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AUSTRALIAN SYSTEMATIC BOTANY SOCIETY NEWSLETTER 43 (JUNE 1985)

"THE EFFECT OF AUSTRALIAN DICOTYLEDONS ON THE TAXONOMY OF THE ANGIOSPERMS"

The 1985 N.T. Burbidge Memorial Lecture

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INTRODUCTION

I want to thank the Australian Systematic Botany Society for the honour accorded me in its invitation to present the Burbidge Memorial address. This address could well be considered an extension of Professor Arthur Cronquist's lecture at the ASBS dinner of August 1981, at the XIII International Botanical Congress, Sydney (Cronquist, 1981b), though not necessarily as precise and certainly not as original.

The pathway I propose to follow here is not necessarily one that Nancy Tyson Burbidge may have selected as one worthy of her time; she had made a major phytogeographic study of the flora of Australia and prepared an account of the genera in this country (Burbidge 1960, 1963). In developing my theme there are many topics I shall not glance at, and others that I shall overlook. I shall not examine the effect of Australian plants on infrafamilial concepts. The family Gramineae, for example, is well enough defined, and the addition to it of data on *Micraira* though significant for agrostologists, does not affect the main issue. Dioecism in *Spinifex* and *Zygochloa* should vitally affect the diagnosis of the tribe Paniceae; but has it? Has Lazarides' (1979) monoecious, aquatic genus *Hygrochloa*, where male spikelets are distributed in the upper part of the inflorescences and female spikelets are below in distant spikelike racemes, affected the classification of the Paniceae? For reasons of default the answer is "No" to both.

Similarly, I do not propose to consider *Eucalyptus* at any length, because any study of Myrtaceae cannot have avoided it; its contribution is made and in particular was part of the Myrtales Symposium at Sydney in 1981. No comment needs be made on its infrageneric classification.

The Australian Flora in 18th and 19th Century Taxonomy

Cook with Banks and Solander included Australia in their explorations; the non-publication of Solander's book affected both Australia and New Zealand. As a result of borrowings from the mss, the influence of Linnaeus himself was reflected in other published papers.

The French influence lay in J.H.H. de Labillardière (1804) for Australia, and later for New Zealand in A. Richard in 1832 and E. Raoul (1846).

New Zealand had no Robert Brown describing the plants, erecting genera and diagnosing families at the turn of the century. Brown (1810) used

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de Jussieu's Genera Plantarum (1789) as the base for his presentation of families and genera, departing quite soon from Linnaeus and using the latest up-to-date taxonomic system.

Joseph Dalton Hooker's Flora Antarctica (1844-1847), Flora Novae-Zelandiae (1852-1855), and Flora Tasmaniae (1855-1860) provided the strong southern personal field experience to influence Genera Plantarum (1862-1883) which he wrote as junior author with George Bentham. Flora Australiensis by G. Bentham (1863-1878), written with the abundant help of Ferdinand von Mueller, should have ensured that Genera Plantarum awarded the Australian flora all the rank and status it required. Robert Brown had prepared the way for both of Bentham's projects. I am left with the impression that just a century after Linnaeus' Species Plantarum (1753), the Australian flora became of an age to influence the taxonomy of the angiosperms. That expression would be maximized in Bentham and Hooker's Genera Plantarum and in Bentham's Flora Australiensis.

The Data Base

I have used Burbidge (1963), Morley and Toelken (1983), the recent volumes of "Flora of Australia", and such revisions as were appropriate in Muelleria, Nuytsia, Brunonia, and Telopea to provide the data I needed.

Errors are mine. In the late 1940's and early 1950's, an account from one's tailor always bore the notation E&OE; one rarely sees it in these days of computer accounting. It meant errors and omissions excepted. Errors and omissions I have tried to guard against, but I am sure some genera have slipped between the cracks. Some I can't even follow from Burbidge to Morley and Toelken!

Naturalized plants are not our concern.

The Question of Influence

What I want to examine is influence. Do Australian plants *per se.* influence the way genera are described, or the way families are delineated especially when the descriptions are prepared extraterritorially?

How influential is the flora of Australia on the taxonomy of the Angiosperm Dicotyledonae?

Three examples may demonstrate the point: The Alseuosmiaceae, until van Steenis (1984) settled Australian-New Guinean taxa in *Wittsteinia* and redisposed one Queensland species of *Randia* to the new genus *Crispiloba*, were the French connection (New Caledonia to New Zealand). Its Gondwanan connection is now secure and Australia, once non-alseuosmioid, is now central to the family. The family diagnosis of Cronquist must now include reference to the semi-verticellate leaves of *Crispiloba* and its other characters.

Similar to van Steenis' work is Henderson and Clifford (1984) on the Phormiaceae, Monocotyledonae, showing that the family is a Southern Hemisphere one encompassing *Dianella*, *Phormium*, *Stypandra* and two other genera. This is influential botany, and Australia's flora is important.

At another end of the Australian scene, is Johnson and Briggs (1975) on Proteaceae. The effect of the Australian flora is there expressed to its fullest. And although 40% of genera occur extraterritorially, no one can avoid the data base provided there, should any one wish to discuss the family in any way. This is influence at its maximum.

ORDERS AND FAMILIES IN AUSTRALIA

Because the Cronquist (1981a) system is the one to be used in the Flora of Australia, I have therefore used it as the basis for this discussion.

Orders: At the level of Orders, none is exclusively Australian, but Batales would be Australian but for the one species of *Batis* (*B. maritima*) which occurs even in the Galapagos Islands. Together with the Bataceae, the endemic Gyrostemonaceae are the total of the Order. In the monocotyledons the order Hydatellales would be almost solely Australian but for *Hydatella inconspicua* of New Zealand.

Families: Cronquist entertains 315 families of dicotyledons, 31 of which are attributed to R. Brown; 87 families are monogeneric (and many of these are monotypic).

A frequency distribution of families based on the number of genera in each is shown in Table 1; the scale is a doubling one and one of unequal increments. Included in Table 1 are cumulative percentages on a world basis which show that about 65% of families are comprised of 1-10 genera; about 75% of families consist of 1-20 genera per family; and that about 90% of all families contain 1-80 genera.

Table 1. Frequency distribution of family sizes in Class Magnoliopsida

World			Cumulative %		Australia	
Genera per family	f	%	World	Australia	No. of families	%
1	87	28	28	15	25	15
2-3	51	16	44	23	13	8
4-5	29	9	53	31	13	8
6-10	34	11	64	39	13	8
11-20	36	11	75	54	24	15
21-40	25	8	83	67	22	13
41-80	25	8	91	82	25	15
81-160	16	5	96	92	16	10
161-320	8	3	99	97	8	5
321-640	3	1	100	99	3	2
> 640	1		100	100	1	1
	315				163	

The world data appear to be separable into five groups:

(i) families of 1 genus
(ii) families of 2 or 3 genera
(iii) families of 4-80 genera
(iv) families of 81-160 genera
(v) families >160 genera

The actual frequency distribution becomes sharply discontinuous at 40 genera per family: after that most cells are empty.

For Australia, there are 163 families of dicotyledons - just over half of Cronquist's dicotyl families. Monogeneric families give botanical credibility to countries, a kind of botanical respectability. The very large families, Asteraceae (>1000 genera), Fabaceae and Rubiaceae (c. 450 genera) and Brassicaceae (350 genera) must be absent from few countries.

Some other points can be made. (i) About half the families in Australia contain 20 genera or fewer, relative to 75% for the world. Most of the difference is taken up by monogeneric families. (ii) All families with 81 genera or more are represented in Australia, and perhaps by this size, there is an inevitability for a large continent. (iii) Relatively, Australia has representation in a large number of the middle sized families - 11-20 genera/family, 21-40 genera/family and 41-80 genera/family - in excess of the "Cronquist Expectation". But there must be compensation of some sort.

