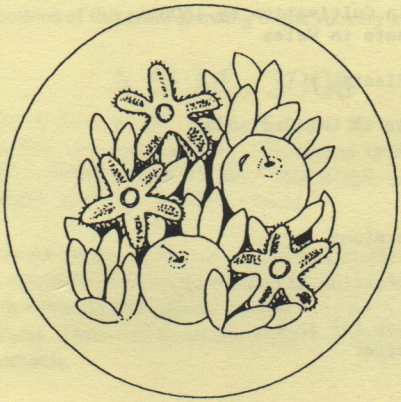
PENTACHONDRA

NEWSLETTER OF THE AUSTRALASIAN PLANT SOCIETY



ISSUE 24 MAY 2000

AUSTRALASIAN PLANT SOCIETY

Newsletter No. 24

May 2000

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EDITORIAL

Apart from a few cold and frosty nights, winter 99/00 has been relatively mild. Unlike other winters where most cold damage has been outdoors, this time it appears that my greenhouse plants have suffered most. After a long mild autumn, very frosty nights in mid December (temperature dropping to -8°C) devastated many plants under glass, despite them having horticultural fleece protection. Whole branches of *Indigofera australis* suffered, both leaves and flowering racemes discoloured and wilted. *Kennedya rubicunda* looked decidedly dead as did *Melaleuca nesophila* right down to soil level. The tips on *Acmena smithii* and *Melaleuca hypericifolia* were browned. By the end of March there has been no regrowth on *Melaleuca nesophila* or *Kennedya rubicunda*. Other greenhouse losses include *Prostanthera walteri*, *Metrosideros robusta* and *Carmichaelia enysii*. One other winter casualty is *Libertia grandiflora* which was growing in a pot on the patio. The pot became waterlogged and the leaves started rotting at the base - I only noticed this when a strong wind gradually blew away the loosened leaves. Sections of this plant growing in the rockery are thriving.

A.G.M. 2000

This year's AGM will be held at the Welsh National Botanic Garden, Middleton Hall, Llanarthne, Carmarthenshire, and will include a conducted tour of the Gardens. Members wishing to attend should assemble outside the main gate at 2pm on Saturday June 17th. Lunch can be obtained at the public house in Llanarthne village.

This new Botanic Garden has as its centrepiece, the largest single span glasshouse in the world featuring plants from amongst other countries, those of Australia. The Garden will act as a focus for the conservation of threatened plant species, as well as helping people to understand the vital function that plants perform. There will be an opportunity to walk through temperate woodlands of New Zealand and Tasmania.

THE AUSSIE INFO-PACK

Following the questionnaire sent out with the last issue, several members asked about the Info-Pack previously written about in Issue 22. This pack has been compiled from many sources, including the Internet, by Tony Entwistle. It covers approximately 80 sides of A4 and costs £3.50 inclusive (payment to APS). Send orders to Tony Entwistle (see inside back cover for address) and please wait 3-4 weeks for delivery as requests are prepared to order.

The pack comprises amongst many other topics, lists of UK nurseries selling Australasian plants, Australian, New Zealand and South African native seed suppliers, Australian and NZ retail native plant nurseries, and booklists.

APS WEBSITE

A new website is being set up by APS members Jeff Layman and D. Gallacher, as the previous one was unsatisfactory. Hopefully, more details will be available for our next issue. If you are impatient, feel free to contact Jeff, at 7 Holming End, Horsham, W. Sussex, RH12 4WW or D. Gallacher, Pear Tree Farm, Guildford Rd, Cranleigh, Surrey, GU6 8LT.

SEED LIST AND SEED DONORS

Many thanks to Dennis Rowlinson and G.Courtois for donating seed to the seed list.

For this year only, as a trial, the Society is offering members the chance to list upto five substitutes when ordering seed from the seedlist. This is in response to several members expressing dissatisfaction at the number of seeds available when sending in their orders. Personally I feel that members are getting very good value for money, even if they don't receive all that they request. Please remember the Society when harvesting seed, no matter how small the amount. Jeff Irons is happy to receive seed at any time of the year.

HOW MUCH DOES IT COST TO ADVERTISE IN PENTACHONDRA?

£6 full page, £4 half page and £2 quarter page.

TREASURER'S REPORT 1999
(Please see enclosed statement of accounts)

This has been a satisfactory year and £200 has been added to our reserves. The only additional expenses this year were those of staging the Tatton Park Show exhibit which in the end only cost the Society £88, as we applied for and received the full RHS grant of £125.

There was a small loss - some £18 - with the production of the 'Aussie Pack' as this was very poorly supported.

Membership of the Society continues to grow and peaked at over 180 at the end of the year, though the total for this year is down to 157. Approximately half the new members each year do not renew, and we do not know why, though other societies such as the AGS find the same. I have a feeling that more get-togethers at local level would help, but this is something that only members at grass-root level can arrange themselves.

CD-ROM - 'WILD PLANTS OF VICTORIA'

This lists 4500 species, 2500 with colour photographs. Obtainable from Viridian Biological Databases, 614 Hawthorn Road, Brighton East, Victoria 3187. Cost A$96 (including p&p). Visa and Mastercard accepted.

THE COUNTY PARK PODOCARPUS

By Jeff Irons

One of the present day buzz words is biodiversity and although there is a large number of plant species in horticulture many of them are represented in gardens by just one, or perhaps a few clones. If you doubt this just look round your home area and see how many gardens have a *Forsythia* other than 'Lynwood'. Many species differ considerably in the wild, ranging from shrubs to trees, having different shapes, foliage, and leaf colour. They can straddle a wide range of habitats, in different geographic areas. This biodiversity helps to ensure the continuation of the species. Dutch Elm disease gave us an example of what can happen when horticulture relies on just a few clones.

Graham Hutchins has done a great service to horticulture by collecting the New Zealand *Podocarpus nivalis* from 27 different locations and the Australian *P. lawrencei* from three places. Fifteen of them are offered for sale at his nursery. These two species can interbreed, and botanical revision may put them in the same taxon. Some of the interbred offspring raised at County Park Nursery have been given promotional names and have Plant Breeders Rights. They offer a new range of foliage colours in *Podocarpus* and should be suitable for pot cultivation. Though primarily outdoor plants they could be taken indoors for short periods. Among these new *Podocarpus* are:

Podocarpus - genus of evergreen, coniferous trees and shrubs. Male and female flowers are usually borne on separate trees. Grow best in fertile, moist but well-drained, humus-rich soil in full sun, with shelter from cold winds.

'County Park Fire' - a female plant with creamy-yellow young growth which changes through pink to green, and has purplish hues in winter.

'Blaze' - a female plant with orangey young growth and purple-bronze shades in winter.

'Chocolate Box' - another female plant, which takes on a chocolate hue in winter.

Keep an eye out for these in your local garden centre. Added interest can be given by ensuring that they fruit in autumn. To do this you will need to grow a male plant nearby. Two male forms, available to callers at County Park Nursery, are "Lodestone" and "Otari". With them in the garden you would be able to raise your own seedlings, and increase our horticultural diversity still further.

CONTROL OF PESTS OF ORNAMENTAL PLANTS

J.H. BUXTON



Many Australian plants are susceptible to common pests such as whitefly, especially if maintained in a greenhouse; as temperatures never get low enough to eliminate the pest. Populations can tick over at a low level during the winter, and then rapidly build up in Spring and Summer.

One point to remember is that you may have low numbers of insects such as spider mite, scale insect, etc on plants when you buy them from a commercial nursery. In which case, they are likely to have been exposed to a range of insecticides and may have become resistant! Later on, when numbers increase, no wonder that the products available to amateurs do not achieve control.

The main pests I have found troublesome on the Australasian plants I grow (including *Pseudopanax, Cordyline, Sollya*, etc) are whitefly, aphids, scale insect, vine weevil and red spider mite.

WHITEFLY

Once the population of this pest has built up and you get 'clouds' of whitefly, control is extremely difficult. Two suggestions here : get a yellow sticky trap and, on a warm day, repeatedly tap the plant while holding the trap above it. You catch a lot of whiteflies this way! Another idea is to submerge the whole plant (only possible if specimen is not too large) in a bucket of lukewarm water, to which a few drops of washing up liquid has been added. 'Swish' the plant around - this will remove most of the adults. To control the 'scale' stages, which are immobile and lie flat on the leaves, you need to spray the leaf undersides thoroughly, using a product such as Safers Insecticidal Soap. Nicotine is also effective (make your own by crumbling a few cigarettes into lukewarm water, and filtering through a pair of tights and adding some washing up liquid). Products containing pyrethroids, such as Tumblebug, are unlikely to work well these days because of resistance.

A new product just on the market is Provado, from Bio Ltd. This contains Imidacloprid, a very effective new insecticide which is fully systemic. This can be watered onto the compost and should give good results.

Biocontrol using *Encarsia* can work, but only in a warm greenhouse (around 15°C or above), and high populations of whitefly causing the leaves to become sticky, will stop the parasite from working. Other biocontrols, such as *Delphastus* (Ladybird) or *Microlophus* (predatory bug) are also worth considering.

APHIDS

The new product Provado should also give excellent control of aphids. Alternatives are Rapid (Pirimicarb) or Safers Soap. Biocontrol is unlikely to work well.

VINE WEEVIL

The "Trojan Horse" of the pest world - it sneaks up on you! Watch out for leaf notching - this is the first sign of adults. Remember they are nocturnal, so go out at night with a torch and pick them off and destroy. Insecticides are unlikely to be effective against adult weevils but Provado, as a drench, can control the larvae. Badly affected plants should be burnt, or if possible, the roots washed to remove all larvae and then repotted in fresh compost.

