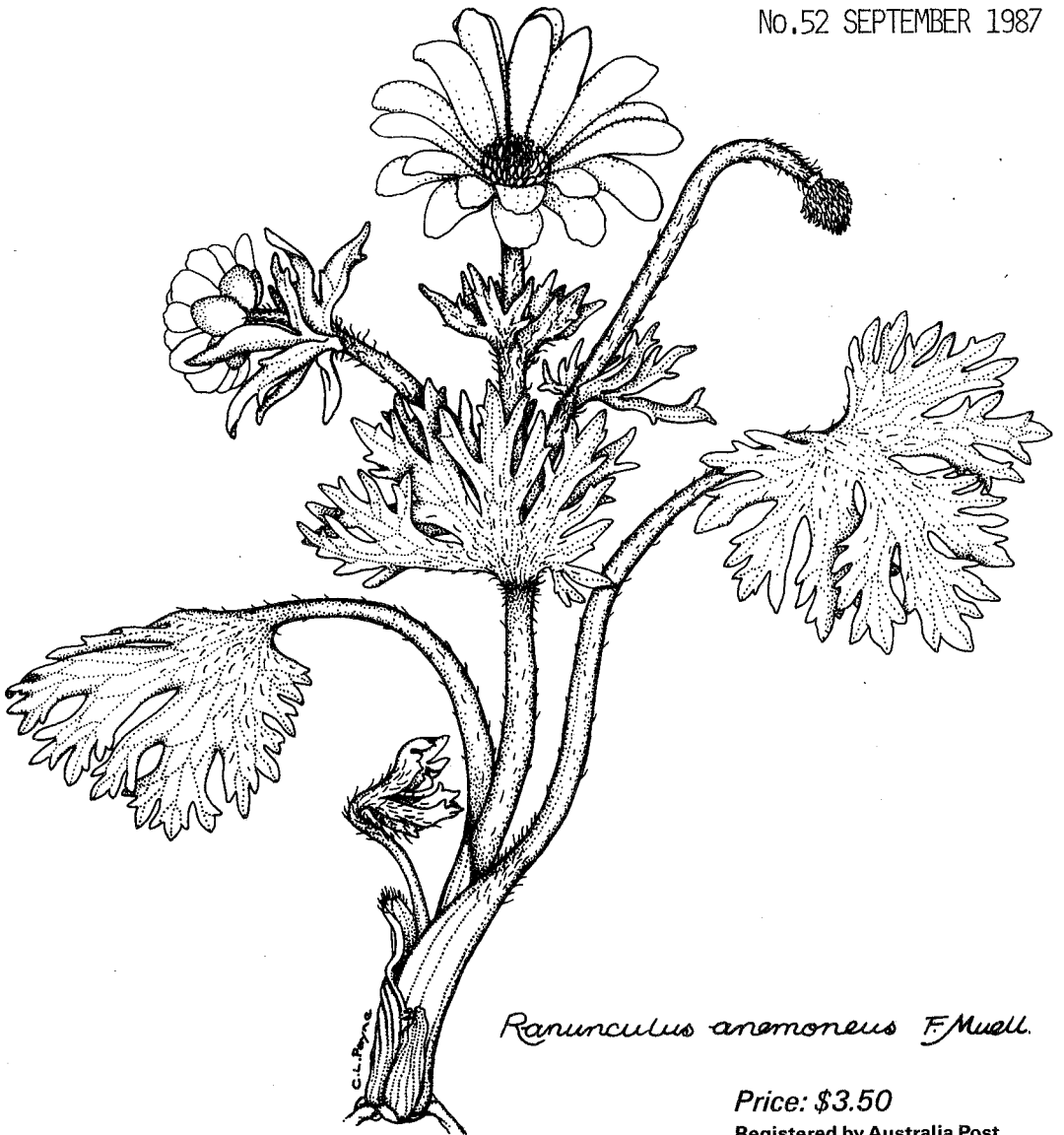
Australian Systematic Botany Society NEWSLETTER

No.52 SEPTEMBER 1987



Ranunculus anemoneus F.Muell.

Price: $3.50

Registered by Australia Post
Publication No. NBH 8068

AUSTRALIAN SYSTEMATIC BOTANY SOCIETY
INCORPORATED

OFFICE BEARERS

President

Dr B.G. Briggs
National Herbarium
Mrs Macquaries Road
SYDNEY, N.S.W. 2000

Vice President

Dr J.G. West
Australian National Herbarium
C.S.I.R.O.
G.P.O. Box 1600
CANBERRA, A.C.T. 2601

Secretary

Dr L. Haegi
State Herbarium
North Terrace
ADELAIDE, S.A. 5000

Treasurer

Dr D.B. Foreman
National Herbarium
Birdwood Avenue
SOUTH YARRA, Vic. 3141

Councillors

Dr M. Crisp
Australian National Botanic Gardens
G.P.O. Box 158
CANBERRA, A.C.T. 2601

Mr R. Henderson
Queensland Herbarium
Meiers Road
INDOOROOPILLY, Qld. 4068

Chapter Convenors

Adelaide	Dr Barbara Randell
Armidale	Mr John Williams
Brisbane	Mr Laurie Jessup
Canberra	Mr Alex George
Darwin	Mr Clyde Dunlop
Hobart	Dr Tony Orchard
Melbourne	Mr Stephen Forbes
Perth	Dr Terry Macfarlane
Sydney	Prof. Roger Carolin
Townsville	Dr Betsy Jackes

Affiliated Society: Papua New Guinea Botanical Society

N.T. BURBIDGE MEMORIAL LECTURE

The generation who knew Nancy Burbidge who died in 1977 must retain memories of her vigour and attractive personality. She is known for her taxonomic revisions, her work for a new Flora of Australia now being achieved, and for her great study on the phytogeography of the Australian flora. Reading this today makes one realise what an enormous change the acceptance of plate tectonics has wrought to our thinking. Her summary just preceded that landslide. I am pleased to honour her memory.

THE DIVERSITY OF SOLANUM FRUITS: A WORLD SURVEY

D.E. Symon
C/o State Herbarium, North Terrace, Adelaide

The fruits of plants include that phase of their life-cycle involving dispersal of seed, which is achieved by many means. We will dispense with those physical dispersal factors like wind or water as the genus Solanum develops berries usually with numerous seeds and birds and mammals appear to be the main dispersal agents. A berry is usually defined as a succulent, indehiscent juicy structure with seeds immersed in the flesh. What can selective forces do with that? An unexpected selective force is the botanical collector who does not like to put juicy, succulent fruits into his plant press. So for a great many species information is still lacking and when one reads on the label "berries green" which they all are when immature, one does not know whether they were green and immature (usually) or green and mature.

Solanum is a very large and obviously successful genus with almost cosmopolitan distribution. The greatest concentration of species is in the warm temperate and tropical regions especially South and Central America. South America still lacks up-to-date Floras in many areas. Because of big gaps in knowledge, the subgeneric groupings of Solanum have by no means been finalised and in my work these remain problem areas. My own work suggests that fruit types are in fact useful characters to assist in defining some subgeneric taxa.

Solanum is well developed on all the southern Continents and it is valid to consider whether this is due to speciation on each Continent from an ancient common stock (which I favour) or that there has been long distance dispersal and then radiation. This has probably occurred too, but is of course not easy to clinch. Those of you who read P. Martin et al. on protein sequences will be intrigued to find that a disparate group of Australian species were more like each other than some were to apparently related species in Africa - for which I have no satisfactory explanation. Considering South America as the core source, the diversity of species groups, especially in Australia and to a lesser extent in Africa, rather argue against long distance dispersal of limited diaspores. The diversity in Australia, with several groups not represented outside the Australian plate, is indicative to me of a long history in Australasia.