The Australian distribution frequency can better be divided into five somewhat different size classes - families of (a) 1 genus; (b) 2-10 genera; (c) 11-80 genera; (d) 81-160 genera; (e) >160 genera. For Cronquist, and for all systematists, there is little reality in this distribution of families because families are genera-dependent, not size-dependent. Nevertheless, one cannot fail to find noteworthy facts.

Monogeneric Families

Monogeneric families are amenable to several possible classifications but fall thus:

6 Endemic families - Austrobaileyaceae, Idiospermaceae, Davidsoniaceae, Brunoniaceae, Akaniaceae, Cephalotaceae.

5 families in Australia, New Guinea and/or New Caledonia - included here are Balanopaceae, and Eupomatiaceae, Himantandraceae, Bataceae, Cardiopteridaceae.

Corynocarpaceae in Australia, New Guinea and New Zealand.

3 families in Australia, New Zealand, and South America - Donatiaceae, Eucryphiaceae, Gunneraceae.

5 tropical or subtropical oligotypic families - Sphenocleaceae, Nelumbonaceae, Alangiaceae, Ceratophyllaceae, Symplocaceae.

3 tropical families - Nepenthaceae, Xanthophyllaceae, Leeaceae.

2 Cosmopolitan polytypic families - Cuscutaceae, Callitrichaceae.

These total 25 families and are 15% of the monogeneric families in Cronquist's System.

If one wants an early glance at Gondwanaland families some are evident. Three families form a southern alliance - Donatiaceae, Eucryphiaceae and Gunneraceae - and there is a northern alliance with Cardiopteridaceae, Eupomatiaceae and Balonopaceae. Brunoniaceae are an eremaean family. Perhaps that is what could be expected in part, allowing for warmer northern areas, eremaea, the austral connections, and the south western province of Western Australia.

Di- and Trigeneric Families

Only one endemic family comprises three genera - Tremandraceae - mostly from the south western province of Western Australia. "None of the species is of much economic importance or well known to botanists generally" (Cronquist 1981a, p. 775). There seems a clear responsibility for Western Australian botanists to rectify the deficiency detected by Cronquist for this family.

Two bi-generic families with Gondwanan affinities, Byblidaceae and Trimeniaceae, have one Australian endemic genus each, *Byblis* and *Piptocalyx* respectively. *Trimenia* is found in New Guinea, New Caledonia and Fiji; the other byblidian - could one write byblidulous? - genus, *Roridula*, is South African. The marriage of *Byblis* and *Roridula* in Byblidiaceae, as revealed in the family description, seems to possess some of the qualities of mismatching.

The affinities of the Stackhousiaceae are also Gondwanan; two endemic genera, *Macgregoria* and *Tripterococcus*, and the predominantly Australian *Stackhousia*, are the members.

The affinities of trigeneric Alseuosmiaceae continue to be Gondwanan as van Steenis (1984) has emphasised very recently. Two genera are in Australia - endemic *Crispiloba* and *Wittsteinia* which is also found in New Caledonia and New Guinea. *Alseuosmia* is in New Zealand in New Caledonia. *Frankenia*, Frankeniaceae, with c. 60% of its species in Australia, is in this group; the other two genera are monotypic or tritypic. Strangely Cronquist fails to mention Australia for this family.

There are several single-genus representations in families Sonneratiaceae, Actinidiaceae, Elatinaceae, Elaeagnaceae, Plantaginaceae, Cabombacaceae, Bixaceae, Dichapetalaceae - the most of tropical inclination except Plantaginaceae and Elatinaceae.

Total families 13; 1 endemic (Tremandraceae).

Tetra- and Pentageneric Families (Table 2)

Thirteen families occur in this class. The four genera of the endemic family Gyrostemonaceae are largely eremaean but not exclusively so and "None of the species is economically important or familiar to botanists in general" (Cronquist 1981a, p. 455); this may be a familiar comment, but is not without international significance.

There are five genera in Stylidiaceae and four are found in Australia. *Levenhookia* alone is endemic and very strongly south west provincial in Western Australia; *Forstera* and *Phyllachne* are recorded from New Zealand and South America. *Stylidium*, oligotypic outside Australia, is also strongly south west provincial of Western Australia.

In both Menyanthaceae and Lentibulariaceae, two genera are in Australia. Both families have southern connections; *Liparophyllum* is also in New Zealand, and *Polypompholyx* (Lentibulariaceae) is shared with South America. *Utricularia* is polytypic in Australia.

Table 2. Distribution of families of Australian plants with 4 or 5 genera/ family

No. of genera in family	Australian Representation - Genera			
	4	3	2	1
4	Surianaceae Gyrostemonaceae	Casuarinaceae	Hernandiaceae Myoporaceae Droseraceae *Aquifoliaceae*	*Ebenaceae* *Erythroxylaceae*
5	Stylidiaceae	Menyanthaceae Lentibulariaceae Nymphaeaceae		

Italics - no endemic genera

There are four genera in the Surianaceae; three genera are endemic and *Suriana* is present on Australian coasts. The family lies widely: in eastern Australia (*Cadellia* and *Guilfoylia*) and in the south west province of Western Australia (*Stylobasium*).

Of the four genera in the Myoporaceae, *Eremophila* is endemic and *Myoporum* is extensively, but not uniquely Australian. Droseraceae, a family comprising three monotypic genera and *Drosera* is represented by cosmopolitan *Aldrovandra* and *ca.* 50 species of *Drosera* - most of which are in south western province of Western Australia. Of *Casuarina* and its three segregate genera, three are Australian. Hernandiaceae contain the monotypic tropical *Gryocarpus* and one species of *Hernandia*; two other extraterritorial genera complete the family. The somewhat uncomfortably placed monotypic endemic genus *Ondinea* represents tropical Nymphaeaceae.

Four families composed of 4 or 5 genera are represented in Australia by one or two genera each: Ebenaceae, Aquifoliaceae, Erythroxylaceae and Theaceae. Other than Aquifoliaceae, with *Ilex* and *Sphenostemon*, the families are of tropical distribution.

These 13 families are 45% of all 4- or 5-genera families in Cronquist's System. Representation is therefore very high.

Families with 6-10 genera (Table 3)

No Australian family fills the cell here for 10 endemic genera, but the Pittosporaceae, a family of nine genera, has all genera present in Australia. Six genera are endemic; two extend across shallow Torres Strait, while *Pittosporum* itself is widespread. Nothing in the family diagnosis should escape from Australian influence.

Orchard's (1975) treatment of the Haloragaceae indicates 6 genera in Australia, but *Meziella* is known from the type only. At this concentration, with two endemic genera (*Haloragodendron* and *Glischrocaryon*), the total Australian effect on the taxonomy of the family is very high.

Table 3. Distribution of families of Australian plants with 6-10 genera/ family

Australia		Families
% Genera in family	% Endemic	
100	67	Pittosporaceae
75	25	Haloragaceae
31-50	10	Dilleniaceae, Elaeocarpaceae, Viscaceae
up to 30	0	Aristolochiaceae, Fagaceae, Linaceae, Oxalidaceae, Opiliaceae, Piperaceae, Winteraceae

"Best developed in the Australian region" said Cronquist (p. 298) of the Dilleniaceae, with 10 genera in its complement. *Hibbertia*, also in New Caledonia and Madagascar, numerically dominates the family. *Pachynema* is endemic and two other genera are represented by one species each. Four dilleniaceous genera among 10, but numerically there are more genera in the Elaeocarpaceae where *Peripentadenia*, monotypic and endemic, is the only signal departure from a modest list despite Coode's condescensions to *Elaeocarpus* in Australia (Coode 1984).

Another nine families are represented in this class of 6-10 genera family. The number of genera in each in Australia varies from *Oxalis* as the sole genus in the Oxalidaceae, to Opiliaceae with two genera, and Viscaceae with three among 8 in the family. Fagaceae are included here together with the archaic family Winteraceae.

Families total 13 from Cronquist's 34 in the class. Significant representation is found in Pittosporaceae, Haloragaceae and Elaeocarpaceae.