Biocontrol using nematodes (various products) usually works well, if applied correctly and at the right time (around August - end September at best). These products do not affect adult weevils, but they can search out and kill larvae present in compost.

SCALE INSECTS

Amazingly enough, Provado should control these too, although the systemic action may be slow, especially in woody subjects.

SPIDER MITE

Tricky to control with sprays, but I find that in the greenhouse, the predatory mite *Phytoseiulus* works well, at least from about May onwards. Remember that the predator does not always move well between plants, so try to place predators evenly on all infested plants.

WINTER REPORT FROM WEST SUSSEX

BY JEFF LAYMAN

Clianthus puniceus has seemingly survived the winter (on a south-east facing wall) despite a couple of nights down to -6°C. Although some young leaf growth was browned, the flower buds (which formed last November) seem OK. *Sollya heterophylla*, however, although only a few metres away on the same wall, looks decidedly an ex-plant! Perhaps it will shoot from the base, which was well protected by *Scabiosa farinosa* (with seed supplied by Jeff Irons). *Lophomyrtus* x *ralphii* in a very sheltered place had almost no damage at all (right next to it *Lavandula dentata* was heavily frosted). *Sophora microphylla* 'Sun King' seems OK in the SE-facing corner of a wooden fence (with some perspex to cover it). Several *Anigozanthos flavidus (hybridus???)* seem to have survived at the base of the walls without any protection this winter. The leaves are showing signs of fungal attack, of course, but they do that all year round anyway.

Lophomyrtus x ralphii - this NZ shrub/small tree has almost round dark green leaves upto 2.5cm long. White cup-shaped 4-petalled flowers are produced on mature plants followed by black-red berries. Grow against a warm wall in frost-prone areas.

THE COMELY CURRAJONG

By Tim Longville

Here's a little known and even less grown Tasmanian shrub - little known and grown even in Australia, apparently, let alone in the U.K. *Asterotrichion discolor*, aka *Sida discolor*, aka Currajong, is a member of the Malvacecae. It comes from southern Tasmania where it occurs in wet eucalypt forests, or in wooded gullies, often on rocky ground. In the wild it can be from 3 to 10m tall and from 2 to 4m wide. In the U.K. it's likely to be at the lower end of those ranges of dimensions.

It's evergreen and has sizeable (say up to 7cm long by 3cm wide), toothed, roughly sagittate, pale-ish green leaves. They're solid and substantial and have considerable 'presence.' They also have a distinct and useful resistance to wind and salt. The growth-habit is upright and sturdy - so sturdy that even tiny seedlings in the open in gale conditions need no staking. The growth speed is quick. In six months, seedlings here grew to 45cm, and during the following so-far-mild (if wet and windy) winter, have perhaps slowed down but certainly haven't stopped.

I don't know at what size Currajong flowers or how long it takes to reach that size. Given its performance so far and given that it *is* a mallow I'd guess the answers are 'Small' and 'Not long'. I shan't be surprised if it flowers next season and I shall be mildly amazed if it doesn't the season after that. The flowers, if and when they arrive, may well, in this country, be useful late: from August to the first really hard frosts. (This is a best guess, based on the most likely response to being shifted into the Northern Hemisphere.) They will also be different on male and female forms of the plant. The flowers are white and small and, on the male but not the female, both ornamental and possessed of what Rodger Elliot describes as 'a lovely delicate perfume'.

My Solway garden, though mild, is blasted by salt winds and almost permanently both wet and cool. It also has a naturally heavy, moisture-retentive acid soil. In that combination of conditions I struggle to find Australian plants which will thrive. This may well be one which will. I see it as an ideal secondary windbreak shrub which has the additional advantages of attractive foliage and, if it lives up to its billing, attractive flowers at a useful time of the year.

Hardiness? Well, it certainly isn't troubled by -3°C. Given its origins and what little is known about it from previous attempts in the U.K., I imagine that it would begin to suffer damage at about -5/6°C and would be seriously damaged if not killed outright by frosts in double figures.

Germination was easy, profuse and fairly quick, in a well-drained acid compost and a temperature around 18°C. Jeff Irons, from whom my seed came, tells me that the plant certainly has been grown to flowering size in the U.K. at least once but that the plant which flowered has since died. I don't, I'm afraid, know of any commercial source of seed. Nindethana don't list it. Perhaps if enough people express an interest, Jeff could track some down for a future APS list. Of course, if and when my own plants flower....

Acknowledgements Thanks to Jeff, to Rodger Elliot and Rod Randall in Australia, and to Bill Grant in California for their help.

SOME AUSTRALASIAN PLANTS IN CULTIVATION BY 1800

By Brian Halliwell

There is uncertainty as to which Europeans discovered mainland Australia. It may have been Portuguese mariners during the 16th century or Dutch sailors in the same century although they were more active in the earlier years of that following. In 1697 a Dutchman, captain Willem de Vlamingh was searching coastal areas near to what is now Fremantle for shipwrecked sailors. The search took them up the Swan River where some plants were collected, probably the first to come from New Holland. Two herbarium specimens from this collection, now in the herbarium of the botanic gardens at Geneva are *Acacia truncata* and *Synaphea spinulosa*. William Dampier, a former buccaneer, who became a Royal Naval Officer, had visited Western Australia in 1688. On a second visit in 1699, he did some plant collecting.

In 1642 Abel Tasman had sailed from Batavia on a voyage of exploration. He was to discover Tasmania, which he called Antony Van Diemenslandt, after the Governor of the Dutch East Indies. The ship landed on Van Diemens Land and the crew spent time exploring and may have collected plants. Sailing eastwards, New Zealand was discovered although there was no landing. Tasman followed the coastline of the North Island sailing into the Pacific before returning to the Dutch East Indies northwards of New Guinea.

In 1769, the Lords of the Admiralty appointed James Cook to captain HMS Endeavour to take a party of scientists to Tahiti to observe the passage of the planet Venus across the sun. As supercargo Cook had young Joseph Banks, a wealthy amateur naturalist who was a member of the recently formed Royal Society. Banks' party included in addition to personal servants, a professional botanist, Daniel Solander and Sydney Parkinson who was an artist.

When astronomical observations were completed, Cook had instructions from the Admiralty to proceed onwards into the southern Pacific ocean. HMS Endeavour sighted New Zealand on 6th October 1769. Following landing, Banks and his party were the first Europeans to see and investigate the flora of this unknown land. From New Zealand, Cook sailed westward and was to land in Australia near to what is now Sydney in Sting Ray Bay. So rich in plant species was this area that Banks was to rename it Botany Bay. Throughout the trip Banks was collecting plants and seed, Solander collected and prepared herbarium specimens and Parkinson drew plants as well as zoological specimens and the landscape.

HMS Endeavour returned to London in 1772 and later the same year, Cook set out on a second voyage to Australia. In 1775 he made a third but, whilst returning, was killed on Hawaii in 1779. Banks did not accompany Cook on these later voyages but arranged for a naturalist and artist to accompany each trip. Seeds, plants and herbarium specimens from these later voyages came back to Banks.

In 1772 plant collections and drawings made by Banks' party created great interest not only amongst scientists but also amongst gardeners. Seed was given to Kew Gardens and Chelsea Physic Gardens, some went to nurserymen and others to keen amateur gardeners. After such a long voyage, although there was germination, some seed was to prove non-viable. Plants raised from this seed were considered tender and would be grown in greenhouses. In the 17th century, winter protection was provided in Orangeries heated by charcoal braziers which were to be replaced by closed stoves and later by subterranean boilers. Architectural orangeries were to be replaced by less attractive but more practical greenhouses. These were lean-to structures, of substantial timbers, built against south facing walls, with small panes of glass. The importance of light in successful cultivation was not to be appreciated until late in the following century. The underground boilers produced hot air which passed through ducts under the floor and up flues in the back wall, producing a very dry atmosphere.

There has always been rivalry amongst gardeners. It has always been considered a status symbol to be able to grow new and unknown plants. The wealthy landowners were excited by these antipodean plants and wanted to be able to grow them.



Crowea saligna
Solitary bright pink flowers upto 35mm across are produced in terminal leaf axils.

Lee and Kennedy of the Vineyard Nursery, Hammersmith in 1775, offered for sale the first Australian plant *Casuarina stricta* (*Allocasuarina verticillata*). In 1785, they offered *Banksia oblongifolia, B. serrata, Fabrica laevigata (Leptospermum laevigatum), Lambertia formosa, Melaleuca armillaris* with an addition in 1789 of *Metrosideros hispida (Angophora cordifolia).* 1790 saw *Crowea saligna, Grevillea buxifolia, G. sericea* and *Leucopogon lanceolatus.* There were more in 1791 : *Hakea saligna,* the re-instated *Podolobium (Oxylobium) trilobatum, Styphelia viridiflora* and *Westringia rosmarinifolium.* Offered in 1792 were *Bossiaea heterophylla, Bossiaea scolopendrium (schopendria), Daviesia ulicina, Mirabella (Mirabelia) reticulata (rubiaefolia)* and *Sowerbaea juncea.* For 1793 was *Aster tomentosus, (Olearia tomentosa), Bignonia (Tecoma) australis, Myoporum debile* and *Sprengelia incarnata,* and for 1796 *Boronia pinnatifida.*

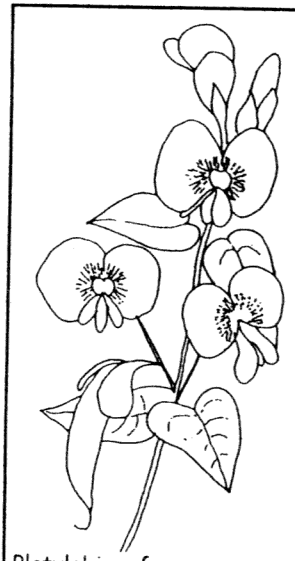
James Lee, one of the partners of this firm, was especially interested in Australian plants and sent out at his own expense, David Burton to collect seed and plants.

