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ARTICLES

THE CASE OF THE FIVE ACACIAS

David Morrison
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Introduction

It is a moot point whether taxonomy is to be considered as a sport, a trade, or an art. For a trade, the technique is scarcely rigid enough; and its claims to be considered an art are vitiated by the rather inartistic rules of nomenclature. On the whole, it seems to be most justly ranked as a sport - often an amateur sport, for which few rules are at present formulated, and of which the prizes are precious few indeed.

Now, in the life of every budding plant taxonomist there exists a contribution to a Flora. It's their initiation into the world of taxonomy, as well as a statement that they've made it. In the same vein, musicians own a Stradivarius or a Steinway, and wine connoisseurs own a case of Chateau Lafite-Rothschild (Bernstein 1982).

And so, several years ago (on August 31st 1987, to be precise), I was asked to contribute to the *Flora of New South Wales*. Now, I certainly don't deny that I accepted this commission so that I could go around talking about my 'Flora work', but I was hoping for some nice neat little group like *Lechenaultia* (in the Goodeniaceae). After all, there's only one known collection of only one species (*L. divaricata*) in the whole state of NSW, and I felt more than well equipped to deal with this. Unfortunately, the editor had a different idea - the acacias.

Flora Work

It would no doubt enhance my somewhat shaky reputation as a taxonomist if I suggested that I accepted this proposal without hesitation, got on with it boldly, and completed it easily. However, the truth is that I had no idea how to write a Flora treatment, knew next-to-nothing about *Acacia*,

and worried about it for the whole two-and-a-half years it took to complete. At 211 species (plus 7 subspecies and 2 varieties), it was the largest thing I'd ever tackled.

I certainly couldn't do it myself, I didn't know whom to ask for help, and I was too embarrassed to palm it off on someone else. The only thing I seemed able to do was worry about it.

The whole thing was out of all proportion. This was, after all, only a Flora treatment - to be used by the general public to try to identify a few plants, or left on a bookshelf to impress the neighbours. After all, no serious taxonomist would ever look at it - they know better, since the keys never work and the descriptions are too short to be useful. Unfortunately, my wife was one of the editorial assistants for the book, and she seemed to be expecting big things from me.

So, I lay awake at night worrying about it, since (unfortunately) all acacias look the same to me. Eventually, I realised that there were only two possible solutions. Firstly, I could take Les Pedley's (1986) advice and accept *Racosperma* as a separate genus, thus renaming the problem - then I'd only have *Acacia farnesiana* to deal with (and possibly *A. nilotica*, if you think it's been naturalised). This linguistic solution was tempting, especially as then getting someone to do *Racosperma* wasn't my problem.

However, I finally decided in favour of the second solution - I needed a bloody good TO to do all the hard work. Fortunately, one of these was already to hand in the form of Michael Bedward - an English emigrant of considerable ability and, more importantly, more knowledge about *Acacia* than I had.

In addition, there was Norman Hall - a true Renaissance Man, who seems to pop up everywhere you look in Australian plant biology. He had, several years before, produced a card

key for the NSW acacias; and Peter Weston and I had re-worked (and expanded) his character list into Mike Dallwitz's DELTA format.

Our idea was to produce an interactive identification key on computer, using Richard Pankhurst's ONLINE program. (Peter was curator of the acacias at NSW at the time, and he seemed very keen to find some easier way to identify them.) Anyway, Norman had already graciously agreed to re-code his data into this new format for us - no mean undertaking in itself. So, I thought, why don't I use the same data, and get the DELTA system on the computer to produce the descriptions and traditional keys as well?

Thus, it looked like I was set - with Norman producing the data and Michael putting it onto the computer, I was away. Some day, I thought, in a few months or so, I'll think about what I need to do next.

Unfortunately, we'd hardly got started when Michael defected to the National Parks & Wildlife Service of NSW for a proper job. This was a serious matter, because I couldn't do the work, and I still couldn't palm it off on someone else. And not a description had yet been produced.

After more sleepless nights worrying about it, I eventually decided I needed another TO. Another good one. Enter Stuart Davies - another bright young refugee from Peter Myerscough's lab. at Sydney University (like Michael and myself), who also knew a phyllode when he saw one and could tell a pinna from a pinnule. It looked as if I was away again.

Stuart made it through the crucial breaking-in period, and the entering of the data onto the computer continued. Meanwhile, I had anxiety attacks thinking about how wrong the data might be, and whether any of us knew what we were doing. And I still hadn't produced a description.

Things went along quietly like this for a few months - well, years actually, as indicated by the falacious annual reports that were the only thing I seemed able to produce. Then one day the data coding and entering was complete. No problem, I thought - now we start producing some keys. So, Stuart learnt to use the CONFOR and KEY programs in the DELTA package. Some keys were thus produced, which Norman proceeded to check by trying to identify a few specimens. In the meantime, we still didn't have any descriptions.

Things went on in this fashion until mid 1989, when Stuart suddenly announced that he had a Ph.D. scholarship to Harvard University (in the USA), and so he wanted to abandon the acacias, with the keys only three-quarters finished. My mouth turned dry, and I broke out in a cold sweat - we still hadn't produced any descriptions. I took two valiums and called my lawyer. She pointed to a depressing lack of anything that I could do to stop him leaving - perhaps I should do the work myself. I told her if I could do it myself I wouldn't have needed Stuart in the first place. I felt like Edmund Hillary waking one morning to find Tensing Norgay gone.

And, so, more sleepless nights ensued, interspersed with nightmares and uncontrollable shivering, as I faced the final reality - I actually would have to do the rest of the work myself. The ultimate humiliation. I'll spare you the horrifying details of those long months, as I struggled onwards, slowly editing description after description, feeling all the while like Robert Scott approaching the south pole. I even began to understand what Dr Frankenstein must have felt.

But I made it.

Taxonomy of Acacia

Along the way I realised what the problem had always been - there are too many damned species. So, I began to formulate a possible solution to this problem. Having rejected the idea of napping the lot of them (since this would only stimulate the seeds in the soil seed bank to germinate, and I'd end up with more than I started with), I eventually decided that a taxonomic solution would suffice (as well as being more ecologically responsible). The problem, as Pedley (1986) has recognised, is basically a nomenclatural one. However, instead of reducing the size of *Acacia* by moving most of the species out, I would like to propose an equally bold alternative - that we simply lump the ones that we currently have.

This idea follows logically from the scientific application of the philosophical principle known as parsimony. As a general methodological rule in science, parsimony has been advocated by nearly all philosophers of science since the legendary William of Occam in the 14th century (Russell 1946), although a logically sound

general justification for parsimony remains elusive (Sober 1985). In taxonomy, its use has so far been more or less restricted to the realm of cladistic analysis (Johnson 1982). However, the axiom that 'entities should not be needlessly divided' sounds to me like a pretty useful general rule, and I think that it could probably be more widely applied in taxonomy than it has been in the past. One could, I think, even suggest that each new species or genus that we create is actually an admission of a mistaken assessment of monophyly.

Now, it seems to me that five is a nice parsimonious number, and so five acacias there shall be. Since I now have so much expertise in producing keys to acacias, here is my proposed new taxonomy of *Acacia*:-

- 1 Mature leaves always bipinnate
 - 2 Stipules distinctly spinescent *A. maledicta*
 - 2* Stipules not distinctly spinescent.....
.....*A. vulgarea*
- 1* Mature leaves not always bipinnate
 - 3 Flower heads distinctly spicate *A. spicata*
 - 3* Flower heads not distinctly spicate
 - 4 Leaves with more than one prominent longitudinal vein *A. pessima*
 - 4* Leaves with only one or no prominent longitudinal veins *A. taedens*

Any plant that cannot be successfully identified using this key is obviously not an *Acacia*.

Believe me, the amount of time and money spent on producing this key was considerably less than that required for the one in the '*Flora of New South Wales*', and it is infinitely easier to use. I therefore expect this new taxonomy to sweep all before it, and to rapidly become the standard by which alternative *Acacia* taxonomies are judged.

For instance, it is interesting to compare this new scheme with those discussed by Pedley (1986) and Maslin (1989). In doing so, the extremely practical nature of my proposal is immediately obvious. For example, *Acacia* is usually delimited as those mimosoid legumes with a large number of free stamens, while I define it simply as those plants that can be successfully identified using my key. This definition does away with a lot of the tedious mucking around that members of 'difficult' taxa always engender - we merely redefine them as someone else's problem.

Also, and far more importantly, any difficulties concerning the higher-order classification of *Acacia* sens. lat. (Maslin 1989) immediately disappear. After all, who would bother to further classify only five species? One genus and subgenus is enough, unless you favour monotypic genera. This is then, by definition, the ultimate solution.

Furthermore, my scheme does away completely with any problems arising from the possible polyphyly of *Acacia* (Maslin 1989). By circumscribing each species so loosely, the terminal taxa themselves are probably polyphyletic, and thus no phylogenetic analysis is possible. If the problem is not amenable to analysis, then the problem should be ignored.

Since my new scheme is so simple, there are also no major world-wide nomenclatural disruptions, nor any in Australia either. The name *Acacia* has priority, and so all acacias remain acacias in my scheme. Once taxonomists have become used to the new species names (which shouldn't take long), the ability of people to communicate concerning biological diversity will be greatly enhanced - there is virtually no diversity within the genus at the species level, and so there's nothing to discuss. Consequently, no misunderstandings can occur.