Families comprising 11-20 genera (Table 4)

Of Cronquist's families, 36 are made up of 11-20 genera. Twenty-four (67%) of these families are represented in Australia, but of these, 17 families consist of 1 or 2(-5) genera and few species - in total perhaps 35 genera and 150 species with many of those in *Calandrinic*. No genus is endemic in this subclass.

Seven families in this size range contain endemic genera, one each in Loganiaceae (*Logania*), Combretaceae (*Macropteranthes*), Molluginaceae (*Macarthuria*), Plumbaginaceae (*Aegialitis*) and Vitaceae (*Clematocissus*); in Polygalaceae there are two endemic genera - *Emblingia* and *Comesperma* but the significant family here is Goodeniaceae. Seventeen genera or thereabouts, constitute the family and 16 of them (94%) are found in Australia; 11 genera are endemic including *Dampiera*, but several are monotypic (e.g. *Diaspasis* and *Pentaptilon*) of the south west province of Western Australia. Perhaps 90% of all goodeniaceous taxa are found in Australia. I agree with Carolin* about the nativity of the family in Gondwanaland.

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* I apologise to Professor R.C. Carolin of Sydney for being unable to locate the reference. If I reflect his views incorrectly, I apologise again; if he had wished to express this view but had never done so, he may accept the attribution; if he wishes to be totally dissociated from any such opinion he may be.

Table 4. Distribution of families of Australian plants with 11-20 genera/ family

Australia		No. of families	Families
% Genera in family	% Endemic		
94	70	1	Goodeniaceae
15-45	10-15	6	Combretaceae, Loganiaceae, Molluginaceae, Polygalaceae, Plumbaginaceae, Vitaceae
5-14	0	17	Caprifoliaceae, Connaraceae, Geraniaceae, Violaceae, etc.

Class 21-40 Genera in a Family (Table 5)

Twenty-two Australian families are represented in the size range 21-40 genera/family. Nineteen of these contain 1 or 2 or 3 genera - and as few species - e.g. Bombacaceae (2), Ochnaceae (1), Nyctaginaceae (3). With more species, even though this is not our standard, and a slightly greater generic representation there are six families including Zygophyllaceae (4), Lythraceae (7), Myrsinaceae (7), Lauraceae (6).

Premier in this size class are the Epacridaceae with 28 genera among 30 (20 of them endemic) present, and about 350 spp. This is one of the highest concentrations of genera per family, just less than Pittosporaceae, and slightly greater than Goodeniaceae. Total dominance by the Australian flora for this southern family is clear!

With 16 of the 25 genera represented in Australia, the family Cunoniaceae is significantly present. Five genera are endemic (e.g. *Callicoma*, *Anodopetalum*) and a further four (e.g. *Gillbeea*) extend northward to include New Guinea and/or New Caledonia. New Zealand is involved in the *Ackama* - *Caldcluvia* debate.

In decreasing order of presence in Australia, Santalaceae with 10 genera (4 endemic) among 35 in the family and Monimiaceae with 10 genera (5 endemic) among 33 in the family, are significant on a world scale.

In the Hamamelidaceae two Queensland monotypic endemic genera are the only members of a family of about 25 genera in total.

Of the 22 families, two-thirds of them are represented by very low number of genera and the Epacridaceae with their high level of endemic genera alone are significant. Cunoniaceae have about half of the genera in the family here, but all these are represented by 1 or 2 species.

Table 5. Distribution of families of Australian plants with 21-40 genera/family

Australia		No. of families	Families
% Genera in family	% Endemic		
93	67	1	Epacridaceae
60	28	1	Cunoniaceae
20-35	11-27	3	Monimiaceae, Santalaceae, Saxifragaceae
8	8	1	Hamamelidaceae
3-20	0	16	Bombacaceae, Lauraceae, Lythraceae, Moraceae, Oleaceae, etc.

Class Size 41-80 Genera per Family (Table 6)

The twenty-five families in this size-class are all in Australia, represented by as few as two genera among 60 in the Malpighiaceae, or as many as 45 among 75 in Proteaceae. Five other families have a high frequency of generic representation:

Sterculiaceae 22 genera, 9 endemic; Celastraceae 14 genera, 6 endemic; Rhamnaceae 16 genera, 7 endemic; Malvaceae 19 genera, 7 endemic; and Convolvulaceae 17 genera, one endemic. Although at a lower frequency of generic representation, about half the genera in the Menispermaceae in Australia are endemic (6, mostly in Queensland), and in Loranthaceae 6 of 10 genera are endemic.

The overwhelming dominance of Proteaceae and the significant contribution to the understanding of Rhamnaceae, Sterculiaceae and Celastraceae can be seen in Table 6.

Acacia 600-700 species in Australia, is one of 17 mimosaceous genera in Australia; none is endemic.

Table 6. Distribution of families of Australian plants with 41-80 genera/family

Australia		No. of families	Families
% Genera in family	% Endemic		
60	50	1	Proteaceae
30-40	15	3	Convolvulaceae, Rhamnaceae, Sterculiaceae
15-29	4-10	9	Araliaceae, Celastraceae, Loranthaceae, Malvaceae, Menispermaceae, Mimosaceae, etc.
10-14	0-2	9	Capparidaceae, Campanulaceae, Clusiaceae, Sapotaceae, Tiliaceae, Thymelaeaceae, etc.
1-4	0	3	Caryophyllaceae, Gentianaceae, Malpighiaceae

Size Class 81-160 Genera per Family (Table 7)

All the 16 families which Cronquist recognises and that fall in this size class - and I must reiterate that for him this is of no importance - are found in Australia. The most important is Myrtaceae followed at a short distance by Rutaceae, Chenopodiaceae and Verbenaceae; this is determined by generic presence not species per genus, nor in the case of *Eucalyptus* by its physiognomic dominance over the landscape. The strongest contrast is with Gesneriaceae, Rosaceae, Bignoniaceae and Ericaceae where generic representation in each amounts to about 5% of that in each family.

Data are summarised in Table 7. Myrtaceae with 75 genera, 55 of them endemic, contain half of the genera in the family. In Chenopodiaceae and Verbenaceae, the fractions of the genera in the families are equal as is the relative level of endemic genera; in the Rutaceae about 60% of the genera in Australia are endemic.

Families Sapindaceae, Boraginaceae, Solanaceae and Cucurbitaceae average about 15% representation of genera per family, and each has some endemic genera, especially in Sapindaceae and Solanaceae. With generic representation at 10% of the family in Flacourtiaceae, Caesalpiniaceae, Aizoaceae and Annonaceae, their contribution is slight.

Table 7. Distribution of families of Australian plants with 81-160 genera/family

Australia		No. of families	Families
% Genera in family	% Endemic		
52	40	1	Myrtaceae
22-28	13-15	3	Chenopodiaceae, Rutaceae, Verbenaceae
13-19	2-8	4	Boraginaceae, Cucurbitaceae, Sapindaceae, Solanaceae
9-10	2	4	Annonaceae, Aizoaceae, Caesalpinaceae, Flacourtiaceae
3-7	0	4	Bignoniaceae, Ericaceae, Gesneriaceae, Rosaceae

Size Class 161-320 Genera per Family (Table 8)

All the families in this size class are present in Australia; the class-size is very large and the Australian share of any family does not exceed 16% of the genera in a family. In Euphorbiaceae *ca.* 50 genera are found in Australia; few are endemic; many are oligotypic. Of the Scrophulariaceae 25 genera, 1 endemic, are present in a family of about 190 genera; all are oligotypic except *Euphrasia*.

In Lamiaceae 6 or 7 endemic genera are present; these are all polytypic except for *Wrixonia*. In Apiaceae 8 genera among 25 in Australia are endemic; most are oligotypic except *Actinotus*.

The families in this class-size are all from the more "advanced" end of the range of families as listed in Cronquist.

