began at the age of 18 in 1964, when he moved from his home in Melbourne to take up the position of Botanical Support Officer in the New Guinea Survey Group of the (then) CSIRO Division of Land Research and Regional Survey (LRRS) in Canberra. Shortly after arriving in Canberra, Lyn travelled to Papua New Guinea for the first time on a familiarisation trip as part of the American Museum of Natural History's 7th Archbold Expedition to the Huon Peninsula.

Following this initial trip, Lyn worked with Richard (Dick) Schodde on the CSIRO LRRS survey of the island of Bougainville, also in 1964. These early surveys proved to be an important influence on Lyn's future career and scientific interests. They formed the basis for a life-long association with New Guinea and the Pacific, field botany, and many of the plant groups that would later become his main research interests (including New Guinea rhododendrons, which Lyn had already begun to cultivate at his home in Melbourne). Two

other New Guinea surveys soon followed in 1966, to the Gulf and Morobe districts and to the Sepik area.

By 1967, Lyn's earlier interest in horticulture beckoned. As a teenager, Lyn had been a keen gardener and at home assisted his parents with propagation and cultivation of plants in their small part-time wholesale nursery business. The Hibiscus rosa-sinensis group was a focus and Lyn developed the *Hibiscus* '*Wirruna*' cultivar at that time, a hybrid between *H. heterophyllus* and *H. splendens* which remains in cultivation. Lyn had also worked at Berna Park Nursery in Cheltenham, Melbourne, at weekends and during school holidays. He purchased land in Cheltenham thinking he may start his own nursery business.

Resigning from his position with CSIRO, Lyn returned to Melbourne to study horticulture at Burnley Horticultural College between 1968 and 1970, having been awarded the A.J.Cronin Memorial Horticultural Scholarship. The return to Melbourne proved significant in more ways than one, as it was at Burnley that he met a fellow horticulture student, Kirsty Gunn. Following completion of horticultural studies, Lyn returned to Canberra in 1971 to take up a position in the Herbarium of the (then) Canberra Botanic Gardens (CBG). Kirsty later joined him and worked with the (then) CSIRO Division of Land Research, and they married in 1972.

Canberra

After approximately six months at CBG, Lyn was able to resume employment in his previous position with the LRRS at CSIRO. Shortly after returning to CSIRO, Lyn began to develop an interest in taxonomy, and this, along with field botany and plant collecting, would come to define his botanical career.

The herbaria of the CSIRO Divisions of Land Research and Regional Survey and Plant Industry were merged in the early 1970s, and Lyn subsequently transferred to the latter Division, where he would spend the remainder of his professional life. Testament to the excellent career structure then available within the organisation, he progressed from a Junior Laboratory Technician (in LRRS) to Principal Research Scientist in Plant Industry at the time of his retirement in 2009. Lyn undertook extensive taxonomic research in a range of groups during his career, with a particular focus on the Malvaceae (especially *Gossypium*, *Hibiscus* and related genera), Myrtaceae and *Rhododendron*. His taxonomic work was nearly always supported by extensive field observations and collections, and his taxonomic concepts were always carefully considered, conservative and robust. Lyn favoured a pragmatic approach to taxonomy, and preferred to emphasise similarities between groups of related taxa, rather than differences, and this is reflected in his broad generic concepts in taxa such as *Hibiscus*, *Melaleuca* and *Syzygium*. he authored or co-authored over 190 scientific publications during his career, including revisions of some large and difficult groups, such as *Hibiscus*, *Melaleuca* and *Syzygium* (see Web ref. 1 for full list of these).

Following significant health problems in the mid-2000s, Lyn retired from full-time employment in 2009, but continued his association with the Herbarium and CSIRO as an Honorary Research Fellow and Emeritus Research Scientist. Despite often quite debilitating illness, he remained an active researcher and author until a few days prior to his death in 2014, publishing widely on his research interests, including a much-anticipated handbook on the genus *Melaleuca* (Brophy et al. 2013).

Research specialisation

While Lyn's research interests were concentrated primarily on Malvaceae, Myrtaceae and *Rhododendron* (Ericaceae), this was by no means the extent of his interest or knowledge of the Australasian (and indeed the world) flora. Perhaps reflecting his early experience in broad-scale vegetation survey, Lyn possessed an extensive and thorough knowledge of vascular plants, and, along with David Jones and Tom Hartley, he was the person to see at CANB if you had a particularly intractable specimen that otherwise defied identification. His earliest forays into taxonomy were as a result of New Guinea survey activity, comprising revisions of *Plantago* (Plantaginaceae) and *Acmena* (Myrtaceae; with Tom Hartley) in New Guinea and adjacent landmasses, and the description of new species of *Homalium* (Salicaceae) and *Rhododendron* from New Guinea (Craven 1976, Hartley & Craven 1977, Craven 1979

and Craven 1980a).

Following survey work in the Alligator Rivers region of the Northern Territory in the early 1970s, Lyn became interested in the genus *Calytrix* (Myrtaceae). *Calytrix*, like many genera in the Australian flora at the time, had last been treated by Bentham (1867) and was in dire need of revision. Lyn published a revision of the northern members of the genus (Craven 1980b), and subsequently undertook a revision of the genus as a whole (Craven 1987) as part of an MSc degree, under the supervision of Mark Westoby, conferred by Macquarie University in 1984. His interest in the Myrtaceae continued to develop in subsequent years, focusing particularly on *Calytrix* and related genera in the Chamelaucieae, and also the Melaleuceae following initiation of studies into the genus *Melaleuca* by former CANB Director Bryan Barlow in the early 1980s. Bryan remembers:

> Lyn enthusiastically supported our idea to initiate a team approach to revision of the large genus Melaleuca, and it was a pleasure to work with him on the project. I can also honestly say that when I came to CSIRO as Head of the Herbarium (to the surprise of some), Lyn was the person who was most welcoming, and tried the hardest to make me feel at home. I still value Lyn's tolerance and understanding very highly.

Lyn's initial involvement in this project was to focus on the "scabra group" of *Melaleuca s.s.*, comprising some 60+ taxa largely confined to the southwestern botanical province of Western Australia. This work subsequently developed to encompass a revision of the genus *Melaleuca* s.s. (Craven & Lepschi 1999, Craven et al. 2004), as well as revisions of *Callistemon* (transferred to *Melaleuca*; Craven 2009; Brophy et al. 2013; Craven & Matarczyk unpubl.) and several smaller "satellite" genera.

Lyn also maintained an interest in *Syzygium* and related genera, following on from his early work with Tom Hartley on *Acmena*. Lyn and Tom intended to collaborate on a revision of *Syzygium* in Papuasia, and a sizeable portion of the herbarium vault at CANB was long occupied by large amounts of loan material of this genus, bearing notes in Lyn's and Tom's respectively distinctive handwritings. Tom's herculean efforts in the Rutaceae and his subsequent health issues combined to prevent this work from being completed. Nonetheless, Lyn undertook taxonomic studies in *Syzygium* in Australia, Papuasia, the Pacific and south-east Asia, and at the time of his death was working on a revision of the genus in New Guinea.

Evolution of Myrtaceae, particularly in regard to generic boundaries, became an increasing focus of Lyn's research in later years, and saw significant collaborative studies with students including Lachlan Copeland, Robert "Bort" Edwards, Ed Biffin, and Andrew Thornhill. Lyn generally favoured broad generic concepts, on the basis that they better represented the phylogeny of the group concerned, and had greater practical utility than the recognition of numerous (sometimes poorly defined) narrow generic segregates. Lyn applied this philosophy across all his research groups, at all levels of the taxonomic hierarchy, as his publication record attests.

Lyn's research interests in the Malvaceae and *Rhododendron* were long-standing, fostered by an early horticultural interest in these groups, and it is likely that one of his final publications will be a paper describing a number of new *Hibiscus* species from northern Australia (Craven et al., submitted). His contributions to the systematics of the Malvaceae were focused primarily on the Hibisceae, and encompassed taxonomic revisions as well as phylogenetic studies, the latter primarily in conjunction with former PhD student Bernard Pfeil. Lyn's research into the Malvaceae also demonstrated his strong belief in the utility of systematics and taxonomy outside of the disciplines themselves. Beginning in the 1980s, he collaborated extensively with colleagues from the crop adaptation group within CSIRO Plant Industry, the United States Department of Agriculture, and other agencies, on studies of the genus *Gossypium*. This work focused on crop improvement through the introduction of novel genes from Australian wild relatives.

Lyn's research on Australian *Glycine* (Fabaceae) was also influenced by collaboration with colleagues in disciplines other than systematics, through crop improvement studies undertaken by CSIRO Plant Industry. Similarly, Lyn's revision of the genus *Heliotropium*

was initiated by (then) CANB director Bryan Barlow in the early 1980s as a contribution towards biocontrol studies being undertaken by the former CSIRO Division of Entomology. The studies investigated the possibility of using arthropod and fungal control agents against *Heliotropium europaeum* in Australia (Delfosse 1985). At the time, the likely effects of these agents on non-target plant taxa were unknown due to the limited understanding of the taxonomy of the genus *Heliotropium* in Australia. Initially this project was to be a collaborative effort, involving a number of CANB staff, but ultimately it was Lyn that saw the project to fruition, publishing a detailed taxonomic treatment of the genus in Australia (Craven 1996a).

Other collaborations stretched across the continent and the Tasman and Pacific, particularly with like-minded individuals. Included in this issue are tributes by Lyn's collaborators Joe Brophy (p. 31), Peter de Lange (p. 32), Rhys Gardner (p. 33), Andrew Mitchell (p. 34) and Andrew Ford (p. 35) .

The genus *Rhododendron* remained a constant source of interest and fascination to Lyn, both horticulturally and systematically, in particular sect. *Schistanthe* (the *Vireya* rhododendrons, previously sect. *Vireya*). The members of this group of some 300 species distributed throughout south-east Asia and Malesia are popular as horticultural subjects. Lyn published extensively on the genus in the scientific literature with collaborators including Gill Brown, whom he co-supervised for her PhD conferred in 2004 (Fig. 2), and also in a number of horticultural works. The latter publications often "translated" the results of the latest research on the Vireyas for a non-specialist audience, explaining the reasons behind taxonomic rearrangements and re-namings in an accessible manner.

Lyn's pragmatic view of taxonomy and systematics was highlighted in the recognition of a second species of *Rhododendron* in Australia. He determined that plants previously referred to *R. lochiae* F.Muell. comprised two taxa: (1) an entity with a straight floral tube and pubescent anther filaments, which was commonly cultivated (*R. lochiae sensu* Craven); and (2) a previously overlooked, poorly-known taxon with a curved floral tube and glabrous anther filaments (*R. notiale* Craven). Since the type of *R. lochiae* represented the curved-tube taxon, a proposal was made to conserve the name with a conserved type (Craven 1996b) in order to maintain the way it was being used

Fig. 2. Gill Brown's PhD graduation, 18 Dec 2004, School of Botany, University of Melbourne. From L-R: Frank Udovicic, Gill, Lyn.
Ph. Rod Brown

in the scientific and horticultural communities. This proposal was defeated and a new name was thus required for the straight-tubed taxon. In his subsequent paper (Craven 2002) where *R. notiale* is synonymised under *R. lochiae*, and the name *R. viriosum* is published for the straight-tubed taxon, Lyn noted that:

> It seems, from my interpretation of their reports relating to the *Rhododendron lochiae* proposal, that the Committee [for Spermatophyta] believes that as far as the application and conservation of names is concerned there should be rigid separation between taxonomy and nomenclature *per se*. However, such an extreme view, even if achievable, is not in accordance with the wishes of many users of plant names, the majority of whom are not herbarium botanists.

Lyn's taxonomic output can be characterised by a careful, thorough methodology with meticulous and rigorous data collection and interpretation. While fieldwork may have initially alerted Lyn to the existence of an issue requiring resolution, taxonomic questions or revisions were generally approached first via examination of the collections at CANB, with available materials carefully laid out over much (or all!) of the available bench space in the herbarium. Taxa would be defined on the basis of herbarium specimens sorted into the most narrowly-defined entities, with these hypotheses subsequently refined through extensive fieldwork, cultivation of live material, careful examination of morphological and other features, and (increasingly as technology became available) molecular data sources. Lyn's contributions to various state and national floras as well as to other not strictly systematic works (e.g. Brophy et al. 2013), reflect his belief in the applicability of his chosen discipline, and his view that the results of scientific research should be readily available in a form useful to those outside the systematic and taxonomic communities.

Lyn served as the herbarium librarian for over two decades and worked to expand the library collections. Purchases were not restricted to purely systematic publications but encompassed areas including biogeography, ethnobotany, botanical art history, and botanists' biographies. Floras of regions adjacent to Australia were included, as well as publications of interest to the researchers working in the herbarium at the time and to others around Australia who could access the library via the inter-library loan system. Lyn was mindful of choosing distinct book and journal binding colours so that they could be found easily on the shelves. Surplus scientific publications were regularly dispatched during Lyn's tenure to institutions with less-developed libraries, including herbaria in New Guinea and the Pacific. After his death, a significant portion of his personal library was similarly shared with colleagues both in Australia and overseas.

Influences and mentorship

Reflecting Lyn's earliest experiences in systematics, colleagues Ru Hoogland and Dick Schodde proved to be significant influences on Lyn's approach to his chosen discipline, in both fieldwork and the herbarium (see Dick Schodde's tribute on p. 36). Lyn also respected the straightforward methodology and taxonomic philosophy of local colleagues such as Tom Hartley, and international luminaries including Cornelis van Steenis, Hermann Sleumer, and Bernard Verdcourt.

Prior to taking up his first position with CSIRO in 1964, Lyn briefly studied to become a primary school teacher. While it was not his eventual career, Lyn's abilities as a teacher and mentor were well demonstrated in later life. He formally co-supervised ten students between 1998 and 2011 for projects ranging from Honours to PhD degrees, with study topics reflecting his primary research interests:

1998 L.S. Juswara, Systematics of the *Hibiscus panduriformis* (Malvaceae) complex in Australia, Grad. Dip. Sci., Australian National University, co-supervised with Penny Gullan (ANU)

2002 B.E. Pfeil, Generic limits of the Australian representatives of Hibisceae (Malvaceae), PhD, Australian National University, with Curt Brubaker (CSIRO), Mike Crisp (ANU)

2004 G.K. Brown, Evolution and biogeography of *Rhododendron* sect. *Vireya* (Ericaceae), PhD, University of Melbourne, with Randy Bayer (CSIRO), Pauline Ladiges (MELU)

2006 L.M. Copeland, Systematics of *Homoranthus* (Myrtaceae), PhD, University of New England, with Jeremy Bruhl (UNE), Curt Brubaker (CSIRO)

2006 R.D. Edwards, Molecular systematics and morphology of *Melaleuca* (Myrtaceae) and

allies, Honours, Australian National University, with Mike Crisp (ANU), Lyn Cook (ANU)

2008 E. Biffin, Molecular phylogenetics and taxonomy of *Syzygium* (Myrtaceae) and allies, PhD, Australian National University, with Mike Crisp (ANU), Paul Gadek (JCU)

2008 M.L. Baum, Systematics of *Howittia* (Malvaceae), Honours, Australian National University, with Mike Crisp (ANU), Linda Broadhurst (CSIRO)

2009 S.H. Tuiwawa, Systematics of *Syzygium* in Vanuatu, MSc, Australian National University, with Mike Crisp (ANU), David Morris (ANU)

2011 A.H. Thornhill, Pollen studies in Myrtaceae, PhD, Australian National University, with Mike Crisp (ANU), Geoff Hope (ANU)

2013 R.D. Edwards, Biogeography of the Australian Monsoon Flora, with emphasis on the broad-leaved paper bark (*Melaleuca leucadendra*) species complex, PhD, University of Queensland, with Lyn Cook (UQ), Mike Crisp (ANU)

Ongoing: B. Choi, Systematics and evolution of *Melaleuca* (Myrtaceae), PhD, Australian National University, with Mike Crisp, (ANU), Lyn Cook (UQ), Carsten Kulheim (ANU), Joe Miller (CANB), Brendan Lepschi (CANB)

An active and interested supervisor, Lyn ensured his students were exposed to all facets of systematic botany. Wherever possible, he cultivated material of study taxa in the extensive glasshouse facilities available at CSIRO, thus allowing examination of living material that may have otherwise been unobtainable. Similarly, Lyn enabled students to undertake fieldwork in support of their research projects (and of course to further his own understanding of his main research interests). For example, in just one year (2003), Lyn and his students made trips to Sulawesi, Fiji and New Caledonia as part of ongoing studies in *Rhododendron* and *Syzygium*, resulting in many important and informative collections.

In addition to formal student supervision, Lyn mentored and advised countless other young and not-so-young botanists over the course of his life, especially at his home institution. Most staff members of a particular age at the Australian National Herbarium would have benefitted in some way from Lyn's guidance or advice, delivered with characteristically wry humour, in the early years of their careers. Anna recalls sharing a room with both Gill Brown and Bernard Pfeil and noting Lyn's solicitude towards his students:

> He would drop around to the students' room most afternoons to discuss progress and any problems they may be having during what I came to think of as his 'pastoral visits'. After a while, he obviously felt that he should extend this interest to me and my project. I was initially somewhat suspicious of being questioned about how 'the dear little Commies' (*Comesperma*) were going, but later came to see this as a kind gesture on Lyn's behalf. It is illustrative of his interest in the flora, as he could describe from memory the habitat of collections he'd made of the genus from northern Australia, but also his concern for the welfare of his colleagues.

Lyn's singular adherence to his principles and his many curatorial idiosyncrasies, however, could cause some consternation for more junior members of staff, especially where these were at variance with accepted practice at CANB. Brendan recalls being asked in 1993 by a particularly exasperated Kevin Thiele, then a postdoctoral fellow at CANB, why it was that "…everything you and Lyn do has to be contrary to what everyone else does?!". While Lyn's highly personal approach to herbarium management and curation may not have accorded exactly with that of his peers, he instilled a strong sense of pragmatism, practicality and, above all, scientific rigour in those fortunate enough to be under his guidance. Personal gain and recognition was of scant importance to Lyn in terms of his science, and he ensured that his students were aware of the need for sound, defensible data to support their conclusions. He similarly encouraged a conservative (but not timid) approach to interpreting the results of taxonomic and systematic studies, always encouraging the student to form their own hypotheses and opinions.

Travels and collections

Following on from Lyn's early experiences with the New Guinea Survey Group, fieldwork played a very important role in his subsequent botanical career. He travelled and collected widely in Australia, Malesia and the Pacific (Fig. 3), with major field trips, listed chronologically at the end of this article, a regular occurrence until the late 2000s when ill health curtailed his ability to travel extensively.

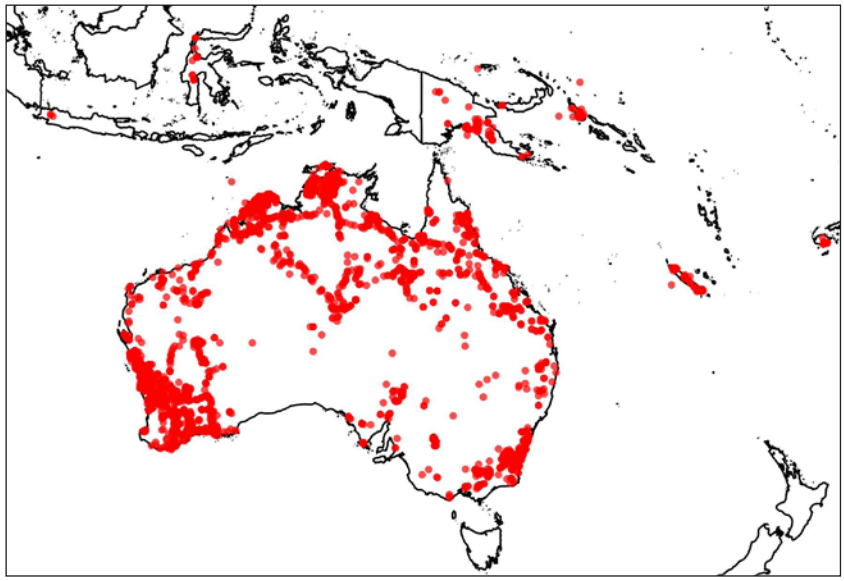

Fig. 3. Map of 23,125 collections, including those of which Lyn was the principal collector and those a co-collector. From Australia's Virtual Herbarium (AVH 2016)

Reflecting his earliest botanical experiences, New Guinea and adjacent landmasses held a particular fascination for Lyn (Fig. 4), although opportunities to collect in these areas were limited following the last of CSIRO land use surveys in the mid-1970s. Apart from a LRRS trip to the Central Province in the south-east of PNG in 1974, Lyn did not return to PNG again to collect until early 2006. Despite cessation of the New Guinea surveys, Lyn continued to be involved with large scale botanical survey work throughout his career, particularly in the monsoonal Northern Territory, as part of surveys undertaken by CSIRO prior to the establishment of conservation reserves, such as the Alligator Rivers Wildlife Sanctuary and Kakadu National Park in the 1970s and 1980s. Important co-collectors on these surveys included Mike Lazarides, Greg Whitbread, Glenn Wightman and Andrew Slee. Lyn also participated in two surveys organised by the (then) CSIRO Division of Wildlife Research at the invitation of former LRRS colleague, Dick Schodde. These took him to the McArthur River region in the Northern Territory in 1976 (CSIRO 1976), and the Lake Way area near Wiluna in arid Western Australia in 1978 (CSIRO 1978). He also took part in the Pilbara Region Biological Survey in 2006, covering part of the eastern Pilbara with co-collectors Tony Bean, Brendan Lepschi and Karen Wilson (Lepschi 2006; Fig. 5).

