



Australian Systematic Botany Society

CSIRO HERBARIUM
- 6 JUL 1983
CANBERRA

NEWSLETTER

No. 35 JUNE 1983



Amylotheca dictyophleba
(F. Muell.) Tieghem

Price: \$2.00
Registered by AUSTRALIA POST
Publication No. QBH3340

NO 589 (au) Au

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Applied Plant Systematics:

CASE STUDIES IN THE CONSERVATION OF RARE WESTERN AUSTRALIAN FLORA

Stephen D. Hopper

Western Australian Wildlife Research Centre

The following paper was delivered at the November 1982 meeting of the Melbourne Chapter of A.S.B.S.

Plant systematics is very much an applied field of science because of the need to use names for communication in all aspects of biology. In this presentation, I wish to discuss the application of systematics to a rather new field of botanical enquiry, the conservation of rare flora, with particular reference to the administration and enforcement of the Western Australian Wildlife Conservation Act.

This Act, proclaimed in 1980, empowers the Minister for Fisheries and Wildlife to confer legislative protection upon plants considered likely to become extinct, rare, or otherwise in need of special protection. The legal procedure for so doing involves publication of a schedule of rare flora in notices in the Government Gazette. Additions or deletions to the schedule may be made by the Minister by publication of a revised list of gazetted rare flora.

Plants are recommended to the Minister for gazettal as rare by the Western Australian Wildlife Authority which is, in turn, advised by its Flora Committee. Botanists on the Flora Committee represent private industry, universities and government bodies including the Department of Fisheries and Wildlife, the Western Australian Herbarium and Kings Park and Botanic Garden. Because of the large number of Western Australian plants that could be regarded as rare (e.g. Marchant and Keighery (1979) list more than 2 000 species as poorly collected or presumably rare), the Flora Committee decided to recommend for gazettal only those taxa that had been formally named, that had been searched for thoroughly in recent years, and that had less than a few thousand reproductively mature plants known in the wild, or that had more individuals than this but they were inadequately represented in nature reserves and national parks.

To date two schedules of rare flora have been published. The first, appearing in the Government Gazette of 14 November, 1980, listed 100 taxa (Rye and Hopper 1981), while the more recent schedule of 12 March, 1982 deleted 4 and added 36 taxa, making a total of 132 plants gazetted as rare at the time of writing (Table 1; Patrick and Hopper 1982).

Gazetted rare flora cannot be taken, damaged or destroyed in the wild on Crown or private land without the special written consent of the Minister. Because the Wildlife Conservation Act binds the Crown, this requirement applies to Government officers as well as to private citizens. A fine of up to \$1,000 may be imposed on persons who destroy rare flora without written ministerial permission. Private landowners may apply for compensation if they are refused permission by the Minister to take gazetted rare flora.

The selection of taxa to be investigated and recommended for gazettal as rare depends very much on the advice of botanists who have an intimate field knowledge of their chosen groups. Leads are also gleaned from the lists in Marchant and Keighery (1979), Leigh *et al.* (1981), and Rye (1982), as well as from the taxonomic literature. I would appreciate hearing about rare W.A.

taxa, described and undescribed, from interested readers of the A.S.B.S. Newsletter.

The long list of potential candidates for gazettal as rare is being investigated by officers of the Department of Fisheries and Wildlife, by a small team of consultants employed on State and Government and Australian Heritage Commission funds, and by botanists from other organisations.

The Department of Fisheries and Wildlife's program has involved work at two levels: major collations of existing data, and more circumscribed studies of the distribution and biology of selected rare plants. Collations of existing data have involved extensive use of the library and collections at the Western Australian Herbarium (I am grateful to Dr Green and his staff for facilitating this work). Rye (1982a) prepared a list of 527 geographically restricted species (ranges less than 100 km) for southern Western Australia. Subsequently, a number of consultants have prepared collations of specimen information, published descriptions and maps of rare and restricted taxa of major regions in southern Western Australia such as the Swan Coastal Plain and Darling Scarp, the Northern and Southern Sandplains, the Wheatbelt, and the Jarrah and Karri Forests.

