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EDITORIAL

Our apologies to Paul Hattersley and all of those readers left scratching their heads at the bottom of pages 15 & 20 of the last *Newsletter* (see Erratum below). Flushed with a sense of achievement and relief, we had hardly returned from mailing the last edition when Peter Wilson (who can spot a typo at 20 paces) appeared, Issue 67 in hand, demanding clarification.

This is our third issue of the *Newsletter*, and as the materials and methods become more familiar to us it is definitely getting easier to produce each issue. We would therefore like to offer the following general guidelines for contributors.

The stated deadline for contributions is the last day of the month prior to publication. We have to strictly apply this deadline to large contributions (more than two typed pages, say), because it becomes extremely difficult to re-do the layout to fit these longer contributions in. It also has to be applied to those contributions appearing in the Articles or Commentary sections. This is because they appear in the first half of the *Newsletter*, and we therefore have to re-do a large part of the layout to accommodate late contributions.

Also, if the contribution is received early enough, then there is usually time for us to send the author a print-out of the final version, so that they can proof-read and/or amend it. This is definitely an offer worth accepting, especially if we have had to do the typing.

Smaller contributions, especially those appearing in the Reports or Notices sections, can usually be accepted during the first two weeks of the month of publication, but we would (for obvious reasons) prefer people not to make a habit of leaving it that late. This especially applies to the Council, some of whom seem to believe that these guidelines don't apply to them.

At the moment, the most common method for receiving contributions is by fax during the first ten days **after** the deadline. While this is presumably an attempt by the authors to make sure that the contributions make it in time, it also means that we have to re-type them from very poor quality copy. Don't forget that it is easier (for us) and cheaper (for the Society) if contributions (especially the longer ones) are submitted on a computer disk.

We will accept book reviews with gratitude at any time. To maintain the goodwill of the book publishers (and the credibility of the Society), we need to publish these reviews as soon as possible after receiving the free review copies. Unfortunately, there are still reviews outstanding from last year. Furthermore, any ASBS member who spots a book of potential interest to other members and/or would like to review a particular book, then please contact us and we will try to arrange a review copy for you.

Finally, in consideration for the long-suffering author, we offer the following barbs from the pen of Samuel Clemens (who hid his writings under the name Mark Twain):-

How often we recall with regret, that Napoleon once shot at a magazine editor and missed him and killed a publisher. But we remember with charity, that his intentions were good.

- from a letter to Henry Alden (whoever he was), 11 November 1906

I am not the editor of a newspaper and shall always try to do right and be good, so that God will not make me one.

- *Galaxy* magazine, 1870

Barbara Wiecek
David Morrison

Erratum

In the last issue of the *Newsletter*, an old version of two of the pages (page 16 and page 20) in Paul Hattersley's article were inadvertently substituted for the corrected final version. Consequently, parts of two sentences were left out.

The sentence at the bottom of page 15 should read:-

In any event, Chaloner's answer to the question of which names should be put on a list of fossil NCU, is to include them all.

The final sentence on page 20 should read:-

After 1 Jan. 1995, when not all the conditions of valid publication have been met prior to registration, the name must be resubmitted for registration once these conditions have been met.

ARTICLES

Cleland Memories

Introduction

The May meeting of the Adelaide Chapter was an evening commemorating Prof. Sir John B. Cleland, who died 20 years ago. Cleland chose medicine for his professional career (specializing in pathology and public health), but in addition he made notable contributions to botany, ornithology, anthropology, and conservation, mainly in South Australia.

The main presentation of the evening was by his close friend, the medico-naturalist Dr Eric Sims; and a transcript of this talk is presented below. The meeting was introduced by an *ad hoc* telephone message sent to the meeting via the convener (Dr Bill Barker) by Dr Hansjoërg Eichler who, as former head (Keeper) of the State Herbarium of South Australia, dealt much with Prof. Cleland; and this contribution (somewhat amended) is also reproduced below.

Cleland's daughter the ornithologist Joan Paton, his grand-daughter the biochemist Barbara Paton, and his friend the medico-natural scientist Dr Ron Southcott also spoke briefly. Joan Paton played a tape made in the 1960s by the family, which included Cleland talking about the Aboriginal trade in *Duboisia* (tobacco) from central Australia as far as Port Augusta, despite a nearby stand that the local Aborigines never used.

More information about J.B. Cleland can be found in the following publications:-

Eardley, C.M., Hansford, C.G., Campbell, T.D. (1959) John Burton Cleland — A tribute on his eightieth birthday. *Trans. Roy. Soc. S. Aust.* **82:** 339-344.

Southcott, R.V. (1968) A tribute to John Burton Cleland on his ninetieth birthday. *Med. J. Aust.* **1:** 1097.

Southcott, R.V. (1971) Obituary — John Burton Cleland, Kt., C.B.E., M.D., Ch.M., F.R.A.C.P. 22.vi.1878-11.viii.1971. *Trans. Roy. Soc. S. Aust.* **95:** 242- 247.

Anonymous [E.B. Sims] (1972) Obituary. Sir John Burton Cleland, Kt., C.B.E., M.D., Ch.M., F.R.A.C.P., M.C.P.A. *Pathology* **4:** 159-160.

Simpson, E.R. (1986) *The Clelands of Beaumont.* Beaumont Press.

Twidale, C.R., Tyler, M.J., Davies, M. (eds) (1986) *Ideas and Endeavours. The Natural Sciences in South Australia.* Roy. Soc. S. Aust., Adelaide.

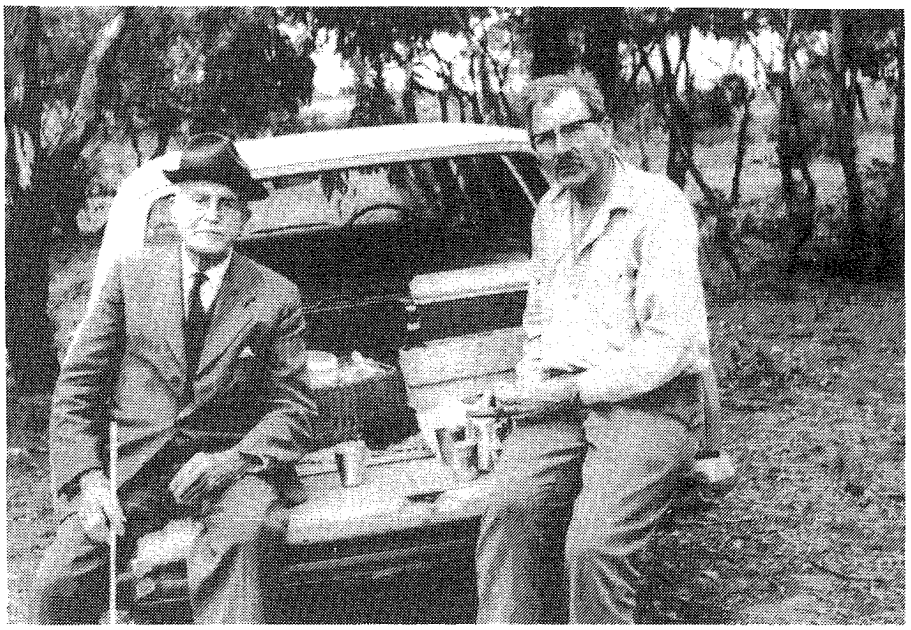
Hansjoërg Eichler

I am sending my greetings to the commemorative J.B. Cleland meeting and, having learned of it only this morning, wish to express my regret that I cannot attend. I am glad that I saw much of J.B. Cleland, and feel greatly privileged that I got to know him rather well. His manners impressed me always as those of a perfect gentlemen.

Prof. Cleland knew the South Australian flora exceptionally well, and with his keen eye and excellent memory it was not surprising that he often picked up unusual plants. I still remember his first determination request shortly after my arrival in Adelaide in November 1955. It concerned the identity of a little annual (only a few cm high), which he had brought back from White's Well at the Head of the Bight with the comment "What is this? I have never seen it and even do not know its family". His ignorance is excused; it turned out to be a rare umbellifer, *Neosciadium glochidiatum* (Benth.) Domin, previously known only from Western Australia and, till then, not represented in any Australian herbarium.

Cleland's contribution to the Adelaide herbarium is immense. Most of his collections were made before the State Herbarium was established. After my arrival, he transferred his collections from his home in batches on numerous visits to AD, as a donation to the University of Adelaide for gradual incorporation into the general herbarium. Previously, he had given many specimens and much information to J.M. Black, who could not have written his *Flora* so well without Cleland's help.

Cleland travelled widely, and especially so within South Australia; he always kept an eye out for plants. His collections were sometimes scraps, but coming at the time that they did (before land clearance, and when few others collected so avidly), they were nevertheless valuable. He loved making "messes" of sedges, gahnias, etc. His manner of pressing was by sitting on his specimens (in envelopes) while bouncing around in the car.



John Cleland (left) and Eric Sims (right) with the Kingswood in the bush about 1969.

Especially noteworthy was his consistent use of the place name and date of collection. This was rarely, if ever, wrong (although labels may have been mixed subsequently in the herbarium), and this minimum of information ensured the value of the collection. Sometimes the locality was difficult to decipher; when I asked him where "Betty's backyard" (the only locality indication) was, he explained smilingly: "Oh, that was in my daughter's garden".

Cleland's observations and activities were important in many areas of natural history and medicine, to which his medical friends Eric Sims and Ron Southcott, and his daughter, will no doubt allude (with their greater knowledge). Of great importance was his concern for conservation. He was ahead of his time. He saw the need to conserve roadsides, though not in vogue then, and small areas, such as Stansbury Scrub. I remember when he enquired about my impressions after I had just returned from a trip to Yorke Peninsula, when I expressed dismay about finding so little native vegetation left. He listened attentively when I mentioned a fragment I saw between Minlaton and Stansbury, and promptly asked me to write a letter about this to the secretary of the National Parks Commission (Mr Hale) so that it be brought to their attention. Cleland, as one of the commissioners, was instrumental in many such conservation efforts.

J.B. Cleland stands out as a great personality, whom I remember with fondness.

Eric Sims

I am pleased to have this opportunity to reminisce about John Burton Cleland; and I am also pleased that a new generation is still interested in him, as I have always thought of him as one of our great citizens, perhaps the last of the all-round naturalists in the Darwinian tradition.

He was born in 1878 and died in 1971, so his lifetime spanned from the pennyfarthing bicycle to the men landing on the moon. His father, William Lennox Cleland, was the medical superintendent of the Parkside Mental Hospital (now Glenside) from 1878-1913, so J.B.C.'s early years were spent in a house in the grounds there, and he had many interesting memories of the place. In particular, he remembered the several thousand mulberry trees planted there to feed the silkworms that the patients had in a magnanarie, the place where the silkworms were reared in sufficient numbers to make an audible munching noise!

J.B.C.'s father was himself interested in natural history, visiting amongst other places the Gawler Ranges on a plant-collecting expedition, during which he found the mulga fern that was named *Cheilanthes clelandii* by Ferdinand von Mueller and Ralph Tate after him in 1888 (although

unhappily it was later found to have been described as *C. sieberi* 40 years previously). William was a Fellow of the Royal Society of South Australia for 37 years, and enrolled son John at the age of 17. He had always encouraged J.B.C.'s interest in natural history, one important stimulus being the gift of M.C. Cooke's *Handbook of Australian Fungi* (1892) for his 14th birthday. The 19th century was, of course, the heyday of collecting, and walking, both of which J.B.C. indulged to the full.

He kept a diary from his boyhood years onwards; and he read omnivorously, collecting favourite excerpts from many sources, which he later published in several series under the title *Acceptable Words*. One such collection of quotations was published in his honour towards the end of his days, by the honorary staff of the Adelaide Children's Hospital; and I have copies of that publication for you tonight.* Although it probably dates from J.B.C.'s later medical association with Parkside, there is one legacy of his there in the form of a fine *Acacia salicina*, the Broughton willow, overhanging the fence on Greenhill Road, nearly opposite the corner of Cleland Avenue. He grew this, I think, from seed, and it is now a living monument to him.

Cleland started medicine at the University of Adelaide in 1895, but the notorious Adelaide Hospital row in 1898 forced all of the medical undergraduates in the clinical years to go to either Melbourne or Sydney to complete their course. On the advice of Dr R.H. Pulleine, who was also a medical naturalist with a special interest in spiders, J.B.C. elected to go to Sydney, where Pulleine told him the opportunities for field naturalizing were better than in Melbourne.

He usually returned to Adelaide during the university vacations, having to go through customs barriers at the borders in those last years just before federation; and, in characteristic fashion, he explored the vegetation along the railway line whenever the train stopped long enough for him to do so. On such an occasion he found a new *Leucopogon*, which I presume is the one now named after him. In those years he also started a collection of bird skins, which was later of great use to Gregory Matthews when he was preparing his monumental *Birds of Australia*. Needless to say, although the birds had to be shot to get their skins, J.B.C. justified this by also dissecting the birds for any parasitic infestation and to determine the food residues in their stomachs. These studies in due course led to the publications in appropriate journals, one of which I have here tonight as an example.

After his graduation in 1900, followed by a period as a house officer at the Royal Prince Alfred Hospital in Sydney, he became assistant pathologist. During this time he was involved in a bubonic plague outbreak, in which 100 people died. This was, as usual, spread by fleas from rats, and it started close to the waterfront in the Rocks area. He studied this epidemic by investigating the rats and their parasites, and by post-mortems on the victims (done, one is now horrified to contemplate, without gloves).

Then, in 1903, J.B.C. did post-graduate studies overseas, in the United Kingdom. In due course he returned, in 1905, to Western Australia, to the position of Government Bacteriologist and Pathologist. Whilst there, in 1907, he did his famous trip to the north-west to investigate a herd of camels, which had just been landed at Port Hedland, for their possible infection with surra, a trypanosome disease that could have been disastrous for Australian animal husbandry if it was introduced. He actually found several infected camels, which were destroyed; but, whilst he had the opportunity, he also studied the diurnal temperature variation in camels, reporting his findings in a paper that was quite a pioneer publication of its kind.

In 1909, Cleland joined the Bureau of Microbiology in Sydney, where one of his notable achievements was the proof that dengue fever was transmitted by the mosquito *Aedes aegypti*. He established this by going to Murwillumbah, in northern New South Wales, where there was an outbreak in 1916. He collected mosquitoes in the room of a patient, and confined them in a container of flywire; but, as the mosquitoes got thinner after digesting the blood meal that they already had in their stomachs, they began to escape through the holes in the wire. Accordingly, J.B.C. inserted his arm to get them fat again on his own blood, and inevitably, a few days later, he developed dengue fever. Finally, he returned, in 1920, to Adelaide, as the Marks Professor of Pathology and Bacteriology in the University of Adelaide.

My first contact with J.B.C. was as a student in 1936, when I reached the fourth year of my course and consequently had to study pathology. We all regarded the "Old Prof." with great respect and affection, and enjoyed his teaching sessions, which were conducted informally in the lab. with us sitting at our microscopes. But perhaps his main

*The members present gratefully accepted copies of the publication.

teaching was in the autopsy room, where he was in his element. By the end of his career he had personally done over 7,000 post-mortems, dictating his findings to generations of student scribes for recording in the P.M. book, with quite a flair for showmanship; and I particularly remember his getting one of us to light a jet of gas that spurted from some body cavity or other when he first made his incision. He later told me that he had a recurring nightmare in which he would open a cadaver and find the heart still beating. He then went on to tell me a macabre story about such an episode, so vividly that he almost convinced me that it had happened to him.

During his professional years J.B.C. participated in a number of university anthropological expeditions to the north of the state, which gave him the opportunities for plant collection in remote places. I remember him telling me his first experience of the gidgee, *Acacia cambagei* (which well deserves its popular name of stinking wattle), when he mistakenly believed that the smell was arising from another passenger in the vehicle having had a regrettable accident in his pants.