The textbooks state that Solanum has a bilocular ovary with axile placentation and so it has if you section most ovaries. By the time the fruit is ripe many modifications may occur. The most obvious of these, elaboration of the placenta, seems related to seed number. Without exception berries with over 100 seeds have variously enlarged placentas. This modification does not seem related to dispersal mechanism as some of

the dry censer like fruits forms e.g. S. tudununggae have it too. It does not appear to be of much taxonomic importance.

The development of secondary septs makes the berry quadrilocular. The migration of the placentae along these septs also occurs in several groups.

The development of innovations from the pericarp is intriguing. These may be so extensive that they separate the seeds into separate compartments, resulting in rather 'hard' berries. What is their function? I have no evidence but would suggest that the septs may reduce insect movement within the berry. The placenta and septs of Capsicum are loaded with Capiscain and it is possible, but by no means demonstrated, that the septs of Solanum may contain alkaloids.

Another rare modification of the berry is the great reduction in seed number to about 8 and the enclosure of each seed is a sclerotic or stony endocarp. This is almost surely related to protection of the seed from some dispersal agent. This was the basis of Hassler's genus Lycianthes (greatly expanded by Bitter). As an aside I can say that the biology of the stone cell granules in the fruit of some species of Solanum is inadequately understood.

More common is the disintegration of the septa to form a unilocular berry with axile placentation. This is confined to smaller, red fruits known to be dispersed by birds. They fall into several taxonomic groups - Sect. Dunaliana centred on New Guinea and group Ferocissimum centred on eastern Australia extending to New Caledonia. Whalen in his analysis of species groups in the prickly Solanum also makes 2 allied groups - with smallish red fruits and pale lavender or white flowers - that occurs in the Caribbean/Antilles Islands. Only one species was available to me for analysis and this also lacks septs and has a unilocular fruit with columnar axile placentation.

One of the largest and economically important groups consists of the tuber-bearing species from South America. At least 150 species are involved, though not all produce tubers. Section Petota fruits are all succulent, green when mature, highly aromatic and are shed with their pedicels onto the ground when ripe. Some even ripen on the ground, Professor Hawkes (the authority on this group) says that nothing is known of their dispersal agents. Now green, aromatic fruits shed when mature are not confined to this taxonomic group. They occur in the Archaesolanum kangaroo apples (simile, symonii, vescum, multivenosum); in Sect. Solanum black nightshades opacum, physalifolium (sarrachoides); in the Australian ellipticum group (ellipticum, cleistogamum); in some Lycianthes in South America e.g. L. rantonei. As far as I can see none occur in Afro/India/Asia. What ties these together? Small ground dwelling marsupials which are common to both areas.

Some very large green-fruited species occur in South America. You may know the large drab green fruits of S. macranthum cultivated as an ornamental. Whalen's Crinitum group with S. lycocarpum to 10 cm in diam. This has an edible pulp and is known to be eaten by local dogs. It has also been recorded that S. vescum with green aromatic fruits is eaten by dingoes.

It is interesting to note that in a number of cases the species with coloured fruits are widely spread - e.g. aviculare, laciniatum, reach oceanic islands, New Zealand and Lord Howe Island, whereas those with green fruits are more restricted, eg. opacum v. nigrum/americanum. Birds take the coloured ones and fly.

Africa has many smallish red and yellow fruit species in several different sections.

Many species have yellowish, mucilagenous berries, relatively large in size (ie. greater than 1-1.5 cm diam.) and occur in all continents. It is believed that these are distributed by mammals, though again evidence is almost non-existent.

It is from these large yellow fruited forms that S. melongena was domesticated. So they attracted man too! You mostly see melongena as a large purple fruit, but that is the result of domestication. In Australia the Aborigines eat S. chippendalei and it may be significant that it is the most widespread of that group of species - through arid Australia, already a camp follower.

Several species in Australia finally form hard dry bony indehiscent fruits. They have evolved from firm, yellow, mucilagenous forms that are rarely if ever succulent. We believe the latter are distributed by mammals. An unfortunate Euro got shot in Western Australia with one in its mouth - about the extent of our data, and it is known that yellow footed rock wallabies in the Flinders Ranges eat S. petrophilum before the bony stage is reached; so possibly these hard, dry berries are a protection against marsupial attack. Most, but not all, grow in rocky sites where wallabies occur. I have not seen them from other Continents.

Unique to Australia are the few species in the Kimberleys that have evolved a censer mechanism. The berry is almost enclosed in a coriaceous calyx tube. The berry within is circumcissile near its base and shrinks and dries to form a loose plug or cap within the globular calyx tube. Seed may be distributed by shaking the plant and it is significant that both species have tall, slender, relatively unbranched stems. Are they whipped about by cyclonic summer storms to pepper the ground with their seeds? These have not been recognised elsewhere.

The only parallel to these capsular forms are the Buffalo burrs of Mexico and south-west America, which dry and open like a capsule. The seeds seem to be distributed by knocking as the burrs are not shed (cf. trample burrs) nor are the plants wind driven roly polys.

Fruits need to be protected from predators. This is achieved by several means. All fruits are cryptically green during the immature phase. Quite a high proportion are protected by intensely prickly calyces - an obvious protection against vertebrates, but doubtful protection against most insects. In some cases S. melanospermum and S. clarkiae the calyx lobes are raised when fruit is mature - asking to be taken. Succulence, aroma and colour develop at maturity.

Many Solanum and Solanaceae contain high levels of alkaloids. This can be interpreted as a defence against predators as the alkaloids can be drastic physiologically. It may be significant that unarmed species like the kangaroo apples have significantly higher levels than the armed species. Note that in nearly all the scattered records available, the alkaloid levels are high in the green fruit and fall as the fruits ripen, often quite dramatically as in kangaroo apples e.g. 3.0 - 0.5%, a logical development for a bird dispersed fruit, protected while green and attractive when ripe.

SPECIFIC DISPERSAL AGENTS

Reptiles - the large land tortoises are herbivores and those on Galapagos are known to eat fruits of tomato and enhance its germination but as major agents they can be dismissed.

Ratite birds - Emu, Cassowary, Rhea, and Ostrich eat a wide variety of fruits. The Emu and Cassowary are known to eat both green and coloured Solanum fruits either on the ground or from the bush. Both have been major dispersal agents.

Birds are major dispersers of seeds and take in particular, succulent, red, black and orange fruits, mostly of small to medium size. The more succulent and less structured a berry is the less grinding in gizzard is needed - so perhaps no septa is a response to bird dispersal.
Flying foxes - known to take several unarmed species in Central America. The fruits are held erect, dull yellow in colour and mostly aromatic.
Mammals - Evidence very scattered. Known to eat some of the yellow fruited forms of medium to large size and known to eat large green aromatic fruits in South America and Australia.

The genus is conveniently divided into two large groups (a) the stellate haired species (b) simple haired species.