This new scheme also dramatically shortens the list of Rare or Threatened Australian Plants (Briggs and Leigh 1988), as there are now no acacias that are either threatened or rare. This is obviously a major contribution to the conservation of the Australian flora.

Conclusion

Some stories end with bloodshed and intrigue, but fortunately not this one. This *Flora* work has cost me grey hairs and sleepless nights, tension and anxiety. But there's one thing that I've learned - there are people who are born to *Flora* work and people born to curation, and I know which one I am.

Acknowledgements

Firstly, I'd like to thank Norman Hall for his help in producing the original coded data for this project, and for checking the early versions of the keys produced - the time and effort he has put into this work during his retirement is as

impressive as anything else he's done. Secondly, Michael Bedward and (especially) Stuart Davies contributed a remarkable amount of excellent work for very little reward - all too typical in these days of government funding. Finally, thanks to Peter Weston for starting the project in the first place, Jocelyn Powell for then conning me into the Flora work, Gwen Harden for prodding me along over the years, Louisa Murray for making sure that the manuscript Gwen got wasn't too embarrassing, Leonard S. Bernstein for providing the idea for this story (not the Leonard Bernstein that you're thinking of), and Michael Crisp, Stuart Davies, and Louisa Murray for their helpful comments on the many earlier versions of the manuscript.

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WHAT PRICE A HERBARIUM SPECIMEN?

Philip Short

National Herbarium of Victoria

In a recent paper (Short 1990) I highlighted the fact that the importance of the National Herbarium of Victoria (MEL) to both overseas and Australian botanists is due, in no small way, to the purchase of specimens from private collectors. At the time I was aware that much information pertaining to such collections has either been lost or is yet to be located in various files. I also overlooked the occurrence in the MEL library of four volumes of letters and reports dating from 9 May 1907 to 29 November 1910¹, a period during which Alfred J. Ewart was Government Botanist of Victoria. The files in the volumes relate to the day to day running of the herbarium. Among other things they include an annual report for 1906-1907 and several monthly reports on the herbarium, and a wealth of letters to contemporary naturalists and professional

botanists concerning the identification and loan of specimens. Recipients of such letters include G. Albo, Raleigh Black, Diels, Gilruth, Max Koch, J.H. Maiden, Spencer Le Moore, Pritzel, L. Rodway, R.S. Rogers, P.R. St John, Oswald Sargent and C. Walter.

Information contained in these letters can shed light on problems or puzzles which are useful to taxonomists, or else do little more than help satisfy some esoteric pursuit. An interest in the past cost of herbarium specimens no doubt falls into the latter class of pursuit! To balance the ledger I've added some biographical, (perhaps more useful?), data to the notes outlining MEL's purchase, or attempted purchase, of the collections of Diels & Pritzel, W.V. Fitzgerald, G.F. Hill, F.M. Reader and C. Walter.

1. Four bound volumes of letters, MEL reference number (ef)580.744 ROY. Each volume contains an index to the letters and reports. Unless otherwise noted all letters cited in this note are to be found in one of these four volumes.

L. Diels and E. Pritzel

It is possible that MEL purchased some of its Western Australian collections gathered by Diels & Pritzel. There are letters to both botanists

enquiring about the possible acquisition of a set of their specimens. In one letter, dated 18 October 1909, Ewart wrote to Pritzel:

"Re yours of 7/18/09 we would be glad to receive authentic specimens of Australian plants described by Dr Diels & yourself: for a fairly complete set we should be willing to pay at the rate of 1/- per specimen & at the same rate for authentic specimens of Australian plants described by Gilg., W.V. Fitzgerald & Spencer le Moore."

However, at least some, perhaps all, of the Diels & Pritzel specimens in MEL's possession (of which I have few details) were donated, as evidenced by Ewart's letter of 16 November 1909 to Diels:

"I have the honour to acknowledge with very best thanks the receipt of seven type specimens of your West Australian Herbarium specimens donated by you to our Herbarium."

William Vincent Fitzgerald (1867-1929)

This man is deserving of a detailed biography and none exists. I have, however, commenced compiling notes and have beside me as I type this article 30-odd typed pages detailing, to some extent, Fitzgerald's activities in Tasmania, Western Australia and New Guinea. Among other things he described five new genera and about 210 new species from Western Australia. His most important work was on the botany of the Kimberleys (Fitzgerald 1918). He was also out of favour with A.J. Ewart. As I plan to publish a more detailed account I will just whet your appetite with this bit of botanical gossip (and keep to the main theme of this note) by citing the following extract from a letter of Ewart's dated 29 March 1909 to the nurseryman J. Staer, in New South Wales:

"My acquaintance with him (Mr Fitzgerald) was limited to a few minutes conversation during the few days on which he visited the Melbourne Herbarium. After he had left enquiries made through the police elicited the fact that several things had happened in W. Australia seriously to his detriment - his name was accordingly placed on the Botanical Black list as regard herbarium exchanges.

"I hope you will obtain possession of his Herbarium. I should not formally assert a claim to any [word illegible] specimens contained in it but should be glad to receive them, & also to purchase specimens of any species named and described by him, as well as of any Australian species described subsequently to 1896. The value of £750 he placed on his Herbarium is absolutely absurd. I should judge its value to be between £50 & £100 according to its character & completeness. We paid £800 for the Sonder Herbarium, one of the best private Herbaria ever made, & £80 for the Reader Herbarium. Reader is a better botanist & his naming more reliable than Fitzgerald, but it is impossible to value a Herbarium one has not seen. Herbarium specimens purchased singly are usually sold from 1d to 6d per sheet."

MEL didn't purchase the herbarium. Fitzgerald's collections seem to be mainly in E, NSW and PERTH.

Gerald Freer Hill (1880-1954)

Hill was undoubtedly one of the last eminent naturalists to tread the Australian countryside. He was educated at a private school in Melbourne, and later at the Burnley School of Horticulture, and in 1897 shifted to Ararat to grow fruit. He subsequently abandoned this pursuit to become a shorthand instructor and for some time resided in Wellington, New Zealand. He returned to Melbourne in 1908 (Gay 1954). Hill's early interest in natural history seems to have concerned mammals as evidenced by correspondence with the National Museum of Victoria in 1903 (Pescott 1954). In 1909-1910 he went to north-west Australia where he collected bird skins and eggs for H.L. White and at the same time collected plants for MEL. In 1911-1912 he was a member of Captain H.V. Barclay's expedition to the Northern Territory. After this expedition he was appointed as Government Entomologist to the Northern Territory. As noted by Gay (1954), when Hill resigned this position in 1917 to return to Melbourne, he held the positions of not just Government Entomologist but was also Officer-in-Charge of Plant Quarantine, Acting Curator of the Botanic Gardens, and Acting Veterinary Officer! That he

could hold so many positions is partly a reflection of the times but is also testament to the wide-ranging knowledge of Hill. For two years at Melbourne Hill's research concerned the study of sheep blowfly and worm nodules in cattle. He then held a variety of entomological jobs (see Gay 1954), work which included investigations of anopheline mosquitoes in New Guinea and New Britain. However, his major research work was a taxonomic study of Australian and adjacent Pacific island termites, which culminated in a monograph of Isoptera of the Australian region (Hill 1942).

Although his major contribution to the natural sciences was in the field of entomology, Hill made very important contributions to botany. The collections gathered on the Barclay expedition formed much of the basis for *The Flora of the Northern Territory* (Ewart & Davies 1917). At MEL we have Hill's 1911 diary from the Barclay expedition, plus four letters (one to Hill, three from him) pertaining to his collections from north-west Australia.

Hill's collections from north-west Australia

Ewart wrote to Hill on 22 July 1909:

"I have received your donation to the herbarium & thank you for the same.

"We should be willing to purchase the plants collected by you in N.W. Australia at 5/- per dozen if the quantity is large, or at 6d per sheet if the quantity is small, & would reimburse the cost of carriage from the nearest port or Railway station. The specimens should be good ones several well dried plants in each sheet well lined with flowers (& fruit if possible). They should be numbered & with the collectors name, date & locality in the collectors own handwriting. There would be no objection to your retaining a duplicate set provided it remained in your possession until the specimens had been examined by us, since if any specimens were submitted to other botanists before examination by us our labour of identification might be wasted.

"For any specimens that proved to be new undescribed species we would pay a bonus of 5/- & for new varieties 1/-. [My highlighting]

"Specimens forwarded twice under separate numbers not to count unless from an unusual locality or showing some special peculiarity."

At MEL there are three letters from Hill², the first of which was dated 8 February 1910 and has the sender's address as c/o Drysdale River Mission, Hat Point, via Derby. It reads in part:

"In reply to your letter of July 22nd 09 in which you stated that you would purchase botanical specimens collected by me in N.W. Aust. I beg to say that I am sending you, per SS 'Koombana' leaving Wyndham about 17th inst. 1 small case containing botanical specimens & woods from the vicinity of Napier Broome Bay N.W. Aust.; B/L enclosed herewith.

"This lot represents a small part of the flora of the locality but I wished to get these plants away as I find it difficult to keep them from becoming mouldy in this climate. As the wet season advances I hope to get many more specimens & also seeds of some of those I have sent you. I am keeping a small specimen with corresponding number of each species for my own information & use; so that if you wish to communicate with me about any particular plant it will be necessary to give the number only.

