

Australian Plants

A close-up photograph of a branch with several yellow, ribbed fruits, likely from a Banksia species. Some fruits are whole, while others are open, revealing bright red, fleshy structures and black seeds. The background is dark, making the yellow and red colors stand out.

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Along with an easy reading mix of articles, we also bring the sad news of the death of Bill Payne. Peter Olde, leader of the *Grevillea* SG, has provided his obituary for printing in "Bill's" journal.

With the passing of many of our older members and the approach of ASGAP's 50th anniversary and the Conference in Newcastle in 2007, it is a time to contemplate our origins, achievements and the wonderful things that the Societies are today. It is also a time to look to the future.

It would have been a wonderful time 50 years ago. Bill and all the people with him were younger and so enthusiastic - they wanted to change the world. Today we have a legacy of knowledge and experienced people to learn from.

In looking to the future we must remember that a Society is not just a president - it also comprises other workers and members. All are necessary. In looking to the future of the *Australian Plants* journal we must remember it is not just the editor but the readers, contributors, proofreaders and a team of other administrative workers that make it happen.

Whatever your age or experience, there is something you can do to ensure that both this journal and the legacy of the Society go on for another 50 years. All you need is enthusiasm.

Keep up the good work! (If you want to contribute to the journal, send an email to edap@ausplants-nsw.org.au)

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Front cover: ***Cupania (Cupaniopsis anacardioides)* fruits, - photo: Ivan Holliday (p152.)**

Back cover: **Arbour and Frog Pond at the Tasmanian Arboretum at Eugenana near Devonport, Tas - photo: Dick Burns (p. 167)**

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Vale William 'Bill' H. Payne

(1926-2005)

Peter Olde

The indomitable Bill Payne has died after a long battle with cancer. He slipped away Saturday November 5 at St Joseph's Hospital Auburn aged 79. Thus passed one of our Society's greatest achievers and most dedicated servants. In 1957 Bill attended inaugural meetings of the Society for Growing Australian Plants in Melbourne and Sydney and in October 1957 founded with others the East Hills District Group, of which he remained a member continuously from its inception. He became editor of the Federal body's Journal in September 1959 and produced the first edition *Australian Plants* in December of that year. He was also for one year President of the Society in New South Wales (1976-77) and was made a Life Member in March 1972, nominated by his friend of many years Noel Gane, a co-worker with similar interests. He received the Australian Plants Award in the Amateur Category in 1993. Most of his numerous achievements are listed in an excellent tribute to him published in *Australian Plants* Vol 21 No 173 (December 2002). It was his achievement as editor of *Australian Plants* for over 40 years, producing 170 issues, that marked him out as someone special.

Bill rose from humble beginnings, trained to become an electrical engineer and ultimately took charge of the electricity supply of Sydney's western districts for the Sydney County Council, retiring in 1981 at age 55. One of his hobbies was square dancing, an activity which he enjoyed with his wife Beryl and one at which he became highly adept. Bill gave great support to anyone who tried to achieve things, especially authors and organisers, believing strongly that we need to continually present the Australian flora to the public. He was a great campaigner, who thought ahead, and came up with plans to implement his ideas. Memorable events that he used to advantage were the Australian Bicentennial, The Olympics, Year 2000, the government funding for which he thought the Australian flora should share. In his latter years especially, he became also a vocal conservationist, using the editor's platform to preach his concerns and urge a better way forward. He strongly supported the commercial cut-flower industry, being opposed to the confusion of South African flora with Australian as 'native' and advocating an industry that sustained itself from cultivated rather than wild source.

Bill had a complex personality and was, like most of us, a man of many strengths and weaknesses. He had had no training as an editor. It was all done on the job. The beginning of his editorship was not easy and he had opposition from Thistle Stead (nee Harris) who felt the journal would impact on sales of her books. He also had support, particularly from botanists like Jim Willis in Melbourne and Roger Carolin in Sydney. By sheer perseverance and dedication, he not only built up but took personal ownership of *Australian Plants* even though it wasn't his, and often felt personally insulted and threatened when it underwent criticism or when he perceived it might be taken away from him, as it eventually was in rather unhappy circumstances in 2001.