Table 8. Distribution of families of Australian plants with 161-320 genera/ family

Australia		No. of families	Families
% Genera in family	% Endemic		
15-16	1-5	2	Euphorbiaceae, Scrophulariaceae
10	3	1	Lamiaceae
5-8	1-4	4	Acanthaceae, Apiaceae, Apocynaceae, Asclepidaceae
3	0	1	Melastomataceae

Size Class > 320 Genera per Family

On a world base there are four families with more than 320 genera in them; all occur in Australia. The largest is Compositae with more than 1100 genera; there are about 120 Australian genera. Fabaceae, however, with 140 genera in Australia among 440 in the family, reach to one third representation; endemic genera are about 40, *ca.* 10% of the family. Among 26 genera of the Brassicaceae in Australia, 17 are endemic. The subsidiary centre in Australia to which Cronquist (p. 448) refers is clear; the family as a whole is estimated at 350 genera.

Generic representation in Rubiaceae, where 37 genera among 450 occur, is about the same as in crucifers; endemic genera though are few.

DISCUSSION

What influence then do Australian families of dicotyledons have on the classification of dicotyledonous Angiosperms?

Monogeneric families attract attention to themselves. Monotypic monogeneric families such as Brunoniaceae (*Brunonia australis*) and Idiospermaceae (*Idiospermum australiense*) just attract interest, such as the report of Prakash *et al.* (1984) on *Galbulimima* (Himantandraceae). The ditypic, monogeneric Austrobaileyaceae are just as interesting. Families at the "primitive/archaic" end of the dicotyl spectrum - Austrobaileyaceae - and at the "advanced/recent" end - Brunoniaceae - signify for those reasons; and overall there is a tendency to attribute to many or most of these groups a Gondwanaland history.

In generically small families, it is also simple to attract attention. The trigeneric Tremandraceae are endemic; Australian influence on Stackhousiaceae is almost at its maximum and is greater than for Frankeniaceae. There is no doubt about Gondwanan influence here, nor for the confused bigeneric family Byblidiaceae. "Exceptions prove the rule" the adage says - but with both of two, *Byblis* and *Roridula*, being the exceptions in the family, is this the ultimate proof? The Trimeniaceae may be classical Gondwanan - Australia, New Guinea, New Caledonia and Fiji.

As the number of genera per family increases, there is a better opportunity to assess the influence of them over the family. The size-class 4-5 genera per family is somewhat evenhanded in its influence. The austral, or Gondwanan, Stylidiaceae need only *Oreostylidium* from New Zealand for Australia

to completely encompass that family. All the surinaceous genera including three endemics occur in Australia, and the Myoporaceae, extending beyond Australia to Asia and the Pacific and to the West Indies, have 50% of the genera. The endemic Gyrostemonaceae with four largely eremaean genera, set their own limits, but more importantly, control that of the Batales.

The size range 6-10 genera/family occurs 13 times in the Australian flora, and this is 38% of the families with this size range. Two families are significant: (1) Pittosporaceae with all nine genera present and six of those endemic, and (2) of eight genera in Haloragaceae, six are found in Australia.

Cronquist says of the Dilleniaceae - "best developed in the Australian region"; of *Hibbertia* this would be true, but of the ten genera in the family, four occur here.

In mid-range families of 11-20 genera there are 24 in Australia. Seventeen families comprise 1 or 2 genera here (none endemic) and another six are equally lacklustre although there are 1 or 2 endemic genera in each. With 16 genera in Australia (12 endemic) among 17 for the world, the Gondwanan family Goodeniaceae has not been ignored by Australians and cannot be by the rest of the world.

Epacridaceae are Australian; almost all genera in the family are present. This is unique among larger families. One other family, Cunoniaceae in the size-class 21-40 genera, stands out among the total of 22 families in the group. Sixty percent of the genera in the family occur in Australia; 5 genera are endemic. All 15 genera are typical oligotypic.

In the large family Proteaceae 60% of the 75 genera are found in Australia; 35 genera are endemic. Johnson and Briggs (1975) ensured that the description of the family should not fail for lack of data; the base of information they supplied ranks among the finest in the world.

Twenty five families of this 41-80 genera size-class occur in Australia. Sterculiaceae is represented by 22 genera (9 endemic) among 65; Celastraceae by 14 (6 endemic) among 50, and Rhamnaceae by 16 (7 endemic) among 55 genera.

If Epacridaceae and Proteaceae seem very significant they are complemented by Myrtaceae from the 80-160 class-size, with 75 genera in Australia, 55 of them endemic, and one of them dominating as Barlow (1981) said "... much of Australia's vegetation and contributing greatly to its general character". About 40% of the genera of Myrtaceae are Australian; should that number be increased by 10 or a dozen (Johnson 1984), the percentage will shift from 40 to 43. Three additional large families in which 25% of the genera are Australian, affect dicotyledonous taxonomy viz., Rutaceae 40 genera (23 endemic) in 150, Chenopodiaceae 28 genera with 14 endemic and Verbenaceae with 22 genera (13 endemic).

There are c. 50 euphorbiaceous genera in Australia, about 16% of the 300 in the family; many are oligotypic. In the Scrophulariaceae (about 200 genera) the proportions are about the same.

Among the very large families, the Fabaceae of 440 genera with 140 (40 endemic) in Australia has a one third representation.

The emphasis has tended to become more marked on the endemic elements and on those with reasonably high generic representation. But the

Australian flora has its waif and stray element - one or two species of a genus well represented elsewhere as its sole member of a family. Some few examples include *Brackenridgia* (Ochnaceae), *Josephina* (Pedaliaceae), *Pilostyles* (Rafflesiaceae), *Torrenticola* (Podostemaceae). Fourty-four families are of this kind; 27 families with one genus present, and 17 with two genera represented in Australia.

CONCLUSION

I set out to measure the effect of Australian plants on the taxonomy of the dicotyledonous Angiosperms. I have used the base you selected for your new Flora of Australia - Cronquist's Integrated System; when I compared it with the then modern base H.H. Allan chose for his first New Zealand Flora "A Handbook of the Naturalized Flora of New Zealand" (1940) - Hutchinson's Families of Flowering Plants" - the family descriptions in Cronquist are so detailed and apparently complete that few errors should be made at that level.

I set out not to make a phytogeographic re-assessment of the Australian flora but to satisfy the private and undisclosed ambition, I had to attempt an assessment of the effect of a large Gondwanan continent on taxonomic botany.

There are *ca* 75 families with endemic genera, a figure approaching one half of the 163 families in Australia. About one third of these endemic genera are monotypic. Points of high concentration are Proteaceae, Epacridaceae, Pittosporaceae, Goodeniaceae, Stylidiaceae, Fabaceae.

The plants of the world do not conspire to fit some normal bell-shaped distribution curve, few "primitive-archaic" groups, rising to a peak of groups with middle of the road characters, and down-tailing towards the few "advanced-recent", no more than they are present on any large landmass with a normal campanulate curve for habitats. Australian families range from Winteraceae, Eupomatiaceae, Austrobaileyaceae - all Magnoliales - to the campanulaleous families; the curve is biased perhaps by a higher representation at the "advanced" end of the range.

Speciation is easily comprehended; it caused the big blips on generic curves for small and large land masses. Infraspecific differentiation is continually occurring - everyone concedes that. But generification is a philosophical task which not everyone understands or enjoys. The higher the taxonomic rank, the higher the level of abstraction, and the harder the task. Genera with their recognition and diagnoses are the common problem. Who will be Australia's new Robert Brown or George Bentham? Dahlgren and Clifford (1982) on monocotyledons is a sort of new Bentham and Hooker; and Australian plants are not without influence in that context.

What I think I have done is show that the flora of Australia was a high probability of influencing the taxonomy of the Angiosperms in the 50 families that I have indicated even though half of them are monogeneric and thus self-influencing. Austral families such as Stackhousiaceae, Elaeocarpaceae, Alseuosmiaceae, Tremandraceae emerge as such - they are austral families. West Gondwanan origins for Proteaceae, Epacridaceae and Euphorbiaceae may be seen if only darkly.