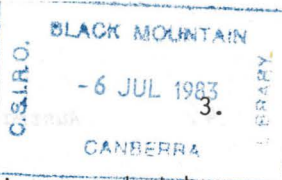
These regional collations are then used as working documents for planning field surveys. Usually 3 to 6 taxa occurring in the same district within a region are selected for detailed survey by a consultant. Three months are spent on each such survey involving field work of one month and thereafter preparing a report which shows the roads and tracks traversed, the precise locations of rare plant populations discovered, details of population size, age structure, habitat, phenology, pollination, land ownership, threats of destruction etc. Because precise locations are documented, these survey reports are kept as confidential unpublished documents for internal departmental use. However, results omitting locality information have been published in the form of colour leaflets (Rye 1982b), scientific papers (e.g. Hopper *et al.* 1982), departmental research reports (Rye and Hopper 1981; Patrick and Hopper 1982), and in the Department's colour wildlife magazine SWANS.

Survey findings are acted upon by the administrative and enforcement staff of the Department, who determine land ownership and then contact the owners to inform them about the rare flora on their property and their legal obligations under the Wildlife Conservation Act. Co-operation is sought in conserving the rare flora. In some instances a mutually agreeable purchase of the land in question by the State Government has been negotiated.

The time-consuming and expensive procedure outlined above clearly needs to be based on sound systematics. Confusion over the identity of gazetted rare flora would be wasteful of public monies and, should prosecution be entertained, such confusion could be legally damaging to the State.

The following case studies illustrate a range of situations relating to rare flora that have required systematic investigation. Problems have arisen at a number of levels in the taxonomic hierarchy, and have required use of many of the techniques available to modern systematic botanists.

In 1978 a rare localised subspecies of the species currently known as *Conostylis bealiana* F. Muell. (Haemodoraceae) was discovered east of Merredin. Subsequent surveys indicate that this subspecies should be recommended for gazettal as rare as soon as it is described. The generic placement of *C. bealiana* has been in some doubt (Green 1961; Keighery 1981) because it shares a number of characters with *Blancoa* Lindl. as well as with *Conostylis*.



Consequently, an investigation of generic limits in *Conostylis* was undertaken drawing on information on morphology, multivariate morphometrics, ecology, phenology and chromosome numbers. The conclusion, soon to be published, is that *Conostylis bealiana* should be transferred to *Blancoa* (together with the two species currently known as subspecies of *Conostylis androstemma* (Lindl.) F. Muell.).

Moving down the taxonomic hierarchy, a rare taxon of uncertain status but related to *Conostylis teretiuscula* F. Muell. and to *C. dielsii* W.V. Fitzg. was collected by several botanists near Wongan Hills in 1976. An examination of relationships within this species group was called for. Using the classical techniques of undertaking a field collection program, examining types and making critical morphological observations, it was established that this rare taxon warranted specific status. Recently named *C. wonganensis* (Hopper 1982), it is now under consideration for gazettal as rare.

Problems of geographical variation and the recognition of rare subspecies have arisen in several groups. For example, a very rare pure yellow form of the common catspaw (*Anigozanthos humilis* Lindl.: Haemodoraceae) has been known from the Mogumber area since the turn of the century. A multivariate morphometric survey of geographical variation in floral morphology throughout the 900 km range of *A. humilis* was undertaken. It demonstrated that the Mogumber form could be distinguished by its flora size and shape (relatively short broad perianths) as well as by its colour. In addition, the Mogumber form was germinated in cultivation and the resulting plants were cross-pollinated among themselves and with typical *A. humilis*. The Mogumber form bred true and produced intermediate hybrids with the typical form (Hopper 1978), indicating that the observed morphological differences have a strong genetic base. The Mogumber form consequently will soon be named as a subspecies and recommended for gazettal as rare.