"It is my intention to leave here in June so that if you wish to communicate with me while I am here it will be necessary to post a letter in Melb. as soon as possible after you receive this."

An addition to the letter, perhaps by Ewart, records '9½ dozen at 5/- per dozen, some sp. in duplicate. £2.7.6.'

The next letter was sent by Hill c/o G.P.O. Perth, with the future address marked as Carnarvon, and was dated 30 August 1910. It reads in part:

"Your letter (of 7.5.10) advising that the plants had reached you & that the proceeds £2.7.6 had been paid to my father reached me at Derby on 9th August. I thank you for same.

"I have another lot from the same locality which I hope to send off on the

2. Housed in MEL library in archives concerning Australian botanists. Archival material primarily compiled by J.H. Willis and D. Pearson.

next steamer. Possibly you will find amongst them duplicates of species already sent.

"I am leaving very shortly for another trip - this time to country from Carnarvon northward and I shall be willing to collect for you if you wish to have plants from this part. If you wish the specimens treated differently to those I am sending you I shall be glad to hear from you. My address will be P.O. Carnarvon for some time to come.

"I am very anxious to know the names of some of the species I sent you. I enclose a list of the numbers [24 numbers] & if you can oblige me I shall be grateful.

"I should also like to know of any of the plants I sent are poisonous to stock. The stock (sheep & goats) suffered severely in that country & I attributed the cause to poisonous plants. If you can tell me the number & name of any possible poisonous species I will communicate with my friends up there."

The third letter from Hill, dated 31 December 1910, was sent from the Melbourne suburb of Windsor. Hill requested Ewart to forward the plant identifications requested in the earlier letter.

Hill's 1911 diary from the Barclay expedition

This diary commences on 11 January, the date he recorded 'Received appointment as Botanist and photographer to Federal Northern Territory Survey Expedition and commenced work, under Capt. Barclay, in offices of Dept. of External Affairs, Spring St Melbourne' and ends on 31 December in the Gulf country at Five Mile Bar Camp, near Borroloola. As with the directions for collecting for the north-west Australia trip Hill seems to have usually gathered each species on a single occasion. Because any given species number may have been used by Hill to describe the vegetation in his daily accounts it is not always clear, from the diary, as to where and when he collected specimens. For example, the collection of *Capparis mitchellii* (No. 87), now numbered as MEL 590763, is labelled as coming from Hermannsburg and was gathered on 13 March, not 17 April as suggested in the extract below.

Hill not only gathered plants but also other items of natural history, including bird and animal skins, and occasionally described the appearance, behaviour and health of Aborigines. The following extract (longer than most) reflects his wide interests and his method of noting plant collections:

"Monday 17 April 1911

"In camp at Alice Springs. Drove out 10 miles along O.T. Line northward with Mr Spicer of telegraph Station to investigate & collect specimens of ants (native name 'Yerumba'). These ants are said to exist only in the mulga plains north of the Macdonnell Ranges. Some individuals in the community carry a considerable quantity of honey in the body & on this account are much sought for by the natives. The honey carrying individuals are nearly twice the size of the others. The smaller individuals are exceedingly active and advance by rapid hops. The tunnels are small and spread out in all directions to a depth of about 2 ft.

"After leaving the telegraph station the track is fairly rough, through broken granite conglomerate country for about 10 miles. Eucalypts (no 115) mark the courses of the dry (now) creek of larger size; while melaleuca scrub grows densely on the smaller water courses & in occasional belts on larger courses. Eucalypt (no 122) is scattered over the hill sides. Mulga (no 22) no 126, acacias 15, 119, 43, 109 are numerous in all parts. *Capparis mitchellii* (87), 93, *Hakea* 94, saltbush 28, 41 are less numerous, grass no 70 and *Anthistiria* (Kangaroo grass 48) are plentiful amongst the rocks. There is abundant grass feed on this country, but most species of grass are too dry & withered to be recognisable.

"Level country commences at about 10 miles from the Telegraph Station. This country is red sand thickly covered with mulga scrub with occasional rich loamy flats carrying fine cotton bush (107) feed. Many species of grass grow in this & all other localities passed through since leaving Oodnadatta but specimens could not be secured for identification owing to

the fact that the seed had in most cases fallen & little more than the roots and stalk remained. One kangaroo was shot & the skin prepared for museum purposes."

Felix Maximilian Reader (1850-1911)

German born, Reader emigrated to Australia and had a chemist's business in Dimboola in the 1890s and 1900s. He was an assiduous collector of Victorian cryptogams and phanerogams (Willis 1949, Short 1990). Ewart's annual report of 1906-1907 records MEL's receipt of Reader's herbarium of about 10,000 sheets. In a letter to J. Staer, dated 29 March 1909, and primarily pertaining to the possible purchase of W.V. Fitzgerald's herbarium, Ewart noted that the Victorian Government had paid £80 for Reader's herbarium.

Carl (Charles) Walter (?1831-1907)

Hall (1978) records that Walter, born in Germany, resided in Victoria for about 50 years, and was one of many amateur botanists encouraged by Mueller to collect plants for MEL. He was employed for many years at the Technological Museum, Melbourne. He died in Melbourne on 11 October 1907. His private herbarium was soon offered to MEL.

Writing to a Miss Fox, on 14 November 1907, Ewart stated:

"In reply to your letter of the 9th inst I regret that the price mentioned £20 is considerably in excess of the value of Mr Walter's collection of plants & botanical books to the herbarium. The collection is certainly not more valuable than the Rev. Dr. Wilson's which we purchased for £10; and the maximum recommendation I could make would be £10 for the collection & £2 for the books. It is quite possible that if a private buyer could be found he might be willing to offer the larger sum mentioned £20; but I am compelled to keep within the limit of the actual value of the collections to the National Herbarium."

On 26 November Ewart wrote to the Minister for Agriculture desiring authority to make the aforementioned purchase for 12. The letter reads in part:

"The collection consists of:

"a) 34 packets of plants all named, averaging 30 sheets per parcel of which approximately 76 would be useful mainly in exchange & 4 to add to the herbarium types

"b) 6 parcels of a ready reference collection of common plants & weeds

"c) 32 Botanical Books including Gandogers enumeration of the flora of Europe."

As evidenced by a further note to Miss Fox, dated 4 December 1907, Ewart obtained authorization to purchase the books and collection. Although no mention of the collector is made Ewart also wrote to Miss Fox on 28 May and 5 June 1908 regarding MEL's purchase, for 1, of a parcel of named algae and a few odd books. Presumably these were also part of Walter's collection.

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There was a Curator named Croft
Who played with his Oracle oft.
He caressed with much pleasure
The hardware's whole measure
And when the Sun shone he logg-offed.

Miscellaneous Poets Inc. ANBG ☺

EXTINCTION IS NOT ALWAYS FOR EVER; TRIUNIA ROBUSTA (PROTEACEAE)

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In late December 1989, we came across a population of approximately 70 individuals of *Triunia robusta* (C. White) D. Foreman in the Mapleton area, south-east Queensland. Following this rediscovery, about a fortnight later L.H. Bird and J. Birbeck found a second population of about three individuals several kilometres further north.

T. robusta appears in 'Rare or Threatened Australian Plants' (ANPWS Special Publication 14: 93, 1988) classified as 2X (presumed extinct). The species had been collected several times late last century, the last collection being in 1900. All collections were from the Eumundi - Yandina area. In recent years this area was intensively searched by P.R. Sharpe, but without success.

The council reserve on which the main population lies has no reserve status, but approaches have been made to the relevant authorities to have the area upgraded to an Environmental Park. Based on our survey of remnant vineforests (dry rainforests) in SE Queensland this stand has the highest number (15) of 'extinct' or variously threatened plants anywhere in the region.

Acknowledgement

Fieldwork was supported by the World Wildlife Fund Australia, 'Project P135 *The Vineforest Flora of South-Eastern Qld*'. ©

THE DEMISE OF THE BRIU ANGIOSPERM COLLECTION

Paul I. Forster & Lyn G. Jessup

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Following a decision of the academic staff of the Botany Department, University of Queensland, shortly before the end of 1989, it was decided to relocate the angiosperm collection of approximately 10,000 sheets that had been built up over a period of 40 or so years. This collection had been mainly used for teaching purposes and was not a research herbarium and it was decided that this function could be just as usefully achieved with a small number of specimens. The resultant space has been used for office accommodation and the lichen herbarium.

The herbarium was founded at the time when the University was sited in George Street, within the present Queensland University of Technology complex. A few of the specimens however were older and dated from the 1880's. The bulk of the collecting was done by Prof D.A.

Herbert and Dr A.B. Cribb in the 1950's. Over the years various rooms in the Goddard Building housed the herbarium. It was originally located in the basement in what is now a research laboratory, and incorporated displays as well as specimens and could have more properly been termed a Botanical Museum.

When Prof R.L. Specht took over as Head of Department in 1966 a major policy change came into effect. The collection was regarded as a poor duplication of the Department of Primary Industries Botany Branch Queensland Herbarium (BRI) and many of the better specimens, including some types, were sent there. Specimens collected from northern Australia were given to the then newly established James Cook University.

From 1961 to 1965 Bryan Barlow (now CANB) and his assistant Kevin Garbutt were

caretakers. Between 1965 and 1974 when David Bedford (now NSW) was appointed Curator, little was done; however several innovations were made, notably several mini-herbaria and a *Eucalyptus* display collection.