He was a prime mover in the Flora and Fauna Handbook Series, which started in the early 1920s*, and, of course contributed his book on *The Toadstools and Mushrooms and Other Larger Fungi of South Australia* (in two parts, 1934-1935) to that series. He also collected many of the specimens for John M. Black's *Flora of South Australia* — and not always in his press. If necessary, he sat on them between newspapers in the car until a convenient moment when he could transfer them to the press, and he used this technique at times later when out with me (but he did stress that it was only an emergency measure).

Although the medical students recognized J.B.C.'s gentleness and wide-ranging knowledge, I did not fully appreciate him until some years after graduation. He had just retired from the University of Adelaide, which he did in 1948, at the age of 70. I was inspired to visit him at his home, seeking information of some sort, possibly about the history of Beaumont (the suburb where he lived) — in addition to his own vast store of knowledge of all sorts, he also had a wonderful library of Australiana and natural history. That visit soon led to saturday outings together, when we travelled quite far afield to botanize, and then to periodic longer holidays exploring the outback. I knew very little botany at first, and he was patience itself in teaching me.

As we drove along he would do what he called "botanical traverses", recording the mileage at the start and then at intervals as I sang it out from the odometer, while he noted down the significant vegetation changes along the way — always on the backs of previously-used paper, which was often old student examination papers. These were then typed by my secretary, and lodged by him in (I think) some government department — they could even be somewhere in this herbarium.* Sometimes we attached to the typescript the Shell maps on which our routes had been marked. It was a good lesson in continuous observation. I happen still to have a typical example of such a traverse in his own fair hand to show you tonight.** Cleland was also responsible for the notices about Wayside Vegetation that one still sees around the State here and there, and he was a consistent campaigner for its preservation.

Our longer explorations included the Murray lands, western New South Wales, the Flinders Ranges, north from Leigh Creek, Kangaroo Island, the Eyre and Yorke Peninsulas, and western Victoria around Nelson. We usually shared a bedroom in homesteads or hotels, which gave us ample opportunities for my continuing education. Then, each morning long before breakfast, we would get up and explore the roadsides or nearby bush on foot — no opportunity for botanizing was ever missed!

On a Murray trip I discovered that *Muehlenbeckia cunninghamii* (the "Lignum" of early explorers, because it was originally "Polygonum") had male flowers on one bush and female flowers on the other. This intrigued me, but J.B.C. merely suggested that I check in Black; and when I reported, somewhat crestfallen, that it was well-known to be dioecious (a new phenomenon for me then) he smiled gently and said: "Yes, but wasn't it nice to find out for yourself?" On that same expedition, when we were away from the river in the mallee country, he demonstrated how to get water from mallee roots, and also introduced me to the stone-making fungus *Polyporus basilapidoides*, with its false sclerotium of hyphae and sand. When I reported to him that I had seen a polpore coming out of the sand under a mallee tree

*This is described in more detail in Cleland, J.B. (1948) Handbooks of the Flora and Fauna of South Australia. *Australian Herbarium News* **2**: 10-13.

*A number are housed in the library of the Waite Agricultural Research Institute.

**A transcript of one these traverses is included at the end of the article.

he said: "Don't pick it, dig it up entirely because it might be a rare one." It remains the only one I have ever seen.

Cleland, of course, was always interested in fungi, and introduced me to many fascinating species, including *Pleurotus lampas* (which thereafter I often had in my bedroom, reflecting its light in the mirror on the dressing table at night), and various extraordinary gasteromycetes such as *Clathrus* (which expands out of its "egg" into a lattice-like sphere when you dig it up), stink horns, birds nest fungi (with their packets of peridioles in splash cups), etc. He also showed me *Septobasidium*, which is a very curious fungus indeed, growing in association with a gall-making insect on *Leptospermum* species in a mysterious semi-parasitic semi-symbiotic relationship; but he did not happen to mention that it was named after himself, *S. clelandii*.

When we were staying at Nelson to botanize in the forest there, he was invited to give a talk to the children in the little one-teacher school, in preparation for which we gathered quite a variety of fungi in the forest before-hand, plus a large bag of cream biscuits from the local store. Even the small children were enchanted by his talk; and they were particularly impressed when he demonstrated how to write on paper with the "ink" from *Coprinus comatus*, the so-called "inky caps" that deliquesce quite quickly into a black sludge during the day after their emergence. If picked early before this happens they are edible, but they are supposed to have in them an antabuse-like substance that makes it risky to drink alcohol with them. Needless to say, this allegation was a challenge to the Old Prof., so we duly tried some riesling with our fried young *Coprinus* caps, with no ill effects.

Our lunches in the bush were peripatetic events, both of us wandering around with a sandwich in hand; and if I wandered off on my own, his parting instruction always was: "Bring back anything different." On one such occasion I found a new fungus, and asked if I could eat it; to which he replied: "Yes, but leave some by the body." His scientific zeal was such that any experiment, however disastrous, should add to knowledge. I have told this story elsewhere at quite a large gathering, and have even had it told back to me later as a new piece of the Cleland legend.

On another occasion, we were exploring the roadside vegetation between Finnis and Milang. I came back from my wander with a piece of a rather succulent shrub new to me, which he immediately recognized as *Acacia pinguifolia*, a fairly-recently described and quite rare species. J.B.C. decided that it had to be protected at all costs, so he started an agitation, which resulted in our returning a few weeks later to that roadside with a flotilla of cars, containing the minister for agriculture, members of the Strathalbyn District Council, the district clerk, and a television crew. It was quite a day, and the whole exercise did alert the local residents to the importance of conservation. It certainly was a welcome change in his daily duties for the minister!*

J.B.C.'s vast knowledge of the State's flora meant that he knew what plants to expect where; and he also knew what plants we had already seen together. Thus, when one day I came up to him and said: "I have just seen a blue flower that is new to me", he just said: "That will be *Cheiranthera*", and indeed it was. He could remember where he had found particular plants years before; and he impressed me greatly when we were in the Gawler Ranges, and he said: "We are approaching a gate where I once found *Cassia pleurocarpa*", and when we got to the gate there it was.

He was constantly observing. When he visited Mareeba Babies Hospital at Woodville professionally, he would explore the plants along the nearby railway line; and there he found *Senecio cunninghamii*, which was quite unexpected. He explored cemeteries as well, and found *Lomandra densiflora* amongst the graves at West Terrace, where it had previously been regarded as just a tussocky grass; and walking along North Terrace he noted all of the weeds, including a healthy African daisy in the gutter of the museum. He taught me not to despise weeds. He boasted that he had 110 different species in his garden at Beaumont; and, in our wandering around that garden, on many occasions he showed me how interesting purslane (*Portulaca oleracea*) and toad flax (*Kickxia* sp.), for instance, could be.

Cleland was also constantly pondering about phenomena such as the change of colour of the Blue Lake at Mount Gambier. He suggested that it was due to the fluorescent substance in the leaves of *Bursaria spinosa*, which might fall into the lake at the appropriate time of the year. I could not talk him out of this theory, even when I pointed out that *Bursaria* did not occur around the lake, and that a non-botanical explanation would have to be sought.

He became interested at one stage in tracing the whereabouts of the desert lime (*Eremocitrus glauca*), which Black said occurred only in a small

*Cleland was 86 at the time, and yet he could still command attention from the politicians at that age.

John Cleland (centre), the then Minister of Agriculture, David Brookman (right), and a member of the Strathalbyn District Counncil (left) studying the population of *Acacia pinguifolia*.

area near Carrieton. The Old Prof., in his wisdom, suggested that I write to the postmaster at Carrieton to ask if we could be put in touch with any local landowner who might be able to help us; and, to my surprise, the postmaster very obligingly answered my letter, suggesting that we contact Bill Shephard of Yackara Station, out in the ranges between Carrieton and Hawker. This led to a number of visits to Yackara, and we finally found the *Eremocitrus* in The Horseshoe, towards Mookra Tower. We also saw many other things new to me, such as *Geococcus pusillus*, the native jasmine, etc. As you can gather, that chance acquaintance with hospitable Bill Shephard ripened into a friendship, but unhappily he is now deceased.

My children joined us on many expeditions in later years, and J.B.C. used to entertain them with songs and recitations from his own childhood. He also told them how his mother had tempted him to eat boiled eggs by adding gorse flowers to the water in which they were boiled, to make the white eggs an attractive yellow colour. Naturally, we performed this experiment at home later to prove the point.

Another intriguing memory is his account of a paddleboat excursion on the Murray, undertaken by a group of field naturalists earlier in the century, when he saw against the setting sun the bald head of Dr Angas Johnson apparently growing a good fuzz of new hair. He then realized that those "new hairs" were anopheline mosquitoes, with their bodies held vertically in their characteristic was as they feed.

We heard a typical anecdote of the Old Prof. later from a Western Australian friend, who told us that when J.B.C. was visiting relatives in Esperance, he had once bought a one-way ticket to the first station north on the train line to Norseman. No-one had ever been known to buy such a ticket before, but he did so in order to walk back the 50 miles botanizing along the way; and he is credited with finding five new species during that walk.

Cleland had what he liked to call the *cacoëthes scribendi*, the evil habit of writing; and he certainly wrote an incredible number of papers over his long life for various publications, such as the medical journals, the *South Australian Naturalist*, and the *Transactions of the Royal Society of South Australia*. These reflected his wide range of interests; but the botanical ones included a series on the Encounter Bay flora, the Kangaroo Island flora, and the original flora of the Adelaide plains. Some publications were shared with J.M. Black, and at least one was shared with Charles Fenner. Various observations about birds appeared in the *Emu*; and he continued to dictate articles for the *South Australian Naturalist* even during the last three years of his life, when he was blind.

In spite of that blindness, he could often visualize where we were at any given moment on our saturday jaunts, with some input from me, because he had walked and cycled many of those ways in the years gone by. When sympathized with by one of my friends about his blindness on one of our outings one saturday, he gently replied, without a trace of bitterness: "Yes, but I have a lot to think about." And indeed he did.

Cleland Traverse

Tarlee –> Burra –> Oakbank Station.

20/9/68.

Leave Tarlee.

451.7 Grassy fields. Soursobs.
54.5 Giles Corner. Turn off to Burra.
Still grassy fields. Occasional trees
56.8 Tall Eucalypts with grass
57.5 Grass by wayside. Occasional Ac. pycnantha (Wattle)
Planted sugar gums.
59.1 Riverton
60. Avenue of sugar-gums by roadside
Cross railway line. Grassy fields still
61.3 Grass and fennel. Occasional Wattles by roadside
64.6 Planted Eucalypts and pines. Grass.
65.6 Saddleworth (32 m. to Burra)
Marsh-mallow. Barley grass
Still grassy fields with occasional trees, mostly planted.
Low grassy hills with Occasional trees
More trees on the hilly rises.
71.4 Manoora Cross railway line.
Grassy rises as before. Hardly a tree. Occasional Wattle
77.5 Grassy still. Australian shrubs on left planted by
the wayside. Burra hills on right.
Grassy, hardly a tree.
Black Springs 2 miles on right
83. Clare road comes in on left
Enter Dist. C. of Burra
83.9 Lake on right. Hilly rises, grassy, hardly a tree.
87. Grass. Pipe-line (small pipes)
Bulbinopsis, Ac. rotundifolia, Swainsona, Stackhousia
(slightly yellow flowers, no scent). Running parallel with a
larger pipeline.
88.6 Tanks. Grassy fields
92.4 Railway on left. Still grassy, hardly a tree, occasional
Wattle.
96.2 Now running east.
Grassy as before. More hilly.
Planted pines by road.
98.3 Burra outskirts.

Comment - From Tarlee to the Burra no native vegetation
left on roadside except for a few wattles and occasional
liliaceous plants etc.
No remnants of the original scrub visible from the
road.

Burra –> Oakbank Station (114 miles)

98.6 Leave Burra
Cross Burra Creek
Grassy hills. No trees (prob. all cut for copper mines)
Iron grass tufts (Lomandra effusa) on the hills.
01 Road to N. Burra comes in on left.
Ploughed fields and grassy.
2.2 Turn off to Morgan on right.

5? (or 3) chain road - Kochia(?) bushes and grass flats between low hills. Grassy. No trees

5 Turn off on right to Mongalata.
Nitraria, Chenopods, Asphodel,
Creek on left. Gravel.

7. Cross big creek.

7.7 Main turn off to Mangalata.
Grassy plain with scattered bushes (Chenopods?)
Introduced Crucifers, barley grass by road.
Eucalypts with mallee habit (?Euc. odorata group)
Barley grass, Nitraria and Kochia? with much grass.

11.8 Leave the low hills on to the plain.
Bluebush, Kochia and grass.

14.5 Group of small Eucalypt.
Bushes as before with grass between. Much Asphodelus. Nitraria.
5 chain road. Clumps of trees in the distance, probably tall mallee.
Now hardly a tree in sight in places.
Shrubs more numerous on the country side.

20.2 Gravelly patch. Running beside the Burra range of hills on right.
Crucifers, Composites etc.
Plains slightly undulating. Yellow-tops (Compositae)
Much - (?) Not much Bluebush, Kochia and Yellow-top.
Ac. osswaldii probably.

24.1 Much Yellow-top. Kochia etc.
Bare patches

27.9 Glenora and Kiaora on left
Woolgangie stn. on right.
Very bare round cross-roads.

28.2 Stop. Sisymbrium, Ward's Weed, Medicago denticulata, Yellow-top, Stipa grass, barley grass, Kochias. Almost treeless, occasional distant one.

32.4 Murkaby homestead.
Yellow-top patches again with scattered Kochia.
Kochia becomes more abundant, no Blue bush.
Bare patches

35 Detour on account of road-works, Gate 1, to right, S. of main road.
Atriplex (Pop), Kochia. Herbage between the bushes.

36.2 Droving lane of stakes mark the road

37.2 Gate 2. Bluebush appears.

38. Woolgangie Station. Bluebush, Yellow-top.

38.8 Koomooloo, Gate 3, turn off on right.
Eaten out, low. Large bare patches.
Netting fence and telephone on left.
Bluebush again.

40.8 Clump of Black Oak (Casuarina cristata)
Bluebush.
Gate 4. Heterodendron (Bullock bush)

41.7 Gate 5.
Heterodendron, Ac. osswaldii, Lycium australe, 2 species of Eremophila. Bluebush
Groves and belts of Black-oak between Blue-bush flats with Yellow-top

43.4 Cassia, Bluebush etc, Exocarpos aphylla,
Bullock-bush.

44. Gate 6. Bluebush. Scattered clumps of Black-oak,
Patches with hardly a tree in sight.

Myoporum platycarpum (False Sandal Wood),
Clumps of Black-oak, some dead. Yellow-top.
46.6 Gate 7 (open). Dam on right.
47. Green patch with Nicotiana.
47.6 Lunch
Native Lycium, Scaevola spinescens, Black-oak, Ac. colletioides (Wait-a-while). Helipterum (yellow) Eremophila.
48.4 Gate 8. Nicotiana, Blue-bush flats, etc.
Much Black-oak (many trees dead), Heterodendron, Myoporum.
Blue-bush flats with Helipterum.
50.2 Gate 9. Enter new main road after detour. Ramp.
Take new road to right.
Black-oak etc.
51.4 Grid. Black-oaks etc. with Kochia
52. Grid. Old road again.
Open Black-oak country. Myoporum.
54 In open Black-oak country. Exocarpos aphylla, Bluebush.
54.7 'Run through' instead of grid.
Open tall Black-oak and Blue-bush with shrubs like Exocarpos
58.6 'Run through' In open forest of Black-oaks with Blue-bush
61.1 'Run through'
Black-oak as before Bullock bush.
Exocarpos.
Dense black-oak. Ac. colletioides
62.3 'Run through'.
Oak again.
64.9 Patch without black-oak. Large flowered Senecio.
65.4 'Run through'.
66.4 Gate. Ac. colletioides, Exocarpos.
Black oaks.
68.1 Still open Black-oak and Bluebush
71.9 Gate. Stipa (Spear grass), Nicotiana.
Black-oak country again.
72.8 Lignum depression with Nicotiana
Treeless patches with Bluebush.
74.8 Gate. As before
Large open patches with Stipa.
75.9 'Run through'
Patches of Stipa a mile across.
Homestead.
77.1 Gate (open)
Stipa and Black-oak (much dead)
Patches of open Stipa. Black-oak in scattered clumps.
80.5 Gate
Black-oak and Blue bush
Much stipa
Wide open patches again
84.4 Koonamore Daisy (Erodiophyllum)
Open Stipa
Black-oaks again with Blue bush
84.9 Gate on hinges
Black-oak, Bluebush and shrubs
85.8 Lilydale Gate
Cassia. Black-oak and Bluebush. Koonamore Daisy
88.9 Patches of dense Black-oak.