Very rare poorly collected taxa pose particularly difficult conservation problems. *Caladenia lavandulacea* Rogers is a case in point. Several searches for this elusive orchid have been undertaken in the western central wheatbelt where the single type specimen was collected. While a few specimens that approximately match the original description have turned up, it was not until the holotype at AD was examined and photographed recently that it was realised that none of the modern collections are typical *C. lavandulacea*. Examination of the type did suggest that the species was probably a hybrid of *C. sigmoidea* Rogers and *C. dougliae* O.H. Sargent. A fresh look at specimens at PERTH by A.P. Brown, after seeing photographs of the holotype, unearthed material from Mt Jackson that may well be *C. lavandulacea*. A search at this locality is now planned.

Even though *C. lavandulacea* may prove to be a hybrid, there are sound reasons for continuing its gazettal as a rare plant. Natural hybrids are of considerable scientific interest, throwing light on the genetic relationships of their parents, and sometimes giving rise to new species in their own right. It is essential to conserve natural hybrids *in situ* so that the ecological and genetic conditions under which they arise may be studied and their potential to establish new evolutionary lineages may be assessed. For these reasons, I would urge botanists dealing with the W.A. flora to include descriptions of rare hybrids in their taxonomic works so that the option of gazettal as rare can be considered.

Lastly, I would like to mention two instances where some confusion prevails in the identification and drawings of rare taxa illustrated by Rye and Hopper (1981). The first involves *Verticordia helicrysantha* F. Muell. ex Benth. In 1982 K.R. Newbery drew my attention to the discovery by N. Stevens of a

Verticordia population near Cape Riche that had features more in accord with Bentham's description of *V. helicrysantha* than did the specimens from the Fitzgerald River National Park that were described and illustrated by Rye and Hopper (1981). The latter specimens, which had been determined as *V. helicrysantha*, appear to be a distinct species or subspecies. Thus, the treatment of *V. helicrysantha* in Rye and Hopper (1981) may require amendment once the type of this species has been examined.

The second example concerns *Eucalyptus johnsoniana* Brooker et Blaxell. Two drawings of nuts of this gazetted rare mallee were provided by Rye and Hopper (1981: 97), one of a solitary mature fruit (drawn from Brooker 5003 at PERTH) and the second of two "immature" fruits (drawn from J.S. Beard 7814). A consultant was employed to search for and map *E. johnsoniana* in 1981. During the course of the survey he remarked upon the variability of the taxon. This did not immediately arouse my attention as I had not seen the variants in the field. Once the survey was completed, the mapped information was acted upon by administrative staff of the Department of Fisheries and Wildlife, and land owners were notified about *E. johnsoniana* on their properties. Subsequently, field work in collaboration with E.A. Griffin and M.I.H. Brooker established the presence of at least two rare undescribed monocalypts in the region where *E. johnsoniana* occurs. One of these had been mapped by the consultant as a variant of *E. johnsoniana*, and was the taxon collected by J.S. Beard whose mature fruits were erroneously illustrated as immature fruits of *E. johnsoniana* by Rye and Hopper (1981). Fortunately, the undescribed species warrants gazetted as rare in its own right, so the error made will have no serious ramifications regarding the land owners who have been contacted. However, this case impressed upon me the need to ensure that voucher specimens are collected on surveys of gazetted rare flora and then to compare these specimens critically against type descriptions (and type specimens whenever possible).

Systematics clearly constitutes an essential part of an effective flora conservation program in Western Australia. In closing, I would ask members of A.S.B.S. to consider devoting some of their energies in the immediate future towards the investigation and formal description of rare plants. The collection of papers devoted to describing rare species of the Wongan Hills in *Nuytsia* 4(1) 1982 illustrates the kind of co-operative effort that is possible.

I am grateful to Dr B.L. Rye for commenting on the manuscript.

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Table 1. Notice listing rare flora in the Government Gazette, W.A. of March 12, 1982.

WILDLIFE CONSERVATION ACT 1950-1980.