In small families of 2-10 genera, Australia is represented by 39. By my estimate Australian genera significantly influence all of 117 families in this class, i.e. 9%. In families with 11-80 genera, Australian genera are

present in 71 of 86 families on a world basis; the flora is significant of 8 of them, i.e. 9%. Of 24 large families with 81-320 genera, Australian genera occur in all; 6 are significantly influential, i.e. 25%. Of the four large families consisting of 321 genera or more, Australian Fabaceae are most significant with a contributory influence on one-third of the family. Asteraceae, Brassicaceae and Rubiaceae are very much influenced by Australian genera. These estimates, 9% for small and mid-sized families, and 25% for the large families, suggest that Australian genera significantly influence the definition of not less than 9% of the families of flowering plants in the world. The arithmetic defence may seem artificially contrived; the only contrivance lies in the simplification adopted in Table 1.

Such values set against the significance of the Southern Hemisphere continental floras of Africa and South America and of the southern Old and New World tropics alone, can only emphasise the role of the Australian flora in the definition of the Magnoliopsid families of the world.

Nancy Tyson Burbidge in 1960 discussed the phytogeography of Australia in what was essentially a pre-plate-tectonics phase. Your President's well developed essay in Flora of Australia Volume 1 complemented her study (Barlow 1981). In this Burbidge Memorial Lecture I hope to have shown that the new Flora of Australia offers the ultimate opportunity in the 20th Century, to vindicate Daniel Solander and the artists who accompanied Joseph Banks on his major botanical exploration *in terras australes*, and to emulate the outcome of Robert Brown's *Iter Australiense*.

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WHAT IS THE CORRECT NAME FOR KANGAROO GRASS?

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Themeda australis (R.Br.)Stapf has been the name most commonly used for Kangaroo Grass, "perhaps the most widespread grass in Australia" (Tothill & Hacker, 1983). There have, however, been a number of occasions when the name of the Afro-Asian species *T. triandra* Forssk. has been applied to the Australian taxon called *T. australis*. Two such uses occurred rather early in Australian botanical literature (Black, 1922; Domin, 1915) but Australian botanists since have usually retained *T. australis* for it. It now appears that *T. triandra* is being applied again to Kangaroo Grass by some present-day authors (Clayton & Renvoize, 1982; Jessop, 1984). For preparation of the account of the Andropogoneae for the Flora of Australia, it is important that the correct name for this widespread and economically important grass is established.

T. triandra in the restricted sense, has been reported to have a distribution from Macronesia to Melanesia (Andrews, 1956; Bor, 1960; Chippindall, 1955; Clayton, 1972; Guillaumin, 1948; Hansen & Sunding, 1979; Lazarides, 1980; Launert, 1970; Maire, 1952; Napper, 1965; Simon, 1971; Stapf, 1919; Tackholm, 1974). In literature dealing with these plants in the Malesian region, there is an ambivalence in use of names for them. In Backer & Backhuizen van den Brink, 1968, the name *T. australis* is used with a footnote that "the species should perhaps be referred to *T. triandra* Forssk. (as it has before)"; in Henty, 1969, *T. australis* is used (there being no reference to *T. triandra*); in Sajise *et al.*, 1974, *T. triandra* is used with a reference to the distribution being "in Africa and abundant in India and Australia".

Significant research has been conducted on the cytology of plants called *T. australis* (Hayman, 1960) and those called *T. triandra* (Gluckmann, 1951; de Wet, 1960). Results have shown both taxa to be extremely variable and to display ploidy levels from diploidy to hexaploidy. There is a significant difference in cytogeography in that the high altitude areas in Australia contain only diploids whereas the grass veld of the high South African plateau has tetraploids, pentaploids and hexaploids. Vickery, 1961, alluded to the similarity between *T. australis* and *T. triandra* but upheld them to be separate mainly on the grounds of expediency "until such time

as the whole position is reviewed on the basis of collections from all parts of the geographic range". I was formerly of this opinion but when the question is posed as to how the two species differ we find that nowhere has this been stated. J.M. Black changed back to using *T. australis* in the second edition of his Flora of South Australia (Black, 1943) on the basis of their being kept apart by Stapf - "Dr O. Stapf treated them as separate species although he did not give the distinguishing characters". Stapf, l.c., actually regarded one of his varieties of *T. triandra* as "very near the Australian *T. australis*".

In both entities, many variants have been recognized and sometimes given formal names (see Stapf, l.c., and Chippindall, l.c., for a listing of varieties of *T. triandra* and Domin, l.c., for a listing of varieties and subvarieties of *T. australis* (sub *T. triandra*) in Queensland). Vickery, l.c., gives characters for 7 forms in New South Wales but does not formally name them as "no clear demarcation has been found between them". She further considers that the variants within Australia "do not readily lend themselves to separation into taxa. The application of names to such variants approximate to the naming of individuals or limited populations, and such names will have no meanings of general validity or utility". The same comment is equally valid for variants of *T. triandra* in Africa, although there has been greater success in South Africa in correlating ploidy level with morphological and anatomical characters (Chippindall, l.c., de Wet, l.c.) in the varieties.

In view of the close parallels between the Afro-Asian and Australian populations, it seems a sensible move to regard the whole complex under the earlier name *T. triandra* until it can be shown that there are any specific differences between them. There are, in fact, a number of other species of the Andropogoneae widespread throughout the Old World. In its apomictic method of reproduction *T. triandra* is very similar to *Heteropogon contortus* (L.) P. Beauv. ex Roemer & Schultes, itself supposedly native to both Old and New World tropics (Emery & Brown 1958), and is the basic reason for the variability exhibited by both species. For these reasons, I propose to use the name *T. triandra* for our Kangaroo Grass.

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A PLEA FOR BETTER COLLECTION AND CURATION OF LARGE FERNS

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Ferns have always been popular subjects for collection and scientific study, and, numerically they are well represented in most herbaria. However, recent work on the genus *Hypolepis* indicates to me that the quantity of collections belies a serious weakness in their quality, especially amongst the larger species.

Most species of *Hypolepis* have fronds considerably larger than the average herbarium sheet, and my experience suggests that ferns whose dimensions exceed this magical size are subject to poor collection and curatorial techniques. Although the quantity of collections may not be affected, the quality is often seriously diminished in one or more of the following ways:-

(i) Only a portion of the frond (usually just a pinna or the frond apex) is collected,

(ii) The stipe and rhizome are very rarely collected,

(iii) The frond is mounted with ends hanging over the edge of the sheet so that pieces are rapidly abraded.

(iv) The frond is repeatedly folded over on itself before mounting so that it becomes impossible to determine its original size or shape.

The astonishing fact is that in examining well over a thousand herbarium sheets from some of the principal herbaria in Europe and Australasia, representing 15-20 species of *Hypolepis* from the Malesian and Pacific regions, I found no more than half a dozen collections that were suitable for compiling a full description of any one species. In some apparently quite common species, it has proved impossible to find even a single complete frond that would provide an indication of its overall size. Discussions with other pteridologists indicate that this is probably a typical situation for a genus of large ferns.

Such evidence confirms that there is no substitute for first-hand field observations in any taxonomic revision, and that collections of a particular group of plants made with a specific purpose in mind are vastly superior to general collections. Nevertheless, a considerable amount of time, effort and resources are put into making general collections every year by most herbaria in the world, and, whilst modern collections are improving in quality, there are still some disturbing trends evident. In an endeavour to reduce what can only be regarded as a serious waste of effort on the part of collectors and herbarium curators, I put forward the following very basic guidelines for improving the quality of outsize fern specimens.

Collections

Collecting large ferns is a time-consuming exercise requiring large quantities of drying paper and pressing space; the paucity of good collections in herbaria merely reflects these difficulties. Nevertheless, the point cannot be overstressed that one frond collected in its entirety is worth any number of fragmentary collections.