As before
89.7 Bend in road
Eremophila scoparii. Much Cassia in Black-oak
91. Mallee
Gate out of Lilydale
Black-oak as before. Myoporum.
96.4 Air-strip of Quongdong Station.
Blue-bush and Black-oak. Red-flowered Eremophila
97.9 Open gate
99.1 Quondong Station.
Blue-bush and Black-oak.
Enter Oakbank.
01.5 Gate
Open Stipa, Bluebush, Black-oak, etc.
Pools of water on the road (thunder shower)
Much open country.
10.2 Gate
Very open.
16.1 Oakbank homestead.

Three Composites formed extensive yellow patches (Craspedia pleiocephala, Helipterum moschatum and H. variable) each in relatively pure stands. Erodiophyllum elderi was seen on Lilydale & (subsequently) on Oakvale. The introduced Blue Pimpernel (*Anagallis arvensis) was very abundant in dam drains at Oakbank, as was also native flax (Linum marginale). The Sow thistles seemed more dissected than those near Adelaide

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Domin's Australian grass types come to light

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Introduction

In a previous note in this *Newsletter*, Bryan Simon (1987) drew attention to his difficulties in locating a number of types of Australian grass taxa named by Karel Domin (1915 and other publications), including special problems with *Aristida*. Enquiries made of the Director of the Botanical Department, National Museum in Prague (PR), where Domin's Australian collections are housed (Kanis, 1977), had yielded negative results, yet at least some of the types concerned had been seen in the 1960s. Consequently, I enquired again about these specimens while at PR in August 1990 during my term as Australian Botanical Liaison Officer.

Domin's Types

A few months before my visit, the communist government of Czechoslovakia had fallen and was subsequently replaced by an elected non-communist government. Also, about this time a new head of the Botanical Department, Dr J. Chrtek, had been appointed. My letter concerning my visit had not been received when I arrived, but in spite of this I was met with great kindness. Dr Chrtek was not familiar with the Domin collection or its arrangement, although everyone knew that it was kept separate and filled a number of large cupboards in an office used as a mounting room. After I had explained the problem with the grass types, it was the work of only a few minutes to ascertain the

arrangement of the specimens and to explore the grass section.

At the end of the Domin herbarium, on a shelf scarcely reached by the room's lighting, three large bundles were found and brought forth. The note written in Czech on the outside of the bundles, translated for me by Dr Chrtek, states that this material was found by (pointed out to?) Dr Kavandy in England (i.e. Kew) and sent to PR. Dr Kavandy is a Czech botanist. The specimens were despatched from Kew in early 1970. The note also said that the specimens were to be numbered and put in their proper place, although obviously this had never been done. It is because of this and the fact that the outside of the bundles did not even indicate that they were grasses that previous requests for these specimens have not been successful.

I examined the three bundles, and briefly recorded the contents. They consisted of over one hundred specimens of grasses, many of them types. The specimens are all unmounted and bear labels handwritten by Domin. Unlike those in the main Domin collection, these specimens lack a Domin *Iter Australiense* number, PR sheet number, and PR accession stamp (which in the main Domin collection bears the date 1960). In some cases they are in species folders, while in other cases they are not in taxonomic order. For certain genera it seems that all of Domin's Australian material is in the bundles, while for others part of the material is also in the main Domin collection. The material is preponderantly from the end of Domin's generic sequence. A significant number of specimens contain a taxonomic mixture, as indicated by later determinations or even by a quick glance. As with grass specimens in the main Domin collection, many in the bundles bear determinavit slips by C.E. Hubbard dated in the early 1930s, or have Hubbard's initials on the corner of the label. In contrast to the main collection, there are also determinavit slips from other botanists (see below).

The explanation for the above observations seems to be as follows. C.E. Hubbard visited Queensland in 1930, to revise the grass collections of the Queensland Herbarium and to conduct research on pastures (Anon., 1931, 1932a p. 36; Brenan, 1981). During this visit he also collected extensively. Afterwards, Domin sent his Australian (mainly Queensland) grass collection (except *Aristida*, see below) by installments to Kew as a loan for study by Hubbard (Anon., 1932b p. 35; 1933 p. 34). Most of the material was returned to Domin, presumably during the 1930s; and some years after Domin's death in 1953 it was accessioned by PR (Kanis, 1977). Apparently, at this time the specimens were mounted and the sheets numbered. Where the material was excessive for a single sheet, additional uniquely numbered sheets were used, bearing typed copies of Domin's handwritten labels and where applicable of Hubbard's determinavit slips.

The material in the "lost" bundles was not returned at that time, and one can speculate that the Second World War, and the German seizure of Czechoslovakia just before it, may have been the reason. The subsequent political events leading to the Communist takeover, and including Domin's retirement from his official positions and his death a few years later, may explain why the material was not sent back to Czechoslovakia until long after the war. The return was not made until well after Hubbard's 1965 retirement from Kew as Keeper of the Herbarium and Library and Deputy Director. I was informed that meanwhile the specimens were kept in "Hubbard's Cupboard". This is not to say that they languished there, instead, they were put to good use.

Botanists whose annotations were seen on the specimens in the bundles are as follows:- C.E. Hubbard (1930s; much of the material); W. Hartley (1939, 1940; *Eriachne*); N.T. Burbidge (1940; *Enneapogon*); J. Vickery (1948; *Danthonia*); S.T. Blake (1964; much of the material); Blake & Hubbard (1964; *Triodia*); M. Lazarides (1966; various); D.E. Anderson (1968; *Chloris*); Anonymous, Herb. Kew (Jan. 1970; various). Examples of citations based on the examination of the material at Kew during this period are:- Vickery (1956 p. 294), who cites Domin type material in *Danthonia* as "Herb. Domin, seen by me at Kew"; and Anderson (1974 p. 80), who cites syntypes of *Chloris ruderalis* Domin as "All at K!, on extended loan from PR."

Thus, although the return of the loan was long delayed, there are extenuating circumstances:- the specimens were not exposed to excessive risk of loss by being consigned to war-torn or politically unstable Europe; they were made available to a succession of relevant specialists; they were never regarded as spoils of war and incorporated into the Kew collection (some duplicate material is incorporated in the Kew collection; Simon, 1987); and they were eventually sent to the new owners. The new owners have themselves tarried in unpacking and incorporating the consignment.

Bryan Simon (1987) also mentioned in his article that the extensive *Aristida* material collected by Domin in Australia was sent by Domin to Henrard at Leiden and has been incorporated there,

except for a few specimens either at PR or missing. I saw five specimens in the main Domin collection at PR. At least two of them bear a 1967 Kew loan number and a sticker with a Kew negative number, and all are annotated by P. Bourreil, University of Marseilles. Three have no Domin identification and so are probably not types, whereas the other two are probably type material of *Aristida caput-medusae* Domin, a species noted by Simon (1987) as being represented among the types incorporated at Leiden. Thus, the few *Aristida* types listed as missing by Simon are still missing.

I asked Dr Chrtek if he would refrain from numbering and incorporating the Domin bundles until an Australian specialist could examine the material and identify mixed collections. I have passed my summary of the bundle contents to Bryan Simon, so that he can borrow them and make the necessary examination.

A note on Domin's annotations of Kew specimens

Kanis (1977) states that Domin rarely, if ever, annotated specimens other than in his private herbarium, concluding that the Clement specimens at Kew are most probably only isotypes, and that the PR specimens should be regarded as holotypes or selected as lectotypes. However, I have observed a number of specimens with Domin's handwritten determinavit slips in various families at Kew. In the case of species named by him, there is usually an annotation such as the "Panicum n. sp." referred to by Hubbard (1934 p. 447), suggesting that he decided on a specific epithet subsequently. In the few cases that I have noted, the PR specimens of Clement from Domin's herbarium bear the specific epithet. Thus, there is some justice for Kanis's view, but it could be argued that the Kew specimens are syntypes and are thus eligible as lectotypes. It is, however, worth reiterating that there are duplicates at PR of many of the specimens cited by Domin that were collected by other people.

Bryan Simon's suggestion of a register of Domin's material at PR, K, L and possibly PRC remains a desideratum.

Acknowledgements

I would like to acknowledge the friendliness and help of Drs Chrtek, Holub and Holubova at PR, and the information from Mr Peter Green and Dr R.K. Brummitt at Kew. My term as Australian Botanical Liaison Officer was funded by the Australian Biological Resources Study and the Western Australian Department of Conservation and Land Management.

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Ostrich, n. A large bird which (for its sins, doubtless) nature has denied that hinder toe in which so many pious naturalists have seen conspicuous evidence of design. The absence of a good pair of working wings is no defect, for, as has been ingeniously pointed out, the ostrich does not fly.

Proboscis, n. The rudimentary organ of an elephant which serves him in place of the knife-and-fork that evolution has as yet denied him. For purposes of humour it is popularly called a trunk.

Ambrose Bierce
The Devil's Dictionary

The Casuarinaceae: a biogeography-based theory

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Introduction

Both Good (1974) and Takhtajan (1986) divide Australia into three major floristic regions:- (1) north and east Australian; (2) south-west Australian; and (3) central Australian. Good also divides Australia into three major climatic provinces corresponding to the floristic regions. It seems to me that these floristic and climatic divisions should be reflected in a good classificatory system or theory, unless reasons to the contrary are given.

So far, I do not see any solid reason why the family Casuarinaceae should be an exception to this idea. Therefore, I believe that the biogeographical scenarios outlined below are relevant to a proper discussion of the classification of the group.

Biogeography

The ancestral *Casuarina* stock was widespread across Gondwanaland in the mid Cretaceous (and possibly earlier). Its morphology was somewhat similar to today's *Gymnostoma*, but at the end of the Cretaceous, two factors caused the division of this stock into three major regional biotypes:-

(1) climatic differentiation. This made the south-west corner of Australia from North-west Cape to Esperance (Figure 1A) wetter than the rest of the continent; and

(2) minor flooding, forming Lake Winton (Laseron, 1969). This served as a geographical barrier, which separated eastern and central Australia.

The isolated south-west biotype probably became the ancestral stock for today's "Pinaster group" (*C. pinaster* and three other species), while the eastern biotype formed the "Glauca group" (*Casuarina* s.str.). The central Australian biotype could then have given rise to the remainder of the species. The effect of the climatic differentiation on the evolution of the biota is usually considered to be greater than that of the geographical separation, not only because the former lasted longer, but also because the climates in the eastern and central regions were relatively similar, although the central region was slightly drier than the east.

The isolation of the eastern and central biotypes was not complete, however, due to the land connections at the northern and southern shores of Lake Winton (also known as Eromanga Basin), where intermediate populations were possible.

During the early Paleogene the three biotypes underwent adaptive radiation into a number of sub-biotypes. Lake Winton dried up, allowing subsequent mingling of the eastern and central biotypes, including their northern and southern intermediates (Figure 1B). The northern intermediate was possibly the ancestor of *C. inophloia* and the taxon currently referred to as *C. cunninghamiana* ssp. *miodon*, with the southern intermediate developing into *C. fraseriana*, *C. torulosa* and *C. decussata*.

As the south-west wet zone contracted, and with it the ranges of its inhabitants, some of the central sub-biotypes from near the boundary could then have moved into the niches vacated by the south-west biotypes. These central sub-biotypes would then have been the precursors of some of the central-element representatives in the south-west region. The differentiation of these sub-biotypes was probably also considerably influenced by soil type. Four ancestral stocks are suggested:- one possibly forming today's *C. dielsiana*; the second forming *C. drummondiana*, *C. microstachya* and *C. ramosissima*; the third forming *C. scleroclada*, *C. tortiramula* and *C. corniculata*; and the last forming *C. acutivalvis*, *C. campestris* and *C. tessellata*. The precursors of other species currently in the south-west of Western Australia probably entered the region much later than these four stocks.

The adaptive evolution from the mesic *Gymnostoma*-like ancestors to the xerophyllous Cryptostomae was probably triggered by the climatic deterioration at the end of the Eocene. However, the rise of *C. decaisneana* could be earlier than this event, because its precursor might already have been in a drier environment.

During the Oligocene the south-west wet region was disappearing and the central region was becoming drier. Possibly by the end of the Oligocene true Cryptostomae had arisen, probably in the southern half of Australia.

As shown by the fossil record, the early

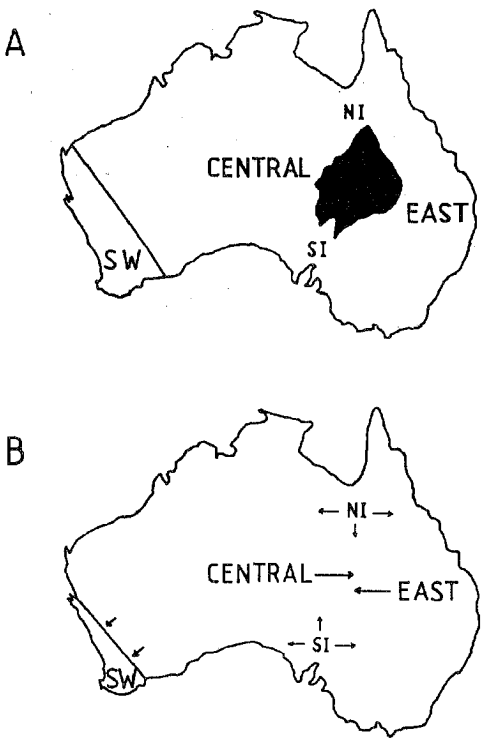

Figure 1. Hypothesized geographical separation of early casuarinas into three elements. A: late Cretaceous; B: mid Eocene. SW = south-west; NI = northern intermediate; SI = southern intermediate. Darkened area indicates a lake.

Miocene was a time of abundance, with *Gymnostoma*, the Cryptostomae and the transitional forms between them co-existing. The density of members of *Gymnostoma* was thinned by the mid Miocene climatic deterioration — possibly to near extinction in the southern half of Australia. As aridity overtook Australia from the south (Beadle, 1981; Bowler, 1982), some Cryptostomae species were also reduced in size from trees to shrubs. These early shrubby casuarinas, with a morphology presumably similar to today's *C. trichodon* or *C. helmsii*, were probably the precursors of the "Distyla group". The present high diversity in this group is believed to be due partly to the prevalence of aridity across a large area of southern Australia.

Whereas the Cryptostomae survived by the development of a more xerophyllous morphology, the eastern species would have had the option of two additional strategies based on drought avoidance:- (1) some migrated to Asia via northern Australia in the manner of *Gymnostoma*; and (2) some became hydrophilic, allowing them to survive at the margins of permanent water bodies — both fresh and saline.

This second strategy would have required physiological rather than morphological modification. For example, *C. glauca* demonstrates some remarkable physiological modifications, which allow it to occupy beach fronts along the east coast and to tolerate a submerged root system due to surface water tables. White (1986) suggests that this further adaptation is an important evolutionary advance.