In about 1787, Lee published a 4 page pamphlet entitled 'Rules for Collecting and Preserving Seed from Botany Bay'. Although Lee and Kennedy might have been the leading nursery for Australian plants in London, they were not the only one.

It was in 1788 that Governor Philip arrived with the first fleet at Port Jackson to set up a penal colony. Perhaps Lee's pamphlet was intended for settlers, military, warders and their families as well as convicts who would become freemen when their sentences had expired. Seed collected by these early settlers from the Port Jackson area included *Acacia linifolia, A. juniperina, A. myrtifolia, A. verticillata, Eucalyptus resinifera, E. robusta, Goodia lotifolia, Isopogon anemonifolius, Platylobium parviflorum, P. formosum* and *Pultenaea retusa.*



Leucopogon lanceolatus - lance bearded heath is a bushy shrub with white tubular flowers upto 2mm long arranged in terminal spikes.



Platylobium formosum - pea-shaped yellow flowers with red centre.

There were numerous plant collectors in south eastern Australia during the last quarter of the 18th century and the first half the 19th. Following Banks in 1769, collecting in New Zealand did not resume until after settlement in the 1840s. In addition to Banks' few plants from New Zealand already mentioned, there was also *Solanum laciniatum*, poroporo, and *Tetragona expansa*, New Zealand spinach, probably the only edible plant from this new land which was to attract northern vegetable gardeners.

In addition to many well known Australian genera which have already appeared in this article, there were others with their species. *Leptospermum lanigerum*, which is hardy over much of England had come in 1774. Probably the best known species of the genus, which is on the border of hardiness, *Leptospermum scoparium*, with a New Zealand and Australian distribution, arrived in 1772. The species had come from Australia but the coloured flower forms which are now more popular were selections of the New Zealand form made in the late 19th and during the 20th centuries. *Pittosporum* is an evergreen shrub genus which though occurring in the Northern Hemisphere, has more species in Australia and New Zealand. *P. undulatum* (1789) and *P. revolutum* (1795) are both Australian species.

Humea elegans (Calomeria amaranthoides) the incense plant, formerly common in conservatories came in 1800, and was described in 1804. This substantial biennial has spectacular tassels of scented flowers and strongly aromatic foliage. Another conservatory plant that is grown as a house plant where there is plenty of room, *Araucaria heterophylla*, Norfolk Island Pine, came in 1793. The genus *Metrosideros* is mentioned frequently but it is doubtful if any species listed remain in that genus today. *M. hispida* is now *Angophora cordifolia* and *citrina, salignus, lophanthus* and *viminalis* introduced before 1800 are now classified in the genus *Callistemon*.

The dominant tree genus in Australia is *Eucalyptus*. In the 19th century there was much interest in the genus by foresters in temperate regions of both hemispheres as timber. *EE. corymbosa, marginata, obliqua, piperata, resinifera* and *robusta* must have embarrassed 18th century gardeners with their ultimate size and rapid rate of growth.

In 1795, Catherine II of Russia sent a request to King George III of England for a collection of plants. Seeing a diplomatic advantage, George III commanded Joseph Banks, who had become unofficial director of Kew Gardens, to select plants from the Kew collection to send to Russia. Almost 500 plants in 226 species were assembled for Catherine. In this collection were some from Australia and New Zealand: *Pultaenea daphnoides, Platylobium formosum, Mimosa (Acacia) myrtifolia, M. (Acacia) suaveolens, Metrosideros piperata, M. (Callistemon) citrinus, Phormium tenax, Sophora microphylla* and *Crinum* sp from Botany Bay (probably *Crinum pedunculatum*). The consignment sent in the ship Venus which had been modified for the plants, was accompanied by a Kew gardener, George Noe; it arrived in St. Petersburg on 8th August 1795.

Catherine had developed an interest in horticulture and created gardens with greenhouses around the Imperial Palaces. Some of the garden supervisors were Englishmen. When the plants arrived in St. Petersburg, she visited them daily and personally drew any that came into flower. She did not have long to enjoy these plants from England, for she died in 1796.

A suitable ending to this part and of the entire article is a quotation taken from a letter Catherine had written to Voltaire in 1772, 'I love to distraction the gardens in the English style - their curving lines, the gentle slopes and the pond-like lakes. My anglomania predominates over my plutomania.'

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COLD WEATHER EFFECT ON PLANTS IN WALES
By Nick Andrews

'Some brief updates on the effects of the recent cold weather, where the temperature here fell below -10°C. This came after an exceptionally mild autumn, when some plants were still in growth.'

1. **UNHARMED**

Olearia virgata traversii
Chordospartium stevensonii & muritai
Notospartium carmichaelii
Acacia dealbata subalpina (Celyn Vale)
Prostanthera cuneata
Pachystegia insignis
Hovea montana
Carmichaelia grandiflora
Eucalyptus urnigera (Celyn Vale)
Callistemon pallidus (lilac form)
Orthrosanthus polystachyus
Callistemon subulatus
Eucryphia lucida 'Pink Cloud'
Eucryphia milliganii

Pachystegia insignis, Marlborough Rock Daisy, is naturally found on limestone cliffs in South Island, NZ. It forms a woody shrub upto 50cm tall. Leaves are thick and leathery, 4-6cm x 2-3cm with a dense covering of hairs on the underside. 8cm long stems are also covered in small hairs. White felt-like buds open to reveal daisy-like flowers about 3cm in diameter; long white petals surrounding many yellow florets. Grow in well drained soil in full sun and sheltered from cold winds. Winter protection is recommended.

Notospartium carmichaelia is one of the beautiful weeping brooms of South Island, NZ. Racemes of small pink-lilac pea flowers are produced on slender pendulous leafless green shoots. Best grown at the base of a sunny wall.

2. **SLIGHT DAMAGE TO FOLIAGE AND SOME FLOWER BUDS (WHERE PRESENT)**

Acacia pataczeckii - I am so pleased that this survived. Even a good % of flowerbuds remain.
Pachystegia rufa
Embothrium coccineum
Pseudowintera colorata

3. **SIGNIFICANT DAMAGE TO FOLIAGE AND SOME STEMS**

Acacia obliquinervia
Eucalyptus gregsoniana
Olearia x scilloniensis
Clematis paniculata

Pseudowintera colorata is native to the mountain forests of NZ. It forms an aromatic, evergreen bushy shrub with leathery elliptic-shaped leaves upto 8cm long, yellow-green in colour, with pink and red markings on the upper surface. Greenish-yellow cup-shaped flowers are produced in spring followed by red berries which in time turn black. In milder areas grow outside in a sheltered border in humus-rich, neutral to acid soil.

4. **KILLED**

Acacia mucronata v longifolia 4.5m tall and just budding to flower!!
? Eucalyptus dalrympleana (no specific provenance)
Hovea sp "R"
Pimelia nivea

'I have been very pleased with the quality of seed purchased from Wildseed Tasmania, (many high provenance collections). *Telopea truncata* and *Eucalyptus johnstonii* germinated very quickly. They were quick to respond to my E-mail enquiries and offered very helpful advice I would recommend them.'

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A NEW PROSTANTHERA
By Jeff Irons

We tend to think of June as being the month of paeonies and primulas. Their flamboyant charms make us forget that many other beautiful plants flower at the same time. A surprising number of them is Antipodean and last June, when walking round my suburban garden, I found over 40 plants from the Antipodes in bloom.

One of the best of them is also one of the least known. It is *Prostanthera* "Badja Peak", which comes from Big Badja mountain, near Cooma, in New South Wales. I believe it to be a naturally occurring sterile hybrid. Throughout June the top half metre of this evergreen shrub is covered with large flowers. They are almost white, with large purple markings. Though scentless they have a copious nectar flow, and this is a good bee plant. When staying with me Rodger Elliot took pictures of "Badja Peak", which he had not seen before.

I think that this is a good plant for gardens in the west and south, probably inland too. I don't know its annual size, because pruning after flowering keeps my specimens down to about 0.7m. A cool position can delay flowering, so that it is as late as September. Keep an eye out for it in the lists of Paul Allanson, Gary Dunlop and Keith Lever.

Gk. Prosthebe appendage) alluding to the spur-like
Anthera anthera) appendage on the anthers

Pronunciation: pros-TANTH-er-a, not as would be expected with the stress on the penultimate syllable.

PLACES TO SEE AUSTRALIAN PLANTS
BY JEFF LAYMAN

I wonder if it would be useful for APS members to have a list of places in the UK where one can see Australian plants. I don't mean the usual botanical gardens such as Kew, or places like Tresco, which are well known, but places you come across unexpectedly. I came across a couple last year.