TABLE I Stellate haired (except wendlandi) American species

GROUP	AREA	SPP	FRUITS
WENDLANDI	Central America	6	large, ?green
NEMORENSE	Amazon	6	large, ?
YUCATANUM	Central America	4	small, red
CROTONOIDES	Antilles	4	small, red
BAHAMENSE	South America	3	small, red, black
ASTEROPHYTUM	Brazil	3	medium, ?
unnamed	Amazon	5	large, ?
CRINITUM	Amazon-Andes	8	very large, green
POLYTRICHUM	South of South America	8	medium, ?
TORVUM	South America	50	medium, drab green yellow
SUBINERME	Central-South America	3	medium, orange sticky
ERYTHROTRICHUM	Central-South America	25	medium, yellow
LANCEIFOLIUM	Central & South America	15	medium, orange-red
QUITOENSE	North Andes-Pacific	12	large, orange-yellow
MAMMOSUM	American Tropics	20	large, yellow, orange-red
WACHETII	South Brazil	4	medium, green/white
MULTISPINUM	East of South America	7	medium, green/yellow
ROSTRATUM	Mexico-South of U.S.A.	12	medium, dry capsular
SANDWICENSE	Hawaii	3	medium, orange, red, black

From this array appears a correlation between:
(1) large size and green coloured (ripe) fruits
(2) small red fruits
(3) medium yellow to orange fruits.

Note a few white fruits (not in Australia) some capsular forms, no bony fruits, no trample burrs.

TABLE II Stellate haired mainly African

GROUP	AREA	SPP	FRUITS
GIGANTEUM	East Africa	10	small, red-black
ANGUIVI	Africa	40	medium, orange-red
JUBAE	East Africa	5	medium, red
ARUNDO	East Africa	3	large, yellow
INCANUM	Afro-South Asia	12	large, yellow
THRUPPII	Afro-Arabia	3	medium, yellow
BUMELIIFOLIUM	Madagascar	3	medium, hard?
VESPERTILIO	Mexico-Canary Island	4	medium, greenish
Stellate haired Australasian			
DUNALIANUM	Australian Plate	20	small, red
FEROCISSIMUM	Australian Plate	30	small, red-black
MACOORAI	Eastern Australia	8	large, orange/red
HYSTRIX	Australia	8	large, green-black
ELLIPTICUM	Australia	35	medium, yellow, green, bony
DIOICUM	North West Australia	16	large, yellow, bony, dry censer

From this array the same correlation between small red fruits, the limited range in Africa, almost no green, no bony, no dry fruits. In Australia considerable diversity including trample burr, dry and bony, and censer capsular fruits.

TABLE III Simple haired (some dendritic) American species

GROUP	AREA	SPP	FRUITS
PETOTA	South America	100	medium to large, green, lance
BASARTHRUM	Central-South America		large, green, lance
ANARRICHOMENUM	South America	few	small, red-black
JASMINOSOLANUM	South America	6	small-medium, red, black
HERPOSOLANUM	South America	1	-
HERPYSTICHUM	South-Central America	1	large, lance
PTEROIDEA	Central America	5	medium large, lance, white

TABLE III Simple haired (some dendritic) American species

GROUP	AREA	SPP	FRUITS
CHAMAESARACHID	South America	1	small, black
EPISARCOPHYLLUM	South America	2	
GONATOTRICHUM	Central-South America	few	small, yellow, ?
EXTENSUM	Central America	4	medium, white, purple, black
BREVANTHERUM	Central-South America	30	medium, orange yellow
PSEUDOCAPSICUM	South America	4	medium, orange red
GEMINATA	Central-South America	85	medium, green, orange, red, black
LYCIANTHES	Asia, Papua New Guinea, America	50	very variable, green, red, black

This half of the genus shows definate distinctions from the prickly, stellate haired half. No bony, dry or capsular forms occur, the white and lance shapes do not occur in Africa or Australia. The same separation of small red and medium to large green berries, almost no large yellow fruits recognised.

TABLE IV Simple haired (some dendritic) non American species

GROUP	AREA	SPP	FRUITS
SOLANUM	South America/ Cosmopolitan	50	small, black, green, orange
ARCHAESOLANUM	Australian Plate	8	large, green, orange, red
DULCAMARA	Eurasia	5	small, red
NORMANIA	Canary Island	1	small, -
AFROSOLANUM	Africa	20	small, red
BENDERIANUM	Africa	1	small, green
QUADRANGULARE	South Africa	1-2	small, red
LEMURISOLANUM	Madagascar	3	small, apiculate, ?red
MACRONESIOTES	Madagascar	3	-

The same small red association, but not much diversity.

SUMMARY

1. Aspects of the berry.
(a) Solanum has achieved a wide range of size from several mm to 10 cm.

Texture from succulent to mucilagenous, to bony, to dry and capsular. Colours red, yellow, green, purple, black, white, pink, blue, (rare). Some may be scattered by wind but none borne by wind are known, nor are any water borne forms known.

(b) Several capsular forms in Mexico and Australia only.

(c) Dry bony forms whose distribution agent is not known occur in Australia only.

(d) The berry may be protected by a prickly calyx which is relaxed when the fruit is ripe and trample burrs are suspected for several Australian species.

(e) Pubescent fruits occur in the north of South America.

2. Dispersal agents are known to include:

(a) birds, known to take red fruit

(b) bats, known to take orange erect fruits

(c) mammals, known to take largish yellow and large green fruits

(d) vertebrate dispersal agents have collaborated to effect a very successful genus.

3. There are some major divisions in the genus and fruit type is related to taxonomy. There seems to be some continental patterning.

WHAT LESSONS CAN ONE LEARN FROM THIS SURVEY?

(1) From the botanists point of view there are still big gaps in the alpha taxonomic knowledge of Solanum, particularly in regard to knowledge of fruits.

(2) There are still big gaps in knowledge of the structure and chemistry of fruits.

(3) The general biology of fruit dispersal - seed - seedling is little known.

(4) From the zoologist - ecologist viewpoint there are seemingly vast gaps in our knowledge of the plant animal-relationship. I would consider this a major gap in the botanist/zoologist interaction and would plead for more cooperative work.

A NOTE ON GNAPHALIUM L. IN AUSTRALIA

Philip Short
National Herbarium of Victoria

In May, having been pestered for some time about the problems of distinguishing the species of Gnaphalium said to occur in Victoria, I attempted to sort the MEL collections into some sort of order. Visitors to MEL who are in the habit of recognizing more than one spicate species are in for a shock should they delve into our cupboards. I only recognize one. And I also believe that some of the cluster-headed species are better lumped together, at least for the time being. Thus the new checklist for Gnaphalium s. lat., to be included in the forthcoming VICLIST (i.e. 'A census of the Vascular plants of Victoria' by Stephen Forbes), will read something like this:

G. argentifolium Wakefield
G. fordianum M. Gray
G. indutum Hook. f.
G. involucratum Forst. f. s. lat.
syn. G. ensifer Drury; G. gymnocephalum DC.; G. sphaericum Willd.; G. japonicum auct. non Thunb.; G. collinum Labill., nom. illeg.
G. nitidulum Hook. f.
G. polycaulon Pers.
G. purpureum L. s. lat.
syn. G. americanum Mill.; G. calviceps Fern.; G. coarctatum Willd.; G. pensylvanicum Willd.; G. spicatum Lam., nom illeg.; G. subfalcatum Cabr.
G. traversii Hook. f.
G. umbricola Willis
Pseudognaphalium luteo-album (L.) Hilliard & Burtt
syn. G. luteo-album L.
Vellereophyton dealbatum (Thunb.) Hilliard & Burtt
syn. G. dealbatum Thunb.; G. candidissimum Lam. nom illeg.

A few comments are in order.

G. purpureum s. lat. - Spicate cudweeds, Native to America.

A most obvious feature (generally used in keys to the species) by which specimens can be sorted is leaf vestiture. Specimens with leaves which are white-hairy below but glabrous above are readily differentiated from specimens which are similarly hairy on both surfaces. Thus two groups are readily discerned. Using such features as leaf shape, including whether or not the leaves are plane and straight or have the upper surface applied, it is again not difficult to recognize other entities, entities to which names such as G. claviceps, G. subfalcatum etc. can be applied. The catch is that characters which are commonly used to recognize named taxa occur in an array of combinations and it is common to find intermediate specimens which cannot be readily referred to taxa with formal specific rank.