In 1975 when Lyn Jessup was appointed as Curator, the herbarium had been established in its main role as a teaching collection. Further consolidation of the collection was undertaken by removing badly insect-damaged specimens and treating the remainder. The hours spent on the collection were reduced to nil in 1989 with the need to assign staff to more urgent routine duties in the Department. Taxonomic changes were then only able to be made when visiting botanists annotated specimens they examined. The last of these changes occurred in December 1989 when Tony Bean reviewed the *Eucalypts* in the collection.

Approximately two-thirds of the angiosperm collection held in BRIU were of limited value, being poor material and lacking adequate label data; these collections have been presented as a gift to the Gympie Forestry School. The other one-third were of good quality collections and have been incorporated at the Queensland Herbarium. Some material already represented in BRI has been given to QRS (rainforest taxa)

and MEL (general collections) or to other unspecified herbaria.

Major collections in the approximately 3500 sheets to go to BRI included a long run of early D.E. Symon collections ex ADW, a few J.H.L. Waterhouse collections ex K from the Solomon Islands, numerous B.A. Barlow vouchers for Loranthaceae and Casuarinaceae chromosome counts, most of the V.H. Boughton *Acacia* anatomy vouchers, several hundred native and exotic collections by the authors, and various miscellaneous vouchers for research undertaken by students over the years at the University. Only two types were seen, both Loranthaceae isotypes of B.A. Barlow.

This move to BRI of the angiosperms follows the algal collection (including various types) which went in 1989 following the retirement of Dr A.B. Cribb.

Acknowledgements

Thanks to the staff of BRI for assistance at very short notice and for processing the BRIU collections so quickly. Many thanks also to Mrs Dorothy Fawcett who gave so freely of her time to help with collecting and curation duties from 1984 to 1989. ©

GEORGE CALEY - BOTANICUS PERITUS ET ACCURATUS

Joan Webb

Lecturer in Science Education

University of Technology, Sydney (Kuring-gai Campus)

George Caley, Bank's botanical collector in New South Wales (1800-1810), did not receive the acclaim accorded to botanists such as Robert Brown and Allan Cunningham, but his nineteenth century contemporaries recognised his skills, and wished to give him due acknowledgement according to the accepted custom. In the first half of the nineteenth century, ten plants were named after Caley, and one by Maiden in 1905, but only five of these names are in use today. Robert Brown named six, George Don two, and Bentham, Maiden and Cunningham named one each. In Brown's *Prodromus* of 1810, page 329, he wrote in his dedication of the genus *Caleana*, in Latin, 'Genus pulchrum et valde distinctum dixi in honorem Georgii Caley, botanici periti et

accurati...' - in honour of George Caley, a skilful and accurate botanist. Allan Cunningham, botanist on the Oxley expedition in 1817, named a mountain after Caley, and said in his tribute, 'This mount has been named in honour of Mr. George Caley, a most accurate, intelligent, and diligent botanist...' The botanical fraternity recognised Caley's contribution and gave him due honour. We may then well ask, why were six names discarded? Not one of these six changes was a denial of Caley's accreditation; often it was due to later more accurate examination of the specific characters of the plant in question.

The names in use today are:

- 1 *Caleana* R.Br. Prod. 329 (1810)
- 2 *Grevillea caleyi* R.Br. Prot. Nov. 22(1830)
- 3 *Banksia caleyi* R.Br. Prot. Nov. 35 (1830)
- 4 *Viola caleyana* G.Don, Gen. Syst. 1: 329 (1831)
- 5 *Eucalyptus caleyi* Maiden, Proc. Linn. Soc. NSW 30: 512 (1905)

The type specimens for *Grevillea caleyi* and *Viola caleyana* were collected by Caley and are in the herbarium of The Natural History Museum [British Museum (Natural History)].

The names now discarded are *Acacia caleyi*, Cunn. ex Benth., *Petrophile caleyi* Benth., *Persoonia caleyi* R.Br., *Dodonaea caleyana* G.Don, *Anadenia caleyi* R.Br. Curiosity prompted the historical search to determine why these six Caley names were no longer in use.

Acacia podalyriaefolia, named by Allan Cunningham, was published by George Don in 1832; the specimen of *Acacia* named *Acacia caleyi* by Allan Cunningham and published by George Bentham in 1842 was actually a stunted specimen of *Acacia podalyriaefolia* and the two were mistakenly identified as different species.

The name *Petrophile caleyi* was not published by Robert Brown, but with a Caley specimen of *Petrophile sessilis* in the herbarium of the British Museum (NH) is a note in Brown's handwriting, '*Petrophila Caleyi* R.Br., New South Wales, New River Journey, Jany 1805, George Caley'. Above this note on the specimen sheet is written, '*sessilis* Prot. Nov. p.6.' The name *Petrophile sessilis* was published by Schultes in 1827 (*P. sessilis* Sieb. ex Schult.) and by Brown in 1830; Brown apparently decided the Caley specimen did not represent a different species.

The third species provides an unsolved mystery; in attempting to discover the details concerning *Prostanthera caleyi*, this matter was discussed with Dr Barry Conn, Sydney. Dr Conn has worked on this genus for a number of years and his research has failed to locate the specimen Bentham described in 1834; Dr Conn had a search conducted in 60 large herbaria in Europe and America and none of them hold the specimen of *Prostanthera caleyi*. It appears that Bentham described the plant in 1834 from a Caley specimen in A.B. Lambert's herbarium, saying it was similar to *Prostanthera aspalathoides* (a semi-arid plant of the outer western slopes). Then in 1870 Bentham said *P.*

caleyi was similar to *P. chlorantha* (which is restricted to South Australia). Bentham then decided to re-examine the specimen but couldn't find it, owing to the dispersion of the Lambertian herbarium. (Conn, 1984). Unfortunately there are no distinctive features in Bentham's 1834 description to help us identify it accurately today.

Robert Brown's *Persoonia caleyi* (Prot. Nov. 13, 1830) was named from a Caley specimen collected at Jervis Bay in 1801; the specimen is in the British Museum (NH) under *Persoonia mollis*. *Persoonia mollis* is a species with a distribution extending from Victoria in the south to the Hornsby Plateau in the north. From north to south the taxon appears to form a cline, with the broad-leafed form on the Hornsby Plateau, and the narrow-leafed form in the south. The narrow-leafed variety, Brown's *Persoonia caleyi*, extends from Nowra and the northern Budawang Ranges south to Braidwood. It would appear that Brown's sampling was poor and he probably had only the two extremes; he called the broad-leafed one *Persoonia mollis* and the narrow-leafed one *Persoonia caleyi*. As indicated, revision places them in the one species.

In the Melbourne herbarium are several specimens of *Persoonia* collected by Ferdinand von Mueller where one can just see that he initially used the epithet 'caleyi' but then wrote over this name 'chamaepeuce'. *Persoonia caleyi* F. Muell. *Pl. Vict.* 2: t.69 (1865) was a misapplication of Brown's epithet by Mueller to a different taxon; Mueller obviously made a mistake in applying *Persoonia caleyi* R.Br. to *Persoonia chamaepeuce*, and it is not possible to make inferences about the basis for his error.

Caley's *Dodonaea*, described by George Don in 1831, was named *Dodonaea caleyana* and published together with a description of *Dodonaea boroniaefolia* (now *D. boroniifolia*), both specimens being examined in the herbarium of A.B. Lambert. *D. caleyana* is now considered to be within the range of variation of *D. boroniifolia*; this latter taxon is widespread in eastern Australia, and a variable species throughout its distribution particularly in leaf and leaflet size and indumentum density (West, 1984). This is just another example of errors made in the early days when very few specimens of a taxon were examined; Don was probably looking at extremes of the variation. In his description, *D. boroniaefolia* has leaflets 'trifid at the apex', and 'pubescent'; *D. caleyana* has

'ovate' leaflets, and is 'pilose'. The specimens from Lambert's collection described by Don were not to be found in the British Museum (NH) in 1989. In 1863 Bentham referred to the taxon as *D. boroniaefolia*, with *D. caleyana* as a synonym; he made no reference to the Caley specimen and therefore must have been unable to examine it. With a similar publication date, Bentham perhaps chose the name printed first on page 674 of Don's 'General History' (Don, 1831).

Robert Brown's *Anadenia caleyi* (Prot. Nov. 16, 1830) is now *Grevillea ramosissima*, for which Caley's 1806 specimen is the type in the British Museum (NH). Caley called the plant *Embothrium ilicifolium*; a note on the type specimen page says 'Barrallier's Journey, Mr. George Caley'. A note by R. Brown on the same sheet says, '*Anadenia montana*, *Anadenia Caleyi*, R.Br. = *Grevillea ramosissima*'. This is an instance once again of Brown having access to too few specimens, this time of the genus now called *Grevillea*; his concept of the taxon seemed to be that of several clearly defined and separate groups, rather than the more diverse yet continuous group, morphologically, that was recognised later. In 1856 Meissner revised the Proteaceae, by which time many more specimens were available for examination. *Anadenia* R.Br. was no longer accepted as a separate genus from *Grevillea* R.Br. and *Anadenia caleyi* R.Br. became a replaced synonym for *Grevillea ramosissima* Meissn., the epithet '*caleyi*' already being occupied by *Grevillea caleyi* R.Br. Prot. Nov. 22. It may be concluded from Meissner's publication (1856) that he had seen Caley's specimen of *G. ramosissima* in the herbarium of Robert Brown, although Bentham (1870) did not mention the Caley specimen.