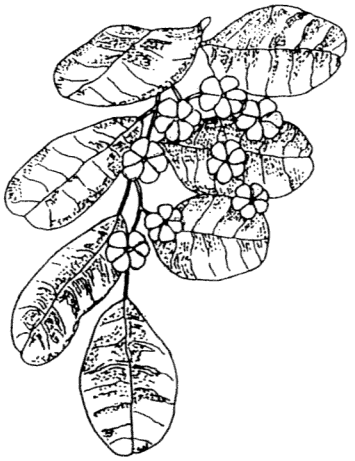
The first, most surprisingly, was at Bluewater - the new shopping centre near Dartford (just off the M25 south of the east Thames crossing). Apart from extraordinary architecture and decor

(which are well worth seeing), Bluewater has a "Wintergarden". This has a lot of tropical and subtropical plants. The major difference between it and similar areas in ther shopping malls, etc, is the size of the trees. Many are mature. I saw several large eucalypts in flower, as well as many smaller shrubs. Of course, nothing is named, so I thought it worthwhile dropping a line to the Management there to see if they could help with the larger plants. A few days later, the reply came back:

10/12 metres:	*Eucalyptus* spp
10 metres:	*Grevillea robusta*
	Schefflera actinophylla
8 metres:	*Syzygium paniculatum*
6 metres:	*Macadamia integrifolia*
	Pandanus tectorius
5 metres:	*Cupaniopsis anacardioides*
	Ficus rubiginosa
4/5 metres:	*Callistemon viminalis*

The eucalytpus trees were in flower in July. If anyone visits there at other times, it would be interesting to know what is in flower.

Cupaniopsis anacardioides
Leaf & Fruit



A small Australian tree with mature leaves upto 10cm long. Flowers are arranged in long pendulous panicles, each bloom being greenish-white and fragrant. Fruits are bright orange-yellow capsules.

The other place was in the "Yellow Book". On a very hot day last 25 July, I went to 9 Raymead Close in Leatherhead, Surrey. The description said nothing about Australian plants, but there were lots there. Many Melaleucas in pots, and quite a lot of Myrtaceae apparently growing happily in the sandy soil without protection. Well, that's not strictly true; the dreaded *Cupressocyparis* x *leylandii* were here doing their best, forming a shelter belt 10 metres or more high at the north end of the garden. Add to that their water-extracting effect on the sandy soil, and that perhaps explains why the Australian plants were doing well. A *Carmichaelia orbiculata* only a metre or two from the hedge was about 120 x 120cm and had quite a lot of flowers on it. Although very little was labelled, the owner had a "crib" book she kept with what was where. Unfortunately it got so hot and humid (around 30°C) in the early afternoon, I gave up and sought liquid refreshment in the shade elsewhere! If it is open again this year I shall return.

So if you have visited somewhere and come across some Australian plants please drop a line to Pentachondra. It doesn't matter what part of the country, or even the continent; we all visit different areas, sometimes unexpectedly. How annoying it would be to travel a few hundred kilometres on business, have a bit of spare time, and find later that you were just around the corner from some wonderful plants! A bit of advance warning here and that might not happen.

WAHLENBERGIA 'AKORA'
By Dennis Rowlinson

After growing *Wahlenbergia* 'Akora' on a wall in 1998 and having a hard job to dissuade the snails and slugs, at the start of 1999 I decided to grow it in a 30cm pot to give it some protection.

While I had been very pleased with it's performance the previous year on the wall, the show of flowers whilst in the pot was amazing and lasted for many months from early summer to late autumn in a continuous succession of flushes.

It was grown in my usual peat/grit/JI mix with some 6X added, and this seemed to suit the plant very well. The pot was placed out on my gravel plunge area in late May and did not receive any extra water over the summer dry spells. On the onset of the first frosts the pot was moved to a slightly sheltered area and watered gently via a saucer.

A root cutting was taken and placed in a frost free area in case the wet winter weather killed the plant whilst over-wintering Most of the flowers were pollinated and the seed produced was removed as it ripened, and stored.

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OBSERVATIONS ON THE COLD HARDINESS OF SOME AUSTRALASIAN PLANTS IN THE MIDLANDS

BY JOHN BUXTON

I live in Herefordshire, and garden in a true frost pocket, at the base of a 300ft hill in gently rolling countryside. You may ask yourself "Why bother to garden in a frost pocket?", and I do, often; but "hope beats eternal", and I keep on trying, with some successes and many failures.

One of the most difficult areas I find when wanting to grow new plants is the information of hardiness. So often, the details given in books seem to be obtained from other books, rather than from first hand knowledge. It seems to me that there is no substitute for practical experience, ie. trying to grow new plants under your own conditions, so this is what I try to do. As an example, I have come across several books that refer to *Prostanthera cuneata* as tender, whereas my experience over 6 years so far has shown it to be tough as old boots!

Winter 1999/2000 was very mild right up until late December, when the weather suddenly changed, and we had snow and ice for 4 days consecutively. From Friday 17th until Tuesday 21st we had clear nights and severe frosts, with the minima of -12°C recorded on Saturday 18th and Sunday 19th December. This severe weather, coming after a period of mild weather, had a major effect on some plants, while others appeared unscathed. I thought it worthwhile recording

the reaction of a number of plant species, in the hope that it may be useful to APS members who garden in cold parts of the UK.

PLANT SPECIES	SIZE (M)	COMMENTS
Pseudopanax crassifolius	2.5	No damage
Pseudopanax ferox	1.0	Old growth OK; new growth killed
Pseudopanax linearifolius	1.0	Slight leaf blackening, otherwise OK
Pseudopanax laetus	1.0	No damage

Pseudopanax crassifolius - NZ evergreen tree. As a young plant the seedling leaves are long and slender upto 60cm in length and downward pointing. Mature leaves can be as long as 1m. Valuable architectural plant.

Hoheria lyallii	2.5	Looks dead at present
Hoheria sexstylosa	1.5	Looks undamaged
Hakea sericea	3.0	No damage
Hakea lissosperma	0.5	No damage
Lomatia tinctoria	0.5	No damage
Lomatia silaifolia	0.5	No damage

Lomatia tinctoria - small bushy Australian shrub with pinnate dark green leaves upto 8cm long. Racemes of fragrant creamy white flowers are borne in midsummer.

Olearia 'Zennorensis'	1.5	Severe damage but may recover in time
Olearia x haastii	1.5	No damage
Telopea speciosissima	0.5	No damage
Telopea truncata	1.0	No damage
Telopea mongaensis*	1.0	No damage

*(very protected position against house wall)

Drimys lanceolata	1.0	No damage

Drimys lanceolata - Australian shrub with evergreen elliptic-shaped glossy dark green leaves upto 8cm long. Clusters of white flowers are produced in spring.

Melaleuca viridiflora**	1.0	No damage

**This name may not be correct. My plant came from Burncoose & Southdown Nurseries under this name

Leptospermum grandiflorum	2.5	No damage
Grevillea 'Canberra Gem'	1.0	No damage
Grevillea lanigera 'Mt Tamboritha'	Prostrate	Killed
Cordyline australis	0.5-3.0	No damage except some leaf browning
Cordyline indivisa	0.5	No damage
Prostanthera cuneata	0.5	No damage
Prostanthera incisa rosea	0.5	Half killed - may die

Prostanthera rotundifolia	2.0	Half killed - may die
Callistemon pallidus	1.0	No damage
Callistemon sieberi	1.5	No damage

COMMENTS

The most interesting finding from these observations concerns the *Telopea* species. *Telopea truncata* completely in the open, was hardy, and it seems that *Telopea speciosissima* is fairly robust as well. The flowers of these plants, especially of the latter, are so superb that it seems worth every effort to grow them more widely. The first report I came across regarding the hardiness of *Telopea* was in the book "The Waratah", by Paul Nixon (published by Kangaroo Press), where he states that *T. speciosissima* withstood -12°C in Australia.

Another group of plants that appear hardier than at first thought are the *Pseudopanax* genus. For architectural effect in the garden, I love these plants. *P. crassifolius* is obviously one to try in cold areas, and would look dramatic as a group of 3 plants grown as a "focal point". *P. laetus* seems worthy of further investigation as well, and I intend to acquire another plant this year and plant it in a sheltered situation.

The obvious toughness of *Grevillea* 'Canberra Gem' is also noteworthy. One wonders whether this variety could be used in further breeding, with the object of widening the colour range, yet maintaining hardiness. All the other Grevilleas I have tried, including *G. alpina*, seem to die at the first sign of hard frosts!

These are just a few comments, but perhaps they will spur other APS members to comment further, and encourage debate!

IN MY GARDEN I GROW.....

BY SUE HYAMS

My garden is very open, either to east winds or west winds. When I moved here seven years ago, the only mature shrubs were three hollies and a berberis. Being impatient to start planting Australasian shrubs, most were situated next to a southfacing wall or fence. Having a sandy loam has obviously helped drainage-wise. Although the following plants may appear to many of you not to be particularly interesting, when I've grown some shelter, I may be able to be more adventurous. Until then, the greenhouse will just have to expand its walls!

In May '88 seed of the Australian shrub *Bursaria spinosa* was sown. In November of the same year germination occurred. After spending the first few years containerised, one of the resulting seedlings was later planted against the southfacing house wall, where it has thrived despite suffering damage in several winters. In winter '93/'94 the tips of the uppermost branches were scorched. In winter '95/'96 - (January) - there were more wilted tips and the top half of the shrub was completely defoliated when the temperature dropped to -10°C for several successive nights; the lower half remained green. By mid March the part of the shrub exposed to the east

wind was completely defoliated. By early summer, a new coat of leaves clothed it. This specimen first flowered in July '94, and has since bloomed every July. Sweet Bursaria or Native Blackthorn has creamy sweetly-scented 5 petalled starry flowers arranged in terminal panicles upto 25cm long which sit amongst spiny branches covered in glossy green oval leaves. Following the flowers are the fruits, dry, flattened, brown, purse-like capsules.