Section 23F.

Notice.

F & W 616/80.

THE Minister for Fisheries and Wildlife acting under the provisions of subsection (2) of section 23F of the Wildlife Conservation Act 1950-1980 hereby declares that protected flora of the taxa listed in the schedule to this Notice growing in its original state and not in its domesticated or cultivated state are rare flora throughout the whole of the State.

The previous Notice relating to rare flora published in the Government Gazette on 14 November 1980 is hereby cancelled.

GORDON MASTERS,

Acting Minister for Fisheries and Wildlife.

Schedule.

<i>Acacia anomala</i>	<i>Diuris purdiei</i>	<i>Halosarcia entrichoma</i>
<i>Acacia aphylla</i>	<i>Dodonaea hackettiana</i>	<i>Hibbertia bracteosa</i>
<i>Acacia argutifolia</i>	<i>Drosera occidentalis</i>	<i>Hibbertia miniata</i>
<i>Acacia depressa</i>	<i>Drummondita ericoides</i>	<i>Hydrocotyle lemnoides</i>
<i>Acacia guinetii</i>	<i>Drummondita hassellii</i>	<i>Kennedia beckxiana</i>
<i>Acacia simulans</i>	var. <i>longifolia</i>	<i>Kennedia glabrata</i>
<i>Adenanthos cunninghamii</i>	<i>Eremophila denticulata</i>	<i>Kennedia macrophylla</i>
<i>Adenanthos detmoldii</i>	<i>Eremophila inflata</i>	<i>Lambertia echinata</i>
<i>Adenanthos dobagii</i>	<i>Eremophila merrallii</i>	<i>Lambertia orbifolia</i>
<i>Adenanthos ellipticus</i>	<i>Eremophila microtheca</i>	<i>Lambertia rariflora</i>
<i>Adenanthos eyrei</i>	<i>Eremophila resinosa</i>	<i>Lasiopetalum bracteatum</i>
<i>Adenanthos ileticos</i>	<i>Eremophila serpens</i>	<i>Lechenaultia pulvinaris</i>
<i>Adenanthos pungens</i>	<i>Eremophila virens</i>	<i>Lechenaultia superba</i>
<i>Adenanthos velutinus</i>	<i>Eremophila viscida</i>	<i>Leucopogon obtectus</i>
<i>Aponogeton hexatepalus</i>	<i>Eucalyptus aquilina</i>	<i>Myoporum salsoloides</i>
<i>Asplenium obtusatum</i>	<i>Eucalyptus bennettiae</i>	<i>Pityrodia augustensis</i>
<i>Baeckea arbuscula</i>	<i>Eucalyptus brachyphylla</i>	<i>Pomaderris bilocularis</i>
<i>Banksia brownii</i>	<i>Eucalyptus burdettiana</i>	<i>Pomaderris grandis</i>
<i>Banksia chamaephyton</i>	<i>Eucalyptus caesia</i>	<i>Prasophyllum lanceolatum</i>
<i>Banksia cuneata</i>	<i>Eucalyptus calcicola</i>	<i>Prasophyllum triangulare</i>
<i>Banksia goodii</i>	<i>Eucalyptus carnabyi</i>	<i>Ptychosema pusillum</i>
<i>Banksia meisneri</i>	<i>Eucalyptus coronata</i>	<i>Pultenaea skinneri</i>
var. <i>ascendens</i>	<i>Eucalyptus desmodenstis</i>	<i>Rhizanthella gardneri</i>
<i>Banksia sphaerocarpa</i>	<i>Eucalyptus exilis</i>	<i>Ricinocarpus trichophorus</i>
var. <i>dolichostyla</i>	<i>Eucalyptus insularis</i>	<i>Roycea pycnophylloides</i>
<i>Banksia tricuspis</i>	<i>Eucalyptus johnsoniana</i>	<i>Sowerbaea multicaulis</i>
<i>Boronia tenuis</i>	<i>Eucalyptus kruseana</i>	<i>Spirogardnera rubescens</i>
<i>Caladenia bryceana</i>	<i>Eucalyptus pendens</i>	<i>Stachystemon axillaris</i>
<i>Caladenia gemmata</i>	<i>Eucalyptus rhodantha</i>	<i>Stawellia dimorphantha</i>
forma <i>lutea</i>	<i>Eucalyptus steedmanii</i>	<i>Styldium coroniforme</i>
<i>Caladenia lavandulacea</i>	<i>Franklandia triaristata</i>	<i>Styldium expeditonis</i>
<i>Caladenia triangularis</i>	<i>Gastrolobium appressum</i>	<i>Styldium galioides</i>
<i>Casuarina fibrosa</i>	<i>Gastrolobium glaucum</i>	<i>Synaphea pinnata</i>
<i>Conostylis misera</i>	<i>Grevillea baxteri</i>	<i>Tegicornia uniflora</i>
<i>Conostylis pauciflora</i>	<i>Grevillea cirsifolia</i>	<i>Thelymitra fuscolutea</i>
<i>Cooperookia georgei</i>	<i>Grevillea drummondii</i>	var. <i>stellata</i>
<i>Darwinia acerosa</i>	<i>Grevillea dryandroides</i>	<i>Thelymitra macmillanii</i>
<i>Darwinia carnea</i>	<i>Grevillea inconspicua</i>	<i>Thelymitra psammophila</i>
<i>Darwinia collina</i>	<i>Grevillea infundibularis</i>	<i>Urocarpus niveus</i>
<i>Darwinia macrostegia</i>	<i>Grevillea involuocrata</i>	<i>Urocarpus pheballoides</i>
<i>Darwinia masonii</i>	<i>Grevillea prostrata</i>	<i>Verticordia helichrysantha</i>
<i>Darwinia meeboldii</i>	<i>Grevillea ripicola</i>	<i>Verticordia staminosa</i>
<i>Darwinia oxylepis</i>	<i>Grevillea saccata</i>	<i>Villarsia calthifolia</i>
<i>Darwinia squarrosa</i>	<i>Hakea aculeata</i>	<i>Wurmbea humilis</i>
<i>Darwinia wittwerorum</i>	<i>Hakea megalosperma</i>	<i>Wurmbea tubulosa</i>
<i>Daviesia euphorbioides</i>	<i>Halosarcia bulbosa</i>	