Following a previous paper (Webb, 1990), this short article is presented for the interest of historians and taxonomists in recognition of the tributes paid to George Caley by the nineteenth and twentieth century botanical fraternity.

Acknowledgements

I wish to thank members of the staff of the National Herbarium, Sydney, in particular Barry Conn, Bob Makinson, Peter Weston and Peter Wilson.

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AUSTRALIAN SYSTEMATIC BOTANY SOCIETY INC. - BUSINESS

1990 ASBS MEETINGS

Indo-Pacific Biogeography: At the Crossroads

A reminder about the 1990 ASBS symposium, to be held in Canberra August 29 and 30. The response offering papers has been very good and the Organising Committee feels it will be an interesting meeting. We can still accommodate new papers, **especially posters**, but you will need to contact Judy West or Mike Crisp soon.

If you have not registered yet, please do so soon. Use the brochure enclosed with your last *Newsletter*.

Provisional list of Symposium Papers

- Burrett, Clive: Keynote:** Chips off the old block - palaeogeographic development of SE Asia by rifting, drifting and collision.
Barlow, Bryan: Loranthaceae: reunion of an old Gondwanan family at Wallace's line.

- Barker, Bill:** Pollination and seed dispersal in *Euphrasia disperma* Hook. f. s. lat. (Scrophulariaceae) of New Zealand and their evolutionary significance.
- Carpenter, Ray:** Macrofossil evidence for Gondwanan elements in the Indo-Pacific flora.
- Clements, Mark:** Biogeography of Dendrobieae (Orchidaceae).
- Coode, Mark:** Biogeography of Elaeocarpaceae.
- Cracraft, Joel:** Avian biogeographic patterns within Australasia.
- Hartley, Tom:** Morphology and geography of Indo-Pacific Rutaceae.
- Hattersley, Paul and Long, Christine:** Systematics, biogeography and photosynthetic pathway variation in Indo-Malayan/African *Alloteropsis* (Poaceae).
- Haynes, Alison:** The biogeography of Pacific Island freshwater gastropods.
- Martin, Peter:** Molecular data relevant to the origin and biogeography of angiosperms.
- Mouna, Jyrki:** Origin of Polynesian Eucnemida (Coleoptera).
- Read, Jenny:** The northern restriction of *Nothofagus* subgenus *Brassospora*: hypothesis from ecophysiological studies.
- Simon, Bryan and Lazarides, Mike:** The biogeography of Indo-Pacific grasses.
- Symon, David:** *Solanum*, a genus divided by Wallace's line.

Forum/Posters

- Heyligers, Petrus:** Strandline plants: a progress report.
- Pickering, Catherine:** Hybridisation in five alpine species of *Ranunculus*.

DELTA Workshop

The Organising Committee has decided that we will also have a workshop on the DELTA system for storing and manipulating taxonomic data and descriptions. This will be the afternoon session of Thursday August 30th. Both Les Watson and Mike Dallwitz strongly support the idea and will be the major role players in running the workshop. The idea is to bring together DELTA users of various levels. For the 'advanced' users it will provide an opportunity to catch up on recent developments. Those who have ventured

along only some of DELTA's various paths will have the chance of taking new directions. For those who have been intending to use the package and have never really got round to it there will be the opportunity to familiarise themselves with some of its characteristics.

The present plan is to have an *introductory talk* outlining current capabilities and imminent developments of DELTA, with special emphasis on practical applications of the identification information retrieval program INTKEY. Then will follow a session providing *hands-on experience*. This will include a demonstration of INTKEY with a choice of available data sets: genera of Poaceae and Leguminosae-Caesalpinioideae, species of Poaceae-Panicaceae and Pooideae, genera of Cyperaceae and flowering plant families.

In addition, we hope to involve current DELTA users in the workshop who might bring their favourite data sets. As well as taking the opportunity of updating and/or extending their own knowledge of the software they could demonstrate some particular aspect of DELTA.

If you are interested in participating in this DELTA workshop, please return the form below. An initial indication is all that is needed at this stage.

DELTA WORKSHOP Canberra, 30 August 1990

I am interested in attending the workshop

Name

Address

.....

.....

Return this form to:

Dr Paul Hattersley

Research School of Biological Sciences

Australian National University

GPO Box 475, Canberra ACT 2601

phone: (06) 249 4666

fax: (06) 248 9995

REPORTS

BUREAU OF FLORA AND FAUNA**More winds of change**

Some of the changes recommended in the Macdonald Report on the Australian National Parks and Wildlife Service are being implemented. Some will affect the Bureau of Flora and Fauna. Details have not yet been announced, but the changes will be in place shortly and will be advised in the next 'Newsletter'.

The new Science 3 Scientific Editors who will shortly take up duty with the Flora Section are Ms Cheryl Grgurinovic and Dr Paul Hattersley. Ian Telford is currently acting in Helen Thompson's position while Helen is on leave enjoying the snows and mountains of Canada and Alaska.

Volume 18 of the 'Flora of Australia' was due to be delivered as this report was being written. Volumes 35 and 50 are well along the editing process and should go to press towards the end of 1990.

The 'Guide for Contributors to the Bryophyte Volumes' of the 'Flora' has just been published. It will be distributed to all such contributors but is also available free upon request to the Bureau.

During March, Alex George visited herbaria in Brisbane, Sydney, Melbourne, Adelaide and Perth to see ABRS grantees and 'Flora' contributors. Firm offers have now been received for about three quarters of the remaining taxa to be prepared for the 'Flora', although there is still concern about the level of resources available. Of considerable encouragement in this respect is the undertaking by the Federal Government to increase funding for the Australian Biological Resources Study (ABRS) by \$1,000,000 in the year 1991-2 and by \$1,500,000 in 1992-3. This will double the grant funds and should allay some of the concerns that have been expressed about insufficient support for research. The ABRS Advisory Committee has now formally adopted the policy

to allocate funds as equally as possible between botanical and zoological grants.

On 21 and 22 April Alex George attended the Meeting of Australian Lichenologists held at Rex and Sue Filson's new home at Booral, NSW. Discussions were held on progress and planning for the lichen volumes of the 'Flora'. It is hoped that the first volume will be ready for publication by the time of an international lichenology meeting in Lund, Sweden, in August 1992.

Corrections to 'Flora of Australia'*Volume 3*

Two significant errors in the text of Casuarinaceae have been brought to my attention by Karen Wilson.

On p. 110, in the description of *Casuarina pauper*, insert between 'teeth 9-13' and persistently, the missing text 'spreading to recurved, 0.8-0.9 mm long; cones usually'

On p. 120, key to species of *Allocasuarina*, couplet 13, 13: should follow lead 10:, not lead 9:.

Volume 46

Lawrie Johnson has drawn to my attention that, based on the words from which the name is derived, *Xerolirion* should be neuter, not feminine. I agree with his opinion and therefore wish to correct the gender to neuter in accordance with Article 76.2 of the 'International Code'. The specific epithet should accordingly be corrected to *divaricatum*.

Fungi for the Flora

A very successful workshop on Fungi was held in Canberra on 10 and 11 April. Participants were John Alcorn, Neale Bougher, Des Connole, Cheryl Grgurinovic, Alan Mills, Ian Parberry, Ian Pascoe, Warren Shipton, Heinar Streimann, John Walker and Alec Wood. The workshop provided a review of the current state of knowledge and listed researchers where known. It recommended a system of classification to be used in planning the 'Flora' (*Ainsworth & Bisby's Dictionary of the Fungi* 7th edn by Hawksworth, Sutton & Ainsworth), priorities for research, and

proposals for early fungal volumes of the '*Flora of Australia*'. The workshop results highlighted the scarcity of resources available for mycological research in Australia. A report has been prepared for consideration by the Flora Editorial Committee and the ABRS Advisory Committee.

Census of Australian Vascular Plants

This work, number 11 in the Australian Flora and Fauna series, will go to press shortly. It gives the distribution for some 17,548 native and naturalised species recorded for Australia, as well as several thousand infraspecific taxa.

'Australian Plant Name Index'

Work on the '*Index*' is progressing well with the increased resources currently allocated. We anticipate sending the first two (of four) volumes to press before the end of 1990 and the second two early in 1991.

Alex George

Acting Associate Director, Flora.

©

AUSTRALIAN BOTANICAL LIAISON OFFICER

Natural History Museum (BM)

The Board of Trustees presented a corporate plan on 23 April which will lead to a substantial reduction in staff over the next couple of years. The museum faces a financial crisis but also it is planned to reorganise research activities. Although some of the posts lost will be by means of retirement, there will also be many subject to redevelopment or compulsory early retirement. The Botany Department will lose about 10 positions, affecting or ending research on diatoms, bryophytes, palaeobotany and taxonomic computing. Further information can be found in '*Nature*' and '*New Scientist*' for April and May. People interested in writing letters or petitions can obtain more details and appropriate addresses from a document I will lodge with the '*Newsletter*' Editor.

Royal Botanic Gardens, Kew

A review is to be conducted of research at the Gardens (including the Herbarium and Jodrell Laboratory) in October. This is an important event, and is being taken seriously. (The BM was reviewed a couple of years ago...)