Bursaria spinosa

A visit to a local nursery in '93 resulted in a couple of purchases, one of which was *Corokia* x *virgata*. This NZ shrub has spreading branches which are thin and zigzag slightly, giving it its common name of wire-netting shrub. When young the branchlets are covered in white down. The leaves are variable in shape ranging from spoon-shaped to lance-shaped, and are approximately 2.5cm long, glossy green above and white beneath. I have found that cold winters turn the foliage bronze, or in severe cases, black in colour but come the following spring, the plant soon greens up again. Small star-shaped bright yellow flowers are produced in spring, my first display being May/June '95, followed by orange berries in autumn. After the cold winter of '95/'96 there was no flowering.

The other plant bought at the nursery was *Muehlenbeckia complexa*. This was planted in the same border as *Bursaria spinosa*. This New Zealand plant is a vigorous creeping plant/twining climber with slender shoots and rounded to violin-shaped dark green leaves, 0.5 - 1.5cm long. The first racemes of flowers, greenish white in colour, were produced in summer '95. White fleshy fruits normally follow the flowers but not in my case! In the winter of '95/'96 the temperature dropped to -10°C for several successive nights. For many days and nights, freezing fog was experienced. By January most of the foliage 30cm above soil level had assumed a blackish-green appearance, and by mid March was completely defoliated. Since the plant had become so rampant in just two years I wasn't over worried. By May, it was fighting back with avengeance. Although invasive, (within weeks it can reach the top of a 2m trellis), I like this plant. It makes good groundcover but unfortunately twines itself round anything it comes into contact with, including my two Pittosporums, *P. tenuifolium* and *P.* 'Silver Queen'.

Pittosporum tenuifolium was bought in '88 and spent its first five years growing in my garden in Middlesbrough before moving to Knayton in '93. Now a bushy shrub, approximately 1.5m x 1.5m, it thrives in its southfacing position. It regularly flowers in April/May producing ruby-black bell-shaped flowers, 10mm across, sweetly scented. The foliage is glossy with wavy edges, mid-green, 2.5-6cm long, produced alternately on dark grey-black stems. The cold winter of 95/96 didn't cause any damage at all.

Pittosporum 'Silver Queen' was bought in '94 and planted against the same southfacing wall. 'Silver Queen' has grey-green leaves with creamy margins and the same ruby-black flowers produced slightly later, often into June. Winter '95/'96, and there was frosted tip damage to the top of the plant despite erecting a horticultural fleece tent. In fact, there has been tip damage most winters, but nothing more severe.

In '97 I bought two plants labelled *Ozothamnus* 'Silver Jubilee'. Despite having the same name, there were distinct differences between the two Australian shrubs. The specimen bought from my place of work is the real thing, whereas the other, bought at the Harrogate Spring Flower Show, turned out to be *Ozothamnus rosmarinifolius*. The latter is an upright shrub with dark green rosemary-like foliage whereas 'Silver Jubilee' has silvery grey leaves. Both plants formed terminal clumps of flower buds the following June, terracotta in colour, later opening to white flowerheads. Both shrubs have so far suffered no damage.



Wahlenbergia gloriosa

I grow several New Zealand daisy bushes, *Olearia* x *macrodonta*, *O. nummularifolia* and *O.* x *scilloniensis*. *Olearia* x *macrodonta* and x *scilloniensis* are planted next to each other against a southfacing house wall. For some reason it took 11 years for the former shrub to flower : corymbs, upto 15cm across, of white daisies nestle amongst dark green holly-like leaves.

Olearia x *scilloniensis* has wavy-margined, grey-green leaves. The flowerheads, produced in abundance, are dazzling white daisies with yellow centres, forming corymbs upto 7cm across. In winter '93/'94, many of the branch tips were scorched, but this was minor damage compared to that of winter '95/'96 when, in January, all the foliage of two bushes, each 1m x 1m, was browned, right down to ground level. As well as this, the branch tips wilted. By March both shrubs looked dead. In May signs of regrowth appeared from the base of one bush. There was no flowering that year as the bush put all its energy into recovering. The second *O.* x *scilloniensis* never recovered.

Olearia nummularifolia is a slow growing daisy bush compared to the other two mentioned. Upright shoots are covered in oval, leathery leaves, upto 1cm long, green above, woolly beneath. Daisy flowerheads are produced in small clusters at the shoot tips in midsummer. This shrub sails through winters.

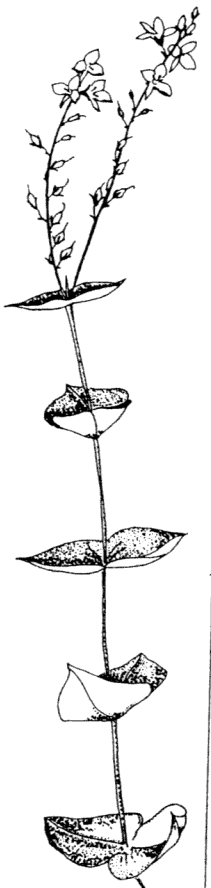
Another New Zealand shrub, the evergreen *Griselinia littoralis* was planted in the front garden in '97, again in a southfacing aspect. The broadly ovate, leathery bright green leaves suffered frosted tips in a late frost in April '99, after a mild March. This has been the only winter damage so far.

In '93 I bought a small plant of the Australian Royal Bluebell *Wahlenbergia gloriosa* which was planted in my scree bed where it more than doubled by '94. It continued to increase for the next three years as rhizomes crept slowly through the scree. Some of these rhizomes were transplanted into other containers including a half barrel. However, by summer '98 the plant in the scree was a shadow of its former self. Winter '97/'98 had been wetter than previous ones and maybe this was the cause. The specimen in the half barrel, protected by the overhang of the eaves fared much better. The original scree plant gradually disappeared, although a smaller one has sprung up in another part of the bed. The blue upturned bell flowers are produced in abundance in June and July with a handful blooming right through until autumn.

Another blue flowered plant is *Derwentia perfoliata* which was bought in '94. The first flowering racemes were produced in '95, and have continued to be produced every summer since.

As well as several eucalypts, which seem to thrive (only *Eucalyptus coccifera* suffered in the cold winter of '95/'96 when about half of the foliage was affected and had to be later removed), I also grow a number of phormiums, most of them bought as plants eg *Phormium cookianum*, *P.* 'Bronze Baby', *P.* 'Flamingo', *P.* 'Maori Queen' and *P.* 'Yellow Wave'. Several clumps of *P. tenax*, some 1.5m tall, thrive in my southwest facing front garden. These are the result of seed sown in '94. None of them has suffered any winter damage.

Not a brilliantly inspiring group of plants, but we all have to start somewhere!



Derwentia perfoliata

WINTER IN CHESHIRE

By Tony Entwistle

Report written mid-March

A mild, wet and windy winter certainly in that we did not have any protracted cold spells but it was not without problems. 90% of damage was caused on one night (Dec 14th) when the temperature plunged to -8°C (-10°C was recorded at Manchester Airport). All my Acacias were blackened and killed to near ground level, as was a 3m high *Clianthus puniceus* which had survived the previous two winters with only minor damage. Several Melaleucas were killed completely. I am confident that the Acacias will reshoot as the frost was not that prolonged. My Callistemons and Correas were untouched, in fact the latter flowered throughout the winter. Surprisingly *Pseudopanax arboreus* was unharmed. *Prostanthera rotundifolia* was killed, *P. cuneata* untouched. *Grevillea* 'Canberra Gem' and *Grevillea juniperina sulphurea* seem OK, though they were protected with some bubble-glaze.

One wonders if there is for many Australian plants a critical temperature, say around -5°C or whether a severe frost following a mild spell is responsible.

COMMENTS ON PREVIOUS ISSUE

By Brian Halliwell

'Dr Sumner's comments in his article 'Southern Springs and Northern Springs' makes interesting reading.

'One point that can affect survival rates in eucalypts is horticultural and often overlooked. Eucalypts raised from own seed or bought from nursery/garden centres are pot grown and what is planted is often rootbound. Rootbound plants produce poor root systems which often fail to ramify through the soil to reach depths below frost penetration. I have seen 30 year old eucalypts blown out of the soil. These showed the outline of the original pot and there were no tap roots.

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Might I suggest a different method of raising seedlings:
Sow seed in warmth in March. Following germination, thin to one seedling per pot or prick out singly into small pots. Plant out seedlings in late May. At 6-8 weeks old, seedlings may be a few centimetres high only but anyone who has grown eucalypts will know their fast rate of growth. By the onset of the next winter, seedlings may be 1 metre high or even twice this height. More important though, is that the root system will have spread and penetrated downwards into the subsoil and a taproot will have formed which will be below the depth of frost penetration. If there are no severe frosts in the first two winters, the bark will become thick enough to resist frost damage.

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2000 SEEDLIST

Notes by Jeff Irons

Apart from all the deletions Sue Hyams has had the tedious chore of entering over 200 new names and their codes. Don't let this increase go to your head. Before requesting a full allocation ask yourself how you will cope with all the seedlings.

Bellendena montana. In spite of the comments in the germination notes members still ask for this. It is very unlikely to germinate.

Craspedia crocata (x jamesii?). This 60cm herb was received as *C. aurantia*, and was grown for bulking up. It is obviously not *aurantia*, and was thought to be *C. crocata*. Under the microscope it displays some features of *C. jamesii*. Identification is awaited.

Grevillea monticola. Do not confuse with *Grevillea montis-cole*. The two species grow 2000 miles apart.

Melaleuca. The new additions are mostly from the S.W. of Western Australia. If winters like those of the last three years continue, members near the south and west coasts may be able to grow them outdoors.