The following technique is the one I normally use:-

(i) Cut the frond into lengths approximating to the size of a herbarium sheet; the stipe should be left attached to a small piece of the rhizome at one end, and to the basal pair of pinnae at the other.

(ii) Label the pieces consecutively from apex to base (e.g. PJB 1234 a-e) so that the frond can be easily reconstructed.

(iii) Press the pieces individually, avoiding folding them as far as possible. However, the longer pinnae are probably better folded rather than cut to prevent confusion in reconstructing the frond, but in really large fronds, cutting of the pinnae is unavoidable. In this case, a more elaborate numbering system may be needed.

The following measurements should also be taken:-

(i) Length and breadth of the lamina.

(ii) Length and diameter of the stipe.

(iii) Distance from the lamina apex to the point of attachment on the rachis of the longest pinna.

If pressing space is in very short supply, it is possible to cut off and discard all the pinnae on one side of the rachis. However, if this is done,

it is essential to record the full lamina dimensions with the preserved half-frond.

In the case of really large specimens such as tree-fern fronds, where it is clearly impractical to preserve the entire frond, I find that three pieces will normally suffice:-

(i) The apical pinnae.

(ii) The longest pinna, together with a length of the attached rachis.

(iii) The entire stipe and attached basal pair of pinnae.

Measurements of the frond (as above) are essential together with notes on the size and nature of the trunk, presence or absence of a skirt of dead fronds, etc.

If duplicates are being collected, a second frond must be selected, marked as a duplicate and appropriately pressed. Retaining the discarded portions of the first frond as duplicates only leads to confusion, especially by herbarium staff who have not been involved with the collecting.

Curation

Well-collected specimens can be ruined by poor curatorial techniques. Unfortunately, the following points that should be axiomatic, need repeating:-

(i) Fern specimens should be mounted underside upwards with the sporangia exposed, but with a few pinnae bent over to show the upper surface.

(ii) Pieces should not be left hanging over the edge of the sheet.

(iii) The specimen should be cut to fit several sheets, rather than folded repeatedly to fit one sheet.

Exchange specimens

Most herbaria run extensive exchange programmes with other institutions and, in my opinion, the emphasis on obtaining duplicates for exchange has all too often been responsible for destroying what would otherwise have been perfectly good collections of large ferns. I have seen many instances where single fronds have been cut up by the collector, and the individual pieces distributed as duplicates by the parent herbarium. Again, it cannot be overstressed that one frond mounted on 10 sheets and placed in one herbarium is infinitely preferable to 10 sheets distributed to 10 different herbaria.

In summary, I would emphasise that most herbaria already hold enough voucher specimens of large ferns. In the long run, a few more well-collected and well-curated specimens of whole fronds will be of considerably greater scientific value than all the existing fragmentary collections. Remember that in many instances, the addition of one complete frond of a large fern species will at least double the institution's holdings of entire specimens of that species.

CULTIVARS

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The term cultivar was formed from a contraction of the words "cultivated" and "variety". It is generally used to designate those plants which have been raised in our gardens as distinct seedlings (e.g. *Grevillea* 'Poorinda Blondie' is said to be a seedling of *Grevillea hookeriana* which has a different leaf shape and colour of styles), sports of species (e.g. *Hypocalymma cordifolium* 'Golden Veil' is a shoot mutation which has variegated foliage) or hybrids between species (e.g. *Grevillea* 'Poorinda Peter' is said to be a hybrid between *G. acanthifolia* and *G. longifolia*). Cultivars can also be selected from the wild but these are usually one-off variants which need to be maintained by cultivation (e.g. *Crowea exalata* 'Austraflora Greencape' is a naturally occurring form of the species which is different from known normal forms of *Crowea exalata* in its prostrate habit).

In 1983, The Royal Botanic Gardens and National Herbarium of Victoria initiated a one year survey of plant cultivars growing in Victoria. The main object of this survey was to build a photographic and pressed specimen reference collection which could be used for identification purposes. One year is a very short time to do a survey of this kind (there are literally thousands of cultivars) and so in the beginning a number of groups of cultivars were chosen which were considered confusing and therefore difficult to identify. These were mostly exotic genera such as *Malus* cvs. (Ornamental Apples), *Prunus* cvs. (Ornamental Flowering Cherries), *Nerium* cvs. (Oleanders), *Acer* cvs. (Maples), *Abutilon* cvs.(Chinese Lantern), *Syringa* cvs. (Lilacs), *Camellia* cvs. (Camellias) and many other smaller groups. Several Australian native groups were collected such as grevilleas and callistemons but because cultivars arising from the Australian Flora are recorded by the National Botanic Gardens in Canberra these were not considered a priority.

Cultivars were collected from various sources - Nurseries, The Royal Botanic Gardens, Provincial Botanic Gardens and private individuals. Each one has brought back to the Herbarium where it was photographed, its name and any other relevant information placed on a card and a pressed specimen made. In order to record flower colour accurately each cultivar was colour coded using the Royal Horticultural Society Colour Chart.

The term cultivar was first coined and put into operation by the International Horticultural Congress and International Botanical Congress as long ago as 1952. This first co-ordinated attempt to stabilise the names of cultivated plants resulted in the formation of the International Code of Nomenclature for Cultivated Plants (or Horticultural Code) published by The Royal Horticultural Society in 1953 and in the words of article one of the code - "Cultivated plants are essential to civilization. It is important, therefore, that a precise, stable, and internationally accepted system should be available for their naming".

As set out by the code, cultivars are given a non latinized "Fancy" or vernacular name which is placed in single quotation marks after the botanical name, e.g. *Camellia japonica* 'Great Eastern'.

If the specific epithet is not known the "Fancy" name can be placed directly after the generic name, e.g. *Prunus* 'Elvins' (The parents involved in the formation of this cultivar are uncertain and thus no specific name can be given).

The greatest problem in recording cultivars comes from trying to establish correct names. Substitute names are often used (e.g. *Prunus* 'Double Crimson' instead of *Prunus persica* 'Harbinger') and while these are mostly descriptive, they give no handle by which further information can be found. Also a number of different cultivars can be called by the same name, e.g. *Prunus* 'Double Crimson' is also used for a double red flowering almond (*Prunus dulcis*) and so by using "ad hoc" descriptive names in this manner, identification of the correct plant is made difficult.

As part of the survey a listing was made of cultivars from Victorian Nursery catalogues dating back to 1855. This list shows a large number of cultivars which have been lost over the years. Several reasons can be suggested for this - changing fashions, pressure of propagation and difficulty of cultivation. A major factor, however, which became obvious from looking through the nursery catalogues is the number of cultivars which are lost when a particular nursery closes down.

Many of these cultivars have great historic value and are very much part of our National Heritage. For example, the *Camellia* collection in the Royal Botanic Gardens contains examples of cultivars which were raised and developed by early Australians such as William Macarthur, Silas Sheather, Michael Guilfoyle and Thomas Shepherd. They were also, and perhaps more importantly, some of the plants that featured in our early gardens. There is currently an enormous interest in conserving our historic gardens, however, this cannot be successfully achieved without conserving our garden plants. Unless we actively collect and maintain old cultivars by placing them in permanent collections they will be lost forever, and we will have lost an important part of our garden history.

Apart from their function as conservation reservoirs, these collections would also be useful for reference, enabling work to be carried out on the correct identification and description of stocks, for comparison and evaluation, for propagation and distribution, and for further breeding and research.

A number of locations which offer different growing conditions and management regimes could be used for this purpose, e.g. Local Councils, National Trust Gardens, Educational Establishments, Research Stations and Botanic Gardens. The responsibility for many of these collections could be a very useful function of the twenty or so Provincial Botanic Gardens spread throughout the state.

Much more work is required if we are to properly record cultivars growing in our gardens. A permanent system of dealing with them is necessary if we are to overcome the "ad hoc" treatment they presently receive especially if a more accurate and stable system of naming is to be achieved.