It may be that in some regions, e.g. New Zealand, intermediate specimens are absent or at least uncommon, giving some credence to the desire to recognize a number of species in the G. purpureum complex. However the large number of intermediate specimens housed at MEL have convinced me that this is not desirable in Victoria and probably much of Australia.

Drury (1971) published an account of the spicate American cudweeds in New Zealand and it is his concepts that are apparently followed by Australian botanists who persist in trying to recognize a number of species. But Drury himself clearly had problems in recognizing and deciding the formal rank of taxa. Under his treatment of G. americanum he noted that 'specimens....resemble diminutive plants of G. spicatum with which they are easily confused (cf. Cabrera 1941)' (p.183). Under G. subfalcatum he stated that the species 'belongs to a group of closely related annuals which include G. calviceps, G. pensylvanicum, and a Mexican species....G. stagnale. These entities are difficult to differentiate one from the other; in fact, a monographer would probably consider the three entities conspecific' (p.167). However it is the work of American authors I find most informative. Certainly some of them recognize a number of species (e.g. Correll & Johnston 1970) within the complex but it is quite evident that concepts vary, a fact again noted by Drury (l.c.). Under his treatment of G. coarctatum he noted that 'Cabrera

(1941) experienced great difficulty in giving the precise geographical distribution in the Americas because authors varied greatly in the interpretation of the species' (p.180). Cronquist (1980), in a treatment of the Compositae of the southeastern United States, adopted a broad concept. Thus under G. purpureum he has the following:

> '...woolly annual or biennial....A widespread native Am weed....not entirely restricted to disturbed habitats. The polymorphic var. purpureum, occurring throughout our range and far beyond, has the leaves (except the uppermost) oblanceolate or spatulate and tending to be obviously greener and less hairy on the upper than on the lower surface. Var. americanum (Miller) Klatt; var. spathulatum (Lam.) Ahles; G. spathulatum Lam.; G. peregrinum Fern. The more stable var. falcatum (T. & G.) Lam., occurring in the coastal states....s into tropical Am, has the leaves (except the lowermost) all linear or merely linear-oblanceolate and tending to be about equally hairy on both sides. G. falcatum Lam.; G. calviceps Fern.' (Cronquist 1980, p.178).

It seems absurd that Australian botanists attempt to recognize species in this complex when in their native America there is considerable disagreement as to the limits of species and a broad concept is not uncommonly advocated.

G. involucratum s. lat. - Native to Australia & New Zealand.

Although I expect general agreement for the broad concept proposed for the spicate group I suspect that many will disagree with the reduction of G. ensifer etc. to synonymy under G. involucratum. Most certainly there are some very distinctive taxa and it is conceptually difficult to equate annuals with a single, bisexual floret in each capitulum with stoloniferous perennials with 3-4 bisexual florets per capitulum. But as with the above group, I find that an array of character combinations exists, making recognition of the above listed species somewhat untenable.

Perhaps some infraspecific categories should be formally recognized. Perhaps more taxa should be described. Perhaps after some field work I may change my mind. But for the time-being I see little advantage in attempting to follow Drury's (1973) account. (I should add that I'm not planning a revision of this most unattractive group of plants - they are worse than what I normally work on!)

Alpine species

Gnaphalium argentifolium, G. fordianum, G. nitidulum, G. traversii and G. umbricola are all alpine species. Compared to the introduced spicate group and the more or less lowland native entities in the G. involucratum complex, the alpine taxa seem to be more clearly delimited. Perhaps it has something to do with geographical isolation. However I'm not completely happy with specific limits in this group either. More taxa should be recognized, e.g. a narrow-leaf form of G. fordianum. The possibility that we share species with New Zealand must also be examined.

General comments

Tony Orchard (HO) visited MEL in early June and made a number of comments worthy of note. A couple related to Gnaphalium. Firstly he reminded me that there is a bit of a problem with generic limits in regard to alpine Tasmania species of Gnaphalium, suggesting a relationship with Ewartia. Secondly he commented that the variation one

sees in Gnaphalium reminded him of blackberries. I'm sure all readers are aware of the difficulties in recognizing members of the Rubus fruticosus species aggregate. I thought the comparison most apt.

Since Tony's visit I've had a bit of a look at reproductive modes in Gnaphalium. Vegetative apomixis is common, with many taxa being stoloniferous. I also believe self-pollination to be the norm.

In Gnaphalium two floret types exist in any one capitulum, bisexual disc florets and filiform female florets. See for example descriptions by Cooke (1986). Thus species of Gnaphalium, as are many members of the Compositae, are gynomonoecious. Ratios of bisexual: female florets are recorded in descriptions. A few examples (using their species concepts) from Drury (1971), Gray (1979) and Cooke (1986) - G. sphaericum 1:16-20(26); G. nitidulum 10:54; G. subfalcatum c. 3:40-50; G. fordianum 3-13:35-36. If you aren't particularly familiar with Gnaphalium then this information may be suggesting that cross-pollination between plants is common. But pollen:ovule ratios (P/Os) suggest otherwise. The following P/Os were determined for a single capitulum from each taxon.

Taxon	Collection	Pollen grains in bisexual floret	Bisexual:Female florets	P/O
G. fordianum	Adair 993	516	4:33	56
G. involucratum (perennial)	Muir 2958	472	4:44	39
G. involucratum	Short 1239	362	1:19	18
G. purpureum	Clarke 1575	800	4:54	55

Pollen:ovule ratios should be determined on a population basis, taking into account variation in floret sex ratios, not to mention pollen grain number, but I suspect that P/Os of less than 100 will still be found should wider samples be taken. Such values are of course indicative of a high degree of inbreeding (e.g. see Short 1981, Lawrence 1985). Looking at plants it is not difficult to see that the transfer of pollen from the inner bisexual floret(s) to the outer female florets could quite readily occur within individual capitula. The maturation of female before bisexual florets would also promote outcrossing.

My collection (Short 1239) of the annual taxon referrable to G. involucratum s. lat. and with the P/O value of 18 is particularly interesting. The spirit collection contains plants with generally mature capitula but on dissecting one capitulum I noticed that the single bisexual floret had not shed its pollen. But all female florets had well-developed fruit. Had a nifty pollinator been at work or is it possible that agamospermy occurs in this taxon? I haven't followed this up but when determing the P/O I saw no evidence of infertile pollen. Nonetheless I'm wondering whether the comparison of Gnaphalium with Rubus is more apt than we thought. (The latter is well known to be agamospermic.) Whatever the case the difficulty in ascertaining specific limits is compatible with observations on the reproductive modes in Gnaphalium.

REFERENCES

Cooke, D.A. (1986). Gnaphalium. In Jessop, J.P. & Toelken, H.R. (eds), 'Flora of South Australia' part 3. (Government Printer:Adelaide). pp. 1516-1519.

Correll, D.S. & Johnston, M.C. (1970). 'Manual of the vascular plants of Texas'. (Texas Research Foundation:Renner, Texas).

Cronquist, A. (1980). 'Vascular flora of the southeastern United States'. vol. 1. Asteraceae. (Uni. North Carolina Press:Chapel Hill).

Drury, D.G. (1971). The American spicate cudweeds adventive to New Zealand: (Gnaphalium section Gamochaeta - Compositae). New Zealand J. Bot. 9:157-185.