Continued on page 158



Above and Top Right:
Dwarf form of *Corymbia eximia*.

Right: *Eucalyptus spathulata*

Below: *Eucalyptus erythrocorys* as a poor street tree.

See page 151.

Photos: I Holliday





Above Left and Above:

Harpullia pendula -
Tulipwood and its fruit.

Left and Below Left:

Cupaniopsis
anacardioides - Cupania
and its fruit.

Right:

Lysiphyllum gilvum - the
Bean Tree

Below Right:

Hymenosporum sp.
Native Frangipani

See page 152.

Photos: I Holliday



An Adelaide Perspective

with particular emphasis on its street trees _____ Ivan Holliday*

History

Our friends from the eastern States describe Adelaide as a large country town, which, of course, is nonsense.

Adelaide covers an area as large as Sydney and much larger than many famous cities such as Rome. Certainly these cities have much larger populations, Adelaide being a low-density, spreading city of about 1.3 million people.

Despite its dryness, Adelaide is one of the most treed cities, probably in the world. When one approaches it from the Mt Lofty Ranges the city area appears as a sea of green, much like an urban forest.

This was not always the case because in its early years cheap freehold land was available. This attracted wealthy families from the U.K. who built mansions which they surrounded with pastoral land by denuding most of the natural vegetation.

Much later, as Adelaide grew and spread, the $\frac{1}{4}$ acre allotment became the norm, each with its own garden. Shortly after World War 2, a conscious policy of roadside, street and park tree planting transformed the city. In turn, this has attracted native animal and bird species, particularly brush-tailed possums, koalas and parrots of all descriptions, as well as reptiles and insects to the urban areas.

One downside is that, unless netted, fruit trees (except citrus) and grapes, so prevalent in backyards in the 1930's and 40's are no longer worthwhile. The influx of blue-tongue lizards, however, has wiped out shell-back snails in gardens where the blue-tongues abide.

The current Government policy to increase the city's density by allowing 3 allotments where there was one is gradually eroding the tree population. While very large trees are protected by tree preservation regulations, numerous older houses with large gardens are being-demolished at a rapid rate. The regulations based on tree girth (2m or more) is ridiculous anyway because rare trees of lesser girth can be removed, while developers and home owners are removing many other trees which would normally remain, before they reach the controlled girth.

With 3 houses on the traditional $\frac{1}{4}$ acre allotment the gardens are becoming non-functional decorations encouraged by the various TV make-over programmes and often inspired by modern landscape architectural fashion where they are looked upon as an art form, rather than a functional part of the home. These small gardens are dominated by small strap-leaf plants, Mondo Grass and standard Roses.

* Ivan Holliday is a life member of the South Australian Region of the Australian Plants Society who has written many books on Australian Flora, including banksias, melaleucas and the recently released Hakea book.

An earlier swing towards growing Australian native plants lost its appeal because most people thought you just planted them and that was it. Naturally, most unpruned woody plants such as *Melaleuca* and *Callistemon* became ugly with age, particularly so in public plantings where they were just left to their own devices. As a consequence the general public mainly reverted back to exotic plants for their gardens.

Because of water restrictions and its cost in homes where there is still room for a reasonable sized garden natives have again gained some popularity. This is particularly so along many major road median strips and verges where masses of various native grasses have been planted. This fashion towards native grasses may well cause another swing away from native species because so many of them look so unappealing for much of the year.

Street Trees

Many native trees, however, are re-emerging as suitable street trees.

In the 1950's, due in part to the Wail nursery in the Victorian Wimmera district, many Western Australian eucalypt species became fashionable. The Wail nursery had raised these for farm and roadside planting in the Wimmera where many were successful and often replaced the almost universal use of pollarded Sugar Gums, (*Eucalyptus cladocalyx*) as windbreak trees on farms.

As a consequence, the Woods and Forests Department took up growing these W.A. species here in Adelaide at their nursery. Local councils planted many in suburban streets, including mallet species* such as *E. spathulata* (photo p. 148), *E. astringens*, *E. gardneri*, *E. sargentii* and *E. occidentalis* to name a few, most proving over time, to be a mistake and unsuitable as street trees. In Adelaide's richer clay soils they have grown far too large and being allelopathic, have killed everything beneath their canopy, have lost limbs and blown over in storms. Some have been relatively satisfactory in the poorer sandier soil areas, nearer the coast.