Two fund-raising facilities have been established at Kew. The Friends of the Royal Botanic Gardens, Kew organisation is to interest the general public in the Gardens and to provide a means of generating funds. The Kew Foundation is to coordinate, professionalise and expand approaches to companies for sponsorship or donations.

Species Plantarum Project

Following a further meeting of the originating institutions at Missouri recently, plans for this world-wide project to provide a taxonomic coverage of plant species are proceeding. A meeting will be held 12-13 November at Kew open to all interested people and institutions to discuss the project further (herbaria should have received a letter from Kew concerning this).

Recent Australian Visitors

The following people visited the Herbarium for periods of two hours to over a week: Jenni Le Cussan, Atherton; Peter Kraehenbuhl, Adelaide; Gillian Perry, Bruce Maslin and John Viska, all of Perth. Joy Thompson, Sydney, is still a frequent visitor, working on *Swainsona*.

British Weather

I seem unable to avoid this subject. The 1990 Spring was the driest since 1893, and this is evident from the colour of the lawns, not to mention the remarkable number of sunny days and the presence of sprinklers in the Gardens and on the Kew Green cricket pitch.

Terry Macfarlane

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Correction: A misprint crept into the last ABLO report. In the fourth last line the amount should have read \$40,000 - dollars not pounds. ©

REVIEWS

The Evolution and Classification of Flowering Plants. Second Edition. By Arthur Cronquist. *The New York Botanical Garden, 1988. 555 pp. ISBN 0-89327-332-5. c. \$105.00.*

What did the first angiosperm look like? Where did it originate? And when? And what were its immediate descendants, the progenitors of the highest natural groups within the angiosperms? These are some of the 'big' questions in plant systematics, yet their answers are still largely shrouded in mystery. Enormous energy has gone into the attempt to answer them, and those who have tried to do so have built reputations on their efforts.

Arthur Cronquist is one such. His system of angiosperm classification is influential, especially in this country where it has been adopted for the *Flora of Australia*. So it behoves Australians especially to examine his rationale.

Taxonomic Metaphors

Never doubt the power of visual metaphors in science (Gould 1990). Four graphic metaphors have encapsulated the history of taxonomic thought by illustrating successive models of relationships (Stevens 1984). In the beginning, Aristotle gave us the ladder (*scala naturae*), a great unbroken chain of being ascending from inanimate matter through plants and animals to humankind at the summit. Simplistic though it is, *scala naturae* still pervades popular thinking on the place of humans in the scheme of things (Gould 1990: Chapter 1).

After Linnaeus, taxonomists invoked the web or net, in which relationships were perceived as horizontal, multiple and undirected. The web was the consequence of a superficial level of character analysis, which seemed to show multiple parallelisms between intuitively recognised natural taxa. These taxa seemed polythetic: definable only by an inconsistent set of overlapping morphological characters.

Even before Darwin, some taxonomists used the metaphor of a tree which, after all, described the hierarchy of Linnean classification.

Darwin's theory of descent with modification gave the tree a theoretical buttress, but ironically

it was mainly zoologists, especially Haeckel, who embraced this botanical metaphor. As Peter Stevens so eloquently relates, botanists accepted Darwinism as an explanation for their systems but continued using polythetic methods. The unconscious fusion of these disparate elements gave birth to a chimaera: Bessey's cactus (1915; Fig. 1). Horizontal relationships of the web and vertical relationships of the tree blended to form grades;

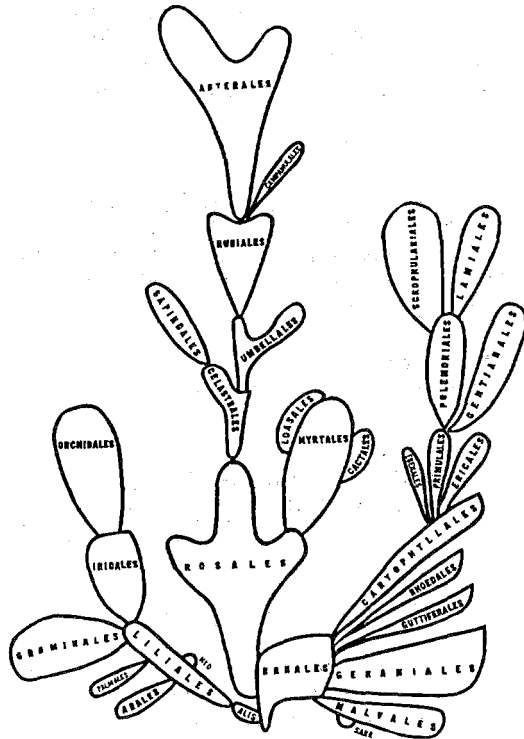


Fig. 1. *Opuntia besseyi*

extant taxa gave rise to other extant taxa, almost without direction. Gradistic metaphors have taken a variety of visual forms: cacti, blobs, balloons, bubbles, dartboards; but all embodied an imprecise view of relationships, as if higher taxa have evolved along a broad front. The polythetic grade taxa were circumscribed intuitively and explained afterwards in evolutionary terms. Comparison of alternative classifications, having no explicit basis in character analysis, came down to polemics and the number of alternative classifications

proliferated. Stevens (1984: p. 201) provides a telling series of quotations describing this descent into chaos by 'evolutionary' systematics. I shall never forget the spectacle of Cronquist and Thorne slugging it out at the Sydney IBC in 1981.

Gilmour and his heirs, the pheneticists, rebelled against the subjectivity of gradism. They rejected any phylogenetic basis for classification, opting instead for the objectivity of overall similarity. Ironically, they resurrected the tree as their visual metaphor, in the form of the unrooted phenogram. This was ironical because it paved the way for the cladists, who reclaimed the tree for phylogenetics, giving it a root by rejecting overall similarity in favour of synapomorphy. Cladistics finally gave an explicit basis for reconstructing the historically unique pattern of evolutionary relationships.

Cronquist leaves the reader of *The Evolution and Classification of Flowering Plants* in no doubt about the metaphor he accepts for taxonomic methodology (pages 159-163):

"We are all - or nearly all - Besseyans. It is conceivable that some completely new set of concepts will at some future time displace the modified Besseyan concepts now in vogue. ... Yet the prognosis is for evolution rather than revolution".

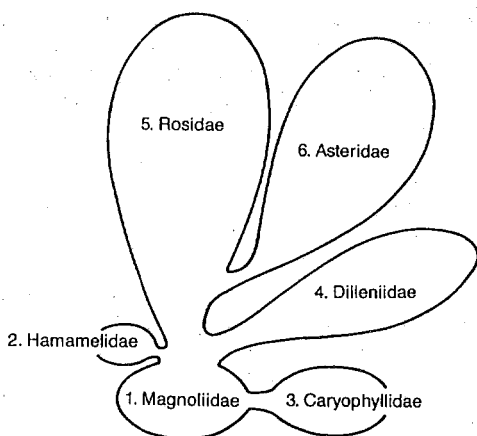


Fig. 2. Cronquist's representation of relationships between subclasses of Magnoliopsida (Dicots).

The Besseyan method which Cronquist favours must 'start with the groups which are least

modified from the ancestral prototype, rather than those which have undergone most change'. Such emphasis on taxa as ancestors typifies gradistic systematics, although it actually comes from residual notions of *scala naturae* (Stevens 1984: p. 190). Cronquist's diagram of relationships among the subclasses of Magnoliopsida (dicots), on pages 263 and 502 (Fig. 2), confirms his debt to Bessey.

Methods and Criticisms

Cronquist discusses taxonomic methodology, including phylogeny, in the first chapter of his book. A large part of this is a critique of 'cladism', which is reproduced essentially unchanged from an earlier paper (Cronquist 1987). His arguments have been refuted by Donoghue and Cantino (1988) and Humphries and Chappill (1988), and I do not intend to repeat the whole debate here. One of Cronquist's strongest criticisms of cladists is against their rejection of paraphyletic taxa. I find this attitude (which is widespread) curious, given that the same people do not hesitate to reject polyphyletic taxa. Yet paraphyletic taxa confound the discussion of relationships among both taxa and characters in exactly the same way as do polyphyletic taxa.

While criticising much of cladistic methodology, Cronquist does accept some aspects, such as the concepts of apomorphy and plesiomorphy. And he finally recommends using Wagner Groundplan-Divergence for reconstructing phylogeny. Wagner's method was original and, when published in 1961, anticipated Hennig's method, which was to become the basis of cladistics after it was translated into English in 1966. Moreover, Farris gave Wagner's name to the first computer algorithm to calculate cladograms using the parsimony criterion, which now underlies the mainstream of cladistic methodology. In an empirical comparison of methods, Churchill et al. (1984) found no essential difference between Wagner Groundplan-Divergence, Wagner [Farris's] parsimony and Hennig's argumentation method. Nevertheless, Wagner Groundplan-Divergence, being a pencil-and-paper method, is limited to small data sets, and has been left far behind by the powerful parsimony algorithms available today. Why then does Cronquist reject parsimony (pages 38-39) while advocating its

conceptual but long-superseded predecessor for phylogenetic reconstruction?

Conversely, Cronquist reveals an essentially phenetic approach to systematics on page 2: 'taxonomy is a study aimed at producing a system of classification of organisms which best reflects the totality of their similarities and differences'. The same view is expressed on page 5, under the heading 'Some Principles'. This may seem surprising, given Cronquist's claim to a phylogenetic approach. However, as Humphries and Chappill (1988) have explained in detail, emphasising gaps or differences when defining taxa amounts to phenetics, not phylogenetics.