Much of the remainder of Lyn's fieldwork activity, especially that undertaken from the 1980s onwards, was directed primarily at specific research groups. However, he strongly believed in the value of general collecting and would always make good collections of other species encountered while in the field. Lyn placed great emphasis on collaborative fieldwork and spent much time in the field with fellow researchers, students and (especially) colleagues from CANB. These included trips to south-western Western Australia to collect Myrtaceae (especially *Calytrix*) in 1981 with Judy West, and numerous trips with research colleagues studying wild relatives of crop plants (cotton and soybean) during the 1980s and 1990s. These latter trips covered the monsoonal Northern Territory, the Kimberley region of Western Australia, northern Queensland, and other areas in eastern and central Australia. Important co-collectors on these trips included Curt Brubaker, Paul Fryxell, Jim Grace, Ted Hymowitz, Andrew Mitchell, James McD. (Mac) Stewart, Bernard Pfeil and Jonathan Wendel. Indicative of a far more relaxed approach to field safety in years past, Lyn also undertook a solo trip to the Pilbara region of Western Australia in 1982 to collect *Heliotropium*, after a co-collector from PERTH proved to be unavailable.

Following commencement of taxonomic studies on *Melaleuca* at CANB, Lyn undertook a number of fieldtrips to collect material for this project, especially focusing on taxa in the

Fig. 4. Holding a *Nypa fruticans* infructescence (*L.A.Craven & R.Schodde 875*; CANB 208229), near Ravikivau, Purari River delta, Papua New Guinea, 19 Feb 1966. Ph. D. Schodde

poorly-understood "scabra group". One trip was undertaken in 1990 with Frank Zich and a second in 1992 with both Andrew Lyne and Frank Zich. A final *Melaleuca* collecting trip in 1994 illustrated Lyn's collaborative approach to his science and his acknowledgement of the role that skilled non-professionals play in taxonomy and systematics. In addition to research assistant Brendan, Lyn also invited Ivan Holliday, an amateur Adelaide horticulturist and author with an interest in the genus. Ivan enthusiastically participated in the trip and it eventually resulted in the publication of a second volume of his book, *A field guide to melaleucas* (Holliday 1997). Subsequent research on *Melaleuca* led to two further fieldtrips to south-western Western Australia in 2000, specifically targeting the *M. uncinata* complex, in collaboration with Linda Broadhurst and Margaret Byrne (see Craven et al. (2004)). Linda recalls:

> One of my abiding memories of Lyn was our *Melaleuca* field trip (with Brendan) in WA. A wonderful trip was made even better by Lyn's insistence that we always stop in the nearest small town for coffee and something to eat at morning tea-time. We sampled lots of bakeries and coffee shops in the WA wheatbelt and beyond making it a truly memorable trip!

Several significant and productive citizen science friendships developed after Lyn met rural folk who were interested in their local flora. They were willing and able to assist as spotters of target species for him and so make their contribution to science. Lyn enjoyed the networking opportunities of his brand of botany and valued the contributions of others.

Lyn made many other incidental collections, particularly in south-eastern Australia around Canberra and in the alpine and sub-alpine areas of New South Wales and Victoria, in the course of other work and often on family holidays. Indicative of Lyn's horticultural leanings and his strong belief in the utility of herbarium collections as a research and reference tool, He often collected material of non-Australian taxa in cultivation. These, like all of his collections, are ample, high quality specimens.

The quality of Lyn's specimens makes them instantly recognisable. They are invariably large, informative specimens with accurate data, often comprising multiple sheets so as to capture important morphological features not able to be represented on a single sheet. Lyn's skills as a field botanist and collector can be traced back to his earliest experiences with the New Guinea Survey Group, under the direction of Ru Hoogland. According to Lyn, it was Hoogland's guidance and expertise as a field botanist that provided the basis for the high quality collections made by Lyn and other staff of the LRRS, both in New Guinea and mainland Australia. Similarly, a guiding principle of the LRRS collections was the wide distribution of duplicate material to herbaria across the world, something Lyn continued throughout his career. As well as agreeing with Hoogland's views on the free and open sharing of scientific data, Lyn saw duplicate distribution as an "insurance policy" against potential loss of material in one's home institution (especially where

types are concerned), a means of obtaining reliable determinations from experts in other herbaria, and way to develop herbarium collections through distribution of effort. Lyn and Brendan long intended, but ultimately failed to "beat" Hoogland's apparent record for duplicate distribution: thirty-eight sheets of a naturalised *Acacia baileyana* collected in Canberra in 1962 (*Hoogland 2554*, CANB 122546), distributed to all major Australian herbaria as well as a large number of overseas institutions. The type of *Melaleuca interioris* (*Lepschi & Craven 4358*, CANB 638283), however, was a noteworthy effort, with 32 duplicates, again widely distributed to all major Australian herbaria as well as many international institutions.

Lyn's collections number in excess of 15,500 gatherings, a significant contribution by any standard, but even more so when one considers that many of these have multiple sheets and anywhere from two to more than ten duplicates. He primarily collected the indigenous flora, weedy taxa being of lesser interest, unless they were related to groups of research interest. Brendan recalls his (apparently feigned) disappointment at him collecting the naturalised *Datura leichhardtii* in western Queensland in late 1993: "Send a bloke to the middle of nowhere and what does he come back with?! A weed!".

Early in his career with CSIRO, as a result of his association with fellow LRRS New Guinea Survey team member and plant-taxonomist-turned-ornithologist Dick Schodde, Lyn also made significant contributions to bird collecting in New Guinea (see p. 36).

Lyn harboured a strong dislike for anything and anyone advocating a bureaucratic or small-minded approach to science (and to life in general), and this extended to his views on biological collections. In his view herbarium collections should be allowed to grow and develop without bureaucratic restrictions, but only by the addition of good-quality material with associated data. He advocated the free exchange of specimens and information between researchers, institutions and other interested parties. In his view collecting was a centrally important part of botany supporting taxonomy, systematics and other research.

Fig. 5. Lyn tending to CANB specimens from the Pilbara Biological Survey with Steve van Leeuwen preventing a "pressalanche" in the background, 2 May 2006.
Ph. B. Lepschi

Names

Lyn's approach to plant nomenclature was typically idiosyncratic and yet thoroughly practical. For example, when publishing *nomina nova* he would generally choose a name to reflect the meaning of the original epithet (so that *Calothamnus sanguineus* became *Melaleuca cruenta*). He would publish names honouring those who he felt had made a significant contribution to botanical science, regardless of his own feelings towards the person. While many of Lyn's epithets are descriptive he took care to choose names that were more interesting than the obvious options and often found inspiration outside the purely botanical. This imaginative approach was particularly evident in *Heliotropium*, where diagnostic characters are small and frequently hard to distinguish, with a great deal of superficial resemblance between taxa. Lyn chose the epithet *tytoides*, for example, because the mericarps, when viewed from an extremely specific angle, resembled the face of

an owl, and *tachyglossoides* because the hairy mericarps were reminiscent of an echidna.

Lyn would also take care to choose what he felt were euphonious names, including *Melaleuca campanae* (for Barbara and Don Bellairs) and *M. sapientes* (for Rob and Ann Smart). He had a particular respect for such non-professional botanists and collectors interested in the flora of their local areas. He encouraged and mentored numerous individuals across Australia, and freely provided materials, advice and information. In return, the collections at CANB were augmented by the addition of numerous high-quality specimens from regions otherwise not (or rarely) visited by herbarium staff. As well as specific epithets acknowledging particular individuals (such as those above), A broader appreciation is reflected in *Melaleuca zeteticorum*, named for those "disposed to search" their natural environment.

While Lyn made a significant contribution to the taxonomy of Australian and extra-Australian plants (summarised in Tables 1 and 2), he did not have terribly much patience for the more pettifogging details of nomenclature and the Code, particularly in instances where he felt that decisions would have a detrimental effect on clarity or impact unduly on less affluent nations or groups. For example, he was one of the authors of a paper entitled "*Acacia*: The case against moving the type to Australia" (Luckow et al., 2005).

Although Lyn made several large-scale recombinations and rearrangements necessitated by changes in taxonomic concepts (e.g transfer of *Callistemon* to *Melaleuca*) he was definitely not an armchair nomenclaturist. Anna recalls reading one of Lyn's papers for the CSIRO internal review panel, in which he published a new species in a myrtaceous genus. While discussing the paper, Lyn mentioned in passing that he thought the generic name may have been misspelled by its original author. With the naivete of (relative) youth, Anna suggested that this paper would be an ideal opportunity to address and resolve the question. Lyn's response was "Got to leave something for someone else to do, eh?".

Eponymy

As of May 2016, there are thirteen published plant names honouring Lyn's contributions to taxonomy and systematics (Table 3). The breadth of taxonomic groups covered is a reflection of his diverse collecting and an indication of the esteem in which he was held by colleagues across areas of botanical specialisation.

Table 1. Numbers of plant names based on Australian type material authored or co-authored by Lyn Craven (APNI (2016); IPNI (2016)).

Boraginaceae: *Heliotropium*, 58 n.sp.: recombinations or renamings: 3 sp.
Capparaceae: *Cleome*, 1 n.sp.
Dilleniaceae: *Pachynema*, 3 n.sp.
Ericaceae: *Rhododendron*, 2 n.sp.
Fabaceae: *Glycine*, 8 n.sp.
Malvaceae:
Decaschistia, 2 n.sp.
Gossypium, 7 n.sp.
Hibiscus, 21 n.sp.[1], 2 n.var.; recomb./renam.: 4 sp.
Lagunaria, recomb./renam.: 1 sp.
Urena, 1 n.sp.: recomb./renam.: 1 var.
Myrtaceae[2]:
Asteromyrtus, recomb./renam.: 5 sp.
Backhousia, 2 n.sp.
Beaufortia, recomb./renam.: 1 sp.
Calytrix, 32 n.sp., 1 n.subsp.; recomb./renam.:12 sp. 1 subsp.
Darwinia, 2 n.sp.
Homalocalyx, 3 n.sp.: recomb./renam.: 6 sp.
Homoranthus, 7 n.sp.
Lindsayomyrtus, recomb./renam.: 1 sp.
Melaleuca, 73 n.sp., 6 subsp., 2 var.; recomb./renam.: 126 sp. 15 subsp., 11 var.
Petraeomyrtus, recomb./renam.: 1 sp.
Phymatocarpus, 1 n.sp.
Syzygium, 6 n.sp., 1 n.subsp.: recomb./renam.:13 sp., 1 subsp.
Poaceae: *Micraira*, 1 n.sp.
Simaroubaceae: *Quassia*, 1 n.sp.
Solanaceae: *Duboisia*, 1 n.sp.
Totals (Australian)*:* 232 n.sp., 8 n.subsp., 4 n.var.; recomb./renam. 177 sp., 17 subsp., 12 var.

[1] Plus one manuscript name as at June 2016.
[2] Plus one new genus name, one new subgenus name and two new subgeneric combinations, six new section names and two new sectional combinations.

Names based on Craven type material

A combination of data extracts from ANHSIR, APNI, and IPNI (all 2016) show that a total of 279 scientific names have been based on type material with Lyn as sole or co-collector, ranging over 53 families and 103 genera. Of these 279 names, 124 list him as at least a co-author but the remaining 155 taxa were described by other unaffiliated authors. This is an indication of the high quality of Lyn's collections and his belief in distributing them as widely as possible to make them available for research.

Table 2. Numbers of plant names based on extra-Australian type material authored or co-authored by Lyn Craven (APNI 2016); IPNI 2016)[1]

Boraginaceae[2]: *Heliotropium*, 6 n.sp.; recombinations or renamings: 6 sp., 2 subsp.
Ericaceae: *Rhododendron*, 5 n.sp; recomb./renam.: 17 sp., 1 subsp., 1 var., 2 formae
Salicaceae: *Homalium*, 5 n.sp
Myrtaceae[3]:
Acmena, 4 n.sp; recomb./renam.: 1 sp
Asteromyrtus, 1 n.sp; recomb./renam.: 1 sp.
Decaspermum, 1 n.sp.
Eucalyptopsis, 1 n.sp.
Melaleuca; recomb./renam.: 5 sp., 1 var.
Octamyrtus, 1 n.sp.
Syzygium, 5 n.sp; recomb./renam.: 22 sp., 1 var.
Plantaginaceae, *Plantago*, 1 n.sp.
Totals (extra-Australian)*:* 24 n.sp.; recomb./renam.: 52 sp., 3 subsp., 3 var., 2 formae

[1] These figures may be an underestimate, as the Index Kewensis source data only includes type information from 1997 onward.
[2] Plus one new subfamilial name
[3] Plus one new section name and one new sectional combination.

Table 3. Plant names honouring Lyn Craven.

Australian taxa
Angiosperms
Dilleniaceae: *Hibbertia cravenii* J.W.Horn
Ericaceae: *Rhododendron cravenii* Danet
Goodeniaceae: *Goodenia cravenii* R.L.Barrett & M.D.Barrett
Malvaceae: *Hibiscus cravenii* (Fryxell) B.E.Pfeil & Craven [Basionym: *Alyogyne cravenii* Fryxell]
Poaceae: *Hygrochloa cravenii* Lazarides
Proteaceae: *Grevillea cravenii* Makinson
Lichens
Parmeliaceae: *Xanthoparmelia cravenii* Elix & J.Johnst.; *Xanthoparmelia lynii* Elix & J.Johnst.
Extra-Australian taxa (Angiosperms)
Araceae: *Rhaphidophora cravenschoddeana* P.C.Boyce (also honouring co-collector of the type material, Dick Schodde)
Myrtaceae: *Eugenia craveniana* N.Snow & Peter G.Wilson; *Syzygium cravenii* B.J.Conn & Damas
Pittosporaceae: *Pittosporum cravenianum* Schodde
Rutaceae: *Melicope cravenii* T.G.Hartley

Other legacies

While Lyn's scientific contributions are significant, his absence is felt at CANB in a number of other ways.

Lyn was a keen cook and several of his CANB colleagues have recipes in their collections in his distinctive blue-biroed handwriting. He seemed to tackle recipes almost scientifically, undertaking frequent replication and variations, buying ingredients in vast bulk quantities, and often using produce from his own garden. The fruits of these labours were enthusiastically consumed at CANB morning teas and some (persimmon cookies, for example) are still being made by members of staff.

Lyn's horticultural skills were also generously shared, with various of his bulbs, cuttings and seeds being dispersed throughout the gardens of Canberra and donated to local fetes. Kirsten still enjoys a cheerful display of dwarf cyclamens each year, with the original seeds supplied by Lyn with advice to scatter them at will. He would also grow tomato seedlings in order to raise funds for Melbourne Cup afternoon tea at CANB, planting several less-common varieties and providing detailed tasting and propagation notes to the buyers. He enjoyed growing vegetables but his passion was the cultivation and conservation of Vireya rhododendrons. His living collection has been donated to the Victorian Branch of the Australian Rhododendron Society and plants are now housed in a purpose-built Vireya House at the National Rhododendron Gardens at Olinda in Victoria.

For curators and collection managers, one slightly infuriating habit of Lyn's was his unorthodox use of herbarium supplies for ephemeral purposes. He would store industrial quantities of all such supplies in his own office, which would sometimes be utilised (in his absence) by other staff members as a secondary source of materials. Staff would often find brief notes of Lyn's whereabouts in indelible ink on pristine herbarium card, flimsies or other similar materials. His homemade fruit bread would be carved on a new sheet of herbarium cardboard and other archival herbarium supplies would be appropriated for temporary uses including pin-boards, or as display boards for pictures of interesting rhododendrons and pithy quotes from botanical publications. More thrifty members of staff at CANB would take it upon themselves to return the results of Lyn's craft to their intended use, painstakingly pasting card over the front flap of purpose-made herbarium boxes which had had their temporary contents permanently designated in 'texta'.

Lyn also had an unerring ability to identify in others skills that he did not share, or perhaps did not care to develop (more complex computer manipulation, wrangling with printers and so on). He was somehow able to subtly flatter his colleagues who did possess these skills so that they almost felt rewarded by the opportunity to assist him with often quite time-consuming projects.

We will also miss Lyn's personal quirks including a curiously tuneless whistle (heard any time he walked down the corridor of the Herbarium), his obtuse and highly individual sense of humour, and his insistence on using a metal mug both in the field and in the tea room (accompanied by the incessant "chinking" of a slowly-stirring teaspoon until the beverage was entirely consumed). Lyn had an encyclopaedic knowledge of the flora of Australia and the world, and a ready willingness to advise on taxonomic, nomenclatural or horticultural matters, and to offer considered (but sometimes unsolicited) opinions on his multitudinous other interests.

Personal and Family Life

Kirsty has written:

> As a child it is understood that Lyn was a reserved boy who liked to have his Primary School lunch at home rather than in the playground. He was self-assured and interested in his school work and always did his homework. He was an avid reader and his love of natural history and, in particular, birds and plants, emerged at an early age. Lyn was not sporty. But as the son of sporty parents, gaining a place in a secondary school team, albeit the "not much running required" hockey goalie, earned him the privilege of a home aviary where he kept finches, quail and bantams. He was not a tennis partner for his sister. He fished from the bayside beach at Black Rock with his Dad and grew to enjoy trout fishing.
>
> Lyn was a mature and diligent tertiary student who had experienced the rigours of fieldwork in PNG. By this stage a career path was in his mind and he began the slow yet focussed path to working in botany and plant taxonomy and applied himself with commitment. While a student in Melbourne he was a young office bearer in the Victorian branch of the Australian Rhododendron Society.
>
> After marriage Lyn acquired new skills in carpentry which he applied to furniture making for the newly built family home. He built a generously large glasshouse on the block modelled on those of CSIRO and progressively filled it with species Rhododendrons raised from seed, cuttings or obtained from other enthusiasts.
>
> Lyn was no dilettante and his personal life was goal-oriented and purposeful. It was, for some family members, annoyingly prioritised. He applied the same rigours to his personal interests as to his botanical work. There were no half measures and if the job was worth doing it was completed. While there was no stereo microscope at home much botany progressed after hours.
>
> Family life was punctuated by Lyn's absences for fieldwork and he was missed. When at home he factored in time for the interests of Cathy and Ross and assisted where possible with limited community activities. Lyn was very caring in his own way and proud of Cathy and Ross's personal achievements while acknowledging they were always free to enjoy their own success and define their personal paths. He was a caring person and valued our geographically spread family and friends.
>
> Camping was a feature of family life and Lyn had some interesting, and often lesser known destinations in mind to share with local friends. Lyn had a thirst for knowledge and was an ideas man. He was a lateral thinker for things other than grant proposals and research topics for students and had many good ideas. He sometimes had good ideas about how others might like to spend their time that were variously adopted or rejected. At the same time though he gave of himself and was a sharing person and made a difference when it counted most.
>
> In his later years Lyn allowed himself the luxury of socialising more extensively. He really valued the company of local neighbourhood friends and joined various U3A groups where he was a valued member. The National Folk Festival became important to him as did a wider appreciation of music. He followed "the world game" (soccer) and cycling. Hosting work-related visitors had always been a part of home life but had always

been shared. He more recently hosted fabulous Men's Dinners while I was away and expanded his culinary skills. He created his own signature pizzas and curries and always knew better than the recipe.

Lyn was always modest in his achievements, both personal and professional. He was intelligent, kind and generous. In adversity he was not one to carry a grudge and in the years of his illness demonstrated poise, dignity, grace, determination and courage when faced with the challenging circumstances which unfolded. At all times he was committed to his family, friends and colleagues and the furthering of horticultural and botanical knowledge.

In conclusion

While we will remember Lyn very much as an individual, he is also one of the last of a cohort of systematists who worked to develop modern taxonomic collections and research at CANB. Lyn's work contributed to the development of the Australian National Herbarium and its growth from a number of small, but significant collections within CSIRO, to a well-integrated institution with a national focus and international standing. Combined with the deaths of Laurie Adams, Ian Brooker, Max Gray, Tom Hartley and Mike Lazarides over recent years, Lyn's absence is keenly felt, and represents a significant loss both to the Australian National Herbarium and to taxonomic botany in Australasia.