The lack of post-Miocene *Gymnostoma* fossils suggests that the sudden chilling around the Miocene/Pliocene boundary removed *Gymnostoma* from most of Australia. Thereafter, the growing dune system extending from Broome to Adelaide would have divided the mingled east-central elements into eastern and western sections. This separation of the western biotype could explain the origin of *C. lehmanniana* as an isolated member of the Distyla group. Examples of sibling species pairs on each side of this dune system are:-

South-west Western Australia	From Nullarbor Plain eastward
C. lehmanniana	*C. paludosa*
C. obesa	*C. glauca*
C. decussata	*C. torulosa*
C. huegeliana	*C. verticillata*

The Grampians are the western end of the

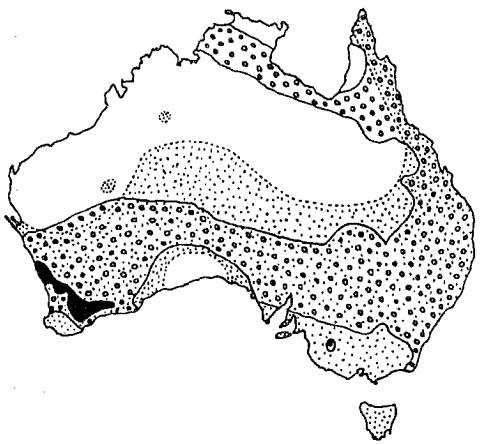

Figure 2. Present distribution of Australian Cryptostomae (compiled from Bennett, 1982 and Doran and Hall, 1983). Darkened area: Pinaster group (4 spp.); circled area: Glauca group (5 spp.); stippled area: *Allocasuarina*.

southern Great Dividing Range. During the Pleistocene, species scattered around the surrounding plains might have used the Grampians as a refuge during climatic surge strokes (flood or aridity), and thus given it a wide diversity of species. The unique conditions in the Grampians are possibly accounted for by two factors:- (1) its location among vast, relatively low lands that supported many species; (2) its position at the western end of a major range, trapping moisture carried by the prevailing westerly winds.

Currently, casuarinas occur mainly in the southern half of Australia and, to a much lesser extent, its north-eastern coastal region (Figure 2). In the northern half, the Glauca group have a wider range than does *Allocasuarina*, whereas in the south they are latitudinally in the middle of the *Allocasuarina* range.

The Pinaster group only occupies a narrow belt of south-western Western Australia (Figure 2) adjacent to the arid plateau. The assumed relict nature of this group is reflected by the fact that they have apparently neither adapted to the flat arid plateau to the north-east, nor penetrated the lower lands to the south-west, both of which are probably less suitable as refugia. *C. fibrosa* is so restricted in its range that it is currently facing extinction.

As rainfall in the area where the Glauca group is absent (the south coast) is high, their distribution would imply that they cannot tolerate low temperature. In contrast, the absence of *Allocasuarina* from north-western Queensland and northern Northern Territory suggests that this group can tolerate only either high temperature or high rainfall, but not the combination of both.

I conclude that, as a whole, the biogeographical aspects discussed above better support the present theory than does the splitting of the Cryptostomae into *Allocasuarina* and *Casuarina* s.str. by Johnson (1982). There are wide areas of overlap between these two taxa, whereas the Pinaster group have a very narrow, distinct distribution range and/or habitat requirements — in addition to their unique morphology.

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Grasses of the New World and 42nd AIBS meeting, San Antonio, Texas

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Introduction

At the beginning of August I attended a meeting of grass taxonomists in San Antonio, Texas, to discuss the proposed format of a new project to be undertaken by New World agrostologists — The Grasses of the New World. This was held prior to the general sessions of the 42nd meeting of the American Institute of Biological Sciences (AIBS).

The Grasses of the New World

New World grasses account for 325 genera and 3,300 species, out of about 700 genera and 10,000 species worldwide. This is to be the first overall treatment of New World grasses, although several regional grass floras are in various stages of completion (*Flora Mesoamerica*, *Manual of North American Grasses*, and *Flora of North America*). The inclusion of North, Central and South America in one work is thought to be justified, in that tropical and temperate members of the region have to be evaluated simultaneously. For example, the very poorly known Andean pooid grasses can only be understood in relation to pooids from North America, Mexico and Argentina.

The objective is the production of a critical, illustrated, multi-volume taxonomic treatment of all of the grasses of the New World. The project will involve the collaboration of agrostologists from most American countries, particularly those from Latin America, through visitor grants enabling them to visit the Smithsonian Institution and Missouri Botanical Garden for extended periods.

The objectives for the first five years of the programme are:-

1) Publication of a checklist accounting for all (approximately 20,000) of the names used for New World grasses.

2) Preparation of a character list for all of the New World grass genera and species.

3) Setting up and training in the use of the TROPICOS and DELTA database systems at the collaborating institutions.

4) Publication of a generic conspectus of the New World grasses, including a key to all of the genera.

5) Publication of the first two volumes of the flora, to include bambusoid and chloridoid grasses.

6) Preservation of field collections of representative groups for later molecular analysis.

The five principal editors for the project are:-

Emmet Judziewicz
Research Associate, University of Wisconsin

Gerrit Davidse
Senior Curator, Missouri Botanical Garden

Tarciso Filgueras
Investigador Scientifico, Reserva Ecologia do IBGE, Brasilia, Brazil

Fernando Zuloaga
Investigador Independiente, Instituto de Botanica Darwinion, Buenos Aires, Argentina

Paul Peterson
Associate Curator of Grasses, Smithsonian Institution

The San Antonio meeting was held in the Espada Room of the Hilton Hotel. It was chaired by Emmet Judziewicz and Paul Peterson, and was attended by twelve other agrostologists from the U.S.A., two each from Brazil and Mexico, one each from Argentina, Chile, Peru, and Venezuela, and myself as the only representative from the Old World. A detailed 13 page developmental proposal, backed by letters of support from Peter Raven and Enrique Forero (Director and Director of Research, respectively, from the Missouri Botanical Garden) and Laurence Skog (Chairman of the Department of Botany, Smithsonian Institution), was circulated.

Discussion centred on the purpose, arrangement, and format of the checklist planned for publication by March 1993, pending funding. Robert Webster (United States Department of Agriculture, and editor of the *DELTA Newsletter*) stressed the point of having an updatable database, and that the one system should be used from the outset. The checklist and flora would include synonymy, which would be easy enough to produce from Davidse's TROPICOS database, so that they would become definitive treatments. The checklist would be alphabetically arranged, but the floristic treatment would be systematically arranged.

The DELTA character list was discussed. Webster suggested that the Dallwitz and Watson list for world genera should be modified to include those characters that are to be used at the species level. While it might initially be easier to have different character lists for different subfamilies and tribes, Webster proposed the adoption of one big list, and that someone should take responsibility for the final wording of the list. He has a list of 350 characters for his New World genera, which he estimates could be expanded to 400-500 for species, with the provision that any taxon can be effectively dealt with using 40-50 characters. Computer demonstrations using DELTA and TROPICOS were given on the morning of the second day of the meeting, but I was not present, due to a prior commitment to attend a cladistics workshop at Trinity University.

The floristic treatment would be arranged by subfamilies and tribes. There was discussion concerning the merits of indented and bracketed keys. A plea was made for regional keys in a work covering such a large geographical area. This could easily be done using DELTA. With regard to illustrations, some aspect of each species is to be illustrated. Regarding distribution maps, one hemisphere map for each species was suggested,

with a more localized map for local endemics or species with a narrow range of distribution.

The responsibilites of the five scientific editors are to be divided up as follows:- Arundinoideae (15 genera/100 species) – Davidse; Bambusoideae (50/430) – Judziewicz; Chloridoideae (70/600) – Peterson; Pooideae (90/950) – Judziewicz, Peterson & Zuloaga; Paniceae (62/900) – Davidse, Filgueras & Zuloaga; Andropogoneae (36/300) – Filgueras & Judziewicz.

A total budget of $560,000 is envisaged for the project. Five grant proposals are presently pending, but only $85,000 has been obtained so far. The importance of tapping into programmes dealing with biodiversity and ecology was stressed; in fact, from anywhere that it is likely to obtain funds.

AIBS and afterwards

The AIBS meeting was opened by AIBS president Paul Risser, following which the 1991 AIBS Distinguished Service Award was presented to potato breeder John Niederhauser. The plenary address was then given by Lauro Cavazos, U.S. Secretary of Education 1988-1990, on the role of biology and science education. The AIBS meetings followed for four days, in several wings of the San Antonio Convention Center, and many interesting and diverse subjects were covered by approximatley 800 authors belonging to nine different societies. In addition, there were the usual dinners and social programmes, and the enchanting San Antonio River Walk, with its restaurants, music, and river stage, giving one the opportunity to relax from scientific pursuits.

After AIBS, we (my wife Pam and I) accompanied a party of 19 people on the post-conference field trip to the Rancho del Cielo, in the Sierra de Guatemala, a disjunct segment of the Sierra Madre Oriental mountains of Mexico in the southern part of Tamaulipas Province. It is a field station of Texas Southmost College at Brownsville, and is located at 3,800' in Central America's northernmost cloud forest. At this point, the range has a succession of vegetational zones that, within 20 miles, pass from thorn forest and tropical deciduous forest at low elevations, through tropical semi-evergreen forest, cloud forest, humid pine-oak forest, dry oak-pine forest, and montane chaparral.

Pine is most common at higher elevations of this range, which reaches nearly 7,000'. In the cloud forest, temperate trees of North America (oak, hickory, maple, walnut, redbud, and magnolia) intermingle with podocarps and other trees from the neotropics. Epiphytic bromeliads, orchids, and ferns are abundant. In places, the lofty canopy is broken by rocky, moss-covered hillocks, where large trees give way to clumps of *Agave*. The presence of cloud forest at elevations between 3,000 and 4,000' is owing largely to the configuration of the range, and the rapid upsurge of moisture-laden winds from the Gulf of Mexico, which is about 90 miles to the east.

It was a very stimulating experience for me to be able to botanize in the neotropics for the first time. I collected all of the grasses (some genera such as *Zeugites*, *Lasciasis*, and *Dichanthelium* being completely new to me), and assisted Hugh Iltis (University of Wisconsin) in processing other plants, of which we collected about 200. Another plant collection was made by Lyn Raulerson and Agnes Reinhart (University of Guam). The first set of duplicates of all of the collections is required to go to the University of Tamaulipas herbarium, which was one of the conditions of our being able to collect. On the return trip to the U.S.A., we went on a detour from Ciudad Victoria towards San Luis Potosi, over the very beautiful main range of the Sierra Madre Oriental, for Hugh Iltis to collect an undescribed caper in the arid country on the other side of the range.

Prior to the AIBS meetings, Pam and I had spent five enjoyable days in Hawaii, when I spent a couple of hours at the Bishop Museum with Fiona Getliffe Norris (the curator), and received an update from Ben Stone on the Flora of the Philippines project. We were fortunate to coincide our visit with the solar eclipse, seen best from the Big Island, which we visited a couple of days after the great event. From there we flew to Los Angeles, and then traversed a large chunk of the western U.S.A. by Amtrak, managing to visit the Grand Canyon, the Pacific coast, Pullman and the Marion Owenby Herbarium of the University of Washington State, across the Rockies via the Glacier National Park to Chicago, and down to St Louis, where we had a profitable time at the Missouri Botanical Garden, myself at the herbarium and Pam in the gardens.

I had discussions with Gerrit Davidse, Bob Magill, and Jim Zarucchi concerning the TROPICOS database system used at MO. This is essentially a names-based database, proving to be extremely useful to the working taxonomist, and it is being used fairly extensively in tropical American countries. Davidse gave me a thorough review of how he uses the system for his world-wide database of grass names, of which he has more detailed information for the neotropical grasses. At this stage, he

estimates that he has about 30,000 names, perhaps about half of the total number, whereas the legumes database is about 95% complete. MO provides their TROPICOS data free of charge, and the software for $150, the payment going to the Revelation Company.

Bob Magill, the developer of the system, highlighted a few other features of TROPICOS, and Jim Zarucchi gave me an objective assessment of ALICE and TROPICOS, as he has had experience with both systems. ALICE, developed at Kew by Bob Allkin and P.J. Winfield, is basically a taxon-based system for compiling authoritative lists for non-taxonomists.

Resurrection of the Honiara Herbarium (BSIP), Solomon Islands

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Introduction

In June 1991, David Liddle and I visited Solomon Islands on a privately-funded botanical reconnaissance, mainly for the purposes of obtaining material for our revisions of *Hoya* and other Asclepiadaceae in Papuasia. During the three weeks that we were there, we made a number of visits to the now re-opened Honiara Herbarium (BSIP), which had been closed and in some sort of physical stasis for nearly 20 years.

The Herbarium

Honiara Herbarium has now been open about a year and a half. The re-opening is a result of the employment for two years of a New Zealand volunteer botanist, David Glenny, who is working on a fern flora of Solomon Islands and also making bryophyte collections. Part of David's duties during this period has been to train a local forestry graduate, Myknee Qusa (Sirokolo), who will continue to maintain and expand the herbarium following the volunteer's departure early in 1992.

Given the long period of no maintenance and no resident botanist, the 20,000–30,000 sheets in BSIP are in remarkably good condition. However, conditions still leave a lot to be desired; and, as yet, no dryer has been constructed, the single air-conditioner is geriatric (and more like the top of a freezer), and insects are rife. Apart from the holdings at Kew, BSIP must have the greatest concentration of specimens from Solomon Islands extant in a single locality, and should be visited by botanists working on taxa from the Papuasian region. Quite a few isotypes of the BSIP distribution series are present, and most are isolated in type folders. While the flowers of many specimens have been destroyed, many have not, and many fruiting specimens are in good condition.

Solomon Islands is a small nation and cannot afford to spend large amounts of money on something as apparently esoteric as a herbarium. Hence, it would be appropriate for Australian herbaria and other botanical institutions to donate journals and books or other relevant materials. A free subscription to the *ASBS Newsletter*, for example, would go a long way towards keeping Myknee in touch with what is going on in the region. There is no real point in flooding BSIP with Australian literature unless it directly relates to the flora of Solomon Islands; however, it may be possible for ASBS to support annual subscriptions to journals, particularly *Australian Systematic Botany* and *Blumea*, as well as other Australian herbaria journals. If nothing else, this would create a small library resource that not only the resident staff could consult but also visiting botanists.

Probably the best support we can provide for BSIP is for botanists to visit and consult/curate the holdings. Honiara Herbarium, as a result of its long closure, is 20 years behind in curation, and it would be a most useful exercise if visiting experts could curate their specialities.

Botanists interested in visiting Solomon Islands for research purposes should note that a 9-10 month wait is necessary before the required research permit can be obtained from the Ministry for Natural Resources. Intending visitors should also contact the herbarium:-

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Solomon Islands.

COMMENTARY

Fake tectonics and continental drip

With the advent of plate tectonics theory in the late 1960s (Morgan, 1968) geologic thought was revolutionized; continental drift gained popularity (at last) and, as everybody has been saying: "The textbooks must be re-written". Unfortunately, no one to date has done it right.

There is a very important dimension missing in the new theory, one so obvious that it is little wonder that it has escaped the attention of geologists and geophysicists. I refer to the shapes of the earth's continents and their bearing to past drift motions. Conventional plate tectonics states that continents drift, relative to one another, because they are situated on the backs of crustal plates, which move in response to sea-floor spreading away from mid-ocean spreading ridges into subduction zones, where the plate disappears into the earth's interior. The whole process is similar to the activities of many conveyor belts joined on the earth's surface in constant, though slow, motion.

However, the outlines of all continents are tear-drop shaped, with the pointed ends trending south indicating the directions from which they have come. This startling concept is called "continental drip", and is the essential concept of "Fake tectonics", the acronym for Final Answers for the Knowledge of Earth tectonics. Actually, fake tectonics can be traced back to the early historical development of continental drift, when Wegener (1929) referred to the continents' flight away from the poles, or "polarfluchtkraft". A step in the right direction was made by Dietz and Holden (1970), when they recognized that there was only a "sudpolarfluchtkraft" (south polar fleeing force). The whole truth can now be recognized. There are "sudpolarfluchttrofeln" (south polar fleeing drips).

The concept has great heuristic value. For instance, because the continents appear to flow north, we can finally recognize that our place in the solar system has been topsy-turvy — that the planets revolve around the sun in a clockwise (not counterclockwise) manner, and that the south pole should be at the top of the globe and the north pole on the bottom because, as we all know, drips should always flow down.