In fact, very few eucalypts are suited for street tree planting. A few exceptions include the dwarf form of the Yellow Bloodwood, *Corymbia eximia* (photo p. 148), grafted forms of *Corymbia ficifolia* and in some areas *Eucalyptus dolichorhyncha*. *Eucalyptus platypus* near the sea in sandy soils and sometimes elsewhere has been satisfactory. There are many other eucalypt species such as the smaller forms of *E. leucoxylon*, *E. torquata* etc, which often form good street trees but grown as they are from seed, they cannot be relied on. Too many unsuitable variations occur. Because of its magnificent flowers, *E. erythrocorys* has been used in some streets, but seldom with success because of its ugly habit of growth (see photo p. 148).

The informed Councils are now performing trials with a number of other Australian species, some from quite different natural habitats. A number of these are showing great promise.

* Definitions of Mallet species

"As opposed to a mallee, a mallet has one trunk and many (side) branches in the crown. The expression comes from WA and refers to the shape of the tree" - Dick Turner

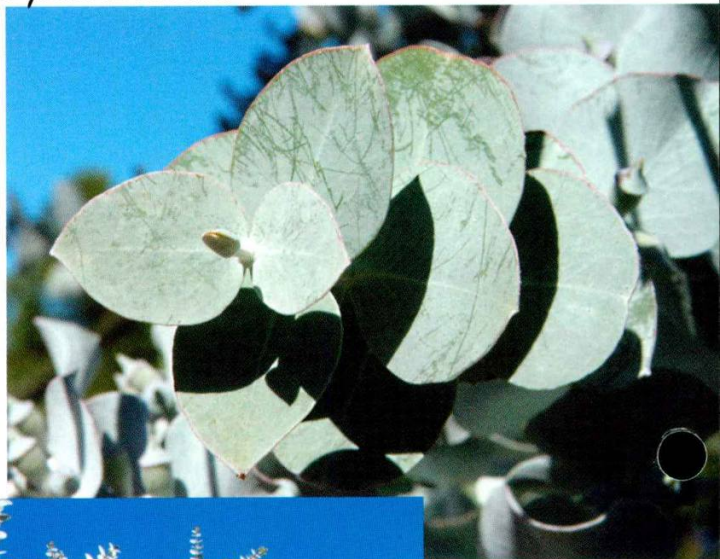
"A small to medium sized tree with a conspicuously dense terminal crown; often in more or less pure stands." *Field Guide to Eucalypts Vol 2- South Western and Southern Australia*, M.I.H. Brooker and D.A. Kleinig (1990), Incata Press, Sydney and Melbourne.

These include Cupania - *Cupaniopsis anacardioides* (photo p. 149 and front cover), Native Frangipani - *Hymenosporum flavum* (photo p. 149), Tulipwood - *Harpullia pendula* from the sub-tropics (photo p. 149), the Bean Tree - *Lysiphyllum gilvum* (photo p. 149) and Wilga - *Geijera parviflora* from the dry areas; and Drooping Myall - *Acacia pendula* among the wattles. The best *Melaleuca* seems to be Prickly Paperbark - *Melaleuca styphelioides*, despite its much larger growth under natural or more favourable conditions. Two other species worthy of more trials are Moonah, *M. lanceolata* - tree form and Black Tea-tree, *M. bracteata*, although this latter species tends to be too variable in habit.

A number of *Callistemon* have proved suitable provided they are trained and pruned with care, but because of their hybridisation they are mostly not recognisable species. *Callistemon* 'Harkness' is used frequently and does particularly well in clay - limestone soils.

Although rarely used, Water Gum - *Tristaniaopsis laurina* are occasionally seen as attractive street specimens.

Eucalyptus pulverulenta



Eucalyptus pulverulenta
see pages 153 and 154

Photos: M Moir

Eucalyptus pulverulenta 'Baby Blue' — a genetic mystery?