Acknowledgments

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Major collecting trips undertaken by Lyn Craven

Primarily for CSIRO Division of Land Research and Regional Survey and Division of Plant Industry. Listed are the country, region, notes on survey and accompanying collectors.

1964 New Guinea, Bougainville Island, Collections for CSIRO Land Research and Regional Survey (LRRS); with R.Schodde

1966 New Guinea, Gulf and Morobe Districts; Sepik District, Collections for CSIRO Land Research and Regional Survey (LRRS); with R. Schodde (Fig. 4)

1973 Northern Territory, Alligator Rivers region, CSIRO Division of Land Use Research survey

1974 New Guinea, Central District

1975 New South Wales and Queensland, with A.E. Orchard & T.A. Halliday (for AEO's *Myriophyllum* revision)

1976 Northern Territory, McArthur River region, CSIRO Division of Wildlife Research faunal survey

1977 Northern Territory and Queensland, monsoonal,

1978 Western Australia, Wiluna district, CSIRO Division of Wildlife Research faunal survey

1980 Northern Territory, Alligator Rivers region, CSIRO survey for establishment of Alligator Rivers Wildlife Sanctuary/Kakadu National Park

1981 Northern Territory, Alligator Rivers region, CSIRO survey for establishment of Alligator Rivers Wildlife Sanctuary/Kakadu National Park; with G.H. Whitbread

1981 Western Australia, South-western, *Calytrix* and other Myrtaceae; with J.G. West (*Calandrinia*)

1982 Western Australia, Pilbara region, *Heliotropium*

1983 Northern Territory, arid zone, *Heliotropium* and Malvaceae (especially *Gossypium*); some with P.A. Fryxell

1983, Western Australia and Northern Territory, monsoonal, Malvaceae (especially *Gossypium*); some with P.A. Fryxell & J.McD. Stewart

1984 Northern Territory, Alligator Rivers region, with G. Wightman

1984 Western Australia and Northern Territory, monsoonal

1985 Western Australia and Northern Territory, monsoonal, Malvaceae (especially *Gossypium*); with P.A. Fryxell & J.McD. Stewart

1987 Northern Territory and Queensland, monsoonal, *Heliotropium*, Malvaceae (especially *Gossypium*); with J. Grace

1990 Northern Territory, Alligator Rivers region, survey for stage two of Kakadu National Park; with A.V. Slee & others

1990 Western Australia, South-western, *Melaleuca*; with F.A. Zich

1992 New South Wales and Queensland, -, *Gossypium*; with J. Grace, P. Lawrence & others

1992 Western Australia, South-western, *Melaleuca*; with F.A. Zich & A.M. Lyne

1993 Western Australia, Monsoonal, *Glycine*; with J.McD. Stewart & A.A. Mitchell

1993 New South Wales and South Australia, *Gossypium*; with A.H.D. Brown, J. Grace & others

1994 Western Australia, South-western, *Melaleuca*; with B.J. Lepschi & I. Holliday

1997 New South Wales and Queensland, -, Malvaceae (especially *Gossypium*); with P.A. Fryxell & J.McD. Stewart (June). *Callistemon*; with J.A. Matarczyk (October-November)

1997 Northern Territory and Queensland, arid zone, Malvaceae (especially *Gossypium*); with C.L. Brubaker, J. Grace & J.F. Wendel

2000 Western Australia (twice), South-western, *Melaleuca uncinata* group; with M.M. Byrne, L.M. Broadhurst & W.E. O'Sullivan (April) and B.J. Lepschi (October–November)

2000 Western Australia and Northern Territory, monsoonal, With B.E. Pfeil

2001 Northern Territory and Queensland, monsoonal, *Glycine*; with T. Hymowitz (NT only)

2003 Indonesia, Sulawesi, *Rhododendron* sect. *Schistanthe*; with G.K. Brown

2003 Fiji, *Syzygium*; with E. Biffin

2003 New Caledonia, *Syzygium*; with E. Biffin

2006 New Guinea

2006 Western Australia, Pilbara region, WA Department of Conservation and Land Management's Pilbara Biological Survey; with A.R. Bean, B.J. Lepschi, K.L. Wilson and others

2008 New Caledonia, *Syzygium*; with R.L. Craven and others

Memories of Lyn Craven

Joe Brophy
Senior Research Fellow, School of Chemistry, University of New South Wales

I have been privileged to have collaborated with Lyn Craven for over 30 years. I had heard of him as a botanist who was working on genera within the family Myrtaceae and as a chemist working on leaf oils was looking forward to meeting him and the opportunity arose at a meeting in Canberra in the early 1990s. As a result of that meeting we collaborated for over 30 years on projects on essential oils, starting with a publication on the leaf oils of the genus *Asteromyrtus* in 1994 and culminating in the publishing of the book *Melaleucas: their botany, essential oils and uses* by Brophy, Craven and Doran, in the year before Lyn died.

As part of the second and third collecting trips to Western Australia that Lyn made with Brendan Lepschi and others he collected samples for oil analyses. The results of his collecting trips there were looked forward to with a mixture of both excitement and trepidation. For a period of about a month on each trip numerous Australia Post Express Post bags would arrive each day for recording and then analysis and it usually reached the stage that my office floor was literally covered with these opened bags, and it took a considerable time to clear the office as we analysed the specimens for their oil. Lyn showed a real interest in what sort of oils these species produced and was always on the lookout for species which could be of economic use because of their oils or other attributes.

When we decided to 'get serious' about the melaleuca book there were about 90 species still not examined for their oils. Lyn first of all checked out the Botanic Gardens sources for species that we had not sampled and after that, with John Doran, worked out what species could be obtained by John and David Lea on their collecting trip to WA. After that trip there were still a small number of species to be got and he was then able to call on friends out in the outback of WA to collect the odd species that were in their locality. He seemed to know people everywhere. When it was all finished we had managed to get all but one *Melaleuca* species and so were able to produce a comprehensive book.

He was a good friend with a very dry sense of humour and I will miss our correspondence and, less frequently, phone calls. I think that our collaboration is a great example of what can be achieved by people attacking a problem from different perspectives.

Fig. Lyn and Joe Brophy (UNSW) on the central coast of New South Wales sampling *Melaleuca* spp. for essential oil extractions, 10 Mar 1993. Ph. B. Lepschi

Lyn Craven (1945–2014)
thanks for all the curries and the support

Peter J. de Lange
Kaipūtaiao Matua- Mātai Hauropi, Department of Conservation, Private Bag 68908, Newton, Auckland 1145, New Zealand (*pdelange@doc.govt.nz*)

I first met Lyn Craven through the invitation of Dr Rhys Gardner of Sandringham, Auckland. I knew of Lyn of course, through his prolific papers, an entertaining conference paper I saw him give in Auckland at a Systematics Conference during November 1991, and from the high praise Rhys meted out whenever his name was mentioned in his hearing. My view – if Rhys praises someone, then that someone is someone you had better pay attention to.

I also knew Lyn through my association with Dr Brian Murray at the University of Auckland. Brian had bravely taken me on as a PhD student, and as neither of us liked looking at *Kunzea ericoides* chromosomes that much, we'd taken to counting other indigenous New Zealand plants (as yet uncounted) for 'fun'. Lyn had popped into our lab to see Brian whom he knew because Brian periodically went to Canberra to count chromosomes for various projects he was doing with Dr Andrew Young. At the time I had just done some *Hibiscus* in the problematic *H. trionum* complex. Lyn was very interested in my results as he was then engaged in a study of Australian 'bladder ketmia' (as he called the various members of the *H. trionum* complex) and getting 'nowhere'.

A few years later I was at a conference in Melbourne (2003) honouring von Mueller where Lyn had entertained us all with his hilarious paper on *Melaleuca uncinata*, complete with images of the awful 'kitsch' then being made and sold from this species complex. He also presented another paper on Hibiscus from which I learned that the flowers of this genus were once used (and still are in parts of India) by street urchins to shine shoes. As a break from the presentations Lyn spirited me and Eve Lucas out for lunch at a local 'hole in the wall' where we ate (on his recommendation) an exceptional curry, whilst Lyn outlined all sorts of fantastic projects he wanted our input in. This resulted in my sending him seed of the two New Zealand members of 'bladder ketmia' complex I had recognised, from whose study Lyn then wanted Brian Murray and me to count the chromosomes of the Australian and African accessions he had acquired

Lyn, I soon learned, had interesting political views and he simply could not abide US President George W. Bush Jnr. As a result we traded many an electronic joke, and he simply adored my gift of a 2006 calendar that trumpeted a 'special' Bush quote for all 365 days of the year!

While this was going on, back in New Zealand, once Brian Murray and I had obtained all the necessary biosecurity approvals Lyn sent out a consignment of 'bladder ketmia' seed, from which we grew a range of plants, and from which we dually counted their chromosomes. This ended up being my first paper written with Lyn (Murray et al. 2008), and it highlighted amongst many things that the New Zealand members (one shared with Australia – now *H. richardsonii*) were all diploid, the rest of the Australian and African ones were tetraploid. Lyn was delighted. Of course by then Lyn had already been diagnosed with cancer but if it bothered him he hid it very well, and he insisted on keeping on with the Hibiscus revision. In due course Craven et al. (2011) was published – my second collaborative paper with Lyn – in which we showed that *Hibiscus trionum* is not in Australia or New Zealand. We also recognised a new species (*Hibiscus verdcourtii*) for Australia, and reinstated to that continent's flora *H. tridactylites* and *H. richardsonii*. In New Zealand we recognised *H. richardsonii* as indigenous and also described, using an informal 'tag name' a still unresolved, presumably naturalised 'bladder ketmia'. At the time I had been convinced this entity had come to New Zealand from Australia but Lyn noted it matched nothing there or indeed in Africa, and thought it another new species. Since then I have looked for it in various Canadian, USA (American) and European herbaria I have visited and failed to find it. Perhaps Lyn was right, and our New Zealand 'weed' is actually another as yet unnamed, possibly endemic species.

I'd like it put on record that throughout my PhD on the hellish New Zealand members of the *Kunzea ericoides* complex Lyn was a staunch ally, he never minced his words either, always delivering his views on my writings in unambiguous sentences. He always helped. When needing *Asteromyrtus* for my *Kunzea* phylogenetics study he went to extraordinary lengths to help me obtain vital DNA samples so enabling that works completion (de Lange et al. 2010), and, whilst I cannot say for certain I think he had a hand in reviewing my final monograph of the New Zealand species (de Lange 2014).

Toward the end of his life he took (to my eyes anyway) an unexpected interest in New Zealand's indigenous bird life, and together with partner Kirsty toured parts of our country looking for birds. In this field Lyn even took on New Zealand ornithologists, when he maintained – correctly I believe – that he had seen brown creeper (*Mohoua novaezeelandiae*) outside their stated South Island range in south Westland. I don't think he ever convinced our "birdo's", but he certainly gave them a good run for their money.

Lyn was as kind and generous as he was thoughtful and meticulous. He always sent me his family's 'Xmas letter'. He liked to talk about his garden. He enjoyed taking the mickey out of us New Zealanders in a hilarious, impersonal way that made you laugh – something I think New Zealanders are losing the ability to do these days. He enjoyed a good joke, and as I have indicated he really loathed politicians – especially those from the former Bush Jnr. administration. He was always sending you things – indeed late last year I received a massive tome on Australian *Melaleuca* (Brophy et al. 2013), this in return he said for my having send him a copy of *Threatened Plants of New Zealand* (de Lange et al. 2010b).

I will miss Lyn but I feel honoured to have known him, and worked with him. He was a great man.

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Vale Lyn Craven

Rhys Gardner
Research Associate, Botany Department, Auckland War Memorial Museum

In the mid-1980s I was asked by anthropologist Ralph Bulmer if I would try to name his New Guinea collections, orphans scattered through numerous of the less-visited AK family folders. It seemed wise to ask for help, so it came about, in the carefree but efficient fashion of those days, that a fragment of an AK *Pittosporum* found its way to Lyn, perhaps for no better reason than a "related species" bore his name.

The same round of begging-letters had drawn an expressive reply from Corner, urging me to use his keys. Lyn's was equally prompt, and only cautiously confirmatory of the name I had suggested, but somehow I felt encouraged, and wrote more, and so our friendship began. Later I was able to show him my own New Guinea collections (and better, give duplicates to CANB); these, especially of *Rhododendron* and *Syzygium*, might have made up for my naive beginning.

I visited Canberra several times with respect to the Bulmer project, noting and enjoying

the high degree of organization there, both at CANB (bound series of reprints, collectors' names on the flimsies!) and at Melba with Lyn and Kirsty (sunken glasshouse, always pizza on Sunday night!). Between these visits we exchanged letters, phone calls with family news, recipes, news about books of all sorts, and, often (thanks to something marvellous called "surface postage") the books themselves. Everywhere on my shelves I see reminders of Lyn's generosity.

And of course I was hugely impressed by CANB's Hoogland-Craven, Schodde-Craven, and Craven s.s. material, which, as everyone knows, is of the highest standard: big well-laid out specimens, carefully arranged (often over several sheets, upper and lower sides showing, anticipating the digital age), and generally in duplicate or triplicate at least (*Pittosporum cravenianum* had 8 duplicates). The benefit they have been to both beginners and experts in Malesian botany is tremendous.

Lyn and I occasionally disagreed on less important things. I remember being told off for suggesting there had been a degree of extravagance in using treated-wood timbers for the sides of the Craven vegetable beds – a mistake of a New Zealander who didn't realize that Canberra can, occasionally, be quite wet. Lyn would have hated to have been thought extravagant, but would have hated even more being thought to have been less than completely thorough.

We never published together, the closest being something I wrote and he checked over, on peculiar Latin usage in NZ botany. This was rather cheeky as neither of us could be called scholars. But we did think alike here, that not only was the Code clear in its Recommendations on the particular subject (geographical epithets from the Maori language) but also its Principles were clear: tradition was not to be broken with for reasons of political correctness. I can almost hear Lyn when I write this.

When I became ill and had to have therapy in Melbourne for a couple of months, without knowing anyone there, Lyn came and took me out to the mountains — where I nearly froze, but underneath a *Nothofagus*, by a *Coprosma*, and with a fellow-botanist to get the specimens back; what more could I have wished for?

The endurance and thoroughness that carried Lyn through his big groups naturally extended through the years of his illness: if the health of his kidneys depended on drinking a glass of water an hour, day after day after day, you can bet that Lyn didn't spill a drop. Although he confessed to me (just once) in those last years that he'd been "lazy" recently (his strongest word of disapproval); he had, in fact accomplished an astonishing amount. Perhaps there is a hidden "because" here, but to start such things at such a time I think is admirable, let alone finish them.

In one of our last telephone calls, we touched on the subject of *Syzygium*, and as we said goodbye (always "hooroo" from him) it wasn't quite business as usual: "I've just scratched the surface" he said. How often during that time I wished longer days for such a diligent, kind and generous colleague and friend.

December 2014

Lyn Craven, good botanist and friend

Andrew Mitchell
Perth

I took on the role of pastoral advisor in Meekatharra for the WA Department of Agriculture in 1980 with some misgivings due to Meekatharra being in the middle of nowhere, myself being single at 30 and possible social isolation. I didn't realise that the botanical and zoological world would come to me when they found out I was living in Meekatharra and interested in these fields.

My friendship with Lyn started with Lyn ferreting me out in Meekatharra in about 1981 or 1982 when he was on a *Calytrix* collecting trip. I think he took me collecting for a day and showed me what he was after. I probably didn't know the difference between *Calytrix* and the other Myrtaceae in those days. I was certainly surprised at how many duplicates he collected and he, by example was one of the many who

improved my collecting techniques. After that meeting, I collected whatever Lyn was interested in, mainly *Heliotropium*, *Melaleuca* and Malvaceae and we regularly corresponded. I remember he was surprised at me recognising an unlikely shrubby *Heliotropium* from Sunday Island. He was going to call that *H. mitchellii* but that was changed and I was honoured with another taxon, fittingly from Meekatharra.

Lyn was my botanical mentor before that term became regularly used or recognised. Earlier this year I even received a lesson, albeit over the phone, of how to make compost; the do's and don'ts. In the 2000s, when I was based in Darwin and attended meetings in Canberra, it was great to be able to visit Lyn and Kirsty. I was wrapped and taken aback by his tropical *Rhodendron* collection and how many plants he managed to stuff into that greenhouse!

7 October 2014

Corresponding with Lyn Craven

Andrew Ford
CSIRO Atherton

I had the pleasure of writing four journal articles with Lyn and collecting requested material whenever possible (some became types) and even taking photographs. Lyn was a man of great integrity, scientific dignity and accomplishment. For me, he was all of that but also a teacher, a mentor, an encourager and a friend. To be different (just as Lyn was) below I share some email interactions with Lyn, dating back to 2002. As expected, there is much banter and dry humour, along with a sense of achievement and progression of scientific knowledge from ideas and thoughts to the public domain ... which are my lasting memories of the man.

On receiving a journals' review from a manuscript: "Good news, not excellent, but good nonetheless. [Excellent is when the paper doesn't need a keystroke being done to it.]".

On a new species' epithet: "Short, easy-to-spell, euphonious, unique and non-boring. [What more could one want?]"

On meeting deadlines: "Well, I made it, Andrew, I think 1 December would qualify quite well for "early December"."

On being told herbarium specimens were opened by Australia Post: "Maybe Aust Post thought it was getting near the weight or thickness limit, or then again, maybe a mail sorter was just after something to read at lunchtime ... "

On describing the appearance of oil dots: "I realise that "small" and "large" are pretty subjective words, but one cannot expect people to try and measure these things!!!!!!!"

On realisation that a new species of *Melaleuca* has been unearthed: "This has me thinking more strongly that the plant may be new, which is a pest in a way given that the text of the Mel book is with the publisher!!!!"

On typographical errors following internal review, prior to going to *Blumea*, "Bit embarrassed I left out the "L.M." and have a few references missing/confused. But thanks for picking them up. Much better you than the Dutch <grin>"

On the length of epithets and coming from someone who used *tachyglossoides*: "I really must protest at the length of the epithet (*hedraiantheroides*)"

On *Melaleuca* morphology interpretation: "Reckon you have it down pat. Now to put it into a technical, incomprehensible botanical description format!!!"

On the availability to be contacted: "Going to NZ to catch sand flies and eat battered blue cod."

On a reviewer's unusual comments, 1: "Maybe our reviewer is starting out in life as a Papilionist and their only experience with calyces in Myrtaceae comes from looking at

Eucalyptus?????"

On a reviewer's unusual comments, 2: "Really the only difference between Legs and (most) Myrts is the position of the ovary. Well, that is my un-educated opinion!!!!"

On understanding alternatives to technology: "If I knew how to scan and pdf, I would scan the reports and send you pdfs, but our only remaining computer jock is on leave. Not to be defeated, I'm putting hard copies in the post."

On the admission that he made a rare error in a manuscript: "Bunny rabbits, I missed that 'mm'. And no, it was not a trap for you. Maybe it was to give the PI panel readers something to write about ..."

Lyn Craven

Dick Schodde
Canberra

When, in 1964, Lyn Craven joined the New Guinea survey section of CSIRO's Land Research and Regional Survey as herbarium officer and plant collector, he was immediately thrown in at the deep end. In June that year he was taken by Ru Hoogland on the Archbold expedition to New Guinea's Huon Peninsula to learn the ropes of rainforest collecting and the herbarium's procedures for specimen preparation, then in mid July he went straight on to Bougainville with me for several months collecting under the shadow of volcanoes at the south end of that mountainous island. Like all genuine naturalists, Lyn was interested in things that walked, crawled and flew as well as those that just grew. He absorbed my practice of mist-netting and collecting birds and bats in "time off" from plant collecting duties, and participated actively in the work on bats. Our great adventure on the Bougainville survey turned on our attempt to sample the montane flora and avifauna around a crater lake, Lake Loloru, at 1500 m. The rim of the crater presented an unrivalled view of The Slot, the narrow sea channel between flanking islands that make up the Solomons and scene of intense air and sea battles in World War II. From a base at the foot of the crater, four hours walk away, we had arranged to shift camp up to the rim by helicopter for a week's work. On the day of the shift, however, the helicopter had transported only a fraction of the equipment before cloud and rain came down to end the move. There was a plan B, however. Over the next four days, the party made forced marches to the lake, four hours up, four-five hours collecting, and four hours back, to retrieve its equipment and gather what flora and fauna it could, including an endemic *Pandanus* with enormous fruit cones collected by Lyn (see Fig. 4 on p. 24). Note that, at the end of that 12 hour stint on foot, the party then had to press and prepare the day's specimens and pack those dried the day before.