Xanthorrhoea media. This does not have a trunk.

Syzygium luehmanii, Xanthostemon chrysanthus, Xanthosia rotundifolia. These can be grown as house plants.

Notes by Sue Hyams

Astelia solandri. This New Zealand plant is usually found as an epiphytic plant growing in moist forests throughout both the North and South Island. It has long drooping leaves, bright green uppermost and silvery grey beneath. Although it can be grown at ground level, it is shown off to its best when grown on something, such as a tree trunk. To keep the roots damp, moisture retentive material, such as moss, needs to be wrapped round.

Microlaena avenacea. Commonly known as bush rice-grass, *Microlaena avenacea* is found throughout NZ and forms tussocks upto 40cm tall. The leaves are pale to deepish green and are shown at their best when grown in the shade with some moisture at the roots. The flower stems are dainty and slender, upto 60cm tall.

Xanthosia rotundifolia - perennial plant native to WA, upto 60cm tall with leaves upto 5cm long. The 3-lobed flowers are white to yellow inside, purplish outside, arranged in 4-flowered terminal clusters with long petal-like bracts below the 4 stalks. These clusters resemble flattened crosses 3-6cm across, giving the plant its common name of Southern Cross.



Pandorea jasminoides. This 'bower climber' is found in Queensland and N.S.W. It makes an ideal conservatory plant. White to pink trumpet flowers with deep red throats, occasionally all white, are produced amongst shiny, dark green, divided leaves.

Melaleuca elliptica. The 'granite honey-myrtle', native to N.S.W. forms a dense shrub with pendulous branches. Oval grey-green leaves clothe the branches. Orange-red to deep-red flower spikes upto 8cm long are produced on the older wood.

Viminaria juncea.
Commonly known as the native broom, this upright plant, is found in most of Australia except the Northern Territory. Preferring a moist situation, this is a showy plant with fine pendulous branchlets and sprays of light yellow pea flowers.

NATIONAL COLLECTION OF PHORMIUMS

By Christopher Holliday

I have amassed a national collection of phormiums over the last eleven years and also a selection of Australasian plants which complement them. The mild climate of Grange-over-Sands, Cumbria with over 1m of rainfall per annum and sharp drainage on limestone has ensured the survival of these plants. One particular area of the garden is walled on three sides and has a steep hillside of mature woodland to the north, protecting it from north and west winds.

Swathes of phormiums are punctuated with *Acacia dealbata*, *Aciphylla squarrosa*, *Callistemon* sp, *Corokia* sp, *Cordyline sp* and *Pittosporum* sp. *Astelia nervosa* flourishes in the ground or in pots left out all winter. *Tasmannia lanceolata* is slow growing but perfectly healthy. I also have many other southern hemisphere plants such as *Melianthus major*, *Abutilon* sp and *Lobelia tupa*. I have even managed to grow *Echium pininana* after several years of failure.

My main interest is in the phormiums. My interest began eleven years ago and a few years later I started to divide my original plants in order to populate the most sheltered garden, walled on three sides. I have found that the most vigorous phormium is *Phormium cookianum* subsp. *hookeri* 'Tricolor' which I now have in one area as a huge clump of about seven, with others dotted in groups around the garden. It is not subject to the rust on the leaves as *Phormium* 'Yellow Wave' is and always looks extremely healthy. 'Yellow Wave' is also a strong grower, closely followed by *Phormium cookianum* subsp. *hookeri* 'Cream Delight'.

Phormium tenax 'Goliath' is now living up to its name and the progeny are catching up, divided five years ago. I have not divided any of the *Phormium tenax* Purpureum Group but they are



Inflorescence of Phormium cookianum

growing rampantly. In April 1998 I made some deep planting holes underneath a slate terrace and broke up the hardcore underneath with a pneumatic drill. The holes were filled with well-rotted compost, and the phormiums were surrounded with a thick mulch of newspaper and slate chippings. The excess rainfall of 1998's summer created incredible growth and after a mild winter and another summer the plants look quite mature. Some earlier planted phormiums nearby enjoy the full south aspect and the same rainfall, but as the ground is very poor and stony and large planting holes were not made they have been extremely slow in comparison. However, they will no doubt be tougher plants if there is a hard winter. The main key to their survival seems to be ample drainage, which this steep and stony site has.

The garden has appeared on BBC Gardeners World in September 1998, The Times and The English Garden. The garden has been photographed by Clive Boursnell, Andrew Lawson and Jerry Harpur, leading garden photographers. It will appear in Country Life in 2000. In 1999 at the open day in aid of the National Gardens Scheme 630 visitors came round and the garden raised more money in a single day than any other garden in the county for the NGS.

The Gardens at Charney Well and the National Collection of Phormiums can be viewed on Saturday and Sunday 12th and 13th August 2000, 10am until 5pm, in aid of the NGS and Kendal Mountain Rescue.

Charney Well, Hampsfell Road, Grange-over-Sands. 01539 534526. Email charneywel@aol.com

WARATAHS

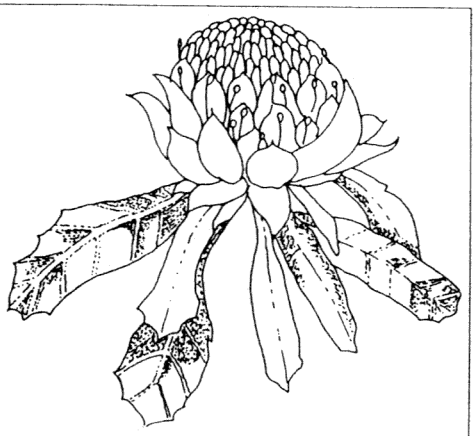
By Jeff Irons

Greek 'tele' = far; 'opsis' = view, appearance.
Waratah is an aboriginal name

Waratahs could be said to be the proteaceous equivalent of the bright red rhododendrons. Like them they are shrubs which have prominent heads of flower in spring and early summer. However, whereas rhododendrons occur in Asia and through the tropical islands into Northern Australia; waratahs are found only in Australia. They date back to the late Cretaceous era, about 65 million years ago. One and a half million years ago there were 5 species of waratah, and four of them can still be found today. The extinct species is *Telopea strahanensis*, which was found at Regatta Point, Strahan, on the west coast of Tasmania.

It is often said that daisies and waratahs do not make good companions. Possibly that is because daisies do not like the shade cast by the shrubby waratahs. Or it could be because their roots have different needs. Be that as it may, as a general rule waratahs grow in isolation with no other plants round them. The Tasmanian waratah, *Telopea truncata*, is the exception and grows in dense scrub, often on forest margins. In contrast to this plant of dolerite-derived soil, the

NSW waratah, *Telopea speciosissima*, sometimes grows in sand. However in such a situation the sand, which appears dry, will be found to be moist only a couple of centimetres or so down. What it does indicate though is the waratah's need for excellent drainage.



Telopea speciosissima

The best waratah for British gardens is probably the Tasmanian *T. truncata*. It can be grown successfully as far north as Wick, yet flourishes in Hampshire's Hillier Arboretum. Arnold-Forster records it growing in Cornwall. An advantage is that it has a branching habit, so although its flowers are smaller than those of the NSW *T. speciosissima*, they more than make up for it in number. Like all the species it needs a cool, moist, acid soil. In 1999 the APS seedlist included *T. truncata f. lutea*. The seed came from a plant growing in the Tasmanian garden of Essie Huxley. Her garden was destroyed by a bush fire in 1982 and the present specimen is a rooted cutting from the original plant. That was a seedling grown from seed collected by her husband in Tasmania's Wellington Range. It was the first known yellow waratah. Since that time other yellow flowered stocks have been discovered at Wherret's Lookout in the Mount Field National Park and in the Comstock Valley near Queenstown. A mainland propagator has recently taken pollen from Essie's plant, with the aim of using it to create hybrids with new colours. A white flowered form has been reported, but so far its existence is unconfirmed.

In the Miocene era, *Telopea mongaensis* was found in Tasmania. Nowadays it occurs only in a small part of New South Wales. Having a suckering habit it makes a good garden plant, with red flower heads in late spring. They can be upto 12cm across, much larger than those of *T. truncata*. Stephen Gibson has given us some seed of this rarely encountered species. It was collected near Robertson in South East NSW. This, the Braidwood Waratah, should make a good garden plant in much of Britain.

In the wet mountain forests of Victoria's Gippsland *T. oreades* makes a shrub up to 3m high, with red flowers about 9cm across. In a few very sheltered places it can be a 10m tree. Its white flowered form is not in general cultivation. I had this species for about 10 years, but the site chosen for it was too dry and the plant died last year. The Gippsland Waratah should be suitable for most gardens in the south and west of Britain, and will tolerate shade.

Everyone wants to grow *T. speciosissima*. Its flower heads are the largest in the genus, up to 15cm across, and bright red bracts make them the most handsome. However in Britain it will survive outdoors only in a few very warm, sheltered spots. Even then the emphasis is on the

word 'survive', for this species comes from areas which have dryish winters and wet summers Here it is really a pot plant, though one which can be stood outdoors in summer. Fine specimens can be grown in pots as small as 3L and will reach 1.8 - 2m in height. There is a white form and in Australia both selections and hybrids are marketed.