Figure 1, a map of the world from a modified cylindrical equally spaced-out projection (Deetz and Adams, 1945), shows that all continents are fundamentally drip-shaped. Some show a multiple drip aspect, the subdrip of Arabia being a good example (A). The open drip symbol of New Zealand is based on its submerged continental outline, and must be considered a drowned drip. The anti-drip of Ceylon (Cy) is interesting, and is included as it

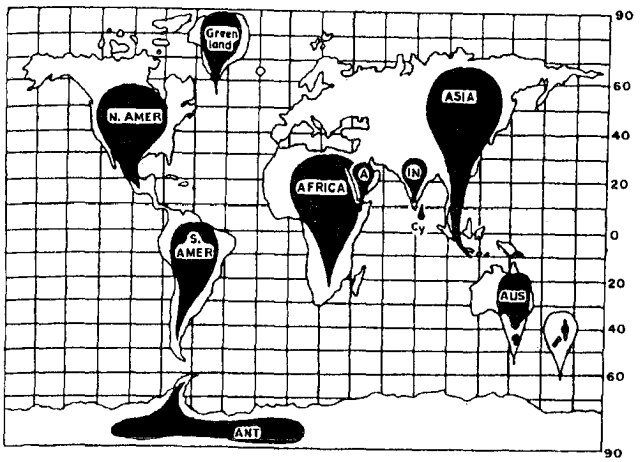

Figure 1. The world, showing the drip-shaped nature of the continents.

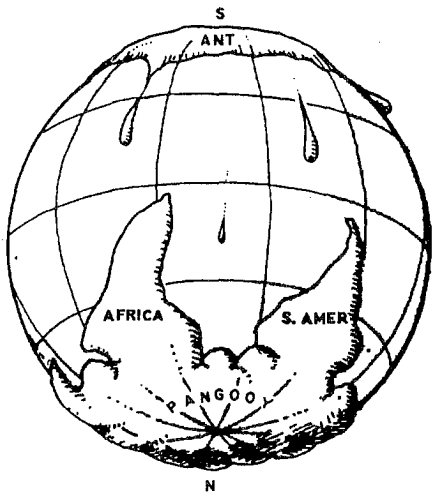

Figure 2. Continental splash, the final coalescence of continental drips.

is the exception that proves the rule. The anti-drip of Antarctica is due to the fact that Antarctica, being situated at the top of the globe, has not yet made up its mind which way to flow; hence that continent has drifted round and round but never down.

Considering that the universal landmass of Pangaea broke up some 200 million years ago, and that the continents are now better than halfway dispersed from the original nucleus at the south pole, the time of their re-uniting at the other end of the world can easily be predicted. Based on computer analyses of the northward vector sums for continents now in motion, this event will occur on Tuesday morning at 9:00 a.m. 1,786,379 A.D. The resulting new universal landmass (excluding Antarctica) is called "Pangooy", and the event is termed "continental splash"; the final coalescence of continental drips (Figure 2). Insofar as Antarctica is perfectly balanced on top of the globe, it is highly unlikely that this continent will ever join the others on their trek down under.

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Continental drip revisited

The theory of Continental Drip, stated so eloquently by Holden (1976), stands as one of the major developments in the earth sciences during the past several centuries, ranking with the development of the principle of uniformitarianism (Hutton, 1785) and the recognition of the ramifications of coprolite shape (Kate, 1954). The simple elegance of the theory is astounding, and the implications for the geosciences innumerable. Herein is reported experimental evidence in support of the theory (Figure 1).

Holden (1976) points out that it is obvious that major continents are teardrop (drip) shaped, and all seem to be dripping toward the north pole. This, of course, proves that cartographers are incorrect, and that north is "down" and south is "up" and not vice-versa, if it can be shown that things do indeed drip downward. Experiments were undertaken to prove that this is the case. Fluids varying in viscosity from "terribly runny" to "awfully gooey" (see Table 1) were freely allowed to drip, and the direction of their dripping was recorded. The experiments were repeated three (3) times for each of the fluids at seven carefully controlled temperatures. The pressure was atmospheric. Results are shown in Figure 2. Notice that in all but one of the 42 trials the fluids were observed to drip downward. As the one exception was the experiment run on the day after one of our Irish graduate students threw a

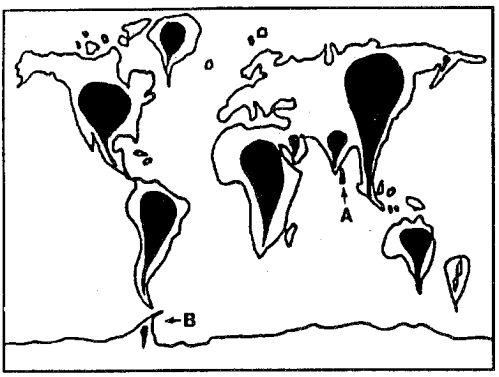

Figure 1. Continental Drip (after Holden, 1976, about four years after, in fact). A — the anti-drop of Sri-Lanka; B — the incipient drip of the Antarctic Peninsula.

St. Patrick's day party, I believe it can be classified under the heading "experimental error".

It can then be concluded that drops will indeed drip downward. The observation that continents drip northward proves that north is down and south is up.

Holden (1976) suggests that Antarctica is an anti-drip, as that continent can't decide which way to go. Rather, it seems to me that Antarctica is in metastable equilibrium on the top of the earth, the south polar region, and only its extreme edges have developed a sufficient instability to begin the big drip northward. It is here proposed that such features be called incipient drips (see Figure 1).

As Holden (1976) correctly points out, the continents broke up from the universal landmass of Pangaea, and undoubtedly are headed for a reunion at the north pole. The beauty of the Continental Drip theory is that there is a simple mechanism for periodic continental breakup and reunion throughout geologic time. The continental reunion at the north pole (continental splash, Holden, 1976) will give rise to an instability in the earth. The continental material, known to have a lower density than the rest of the earth, will be at the bottom of the earth, setting up a tremendous gravitational instability. The earth, then, will "flip" so that the north pole, with all the light materials (continents), will be at the top. The process of continental drip will then begin again, resulting in the inevitable breakup of this future supercontinent of Pangooy(Holden, 1976). This process has no doubt happened several times in the past, and will do so many times in the future. (To those who would argue that all areas of the earth would still be in approximate isostatic equilibrium independent of the positions of continental mass, and hence no such gravitational instability would exist, I would answer "Oh, yeah?".) It should further be noted that at this time north will indeed be up, and south will be down.

Lastly, I would like to propose a change in age nomenclature for rocks, to facilitate the many new studies (which will no doubt take place) applying Continental Drip to rocks of varying age. The so-called Precambrian is the healthiest chunk of earth history around, and has had to put up with the indignity of being called merely "Pre" something else for too long. In addition, this gives rise to the absurdity of referring to events since about 600 million years ago as post-Precambrian. Those of us at the Institute for New Advances in the Study of Ancient Lithologies (old NASAL Tech, as we fondly say) have developed a breakdown of earth history prior to 600 million years ago, based on events recorded in rocks in our vicinity. We call this scheme Nomenclature for Age Systematics of Ancient Lithologies. It is hereby proposed that such a system replace the archaic Precambrian nomenclature, and further, that all new studies (which will no doubt take place) applying Continental Drip to rocks of varying age be divided into the classes NASAL Drip and Post-NASAL Drip.

Table 1. The liquids used in the experiments

Fluid	Viscosity
1. water	terribly runny
2. Bernkasteler Doktor 1976er Spatlese	perfect, but still quite runny
3. tomato soup	runny
4. honey	gooey
5. 30% solution of ethylenecellulose in benzyl alcohol	quite gooey
6. Swix Blue Klister cross-country ski wax	awfully gooey

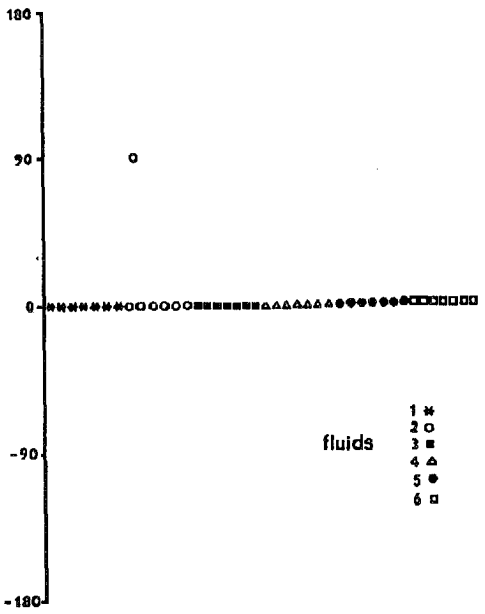

Figure 2. The angle of drip (π – yes, π; why can't π be an angle?) plotted against nothing; after all, it didn't vary with viscosity or temperature. $\pi = 0$ was taken as the perpendicular to the Geoid in a downward direction; $\pi = 180$ would then be up. Each data point represents the mean of the three repetitions of the experiments at the particular temperature, since results in the three trials were always the same.

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Continental drip reviewed

It now seems that there are two competing models of Continental Drip — that proposed by de Kay (1973) and Morrison (1989), and that propounded by Holden (1976) and Holst (1986). While this duality can be considered a very healthy situation, since an unchallenged theory is usually not considered to constitute a progressive research program (*sensu* Lakatos, 1970), it can also be considered as ridiculous, because one of these theories is obviously fundamentally flawed.

Actually, the first person to suggest to me that the continents are drop-shaped, rather than drip-shaped, was Peter Wilson (NSW, pers. comm. 1989); so I certainly wasn't surprised to find that it had been formally proposed in print. That the continents resemble northward trending tear-drops is certainly a superficially appealing observation, but I don't believe that it is tenable in detail as an explanation of changing continental shape. Neither Holden (1976) nor Holst (1986) concern themselves with details, as they both wield a very broad brush. However, as noted by Darwin (1859), it is by the details of a theory that it is most effectively judged — if the details cannot be accounted for, then the explanatory power of the model is rather limited.

Some of the broader characteristics of the continental shapes are equally parsimoniously explained by either of the two competing theories. These include the explanation of the general shape of the larger continental areas as either drops or drips; although I feel that the Asia drop presented in the Holden/Holst model is somewhat arbitrary, and the absence of any reference by them to Europe is a severe oversight. Also, Antarctica can be equally easily interpreted as the remains of a previous super-continent from which our continents are dripping, or as the beginnings of a new super-continent towards which they are currently dripping. However, the Holden/Holst model suggests that Antarctica never joins in the ultimate continental splash that forms Pangooy, while the de Kay/Morrison model is more parsimonious in its postulation of only one final super-continent.

On the other hand, there are at least two sets of details that are not explained by the Holden/Holst theory but are an integral part of the de Kay/Morrison model. Firstly, none of the minor continental drips (listed in Morrison, 1989) can be explained by northward dripping continents. Holst (1986) comes closest to a consideration of this problem when he attempts to explain the Antarctic Peninsula as an *ad hoc* instability (a minor drip) in a

metastable equilibrium (a non-dripping continent); but this Peninsula is more simply explained (as in the de Kay/Morrison model) as a disjunct part of the major drip of South America.

Secondly, none of the islands that are situated below larger land masses (also listed in Morrison, 1989) are explained by the Holden/Holst theory. The de Kay/Morrison model uses them as evidence of the broad range of phenomena predicted by it, while neither Holden (1976) nor Holst (1986) mentions them at all. Consequently, the de Kay/Morrison theory explains more of the observable geographic features of the earth than does the alternative model.

The de Kay/Morrison model of continental drip is thus a more parsimonious explanation of the observable universe (in the hypothetico-deductive sense of Popper, 1959) than any alternative that has been proposed so far. As a result, I believe that it is the most corroborated (or least refuted) model, and is therefore the model to be currently preferred. The changing shape of the continents should thus be causally interpreted as smears left behind by drips, rather than as tear-drops.

Nevertheless, I am indebted both to Holden (1976) and to Holst (1986) for bringing to my attention some aspects of the theory of continental drip that had previously escaped my notice. Any model of continental drip would not be complete without the incorporation of these factors.

Firstly, Holden (1976) makes it explicitly clear that there must be two temporally alternating polar continents — one as the source of the drips and one as the sink. My previous publication completely by-passed any consideration of the possible sources of the drips. Holden and I do differ, however, in our interpretation of whether Antarctica is currently the source or the sink.

Secondly, Holst (1986) explicitly considers the necessity of a polar flip once each drip era is complete, in order for the continental movements to be cyclical rather than to follow time's arrow to one single end-point (cf. Gould, 1987). As he points out, this postulates a beautifully simple (and therefore elegant) mechanism for the periodic breakup and reunion of the continents, thus uniting the mechanisms of drift and drip in one unified tectonic theory. What he fails to point out is that the postulated flips and subsequent wandering of the earth's magnetic pole (cf. Cox, 1973) can now also be explained by this all-encompassing theory.

There are also a couple of other developments in the theory of continental drip that I would like to take this opportunity to discuss.

Firstly, Boulding (1978) has proposed a mechanism for continental drift that seems to be also applicable to continental drip. This mechanism is far more elegant than any of those postulated for drip by de Kay (1973), and it is therefore more likely to be right. Boulding (1978) calls his theory the Xerographic Model of Crustal Convection, because it is based on an analogy with a Xerox 914 photocopier. In this analogy, the paper is the continental material, which initially rests on the toner cartridge, which represents the oceanic material of the upper crust. In the primary convective movement, a piece of paper moves from the feeder bin through the machine to the output tray, which is analogous to the movement of continental plates across the magma. However, the paper also goes through a cycle around the drum and has toner transferred to it, which is analogous to magmatic mixing during continental subduction. The toner is then baked onto the paper by a heating plate, which is analogous to radiogenic heating of magma.

The beauty of this theory is that it also explains other tectonic forces, such as the formation of mountains. If the earth is merely a giant photocopier, then all mountain ranges are simply due to a malfunction in the convective mechanism, which causes the paper (continents) to be crumpled into sharply undulating folds. By the same reasoning, then, continental drip is simply a failure in the heating mechanism, which causes the imperfect union of continental and oceanic material and allows the smear to develop. Therefore, the concept of the earth as a giant malfunctioning photocopier further unites both drift and drip into one unified tectonic theory, unlike the less adequate theory of Plate Tectonics proposed by Morgan (1968).

This mechanism also explains some of the anomalies in the drip theory that are noted by Morrison (1989). Specifically, Mike Crisp (ANU, pers. comm. 1989) has pointed out that many of the islands that run east-west and are not below another land mass are either volcanic in origin (e.g. Iceland) or are in areas of other tectonic activity (e.g. Java, New Guinea), and that many of the spattered islands of the Pacific are also of volcanic origin. If tectonic activity is due to malfunctioning of the photocopier, then these islands are simply splotches of toner such as we usually see on our photocopies. It is perhaps this reason that has caused Holden (1985) to more recently propose the formation of the International Stop Continental Drift Society, which demands (among other things) immediate cessation of sea-floor spreading, quiescence of large volcanoes, and an end to subduction and other crustal discriminations.

In the second new development, Funk (1981)

has discussed additional evidence for the importance of the interaction between politics and geography, as postulated by Morrison (1989). Funk notes that the majority of nations are meridionally–oriented, having their longest geographic axis running north–south. Exceptions to this are few, and include such *ad hoc* situations as:- imperialist nations that have expanded from an original meridional position (e.g. China, U.S.A., U.S.S.R.); countries with small meridionally–oriented population centres (e.g. Australia, Brazil, Egypt); countries formed by marital mergers (e.g. Poland, Spain); and nations formed by arbitrary international treaties (e.g. several nations in central Europe).

Funk points out that there are many obvious benefits in those countries that are meridionally–oriented, including:- a higher standard of living; internal stability; and more liberal governments. Furthermore, he notes that the only geo-political alterations of recent centuries that have persisted are north–south divisions rather than east–west. The influence of politics on geography is evidently more far-reaching than I had originally thought.

Finally, I think that many of the global ecological factors of current international concern will have a significant effect on the process of continental drip. In particular, the model predicts that the global destruction of forests and the increase in soil erosion will both tend to lighten the continental land masses, and thus tend to increase the rate of drip. We may thus be increasing the rate of cycling between Pangooy and Antarctica, and thereby adding yet another problem to our current list of global woes. And who knows what effect global warming will have on a temperature-sensitive process like drip.