SYNIMA AND THE CORDIER BROTHERS - A NOMENCLATURAL NOTE

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In preparing an account of *Synima* (Sapindaceae) for the forthcoming issue of Austrobaileya, we had cause to consider more closely the name *Synima cordieri* (F. Muell.) Radlk. (*Cupania cordieri* F. Muell.), the name usually accepted for a species of rainforest tree in north eastern Queensland and Papua New Guinea.

When Ferdinand von Mueller described the species in his Fragmenta (Fragm. 9: 93) in 1875, he gave it the name *Cupania Cordierii* which, using various editions of the International Code of Botanical Nomenclature, subsequent authors corrected to *C. cordieri* or *Synima cordieri* when the species is accepted as belonging to Radlkofer's segregate genus *Synima*.

However, Mueller went on to explain in his protologue (p. 94) that the epithet he chose was to honour the Cordier brothers for their various achievements.

"Speciem novam tribuo fratribus Cordier, equitibus legionis honoris, quorum alter ad El Alia Algeriae primum silvulas Eucalyptorum plantavit, et hasce arbores utilissimas pro technologia luculentur ibidem observavit; alter in opore suo "sur les champignons" docte de fungis scripsit".

Article 73.10 of the current ICBN rules that wrong use of the termination of an epithet mentioned in Recommendation 73C.1.,i.e. ones derived from modern personal names, is treated as an orthographic error to be corrected. As more than one person was honoured by Mueller in his name, and their personal name ends in '-er', the genative inflection '-orum' should have been used on the epithet. The name should thus be cited as *Synima cordierorum* (F. Muell.) Radlk.

Report from the Bureau of Flora and Fauna

On 7 March, 1985 Dr Rosemary Purdie joined the Flora Section as Editorial Assistant. For the first time, the Flora Section has a complement of five permanent staff.

Volume 25 of the Flora of Australia has been completed and is now with the publisher. Work is proceeding steadily on Volume 46 (the next in line for publication and the first on monocots) as well as a number of manuscripts already in hand for Volumes 3, 18, 19 and 45.

The second and third publications in the Flora and Fauna series - Handbook of the Liverworts of Southern Australia by George Scott and Phytogeography of Eucalyptus by Malcolm Gill, Lee Belbin and George Chippendale - are both in press.

Roger Hnatiuk
Assistant Director (Flora)

Chapter News

PERTH CHAPTER

The annual general meeting of the Perth Chapter was held at the Western Australian Herbarium on 27 March, 1985. The 1984 convener (T.D. Macfarlane, W.A. Herbarium) and committee (S.D. Hopper, W.A. Wildlife Research Centre; W.A. Loneragan, Botany Dept., University of W.A.; B.L. Rye, W.A. Herbarium) were re-elected.

The meeting concluded with a talk by Dr Steve Hopper entitled "Allozyme variation and gene pool conservation in isolated populations of jarrah and some related species". Using preliminary interpretations of an allozyme study recently conducted jointly with G.F. Moran during a stay in Canberra, Steve compared the allozymic variation found in populations of jarrah with that in highly restricted populations of some rare related eucalypt species. The problems encountered in inferring breeding systems and the implications for attempting to adequately conserve the gene pools of all the species were discussed.

T.D. Macfarlane

MELBOURNE CHAPTER

Barry Conn (MEL) visited the Watut/Wafi area of Papua New Guinea from the 9 February until 7 March, 1985. Collections from the middle to upper catchment area of the Watut River (altitude 1000-2200 m) were made. A preliminary ecological study of the Wafi river area (lower Watut River - altitude 200-700 m) was also undertaken in a mixed semi-evergreen forest of *Anisoptera thurifera* and *Protium macgregorii*. The expedition was jointly supported by the Miss M.M. Gibson Trust, CRA Limited, Division of Botany (LAE), P.N.G. Forestry College (Bulolo), National Herbarium of Victoria (MEL) and the Royal Botanic Gardens, South Yarra.

From 26-28 March, David Albrecht (MEL) took part in a rare plant survey with N.S.W. National Parks Service to the Southern Tablelands of New South Wales. Representatives from CANB, CBG and NSW were also involved. A number of rare species and several undescribed species were collected. The areas studied included Nalbaugh, Nungatta, Wadbilliga and Deua National Parks.

On 2 May, Michael Looker (MEL) spoke on the plant cultivar survey which has been undertaken at the Royal Botanic Gardens, Melbourne. The meeting was well attended and there was a great deal of discussion about the problems encountered when dealing with cultivars. An article by Michael, to be published in the Age newspaper, is reproduced in this issue.

On 6 June, Barry Conn presented a talk on 'The Purari - a tropical environment of a high rainfall river basin', of Papua New Guinea. This talk reviewed the multidisciplinary study of this river system which took place from the early 1970's until 1982/83.

Barry Conn

CANBERRA CHAPTER

At a General Meeting on 2 April, Alex George was elected Convenor, Ian Telford Secretary and George Chippendale Committee Member for the next term. We are very grateful to Helen Hewson for maintaining the momentum of the Chapter during her two terms of office.

At the same meeting, Dr Elizabeth Truswell, Bureau of Mineral Resources, Canberra, spoke on 'The initial radiation and rise to dominance of the Angiosperms'.

On 28 May a meeting was held to discuss Effective Publication. Roger Hnatiuk, a member of the IAPT Committee on Effective Publication, led the discussion.

Alex George
Convenor

A CLARIFICATION OF THE CORRECT CITATION OF NSW SPECIMENS

The numbering of specimens in the NSW series is now restricted to those collections originating from NSW which do not have a collector's number. These numbers should be regarded as a substitute for collectors' numbers and should appear on the label after the collector's name. Like collectors' numbers, they identify the whole collection, and are transcribed onto duplicates; thus they are not sheet numbers restricted to specimens located at NSW. Where a collector's number is available, no other number is now being assigned.

The correct citation is:

(1) Where a collector's number is available, that number should be cited, even if the specimen also bears a NSW number, e.g. Coveny 1394, Nov. 1975 (NSW).

(2) Where there is no collector's number the NSW number should be cited in the position of a collection number, e.g. Constable NSW 54361, May 1961 (NSW).

When specimens are sent on loan, there will be found a pencilled loan number in the bottom left hand corner on the outside of each specimen folder. This is a temporary number, to facilitate the checking of loans, and is not to be used in citation.

David Bedford

CARPOBROTUS - ANYBODY INTERESTED?

During the last few years, I have been investigating the role of plants in the formation and stabilization of coastal dunes. While *Carpobrotus* species generally play a subsidiary role in these processes, they may achieve local dominance.

Last spring I decided to try and unravel the identities of the taxa found along the coast of southern N.S.W. and eastern Victoria. I returned with 30 collections which included pickled flowers and (mostly young) fruits, descriptions of characters which would be lost through drying, and many photographs. In the field two or more entities were often recognizable at any one locality. However, when I sorted out the collections, visual comparison led me to conclude that they probably all belong to one quite variable species. This impression was corroborated by the remark of J. Venning in the then just published Volume 4 of Flora of Australia: "Recent collections have extended the known ranges of (the indigenous) species and reduced the morphological disjunctions between them ... Without a good selection of fresh material, however, it has not been possible to revise the status of these species".

As I am unable to spend more time on this taxonomic problem, I am writing to ask if any reader of this Newsletter could use the duplicates of my collections or advise me whether somebody, here or overseas, would be interested in this material.

Petrus C. Heyligers
CSIRO Division of Water & Land Resources, G.P.O. Box 1666, CANBERRA. A.C.T. 2601

NYMPHOIDES SEARCH IN SOUTH AUSTRALIA

Surprisingly, the only two records of *Nymphoides crenata* (Menyanthaceae) for South Australia are pre-1925, namely from Cordillo Downs in the Lake Eyre Basin (May 1924) and from the Murray River, c. 32 km south of Morgan (Nov. 1913). Has this species disappeared from the State or have field workers just ceased to collect it? Occurrences in the Lake Eyre Basin would probably be infrequent and dependent on major rains or flooding but occurrences along the Murray River and its billabongs should be more regular. The species is found along the Murray in Victoria.