Drury, D.G. (1972). The cluster and solitary-headed cudweeds native to New Zealand: (Gnaphalium section Euchiton - Compositae). New Zealand J. Bot. 10:112-179.

Lawrence, M.E. (1985). Senecio L. (Asteraceae) in Australia: Reproductive biology of a genus found primarily in unstable environments. Aust. J. Bot. 33:197-208.

Short, P.S. (1981). Pollen-ovule ratios, breeding systems and distribution patterns of some Australian Gnaphaliinae (Compositae: Inuleae). Muelleria 4:395-417.

FERDINAND MUELLER'S EARLIEST AUSTRALIAN PLANT COLLECTIONS

H.B.S. Womersley,
Department of Botany, University of Adelaide, South Australia, 5000
and D. Sinkora,
National Herbarium of Victoria, Royal Botanic Gardens, South Yarra, Victoria, 3141

Ferdinand Mueller, at the age of 22, arrived at Port Adelaide on the afternoon of 15 December 1847, on the "Hermann von Beckerath", one of 282 passengers landed at Adelaide. From Margaret Willis' account ["By their fruits. A life of Ferdinand von Mueller, Botanist and Explorer." 1949 (Angus and Robertson: Sydney)], it seems probable that Mueller and his two sisters went up to Adelaide that day, and quickly found accommodation at the home of Samuel Davenport. Ferdinand Mueller obtained a position of assistant chemist (he was a pharmacist by training) with Moritz Heuzenroeder in Rundle Street.

Mueller is best known for his collections and publications on the land flora while he was Government Botanist in Victoria. His residence in South Australia, (mainly in Adelaide) was from 15 December 1847 to early August 1852. However, phycologists are aware of two early papers by O.W. Sonder in 1853 and 1855, based largely on collections of Mueller and Mueller's associate C. Stuart in Tasmania. These papers are:

1853 - Plantae Muellerianae. Algae. Linnaea 25 (1852), 657-703 (publ. Dec. 1853). Following the algae, lichens and ferns are described.

1855 - Algae annis 1852 et 1853 collectae. Linnaea 26 (1853), 506-528 [publ. Feb. (pp. 506-512) and May (pp. 513-528) 1855].

The 1853 paper included some 98 genera and 201 species of algae, nearly all marine. The main South Australian localities recorded were Lefevre Peninsula (where Port Adelaide is situated) with 47 species (14 newly described) in 31 genera, Holdfast Bay with 36 species (6 new) in 17 genera, Encounter Bay with 7 species (3 new) in 5 genera, and 23 species (4 new) in 12 genera from Guichen Bay and nearby, with isolated records from Kangaroo Island and Port Lincoln (coll. C. Wilhelmi). The paper also recorded some 68 species (4 new) in 30 genera from Tasmania, based on Stuart collections. Mueller had met Charles Stuart soon after arrival in Adelaide, and he assisted Stuart to go to Tasmania in exchange for collections from there.

Sonder's 1853 paper included the following new genera: Rhodocladia (=Callophyllis Kuetzing), based on C. lambertii (Turner) J. Agardh, from Rivoli and Guichen Bays; Erythroclonium, based on E. muelleri Sonder from Lefevre Peninsula; and Lenormandia, based on L. muelleri Sonder from Rivoli Bay. The 1853 paper included 7 species named by Sonder after Mueller: Caulerpa muelleri and Lenormandia muelleri from Rivoli Bay, and Haliseris muelleri, Halymenia muelleri, Mychodea muelleri, Erythroclonium muelleri and Lomentaria muelleri, all from Lefevre Peninsula. One species, Caulerpa sonderi is ascribed to Mueller as author.

Fortunately Sonder's collections of algae (his own, Mueller's and others) are very well represented at the National Herbarium of Victoria, and most of the Mueller South Australian and later Victorian and other collections are to be found there.

Mueller's friendship with Sonder predated Mueller's departure for South Australia. Margaret Willis recorded Dr Ludwig Preiss as a family friend of Mueller's relatives, and it seems likely Mueller saw the Preiss collections through Sonder after Preiss returned from Western Australia in 1846. Sonder described the Preiss collections in 1846 and 1848 in "Plantae Preissianae", and probably requested Mueller to collect algae for him after his arrival in South Australia. Clearly Mueller was most assiduous in his algal collecting in his early years in Adelaide. Of particular significance in Sonder's 1853 account is the record on p. 659 of Enteromorpha clathrata (Roth) Greville, collected by Mueller at Lefevre Peninsula on 16 Dec. 1847 - the day after he arrived in South Australia. Although this specimen has not been located in MEL, the following collections dated 16 December 1847 were located (these are given only as 'Dec. 1847' in Sonder 1853).

Phycoseris ulva (=Ulva). MEL 650670.

Cutleria multifida (Smith) Greville. MEL 157995.

Haliseris australis Sonder n.sp. [=Dictyopteris australis (Sonder) Askenasy]. MEL 16873, 537244 (holotype and isotype resp.) The holotype is labelled "hb. mihi No. 33" - i.e. the 33rd specimen collected by Mueller on 16 Dec. 1847.

Halymenia muelleri Sonder n.sp. MEL 502394, 502395.

Chylocladia multiramea Sonder n.sp. [= Dasyphyloea insignis Montagne]. MEL 45196 (holotype) and MEL 5023528, 502529 (isotypes).

Acanthococcus gracilaria Sonder n.sp. [= Mychodea gracilaria (Sonder) Kraft]. MEL 1007309 (lectotype) and 8 isolectotypes.

Hypnea seticulosa J. Agardh. MEL 504614.

Amphiroa stelligera (Lamarck) Decaisne [= Metagoniolithon stelliferum (Lamarck) W. v. Bosse]. MEL 50059.

Lomentaria muelleri sonder n.sp. [= Coelarthrum muelleri (Sonder) Boergesen]. MEL 502099 (holotype), 502100 (isotype).
Polysiphonia nigrita Sonder [= Polysiphonia decipiens Montagne]. MEL 45575.

Mueller's first extensive algal collections in South Australia thus included five type collections.

While Mueller was actively collecting the day after his arrival, there are two algal specimens in MEL collected on the day of his arrival - 15 Dec. 1847. They are both labelled (in Latin) "floating fragment from the ocean gulf of St Vincent", with Dbr 15, 1847 (corrected from 1848) as the date. One bears Mueller's m.s. name "S. flindersianum Ferd. Mll" on it and is now numbered MEL 687511. It is identical with Sonder's Sargassum aemulum, which is now recognised as S. distichum Sonder. The other specimen is annotated by Sonder "Sargassum carpophyllum J. Ag. Spec. I. p. 304 n.33" and is a specimen of S. spinuligerum Sonder. Both these species occur in deeper parts of the Gulf and floating fragments are common in summer months. They were probably collected from the ship before it docked at Port Adelaide.

According to Churchill, Muir and Sinkora (1978), "The published works of Ferdinand J.H. Mueller (1825 - 1896)", Muelleria 4, 1-120, Mueller's own publications on Australian plants start in 1850, so the Sonder papers are amongst the earliest based on Mueller's collections. The 1853 and 1855 papers were amongst Sonder's most important contributions on Australian algae, apart from his accounts (1846, 1848) of the Preiss collections from Western Australia [Algae. In C. Lehmann, "Plantae Preissianae", Vol. 2, pp. 148-160 (1846) and 161-195 (1848)]; later papers included one on tropical Australian algae and a census of known Australian species.