All the species can be grown easily from seed. All you have to do is sow the seed shallowly in warmth, say 20-25°C during the day. Unlike Dryandra, low night minima are not necessary. As soon as you see either the radicle or the seed leaves, transplant with one seed to a 15cm pot. The compost is the usual acid, moisture retentive low fertility mix. If germination has not occurred within a month the seed was probably non-viable. You want to encourage the plant to make roots, so remember that the large seeds have plenty of food in them and be miserly with fertiliser. A Grevillea seed contains enough food for a year! Cautious feeding with a low phosphorous product (say N:P:K. 10:2:7) will result in healthy growth. Do though keep an eye out for iron deficiency. *T. truncata* MUST be kept cool and airy, especially in late summer, which is the danger time for death from infection. I've not found the other species to be bothered by heat, and the temperature in my greenhouse occasionally gets up to 50°C, for I believe that light is more important than shade. Transplanting should not be necessary until the 3rd year, and is best carried out just as the plants are beginning to get pot-bound.

If there is any doubt about pot management it can be made easier by using a compost containing upto 10% soil. The clay in the soil will adsorb phosphorous and make it unavailable to the plants. Although I have not tried them I don't see why the clay granules sold for use in hydroponics cannot be used both to open up a compost and adsorb phosphorous. The other danger is sun. Avoid getting sun on a plastic pot. It does not matter with clay pots because clay is porous. Sun shining on a clay pot will make it act like an old-fashioned milk cooler. As water evaporates through the clay it will keep the compost cool. Hot sun shining on a plastic pot results in the roots being given what is, in effect, a steam bath. They do not like it, the leaves turn black and death follows within days. Brown leaves are usually an indication of phosphorous poisoning. If this happens you can either try washing it out, or better, dunk the whole plant in water, wash off all the compost then re-pot in a phophate-free mix.

Summarizing the conditions for Telopea we get:

	mongaensis	oreades	speciosissima	truncata
Humus rich	yes	yes	yes	yes
Heavy/clay	no	no	yes	no
Shady moist	yes	yes	yes	yes
Shady dry	no	yes	no	no
Temporary flooding	no	no	no	yes
Sandy	yes	yes	yes	no
Bird attractor	yes	yes	yes	yes
Snow tolerant	no	no	no	yes
Frost tolerant	?	yes	no	yes

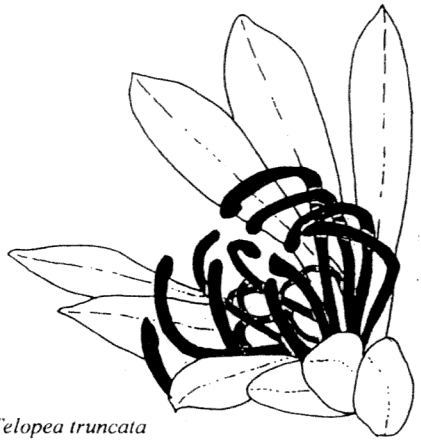
The Waratah Flower

Superficially the waratah flower head resembles that of a chrysanthemum, though with 'blobs' at the end of the petals. However each 'petal' is actually a complete flower, and the head is made up of pairs of flowers arranged in a circle. When looked at closely the flowers seem familiar. They resemble those of *Embothrium*, and in fact *Telopea* is in the same section (called a tribe) of the Protea family as *Embothrium*. The petal with a blob at its end is an unopened flower.

It has four segments joined together at their edges, and splits open along one side to reveal the style. There is an anther at the end of each of the 4 segments. The bright colour indicates that the flowers are pollinated by insects, birds or mammals, and in the wild waratahs are pollinated by birds. Blooms on taller stems get more bird visits than those on shorter stems.

Proteoid Roots

Living as they do, on low nutrient soils proteaceous plants have devised special roots called proteoid roots, to enable them to extract their food. Only 3 species, all Tasmanian, do not have them. These specialised roots are seasonal, appearing at the time of greatest rain. They are very fine and so numerous that they make up as much as half of the plants' root mass. Being so fine they have as much as 15 times as much surface area for their weight as the permanent roots. This gives a very short path for diffusion of nutrients into the root, and proteoid roots are very efficient at mobilizing elements such as phosphorous and manganese.



Telopea truncata

Proteoid roots have important implications for the way in which we manage waratahs and other Proteaceae such as *Grevillea*. They form just below the soil level, and will extend up into an organic mulch. Because of this, plastic should not be used as a weed suppressing soil covering. Neither should the soil round the plants be disturbed. In the garden the high nutrient levels of most British soils has the consequence that fertilizers are not necessary. Indeed they can be harmful. High fertility can result in lower than normal growth, because proteoid roots are not formed. High phosphorous sensitivity is very specific, easily recognised, and to my knowledge is not a problem with *Telopea*.

Proteoid roots are most easily recognized in pot grown plants. When a plant is removed from its pot there should be clusters of roots round the sides. They are white if alive and brown if dead.

Dead ones can look like a clod of soil. If there are no proteoid roots then there is something wrong in the way in which the pot has been managed.

All this technical stuff may seem daunting. Don't let it put you off. Give waratahs a try and you'll be surprized at how easy they are to grow.

Cultivation of Waratahs

In the Ground

A good deep soil is desirable, and ideally there should be no plants within a metre. A good rich loam is ideal. An organic mulch will keep the roots cool, while the tops should get as much sun as possible. Waratahs can be encouraged to bloom by cutting off the spent heads after flowering. This is essential with *T. speciosissima*. Cutting to half the pre-flowering length increases the number of stems for the following year.

In Pots

A heavy compost is preferable, basaltic or dolerite derived soil (ie acid) plus organic matter is ideal. Fertilize when new growth appears.

Footnote

Why is crocking a bad practice?

Unlike Graham Jeffery (Pentachondra, Dec'99, p18), I do not crock my pots. This results from an article read some years ago which stated that crocking actually impedes drainage and worsens the soil water gradient. My pots stand on a sand bed or capillary matting. They are all plastic. Non Proteaceae are grown in 5cm square tubes.

In the ground there is a continuous gradation of water from the surface downwards. However in a pot its base breaks the continuity of the water profile, and so eliminates the effect of the lower soil layers in draining the upper part. It follows that since crocking reduces the depth of compost in a pot it will make the compost wetter. You have to balance the advantage of the very well drained layer at the very bottom of the pot against the disadvantage of the wetter material above it. The overall balance is in favour of not crocking, and of ensuring as good a contact as possible between the base of the pot and the material underneath it.

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SYMBIO MYCOFORCE END/ECTO POTTING MIX

By Tony Entwistle

This is distributed through Avoncrop of Bracknell, Berkshire. They can supply a 10kg bag at a cost of £111.63 incl p&p. I cannot imagine any member wanting to buy all this, but IF sufficient members (at least 18) were interested I would be willing to purchase a bag and resell lots of 500g to members - this would cost you £6 incl p&p. So let me know and we will see if this becomes practical. Symbio tell me that the product contains the Australian ectomycorrhizal spores of *Pisolithus*, which is Eucalypt-conjugate. See related article on Page 29.

WILDFLOWER SEED STARTER

On a recent trip 'Down Under', APS member E.J. White came across the 'Wildflower Seed Starter', a germination booster for Australian native plant seeds.

The Wildflower Seed Starter is a granular material containing smoke and chemicals from the burning of bush materials. It is designed to be sprinkled on top of the soil or potting mix after sowing the seeds. The first watering will release the smoke chemicals to wash around the seeds. For more info contact WA Wildflower Seed Company Pty Ltd, PO Box 804, Canning Bridge, Western Australia 6153.

SPECIAL OFFER

We have one copy of Volume 3 of 'The Grevillea Book' for sale at £10 + £4 p&p. It covers all Grevillea species from *macleayana* to *zygoloba*. Enquiries to Jeff Irons.

It may be possible to get other volumes for around £18-£20 each including postage. Again enquiries to Jeff.

GONDWANALAND - BEFORE AND AFTER

BY TONY ENTWISTLE

The botanic aspects of Gondwanaland have always interested me, both before and after the separation of Gondwanaland some 200 million years ago into South America, South Africa, India, Australasia and Antarctica.

BEFORE - If we look at the families and genera which were in existence then, as they now occur in two or more of the 'separations', there are many puzzles. Why, for example, are there no *Notofagus* or *Araucaria* in South Africa, no Acacias in South America?

The following list, which I am sure is very incomplete, and not including tropicals, are some of the 'originals'

Code - (1) S. Am; (2) S. Af; (3) India; (4) Australia; (5) New Zealand and Oceania.

Families - Proteaceae (1,2,4,5), Cycads (2,4), Araucariaceae (1,4,5).

Genera - Acacia (2,3,4,5), Adansonia (2,4), Acaena (1,5), Albizia (3,4), Azorella (1,5), Calandrinia (1,4), Colobanthus (1,5), Cunonia (2,5), Donatia (1,4,5), Drimys (1,4,5), Elaeocarpus (3,4), Embothrium (1,4), Eucryphia (1,4), Hebe (1,4,5), Hibbertia (2,4), Jovellana (1,5), Lomatia (1,4), Metrosideros (1,2,4,5), Notofagus (1,4,5), Orites (1,4), Ourisia (1,5), Pelargonium (2,4), Phyllachne (1,5), Pratia (1,4,5), Raoulia (1,5), Syzygium (1,4), Wahlenbergia (?,4,5), Weinmannia (1,2,5).

AFTER - the long isolation which followed resulted in the evolution of new families and new genera in existing families. Families such as the Epacrids (mostly 4,5) are clearly very close to the Ericaceae, others seem new developments eg. Bruniaceae in (2), Xanthorrhoeaceae and Tremandraceae in (4).