Both AD and I would welcome any present day collections of *N. crenata* from South Australia. Could collectors please watch for it?

Helen I. Aston (MEL)

FOR "... LADIES, GENTLEMEN AND GARDENERS ..."

Since its first issue in 1787, "Curtis' Botanical Magazine" has been held in high esteem by botanists and horticulturists, both amateurs and professionals. Not only a mine of information and a source of aesthetic delight, its volumes are proving themselves to be a good long-term investment, as a recent sale is reported to have realized UK£40,000 for a set. Originally a private venture, its copyright passed to the Royal Horticultural Society in 1921. Its connections with the Royal Botanic Gardens, Kew, were strong since W.J. Hooker, its editor since 1827, was appointed as the first director of that famous institution in 1841. Traditionally the editorship more or less remained with his successors, although other 'Kewites' have also acted in that capacity. In 1971 Kew acquired the copyright to the Magazine through its Bentham-Moxon Trust and, initially with support of the Stanley Smith Horticultural Trust, continued its publication until 1983. After 184 volumes, produced over a period of almost two centuries, the familiar name was finally abandoned. That it happened just before the transfer of the Kew establishment from a department in the British public service to the more independent status of a semi-government body may not have been entirely accidental.

The Magazine is dead: long live the Magazine! The first volume of a new series was completed during 1984, and a vigorous campaign has been launched recently by its publishing partners, Collingridge, with a view to enlarging its readership. The following information is gleaned from its covers:

"The Kew Magazine, which incorporates Curtis's Botanical Magazine founded in 1787, has, in addition, features of special interest to botanists and horticulturists, plant ecologists and those with a special interest in botanical illustration, so providing an international forum for all these interests."

"This magazine is published four times a year, in February, May, August and November. The annual subscription price is UK£30, overseas £35 ($45 US). Orders, remittances and subscription enquiries should be sent to Marston Book Services Limited, 108 Cowley Road, Oxford, England."

The frequency of the new journal has doubled compared with that of its predecessor, whereas the quality of its artwork and printing is at least as

good. The traditional format of artistic, though accurate, illustrations of ornamental plants, in black and white as well as in colour and accompanied by informative descriptions, is continued as its main feature. It is intended that, from time to time, special attention will be given to particular groups, e.g. *Arisaema* spp. (Araceae) as in the second issue and *Echinocereus* spp. (Cactaceae) as in the fourth. The Magazine is augmented with articles on conservation and subjects of ecological, floristic, horticultural and historical interest, as well as travelogues. There are also short notes, book reviews, readers' letters and announcements of events. All this should indeed widen its appeal, particularly to the serious amateur who does not have regular access to a well-stocked specialized library. Besides, it will no doubt remind many professionals that they will always remain 'amateurs' at heart.

Of the subjects included so far, the following are of particular interest to Australians:

1. A reproduction of *Clianthus formosus* on the front cover of the first issue, after a watercolour by Walter Hood Finch, originally published in "Curtis's" in 1958;

2. An original illustration of *Trimezia sincorana* from Brazil by 'our' Margaret Stones in the first issue;

3. An article entitled "Underground Orchids of Australia" by 'our' Mark Clements and Kew's Phillip Cribb in the second issue;

4. "Road House on the Archer River", a travelogue by Phillip Cribb, who joined an Australian Orchid Foundation expedition through Cape York Peninsula, in the third issue.

It should be realized, however, that the coverage of the Magazine is a world-wide one. Those who restrict their interests to native plants, like many Australians nowadays, may not find its contents sufficiently topical. As far as private subscriptions are concerned, its antipodean market may be somewhat restricted as a consequence of such local trends. Besides, its price, although quite reasonable by today's standards, could be a disincentive because of our much devalued dollar. There is no doubt, however, that "The Kew Magazine" is a must for botanical and horticultural establishments, whether engaged in commerce, education or research, also in our part of the world. As well, there are bound to be some more traditional 'gardeners', whose interests could perhaps be catered for through our public library systems.

Andrew Kanis

Book Review

A Biology of Acacias: T.R. New, Oxford University Press in association with La Trobe University Press, Melbourne. 1984. 153 pp.

An odd little book. All too rare are attempts at covering the biology of large (or small) genera in a comprehensive way. A biology of *Acacia* is obviously of special interest in Australia and one would hope it might stimulate other authors along similar lines. T.R. New, entomologist/ecologist, has compiled a hundred pages of information in 5 main chapters.

1. Classification and phylogeny;
2. Ecology;
3. Acacias and man;
4. Acacias and arthropods;
5. Acacias and other organisms

then follow 3 appendices which consist of the Bentham, Vassal and Pedley, and Pedley subdivisions of the genus. For some peculiar reason these are presented in a formal Latin form which will certainly reduce their use to the general reader. After this is an index of species names used in the volume but this then attributes names to the divisions of the Bentham classification. A substantial bibliography of some 700 entries follows purporting to cover 1982, but it excludes the excellent handbook by D.J.E. Whibley which, with its maps, drawings and photos of 97 species, surely ranks in a general bibliography amongst essentials like the intestinal synthesis of folic acid and biotin in the guinea pig. This is followed by another index, this time of scientific names, excluding *Acacia*. So if you want to find out about glands or nectaries you look up 'foliage' in the table of contents and hope for the best.

Obviously, the book contains much information on *Acacia* in a single volume, but its organisation could be vastly improved if only with a competent index or some cross indexing of the bibliography under an array of subjects. It is a pity such an excellent objective was not better advised.

D.E. Symon

ESA - ASBS SYMPOSIUM

ECOLOGY OF THE AUSTRALIAN WET TROPICS

Brisbane, August 1986

Planning for the Symposium on the Ecology of the Australian Wet Tropics to be held at the University of Queensland on 25-27 August 1986 is well underway.

Accomodation during the Symposium will be available at colleges within the University.

The registration fee has been set at $80 and $35 for full-time students.

The Symposium dinner will be held on Monday (25 August) evening.

The ASBS General Meeting is planned for 4 pm on Tuesday 26 August. The Nancy Burbidge Memorial Lecture will be delivered at 8.15 pm that evening.

The theme for the ASBS Plant Systematics session (Tuesday 26 August) is 'Evolution and Systematics of Australia's Tropical Flora'. Intending contributors to this session should contact Rod Henderson, Queensland Herbarium, Meiers Road, Indooroopilly, Q 4068 Ph. (07) 377 9317.

A pre-symposium field trip to the Atherton Tableland has been organised. It will commence at Cairns airport on Tuesday 19 August. Accomodation for the five nights will be at the Tinaroo National Fitness Camp (15 km NE of Atherton). The field trip will terminate at Cairns airport in time to catch Sunday's return flight to Brisbane. Please note that numbers will be limited to 38 and that a minimum number of 20 is required.

Estimated cost for the 6 days and 5 nights including accomodation, meals and transport, will be $200.

A post-symposium field trip to Fraser Island is planned. Details should be available for inclusion in the next Newsletter.

The Society

The Australian Systematic Botany Society is an 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 published. Contributions should be sent to the Editor at the address given below, preferably typed in duplicate and double-spaced. All items incorporated in the Newsletter will be duly acknowledged. Authors are alone responsible for the views expressed. The deadline for contributions is the last day of February, May, August and November.

Notes

(1) The deadline for the next Newsletter is 31st August.

(2) ASBS Annual Membership is $13 (Aust.) if paid by 31st March, $15 thereafter. Students (full-time) $10. Please remit to the Treasurer.

(3) Advertising space is available for products or services of interest to ASBS members. Current rates are $30 per full page, $15 per half page. Contact the Newsletter Editor for further information.

Mailing List

All address changes should be sent to the Treasurer or the Editor.

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