Sonder (1855) was based almost entirely on Mueller's Victorian collections, mostly from Wilsons Promontory and Port Phillip. It included descriptions of several new genera [Brachycladia, Spongoclonium, Dictyposis and Nizymenia] and species, and three species named after Mueller - Sphacelaria muelleri [=Halopteris funicularis (Montagne) Sauvageau], Callithamnion muelleri [=Heterothamnion muelleri (Sonder) J. Agardh] and Dasya muelleri [=Heterosiphonia muelleri (Sonder) De Toni].

Mueller stimulated many amateur botanists (e.g. Jessie Hussey at Port Elliot) to collect algae, which he transmitted to European specialists, in particular to W.H. Harvey and J.G. Agardh. W.H. Harvey had close contact with Mueller during the Melbourne stay of his 1854-1855 Australian visit, and left with Mueller a set of his "Travelling Set" algae (now in MEL). MEL and NSW both possess sets of Harvey's "Algae Australicae Exsiccatae", a distinct exsiccatae from his "Travelling Set".

Mueller also collected several land plants on 16 Dec. 1847. Margaret Willis (plate opp. p. 37) illustrates a Mueller specimen of Helichrysum leucopsidium DC, also dated Dec. 16, 1847, which J.H. Willis has annotated "Apparently the FIRST BOTANICAL SPECIMEN collected by FERDINAND von MUELLER in Australia at the sea-front of Lefevre's Peninsula, Adelaide, the DAY AFTER HIS ARRIVAL there in the ship "Hermann von Beckerath", December 15, 1847". Dr Willis (personal comm.) recalls several other land plants collected by Mueller on 16 December 1847. These are now known to include Avicennia marina (Forsskal) Vierhapper (MEL 41209), Atriplex cinerea Poiret (MEL 607556), Atriplex paludosa R. Brown (MEL 607785) and Angianthus tomentosus Wendland (MEL 847555).

There can be little doubt that Ferdinand Mueller's earliest Australian collections were rich in marine algae, perhaps (apart from the floating collections) started on a return visit to the ship at the Port Adelaide wharf on 16 Dec. 1847, and a "browse" along the adjacent beach.

LIMONIUM HYBLAEUM: An early introduction to Australia named at last

H.R. Toelken
State Herbarium, Adelaide

Reference to some South Australian specimens in among notes on the genus Limonium (Erben 1986) will not have drawn much attention. Limonium hyblaeum, a species only recently described from Sicily by Brullo (1980), had most probably been cultivated in South Australia for sometime, as the reference to Statice bellidifolia in Francis (1859) could refer to this species, as Erben (1986) found that the species had been offered in a seed catalogue under the name. Erben argued that the species naturalised in various countries because of its adaptability and broad ecological tolerances, and it was collected from South Australia much earlier than the very similar species, L. companyonis.

The earliest record of a naturalised specimen is that of Zietz sub Tepper 1447 (AD) from Port Adelaide in 1889, and it bears the note: "At a dry place in Mangrove swamp remote from dwellings and only accessible by boats." The next collection is an anonymous one from the Port River in 1911, while the first record of L. companyonis also from Port Adelaide is dated 1944. In the recently published Flora of South Australia 4th edn L. hyblaeum is unnamed and since the manuscript was compiled many specimens have been identified to widen its known distribution considerably. Although the species is at present only known from South Australia it is highly likely that this often misidentified species established so early has a wider distribution, or will spread in future to neighbouring States.

The diagnostic characters of the two speices, which have been confused for a long time in South Australia, are given below.

L. hyblaeum Brullo, Bot.Notiser 133: 282 (1980); Erben, Mitt.Bot.München 22: 218 (1986).
Statice bellidifolia sensu ? Francis, Cat.Plants Cult.Govt Bot.Garden, Adelaide 39 (1859).
S. psiloclada sensu Black, Fl.S.Austr. 1 edn: 453 (1926).
Limonium psilocladon sensu Black, Fl.S.Austr. 2 edn: 679 (1957), partly, excl. L. companyonis.
L. sp. Toelken in Jessop & Toelken, Fl.S.Austr. 4 edn: 1034 (1986).

Leaf blade oblanceolate- to obovate-spathulate, abruptly constricted into petiole; spikelets with 2 - 4(5) florets (in South Australia, cf. Eruben 1986); midrib of the sepals extending half to two-thirds the length of the lobes (in dried material the membranous margins of the calyx lobes remain expanded).

Distribution in South Australia: EP, MU, YP, SL, SE.

L. companyonis (Gren. & Billot)Kuntze, Rev.Gen.Pl. 2: 395 (1891), Erben, Mitt.Bot.MÜnchen 14: 466 (1978) Toelken in Jessop & Toelken, Fl.S.Austr. 4 edn: 1032, fig. 509B (1986).
Statice companyonis Gren. & Billot in F. Schultz, Arch.Fl.Fr.Allem. 338 (1885).
Limonium psilocladon sensu Black, Fl.S.Austr. 2 edn: 679 (1952), partly.

Leaf blade oblanceolate to rarely obovate, gradually tapering into petiole; spikelets with 1- 2 (3) florets; midrib of sepals extending into the apex of the lobes or almost so (in dried material the membranous margins of calyx lobes remain expanded only in flowering specimens and then fold in so that the lobes appear narrow and bristle-tipped).

Distribution in South Australia: EP, NL, YP, SL, KI, SE.

PLANT COLLECTING IN THE ISLAND OF *"PINS COLONNAIRES"*

Alistair Watt

For those interested in conifers, the island of New Caledonia has fascination and interest in its misty mountains. Its small area has around 45 species of gymnosperm (most are endemic) and no fewer than 13 of the classically-shaped araucaria or *"Pins Colonnaires"*. Very few of the latter are in cultivation and certainly most could be grown in warm-temperate to sub-tropical areas of the world.

Towards the end of 1986, Bob Cherry and I began organising a private trip to New Caledonia. Impetus was provided by encouragement from John Silba in the U.S.A. and funds being made available by the Maud Gibson Trust of the Royal Botanic Gardens, Melbourne. Unfortunately no-one from the Melbourne Gardens could accompany us, however, great interest in New Caledonian plants led to committments by Adelaide and Sydney Botanic Gardens towards the trip. The subsequent expedition included Dr. Bob Chinnock from Adelaide, and Mrs. Karen Wilson and Mr. Peter Abell from Sydney. A great deal of advice was received from Monsieur Loic Cremere of C.T.F.T. (Tropical Forests Research) in Noumea. I had been lucky enough to meet Mons. Cremiere in Canberra whilst visiting C.S.I.R.O. in November.

To make life a little easier, it was decided to make Noumea a base, making trips to the forest areas from there. It was evidently possible to collect more species in a short period of time in his manner. Visits to other specific areas such as Mt. Panie or Mt. Humboldt required a 3 or 4 day trip, and therefore we did not have the opportunity to visit these areas. The fact that opposite our hotel in Noumea was the Anse Vata 'topless' beach was purely coincidental!

There are three basic botanical regions in New Caledonia in which to see the widest range of conifer species. These are the low-altitude 'Maquis' up to 300m; high-altitude 'Maquis' above 700m (both on the ultra-basic serpentine soils formation in the South East of the Island) and the high altitude non-serpentine mountains in the Central and Northern areas, especially the Mt. Panie area.

Modern publications such as Silba's *Encyclopaedia of Coniferae* give good accounts of the conifers in New Caledonia although De Laubenfels' Volume 1 of the *Flore de la Nouvelle-Caledonie* is the most comprehensive, with detailed locations of species collections as well as keys and good line drawings.

The expedition was fortunate in that from our arrival, great assistance was provided by the New Caledonian Forestry Service. This allowed us to plan our itinerary to cover as much territory as possible in the two weeks available.