Cronquist makes a common error in suggesting that 'taxa are properly established on the basis of multiple *correlations* of characters.' (page 5; emphasis is mine). An hierarchical system is better described by the more general properties of *covariation* or *congruence*.

In a fleeting mention of molecular data (page 6), Cronquist completely misses the point by seeing it as basically different from and more limited than morphological data. He considers molecular evidence to be useless at delimiting taxa. However for 'prokaryotes' it is the *only* useful data, and has contributed enormously to the understanding of these groups in recent years (Lake 1989).

Origins and Ancestors

Chapters 4 and 5 of the book are devoted to the 'big' questions asked at the beginning of this review. Cronquist takes a conventional view of the proto-angiosperm: a magnolioid tree with pinnately veined leaves and showy strobilus-like bisexual flowers. In this he follows Arber and Parkin (1907) and many modern authorities. The outstanding recent cladistic studies by Doyle and Donoghue (1986) and Donoghue and Doyle (1989), who critically reinterpreted available morphological evidence in extant taxa as well as fossils, have shown this to be the most likely hypothesis. Cronquist correctly rejects the hypothesis of an 'Amentiferae' ancestor, in which the unisexual strobilus of the Gnetales are homologised with those of hamamelid families with catkins (Von Wettstein 1907). This homology has not stood up to critical examination, and the presence of vessels in the wood of both groups is now seen as a

convergence. The 'Amentiferae' belong with the 'higher dicots', well removed from the base of the angiosperm tree (Donoghue and Doyle 1989). However, an alternative possibility that is almost as well supported by Donoghue and Doyle's analyses, as well as by the ribosomal RNA sequence data of Zimmer et al. (1989), is that the first angiosperm may have been a herb with palmate leaf venation, resembling the waterlilies and basal monocots ('palaeoherbs'). Both cladistic studies have cast serious doubt upon the traditional recognition of monocots and dicots as the fundamental division within the angiosperms. The dicots especially appear to be paraphyletic. Cronquist, while acknowledging the latter, accepts the traditional classification, but then he has clearly stated his acceptance of paraphyletic taxa. His scenario on the morphology of the first angiosperms and their possible origins makes a good narrative but is scarcely rigorous science. It will take comprehensive cladistic analyses using all the available taxa, both fossil and recent, and all the available evidence, both molecular and morphological, to unravel these mysteries (Donoghue et al. 1989).

Classification System

The second half of this book is a synopsis of Cronquist's (1981) general system of flowering plant families, updated in only minor detail. In fact, Cronquist seems content with his scheme:

"Only a few small changes are introduced, made necessary by advances in knowledge or understanding since 1981.

A more substantial revision at this time would be premature; I must leave it to my successors".

The lengthy descriptions in almost every lead of the keys, especially for the higher taxa (subclasses and orders), are symptomatic of the polythetic nature of Cronquist's grade taxa.

Given that Cronquist (1981) expounds his system in much more detail than in this book, I shall not discuss it further. Kanis (1981) analysed and compared Cronquist's system with those of contemporary authors.

Conclusion

To summarise, *'The Evolution and Classification of Flowering Plants'* provides a detailed insight

into Arthur Cronquist's ideas on the evolutionary process, phylogeny and taxonomic methodology. It is important, given the pervasive influence of Cronquist's system in modern floras and herbaria. I suspect that Cronquist's influence derives more from his system's comprehensiveness and detail, which are almost unique, than from admiration for his methodology. The book is readable and well presented. However, Cronquist's approach is dated, epitomising the unperceived conflict between theory and method which has caused plant systematics to stagnate for a century. I would not teach a course in plant systematics from it.

Acknowledgements

Thanks to Jenny Chappill and Dan Daith for their helpful comments.

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Mike Crisp,

Australian National Botanic Gardens

©

Field Guide to Eucalypts. Volume 2. South-western and Southern Australia. By M.I.H. Brooker and D.A. Kleinig. *Inkata Press. Melbourne and Sydney.* viii + 428 pp., 65 figs, + colour plates for 326 taxa. *Glossary and Index.* ISBN 0-909605-59-9. \$75.

There is no need to say a lot about this book - simply that it is excellent! I say this not from the foundation of ignorance that has recently led at least two overseas reviewers into quite unjustified praise of certain other books on eucalypts that have appeared in the last few years, together with gratuitous and pre-judged comments on taxonomic matters largely irrelevant to those works.

On the contrary, I am closely acquainted with Ian Brooker's work and outlook, and believe I know when to disagree seriously with it - and that is, overall, not really very often.

A botanist in the field, or indeed in home or office, in the region covered by this book can have confidence that the chief text author **knows** the taxa, their field characters and habitats and that his very able photographic collaborator and co-author David Kleinig has effectively, and indeed pleasingly, illustrated the features that characterise them for the purposes of identification - including their habitats.

This said, a closer look does, of course, reveal a number of cases where there is room for some disagreement on the limits or rankings of taxa, and very occasionally as to whether a supposed taxon may not in fact merely represent occasional hybrids. The place to deal with these questions is in the eucalyptological literature, not in this review, and although some changes in names and classification may be called for, ordinary readers need only to be warned that last words are never spoken in the taxonomy of complex groups.

A large number of species included in this book lack validly published names, and some readers will disapprove of the actual use in print of names not yet validated. I personally cannot see much harm in that, though it could be claimed that publication is somewhat premature. An answer is that it is not as premature as the publication of the eucalypt volume of the '*Flora of Australia*', and the picture it gives is far closer to nature.

A key is provided but its use should always be in conjunction with reference to the illustrations, maps, descriptions and notes in the main text. A useful and sensible introductory text completes a volume that can be highly recommended, though one already visualises quite a few of the changes that will be called for in its successor.

It is nice, too, to have another good book about eucalypts as they are now. Soon, superimposed on the destructions of the developers, we shall suffer the efforts of the breeders, genetic engineers and biotechnological saviours of the planet, including (yes) the army of eager tree-planters.

Lawrie A.S. Johnson

Royal Botanic Gardens, Sydney



RECENT PUBLICATIONS

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

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

To order the book directly, write to ASBS, c/- National Herbarium of Victoria, Birdwood Ave, South Yarra, Victoria 3001, Australia. The following prices include postage:

	Australia	Overseas
Individuals		
ASBS members	\$48.00	53.00
Non-members	58.00	63.00
Institutions	70.00	75.00

Local chapters may be interested in organising bulk orders to save on postage. For orders of 12 books or more, the amount per volume for postage reduces substantially e.g. by \$6.00 for shipment to Adelaide, Sydney or Canberra. If you plan to make a bulk order, please keep a record of purchasers and send it to Don Foreman so that he can issue individual receipts and keep a proper record of sales and distribution of the books.

Flora of Australia. Vol. 18. Podostemaceae to Combretaceae. Exec. editor A. S. George. *AGPS, Canberra, 8 June 1990. xvi + 349 pp., 104 figs (incl. 67 colour), 390 maps. RRP \$59.95 hdbk; \$44.95 pbk.*

Families included in this volume of the '*Flora*' are Podostemaceae (by H. I. Aston), Haloragaceae and Gunneraceae (by A. E. Orchard), Sonneratiaceae (by H. J. Hewson), Lythraceae (by H. J. Hewson and P. L. Beesley), Thymelaeaceae (by B. L. Rye and M. J. Heads),

Onagraceae (by J. Thompson),
Melastomataceae (by T. Whiffin) and
Combretaceae (by L. Pedley).

**Encyclopaedia of Australian Plants Suitable
for Cultivation. Vol. 5. Gr - J. W. Rodger Elliot
and David L. Jones. Lothian Publishing
Company Pty. Ltd., Melbourne. 1990. ISBN 0-
85091-285-7. \$85.** ©

NOTICES

MICROFICHE OF HERBARIA HOUSED IN AUSTRALIAN COLLECTIONS

The following is a recently compiled list of all the overseas herbaria which are held in microfiche form in Australian herbaria. This is an update of an earlier list put together by John Jessop and published in this *Newsletter* (*Austral. Syst. Bot. Soc. Newsletter* 19: 9-10 (1979)).