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- Rye, B.L. (1982b). Rare Western Australian Plants (Leaflet series). 1 *Caesia* (*Eucalyptus caesia*); 2 Green Honeysuckle (*Lambertia rariflora*); 3 Fitzgerald Eremophila (*Eremophila denticulata*); 4 Good's Banksia (*Banksia goodii*); 5 Lesueur Hakea (*Hakea megalosperma*); 6 Mogumber Bell (*Darwinia carnea*); 7 Augusta Kennedia (*Kennedia macrophylla*); 8 Underground Orchid (*Rhizanthella gardneri*). Dept Fish. Wildl.: Perth.
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D.S.I.R./C.S.I.R.O. SPONSORED WORKSHOP

Botanists from New Zealand and Australia will meet for a workshop in Melbourne on 24-25 October, 1983, immediately before the next CHAH meeting. The topics to be discussed have not been finalised, but will cover plant-systematic research of special interest to workers in both countries. Problems will be raised resulting from different taxonomic concepts and nomenclature, applied to native and naturalised Vascular Plants occurring on both sides of the Tasman Sea. Participants not otherwise engaged will be able to continue discussions informally, while some will be attending the CHAH meeting on 26-27 October, and a combined excursion may be organised afterwards.

The sponsoring organisations can only support their own staff members financially, but it is hoped that some other botanists, particularly from herbaria and universities in New Zealand and Australia, will be able and willing to participate. Those who are interested are requested to respond within a few days of receiving this Newsletter. Further information can be obtained from Dr. Andrew Kanis, Herbarium Australiense, C.S.I.R.O., P.O. Box 1600, Canberra City, A.C.T. 2601, Tel. 062/465915.