John Purse, Newnham, Kent, UK

My first encounter with Silver-leaved mountain gum (*Eucalyptus pulverulenta* Sims) was with some pot-grown plants about one metre tall, covered with maturing capsules and young flower buds. It was their ability to flower freely when very young, coupled with the compact and tough juvenile foliage on the new shoots, which attracted me to them. The straggly and ungainly appearance of the plants was a big drawback, but perhaps hybridising with a shapelier species could modify this?

I was told that the plants were the 'Baby Blue' variety, which made me delve into the literature. Now, two years on, I think I know quite a lot about Baby Blue, but there remains a mystery: how did this dwarf variety originate? It is said to have been selected from *E. pulverulenta* foliage crops, but if so the achievement was very remarkable. It might possibly be a hybrid, but if so, the parentage cannot even be guessed at. It might also be from a natural dwarf population; I find this possibility intriguing, but there is no direct evidence to support it. In this article, I will summarise what is known, and hope that this stimulates other members of Eucalyptus Study Group to contribute their own experiences and views.

A significant commercial crop, and its origin

Baby Blue is commercially significant. The name is a Trademark¹, though this appears to refer to the dried cut foliage in the USA, rather than the variety itself. By the 1990's there was at least 400 hectares of 'baby blue gum' in southern California², with many individual growers. It is also grown in Mexico, Europe, and Australasia. All this crop is used for cut foliage, both fresh and dried.

The eucalyptus cut foliage industry in California developed around the middle of the 20th century. Various species were and still are favoured, but *E. pulverulenta* seems always to have been important. Baby Blue appears to have been the result of selection by one of these growers, Rod McLellan, who entered the business in 1942. The business founded by Rod McLellan still exists, though the McLellan family sold it following Rod's death in the 1990's, and it still produces Baby Blue[®] dried foliage. The company has two related websites; one of these has a photo of a large field Baby Blue eucalyptus³, while the other has the statement: 'During the early 1960's, Rod had carefully selected eucalyptus varieties with smaller leaves and a more compact branches (sic) and registered the first trademarked eucalyptus, Baby Blue[®]¹. This is the only record I have found that refers to the origin of Baby Blue. This 'careful selection' was remarkably successful: not only is the variety substantially smaller than wild-type *E. pulverulenta* in all respects (even in leaf, flower and capsule size), but it also comes true from seed. In conventional plant breeding, such an achievement in an apparently short period would be remarkable.

The relationship between *E. pulverulenta* and the Baby Blue variety

Eucalyptus pulverulenta was described from three locations in NSW in the early 19th century, and its taxonomic status was clarified by Maiden⁴. The population at one of these locations has subsequently disappeared, and up until 1988 the species was known from small populations in two areas: Cox's River/Mount Blaxland, near Lithgow, and five separate populations in a small area near Cooma in south-eastern NSW. The evident rarity of the species, and vulnerability of the populations near Cooma, led to various conservation studies and initiatives. As a result of these, further populations have been discovered at other locations in NSW^{5,6}. All this points to the species consisting of a number of small relict populations, and this conclusion has been supported by a genetic analysis of the larger natural populations⁵. This analysis suggested that the populations were genetically distinct, and isolated from one other. This is not too surprising – the chances of successful cross-pollination between such geographically distant populations would be very slight. While the different wild populations appear to grow to different heights, rarely more than 5 metres, there is no suggestion at all in the literature that any of these populations has dwarf leaves, flowers or capsules. The differences in height could simply be due to local environmental conditions. In cultivation, the species can grow to much larger dimensions than are ever encountered in the wild.

Eucalyptus pulverulenta appears to have been introduced to California in the early years of the 20th century. It was not present in a list of 52 eucalyptus species present in the USA in 1900⁷, but it is in a list of 76 species present in 1914⁸. Another record from 1971 notes the species being used to produce large quantities of cut foliage⁹. The species descriptions in these records accord closely with descriptions of the species in the wild, and they contain no mention of Baby Blue or of dwarf forms of the species.