COLLECTION	HERBARIA
BANKS J., (specimens and drawings).....	AD
BERTOLINI A., Bologna	PERTH
BURSER J., Stockholm.....	PERTH
CANDOLLE, A.P.de, Geneva	AD BRI HO MEL NSW PERTH
DEFONTAINES R.L., Paris.....	AD BRI NSW PERTH
FORSSKAL P., Copenhagen.....	AD BRI
HERMANN P., Leiden.....	BRI
HUMBOLDT F.H.A., A.J BONPLAND & C.S. KUNTH, Paris	AD BRI NSW
JUSSIEU A.H.L.de, Paris.....	BRI
KOENIG K.D.E., London	AD
KOENIG J.G., Copenhagen	NSW
LAMARCK J.B.A.P.M.de, Paris.....	AD BRI
LINDLEY J., Kew (orchids).....	AD CBG NSW
LINDLEY J., Cambridge (Australian types) Microfilm.....	NSW
LINNAEUS C., Stockholm..	AD BRI NSW PERTH
LINNAEUS C., London	AD BRI MEL NSW PERTH
LOUREIRO J.de, Paris	AD BRI NSW
MICHAUX A., Paris.....	BRI
OAKES AMES, Harvard University(orchids).	CBG
RAUWOLFF L., Leiden	AD
REICHENBACH H.G.L., Vienna	CBG

ROUSSEAU J.-J. & J.B.C.F. AUBLET, Paris... BRI
SAVAGE S., (index to Smith herb) NSW
SMITH J.E., London.. AD BRI CBG NSW PERTH
THUNBERG C.P., Uppsala..... AD BRI
TOURNEFORT J.P.de, Paris

Judy West

Australian National Herbarium, CSIRO

INTERNATIONAL UNION OF BIOLOGICAL SCIENCES, INTERNATIONAL ASSOCIATION FOR PLANT TAXONOMY & SYSTEMATICS ASSOCIATION

IMPROVING THE STABILITY OF NAMES: NEEDS AND OPTIONS

An international symposium to be held at the
Royal Botanic Gardens, Kew, on 21-23 February
1991

The instability of the names of organisms is one of the most common complaints made against taxonomists, and must be addressed to retain the subject's credibility. Special Committees established under the auspices of the General Committee on Botanical Nomenclature are currently considering methods of improving the stability of names of all groups covered by the International Code of Botanical Nomenclature. These options include the production of Lists of Names in Current Use, and procedures for the registration of newly introduced names and (or) publications. Many users feel these proposals do not go far enough, while some taxonomists feel they go too far. Proposals made will be voted on at the International Botanical Congress in 1993, but as these could lead to the most fundamental changes in biological nomenclature since Linnaeus, a frank, open and thorough debate of the needs and options is essential.

By early 1991, the Special Committees will be in the position of formulating proposals meriting

wide discussion, and draft generic lists will be available.

Speakers will include representatives of the Special Committees and those with different opinions, and participation from the floor will be encouraged. The presentations and discussions are to be published in '*Regnum Vegetabile*'.

If you wish to receive further information and registration details in October 1990, please return the slip below to: Professor D.L. Hawksworth, CAB International Mycological Institute, Ferry Lane, Kew, Surrey TW9 3AF, UK [telephone (081) 940 4086; fax (081) 332 1171].

I wish to receive further information about the IUBS/IAPT/Systematics Assoc. symposium
Improving the Stability of Names,
21-23 February 1991.

Name

Address.....

.....

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Telephone..... Fax.....

If the programme permits, I would be interested in presenting a paper on:

.....

AUSTRALIAN ACADEMY OF SCIENCE PROGRAMMES 1990-91

Postdoctoral Fellowships in the UK. Awards for Scientists - 1991.

Deadline for applications: 1 October 1990.

Grant for Scientific Visit to France - 1991. Bede Morris Fellowship Scheme (Rhône - Poulenc Fellow)

Deadline for applications: 1 August 1990

Scientific Exchanges with the UK - 1991.

Deadline for applications: 1 July 1990

Postdoctoral Fellowships in Japan. Awards for Scientists - 1991/92.

Deadline for Applications: 1 November 1990

Scientific Exchanges with Japan - 1991/92.

Deadline for applications: 1 September 1990

Scientific Exchanges with China - 1991/92.

Deadline for applications: 1 December 1990

Application forms available from:
International Exchanges Officer,
Australian Academy of Science,
GPO Box 783,
Canberra ACT 2601.

Telephone enquiries:
(06) 247 3966, Bonnie Bauld.

THE IV INTERNATIONAL SOLANACEAE CONFERENCE

The IV International Solanaceae Conference will be in Adelaide, South Australia, on September 5th-9th 1994. Expressions of interest to:

'Solanaceae Conference',
Botanic Gardens and State Herbarium,
North Terrace,
Adelaide SA 5000

RIDDLES

The botanist in Mufti in '*Newsletter*' No. 62 was Jim Croft of CBG on a collecting trip to Macquarie Island.



This issue's puzzle - some Council members of this society on a field trip in the dim distant past! Guess who? And when?

THE LINNEAN SOCIETY OF LONDON

Annual Regional Meeting 1990
to be held at
THE UNIVERSITY OF READING
25th, 26th and 27th September 1990

THE PRESENT STATE OF THE BIOSPHERE
Monitoring; Conservation; Management
EVOLUTION
Co-evolution; Evolutionary Biology;
Phylogenetic Reconstruction

Deadline for Registration: 31 July 1990

Dr S.L. Jury
Wessex Hall, Whiteknights Road,
Reading RG6 2BQ UK

FOREST 90

Forest 90 : First International Symposium on
Environmental Studies on Tropical Rainforests.
Manaus, Brazil, 7-13 October 1990

LETTER

Dr Michael Crisp Esquire

Esteemed Sir,

It was with joy that I received your invitation to attend the Willy Hennig Society Conference. Willy must be quite a lad!

Yes, I wish to giggle with a Kookaburra, ruffle a frill necked goanna and splash with a beaver-tailed otter-bellied duck-footed platypuss.

But most of all, I wish to visit a pulsing nightclub and rhythmically undulate atop a camel on a beach sprinkled with golden bodies.

I look forward with the most keen anticipation to visiting your most exotic country.

Yours with bated breath.

L.D.M.

Editors note: This letter, we think, was prompted

by the QANTAS brochure recently circulated.

REQUESTS

I'm working in the forest service in Norway. In addition to my supervision work with the Crown forests, I have interest in and do work in my past time with woody species in the Violaceae family, species in the genera *Paypayrola*, *Leonia*, *Rinorea* and *Isiodendron*. I have so far only been able to study few herbarium materials concerning the genera *Hymenanthera* which interests me much. I would appreciate it very much and be very thankful if you could send me seeds of the species *Hymenanthera dentata* the only representative of this genera in Australia. It will be growing in the greenhouse here and give me a chance to study living materials of this interesting genera. I wonder if you also could send seeds of a representative of the genera *Haloragis* a group quite common in Australia. I'm asking for *Haloragis* seeds on behalf of a friend who is working with the family Haloragaceae. I'm frequently traveling to the Middle East and the Mediterranean in connection with different developments projects, I'm also occasionally traveling to South America and Africa, let me know if you want plant materials from these areas. I will do my best to obtain and send to you whatever plant materials you want.

Thank you

Omar Hofun

Lellighet. Nr. 115
Munkerudkleiva. 10
1164 Oslo 11
NORWAY

Dr Wolfgang Forstreuter would be pleased to receive ripe fruits of Santalaceae and Olacaceae for research on seedling development.

Dr Wolfgang Forstreuter,
Fachbereich Biologie - Botanik,
Philipps - Universitat,
D-3550 Margurg
Lahnberge,
WEST GERMANY

AUSTRALIAN SYSTEMATIC BOTANY SOCIETY PUBLICATIONS

EVOLUTION OF THE FLORA AND FAUNA OF ARID AUSTRALIA

Edited by W.R. Barker & P.M. Greenslade. ASBS & ANZAAS, 1982. Price \$20.

This collection of more than 40 papers will interest all concerned with Australia's dry inland or the evolutionary history of its flora and fauna. It is of value to those studying 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; concluding remarks.

FLORA AND FAUNA OF ALPINE AUSTRALASIA: AGES AND ORIGINS

Edited by Bryan A. Barlow. ASBS & CSIRO, 1986. Price \$21.

The alpine environments of Australia, New Guinea and New Zealand differ from each other in terms of topography, genesis, climate and biota. They also contrast strongly with alpine habitats in the northern hemisphere. Paleoclimatology, paleobotany, biogeography, ecology and plant and animal systematics have been used here to give an understanding of the biohistorical relationships of these isolated islands of alpine terrain in the southern hemisphere.

SYSTEMATIC STATUS OF LARGE FLOWERING PLANT GENERA

ASBS Newsletter no. 53, edited by Helen Hewson. December 1987. Price \$5.

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

AUSTRALIAN SYSTEMATIC BOTANY SOCIETY NEWSLETTER

Back issues of the *Newsletter* are available from number 26 (March 1981) onwards, excluding nos 29 and 31. Here is the chance to complete your set. Cover prices are \$3.50 (nos 26-59, excluding 53) and \$5.00 (nos 53 and 60 onwards).

ORDER FORM

To: Helen Thompson
ASBS Book Sales
Australian National Botanic Gardens
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at \$21 per copy plus \$5.00 each postage.

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The Society

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

Membership

Membership is open to all those interested in plant systematics and entitles the member to attend general and chapter meetings and to receive the '*Newsletter*'. Any person may become a member by forwarding the annual subscription to the Treasurer. Subscriptions become due on the 1st January.

The Newsletter

The '*Newsletter*' appears quarterly and keeps members informed of Society events and news, and provides a vehicle for debate and discussion. In addition original articles, notes and letters (not exceeding ten pages in length) will be considered. Contributions should be sent to the Editor at the address given below, preferably as an unformatted word-processor or ASCII file on an MS-DOS or Macintosh diskette accompanied by a printed copy, or as two typed copies with double-spacing. All items incorporated in the '*Newsletter*' will be duly acknowledged. Authors alone are responsible for the views expressed.

Notes

The deadline for contributions is the last day of February, May, August and November. ASBS Annual Membership is \$20 (Aust); students (full-time) \$12. Please make your cheque out to *ASBS Inc* and remit to the Treasurer. Advertising space is available for products or services of interest to ASBS members. Current rate is \$100 per full page, \$50 per half page or less. Contact the '*Newsletter*' Editor for further information. All address changes should be sent to the Treasurer.

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Cover

Don Fortescue

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