Book Review

Flora of Australia, Volume 8, Lecythidales to Batales. pp. 420, 67 figures. Canberra: Australian Government Publishing Service, 1982. Price: \$34 (\$29 soft cover)

The Flora is a constantly evolving form of scientific publication. The new Australian Flora is partly monographic and partly synthetic, a thorough modern treatment building on advances made by other successful recent floras of similar size, particularly *Flora Europaea*, but dealing with species in more detail.

Volume 8, the third in the series to be published, the second to contain flora text, and the first to deal with more than one family, gives the opportunity to compare styles and content among families written by different authors.

At 420 pages this is twice the size of the previous volumes, Vols 1 and 29, and, at a recommended retail price of \$A34.00 (\$A29.00, soft cover), rather more expensive. To many, the eventual cost of the whole series of over 50 volumes must be cause for concern.

High quality printing, layout, and binding have produced a durable and attractive volume graced with several plates of excellent sharp colour photographs and ample professionally executed line drawings. Although the styles of the latter vary considerably, especially in the use of hatching rather than stippling for the Flacourtiaceae, the use of only one artist within a family gives the necessary consistency.

A brief introduction sets out the scope of the volume both taxonomically and geographically. Sensibly Macquarie Island is included. Transient casuals are not described in Flora of Australia, but some of the more important ones are keyed out. The inclusion of "alien taxa established in one or more localities" seems to place the cut-off point in the right place.

Nineteen families are treated in Volume 8, arranged in a phylogenetic sequence after Cronquist. The largest are Brassicaceae, Droseraceae and Frankeniaceae.

The descriptions of families, genera and species naturally vary in length, but all are concise, and I detected no inconsistencies in length or content among descriptions within their next higher taxon. Abbreviations are kept to a minimum, making the text more readable. Descriptions are based on Australian material, except for a new naturalised taxa. Although this is sensible for species and perhaps genera, it could be misleading in the case of families where some, e.g. Cistaceae, thus appear to have a narrow circumscription. Each species description is followed by outlines of the habitats occupied and distribution.

Indented keys are a feature which will please many users, and most dichotomies are roughly equal, often reducing the number of decisions and thus the chances of error. The keys I tried worked well. The provision of separate keys for use with male and female flowers of groups showing monoecy and dioecy is commendable. In some keys dichotomies may be based on single characters rather than two or three but this is often a result of the largely uncorrelated patterns of variation within the group, such as in the Brassicaceae. However, in ultimate couplets, such as those separating *Coronopus* from *Cardaria* (p. 234) or *Rorippa* from *Lunaria* (p. 235) the addition of a second character would have been a simple way to enhance the key.

The inclusion of information on synonymy is valuable. Types are cited alongside the names they define so that taxonomic and nomenclatural synonyms are readily distinguished. I suspect though that, as in the New Zealand flora, many Australian plant names may be inadequately typified. The all-too-frequent annotation "n.v." (not seen) after citation of a type lends strength to that suspicion.

I like the distribution maps in this flora. With 15 maps to a page, always following the relevant species descriptions, they convey a wealth of information about every species without taking up a disproportionate amount of space (30 pages, 7% in all). Map 330 does not agree with the distribution described in the text.

The citation of collections for each taxon is perhaps more a feature of a monographic flora or revision, but, if the collections chosen are widely distributed to state herbaria, they should be valuable for a large country with many localised species.

A minor peculiarity, although not inconsistent with the International Code of Botanical Nomenclature, is the omission of hyphens from compound specific epithets. Familiar names such as *Capsella bursa-pastoris* and *Rorippa nasturtium-aquaticum* look decidedly strange treated this way.