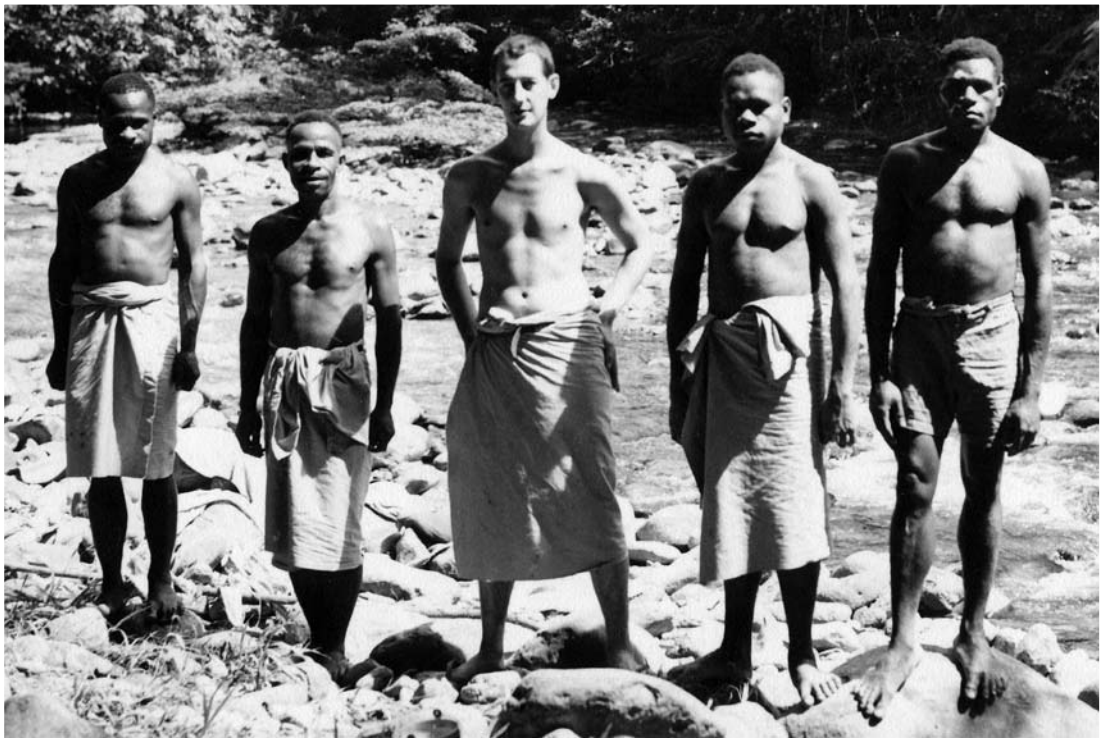
CSIRO land resource surveys in New Guinea were carried out annually through the 1960s to cover different provinces of Papua New Guinea. For ease of movement they were invariably timed to coincide with the dry season, usually over the austral winter. The 1965 survey, however, was to the Gulf of Papua (Gulf Province) where summer months are driest; so the 1965 survey actually began in early January 1966. Again Lyn and I teamed on what proved to be our most productive New Guinean survey ever. Over four months we spent time in mosquito-ridden lowland rainforest, eucalypt savannas, mangrove and *Nypa* swamps on the Purari delta, and cool montane forest at Aseki, in the heartland of the dreaded Kukukuku tribes but friendly and as safe as a bank at that time under *Pax Australiana*. Lyn, who by then had taken over bat collecting in addition to plant collecting, had his teeth taken out in a bush hospital; and I, who had my hands full with plants and birds, was laid low for several weeks when I swung an axe into a knee. Stand-outs among highlights on that survey were: collecting a rare *Dryadodaphne novoguineensis* absolutely bursting with flower at Aseki and confirming its red tepals; Lyn spending a whole day with indigenous assistants digging out and collecting one specimen of *Nypa fruticans*, (see

p. 24 fig. 4) and coming back into camp totally exhausted and drenched in mud; and Lyn and I working for several weeks out of a bark hut on stilts in the Purari delta, watching the tide cover the ground beneath us twice a day, slurping crisp juice laced with OP rum from freshly picked coconuts outside our hut, and tucking into mountains of mud crab provided by the locals at 20 cents a crab.

At the end of the Gulf survey in late April, I repaired (literally) to Canberra, but Lyn stayed on in New Guinea, joining Ru Hoogland once more in mid 1966 for another three months on that year's survey to the middle Sepik River and Hunstein Mountains. Lyn took my indigenous bird preparators with him, and filled in his "spare time" collecting both birds and bats (Fig. 1). Ru Hoogland even caught the bug, and began to gather amphibians for Richard G. Zweifel at the American Museum of Natural History, New York. These extracurricular activities nevertheless clashed somewhat because I began to get letters from Ru complaining about Lyn spending too much time on birds and bats, and others from Lyn saying that frog collecting was interfering with Ru's botanical duties. Even so, that did not stop both from making particularly comprehensive collections of the regional flora.

Lyn later worked with me as plant collector and ecologist on CSIRO Wildlife Research surveys of the McArthur River in the Gulf of Carpentaria in 1976. Concerning this there is one, last apocryphal tale. I drove to the McArthur carrying survey gear, having arranged to pick up Lyn, who was coming by air, at Mt Isa airport. I got to the airport at the appointed time, to find no sign nor record of Lyn. The timetable allowed me only an hour or so in Mt Isa before I had to move on and link up with the rest of the survey. I drove "on spec." to the airline office in town, again drawing a blank. On the verge of giving up, I was just idling down side-streets towards

Fig. 1 (left to right): Yaga, Tai, Lyn, Mengwio and Nensue on a ornithological and botanical collecting trip in the Sepik region of Hunstein River, Papua New Guinea, 1966. Yaga and Tai were specialist bird skinners from Minj near Mount Hagen while Mengwio and Nensue were shooters. Ph. Ru Hoogland



the highway to Camooweal and Borroloola when there, standing on a corner and looking quizzically about him, was a familiar figure. What chance! A minute earlier or later, and that wildlife survey would have had no botanist and Lyn would have been on his way back to Canberra on the next aircraft.

The several hundred bats that Lyn collected on the 1966 CSIRO land resource surveys in Papua New Guinea and his 550 bird specimens from the middle Sepik and Hunstein Mountains are significant collections now held by CSIRO's National Research Collections Australia. All are well-prepared and accurately documented. Apart from slim collections from arbovirus surveys, they are CSIRO's only substantial bird collections from the north New Guinea plain, and include over 130 species plus many regional subspecies not otherwise represented in the national collections. Some are also first records for New Guinea (pygmy form of the Wandering Whistling Duck) or are topotypical for taxa such as the bowerbird *Ailuroedus melanotis astigmaticus* from the Hunstein Mountains. Being only 50 years old, DNA in skin and foot tissues is probably little denatured and still accessible for molecular systematics.

Death notices

Ian Brooker (1934–2016)

Sadly we've received news of the death of Ian Brooker on Saturday 25 June after a short period in hospital. Ian was a world authority on the eucalypts, which were the focus of his career between joining CSIRO's Forest Research Institute in 1970 and his retirement from the Australian National Herbarium in June 1999. His lifetime of research into this large group resulted in an encylopaedic knowledge, which was made available via a large number of scientific and popular publications. Some of his better-known works include several volumes of a *Field Guide to the Eucalypts* (with David Kleinig) and the various editions of the electronic identification key *EUCLID* (with co-authors including John Connors, Andrew Slee and Siobhan Duffy). Ian was awarded as a Member of the Order of Australia in 2006 for his:

> Service to botany, particularly through research leading to the identification and classification in the genus *Eucalyptus*, and as an author.

Enid Robertson (1925–2016)

We also received news of the death of a South Australian botanical stalwart, Enid Robertson. Enid died on Sunday, July 10, 2016, probably the last of her particular generation of botanists in South Australia. Her knowledge of local botany and her depth and breadth of commitment to nature conservation, to management of native vegetation, and to community education was profound and her expertise will be deeply missed by many local groups.

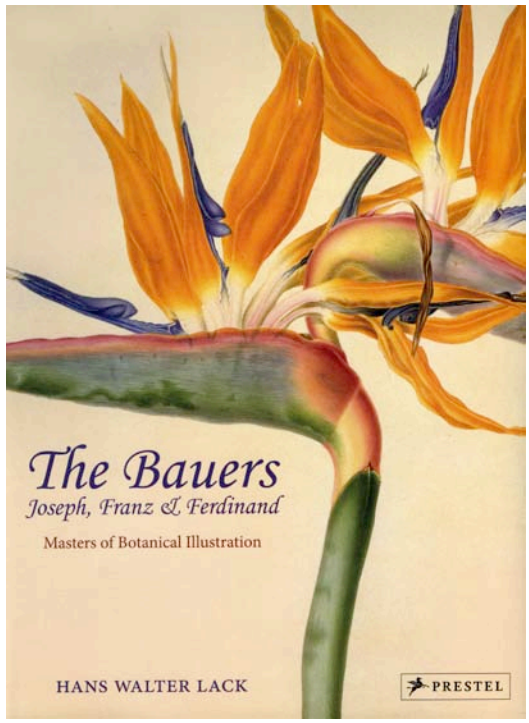
Book reviews

The big book on the Bauers

Review by Alex George, Perth

The Bauers: Joseph, Franz and Ferdinand: Masters of Botanical Illustration: An Illustrated Biography.
By Hans Walter Lack.
Prestel Verlag, Munich, 2015, 496 pp., ISBN 978-3-7913-5489-7.
Price £60.00 (my copy, ordered through a bookshop in Perth, cost $165.00)

A weighty book in both size and content. With a page size of 217 × 310 mm, thick paper and case-bound, it weighs in at 2.6 kg. Walter Lack has produced a masterpiece. His study of the Bauers has spread over 40 years from the time when, visiting the (then) British Museum (Natural History) in London, he was shown original paintings by Ferdinand and Franz Bauer. He later learnt that a third brother, Joseph, had also been a prominent artist. His aim was to attempt a 'triple biography, a great synthesis on the lives and achievements of three outstanding men who dedicated themselves exclusively to the sciences and arts'. Using all the sources that he could find, and despite the gaps that are almost inevitable in historical research, he has done a masterful job to recreate their lives and times, bringing in the geography, the political and social history, the scientific knowledge of the world and how it developed during the period.



Reviewing the book has itself been quite an exercise and I can only glimpse the time and effort that went into its writing. In Australia our main interest is in Ferdinand and Franz so here I concentrate on them, but there is so much fascinating information and interpretation throughout the book. Because few readers may have access to the book here, I summarise the content more than might be usual in a review: this may tempt people to seek it out.

In chapter 1, setting the context into which the Bauers were born, Lack describes 'The incompletely known world', geographically and biologically, and the role of the artist in helping to record what was discovered in the time before photography. He sets down the parameters under which artists worked, including materials (no rubber erasers, for example; paints had to be prepared by the artist; the difference in colours as seen by daylight and candlelight). Replication was by copper engraving involving several artisans who generally never saw the original object. In a rare lapse from the accuracy that is a hallmark of this book, the statement that in 1750 'not a single animal and only two plant species were known from the continent of Australia' (presumably the specimens described by the younger Burman in 1768, though at the time thought to be from Java) overlooks the natural history records of Dampier, published in his books (1697, 1703) and including his plant specimens described and illustrated in the works by Ray (1704) and Plukenet (1705). By then, too, the Black Swan was known from Vlamingh's discovery of the Swan River in 1697.

Chapter 2 covers the formative years in their home town, Feldsberg, in what is now the Czech Republic. There were seven children, two of whom died soon after birth. Those who became artists were Joseph (born 1756), Franz (1758) and Ferdinand (1760). Little is known of their father Lucas who became 'inspector' of the Princely Gallery in Feldsberg, a job that included artistic decorative work. When he died prematurely in 1762, their mother Therese (who lived until 1790) continued to educate them at home and encouraged their artistic development, especially in copying their father's work. In 1763 the Romanian surgeon Norbert Boccius arrived in the town. He was also a keen botanist, compiling a personal herbarium and a florilegium. He became tutor and mentor to the three brothers, coaching them in botany and art, leading to their preparation of drawings for his Codex Liechtenstein. The first published illustration by Franz appeared in 1771 when he was just 13 (reproduced in the book). Working together, the three brothers developed their practice of using a chart of numbered colours. Figure 20.1 is a watercolour of four bunches of different grapes from the *Codex*, drawn by all three ... one wonders which brother drew the fourth bunch? All three were reluctant writers and very few autographic written records remain as a source for their lives. Lack comments that, during his life, Ferdinand probably wrote more numbers than words.

Chapter 3 covers the years when the brothers moved to Vienna, Joseph in 1780, Franz around 1782 and Ferdinand around 1784. All three attended the Imperial Academy of Arts, but little is known of their time there and no art work is known from that time. They came to the attention of 'the Austrian Linnaeus' Nikolaus von Jacquin who had travelled to the Caribbean and came to hold important positions in academia in Vienna. Jacquin hired Franz and Ferdinand to produce drawings for his publications, supervising their work closely. Several works reproduced in the book are attributed to 'the Bauer brothers'. They also widened their botanical perspective through association with the two botanic gardens there. While they did not move in the highest level of society, their horizons would certainly have been broadened during the Vienna years.

The first brother to break away (chapter 4) was Joseph who went to Rome from 1781 to 1788. There he immersed himself in art classes, especially drawing antiquities, male models and copies of paintings.

Chapter 5, at 51 pages the longest (but only just: chapter 10 on the visit to Australia, is 49) describes Ferdinand's tour of the Levant (part of the Ottoman Empire) with John Sibthorp (1758–96) which lasted from 6 March 1786 (from Vienna) to early December 1787 (arrival in Oxford). Sibthorp had arrived in Vienna in November 1785 and by the start of 1786 had engaged Ferdinand to accompany him as artist for the forthcoming journey. In his diary and letters he made no reference to Ferdinand by name and indeed seems to have regarded him as a servant, while yet appreciating his skills as both a landscape and biological artist. They discovered many unnamed species, among which quite a few now bear the epithet *sibthorpii* but none commemorates Ferdinand. Whenever possible Sibthorp obtained information about plants (especially names, uses) from the locals. He found that some colloquial names were the same, or almost the same, as those used by the ancient Greeks. Besides hundreds of plants, Ferdinand also drew fish and landscapes (as Lack says, taking the role of the modern cameraman) and assisted in drying specimens.

A *Fritillaria* that they discovered on Mount Parnassus had to wait 204 years to be named 'no doubt a record' writes Lack, but now surpassed by William Dampier's *Brachyscome* from Dirk Hartog Island (1699) that can still not be named with confidence.

Chapter 6 opens with Lack musing on the 'discepancy' between gathering materials for scientific study and the publication of the results—how we often have no or little information on what happens in between. This can be as relevant today as it was in the time of the Bauers. The chapter covers Ferdinand's years working for Sibthorp at Oxford where, in 4½ years, he produced the extraordinary number of 966 highly accurate folio watercolours for the *Flora Graeca*. His employer was now more forthcoming in praise of his work, commenting that its quality exceeded that of Ehret. Lack discusses the methods adopted by an artist of this kind but points out that some aspects (such

as the light source used in a light table) are unknown. Apart from his artistic output we know very little about Ferdinand's life during this time.

The story then reverts to Franz and his tour through Europe with Joseph von Jacquin (the younger), starting from Vienna in May 1788 and reaching London in December that year. The tour took them through Prague, Dresden, Berlin, Hanover, Frankfurt, Leiden and Brussels but firm details are few and much of the account is a skilful reconstruction by Lack. In contrast to Ferdinand in the Levant, Franz seems to have drawn very little, his main role thus being as a companion for Jacquin. He would, however, have learned much from the places and gardens visited and the many contacts met along the way. In Leipzig they visited Johann Hedwig and Franz saw his drawings of mosses made using a compound microscope, possibly an inspiration for his later work at Kew such as studies of pollen. Here they also met Johann Reinhold Forster who (with his son) had sailed with Cook on the Resolution. And in Utrecht they met Nicolaas Laurens Burman, author of those first two Australian plants named under the Linnaean system.

A long stay in London was part of their tour and, although Jacquin was busy, there is little to show that Franz was likewise, just two watercolours being known for 1789. They visited Edinburgh and Oxford where they saw Ferdinand's work for the *Flora Graeca*. Surely the brothers met but there is no record of this. Joseph Banks and his herbarium and library, as well as Jonas Dryander, formed a focal point, described by Jacquin as 'the crown of all' among the collections that he had seen across Europe. He recorded that all the specimens were mounted and that there was a catalogue of every known plant with synonyms. Just before they were due to leave to return to Vienna in December 1789, Franz was filtered (his word) from Jacquin by Banks and settled at Kew where he would spend the rest of his life. The offer, £300 per annum for life to remain in England and work for him, could hardly be refused. It also allowed him the freedom to work for others. In a codicil to his will Banks stated that 'a botanic garden cannot be compleat unless a resident artist be constantly employed...'

Chapter 8 describes Franz's years in London. There is an overview of Banks and the probable reasons why he hired Franz to paint plants grown at Kew. There's a brief encounter with Charles-Louis L'Héritier de Brutelle who visited England in 1786–87 and studied collections in Banks's herbarium, leading to the publication of *Sertum Anglicum* (1789–92) in which *Eucalyptus* was described.

Franz took lodgings at Kew, learnt English, and anglicised his Christian name to Francis. There is an anonymous portrait of him dated c. 1795 which we may compare with another by William Brockedon in 1834 shown in chapter 16 (no portrait of Ferdinand is known but one wonders about a likely resemblance). Working from living plants he had no need of the colour chart. These paintings are mostly unsigned, now housed in four institutions, variously and not always sensibly curated, and are not easily accessed. Many remained unfinished but reason(s) for this can only be surmised. Among Australian plants are a *Banksia* (probably *oblongifolia*) and floral details of *Anigozanthos flavidus*. He did, however, complete one of the Waratah, *Telopea speciosissima*. Lack gives full due to Franz's output and quality, which for various reasons have never been fully acknowledged in comparison with Ferdinand. He did receive lavish praise from Banks, and his *Delineations of exotick plants cultivated in the Royal Garden at Kew* brought some recognition, even though its cost limited buyers to a wealthy few. There were also eleven plates in his *Strelitzia depicta* ... published with a very small print run, using lithography for the first time in botanical illustration. His commission from Banks gave him the freedom to paint other subjects besides plants.

Both Bauers were acknowledged in the name *Bauera*, coined by Banks and published by Andrews in 1801. In 1805, Salisbury published a detailed account of the genus, illustrated by a plate of morphological dissections by Franz of *B. rubioides*, reproduced on p. 212 (here, as in many reproductions in the book, it would have been good to have the items explained in the caption – while botanists can interpret them, other readers may not be able to). The later *Bauerella* Borzi was just pre-empted

by *Sarcomelicope* Engler. An outstanding scientific achievement was his 23 drawings of the life cycle of wheat, including microscopical analyses and copious notes, prepared over seven years. Accompanying these are 25 plates of the diseases of wheat [corn]. Some were included (and acknowledged) by Banks in a rare (for him) scientific publication, on disease in corn in1805. Franz also studied other fungal diseases, nematodes and aphids. But the bulk of Franz's output remained unpublished.

The next four chapters focus on Ferdinand, first 'the years between', following his work for the *Flora Graeca*, then the expedition to Australia, his time back in England, and his return to Vienna to see out his remaining years. After leaving Oxford he lived in London, the only address known being in Holburn. During this period he drew landscapes, from both the journey to the Levant and around Oxford but with nothing like the accuracy of his drawings of plants. A quite different commission about which there remains much mystery was the title page for a musical score, *The life, death and burial of Cock Robin*, of which Lack tracked down the single known copy at Princeton University. Two commissions came for Aylmer Bourke Lambert, one of herbarium specimens including *Badusa corymbifera*, reproduced on p. 230, so skilfully drawn that it could have been done from a living specimen. The other was for paintings of gymnosperms being grown in England. This also involved Franz and another artist, James Sowerby. The plates range from pencil to completed paintings. Some appeared in Lambert's *A description of the genus* Pinus, copies of which are rare and almost all different, as Lack says, a 'bibliographical monstrosity'. This does not detract from the quality of the plates. During this time Ferdinand painted his first Australian plant, *Lambertia formosa*, apparently basing it on specimens in Smith's herbarium and an unfinished painting by Parkinson. And, significantly for us, he became known to Banks. An appointment to engrave the paintings for Sibthorp's *Flora Graeca* came to nothing (the final fascicle of *Flora Graeca* did not appear until 1840).