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A bicentenary

September 28 1991 marks the bicentenary of a geographical discovery that also had great botanical significance. On that day in 1791, the *Discovery* commanded by George Vancouver was the first European vessel to sail into the embayment, on the south-western corner of the largely-uncharted New Holland, that was later named King George Sound.

The surgeon-naturalist aboard Vancouver's expedition was Archibald Menzies. Although the flora of the region was virtually unknown (Menzies probably being unaware of the two species, said to be from Java but in fact from the Swan River area, described in Burmann's *Flora Indica* in 1768), he must have had a premonition of it, writing before the voyage that the region would be "a fine field for Botanizing!!!" For 12 days he explored the Sound and its hinterland, including Oyster Harbour, becoming fascinated by the flora. The wealth of plants led him to become frustrated by the lack of time "which suffered me only to view as it were their general outlines and be a mere collector, without being able to acquire a more thorough knowledge of each individual species". How many later botanists, drawn to this rich region, have echoed that sentiment!

Menzies made a quite substantial collection, including seeds and live plants, although much

living material was lost on the voyage, which took them to the west coast of North America and eventually home to England in 1796. Nonetheless, considerable material from the expedition survived, much of that from our shores having been sent from Sydney to Joseph Banks at Kew. Seed was sown there, and seedlings were distributed to other gardens in Britain and on the Continent. Herbarium material was probably placed in Joseph Banks' collection, which later was incorporated into the British Museum (Natural History), now the Natural History Museum. A number of Menzies' collections, and some of the plants raised from seed, were used to describe new species.

Menzies is commemorated in the names of Western Australian plants such as *Utricularia menziesii* and *Drosera menziesii* (of which he collected the types) and *Banksia menziesii* (based on a collection by Charles Fraser from the Swan River in 1827). The Douglas fir, first collected by Menzies from the west coast of North America, was also named after him (*Pseudotsuga menziesii*).

The botanical riches glimpsed by Menzies were revealed in greater depth by the next collector there, Robert Brown, voyaging with Matthew Flinders in the *Investigator*. He and the great botanical artist Ferdinand Bauer spent three weeks at the Sound in December 1801, and collected some 500 species. Ever since, the region has been almost a *sine qua non* for the well-travelled botanist in Australia. Last century, it attracted visitors such as Huegel, Drummond, Preiss and Mueller, and the artists Marianne North and Ellis Rowan. One whom the floral riches failed to impress, however, was Charles Darwin, who paid a brief visit in 1836. By then towards the end of his five-year round-the-world voyage on the *Beagle*, he was homesick and anxious for the expedition to be over. He wrote that during the entire voyage he did not spend "a more dull and uninteresting time".

Many botanists living in or visiting Australia in the twentieth century have visited the Sound where, today, thanks to the system of parks and reserves in the area, there is still much natural vegetation to be seen. Yet, after two hundred years of botanical activity, new finds still occur, as shown for example by the discovery of an unnamed *Synaphea* in 1990 on the outskirts of Albany.

Alex George
Flora of Australia

Old herbaria: who collected what?

The fact that Dr Eric Sims collected plants while on excursions with his old professor (Sir J.B. Cleland; see pages 3-11) is an example of the need for care in recording the collectors of herbarium specimens. In the case of J.B. Cleland, he commonly did not note anyone as collector on the labels accompanying his collections in the State Herbarium of South Australia, although the typewritten labels generally record him as the collector. He occasionally noted someone who had brought the specimen to him

According to Dr Sims, Cleland was sufficiently punctilious not to have omitted crediting another person with making the collection. While rarely, if ever, noting the name of Dr Sims as co-collector of specimens, he at times requested that Hansjörg Eichler write to his collecting mate informing him of an interesting result of their botanizing. Dr Sims thinks that this might have been a way of encouraging his continued provision of an extra pair of eyes and ears. If Dr Sims found something of interest, his mentor invariably accompanied him back to the spot. J.B. Cleland, therefore, is likely to be at least one of the collectors of those anonymously collected plants in his herbarium, often the sole collector.

It would therefore be useful to assemble information on anonymously collected specimens in old, often personal, herbaria. Collectors in South Australia such as Cleland and J.M. Black, and surely also Tepper and Ising, were the floristic experts of their day, willing and able to assemble herbaria from a variety of sources. Ferdinand von Mueller's labelling practices would also be very usefully analyzed.

The information that bygone botanists noted on the specimen labels would have depended on what they considered important to their botany, both in general and at the time. The names of collectors, along with ancilliary information such as ecology and ephemeral characters such as colour, probably rated low in comparison with plant name, locality and date (probably in that order of priority).

Bill Barker
State Herbarium of South Australia

The average number of hours worked per person by the Japanese last year was 2,044. Death from overwork apparently now has a special name in Japanese – *karoshi*. This comes from working more than 3,000 hours per year (which is the equivalent of working 12 hours/day for 5 days/week for 50 weeks/year).

A.S.B.S. Inc. BUSINESS

Conference Final Notice

Systematic and Ecological Relationships of South Pacific Floras

November 22-27 1991, Aukland, New Zealand

The second (and final) circular for this joint conference of the New Zealand Botanical Society and the Australian Systematic Botany Society has been sent to all of those people who responded to the first circular, as well as to most botanical institutions in the South Pacific.

A registration form is included with the second circular, which should be returned by all intending participants to Anthony Wright (Auckland Institute & Museum, Private Bag, Auckland 1, New Zealand) no later than 30 September 1991. Anyone who cannot meet this deadline, or who has not yet received a registration form and would like one, should contact Barry Conn (02-2318131) immediately. Completed registration forms must be accompanied by remittances in full payment of fees and accommodation deposits:-

Conference registration fee	$60
Cladistics workshop fee	$60
Full-time student conference fee	$30
Accommodation deposit	$46

Barry Conn
Secretary, ASBS Inc.

CSIRO Scientific Journals
1992 Concessional Price List

The concessional prices for the CSIRO journals listed below are only available to financial members of the Society. Subscriptions must be paid for through the Society — the concessional rates are not available directly from CSIRO. Please note that no late orders will be accepted this year.

Those members wishing to subscribe to any of these journals should send their subscription money to:-

Dr D. Foreman
Treasurer, ASBS Inc.
National Herbarium of Victoria
Birdwood Avenue
South Yarra. Vic. 3141.

by November 15, 1991. Please also include payment for your subscription to the Society for 1992.

Don Foreman
Treasurer, ASBS Inc.

Journal	Concession	Full Rate
Australian Journal of Agricultural Research	$ 90	$180
Australian Journal of Botany	$ 85	$170
Australian Journal of Chemistry	$195	$390
Australian Journal of Experimental Agriculture	$ 90	$190
Australian Journal of Marine & Freshwater Research	$ 85	$170
Australian Journal of Physics	$ 85	$225
Australian Journal of Plant Physiology	$ 85	$170
Australian Journal of Soil Research	$ 75	$170
Australian Journal of Zoology	$ 85	$170
Australian Systematic Botany	$ 75	$150
Invertebrate Taxonomy	$ 95	$220
Reproduction, Fertility & Development	$ 85	$170
Wildlife Research	$ 75	$170
Single back issues	$ 20	$ 40

REPORTS

Australian Biological Resources Study

Understandably, there is confusion over our current name, location and address. Suffice to say that ABRS does exist, albeit as two distinct units within the Australian National Parks and Wildlife Service (the second unit is the Fauna Publication Unit). We are housed at the Australian National Botanic Gardens site on Black Mountain. Our title and postal address are:-

Flora of Australia
Australian Biological Resources Study
Australian National Parks & Wildlife Service
G.P.O. Box 636
CANBERRA. A.C.T. 2601.

Our preferred fax number is (06) 250-9448.

Alex George has reverted to his substantive position as Executive Editor, Flora of Australia, and Helen Hewson is currently Acting Associate Director. The latter position will shortly be advertised for permanent filling.

Review of ABRS

A review of the Australian Biological Resources Study is to be undertaken, in accordance with an Australian Government requirement that all non-statutory bodies be periodically reviewed. In particular, the review will address such aspects as the relevance and adequacy of the aims and objectives of the programme, the role of the ABRS Advisory Committee, and the criteria for evaluating programme efficiency and effectiveness.

A call for submissions will be made shortly.

Australian Plant Name Index

As foreshadowed in the last *Newsletter*, this four-volume work was published in June. It was launched on 20 June by the Minister for the Arts, Sport, the Environment, Tourism and Territories, the Hon. Ros Kelly, at a function at the Australian Academy of Science in Canberra.

The *Index* is available at the special price of $150 until 30 September, after which the price will be $195.

Flora of Australia

With the *Plant Name Index* completed, work on the *Flora* itself is gathering momentum. Volumes 35 and 50 are now in the final stages of preparation. During July, Roger Carolin spent a week in Canberra to assist with manuscript clean-up of the Goodeniaceae. Most of the manuscript for the first lichen volume is now in-house and is being guided along the editorial path by Cheryl Grgurinovic. The volume is on-course for publication in conjunction with an international meeting in Lund in August 1992. Cheryl has also been arranging contributors to the introductory volume on the fungi. Helen Hewson has done a great deal of planning for the three bryophyte volumes.

Plant Indumentum – a Handbook of Terminology

This handbook by Helen Hewson will soon sell out, and a revised edition will be considered. Comments on the use and usefulness of the work will be appreciated, and should be addressed to the A/Associate Director, Flora of Australia, G.P.O. Box 636, A.C.T. 2601.

Calendar

The Australian Government Publishing Service has produced a calendar for 1992 featuring cover paintings from the *Flora of Australia*. It is available from AGPS Bookshops for $8.95.

Alex George
Flora of Australia
ABRS

Australian Botanical Liaison Officer

I must be at the stage that every ABLO has gone through. Where has the year gone? Did my family really accumulate all that stuff in such a short time? With only two weeks to go, all feelings of despair at not having finished everything (or anything?) of my own work has given way to a pragmatic realism that I didn't stand a chance in the first place, so I may as well enjoy all of the farewell parties. At the very least, hopefully all the customers were satisfied.

It has been a great year for us, and we have appreciated our association with Kew. I would like to record here our thanks to the staff at Kew.

Philip Short has arrived, and he wasted no time in falling into most of the pitfalls that we found ourselves in. He has, however, within his first week, found a flat and is settling in with admirable speed. In fact, he was looking so settled and comfortable that I thought he should relieve me of a large loan request from AD for *Sida* and *Abutilon* types! I assumed that Robyn Barker (who made the request) had been saving this for her brother, Philip, and so I felt it proper for me not to intervene. To everybody else — keep those requests coming in; Philip is now eagerly awaiting them. Along with the many introductions of Philip around Kew, the connection with Robyn Barker had to be explained. At one stage, Philip was asked if he was put out by being introduced as Robyn Barker's brother; to which Philip replied that it could be worse — since he could also have been introduced as Bill Barker's brother-in-law!

Peter Bridgewater paid a welcome visit to Kew, in between appearances before a Select Committee of the House of Lords and the International Whaling Commission. While at Kew, he presented a cheque of greater symbolic than financial value to Leonard Forman and Gren Lucas, to mark the completion of the contribution by Kew to the writing of the Christmas Island volume of the *Flora of Australia.*

Alex George came over for the meeting of the Interim Council of the "Species Plantarum Project", held at Kew. Alex has a report of this elsewhere in this *Newsletter*. Interestingly, the next Council meeting will be in Canberra in September of this year, so many ASBS members will be able to find out first hand what is going on with this exciting new project. It was also a good opportunity to talk to both Alex and Peter about the position of the ABLO.

Molly Whalen, from Flinders University, has spent about 2 weeks at Kew and the BM to study *Frankenia* and to examine material of *Adriana* (Euphorbiaceae). Helen Cohn, librarian at MEL, also visited Kew to see some of the Mueller and Bentham correspondence. All in all, it's been a very quiet summer for visitors.

The following recent new publications from Kew may be of interest to ASBS members:- *Legumes of West Asia – A Checklist* by J.M. Lock & K. Simpson (covers Iran, Iraq, Afghanistan and the Arabian Peninsula); *A Revision of Tabernaemontana. 1. The Old World Species* by A.J.M. Leeuwenberg; *The Genera of Sapotaceae* by T.D. Pennington, and *Orchids of the Solomon Islands and Bougainville* by B.A. Lewis & P.J. Cribb. All are available from the Kew Bookshop.

I had one unusual enquiry recently, following the arrest and jailing of a shipping agent acting on behalf of a British biscuit company in the United Arab Emirates. A type of biscuit coated with a mixture of sesame and poppy seeds had been imported to the U.A.E., and following tests by the authorities it was found to contain opiate alkaloids. The offending ingredient was no less than "Australian Blue Poppy Seed". What could I say? — other than that the biscuits would probably be legal all over Australia, except in Queensland where poppy seed is probably legal only if on pumpkin scones. It was one inquiry that I did not cope well with, and I am not sure of the fate of the shipping agent.

The weather? Anybody who tried to watch Wimbledon will know how soggy the summer has been — say no more. My excitement at Geelong's position in the Australian Football League is not shared by anybody else here — Philip has turned out to be a closet South Australia supporter. I should make it home in time for the finals.

Over to you Philip.

Greg Leach
ABLO (emeritus)

A.S.B.S. Canberra Chapter

Regular monthly meetings of the A.S.B.S. Canberra Chapter are planned for the fourth tuesday of the month. The venue is the Seminar Room, Crop Adaptation Building, Division of Plant Industry, CSIRO. Refreshments are available from 4.30 pm. Visitors are welcome. Come along for/with local news and information on recently released books, and to hear sytematically oriented talks.

Seminar Programme, August-November

Tuesday, August 27
Our thanks to Gavin Moran
Division of Forestry and Forest Products, CSIRO
"Genetics of dry zone acacias — systematic implications"

Tuesday, September 24
Jim Zarucchi
Missouri Botanical Garden
Tentative title:- "Legumes and Madagascar — plagues of my life"

Tuesday, October 22
Julia Playford
Research School of Biological Sciences, ANU
"5S ribosomal DNA in acacias"

Tuesday, November 26
Barry Richardson
Australian Biological Resources Study, ANPWS
Tentative title:- "Cause for hope — environmental policy in Australia"

There will also be a number of short, informal talks during September by, for example, Nancy Morin and Frank Bisby. The dates and times will be advised.

Further information can be obtained from me on (06) 246-5175 or (06) 249-2491.

Jeremy Bruhl
Convener

A.S.B.S. Adelaide Chapter

A.S.B.S. Adelaide Chapter meetings are held at 8 pm on the last wednesday of the month in the State Herbarium lecture/tea room at the Royal Botanic Gardens, North Terrace. Visitors and new members are welcome.

Programme, September-February

September
No meeting will be held owing to a late change in the programme.

Wednesday, October 30
Philip Weinstein
Epidemiology Branch, S.A. Department of Health
"The sawflies' banquet: which trees and how to eat them"

Wednesday, November 27
Marjorie Andrew, Black's granddaughter and co-editor of his diaries
"Memories of J.M. Black"
Shirley Clissold and Helen Poole (also Black's granddaughters), will be present, along with Enid Robertson (who completed the second edition of Black's *Flora*).
This meeting will also involve the election of the new convener and book sales officer.

Wednesday, February 26
Anything remotely systematic from anyone remotely systematic.

Further information can be obtained from me on (08) 228-2303.

Bill Barker
Convener

International Organization for Plant Information
(formerly Species Plantarum Project / Global Plant Species Information System)

The meeting at the Royal Botanic Gardens Kew, in June (*Newsletter* **67**: 33), recommended that a new structure be set up to integrate and replace the "Species Plantarum Project" (SPP) and the "Global Plant Species Information System" (GPSIS). The proposed name of the new body is International Organization for Plant Information (Organisation Internationale pour la Connaissance des Vegetaux).

Kew, one of the proponents of SPP, indicated its acceptance of the new organization at the meeting. The proponent of GPSIS, the Commission for Plant Taxonomic Databases (TDWG), is discussing the proposal and will decide its position at a meeting on 18 September.