But what is so fascinating is the development - sometimes in cosmopolitan genera - of either distinct sub-groups to adapt to climatic conditions, or a veritable explosion of species of a family

or genus. The Proteaceae, for example, have proliferated in both (2) - 540spp, and (4) - 842spp. Examples are Cacti, rosulate Violas, Calceolarias and Alstromerias (1): Ericas - 625spp, succulents such as Aloes, Euphorbias and all the Mesembryanthaceae, the profusion of 'bulbs' of the Lily, Iris and Amaryllis family (2): the Chenopods and the Myrtaceae (Eucalypts and all the other myrtles) - 1062spp (4): Hebes, Celmisia and Aciphylla (5). Even the ubiquitous Pea family has done exceptionally well in Australia with 1061 spp.

Remarkably also is the evolution in the post-G land masses in special areas of Brobdingnasian plants eg the giant Espeletias and Puyas of the Andes, the Senecios and Lobelias of central Africa and the Tree Ferns and Blackboys of Australasia.

Australasia remained the longest in isolation from the northern mass (Laurasia), the others joining mostly through volcanic activity. Even in Australia, the East Indies volcanic formation formed in effect a bridge for exchange of plants by birds, winds, and ocean currents. The appearance of the Rhododendron in Australia (only just!) must surely have travelled and evolved from Malaysia in this way.

Tony has been busy this issue, writing several articles! Here is yet another one. Can you provide one for the next issue?

FUNGAL THOUGHTS

By Tony Entwistle

All of us have problems with fungal pathogens - in particular, though not entirely, with the loss, either with a protracted death or a sudden collapse, of seedlings and young plants. This is especially in the winter months when resistance is lowered through a combination of dampness, poor ventilation and light, and low temperatures.

We battle with varying success by using fungicides, by spraying and/or treating the soil or compost. The common problems are damping off (*Pythium* & *Phytophthora*), black root rot (*Thielaviopsis*) & wirestem (*Rhizoctonia*).

We use a variety of fungicides, eg. copper salts, imidiazoles, triazoles, phenylamides and phosphonates. They can be effective but need care as some plants do not like them - a sort of idiosyncratic allergy - and this can often be only found by experiment. For example, a packet of etridiazole contains the warning 'do not use on lettuce, pansies, gloxinias, pyracantha and escallonia - nothing about Banksias!

Now to mycorrhiza. The vast majority of plants in the wild (over 85%) have a symbiotic association with a benevolent fungus. This has many advantages to the plant - it does not stimulate actual growth, but improves uptake of nutrients and minerals, especially phosphate and nitrogen; it improves root systems by up to sevenfold with better tolerance to drought; it improves resistance to pathogenic fungi (which interestingly enough may be other species of the

same genus as the mycorrhizal fungus) eg. *Phytophthora cinnamomi* and *Armillaria* and it may protect the plant from toxicity of metal excess in the soil.

There are four types of mycorrhizae - 'ecto' (Ects) found on most trees and larger shrubs - more than 10% of all plants. These form sheaths around the plant roots but do not invade the roots. They are cultivatable and at times produce fruiting bodies (toadstools) at surface level. They are worldwide, over 5000 spp currently identified.

The second group are 'endo' (Vams), also worldwide and found wherever plants can grow. These are more truly symbiotic and they invade the plant root cells in a true partnership. They are not cultivatable and do not produce 'toadstools'. Over 500 spp have been identified but research is in its infancy. 85% of plants have them, many with Ects as well.

The third group is the Ericoid, confined to Ericaceae and the related Australian Epacridaceae.

The fourth group is the orchidaceous (*Rhizoctonia* spp), known for the longest time. These actually penetrate the germinating seed and it is a delicate balancing act - if it overgrows the fungus will kill the plant.

Studies have been made on most Australian genera and the findings as expected are that all trees and larger shrubs (Eucalypts etc) have Ects, many also Vams. Herbaceous plants and smaller shrubs mostly just Vams.

No Proteaceae have any mycorrhiza, presumably because of their proteoid roots. Neither to sedges, rushes or Restios. Families devoid of mycorrhiza are also such as Caryophyllaceae and Crucifera. The genus *Thysanotus* is interesting in that it has a very peculiar mycorrhiza, half Ect and half Vam.

What does all this mean pragmatically to us trying to grow Australasian plants? It is a sort of catch-22 situation, because if we sterilise our soil, or add fungicides we in effect get rid of any mycorrhizae present - we hope to eliminate the 'nasties' at the expense of the 'goodies'. Studies have shown that some fungicides inhibit only Ects, some only Vams, but all affect one or the other.

Mycorrhizal preparations are already on the market - a mixture of Ects and Vams, sometimes also with beneficial bacteria and other stimulants. Symbio make products such as 'MycoForce Ecto/Endo Potting Mix' (see page 27) (and a seed sowing mix) and a U.S. Product 'Tree Power' made by Plant Health Care will also be generally available soon.

These may be worth trying out. Whether they contain the 'right' Ects and Vams for your plants is an interesting question. It is predicted that in the future the exact mycorrhizal mix for all plants we grow will be available 'tailor-made'. But I think it is worth stating that no plant HAS to have mycorrhizae to grow well, nor do mycorrhizae stimulate actual germination. The 'partner-specificity' of different mycorrhizal species with each plant species is not yet fully known.

Finally, I conclude with some irrelevant but curious medical snippets - did you know that if your toe nails go rotten, you will get the same treatment as that for Chrysanthemum mildew? Even odder, if you get osteoporosis with a crumbling spine, you will be treated with the same drug that Australians inject their avocado trees to prevent them collapsing with die-back!

For further info on the Internet visit the following sites :-

www.planthealthcare.com.us (general facts)
www.ozemail.com.au/~wildflowers (Australian facts)
The WA. SGAP. Site - go to Links and then mycorrhiza

The address of Symbiosis is 38 Bookham Industrial Park, Church Road, Great Bookham, Surrey, KT23 3EU.

QUESTIONNAIRE COMMENTS

Almost half the members spent a coffee break filling in the questionnaire sent out with the previous issue of Pentachondra. Many thanks to all of you; and especially to those members who added a personal thank you for all the work done by everyone for the Society. Initial observations reveal that the majority of members are happy with the present subscription; several said that the cost was too low!

Approximately half the replies were in favour of a **larger issue** as well as more than two issues a year. To be able to achieve this, I will need more articles/news contributions from members. Also, more issues p.a. may mean increasing your subscription. Remember, please don't wait to be asked to write something; just jot down your news and send it in. If it doesn't get used for the current issue it will be kept on file. **Many thanks to all contributors to this issue.**

The **types of articles** requested include: propagation/cultivation tips, booklists, news on members experiences in growing NZ/Aust plants outdoors in the UK particularly in the north of the country. Including an **Exchange & Mart** section seems popular (if you have anything to include in this section for the next issue, sent it to the editor) as does the inclusion of reprints of articles from other Aust/NZ journals. Two-thirds of replies are in favour of including other Southern Hemisphere plants articles, although over half the replies are in favour of the Society remaining Australasian! Only a quarter of members are interested in articles on tropical plants.

Several members said that they felt that the newsletter was **too technical** and that articles weren't geared towards the novice plantsperson. Its difficult knowing what level to aim for - hopefully a varied range of articles of different levels will satisfy most people.

The **seedlist** is one of the main reasons that members renew their subscription. Most people are satisfied with the list although several members said that there were an unacceptable number of seeds unavailable. For this year only, as a trial, we are offering you the chance to name five substitutes. Over half the replies said they would like more species to be available. Most members are satisfied with germination. If seed has been bought directly from Australia, the germination rate doesn't seem to have been any better.

It is generally agreed that the **AGM** should move around GB, with two-thirds in favour of a weekend AGM; members are split evenly on the Society arranging hotel accomodation in the event of a two day meeting. A lecture plus a garden visit seems the preferred type of meeting. Half of those members replying stated that despite a meeting being held close to their home town, they did not attend. Why not? Several members expressed that they would like a **Regional Meeting** in their area. Unfortunately, most regions had only one or two interested people!

Almost half those members who replied have visited Aust/NZ at least once, many having friends or relatives down under. Strangely, only half of these people exchange seeds or horticultural literature with their Antipodean contacts. 18 members expressed interest in the Society arranging a botanical trip; several others were interested but didn't feel they could afford it.

10 members said that they belonged to the APS (SGAP). Almost all those who replied belong to at least one other plant society. A good journal and seedlist seem to be the main incentives. What members hope to get from their membership is contact with other like-minded people, a good seedlist and the possibility of obtaining plants.

Only a handful of members have imported plants from NZ/Aust. Almost half are interested in the Society obtaining plants from abroad to sell on. A third of replies said that nurseries run by members should offer discount to APS members. Many other members said 'no' expressing concern that nurseries make little enough money and couldn't afford discounts.

31 members said that the Society should exhibit regularly at **shows** but only if it was feasible, ie that there were people to man it. Several members expressed willingness to help!

14 members exchange **garden visits** with nearby members; 26 said they would be happy to have APS members look around their garden by prior arrangement. 9 members have their garden open under the Yellow Book scheme; 25 are happy to have their garden included in an APS Gardens Open list.

Two-thirds of replies are in favour of **advertising** to increase membership but keeping advertising costs to a minimum. It is suggested that we see what results the website brings before looking at other advertising options. A third of members replying joined the Society after seeing an advertisement.

SLIDE LIBRARY

The society would like to build up a library of colour slides. It could be used both to lend them to members and, possibly, for rental to commercial sources, as for example to illustrate magazine articles. The first step has to be to appoint a slide custodian. If there is anyone willing to take on the task will they please contact Jeff Irons, signifying their intention. Subsequently we shall be asking members to send their spare slides - or duplicates - to the custodian.

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