In the UK, *E. pulverulenta* is an uncommon species. I know of just seven specimens of the species in southern England that are not Baby Blue. With one exception, these appear to flower freely in June/July (the exception does not appear to ever have flowered). By contrast, specimens of Baby Blue start to flower in mid-September at the earliest. Other Baby Blue plants start to flower in late autumn or mid-winter, and continue flowering until the spring. Such a marked difference in season of flowering would obviously be sufficient to prevent uncontrolled cross-pollination, and would thus ensure genetic isolation of Baby Blue from wild-type *E. pulverulenta* at any location at which both are present.

There is little difference in vigour or leaf size between the individual Baby Blue plants I have been observing. Even when cultivated in fertile soil, plants rarely grow above 3 meters in height. However, there is rather more variation in the date of first flowering in any year, plant size when flowering first occurs, and flower size. (Some plants flower freely when only 50 cm tall, and others have flowers that are quite showy and which completely obscure the leaves.) Variation of this type is normal in many eucalyptus species, but it does suggest that there is underlying genetic variation within Baby Blue populations.

Baby Blue sets seed acceptably well. Several seed suppliers list it as a distinct variety of eucalyptus, but not always as a variety of *E. pulverulenta*.

So how might Baby Blue have arisen?

To me, the variability of the flowering characteristics of Baby Blue, combined with the stability of its dwarf characteristic, suggest that it is derived from a natural dwarf population. In contrast, I find it difficult to see how a recent natural mutation or chance hybridisation could have led so quickly to such an apparently stable and self-fertile variety that nevertheless displays considerable variability between individuals. Also, I cannot think of another eucalyptus species that could yield anything remotely like Baby Blue when hybridised with *E. pulverulenta*. Having said this, there is no firm evidence at all for any natural population resembling Baby Blue in Australia, either today or historically.

Beyond this point, I can only speculate. If Baby Blue is derived from a wild population, this population may superficially resemble (or have resembled) a population of *E. pulverulenta* naturally growing on a very harsh, infertile site. However, its flowering season would distinguish it, and may suggest that the population is (or was) geographically well-separated from other recorded natural populations of *E. pulverulenta*. Seed from this population could have been collected, and subsequently grown in California, prior to 1960. In cultivation in California, the dwarf feature would have become apparent quickly. The new 'variety' would have been easy to propagate by seed, without any risk of cross-pollination with *E. pulverulenta*. If this was the case, trialling to commercialisation could have taken less than five years. This would account for why the variety 'appeared' in horticulture so quickly.

There seems to be a whiff of a 'smoking gun' here, but proof would require the discovery of the wild population. The fact that new populations of *E. pulverulenta* have been discovered in the past 20 years suggests that such a population could still exist today. And there are precedents for the discovery of natural dwarf populations of other eucalyptus species in recent years. I hope this article stimulates readers to contribute their views and knowledge.

* [Two cases involve a population of Eurabbie (*Eucalyptus bicostata*) on Mount Bryan, north of Burra, SA¹⁰, and the population of *Eucalyptus leucoxylon* near Murray Bridge that provides the seed for the 'Magnet' or 'Euky Dwarf'TM variety].

Acknowledgement

I am very grateful to Gus Iglesias of Lugo, Spain for pointing out some of the sources of information that I have used in preparing this article.

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Eucalyptus pulverulenta in profile

Silver-leaved Gum

Margaret Moir

This tree is an extremely decorative and sculptural small Eucalypt that is grown extensively for its foliage in the cut flower trade. It is possibly the best for the purpose in a suitable climate. It is one of the Eucalypts which retains its rounded bluish-silver juvenile foliage into maturity, and the glaucous leaves make a superb counterfoil to other foliage, especially to purple and red.

It appears to be tolerant of wet, dry, poor or heavy soils and not unduly disfigured by insects.

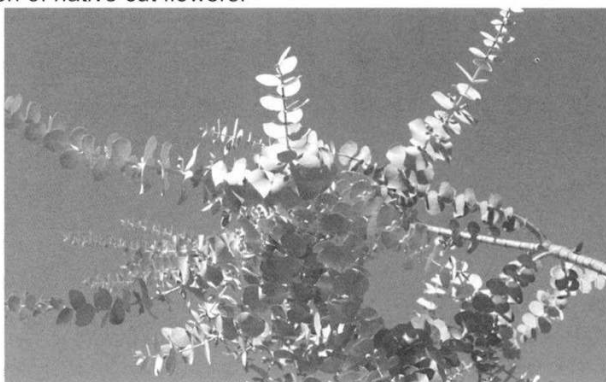
It responds very well to coppicing, after which it becomes an extremely decorative shrubby mallee form. The bark is deep red, decorticating attractively in ribbons, and buds, fruits and cream flowers are very attractive.