The activities of IOPI will be determined by a Council of not more than 30 members, including representatives of IAPT, TDWG, CODATA, UNEP and IUCN. Members of Council will be selected initially to represent taxonomists, user-groups, information technologists, and others appropriate to aspects of the project.

The first project of IOPI will be a Vascular Plant Checklist of the World. A Checklist Committee was nominated to plan and produce the Checklist within five years. It will be supported by several working groups addressing such aspects as the organization of taxonomic resources, the data set to be included, the design of the data base system, and editing.

A meeting of the Interim Council of IOPI will be held in Canberra on 19-20 September, immediately before the 7th International TDWG Workshop. At this meeting, the status of the SPP and GPSIS projects will be discussed and, hopefully, a firm decision taken to proceed with IOPI and the proposed Checklist.

On the assumption that the Canberra meeting will approve the establishment of IOPI or something close to it, application has already been made to IUBS for interim recognition of the organization as a Commission.

Alex George
Flora of Australia

For those of you who are unclear on the history of the various groups involved in these activities, the following list may be helpful.

SPP – the Species Plantarum Project. This was intended as a computer-based project to produce a new *Species Plantarum* ; i.e. a description of all of the plant species of the world, with keys, short descriptions, and distribution information, etc. It was proposed by a consortium of seven major botanical institutions:- Royal Botanic Gardens Kew, Missouri Botanical Garden, New York Botanical Garden, Muséum National d'Histoire Naturelle, Rijksherbarium, Smithsonian Institution, and Conservatoire et Jardin Botaniques de la Ville de Genève. It was launched at a meeting in Kew in November 1990, and was intended to take 50 years to complete.

GPSIS – Global Plant Species Information System. This was intended as a computer-based project to produce a checklist of plant species of the world, including authorities, synonymy, classification, distribution, and bibliography. It was proposed by the IUBS Commission for Plant Taxonomic Databases (which also calls itself the Taxonomic Databases Working Group, or TDWG). It was launched at a meeting in Delphi, Greece, in October 1990, and was to be completed as fast as possible.

CODATA – ICSU Committee on Data for Science and Technology.

IUCN – International Union for Conservation of Nature and Natural Resources. This is an independent body, founded in 1948, for promoting and supporting action related to the protection and sustainable use of living resources. Membership comprises governments, government agencies, international organizations, and private institutions. Its six Commissions consist of more than 700 experts.

UNEP – United Nations Environment Programme. A programme and organization created by the United Nations Conference on the Human Environment in 1972, to provide guidelines for action by governments and international organizations designed to protect and improve the human environment and to remedy and prevent its impairment.

IAPT – International Association for Plant Taxonomy. Founded in 1950 to promote the development of plant taxonomy and to encourage international relations between taxonomists. Publishes *Taxon* and the *Regnum Vegetabile* series. Members can be individuals or institutes.

IUBS – International Union of Biological Sciences. Founded in 1922 to promote the study of biological sciences at the international level. International Botanical Congresses are held under the auspices of its Division of Botany. Members are international scientific associations and societies, as well as national academies of science, research councils, and science associations. IAPT is a member.

ICSU – International Council of Scientific Unions. Founded in 1919 to encourage international scientific activity and to co-ordinate the activities of the international scientific unions. Members are international scientific unions, as well as national academies of science, research councils, and associations of instititions. IUBS is a member.

— Eds

CAVP and APNI

New national computer databases

Last year, the hardcopy version of the *Census of Australian Vascular Plants* (CAVP) (R.J. Hnatiuk, 1990, Australian Flora and Fauna series No. 11) was released, followed in July this year by the *Australian Plant Name Index* (APNI) (A.D. Chapman, 1991, AFF series No. 12, 13, 14, 15). Both of these projects have been a long time coming, but the databases compiled for each of them now provide a continuing basis for continent-wide distributional and nomenclatural data.

CAVP is a list of taxa (recognized names and authorities) for all Australian native and naturalized vascular plants, including pteridophytes. For each name, CAVP gives distribution information (supplied by the states and individual botanists), using the current state and territory botanical regions (except for Tasmania, for which a series of regions were defined that pre-date those currently used at HO). For Victoria, the long-standing but unsatisfactory grid system was used; we hope for an eventual conversion to the proposed floristic regions.

APNI is a list of names of taxa at all ranks from genus downwards, for all vascular genera (again including pteridophytes) known or thought to occur in Australia. Each name is supported by fundamental bibliographic and type information, and nomenclatural comments.

The Australian National Botanic Gardens Herbarium (CBG) now has responsibility for the development and maintenance of these databases, and has allocated staff resources to them. CBG staff will add new taxonomic and distributional data to CAVP, and new names and bibliographic information to APNI.

We plan to incorporate the *Catalogue of Mosses of Australia and its External Territories* (H. Streimann & J. Curnow, 1989, AFF series No. 10) into a combined taxon list, and eventually, with the co-operation of approriate agencies and individuals, other cryptogamic groups as well.

There has already been some feedback from a wide range of users of the hardcopy publications, and many of the errors or omissions have now been corrected in the databases (529 additions and 131 alterations to date). All such comments and corrections are most welcome, as are accounts of the applications for which the information is being (or could be) used. All correspondence should be addressed to:-

The Director, Australian National Botanic Gardens, G.P.O. Box 1777, Canberra. A.C.T. 2601.

Five priority areas for the development of these databases have been set:-

1) Integration of the data structures and standards of CAVP and APNI, to minimize data entry effort and to maximize data consistency. Each CAVP entry will be matched to an entry in APNI, and flagged as a currently accepted name. Disputed names and ranks can also be flagged. The TDWG XDF format, and the Australian HISPID conventions, will be followed.
2) Indication of synonymy (where known) within the integrated list. Some APNI names can be assigned automatically, but the rest will require labour-intensive checking and flagging in the database.
3) Correction and updating from new literature. User response will be very helpful here, particularly from specialists. As far as possible, updating will include distributions, but the distribution statements given in *Flora of Australia* and in some journals are not compatible with CAVP, and require laborious interpretation.
4) Development of data interchange protocols with other users, primarily the state herbaria. As soon as the general parameters are set, a first update for CAVP will be issued in the agreed interchange format.
5) Development of liaison with the users of the data. The *ASBS Newsletter* is one avenue, as are CHAH and CHBG, but these reach only some of the present and potential users. Feedback to date has been from very disparate sources. There are also issues that need canvassing at some length. Examples are:- the need for unique taxon codes; dealing with taxon concept changes and disputed taxonomies; use of the CAVP biogeographical regions; scanning of obscure literature; division of labour in gathering and/or processing some of the data classes.

   We envisage a separate CAVP/APNI newsletter, published periodically, distributed with other publications in main user areas, and also via a respondents' mailing list.

Many people have contributed to the CAVP and APNI compilations. The continued usefulness of these databases will depend on good liaison and information exchange between the users and the ABNG as co-ordinatinng centre. All suggestions for their development are welcome.

Bob Makinson
Australian National Botanic Gardens

PERSONAL NEWS

Leiden Appointments

The University of Leiden has appointed Dr Pieter Baas as Professor of Systematic Botany and Scientific Director of the Research Institute Rijksherbarium / Hortus Botanicus (retro-active from 1 January 1991 onwards). Professor Baas, whose specialization is in systematic and ecological plant anatomy, succeeds Professor C. Kalkman, who retired at the end of last year. Professor Kalkman continues to work at the institute as Honorary Staff Member, and will also continue as chairman of the Flora Malesiana Foundation for a number of years.

From 1 June onwards Dr Jan de Koning has been appointed Prefect of the Hortus Botanicus. He succeeds Dr Ger van Vliet, who moved to the CITES office in Lausanne early last year.

Dr Marco C. Roos has been appointed as leader of the Research Group Tropical Phanerogams from 1 August. He succeeds Dr R. Geesink, who retired from this position for health reasons in 1989, but who continues to work with the group on legume taxonomy and conceptual aspects of phylogenetic taxonomy.

Dr Machiel E. Noordeloos has been appointed from 1 July as Mycologist (Agaricales) in the Research Group Cryptogams. He succeeds Dr C. Baas, who retired earlier this year, but who continues his activities as Honorary Staff Member.

Philip S. Short

Philip Short left Melbourne on July 7, 1991, in order to enjoy Hawaii and Alaska before reaching London on August 11, and settling in to his 1991-1992 term as the Australian Botanical Liaison Officer at Kew.

At a farewell function held at MEL on July 4, a message was received from a Dr Brachyscome (exact identity undisclosed). The message was on behalf of all of the Australian members of the family Asteraceae (alias Compositae), and read:-

If you go in the bush next week you'll find there's quite a ball,
The brachyscomes are laughing, smiling, dancing one and all.
They've got twelve months of freedom, for the word has passed around
That Phil has gone to Kew, and so they know they're safe and sound.
And other daisies, too, no longer droop their heads in fear;
They raise them to the sunshine knowing Phil will not be near
To pickle them in bottles or to squash them in a press.
"We're not averse to science, but it gets us in a mess".

So the comps are all cavorting while they have this grand reprieve;

Though on second thoughts they wonder if they wanted Phil to leave.

"He has helped us find relations, found our aunts and cousins too.

Although he's strict and sorts us out, we'll miss our Phil at Kew".

Helen I. Aston
National Herbarium of Victoria

REVIEWS

Plant Systematics in the Age of Molecular Biology.

Edited by P. Y. Ladiges and L. W. Martinelli. CSIRO, Melbourne. 1990. 163 pp. ISBN 0-643-05098-1. (Reprinted from *Australian Systematic Botany*, Volume 3 Number 1).

Almost no area of the life sciences has been untouched by the "molecular revolution". One of the most acutely affected areas has, of course, been evolutionary biology, and therefore necessarily systematics. But, like many colleagues in other fields, we systematists (whose basic training often pre-dates the molecular era) tend to be uncomfortable with molecular genetics.

Is a whole science degree with majors in biochemistry and molecular biology needed to enable

us to go around confidently talking of "RFLPs", "Southerns" and "5SrDNA probes"? Wouldn't we have to re-train ourselves completely in order to take advantage of this rapidly advancing field? And then there is the matter of expensive laboratory equipment. Molecular biologists routinely use ultracentrifuges, ultrafreezers, autoclaves, spectrophotometers, shaking incubators, sequencing machines, and work in buildings with "Biohazard" and "Radioactivity" signs on the doors — how could herbaria acquire such costly, sophisticated equipment, and where would they put it all even if they could? Haven't we also heard about the high cost of "consumables":- all the prohibitively expensive biochemicals, enzymes and plastic things that every molecular biologist must have to hand before getting started?

Although there is a grain of truth in these preconceptions, it is also fair to say that systematists can become molecular systematists without going back to First Year and without entering the realm of "big science". For instance, one of the great technical advances in molecular biology in the last 20 years, "Southern blotting", can be executed perfectly well using equipment purchased for less than $5 at the supermarket. Moreover, many of the large items of equipment found in molecular biology laboratories are rapidly being made redundant by technical advances that provide simpler and cheaper means for achieving the same results.

It is true that some aspects of molecular systematic work benefit from a profound insight into the biochemical systems that we wish to explore. However, it is also true that the great majority of relevant techniques are now routine, and are described in exquisite detail in laboratory manuals (such as that by Sambrook *et al.*, 1989) as well as being taught in short WEA-type courses (e.g. the excellent weekend course run as part of the University of Sydney's continuing education program). Furthermore, there is an acute shortage of systematic expertise in molecular biological circles, at a time when molecular biologists are realising that they need to analyse their results systematically in order make comparative sense of them. It follows that teamwork between systematists and molecular biologists is mutually beneficial.

The ASBS symposium on "Plant Systematics in the Age of Molecular Biology" was organized primarily as a didactic exercise. Its main aim was to make "orthodox" Australian plant systematists feel more comfortable with the idea of molecular systematics, by teaching us the practicalities and potential benefits of using macromolecules as a source of systematic data. This resulting symposium volume can also be seen as having an educational and a promotional function. Right now, though, there is some pretty stiff competition in this particular literary niche. The multi-authored textbook *Molecular Systematics* (Hillis & Moritz, 1990; see e.g. Braun, 1991 for a review) has much the same goal, and it was so popular that the first edition quickly sold out. I would like to be able to compare the two volumes, but I have not yet been able to obtain a copy of Hillis & Moritz's book.

Producing a volume of this type by organizing a symposium, inviting eminent speakers, and publishing the proceedings has advantages and disadvantages. The main disadvantage is that the coverage is uneven. For instance, step-by-step descriptions of the polymerase chain reaction (PCR) are found in three papers, where one would suffice. On the other hand, no paper even mentions the special difficulties faced by molecular biologists in extracting and purifying macromolecules from plants. (The presentation by Julie Dowd at the symposium on the purification and direct sequencing of ribosomal RNA would have been a useful paper here, but unfortunately it did not make it into the volume. A similar paper on extracting plant DNA and its potential problems would also have been a welcome addition.)

Another problem is that the contributors tend to treat established methods and techniques cursorily, while lavishing great attention on very new approaches. Thus, West & Faith devote about a quarter of their paper to a rather complicated explication of Lake's evolutionary parsimony algorithm, a method that seems unlikely to gain widespread application in its present form. Similarly, the repeated emphasis on PCR, although understandable given its great potential, leaves less room for discussion of other relevant topics.

The main advantage of the symposium volume format is that the contributions are fresh and lively. Most of the papers are imbued with enthusiasm for the subject, and some even read like sales pitches for the authors' favourite sources of data.

The papers roughly fall into three categories:- reviews of systematic methodology (2), reviews of molecular methods and sources of data (8), and case studies (5).

In some cases, the inclusion of different treatments of the same subject has not resulted in redundancy. For instance, the two papers on systematic methodology largely represent the two distinct approaches to phylogenetic analysis of molecular data that have evolved over the last 10-15 years. West & Faith view phylogenetic analysis

primarily as an exercise in pattern analysis in the Hennigian tradition, while Penny *et al.* see it more as an exercise in evolutionary modelling, following Felsenstein. My sympathies lie with the approach of Faith & West, and they have done a good job of briefly reviewing the application of cladistic methods, although their paper reads as though it was written in a hurry. However, I regard Penny *et al.* as the best paper in the volume. It is beautifully written, and it covers potential problems for phylogenetic analysis in a clear and logical way.

Interestingly, the brief forays of some of the molecular specialists into systematic methodology emphasise the desirability of their collaborating with systematists. For example, Gibbs *et al.* discuss at some length the potential problems that reticulate evolution poses for cladistic analysis. It develops, however, that their favoured method of analysis is UPGMA clustering, an approach that not only constrains relationships to be hierarchical but also imposes the additional burden of an assumption of homogeneous evolutionary rates!

The reviews of molecular methods seem to cover all of the most important techniques and sources of data, such as restriction site analysis and PCR (Clegg & Durbin), isozymes (Brown), chloroplast DNA (Timmis & Ayliffe), mitochondrial DNA (Crozier), ribosomal RNA genes (Baverstock & Johnson), gene duplications (Colgan), and even more exotic subjects such as pulsed field electrophoresis (Howlett). They all explain the relevant theoretical bases, but some could have discussed their subjects more deeply. As one would expect, none of these papers gives a blow-by-blow description of methods, or even much of an indication of the sort of facilities that would be required to start doing molecular work, but they do provide useful guides to the literature.

The case studies cover particular applications of isozymes (Moran *et al.*, Coates & Hnatiuk), amino acid sequences (Martin & Dowd), and restriction site mapping (Doyle *et al.*), while Appleby *et al.* discuss the evolutionary origin of haemoglobins. These papers are useful additions to the volume, although they illustrate only a fraction of the topics discussed in the reviews. All find at least some degree of congruence between the results of molecular analysis and earlier morphology-based results. Martin & Dowd's paper represents the end of an era:- they were pioneers of molecular systematics at higher taxonomic levels, but are moving on from amino acid sequencing to the newer, more rewarding, and more crowded field of DNA sequencing. My favourite paper in this collection is Doyle *et al.*'s elegant unravelling of the complex reticulate patterns in an allopolyploid complex in *Glycine*. This sort of reticulation reflects overlapping maternal and paternal hierarchical patterns. The authors have cladistically analysed data from chloroplast DNA (inherited maternally) in order to precisely partition data for biparentally inherited nuclear rRNA genes, so that they can reconstruct maternal and paternal relationships.