It is uncommon nowadays for new combinations and diagnoses of new taxa to be given in a flora, but in this volume 39 are included in an appendix, with other nomenclatural notes. Unfortunately some authors were not able to provide names for some species. Thus, for example, we have *Capparis* sp. A (albeit included under "doubtful taxa") and *Mukia* spp. A-E alongside two named species of their genus. This is unsatisfactory in a flora which will undoubtedly be a standard reference for many years.

The task ahead of Australian plant taxonomists is an immense one: the completion of a flora treating about 18 000 vascular and several thousand non-vascular species, a total of perhaps 25 000. With the publication of Volumes 1, 29 and now 8 they have made a most promising start and the next two decades' work will surely produce a flora in keeping with the botanical achievements of the 20th century and aspirations of the 21st.

Phil Garnock-Jones
Botany Division, D.S.I.R.,
Christchurch, New Zealand.

ASBS-ANZAAS, Perth 1983

The eighth general meeting of the Society and associated programme of section 12 of ANZAAS was held during the week of 16 to 20 May. The main activities of the Society centred around the general meeting, a full day symposium on "The Systematics and Biogeography of the Myrtaceae", a full day excursion and an ASBS-ANZAAS Section 12 dinner.

The general meeting took place on the Tuesday evening and was followed by a short presidential address "Liliaceae, a case for inflation" in which it was proposed that several segregate families replace the existing widely circumscribed family.

The day excursion took us to view both sand plain communities and the Jarrah forest. This was a most pleasant occasion as we had two guides who were very knowledgeable about the flora. For most of us seeing *Pilostyles hamiltonii* (a stem parasite belonging to the Rafflesiaceae) in the field was a highlight of the expedition.

Following the day excursion there was a dinner at Murdoch University. This was a very enjoyable social occasion and we welcomed the opportunity of hearing Dr Peter Bridgewater speak on the current objectives of ABRS.

The Symposium was based upon eight papers and a poster display. These were diverse in content providing sufficient variety to maintain keen interest throughout the day.

The day of the Symposium was "rounded-off" with the Nancy Burbidge Memorial Lecture delivered by Emeritus Professor Brian Grieve. He spoke on the history of the Key to the Flora of temperate Western Australia, the full text of which will be published in a later Newsletter.

The Society was well served by the Perth Chapter and all visiting members wish to thank Dr Neville Marchant, Dr Bernard Dell and Mr Greg Keighery for their efforts in providing such splendid hospitality, organising the field excursion and so successfully integrating our program with ANZAAS.

Trevor Clifford and
Gordon Guymer

Minutes of 8th General Meeting

The 8th General Meeting of the Society was held at the Botany Department, University of Western Australia, Perth on Tuesday, 17 May, 1983 at 7.30 p.m.

The President, Dr H.T. Clifford welcomed the 19 members and 3 visitors present.

Apologies were received from T.E.H. Aplin, N.S. Lander, M.D. Crisp, B.A. Barlow and J.G. West.

1. Minutes of the 7th General Meeting were accepted as published in the *Austral. Syst. Bot. Soc. Newsletter* 28: 3-8 (1981).

2. President's Report. The President outlined the main activities during his term of office.

A letter was sent to the then Minister for Primary Industry Mr Nixon, expressing the Society's opposition to the proposed Plant Variety Rights Bill.

A donation of \$50 was sent to the Australian Conservation Foundation to support the campaign for the Franklin River in Tasmania. The President's article 'Conservation and the Society' in Newsletter 31: 15 (1982) announcing this and requesting correspondence on the matter brought no response from members.

The Society's membership list was supplied to the Tasmanian Wilderness Society to assist the latter's distribution of 'no dams' brochures, with the condition it be used for this purpose only and that the list be destroyed after use.

The recent questionnaire to members concerning assistance for Council members to attend mid-term meetings brought a response from 38 members, but not all answered every question. There was strong support (3:1 in favour) of Society funds being used to assist Councillors even if it necessitated an increase in subscriptions. Suggested increases ranged from \$1 to \$5. Support for the proportion of the fare to be provided was 100% (13), 75% (4), 50% (5), 25% (0) and a fixed maximum amount (3). Votes were 5:1 against candidates standing for Council only if they could pay their own fares to meetings. On the geographical spread of Council positions, 3 members considered that positions must be wide-spread, 28 that they should be and 4 that it is not necessary to have Council positions widespread.