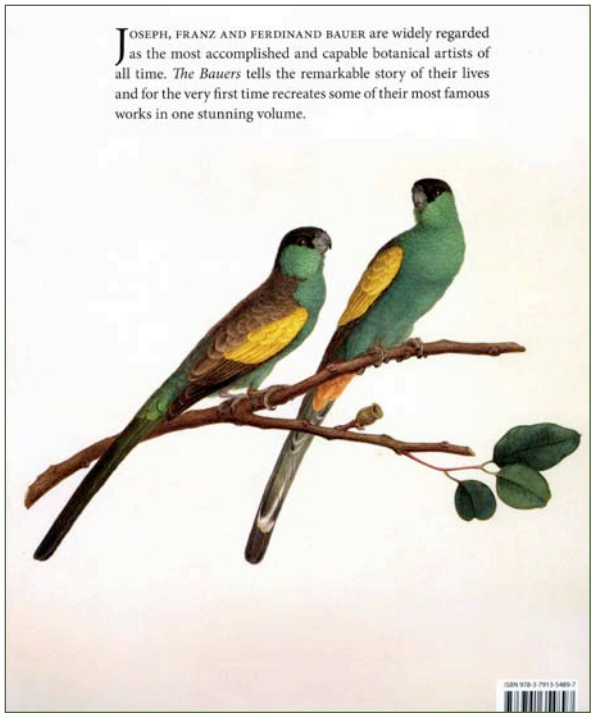
In chapter 10 we come to the expedition to Australia. Ferdinand was the oldest of the five 'scientific gentlemen' and the most experienced in travel. Lack discusses the differences and similarities in the tour of the Levant with the coming voyage. A major difference was that this was a government-sanctioned expedition with consequent conditions on working, the chain of command and the fate of his drawings and specimens. With the landscape artist William Westall aboard, Ferdinand could focus on the natural history discoveries. He had his own cabin and enjoyed a better status than he had with Sibthorp. He was well regarded by his fellow sailors, often mentioned by name in their journals, and Flinders regarded Brown and Bauer as equals in their respective skills and dedication. Flinders described Ferdinand as 'polite and gentle', and if he resembled Franz then this accords with the appearance of the latter in his portrait. He developed a more comprehensive colour code, numbered 2–994, but no copy has survived and Lack postulates that it may have existed only in Ferdinand's head.

Much of what we know of the Investigator's voyage comes from the journals of Flinders, Brown and Good, though several letters from Ferdinand to Franz have survived. His output for the voyage was 1762 pencil drawings of plants (including 1543 from Australia, 80 from Norfolk Island) and 216 pencil drawings of animals (176 from Australia, 40 from Norfolk Island).

Interestingly, in a letter to his brother Joseph in Vienna, dated 8 August 1803, Ferdinand used the word Australia, writing that he was 'in Australlien oder NeüHolland' (in Australia or New Holland). The name had already been used by Shaw in his *Zoology of New Holland* published in 1794. During his stay at Sydney from June 1803 until his visit to Norfolk Island in 1804, Ferdinand became the first to draw the koala, discovered in August 1803 (preparing watercolours after his return to Vienna in 1814). No reason is known why he did not accompany Brown to Van Diemens Land in November 1803. He seems to have found it difficult to fill the time, with less to find, but perhaps a shortage of paper was a problem for his artistic work. In March 1804 he sailed for a few weeks to 'Kingstown' (now Newcastle) where he drew a landscape. In the spring of

1804 he found species not seen before around Sydney and the vicinity, thought by Lack to indicate 'erratic' flowering though known to many familiar with the Australian bush where it's the seasons that can be erratic.

In August 1804 Ferdinand sailed for Norfolk Island, just missing Brown who returned from Van Diemen's Land three days later. Lack describes this as Ferdinand's 'high time as a diligent observer and collector, working independently from Brown or anyone else'. He kept no diary but his collections and drawings testify to his work. He collected 37 of the 44 endemic plants there including *Streblorhiza speciosa* from Phillip Island, now extinct, but an image of his specimens and his pencil drawing are reproduced in the book. He is commemorated in *Solanum bauerianum*, in the climbing *Freycinetia baueri* and others. He drew birds, marine fauna, e.g. the Norfolk kaka, and collected specimens, e.g. the Pacific black duck. He probably met Barnard Walford, an engraver, born in Vienna, convicted in London and transported, then allowed to settle on the island. His return to Sydney in March 1805 was on the cut-down Investigator, possibly on a sea trial to assess whether she was fit for the voyage to England.



Lack describes the unwillingness of Brown and Bauer to sail for England in the *Investigator* in 1805, due to the state of the ship and the poor conditions for storage of their collections, but Governor King prevailed. Up to a week before their departure on 23 May they were collecting and drawing. Ferdinand's luggage included eleven boxes of drawings as well as some of the flora and fauna collections. The non-stop voyage of four months and sixteen days in 'perhaps the most deplorable Ship in all the World' (Brown), around Cape Horn in winter and with the deck almost constantly awash, was a triumph of seamanship for the captain, William Kent, and his crew. One who saw her in Liverpool described 'the extraordinary appearance of this wonderful old ship, her sides being covered with barnacles and seaweed, and her sails, masts and rigging presenting the usual signs of a vessel that had been abandoned' but on board 'a sight presented still more astonishing – plants we had never before beheld, black swans, and other curious birds and animals surrounded us on every side'. How fortunate for art and science that our heroes and their collections survived.

In chapter 11 Ferdinand is back in London but again there are no sources for this period except his drawings. He lived at 10 [Little] Russell St, Bloomsbury, and probably worked at Banks's house, in close co-operation with Brown (probably in the same room). Using his drawings, herbarium specimens and living plants raised at Kew it was a period of outstanding scientific and artistic output. In some cases no herbarium material has survived so a drawing is the only survivor, e.g. *Thysanotus volubilis*. By 1814, the year he moved back to Vienna, he had completed 203 botanical drawings, ten engraved copper plates and hand-coloured about 200 pulls of copper engravings (for his *Illustrationes Florae Novae Hollandiae*). The London drawings were handed to Admiralty where they lay until 1843 when they were passed to the British Museum, the plants to Brown, the animals to John (not Asa as given) Gray, Keeper of Zoology. He probably

continued to make finished paintings in Vienna, which he bequeathed to Franz, and these also ending up in the BM. Ten uncoloured engraving were included in an appendix to Flinders's *Voyage*. His watercolours of Australian plants remain among the best ever made, combining accuracy, minute observation and knowledge of plant colour with superb artistry. It's almost churlish to note one exception: Ferdinand's colour-coded pencil drawing of *Banksia coccinea* is lost, otherwise it might reveal a rare error in his colouring, showing the perianths as red instead of their true greyish white. An oil painting of passion flowers (*Passiflora*), painted by Ferdinand in 1812, was auctioned in 1999 and is now in the Art Gallery of South Australia. Ferdinand returned to Vienna by autumn 1814, taking with him his Australian pencil drawings.

In chapter 12 Lack takes us back to Vienna and the lives of Joseph and Ferdinand there. Joseph had returned from Rome in 1788 and became a valet with the Liechtenstein family. By 1797 he had become a painter to Prince Aloys I Joseph, similar to a position held by the Bauers' father 40 years earlier. This involved artistic work in churches, castles and country houses. He painted some portraits, generally copied from existing works. Then, in 1805 he became director of the Liechtenstein Gallery, among the vast estate of prince Johann I Joseph, and with this a place in the princely court. During his tenure the number of paintings in the gallery almost doubled, to 1630. He also had a commission to create a new art gallery in the summer palace in Rossau, near Vienna. The work involved in planning and setting this up dominated his remaining years until his death in 1831.

Due, again, to scanty sources, there are few details of Ferdinand's last years, but Lack has reconstructed some likely activities. He bought a house in Hietzing, just west of Vienna. Initially he continued with the *Illustrationes*. In November 1816 he sent Brown various plates (some coloured, some not, some on expensive paper) that made up the third instalment of this series, but that seems to have been the end of it. He made two visits to see Franz at Kew, in 1819 and 1824. A set of 12 plates of foxgloves, prepared over many years, was published as *Digitalium monographis* in 1821. In his final years Ferdinand was apparently commissioned, possibly by the Horticultural Society in London, to paint passion flowers. This resulted in 81 watercolours, including *Passiflora aurantia* from Norfolk Island, the only species of the genus that he saw in the wild (the others were painted from cultivated plants). The originals were later bound in two volumes that were sold by the Society in 1859. Ferdinand died in 1826.

In chapter 13 the story returns to Franz at Kew. Late in 1818, Brown and Franz received samples of 'red snow' collected in the north of Baffins Bay. Brown considered it to be caused by an alga but did not name it. Franz concluded that it was fungal spores and proposed the name *Uredo nivalis*, published (his first paper) in the *Quarterly Journal of Literature, Science and the Arts* in 1819 and discussed in a letter that appeared in the *Philosophical Transactions of the Royal Society* (to which he had just been elected). He made drawings of the spores, with fungal spores for comparison, and of an experiment cultivating them in glass jars. Later, Brown was shown to be right, and the species is now known as *Chlamydomonas nivalis* with Franz's epithet.

Franz also drew watercolours of plants from Melville Island to accompany Brown's *Chloris Melvilleana*, published in 1821. For these he relied on reconstituted dried specimens and notes from the collectors. In 1821 he drew the newly discovered parasitic plant that Brown would call *Rafflesia arnoldii* but because he could not be sure of the colours he left most of his drawings as pencil sketches. Lack reproduces Arnold's account of its discovery, over two columns in length.

Lack then discusses Franz's fascination with orchids that began when he was young and never wavered; his final botanical painting, in 1838, was a species of *Catasetum*. He painted more orchids than from any other family. Somehow he acquired a set of 22 watercolours entitled 'Plants found near Port Jakson (sic) Orchideous New Holland by Captain Paterson'. Together with other paintings that Franz collected, these are now in Göttingen. In contrast to growing many Australian plants in glasshouses, the increased humidity from heating by hot water

through pipes (instead of by stoves), introduced at this time, made the cultivation of orchids easier, and Franz had many to study and paint. Five Australian orchids feature in his work, one a *Microtis* that came up in the soil in which a plant of *Cephalotus* had been transplanted. A mutual love of orchids led to the publication by Franz and John Lindley of *Illustrations of orchidaceous plants* (printed by lithography, in four fascicles, 1830–38). Lindley dedicated a spectacular new species as *Oncidium baueri*.

Chapter 14 goes into Franz's studies in microscopy in more detail. Lack explains how, in a study of the stigmatic surface in *Phaius tankervilleae* in 1802, Franz observed the nucleus of the cell but did not understand its significance and was pre-empted in publication by Robert Brown in 1831. In a paper in 1830 Lindley referred to Franz's drawing but did not explain what the 'specks' in the cells were. Over his lifetime Franz drew the pollen grains of more than 175 species from many families (including germinating grains), now housed (with other microscopical drawings) at the BM. Only a few were published but among them is an aborted pollen grain from the sterile hybrid between *Passiflora caerulea* and *P. racemosa*, showing his great power of observation. Again, he failed to understand the importance of pollen but Brown, ever astute, was 'inclined to think ...that it may be consulted with advantage in fixing our notions of the limits of genera'. It also appears that he learnt how to use sulfuric acid to 'clear' pollen grains so that the wall may be more easily examined, a technique not taken up again until the work by Gunnar Erdtman in the 1940s.

From around 1815 (chapter 15) a parallel world opened for Franz through his collaboration with Everard Home, physician, vice-president of the Royal Society 1814–30. This involved zoological and anatomical drawings, especially of microscopic details. They number more than his botanical and mycological drawings, and include human reproductive organs and diseased tissues. A number were included in papers on comparative anatomy, published by Home. Home studied and Franz drew many animals from many localities around the world. Franz was given full credit and it appears that, sometimes at least, Homes' descriptions relied heavily on Franz's artwork. In general he was just as perceptive and accurate in this work as in his botanical drawings.

Chapter 16 is headed 'Franz Bauer, the Nestor of Kew'. The epithet was bestowed by Frederick Scheer, a merchant who lived on Kew Green and became well acquainted with him. It seems a strange connection, Nestor having been considered the wisest of the Greeks during the Trojan War—perhaps the association refers to the struggle over the future of the Royal Garden. Scheer argued for the survival of the Garden during its dark days when it suffered from neglect (it should be remembered that at the time the garden covered just 9 acres, compared with the 300 that it now has). From 1820 to 1840, though, Franz was somewhat removed from these trials, continuing to work in association with various people on subjects that now were largely intended for publication, especially microscopical observations. He also found time for personal interests such as documenting colour change in the developing flower and fruit of the horse chestnut (*Aesculus hippocastanum*), and the development of the truffle (*Tuber aestivum*) that he found at Kew. In 1825 he left England for the only 'foreign' trip since arriving there, with Home to Paris to observe living sperm cells. While there he may well have met Pierre-Joseph Redouté, his French counterpart, although the latter made little use of the microscope and painted plant portraits in contrast to detailed botanical drawings. Among many whom Franz had contact with at Kew was Allan Cunningham who, during his sojourn in England from 1831 to 1836, lived just across the river. Cunningham was one who signed a drawing of fibres in which Franz showed that the cloth used by ancient Egyptians for wrapping mummies was made from flax, not from cotton as had been assumed for centuries. In co-operation with William Hooker he made 41 watercolours of ferns from various countries, published in the *Genera filicum* (1838–40). He painted the details of the tree fern *Cyathea brownii* from specimens collected by Cunningham on Norfolk Island. As earlier with pollen grains, he painted the spores of 27 species of ferns. During these years he was involved in a historic stage leading to photography, the invention of heliography by Nicéphore Niépce. During

a visit to London in 1827, Niépce (staying at Kew) gave four specimens of his work to Franz who annotated and kept them, and in 1839 (the year before his death) wrote a letter that helped to establish Niépce's priority over Daguerre for the invention.

Chapter 17 describes the testaments of Ferdinand and Franz, explaining how their effects were dispersed, many ending up in now-unknown ownership, especially items that were auctioned.

In chapter 18 Lack discusses the limited number of works by Franz and Ferdinand that have appeared in print. The collections in Vienna, Göttingen and London total c. 5,000 drawings and are available for study. Regarding Ferdinand's drawing in the Natural History Museum I think his argument that there was no-one on the staff interested in Australian botany is valid (this remained the case for virtually all European herbaria—during my term as ABLO in 1968 I found that nomenclature on Australian material was the same as in Bentham's day). Endlicher developed a keen interest in the flora of Norfolk Island, no doubt inspired by Ferdinand's collections (of which a good set ended up in Vienna) and his drawings. Ferdinand prepared 117 drawings of them but they were not included in the *Prodromus Florae Norfolkicae* of 1833. However, Endlicher did include 125 uncoloured plates by Ferdinand in the *Iconographia Generum Plantarum* (1839–41).

Martius included drawings of palms by Ferdinand in his *Historia Naturalis Palmarum* (1823–53). But the landscapes were redrawn and the colours of the palms misinterpreted. Lack believes that Ferdinand 'would have been so frustrated at the small number of his drawings published, and the way that they were handled, that 'he would have liked this (Lack's) chapter to be illustrated by one of his watercolours prepared for Sibthorp, not by any of his posthumously published images' and so we have a painting of *Dianthus* from c. 1789.

Chapter 19 covers the fate of mainly Franz and Ferdinand's materials, and how many survived in their institutions, with particular accounts of World War II. Some were lost, e.g. the specimens and drawings removed to Oberhöflein Castle in Austria for safe keeping, where the room in which were held some Australian monocots and Proteaceae was destroyed by fire. It's a sad reflection on human history that the advent of conflict means that those with responsibility for such collections have to act to protect them in whatever way they can, to try and avoid destruction and looting.

Chapter 20, 'Afterlife', discusses obituaries and 'enigmas', intertwined with comments on the Bauers, e.g. Robert Brown in 1844 wrote how fortunate he was 'to have known them ... whose merits in the branch of art which they have cultivated have never been equalled'. William Griffith wrote that Franz 'drew, but did not write' and so did not receive the credit for some of his discoveries. The enigmas include the use of drawing aids used by Franz and Ferdinand. We know that Franz had several microscopes and micrometers and Ferdinand had a camera obscura and a camera lucida. None of their equipment is known to have survived, and there is very little written record of it.

Finally there is an Epilogue, describing some of the major developments during the period of the brothers' lives, through which they were able to work without making any compromises and 'reaching an outstanding degree of sophistication' in their output. While, during their lifetime, Joseph achieved the highest social standing, today Franz and Ferdinand are known as outstanding artists, with Ferdinand the most well-known.

In conclusion ...

Lack has skilfully woven a complex web of people, places and events that could be done only by someone with a European background including deep knowledge of geography, history, systematic botany (including the European flora) and botanical art. Brief biographical accounts are given for all those connected with the Bauers. Some details may not be strictly relevant to the story, e.g. contemporary activities of musicians such as Mozart and Beethoven, but they help to round out the picture of the times. A Euro-centric attitude sometimes shows through, e.g. stating that a 'series of wars' against Frederick II of Prussia in the mid-18th century involved coalitions between various powers that effectively turned it into a 'global conflict'.

As is often the case with Continental Europeans Lack's English is impeccable, with only a very occasional expression showing that it is not his native tongue. In general the text is easy to follow but sometimes an unusual (for me, at least) term is used and not explained (e.g. postremogeniture), and the reader is assumed to have a fair knowledge of botanical terminology.

During his research Lack resolved problems, corrected errors in others' work and made discoveries such as a copy of the Bauers' early colour chart in Madrid. He himself was sometimes surprised at what he found, using the phrase 'hard to believe but true' several times.

Lack has followed the latest nomenclature except for the African *Acacia senegal* and *Oligochaetochilus rufus* for a species of *Pterostylis*.

Illustrations are wide-ranging and well-chosen. I would like to have seen more, but that would have increased the cost. There are plates for which it would be nice to have the full legend. The dust jacket has one of Franz's paintings of *Strelitzia reginae* on the front and one of Ferdinand's of Golden-shouldered Parrot, *Psephotus chrysopterygius*, on the back. There is no mention of these within the book but I'm advised by the author that the former appeared in his book *Franz Bauer: The Painted Record of Nature* (2008) and the latter was issued as a print by Alecto Press in 1997.

Readers of my reviews may recall that I dislike multiple indexes, preferring even a complex single one so that I don't have to bother remembering what the subjects are and in which order they appear. Here we have five. One is to Persons (more than 900 names!) and another to Place Names, but entries for the three Bauers, as well as to institutions holding art and botanical collections, are all indexed under General. The others are to Books, Journals and Manuscripts, and Plants, Fungi, Algae, Animals.

Errors are few in this large text (I made a very rough estimate and made it around 300,000 words). Those I might mention are:

p. 108: the caption to Fig. 5.6 refers for comparison to Fig. 5.2 but in fact it is 5.5, adjacent.

p. 255, column 1 para 2: their first landing at King George Sound was on 9 December 1801 (not November).

p. 270, column 2: the lead-in to the survey along the north coast of Australia omits mention of Tasman's voyage of 1644 when he sailed around the Gulf of Carpentaria and west to about North West Cape.

p. 310, col. 1, para 2, line 13: Asa Gray should be John Edward Gray

p. 310, column 2, 3 lines up: *Corymbas* should be *Corybas*.

p. 337, column 1, para 2, 3 lines up: Albrecht should be Albert (Prince von Sachsen).

p. 443, column 2, para 2: some text seems to be missing from the last two lines.

p. 446, col. 2, para 2, line 10: should be *Prodromus Florae Norfolkicae*, not *... Florae Insulae ...*

Lack states that his work is 'not the definitive biography of the three brothers, but only a summary of what is currently known.' Despite certain gaps in the records about their lives I reached the end of the book feeling that I had read a satisfyingly comprehensive account. That said, this is almost entirely of their lives as artists; we know almost nothing about their private lives otherwise; it's as though art was all-consuming—and perhaps it was. Given the rich detail that Lack has given us, and the knowledge of European history required, it seems doubtful that anyone will tackle the subject again. He has, though, pointed to several avenues still to be addressed, such as an analysis of the paints used by the Bauers, and a thorough study of the hundreds of pen-and-ink tracings in the Naturhistorishes Museum, Vienna.

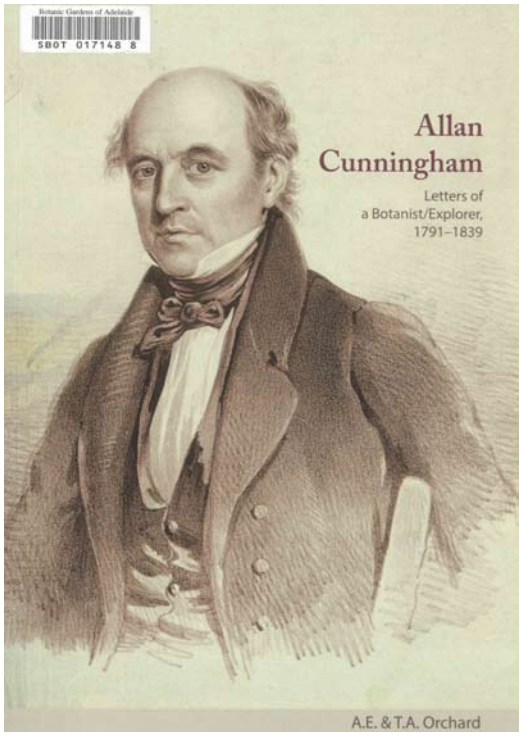
We must be grateful that Lack has written this book. He has done the Bauers proud, summing them up as 'setting the gold standard – forever.' In a word: marvellous.