"Classical" systematists will find this volume a good introduction to molecular systematics, and also a good guide to the literature. Those who wish to use molecular data can use this volume to decide on the techniques and genomes that are most suitable for tackling their problems of interest, and then to investigate those techniques in greater detail. But all systematists should read this volume, or something like it, even if they are not contemplating a move to molecular data. The explosive growth of molecular systematic work that is already under way ensures that "classical" systematists will have to deal with molecular results in the near future. It has even been suggested (see e.g. Briggs, 1991) that our knowledge of phylogeny, and our classifications, will come to be based largely on molecular data, and morphology will be re-interpreted in the light of that knowledge. It is thus essential for all of us to be in a position to critically assess the taxonomic conclusions of molecular systematists. We cannot just bury our heads and pretend that molecular systematics does not concern us.

Professor John Thomson made helpful comments on an earlier draft of this review.

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Peter Weston
National Herbarium of New South Wales
Royal Botanic Gardens Sydney

Flora of New South Wales, Volume One.

Edited by Gwen Harden. New South Wales University Press, Sydney. 1990. 601 pp. ISBN 0-86840-156-0. $69.95

At last that massive gap in the means for identifying all of the indigenous and naturalized vascular plants of New South Wales is being filled. Volume 1 of the *Flora of New South Wales* impressively starts this four-volume set. Covered in this volume are the ferns and fern allies, cycads, conifers and flowering plants (from Annonaceae up to Amygdalaceae) of mainland New South Wales and the included Australian Capital Territory.

Amygdalaceae?? Dahlgren's (1980) system of classification of the flowering plants is used (as taxonomists will know, that is also the arrangement of the National Herbarium of New South Wales). For the layman, the conflict between the generic placement in this *Flora* and in the concurrently published *Flora of Australia* may create some confusion. Let me say right away that I much prefer Dahlgren's system over Cronquist's fossil. And the British herbaria at Kew, Natural History Museum, and Edinburgh have agreed to largely follow Dahlgren's system. Oh that Australian herbaria could come to some similar agreement!

The keys are indented dichotomous, succinct, and are generally easily followed. All of those that I tried worked. Even the key to families is user-friendly, although the first dichotomy on carnivory may prove elusive for some users. An easily-found (by its green pages) and illustrated glossary should facilitate identification by students or amateurs. The introductory explanations on the use of keys, how to collect, etc. should be useful.

The descriptions of families, genera, species, and infra-specific taxa are concise. Major synonyms are given. Habitat and distributional data are provided for each taxon.

The descriptions of the species are embellished by fine line illustrations, often of diagnostic characters. The artists, particularly Christine Payne, have done a wonderful and detailed job of illustrating most of the species described. One worry, however, was *Asplenium australasicum* and *A. harmannii* sharing an illustration when their habits are distinctive.

The colour photographs present an interesting selection, including habit shots for many of the species. Some are spectacular close-ups, such as that of the fruit of *Sloanea australis* and the flower of *Eupomatia bennettii*. I suspect that those of *Pachicornia triandra* and *Elatostema reticulatum* have been reproduced upside-down. Strangely, in the three illustrations of *Eucryphia* the flowers are never figured.

Inclusion of the Australian Capital Territory, apparently without the contributors consulting A.C.T. collections, has led to some omissions. At least ten species commonly naturalized around Canberra are not listed for the Southern Tablelands, including *Pyracantha angustifolia*, *Prunus cerasifera*, *Sorbus domestica*, three *Cotoneaster* species, and *Mahonia leschenaultii*.

Some other deficiencies relate to the listing of Lord Howe Island occurrences of the treated genera and species. Although politically part of New South Wales, the flora of Lord Howe Island is not treated in this *Flora*. Unfortunately, the cross-referencing of Lord Howe Island plants is inconsistent. For example, in the Urticaceae neither *Elatostema* nor *Boehmeria* are listed for the island, although both have endemic species there. In the Violaceae, I note that *Hymenanthera* is used for the mainland species. The genus has been shown to be congeneric with *Melicytus* by Beuzenberg (1961) to which the Lord Howe and Norfolk Island species have been transferred by Green (1970),but Norfolk Island is erroneously listed as being home to a *Hymenanthera*.

Incidentally, while discussing Norfolk and Lord Howe Island matters, the spelling of the species of the monotypic *Lagunaria* is "*L. patersonia* ". Although its natural occurrence on mainland Australia is questioned, this species is definitely native to Queensland (there are many specimens at BRI), Bentham's mainland variety being raised to subspecific rank by Green (1990) after this *Flora* had gone to press.

Generic concepts are always controversial. Relegation of the same species to different genera in contemporary Floras of neighbouring states does not endear taxonomists to the general public, for whom these publications are meant to be clarifying plant identification. Besides the *Hymenanthera-Melicytus* issue noted above, in this volume *Heritiera* is used rather than *Argyrodendron* (the recent *Flora of South-eastern Queensland* (1986) uses *Argyrodenron*), as is *Chamaesyce* rather than *Euphorbia* (the segregate genus is not used in the *Flora of South Australia* (1986) nor is it accepted at Kew). I should emphasize that I am not making taxonomic judgements here concerning correct usage, but merely pointing out that inconsistencies between states causes difficulties for Flora users.

Congratulations to Gwen Harden and her 19 contributors for such an impressive start to this important Flora. All people interested in the plants

of New South Wales, wildflower-enthusiastic layman and scientist alike, should be adding a set to their bookshelves. Future volumes are due to be produced at yearly intervals.

References

Beuzenberg, E.J. (1961) Observations on sex differences and cytotaxonomy of the New Zealand species of Hymenantherinae (Violaceae). *N.Z. J. Sci.* **4:** 337-349.

Dahlgren, R.M. (1980) A revised system of classification of the angiosperms. *Bot. J. Linn. Soc.* **80:** 91-124.

Green, P.S. (1970) Notes relating to the floras of Norfolk and Lord Howe Islands, 1. *J. Arn. Arb.* **51:** 218-220.

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Ian Telford
Australian National Botanic Gardens

Recent Publications

Rare Bushland Plants of Western Sydney.
By Doug Benson and Lyn McDougall. Royal Botanic Gardens, Sydney. 1991. 60 pp. ISBN 0-7242-4319-0. $6.95.

Plant Form. An Illustrated Guide to Flowering Plant Morphology.
By Adrian D. Bell. Oxford University Press, Oxford. 1991. 356 pp. ISBN 0-19-854219-4. $65.00

Geography Through Botany. A Dictionary of Plant Names with Geographical Meanings.
By Günther Kunkel. SPB Academic Publishing, The Hague. 1990. 334 pp. ISBN 90-5103-044-4. $100.

The Diatoms. Biology and Morphology of the Genera.
By F.E. Round, R.M. Crawford and D.G. Mann. Cambridge University Press, Cambridge. 1990. 757 pp. ISBN 0-521-363187. $300.

NOTICES

Conference on Monocotyledons

Monocotyledons: Classification and Evolution

A conference on the above topic will be held in the newly-extended Jodrell Laboratory at the Royal Botanic Gardens Kew, on 19-23 July 1993. The conference is co-sponsored by the Royal Botanic Gardens Kew, the Linnean Society of London, and the Systematics Association.

The purposes of this meeting are to analyze critical characters in monocotyledon systematics, and to review and revise the existing classification by Dahlgren and his co-workers. By bringing together experts from around the world and combining their studies into an integrated framework, it is hoped to produce a relatively complete classification based on modern principles. Key topics will include the origin and relationships of the monocotyledons, and the relationships of such well-known groups as the palms, aroids, orchids, lilies, gingers, and grasses.

The conference will include workshop sessions, using a wide range of currently-available computer software for phylogenetic analysis.

All of the lectures will be by invited speakers. However, contributions are invited for poster presentataions on suprafamilial systematics or aspects of character analysis. Invited speakers include:- V. Albert & M.W. Chase (University of North Carolina), P.A. Cox (Brigham Young University), P. Crane (Field Museum of Natural History, Chicago), D.F. Cutter & P. Rudall (Royal Botanic Gardens Kew), M.J. Donoghue (University of Arizona), J. Dransfield (Royal Botanic Gardens Kew) & N. Uhl (Cornell University), R.L. Dressler (U.S.A.), P.K. Endress (Universität, Zurich), J.C. French & M.G. Chung (Rutgers University), P. Goldblatt (Missouri Botanical Garden), J. Greilhuber (Universität, Wien), J. Harbornne & C.A. Williams (Reading University), R.R. Haynes (University of Alabama), C. J. Humphries(Natural History Museum), E.A. Kellog (Harvard University), W.J. Kress (Smithsonian Institution), R.P. Linder (University of Cape Town), H. Maas (Institute of Taxonomic Botany, Utrecht), S. Mayo (Royal Botanic Gardens Kew), F. Rasmussen(Uni-

(Univeristy of Copenhagen), D. Simpson (Royal Botanic Gardens Kew), D.W. Stevenson (New York Botanical Garden), T. Stützel (Universität, Ulm), P.B. Tomlinson (Harvard Univeristy), J.W. Walker & A. Walker (University of Massachusetts), and E. Zimmer (Smithsonian Institution).

The organizing committe includes:-
David F. Cutter (chairman)
Paula Rudall (secretary)
Christopher J. Humphries (treasurer)
Simon Mayo
Phillip Cribb
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Fax 44-81-948-1197

Paula Rudall
Royal Botanic Gardens Kew

Request for material

The CSIRO Division of Human Nutrition is investigating the chemical, physical and nutritive properties of Australia *Acacia* gums. These gums have potential value in the food industry, and may also have interesting nutritional properties. Currently, Australia imports most of its food-grade gums. Australian plant gums could probably be used in place of these imports. The project will continue for two years, so any samples collected in the next 12 months will be of interest. We wish to receive as many *Acacia* samples as possible.

The gum appears as amber globules exuding from wounds in the bark. We would be grateful if you could take a small sample (1-10 g, or about 2 tablespoons) and send it to us in a plastic bag. A note with the place of collection, the identity of the tree, and examples of foliage, flowers and fruits for a voucher sample would also be appreciated.

Please send the material to:-
Dr Geoffrey Annison
CSIRO Division of Human Nutrition
Glenthorne Laboratory
Majors Road
O'Halloran Hill. S.A. 5158.
Tel (08) 2980317
Fax (08) 3770004

Geoffrey Annison
CSIRO Division of Human Nutrition

Ecology of Sydney Plants Project

Conventionl floras and handbooks provide descriptions for identifying species, but give relatively little ecological and other biological data. Yet such data are becoming increasingly relevant to researchers in many fields, and to natural area managers, as well as in environmental impact assessment. There is therefore the need for a centralized accessible database of this type of information.

The proposed project will be based at the National Herbarium of New South Wales, and will involve gathering material from published and unpublished sources, as well as herbarium records and field observations. The emphasis in the first instance will be on providing information that is already available, and the project will inevitably demonstrate a lack of knowledge about many plant species. Collaboration with other botanists, as well as other interested people, is therefore being sought.

The Sydney region is being interpreted broadly, following that used in *Flora of the Sydney Region*. The information will be largely complementary to that given in taxonomic descriptions, and will include growth form, flowering and fruiting times, longevity and maturity periods, pollination and seed dispersal data, distribution, habitat and plant community, and responses to fire and disturbance. A complete list of the data to be gathered is in *Cunnnighamia* **2(3)**: 499-500.

The literature review and preparation of draft listings will be made available progressively to botanists who can assist by filling gaps in the information. A database will be developed to record both data and the source from which each item has been obtained.

The data will be published in *Cunninghamia* in about ten parts, each covering about 250 species. If feasible, parts will be produced annually. The parts will be arranged alphabetically by family. Eventually, a comprehensive publication covering all of the groups is planned. This will update the information given in the earlier published sections.

Doug Benson
National Herbarium of New South Wales

Request for Material

I am currently researching the nitrogen-fixing legume genus *Chamaecris*, which has recently been segregated from the non-nitrogen-fixing tribe *Cassia*. Although these plants grow all over the world, few people are actually working with them. Hence, I have problems obtaining seeds. I would be very grateful if anyone can help me in this matter by sending seed to:-

T. Naisbitt
Department of Biological Sciences
University of Dundee
Dundee. DD1 4HN.
Scotland, U.K.
Tel 44 (382) 23181
Fax 44 (382) 22318

Thomas Naisbitt
University of Dundee

Books for Sale

I am currently sorting out and disposing of several sets of books that I no longer require. I would therefore be glad of offers for the sale of the following books, either as sets or singly:-

Stafleu and Cowan's *Taxonomic Literature*, second edition, volumes 1, 2, 3, and 4 (but not 5).

Flora of Australia, volumes 1, 4, 8, 19, 22, 25, 29, 45, and 46.

Please contact:-
D. Pearson
80 Highfield Road
Canterbury. Vic. 3126.
Tel (03) 8360342

Daphne Pearson
Canterbury, Victoria

The 1991 Jesse M. Greenman Award

The 1991 Jesse M. Greenman Award has been won by Scott Zona for his publication "A monograph of *Sabal* (Arecaceae: Coryphoideae)", published in *Aliso* **12**: 583-666, 1990. This monographic study is part of a Ph. D. dissertation from Claremont Graduate School, Claremont, California, under the direction of Dr Sherwin Carlquist.

The Greenman Award, a certificate and a cash prize of $US500, is presented each year by the Missouri Botanical Garden. It recognizes the paper judged to be the best in vascular plant or bryophyte systematics based on a doctoral dissertation published during the previous year.

Papers published during 1991 are now being accepted for the 24th annual award, which will be presented in the middle of 1992. Reprints of such papers should be sent to:-

Dr P. Mick Richardson
Greenman Award Committee
Missouri Botanical Garden
P.O. Box 299
St Louis. Missouri. 63166-0299.
U.S.A.

In order to be considered for the 1992 award, reprints must be received by 1 June 1992.

Mick Richardson
Manager of Graduate Studies
Missouri Botanical Garden

Change of Publisher for Flora Malesiana

From this year onwards, the Rijksherbarium / Hortus Botanicus (L) has taken over the publication and distribution of *Flora Malesiana* from Kluwer Academic Publishers. The *Flora* will be published in-house, and the high standard of printing will be maintained. In order to increase the circulation, future installments will be offered for sale at much lower prices than had to be charged by the commercial publishers. Previously published issues and volumes are also available (unless out of stock) at much reduced prices. For detailed price information, please write to:-

Rijksherbarium / Hortus Botanicus
Publications Department
P.O. Box 9514
2300 RA Leiden
The Netherlands.
Fax 31 (71) 273511

The first installment to be issued from Leiden will be II, 2(1) in the Fern series.

P. Baas
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Rijksherbarium / Hortus Botanicus

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This list will be kept up to date, and will be published in each issue.
Please inform David Bedford (NSW) of any changes or additions.

The Society

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

Membership

Membership is open to all those interested in plant systematics. Membership entitles the member to attend general meetings 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 January 1 each year.

The Newsletter

The *Newsletter* appears quarterly, 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 published pages in length) will be considered.

Contributions should be sent to one of the editors at the address given below. They should preferably be submitted 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.

The deadline for contributions is the last day of February, May, August, and November.

All items incorporated in the *Newsletter* will be duly acknowledged. Authors alone are responsible for the views expressed, and statements made by the authors do not necessarily represent the views of the Australian Systematic Botany Society Inc. *Newsletter* items should not be reproduced without the permission of the author of the material.

Notes

ASBS annual membership is $22 (Aust); full-time students $12. Please make cheques out to ASBS Inc., and remit to the treasurer. All changes of address should be sent directly to the treasurer, as well.

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 one of the *Newsletter* editors for further information.

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