Conifers were collected in the areas detailed below:

1. MADELEINE RIVER - CHUTE MADELEINE

In this open 'maquis' area we encountered several of the rarer conifers; *Dacrydium guillauminii* and *Decussocarpus minor* both growing on the banks and in the water of the River Madeleine. *Podocarpus novae-caledoniae* was also seen as small bushes near the river. *Neocallitropsis pancheri* was found on the dry slopes above the river in localised areas only. Probably the most distinctive of the conifers in the maquis area is *Dacrydium araucarioides*. Although common and widespread, it is a very attractive small tree. *Agathis ovata* was widespread throughout the area on the dry slopes.

2. RIVIERE BLEUE

Again east of Noumea, the Riviere Bleue is one of the tributaries which feeds into the Yate. Along the upper reaches, *Libocedrus yateensis* was encountered. A rare and very localised tree, collection of this species was restricted. In the dense rainforest above the river (over the ridge to the Mois de Mais) we found *Acmopyle pancheri, Podocarpus sylvestris* and *Falcatifolium taxoides*. The one *Parasitaxus ustus* we were shown was well and truly dead, perhaps a victim of over-zealous botanical study! The New Caledonian authorities had placed an embargo on collecting this very rare and fascinating parasitic conifer. Along the river 'gallery rain forest', trees of *Agathis robusta, Araucaria bernieri* and *Dacrycarpus vieillardii* were noted, as also were very impressive, large specimens of *Nothofagus codonandra*.

3. MONTAGNE DES SOURCES

To the north of Noumea into the mountains! A 4W.D. vehicle is definitely required on this very steep track. Near the summit, *Neocallitropsis pancheri* was common and grew with *Dacrydium araucarioides* and the occasional *Araucaria muelleri*. From the end of the vehicular track, a very long (3 hour) path continued through stands of *Araucaria muelleri* and *Nothofagus codonandra*, and then *Araucaria humboldtensis* to the summit of one of the peaks high above the Riviere Bleue. This area is the birthplace of several major rivers, hence the name of the mountain. In the rainforest to the north of the ridge, *Prumnopitys ferruginoides* and *Libocedrus austro-caledonica* were common. The occasional *Callitris neocaledonica* and *Podocarpus gnidioides* were seen along the path in open areas and 2 small specimens of *Podocarpus*

decumbens found in wet soaks to the south of the ridge.

Growing with all these conifers was the fascinating flora of the higher altitude ultra-basic maquis, including *Xeronema moorei, Cunonia bullata, Montrouziera sp.* and *Platyspermation sp.*

4. MT. DORE-PIROGUE RIVER

Ostensibly a day off! A very pleasant drive from Noumea, south-east along the coast. To the east of Plum, between the road and the sea there is a small but beautiful stand of what we identified as *Araucaria luxurians.* Immediately above the sea, these had a *Pandanus sp.* growing underneath - a very pretty spot.

5. MT. MOU

Another long, strenuous 3.5 hour uphill walk (plus the other 1.5 hours for becoming lost!) from the sanitarium at Col des Pirogues to the summit of Mt. Mou. The path is steep, through obviously often-burnt heathland. With the rain forest only remaining along a narrow summit ridge, the skyline was dominated by trees of *Araucaria laubenfelsii.* In the rain forest, in addition to the conifers previously seen, the occasional specimen of *Dacrydium lycopodioides* was found. Towards the eastern peak, there exists a very dense moss forest under a canopy of *Nothofagus.* It was interesting to see every branch covered with epiphytic lichens, mosses and ferns. The walk back only took 50 minutes!

6. YATE ROAD

A pleasant drive across the island to Yate. Our main aim was to collect material from the maquis areas. Particularly striking were *Bikkia macrophylla, Dubouzetia confusa, Cunonia purpurea* and two species of grevillea, *exul* and *gillivrayi.* The several *Xanthostemon* species were most attractive and abundant. All this area was well worth seeing.

7. THIO-COL DE PETCHECARA

An early start to drive to the North coast. A bit wetter than the South coast and with the rain forest instead of a maquis flora. Generally, the bush looked dull and uninteresting with fewer species in flower compared to the maquis.

8. TABLE UNIO

After a very comfortable night's lodging at the Forestry Station at Col d'Amieu, we spent some time wondering at the enormous size of the giant bamboo species flourishing in the grounds. The start of the track to the mountain Table Unio was only a short drive. This walk to the summit proved to be very pleasant starting from rainforest and leading to a dense 'moss' forest, then to our surprise, the summit had open low maquis with large specimens of *Dracophyllum* and stunted shrubs of *Prumnopitys ferruginoides.* Just below the actual moss forest, several specimens of *Austrotaxus spicata* were found.

Normally one would expect very inclement weather at this altitude, 1000m, but the summit was under a clear sky and we could see the sea each side of the island and as far North and South as the mountains would allow. Obviously, we were lucky with the weather and to obtain *Austrotaxus* material so easily.

-oOo-

Reprinted from the Conifer Society of Australia Newsletter No.2 1987

Membership of the Society is $10 ($20 for overseas members). There are two annual newsletters.

Send a cheque and your address to

Mr J.Hawker
Treasurer
The Conifer Society of Australia
National Herbarium
Birdwood Avenue
South Yarra
Victoria
Australia 3141

CHAPTER REPORT - SYDNEY

The Sydney Chapter of ASBS and the University of Sydney Botanical Society held a Conversazione and Poster Exhibition in April. A total of 58 exhibits were displayed representing a cross section of botanical research taking place in Sydney. The display covered the full spectrum of botanical research from the way cells work to the way plant communities exist together. The representation was: Physiology (22 papers); Ecophysiology (5 papers); Ecology (12 papers); Systematics (17 papers).

The topics included "Salt Spray Damage to Coastal Vegetation", Mangroves - Roots in the Air for Air in the Roots", "Insect Pollination", "Vegetation History of Macquarie Island", and "Maturity Bronzing of Banas". The Systematics papers covered Algae, Bryophytes, Pteridophytes, Gymnosperms and Angiosperms using a range of techniques and analyses such as embryology, electron microscopy and cladistics.

Between 70 and 80 people attended the Conversazione and the Exhibition remained open for a week.

Prof. R.C. Carolin

REQUEST

PRIMITIVE ANGIOSPERMS FOR ENZYME ELECTROPHORESIS - REQUEST FOR SEEDS

Dr. Doug Soltis of Department of Botany, Washington State University, Pullman, Washington 99164-4230, U.S.A. has requested viable seed of the following species. He needs enough seeds to analyse progeny arrays and hopes to throw light on the question: "are woody angiosperms with high chromosome numbers ancient polyploids"? This work will also be compared with studies already made in ferns.

Taxa requested:
Austrobaileyaceae - any
Winteraceae - Tasmannia insipida, T. lanceolata, T. purpurascens, T. rosea and/or T. stipitata.
Eupomatiaceae - any.

Doug Soltis

CONFERENCE

PRELIMINARY NOTICE: BRACKEN-89: 15-19 August 1989

An International Conference/Workshop at the University of Sydney on the biology, economic significance and control of Bracken. Of interest to colleagues in Pteridology, Weed Control, Ecology, Plant Biogeography.

Send preliminary registrations of interest to:

Prof. J.A. Thomson
School of Biological Sciences
University of Sydney
N.S.W. 2006.
(02) 692 2371 (FAX (02) 692 4203)

OBITUARY

ALISON ASHBY

Miss Alison Ashby, South Australian flower painter died on August 12, 1987 in her 86th year and was buried in an impressively simple ceremony at the Inman Valley cemetery amongst the trees and plants she loved so much.