Letters of Allan Cunningham

Review by Peter Adams
School of Biosciences, University of Melbourne

Allan Cunningham: Letters of a Botanist/Explorer, 1791-1839.
By A.E. & T.A Orchard.
Privately published, 592pp. ISBN 978-0-9941505-2-3, AU$45 (paperback)
http://artuccino.com/Allan_Cunningham_Botanist_1839/index.php/allan-cunningham-letters-of-a-botanist-explorer-1791-1839/
Post orders to Tony Orchard, PO Box 3427, Weston Creek ACT 2611, Australia

If you choose to review the work of a prodigious writer, expect the prodigious task that follows. Allan Cunningham, one of Australia's greatest (and relatively underappreciated) botanists and explorers, is in that category, with much of his work yet to be published. At the onset, I admit to being one of a band of admirers of his contributions to Australian botany, exploration and geography. Others include W.G. McMinn, Kevin Mills, Jean Wells, John Whitehead and the authors of this collection of Cunningham's letters, A.E. and T.A. Orchard. The Orchards and John Whitehead have already written several books on Cunningham and have more to come with Cunningham's journals.



I admit to not reading all of the letters. It was a bridge too far in the time frame. There are 1.5 kg of them in a soft-covered book of 592 pages, with up to 1000 words per page in small type. The letters are fascinating reading, a travelogue of adventures to the New World, a commentary on colonial life and English society in the 1830s, and a botanical miscellany that illustrates the dedication and skill of our botanical forbears. They were able to assign an entirely new flora to existing or new plant families and genera despite a fragmentary and emerging picture.

Allan Cunningham was regarded in his time as a very good botanist who had no formal training and, by 1834, was seen as an authority in botany and geography. There was strong competition between European countries to gain advantages from the New World.

> ... make myself useful in the Capacity of a Collector, ... so that the Royal Collection at Kew may exceed all other Collections in the Riches of new, beautiful and desirable plants. (Cunningham to William Aiton, 27 Aug 1814)

The letters were located and compiled initially from Kew and the Natural History Museum in London when Tony Orchard was the last person to be ABLO in 2008-9. Visits to Cambridge, Oxford, Paris, Geneva and Florence located more letters. Following publication of the book, 100 more have been found and will be published later. The letters are presented in 6 groups in chronological order between 1814 and 1839 with a 7th group of miscellaneous letters referring to him between 1815 and 1859. This is followed by biographical notes of the main correspondents, a select bibliography and a comprehensive index of 19 pages.

The context of Cunningham's time in collecting plants for the Royal Gardens at Kew is set out in a two page preface. The groups of letters mainly involve Cunningham directly, with a few between others and relating to him. The

groups are:

1. Correspondence about his commission and instructions: 1814
2. Contract period Brazil: 1814–16
3. Contract period NSW, Oxley expedition and Captain P. King's voyages: 1817–22
4. NSW land exploration: 1822–31
5. Cunningham in London: 1831–36
6. Cunningham in Sydney and after: 1837–41

The letters are numbered, dated with sources and the recipient's name. Some sketches of plants and land forms are included. There are illustrations of places, main correspondents and events, and some maps and exploration routes.

Cunningham spent five years from 1831 on Strand-on-the-Green, near Kew, sorting his collections and arranging for many botanical introductions and specimens to be described and illustrated. He exchanged letters with key botanists William Hooker, Augustin de Candolle, Robert Brown and Captain P. King and his brother Richard. Some of the letters to the latter were destroyed by Allan for reasons of privacy.

Cunningham was sent out as a collector and botanist to Brazil with James Bowie, then travelled to Australia in 1814, with recording in journals and diaries a part of his contract. It was also a part of his duties to supervise convict labour.

> ... employment for a convict Carpenter in this Garden … I have the honor to request that the prisoner named ... may be appropriated to this Establishment … the last convict Carpenter ... having been confined since December in His Majesty's Jail on a Charge of Burglary. (Cunningham to The Commissioner of Assignment, 5 Apr 1837).

He was in a confusing position on a small salary as a servant of Britain, and seen as that, rather than as a citizen of the colony. Some governors had little respect or support for his responsibilities. There was often conflict and denial of requests for assistance from the authorities. He lived in poor circumstances, often in rented cottages. His dedication extended to long explorations in New South Wales and Queensland involving high risk to his health. He discovered the economically significant Liverpool Plains and Darling Downs, and assisted Captain P.P. King in the surveys of coastal Australia. Many live plants were sent back to Europe, and many imported to the colony.

> … European forest trees, packed in dry Earth or Moss in closed Casks, have been repeatedly imported to this Colony with success, ... 13,600 plants, of about 25 distinct Kinds, … those in .... Moss … had generally a more healthy appearance … (Cunningham to The Colonial Secretary, 4 Jul 1837)

There was a gradual decline in his health from liver problems in Mauritius, osteoarthritis related to much foot slogging on expeditions, and finally the constant wet conditions of his last trip to New Zealand. This apparently reactivated tuberculosis, resulting in severe pneumonia and bronchitis from which he did not recover. He died in Sydney on 27th June 1839 aged 49 years.

> He never got over the illness he contracted in New Zealand, for he appears to have been exposed to rains the whole time … from May to October 1838, … botany has sustained a great loss … a more indefatigable labourer in the field of science has rarely existed than poor Allan Cunningham. (Robert Heward to William Hooker, 10 Dec 1839)

He was well liked in the colony and by his colleagues in London, a quiet, gentle personality with passion and full dedication to his work, who never married. His brother Richard, who was also a collector and Director of the Sydney Gardens, lived a similar life with no descendants.

Cunningham's premature death deprived the botanical world of the most illuminating phase of life evident in the lives of Brown, Banks and Darwin – to come home from travels to a study and gardens, to identify his specimens, and to reflect and analyse his experiences. Instead his collections and records were distributed somewhat piecemeal, some by his biographer on his instructions after his death, and used by others who lacked context and key details.

He expected that Robert Brown would publish his collections in a Flora and his own plan for a Flora by families in order never proceeded beyond a draft form. Cunningham did not receive the customary land grant or financial

reward despite his successful exploration of new territories, including two of the richest areas in Australia. A lack of support and appreciation led to his resignation from the gardens.

> … have been compelled mainly in consequence of the very inadequate support I met with from the late Governor Sir Richard Bourke to resign my situation and resolved eventually to retire altogether from this Country … my having received no reward or remuneration either in Land or otherwise (thanks excepted) for the several long and fatiguing exploratory journeys ... between the years 1822 and 1829, … (Cunningham to Committee of Superintendence of Botanic Gardens about resignation from the Botanic Gardens, 12 Mar 1838).

He had concerns about conservation and loss of habitat as early as the 1830s, with the spread of houses in Sydney and disappearance of flora.

The compilers have done much in this latest contribution of Cunninghamiana to acknowledge him, and consolidate a body of letters of particular use to researchers in a variety of fields, including botany. There are frequent insights in these letters into history, sociology, geography, people and places. The index is very comprehensive but cannot accommodate all of this detail.

I had always wondered about the origins of the history of Lisbon lemons in Melbourne. The lemons saw the orchardists of outer Melbourne through difficult wet seasons that are now only a memory. It is likely that the trees came to Melbourne after requests to Cunningham at the Sydney gardens.

> … Last year I made a request to have two or three layers of the Lisbon Lemon put down for me. … (W. Lonsdale to The Committee of Management, Botanic Garden, Sydney, 15 May 1837)

About 2 months before he died, Cunningham wrote to Robert Brown on 16th May 1839. He expressed disappointment about some New Zealand Orchidaceae losses at sea, mentioned plans to return to London in 1840 and included a statement of his deteriorated state and objectives.

> … I am exhausted in subject, & literally in body. … strove to advance for years botanical Science from pure love … blending the augmentn of our Knowledge of the plants of the Country with that of its internal Geography. …

Anyone interested in plants, people and places associated with this great letter writer is likely to advance their research in these pages. Allan Cunningham left a treasure house of detailed information for future generations of botanists, geographers and historians. I recommend this scholarly assemblage of letters and notes, a unique view of the discoveries, life and times of early Australia.

This was a time of great empires expanding science, and botanic gardens were a prime source of plant material. The national gardens were well financed to send out botanists to enrich the economy – an era that seems to have passed, at least for a while.

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Standing on shoulders

Review by Alex George, Kardinya, W.A.
a.george@murdoch.edu.au

Georgiana Molloy: The Mind that Shines
By Bernice Barry. Picador Pan Macmillan Australia, Sydney (2016), pp. [xi], 336, 32 unnumbered pp of colour plates, softcover, ISBN 978-1-74354-914-8, $39.99. Also available as an ebook.

Because this is the third book on Georgiana Molloy I have included comparison with the two earlier ones:

Portrait with Background: A Life of Georgiana Molloy
By Alexandra Hasluck, Oxford University Press, Melbourne (1955, casebound, reprinted several times in softcover), pp. xii, 284, 8 unnumbered pp of plates.

An All Consuming Passion: Origins, Modernity and the Australian Life of Georgiana Molloy
By William Lines, Allen & Unwin, St Leonards (1994), pp. xi, 398, 16 unnumbered pp of plates, casebound, ISBN 1863735534, originally $39.95.

The new book is already a second edition. The text is hardly changed from the first, self-published edition (Redgate Consultants, Witchcliffe, W.A., 2015, pp. [ix], 373, 32 unnumbered pp of colour plates, softcover, ISBN 978-0-9942064-0-4, $34.95). A different font with closer lines has brought the page number down but with no loss of readability. A number of plates have been omitted (mainly less strictly relevant to Georgiana's story) and new ones added (especially plant specimens dried and fresh). Some captions have been extended. The design has been amended, with some plates larger and some smaller, generally an improvement. The original maps of Britain, Europe and Western Australia have been replaced with large-scale ones of Dunbartonshire and the Augusta district. In the endnotes the numbers are larger and easier to read (but still small in the text), while the index is in a more user-friendly type size. The index is also now in its rightful place at the end of the book (well, almost, being followed by the acknowledgments). There is a new blurb on the back cover. For the keen book collector these changes mean that you should have both editions!

First, I have to declare an interest in this book. You could say I had a hand in it, two hands in fact, since they appear in a photograph on p. 134, one pointing at one of Georgiana's specimens at Kew in 2005.

Bernice Barry has produced an admirable new book about Georgiana Molloy, quite a challenge given that there are already two good accounts of this early settler and plant collector. She has unearthed new facts, reinterpreted documents and widened the reader's understanding with illustrations old and new. Just a few examples are mentioned here.

Why such interest in one who, in the overall history of plant collecting in Australia, is a relatively minor figure (she made possibly 400 collections)? One reason may be that, through her diaries and correspondence, records of others such as her husband, other early settlers and her descendants, not to mention the accolades given by contemporary horticulturists in Britain, we have a far more detailed picture of her life, set in the social, religious, political and economic mores of the times, than for most other settlers. Her plant collecting has attracted more interest among non-botanists than probably any other early collector. Each of the books follows the same broad outline, from the early years of Georgiana Kennedy and John Molloy (JM) to their marriage, migration and settlement at Augusta, the move to the Vasse and re-establishment there, Georgiana's death and the later years of JM and the children.

Like Georgiana, Bernice Barry came from Britain to start a new home on a bush block in the far south-west, albeit 170 years later, and learnt to love Australian plants. From a career in the development of school curricula, she turned to a long-standing interest in

writing and history. Becoming interested in this pious woman, a settler facing the trials of establishing a home in the bush (and heavy forest at that) who became a successful botanical collector, her investigations began to resolve some discrepancies in earlier accounts and became an 'all-consuming pursuit' of the truth about Georgiana's life. Not content to accept the previous accounts, especially of Georgiana's early life, Barry followed up all the known sources and found new ones, in the process filling gaps and correcting errors. She sought to uncover more details of the lives of Georgiana and her husband, and clearly she is one who doesn't give up on a challenge. It led to her decision to pass on the results of her quest with 'what I had learned about exploring the past'. An enlivening feature of her book is the interweaving of accounts of her research with the narrative—the thrills of discovery or enlightenment, the disappointments, serendipity, many instances of assistance from those consulted and responsible for archival material, both public and private. In Britain she visited places where Georgiana lived and attended school. She found details that explained her developing awareness and attitudes that led to her leaving home and going to Scotland, where she lived with the Dunlop family until her marriage. In Australia she lives on the doorstep for seeing and being drawn into the environment where the Molloys settled. Her account is lit up with images of places, manuscripts and letters that take us along on her journey.

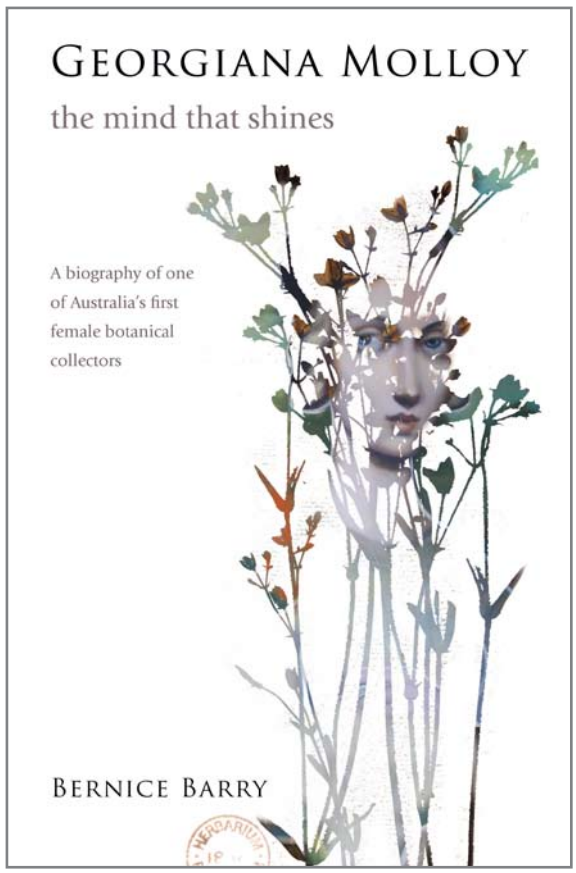
Georgiana's interest in gardening and botany was well founded before leaving Britain. She had already pressed specimens as a pastime, and enjoyed gardening at Roseneath, Scotland. From various sources she acquired seeds and plants and took with her to Australia a *hortus siccus*, as they were then known, containing specimens collected since 1821. She obtained more seeds and bulbs at the Cape. Establishing her garden gave her a much-needed diversion and inspiration (especially religious) after the birth and death of her first child just days after arrival, followed by a miscarriage. The early years were a struggle to clear the forest and establish a farm, in a small community that generally was anything but religious and with many trials and tribulations. Eighteen months later, with her healthy second child thriving, and her garden blooming, but with English flowers, Georgiana still found the 'bush' disturbing. From then on, however, she began to venture out and notice the forms, colours and scents of Australian flowers.

In December 1836 her life changed with the arrival of a letter from English horticulturalist James Mangles, sending seeds and a request to collect seeds of Australian plants accompanied by pressed specimens to be mounted in a *hortus siccus* that he also sent. For Georgiana, he was well-connected—he was a cousin of Governor Stirling's wife Ellen. Starved of the companionship of people of similar intellectual and social standing, Georgiana unburdened herself, her trials and her joys, to Mangles, who proved a generous, compassionate correspondent. The prospect of exploring the bush with a defined goal offered her both respite from the everyday tasks of the home and the opportunity to do something meaningful beyond the domestic. After her son was drowned in a well, it also offered solace. She came to feel that she was an individual of intellectual worth and potential not limited by her daily life. Her daughters were old enough to accompany her and, indeed, became useful 'assistants'. She made a duplicate set of specimens for reference when she received the names and, of course, raised some species in her own garden, making her one of the earliest growers of native plants in this country.

By the time of their departure from Augusta for the Vasse, Georgiana, in keeping with her religious views, felt that she was leaving paradise, but as a place of joy, not one of impending catastrophe. As Lines expressed it, she now felt that 'the world, the wilderness, had its own beauty and purpose'. She was disappointed in the landscape at the Vasse but soon came to recognise its potential for botanical exploration.

Each book describes the life of Georgiana and her husband John Molloy and gives details of other members of their families, as well as those with whom they were associated

during their lives in Britain and in Western Australia. Generally the events and dates coincide, the chief discrepancies being in the early life of John Molloy. During his lifetime he was guarded about his origin, leading to rumours that he was descended illegitimately from royalty. Barry went much further in her research and uncovered the facts, sometimes as a result of revisiting documents with new enlightenment. JM proved to have a relatively humble background (an Irish father who came to London and was a shoemaker, his mother a London girl). He was born on 5 September 1786, probably in St Giles where he was baptised but he sometimes gave it as Harrow where the family lived. The story that he was educated at Harrow School arose from a mis-interpretation of 'Molloy Jn' in the school's records as Molloy, John, when in fact it referred to 'Molloy Junior' from another Molloy family (and different in age). In fact Georgiana's JM signed on as a volunteer with the Royal Navy in 1801, serving until 1805. He then bought a commission in the Oxford Militia, then in 1807 bought a commission in the 95th Regiment of Foot of the regular army. He served in the Peninsular Campaign, fought and was wounded at Waterloo. He remained in the army until deciding to emigrate to the Swan River when he decided also that he should have a wife. He had met Georgiana Kennedy at Crosby in 1821, and it would seem that there was an attraction from the start. Barry realised that a draft letter signed with a nickname that had lain in the Molloy papers was a declaration of love but it was another year before she resolved the problem of the nickname that linked it definitely to John Molloy.



As she extended her research Barry came to realise that she was 'treading in someone else's footsteps', someone long ago, and eventually realised that it was Georgiana's granddaughter, Georgie Hale, who had been researching Georgiana and made copies of letters that were lost until found in the roof of a house and sent to the Augusta Historical Society in 1985. Likewise a sewing box, now held by the National Trust of Western Australia at Wonnerup, proved to be that owned by Georgiana from about the age of 20, still containing many items that had been important in her life such as two of her visiting cards, one in the name of Kennedy, one Molloy.

Barry found that the date of the visit by Georgiana's sister Mary was several months earlier than given by Hasluck and Lines and in fact coincided with that of Ludwig Preiss. She realised that a plan of their house and garden drawn by JM and long taken to be that at Fairlawn on the Vasse River was, in fact the garden at Augusta, and other details of their life there then fell into place.

Hasluck (1955)

Extracts of Georgiana's letters were published in the *Journal of the Historical Society of Western Australia* in 1929 (with the spelling 'Georgina' which Hasluck was able to correct). These attracted the interest of historian Alexandra

Hasluck. She was one of the first to become aware of, and draw attention to, the 'mass of material (all hand-written) contained in the files of the Colonial Secretary's Office, Perth, and now in the Archives Branch of the Perth Public Library, which relates to the early history of the south-western corner of Australia'. She followed this up with members of Georgiana's descendants, both in Australia and in Britain, and other people and sources such as the Royal Horticultural Society in London (at a time when contact was by phone or mail). Her aims were to do justice to Georgiana as a pioneer botanist and to describe the ordinary life of settlers in the first decade or so of the colony. It could be said that her book is a very successful pioneering account of those years.

Lines (1994)

Lines' primary interest was placing Georgiana more deeply in the religious, social and political setting of the time. He also set the Australian scene with accounts of its geological and biological evolution, its settlement by Aborigines, and their beliefs and way of life. Then follows the political, social and economic scene in Britain into which Georgiana was born, and the events that led to her marriage and migration. Besides the material in Perth he consulted the Cumbria Record Office where Kennedy papers are held and in Scotland visited Keppoch House and Rosneath (sic) Church, then thought to have been where Georgiana and John were married.

His is also a more searching discussion of the Nyungar people, their perception of the new settlers and vice versa, and the interaction between them. Lines has a degree in economics, the purpose of which, he wrote in False Economy (see notice in *ASBS Newsletter* 95: 15, 1998), 'is not to acquire a set of ready-made answers to economic questions, but to learn how to avoid being deceived by economists'. I should think he enjoyed reading N.N. Taleb's book *The Black Swan: The Impact of the Highly Improbable* (2007) which 'explores our blindness with respect to randomness, particularly the large deviations', and hence why economists and social scientists are so bad at their jobs.