The book 'Evolution of the Flora and Fauna of Arid Australia' (edited by W.R. Barker and P.J.M. Greenslade) was published late in 1982. Pre-publication sales were 220 and the sales now total 632 (see Treasurer's Report).

A letter was sent to the Director, Office of Forests, Papua New Guinea appealing for support for the herbarium at Lae.

There is cause for concern at the present level of membership. More professional taxonomists should be encouraged to join the Society.

The President expressed his thanks to the Secretary, Dr J.G. West and this was supported with acclamation.

3. Treasurer's Report. In the Treasurer's absence the following report was presented by Mr P. Lumley. The Summary of the Treasurer's Report for the financial year of 1981 and 1982 is based on audited accounts. The 1983 records will be audited at the end of this year.

(i) The N.T. Burbidge Memorial Lecture: Only \$15.00 received in 1981 and no donations since. The members are urged to renew and maintain their commitment to this worthy lecture series.

(ii) Flora of Central Australia: Donations from the various State Government provided \$18,500.00. The Botanic Gardens of Adelaide donated \$2,500.00 (1981 financial report "Term Deposit Account"). Total credit for Flora of Central Australia = \$21,000.00. \$20,000 paid to the publishers, A.H. & A.W. Reed (refer 1981 and 1982 Financial Reports). \$71.75 received from Royalty payments (1983 Financial Report).

(iii) Evolution of the Flora and Fauna of Arid Australia: The Society invested \$1,000.00 (1982 Financial Report) in this publication (Total cost \$21,678.00), which entitles it to a pro rata share of sales. At this stage (6 months after the appearance of the book) \$417.47 has been received (1983 Financial report). Sales to date (412, excluding a pre-publication sale of 220 copies to CSIRO) have brought the publishing venture about halfway to breaking even, but reviews in Australian and overseas periodicals are needed to maintain the momentum of sales.

(iv) 13th International Botanical Congress/ASBS Dinner: The Society cleared \$39.40 from the Dinner (Credit \$2,799.00, Debit \$2,739.60) (1981 and 1982 Financial Report, respectively).

(v) Austral. Syst. Bot. Soc. Newsletter: Note: All figures include printing, collating, trimming and postage costs.

The *Newsletter* has undergone many changes since the last Treasurer's Report (*Austral. Syst. Bot. Soc. Newsletter* 28: 5 (1981)). These changes were initiated because of financial problems or have subsequently led to financial problems. Number 27 was the last one to be produced in Western Australia partly because of the high cost to produce larger issues (e.g. Number 26). Numbers 28-30 were produced at the University of Adelaide. During the time that these issues were produced at Adelaide it was possible to publish larger issues at lower prices. Numbers 31-34 have been produced in Brisbane. Initially, the change in format resulted in a significant increase in the publication cost. A change in the Publisher and a reduction in the number of pages per issue has now stabilised the cost of the *Newsletter* at about \$470.00 per issue. This is equivalent to 70-71% of the Society's subscriptions.

In my opinion the Society must seriously consider whether it is still viable to continue to post the *Newsletter* airmail to overseas members. Postage cost of each *Newsletter* is \$0.17 within Australia, but \$2.00 to Europe, \$1.75 to north and south America, and \$1.00 to Papua New Guinea and New Zealand. Total postage per issue is about \$50.00 for the c. 300 Australian members, whereas it is about \$46.00 for the 30 Overseas members. To reduce the production costs of the *Newsletter* I suggest that those overseas members who want the *Newsletter* to be sent by airmail should pay the postage, otherwise surface mail postage should be used for all members, the only exception being that the ABL0 should still receive the *Newsletter* by airmail. This would represent a