Miss Ashby had a life long interest in natural history and Australian plants of which she propagated, planted and distributed thousands in her lifetime.

She started painting in the early 1930's at least, and the substantial collection of about 1400 paintings is deposited at the Adelaide Botanical Garden. They form the basis of the now widely available popular wild-flower postcards initially sold at the South Australian Museum and Botanic Garden. She developed a painting technique admirably suited to reduction in size for reproduction. Miss Ashby awed her friends and admirers by hurtling between the wild flowers of Western Australia and the Alpine herbfields in the East, almost annually, in a long series of station-wagons, to paint from material freshly collected in the field.

For a long time she provided cut flowers for a continous display at the Museum. These came from the family garden at "Wittunga", her own reserve "Watiparinga" at Belair, her nephews farm "Mt Alma" at Inman Valley and the Burdetts garden at Basket Range. Later Miss Ashby donated the "Watiparinga" reserve to the National Trust. Her niece Mrs Enid Robertson is now active in maintaining it. She was always helpful to taxonomic botanists and was able to direct them to specific localities to find plants. She tagged particular bushes so that flowering and fruiting specimens could be drawn from the same plant.

Her 80th birthday was celebrated by the publication of "Alison Ashby's Wildflowers of Southern Australia" published by the South Australian Museum Board where 34 examples of her paintings are included as well as a portrait of her at work. She is commemorated by Acacia ashbyae and Solanum ashbyae. Her legacy of land, plants and paintings will be enjoyed by many for years to come.

D.E. Symon

NOTICES

ALLIGATOR RIVERS REGION COLLECTION AT UNSW

As a result of work by John Waterhouse from 1980 to 1983, and continued by others, there is now a collection and checklist from the Alligator Rivers Region at the John T Waterhouse Herbarium (UNSW), University of New South Wales. The more recent work was carried out first with support from the Linnean Society of New South Wales' Joyce Vickery Research Fund, and later with the support of a Commonwealth Employment Programme grant obtained through the good offices of the Office of the Supervising Scientist for the Alligator Rivers Region at Jabiru, who also gave invaluable assistance in the field.

The current checklist represents an updated version of that published by Puttock and Waterhouse (1981). Specimens are cited to support each record. In the current version a further 103 species have been added, as well as 700 extra specimen citations. Anyone with interests in particular taxa from the region are invited to obtain specimens on loan. In particular, there are good collections of Myrtaceae, Rubiaceae and Scrophulariaceae. Copies of the updated checklist are available on request.

Bruce Wannan
Chris Quinn

PRICES FOR CSIRO JOURNALS - 1988

	FULL PRICE	CONCESSION PRICE
AUSTRALIAN JOURNAL OF AGRICULTURAL RESEARCH	$125.00	$45.00
AUSTRALIAN JOURNAL OF BIOLOGICAL SCIENCES	$115.00	$40.00
AUSTRALIAN JOURNAL OF BOTANY	$125.00	$45.00
AUSTRALIAN SYSTEMATIC BOTANY (New Journal)	$85.00	$35.00
AUSTRALIAN JOURNAL OF CHEMISTRY	$300.00	$95.00
AUSTRALIAN JOURNAL OF MARINE & FRESHWATER RESEARCH	$135.00	$40.00
AUSTRALIAN JOURNAL OF PHYSICS	$150.00	$50.00
AUSTRALIAN JOURNAL OF PHYSIOLOGY	$125.00	$45.00
AUSTRALIAN JOURNAL OF SOIL RESEARCH	$85.00	$30.00
AUSTRALIAN JOURNAL OF ZOOLOGY	$135.00	$50.00
INVERTEBRATE TAXONOMY	$200.00	$55.00
AUSTRALIAN JOURNAL OF EXPERIMENTAL AGRICULTURE	$110.00	$40.00
AUSTRALIAN WILDLIFE RESEARCH	$100.00	$30.00
AUSTRALIAN FOREST RESEARCH	$50.00	$20.00

The Concession is available to Members of ASBS by sending name, address and payment to MSBS Treasurer by 20th November 1987.

D. Foreman
Treasurer

EXTENSION TO THE NATIONAL HERBARIUM OF VICTORIA (MEL)

Work on the long-awaited extension to the building housing the Natioanl Herbarium of Victoria commenced in mid-July. Building activities are expected to last for about eighteen months during which period the normal work of the Herbarium will be disrupted progressively.

At the end of 1987 at least half of the collections of higher plants will have to be moved into temporary storage and thereafter will be inaccessible until all of the collections have been accommodated in the completed extension towards the end of 1988. In view of the work associated with moving the collections it is unlikely that we will be able to service any loan requests or accommodate visitors for much of 1988.

It would be helpful if persons could anticipate their loan requirements prior to December 1987 and if during 1988 intending visitors enquire beforehand whether accommodation and the material they wish to examine will be available.

J.H. Ross

Australian Systematic Botany

An Australian Journal of Scientific Research

An Offshoot of the *Australian Journal of Botany*

This new journal will be devoted to the systematic botany of the Australian region in both theory and practice.
Papers on all plant groups, both fossil and non-fossil, will be considered for publication. Papers may be of universal interest or specifically relevant to Australia and biogeographically related areas.

Editorial Advisory Committee for 1988:

P. Y. Ladiges (*University of Melbourne, Chair*), T. C. Chambers (*Royal Botanic Gardens, Sydney*), T. G. Hartley (*Australian National Herbarium*), T. D. Macfarlane (*Western Australian Herbarium*), I. G. Pascoe (*Victorian Plant Research Institute*), R. W. Rogers (*University of Queensland*), E. M. Wollaston (*Adelaide University*).

Australian Systematic Botany will be published four times per year.
Volume 1, Number 1, March 1988.

* * * * * * * * * *

From 1988, *Australian Journal of Botany* will become a multidisciplinary journal for papers in

Anatomy	Development	Genetics	Pathology
Cell biology	Ecology	Morphology	Reproductive biology

Editorial Advisory Committee for 1988:

B. A. Barlow (*CSIRO Plant Industry, Chair*), M. P. Austin (*CSIRO Wildlife and Rangelands Research*) J. J. Burdon (*CSIRO Plant Industry*), G. A. Chilvers (*Australian National University*), T. P. O'Brien (*Monash University*), J. B. Reid (*University of Tasmania*), M. Sedgley (*Adelaide University*).

Australian Journal of Botany will continue to be published six times per year.

* * * * * * * * * *

***Brunonia* will cease publication after Volume 10, Number 2, 1987.**

The Society

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

Membership

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

The Newsletter

The Newsletter appears quarterly and keeps members informed of Society events and news, and provides a vehicle for debate and discussion. In addition original articles, notes and letters (not exceeding ten pages in length) will be published. Contributions should be sent to the Editor at the address given below, preferably typed in duplicate and double-spaced. All items incorporated in the Newsletter will be duely acknowledged. Authors are alone responsible for the views expressed.

Notes

- ☐ The deadline for contributions is the last day of February, May, August and November.
- ☐ ASBS Annual Membership is $16 (Aust.) if paid by 31st March, $20 thereafter. Students (full-time) $12. Please remit to the Treasurer.
- ☐ Advertising space is available for products or services of interest to ASBS members. Current rate is $30 per full page. Contact the Newsletter Editor for further information.
- ☐ All address changes should be sent to the Treasurer or the Editor.

Editor et al.

Dr H.J. Hewson
Bureau of Flora and Fauna
G.P.O. Box 1383
CANBERRA, A.C.T. 2601

Typist: CANWORDS
Illustrator: Christine Payne

CONTENTS