I have to admit to ignorance of the meaning of 'Modernity' in the subtitle for his book.

This trio is a good example of research building on what has gone before. Each author has done a great deal of research within the parameters of what could be accessed reasonably at the time. Each added to what had gone before, correcting facts and unearthing new ones.

Each in their way succeeded admirably. I can recommend reading the three books. With their different styles and perspectives there is no loss of interest in reading of the same events, and each broadens the perspective. Barry, for example. adds to the understanding of Georgiana's devoutness with the observation that she was 'also a widely informed, independent thinker and understood that there were many ways to know God.' During her time in Scotland, far from being 'almost a retreat' as interpreted by Lines, she embraced the communities and their society. At the same time she enjoyed the poetry of Burns, hardly the most chaste of poets, and took a book of his poetry to Australia (the subtitle to Barry's book is from his *On Cessnock Banks*). She observed both the people and the natural environment. Barry visited these areas to get a better feel for the places where Georgiana spent some happy years. One visit to Scotland even coincided with the sale of Keppoch House which she was able to visit, roam through its rooms, and solve the question of where Georgiana and John's marriage took place. Behind the house was still the 'secret' flower garden where Georgiana had gardened, where she had gathered her wedding flowers. Photographs help our understanding, also. On this side of the world she photographed places of special meaning to Georgiana, such as the granite slope on the Blackwood where she collected, Castle Rock and Bay where Georgiana dreamed of having a home. There are photos of some of Georgiana's specimens, some of the living plants.

As the novelist Joseph Conrad wrote, his task as a writer was 'to make you see', and first-hand experience in places helps to achieve this end. And, as a recent review of a book on the writer Alan Moorehead by Les Carlyon said, 'history reads better if one walked the ground

in the hope of communing with ghosts'. My understanding of people I've studied, such as William Dampier, has been greatly enriched by visiting the places where he landed and imagining him being there.

Hasluck and Barry, our two women authors, generally refer to Georgiana by her first name, occasionally (after her marriage) as Mrs Molloy. This brings us into closer intimacy with her, compared with Lines' style in which she is usually 'Molloy'. All three usually refer to John as Captain Molloy, but sometimes Lines uses just the family name for him, too, fortunately careful to avoid ambiguity.

In Perth Barry realised the connection between the bells of St Martin in the Fields in London that would have rung out on the day when JM was baptised there in 1786, the same bells that now peal from the Bell Tower on the foreshore at the spot where the Molloys set foot in Perth in 1830.

A document that Barry studied in the Kennedy papers in Cumbria was a long letter of April 1831, describing the voyage out and the first year at Augusta, from Georgiana to her friend Mrs Frances Birkett in Carlisle, though it was thought by Lines to have been to her own family. In fact, the letter had been forwarded to Georgiana's mother whose correspondence survived, while Mrs Birkett's did not. As Barry wrote, 'Sometimes history extends a kindness, a gift from the past to the future.'

Regarding the collection of specimens that Georgiana sent to Mangles, it may be noted that many were brought to her — by her husband and her older children, by other settlers such as Charlotte Heppingstone, and by Aborigines. Even soldiers walking between the Vasse and Augusta brought her specimens. They could be thought of as silent collectors, although JM is acknowledged on the lectotype of *Adenanthos barbiger*, as 'Mrs Capt. Molloy 1839'. But Georgiana was responsible for drying and labelling them all. She also received some from Ludwig Preiss when he visited in December 1839, but she thought them so 'rough and ungainly' that she could not mount them with hers, keeping them separate (did any of these end up in herbaria and, if so, were they attributed to Georgiana or Preiss?). She picked up a few Nyungar names, such as *danja* for *Xylomelum occidentale*, gathered for her by JM on a walk to Augusta and placed under a rock to dry out, to be collected on the return walk. James Drummond also visited her, in June 1842. He it was who collected the specimens of 'the finest species of *Boronia*' and named it after Georgiana.

Georgiana's collections, together with those of Drummond and other collectors, formed the basis of John Lindley's *Swan River Appendix* in which some 283 new species were described. She was delighted to receive a copy of this from Mangles in June 1840 and to note her name sometimes cited as collector (for most, Lindley gave no collector at all with the descriptions). She was acknowledged in other horticultural publications.

No herbarium has a full set of Georgiana's collections. Mangles forwarded them to Lindley and to Joseph Paxton. Both were delighted with the array of species and the care with which they had been gathered and packed. The best set is at Cambridge (CGE), thanks to Lindley's part in naming them, with some at Kew (K), Berlin (B) and Montpellier (MPU). For reason(s) unknown, the numbers given by Georgiana were not recorded on the sheets. The fate of her own set is unknown. Perhaps it was discarded when JM auctioned most of his belongings in 1849, before setting off to visit England. Mangles sent her seeds to 15 horticulturists around Britain.

From a botanical perspective it would be good to have names for plants mentioned particularly by Georgiana in her letters, such as a 'small, neat, white blossom on a furze looking bush', but this will require yet further research. As time progressed she learnt many names and could use them in her letters but some references are just to their numbers.

Georgiana is commemorated in just one plant name, Drummond's *Boronia molloyae*, and that almost didn't happen (P.G.Wilson, *Nuytsia* 12: 140, 1998). A proteaceous genus *Molloya* was published by Meisner in 1855 (as a replacement for *Fitchia* and based on a species that Georgiana never saw) but it proved to be

synonymous with *Strangea*.

There yet remains a small mystery: what were the 'little blue flowers' that Georgiana placed on her first-born's body as they buried it on that May day in 1830? It was too early in the season for the many blue-flowered plants of mid-winter to spring such as *Hardenbergia*, *Hovea*, blue orchids and *Dampiera*. The likely species is *Lobelia anceps* that still grows on the shore at the mouth of the inlet.

It is pleasing to read the acknowledgements of these books, in particular to those who are too often taken for granted but who are essential to research: librarians and archivists. Hasluck acknowledged the then Archives Branch of the Perth Public Library, while Lines wrote of the 'eminently civilised Battye Library of Perth', and of the 'Donors, curators, staff, and volunteers who ... make documents accessible and useful'. The archivists at the Cumbria Record Office, Carlisle, epitomised 'the very best Anglo-Saxon traditions of openness, access, and cooperation'. Barry acknowledged the (now) Cumbria Archive Centre for 'years of five-star customer service'.

On practical editorial matters, I like having the endnotes numbered in a single sequence, rather than a new one for each chapter (though the numbers in the text, in a small, fine font, are hard to read). It can be annoying to turn to these and then realise that you haven't noted the chapter number or title.

Only a few plates are repeated in each book, so in this respect they complement each other. In each book the plates are grouped on unnumbered pages. In Hasluck and Lines they are numbered, which assists citation, but in Barry they are not so you have to say 'between pages ... and ...'. For ease of citation it would be good to have the pages of plates (or at least the individual plates) numbered. Barry also has illustrations within the text that are easily cited.

Both Hasluck and Lines have comprehensive indexes but Barry has one only to people plus the numbers of a handful of the 630 endnotes.

Errors are very few and not misleading except that on p. 116 of Barry the date of Stirling's arrival at the Swan River is given as August (instead of June) 1829.

In case anyone comes across it I should mention a fourth book, *Georgiana: Woman of Flowers* by Libby Hathorn, Hachette Livre Australia Pty Ltd, Sydney (2008), pp (vi), 298. It's a historical novel, aimed especially at young adults. While much of the story is drawn from Georgiana's life and those of her husband and fellow colonists, there are fictional threads woven through it. The names of a few characters have been changed, quite acceptable in a work of fiction, but I don't know if it's 'literary licence' or in error that some facts are incorrect, such as that the voyage out sailed from Plymouth instead of Portsmouth (mentioned several times including the back cover blurb, but at one point in the text Portsmouth slipped in). From a botanical aspect some erroneous additions seem unnecessary, such as placing mangroves in Flinders Bay, red-flowering gum and scented boronia in the forest there, and the two vignettes of flora that head alternate chapters showing two other flowers that Georgiana never saw – one possibly an *Angophora* from N.S.W. (also on the cover), the other *Banksia coccinea*.

Request

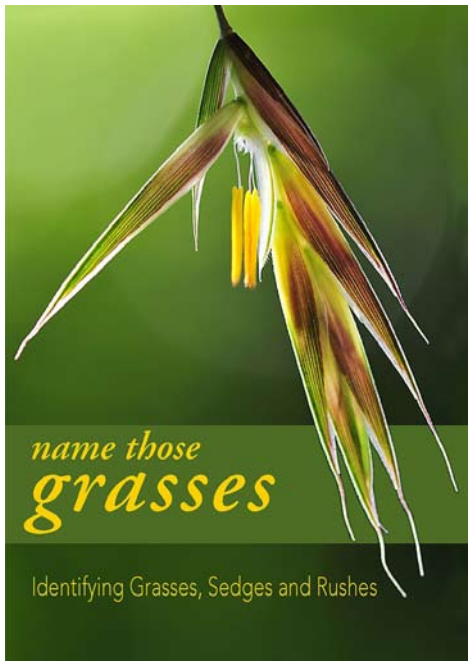
Georgiana's plant lists appear lost. They are not included in transcripts of her letters to Mangles held in the Battye Library, Perth. Sue Patrick compiled a partial list of her specimens in her paper 'Georgiana Molloy and early forest botany in the Augusta to Busselton area of Western Australia', pp 131–14 in M.Calver et al. (eds), *Proc. 6th Natl Conf. of the Australian Forest History Society*, Millpress, Rotterdam (2005), and Jenny Tonkin recorded more during her term as ABLO in 2006–07. These total some 50 species. I would like to continue adding to the list so I would appreciate information on any of her collections, including locality and citation of collector (e.g. sometimes given as 'Mrs Capt Molloy'). On herbarium sheets most are given as the Vasse – I've seen few labelled Augusta, even though her first set was sent from there. Her numbers also appear to have been omitted from the data on sheets. Images would be a bonus!

A pleasure in grass identification

Review by Janice C. Swab
Department of Biological Sciences, Meredith College, Raleigh, NC, USA

Name Those Grasses: Identifying Grasses, Sedges and Rushes
By Ian Clarke
Royal Botanic Gardens Victoria, Melbourne. 2015
536pp. ISBN: 9780980407648. AU $48 (paperback)
https://www.rbg.vic.gov.au/news/how-many-grasses-can-you-name

From the moment I took this book from its package, I loved it! The cover is one of the most pleasing I've seen. However, knowing that one can't judge a book by its cover, I did what anyone would likely do – after reading the Introduction and Chapter one, Making a Start, I went straight for the plants I know best, the rushes. I was pleased to find beautifully-drawn figures, used in order to clearly emphasize the necessary features of each drawing. The taxonomy is up-to-date and the differences between current treatments are emphasized. The practice of using font size to show the relative numbers of species in each section and bold type to indicate sections with species illustrated in the text make the book as easy as possible to use. Clear labels on all drawings and photographs enhance this ease. Plates of photographs are: 1-24, grasses; 25-28, sedges; 29, rushes; 30, 31, restios, rope-rushes; 32, Centrolepidaceae; 33, Anarthriaceae; 34, Ecdeiocoleaceae. In all, 206 of the more common species are illustrated and common names helpfully appear with the Latin ones.



I am sure that any interested non-professional can successfully use this book. The author emphasizes that "this book is intended as a guide to pursuing practical plant identification" and he has certainly made this possible through clarity of the treatments and his truly outstanding illustrations and photographs. Chapters two and three are a primer of all one needs to know about structure, nomenclature, and classification as they apply to these families. (At least I couldn't find anything of significance lacking!). One cannot help but view these wonderful families in a more appreciative way after using this book. I can only imagine what a pleasure it would be to encounter this book as a person's first attempts to "learn" these families!

The author emphasizes that this book is a beginning to prepare users to be able to use detailed keys to treatments from wherever in the world they are working. Following the treatments of the major tribes of grasses (Chapter 4, 237 pp) and sedges Chapter 5, 82 pp), and sections of rushes (Chapter 6, 39 pp), Clarke has included a page of quick review for each family (students often refer to such summaries as "cheat sheets"), adding one for the Restionaceae. Chapter 7 (19 pp) he devotes to the subfamilies of the Restionaceae along with the three genera of the Centrolepidaceae, adding a word and plate of photographs for the Anarthriaceae and Ecdeiocoleaceae. Chapter 8 (8 pp) provides a helpful discussion and illustrations for the Typhaceae.

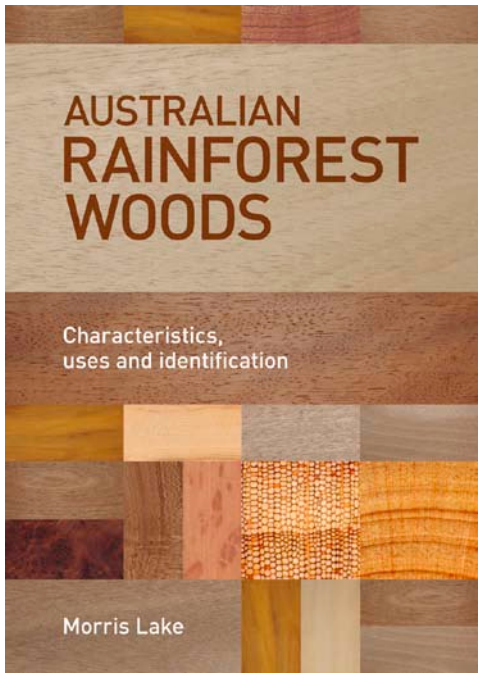
The final chapter, The Process of Identification, is a clear review of how to use keys from traditional to current electronic ones. A comprehensive Reference section is followed by a page giving Symbols, Abbreviations and Contractions used in the book. A detailed Glossary precedes the Index.

A love of Australian rainforest woods

Review by Robert Hill
Faculty of Sciences, The University of Adelaide

Australian Rainforest Woods: Characteristic, Uses and Identifications
By Morris Lake
CSIRO Publishing, Clayton South, Victoria. 2015, 216 pp.
ISBN: 9781486301799, AU $69.95 (hardback)
www.publish.csiro.au/pid/7288.htm

This book is obviously a labour of love by someone who has spent his life working with rainforest woods and understands the technical aspects of wood working very well.



Most of the book is devoted to an alphabetical description of 141 species of rainforest trees that produce commercially useful timber. In each case there is a general description of the species, some photos, and then a small section on how the wood responds to being worked and the types of objects that can best be made from it. The latter is a curious mix of past and present, including such historical uses as propellers for aircraft, butter churns, battery separators, boat building and so on, as well as more contemporary uses. These are not always as well separated as they might be.

This is a book probably best recommended to the dedicated wood-worker, and especially the hobbyist who is genuinely interested in what Australia has to offer. The background information on each species is of variable length and detail, and often contains the author's personal insights from his long connection with the timber industry. There are some quirky interpretations of the evolutionary history of some taxa.

The book is not without its flaws. I found it slightly annoying that there is a large amount of repeated information. In the alphabetical listing, several species in a single genus often appear, one after the other, but on every page the description of the genus is repeated, mostly word-for-word. A better layout would have saved considerable space and unnecessary repetition. Furthermore, the proof-reading of the book is poor. There are too many spelling errors and grammatical errors that should have been picked up. For example, I don't think it is unreasonable to expect that the singular of genera is genus, but more often the former word is used as the singular. In a three page section on *Athrotaxis selaginoides* there is the following set of statements about the potential age of individuals of this species: "It has a life span of 1,000 years"; "Possibly the oldest living specimen … (is) as old as 1500 years"; "some … dated at ages between 1200 and 1700 years"; "The oldest … trees are estimated to be between 1500 and 2000 years old". On two opposite pages, dealing with *Athrotaxis* species, we have these two statements: "*Athrotaxis* originated about 160 million years ago"; and "*Athrotaxis* is thought to have originated around 100 million years ago". Good proof reading should have brought some consistency to such statements and while it is especially noticeable in the section on *Athrotaxis*, similar errors occur throughout the book.

Following the species descriptions there is a section of microphotographs of the wood and these are of very good quality and will be helpful to anyone trying to identify wood specimens. I expect this book will have a limited market, since it does bring together

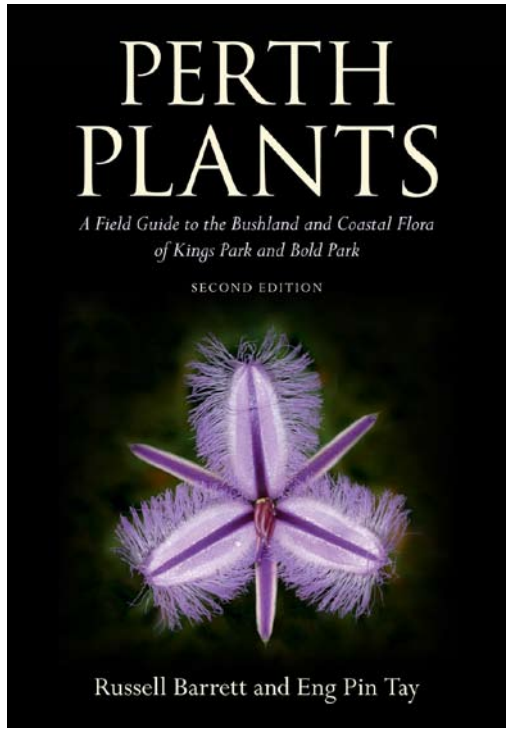
a lot of disparate information into a single place. For those who are interested it provides an interesting view on how someone deeply embedded in the commercial timber industry views the Australian tree vegetation.

A practical guide to Perth's charismatic flora

Review by Tanja Schuster
Royal Botanic Gardens Victoria

Perth Plants: A Field Guide to the Bushland and Coastal Flora of Kings Park and Bold Park. (2nd edition)
By Russell Barrett & Eng Pin Tay
CSIRO Publishing, Clayton South, Victoria. 2016
440pp. ISBN: 9781486306022.
AU $49.95 (paperback)
www.publish.csiro.au/nid/18/pid/7555.htm

This field guide provides an excellent point of entry into one of the most charismatic floras on the planet, that of southwestern Western Australia. I really wish I had had this book when I was recently doing field work there for the first time. Likely I would have had to spend much less time trawling various online databases, wildflower enthusiast blogs, stacks of other regional field guides and floras to learn the species I had seen.



The strength of this field guide lies in presenting thousands of images (several per species) of consistently good quality, and these have been updated from the first edition. Though each image is fairly small, together they clearly convey what is necessary for species identification. The authors have obviously spent much time amassing this wealth of photographic material and have taken great care to select appropriate images. In addition to photos depicting plant habit, close-ups of salient morphological characters, distribution maps, and descriptions of preferred edaphic conditions add particularly useful layers of information for species identification. Another strength is using the Angiosperm Phylogeny Group (APG III) classification for the field guide. Widely known synonyms are also included in the descriptions and are listed in the index to make it as easy as possible to locate species quickly. Images for several species per genus are included when these might be difficult to distinguish (e.g.: *Cassytha*, *Hemiandra*, *Hydrocotyle*), and the often neglected grasses and rushes are well-covered. Orchids, which are of course exceptionally speciose in this part of the world, are spread over 30 glorious pages. Compared to other regional guides, many comparatively uncommon species are included, showing the richness of the flora and how well the authors know it. I also enjoyed the brief introductory section on the history of Kings and Bold Parks and traditional plant uses of the Nyoongar people. A glossary of technical terms and a ruler for measuring plant parts in the field are additional useful tools, though the ruler is buried within the pages and would have been better placed on one of the book covers or both.

The layout of the book makes it very accessible by grouping ferns and gymnosperms, eudicots, and monocots into colour-coded sections. This might be somewhat challenging for beginners with little knowledge about plant groups, as

they may find it difficult to assign the species at hand to a given family. A family guide at the beginning of the photographic section of the book gives assistance with this by listing noteworthy morphological characters and thumbnail images of representative species for the families covered. Eudicots and monocots are each split into two sections of native and introduced species (also colour-coded), which adds a nice layer of information about conservation issues and the vulnerability of native habitats. To forestall any confusion about the split sections, the family guide indicates page numbers for the native and introduced sections should the family include species in both categories.

It is unsurprising that this field guide is now in its second edition, and I am sure there will be more to come on account of the great utility and quality of this practical book. I would also recommend the field guide to those botanising further afield than Perth, because it features many species seen throughout Western Australia's Southwest.

A lifetime spent exploring the Wild West

Review by Mike Crisp
Research School of Biology, ANU, Canberra

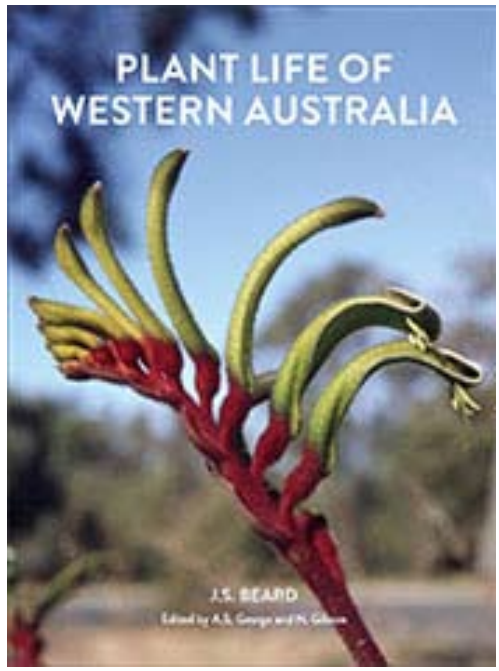
Plant Life of Western Australia (2nd edition)
by John Beard. Edited by A.S. George and N. Gibson
Rosenberg Publishing Pty Ltd, Dural, NSW, 2015
325 pp., ISBN: 9781925078787. AU $55.00-65.00 (hardcover)
www.publish.csiro.au/pid/7594.htm
Also available as an ebook ISBN: 9781925078794.

In 1961, John Beard was appointed as founding director of the Kings Park Botanic Garden, with an explicit brief to cultivate and display the native flora of Western Australia to the public. Beard originated in the UK where he obtained a PhD at Oxford. He was a forester and community ecologist, and early in his career he mapped, classified and analysed vegetation in the American tropics. Therefore, it was not surprising that he rapidly developed an interest in doing the same with Western Australian flora. In the preface to the first edition of *Plant Life of Western Australia*, he wrote of the excitement of exploring the wilderness, especially in the arid interior, and of the feeling of being the first in the field (though of course, this country was home to the indigenous inhabitants). He also noted that, in the early years at Kings Park, new plant species were being brought in continually by their collectors, even from the relatively well-known south-west. Of course, new taxa are still being discovered, or at least 'recognised', from the south-west, today. It must have been very exciting for Beard to realise that he had landed in one of the world's major hotspots of floristic diversity, and at a time when so much of it was yet to be described or cultivated. So, Beard undertook a series of major field trips to every corner of WA, mapping the vegetation.

In 1970-2 Beard moved briefly to NSW as director of the Royal Botanic Gardens before retiring back to Perth. His major lifetime achievement in research comprises a series of articles presenting maps with supporting descriptions ("explanatory memoirs") of the vegetation of all regions of Western Australia. These total about 30 articles, published by Vegmap Publications over the period 1960-74 and are comprehensively cited in Beard et al. (2013). Much of his survey data remained unpublished at his death (Beard et al., 2013). From this lifetime's body of work, he produced syntheses, such as on the theory of classifying phytogeographic regions, and a new phytogeographic map of WA (e.g., Beard 1980). Posthumously, he led a multi-authored, superbly detailed vegetation map of WA at 1:3 million, which integrated all the survey data, with an accompanying explanatory memoir (Beard et al., 2013).

The original edition of *Plant Life of Western Australia* (Beard, 1990), was one of the author's retirement hobbies, after he had moved back to Perth. He conceived it as a photographic record of his 25 years of field work studying the Western Australian flora and vegetation. Regretting the paucity of photos in his research

papers, he saw his book as an opportunity to publish the best of his many colour slides, and to provide a publicly accessible summary of his many published vegetation maps and of his overall "natural regions" classification. The many – more than 500 – slides comprise a superb visual record of the natural landscapes and vegetation of Western Australia, illustrating their diversity and dynamics. The slides also provide an intriguing record of the people involved in the field expeditions, such as Beard's professional colleagues, including Alex George, Herb Demarz and Fred Lullfitz, who collected specimens for taxonomic research and cultivation. As often as not, he was accompanied by friends or members of his own family. Consequently, many photographs in the book include a clearly identifiable "figure in the landscape", with their sometimes enigmatic placement and posture suggesting that the photographer had more than a passing interest in classical landscape art. Some were clad in skimpy clothing (e.g., bikinis) that would definitely not be approved by WH&S authorities today.



The second edition of *Plant Life of Western Australia* (under review here) was published posthumously in 2015 at the initiative of the editors, Alex George and Neil Gibson. A strong motivation was that the original edition had been out of print for many years and was difficult to obtain even on the second-hand book market—perhaps a sign of its popularity with the public. The new book is actually a reprint with minor corrections and couple of new appendices. Both the layout and content are almost unchanged from the first edition, with even the pagination identical throughout the 312 pages of the main text. Minor changes have been made to the fonts and the pages are thicker (though the page dimensions are unchanged), making the book about 50% thicker and thus heavier and a little less convenient to take into the field.

Plant Life of Western Australia starts with a history of ecological vegetation mapping and classification, including the now century-old pioneering study by the German botanist Ludwig Diels (1906). When Beard wrote this brief history in 1990, Diels' very detailed monograph was only available in the original German edition. Recently, it has been translated into English (Grieve et al., 2007) and is well worth reading for an appreciation of Diels' detailed and beautifully illustrated observations of communities in the south-west that are now cleared or heavily disturbed. Additionally, two of the translators (Lamont and Grieve) have relocated many of Diels' sites 80 years later and replicated his photographs, presenting paired comparisons in an appendix. It is surprising to see how much little some sites have changed, in contrast to dramatic change in others.

In the Introduction to *Plant Life of Western Australia*, Beard also presents his structural classification system for the WA vegetation, similar to that of his contemporaries, in which characteristics of the structure, growth-form, and floristic composition of the vegetation were used to define the units of classification. In the second chapter of the book ("The Environment"), Beard describes and illustrates the natural regions (= biomes or floristic zones) and ecological processes, such as climate geology, landforms, soils and fire, that have shaped the development of the WA vegetation. The remainder, and greater part of the book, classifies and describes the natural regions and districts of WA, and is illustrated with maps and Beard's many colour photographs.

The first of the two appendices added by the

editors to the second edition of "Plant Life of Western Australia" lists scientific names that have been updated in the book as a result of taxonomic and nomenclatural changes. However, few such changes are made and the updating is inconsistent, for example the widely accepted segregation of *Corymbia* from *Eucalyptus* has not been recognised; nor has the sinking of *Dryandra* into *Banksia* or that of *Actinostrobus* into *Callitris*. These genera are often community dominants, so such decisions are not trivial in a book such as this. The second appendix is a list of all the identifiable people who appear in Beard's photographs, sorted both by person and by Figure number. The most frequently appearing person is, perhaps unsurprisingly, Beard's wife, followed by his professional colleagues Demarz, George and Lullfitz.

The greatest challenge in producing the new edition was the reproduction of Beard's slides – the photographs that he gave as his *raison d'etre* for publishing the book. The editors were given access to scans of Beard's original slides, which his family had given to the State Library of WA. The Library had scanned the slides and, in the process, destroyed the mounts and the data written onto them. However, the authors managed to retrieve much of the data from other sources. Compared with the first edition, the quality of the images is unfortunately inferior, both in sharpness and the quality of the colours, which look "muddy". I would have expected that the technology for reproducing photographic images should have improved in quality between 1990 and 2015. Nevertheless, this remains the most detailed, accurate and comprehensive book of its kind and should appeal to both the professional scientist (for the quality and comprehensiveness of the underlying data) and to the interested amateur (for its accessible format and abundant illustrations).

I am grateful to Lyn Cook for comments on a draft of this review.

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Spot characters for identifying Malesian plants

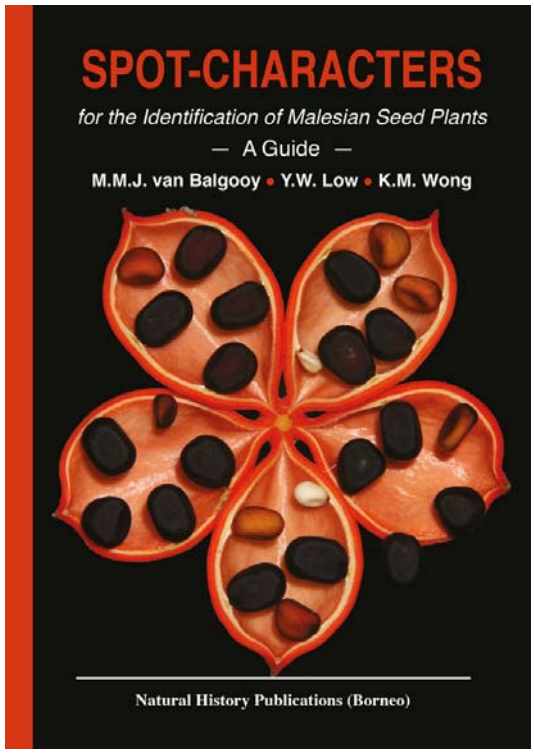
Review by Darren M. Crayn
Australian Tropical Herbarium, James Cook University, PO Box 6811, Cairns 4870

Spot-characters for the identification of Malesian seed plants. A Guide.
By van Balgooy, M.M.J., Low, Y.W., Wong, K.M. (2015)
(Natural History Publications Borneo: Kota Kinabalu). Softback, 278 pages.
Price: approx. AU$65
ISBN: 978-983-812-159-0

Malesia – the floristic region comprising the Malay Peninsula, the Malay Archipelago and New Guinea – is one of the world's great terrestrial biodiversity regions. Among its many impressive claims is that it contains the world's largest and second largest tropical islands - New Guinea and Borneo (second and third largest of all islands globally after Greenland). Geologically highly complex, it is of great interest not only to earth scientists but also to biogeographers and evolutionary biologists as arguably the most fascinating zone of biotic interchange between the northern and southern hemispheres. First and foremost among biologists seduced by its charms was Alfred Russel Wallace, who developed, contemporaneously but independently of Darwin a theory of evolution by natural selection while working as a collector and field biologist based in the Moluccas in the mid-late

nineteenth century.

Malesia is extraordinarily rich in plant diversity. Precise estimates are lacking, but the region is probably home to more than 40,000 seed plant species, about 15% of the global total of c. 270,000 (Chapman 2009). When as a young scientist I was appointed to a role with a focus on the botany of the Malesian and Australasian tropics, my immediate task was to become familiar with the flora. I was saved from the utter despair that descends when one realises that they are hopelessly lost and without a map (and lunch), by two works of monumental scholarship. The first was the 'Rainforest Key' (Hyland et al. 2003), an interactive identification system to Australia's rainforest plants. The second was the three volume series *Malesian Seed Plants* by the Dutch botanist Max van Balgooy (van Balgooy 1997, 1998, 2001).



Of his three volumes, van Balgooy's most valuable contribution for my purposes was volume 1, *Spot Characters* (van Balgooy 1997). Between its covers van Balgooy condensed a lifetime's field and herbarium study of the morphological diversity and identification of the plants of Malesia into a quick and accessible guide to plant identification by the use of spot characters, readily observable features which diagnose certain groups. Van Balgooy's work draws on his training under Prof. C.G.G.J. van Steenis and Dr R.C. Bakhuizen van den Brink. During identification sessions where the material incoming to the Rijksherbarium at Leiden was processed, he watched as they

> ... went through the piles of material like a whirlwind, each trying to beat the other in naming the plants ... Each ... had his own method of memorizing plants. Van Steenis was in the habit of jotting down on small scraps of paper all striking characters he came across ...

It is these records that were ultimately entrusted by van Steenis to van Balgooy, and became, greatly expanded, the basis for S*pot Characters*.

Across its 154 pages van Balgooy (1997) enumerated 105 spot characters, illustrated with line drawings, described in brief prose, and followed by lists of the taxa in which the character occurred. The other two volumes, *2 – Portraits of Tree families* (van Balgooy 1998), and *3 – Portraits of Non-Tree Families* (van Balgooy 2001), helped to confirm identifications obtained initially through use of *Spot Characters*.

This new version (van Balgooy et al. 2015) arrives nearly two decades after the original and is a very substantial update and extension of the original work by an expanded authorship, including Singaporean botanists Yee Wen Low and Khoon Meng Wong. Incremental improvements and enhancements include more features (119 versus 105), more comprehensive lists of taxa (e.g. for character 85, epiphyllous inflorescences, there are 14 taxa versus 9), and taxa listed alphabetically by family (versus by genus). Two much more significant changes are updated taxonomy including adoption of the APG III classification (APG 2009), and a much richer suite of illustrative material.

The adoption of APG III brings 'Spot Characters' into line with the family classification used by many practising botanists, and a growing number of herbaria with major Malesian collections. However the

authors recognise that some of their audience may be using, for whatever purpose, older systems and names and may find some of the changes to family assignments contained in APG III inconvenient. Therefore they include the previous family assignment for taxa where this is likely to be useful. For example, 'Euphorbiaceae' is parenthesised after the less familiar 'Putranjivaceae' for the genus *Drypetes*.

In place of the limited but useful line drawings in the 1997 book, almost all features are now richly illustrated with high quality colour photographs, many of which appear to have been taken expressly for this purpose. Most features are served by several photographs which collectively capture the diversity of expression in different taxa.

As the authors acknowledge in the preface, spot character guides are not substitutes for full floras or identification keys. But like landmarks in a bewildering landscape, they help the user zero in on a correct identification where it might otherwise be exceedingly difficult with the available material. As was the 1997 version, it will be especially useful for herbarium botanists as a number of characters are pertinent to dried material, e.g. 58 – nigrescence.

So is a guide to Malesian spot characters useful for Australian and New Zealand botanists? Clearly the main audience will be those interested in identifying Malesian plants and for them it is indispensable. But Australia, particularly its tropical north, shares many genera with Malesia, especially the island of New Guinea. For example, a quick check of the taxa listed under three haphazardly chosen characters (29 – interpetiolar stipules and stipule-like structures, 51 – peltate leaves, 103 – exocentric style) reveals that approx. 58% occur in Australia. In addition to these taxa shared with Malesia some Australian endemics are included. Ostensibly this is because '...they may turn up sometime in Malesia.' (van Balgooy et al. 2015, p. 3), for example a number of the 49 seed plant genera endemic the Wet Tropics bioregion (Wet Tropics Management Authority 2014) such as *Austromuellera* (Proteaceae; for 53 – triplinerved leaves) and *Crispiloba* (Alseuosmiaceae; for 45 – whorled or verticillate leaves, and 91 – corolla or perianth fimbriate or bifid) and the species *Prumnopitys ladei* (Podocarpaceae; 20 – white or yellow sap). Also included are a few Australian endemics of dry habitats that I admit I didn't expect to see and would indeed be remarkable if discovered in Malesia, such as the monotypic southwestern heath genus *Actinodium* (Myrtaceae; 86 – compact inflorescences). Clearly 'Spot Characters' is useful for Australian plants but it is unclear to what extent it can be considered a primary resource for identifying that flora – time will tell. Of course the New Zealand flora shared with Malesia is covered, for example the genera *Beilschmeidia*, *Cissus*, *Ranunculus*, *Weinmannia*, etc. So the answer to the question 'is this book useful for Australian and New Zealand plants?' is a qualified 'yes'.

Beyond its undoubted value as an identification resource, students of plant morphology will find this a fascinating reference, representing as it does an unparalleled quick guide to the taxonomic distribution and variation of many conspicuous morphological features. This will be useful for workers interested in erecting and testing hypotheses of character homology and evolution, and ecologists eager to understand their ecological significance. Even zoologists, especially those interested in plant-animal interactions will find gems here, such as lists of taxa which form associations with ants (character 10 – ant plants), or possess leaf domatia (character 69) which presumably harbour mites.

Overall *Spot Characters* is a book of considerable merit and proven utility for identifying Malesian plants. It is a comprehensive guide to a charismatic and world famous flora, and therefore will be of interest to anyone eager to understand it. That I should add, is a strong recommendation to buy this book.

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New books

Flora of the Cook Islands

By W.R. (Bill) Sykes
Published by the National Tropical Botanical Gardens, Hawai'i (NTBG), May 2016
Hardcover, 950 pp., 185 colour images, 256 b/w drawings
Order form at http://botany.si.edu/cook_Island.htm
Price range from $A95 - $US99.

Many congratulation to Bill Sykes for the completion of his *Flora of the Cook Islands*. The volume covers both native and cultivated species found on the islands and there are descriptions and keys for 567 flowering plant and 108 fern species. Of these numbers about a third of the flowering plants and all but 4 of the fern species are native, with 26 species endemic to the islands. The native species mostly relate to East Polynesia.

David Glenny of the Allan Herbarium edited the book and publication was a joint project of NTBG, Landcare Research, International Association of Plant Taxonomists, Canterbury Museum and the Smithsonian Institution.

Fig. 1. At the launch of the *Flora of the Cook Island*s. Back row leaf to right: Pam Byrne, Ted Doonerwind (library); Charles Graham, Sue Gibb, Mary Korver, Ines Schonberger, Kate Boardman, Debbie Redmond, Kerry Ford, David Glenny (herbarium); Christine Bezar (retired Landcare editor). Front row left to right: Ilse Breitwieser (herbarium), Peggy Kelly (Bill's wife), Teremoana Yala (Cook Islands High Commissioner to NZ) Bill Sykes, Marie Pa Ariki (Cook Islands Queen), Allan Fife (herbarium).

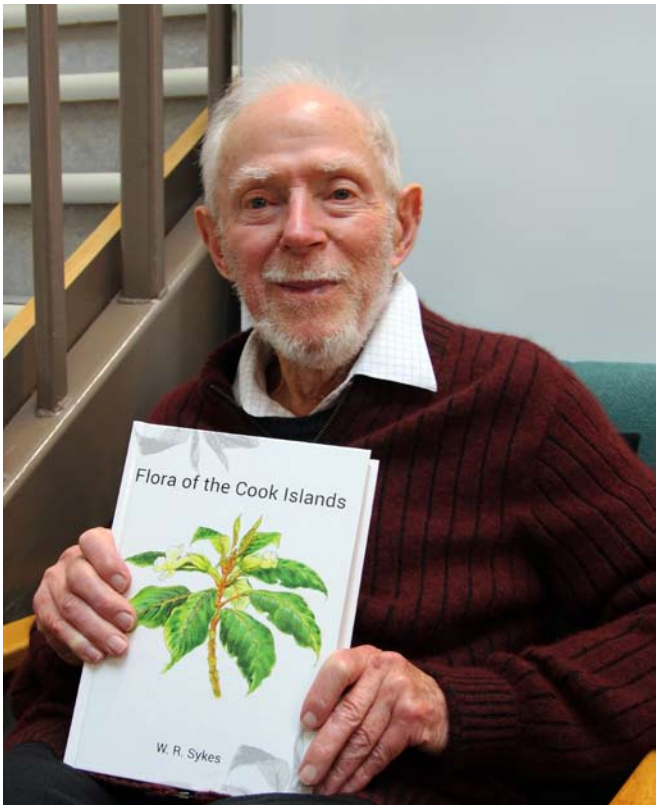

Fig. Bill Sykes in the Allan Herbarium tea room with his fine achievement

Born and trained in horticulture in England, Bill joined Botany Division of DSIR in 1961 and worked on the floras of Niue, the Kermadec Islands and Norfolk Island as well as the New Zealand flora. He also had time on a scientific exchange program at the Guang-Xi Institute of Botany in China. Bill retired in 1992 but has maintained a working presence at the Allan Herbarium as a Landcare Research associate ever since and this is one of the outcomes from that retirement.

Further background to the project can be seen at Web ref. 1 as well as in a *youtube* video of the very colourful launch (Web ref. 2) and Katarina Tawiri's interview with Bill (Web ref. 3).

Web references

1: *http://www.landcareresearch.co.nz/about/news/snippets/first-complete-flora-milestone-for-cook-islands*

2: *https://www.youtube.com/watch?v=Hhx95Wg4gyo*

3: *https://www.youtube.com/watch?v=Qz5YHmfRHYE*

Miscellanea

The Morphology of Steve

This 2004 paper (Web ref. 1) is an oldie but a goodie – you can read the paper, based on data provided by 284 scientists name Steve, as a stand-alone and for a laugh or you can read more about the National Centre for Science Education and their Project Steve and its role in defending the teaching of evolution and climate science in the USA (Web ref. 2). They are still enrolling Steve's – last count of 1393 was on 11th April 2016.

Web references

1: *https://www.improbable.com/airchives/paperair/volume10/v10i4/morph-steve-10-4.pdf*

2: *http://ncse.com/taking-action/project-steve*

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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*.

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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

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History of Systematic Botany in Australasia (book)
Edited by P.S. Short. A4, case bound, 326 pp. ASBS, 1990

For all those people interested in the 1988 ASBS symposium in Melbourne, here are the proceedings. It is a well presented volume, containing 36 papers on: the botanical exploration of our region; the role of horticulturalists, collectors and artists in the early documentation of the flora; the renowned (Mueller, Cunningham), and those whose contribution is sometimes overlooked (Buchanan, Wilhelmi).

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