It has performed extremely well here in Margaret River on our shallow duplex soils, tolerating our wet winters and cool but dry summers. It has been virtually not attacked by insects at all, which would be a huge bonus if it was being grown for cut foliage as large amounts of pesticide are often used for this reason in the production of native cut flowers.

The foliage is extremely decorative and long lasting when cut.

It appears to be tolerant of wet, dry, poor or heavy soils and not unduly disfigured by insects.

See colour photos on page 152.



Eucalyptus pulverulenta in profile

continued on next page

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***Eucalyptus pulverulenta* in profile**

continued from previous page

- Family:** Myrtaceae
- Habit:** Tree or Mallee, Height to 10 m high.
- Bark:** Bark smooth throughout, grey or brown (bronze), shedding in long ribbons. Branchlets green. Pith glands absent; Bark glands present. Cotyledons obreniform (bilobed).
- Leaves:** Intermediate leaves opposite, orbiculate (cordate), straight, entire, glaucous, sessile, 5 cm long, 5 mm wide. Adult leaves disjunct or opposite (neotenous), broad lanceolate to elliptic, not falcate, rounded or emarginate, basally tapered, dull, glaucous, thick, concolorous, 5–10 cm long, 1.2–2 mm wide; Petioles narrowly flattened or channelled, Petioles 10–18 mm long. Lateral veins prominent, acute, moderately spaced.
- Inflorescences:** Conflorescence simple, axillary; Umbellasters 3-flowered, regular. Peduncles terete, 5–9 mm long. Pedicels terete.
- Flowers:** White or cream. Buds ovoid to fusiform (short), glaucous, 7–9 mm long, 4–6 mm diameter. Calyx calyptrate; shedding early. Calyptra conical, 1 times as long as hypanthium, as wide as hypanthium or wider than hypanthium; smooth. Hypanthium smooth.
- Flowering Season:** May to December.
- Fruits:** Fruits cylindrical or hemispherical, sessile, 3–4 locular, 5–8 mm long, 6–8 mm diameter. Disc flat. Valves rim-level or exserted. Chaff dimorphic, linear and cuboid, chaff same colour as seed.
- Range:** Rare and scattered, growing in small stands almost in the understorey of grassy woodland. Grows on rocky hillsides in full sun on relatively poor sandy soils.
- Distribution:** NSW - Central Tablelands, or Southern Tablelands
- Conservation Status:** Listed as vulnerable under the EPBC Act, NSW TSCA.
- Comments:** Lives for more than 100 years.
Resprouts from lignotuber and epicormic buds after fire.
Seed eaten by Crimson Rosella.

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William 'Bill' H. Payne continued from page 147

In the years to 1980, most biennial conferences were spent arguing about *Australian Plants* - the quality of colour photos for editorial standards, especially the size of the journal, or the front cover which was occasionally illegible because the colours did not contrast sufficiently. His habit of breaking articles up and placing parts on different pages to completely fill the spaces infuriated some, not to speak of his controversial habit of editing author's work without approval. He absolutely refused to allow references to be cited. Some people did not like the way he bled photos to the edge of the page without a defining collar, or crammed them all together on a few pages. He got many photographers offside with his habit of returning slides out of their mounts or not at all in some cases. Many however were happy to see their effort in print.

In these debates Bill was at his political best, marshalling support from delegates and arguing convincingly black was white if indeed he thought it was. He was tenacious and usually victorious. It was the battle that mattered not the point at issue, which he would sometimes quietly concede, as he did with the quality of photo reproduction. His problem was the misplaced loyalty he gave to his printer. Ultimately ownership and management of the journal passed from the Federal Body to the New South Wales body, which demanded even more thorough management and greater editorial control than the Federal Body before it. Thereafter debates were confined to NSW Council which decided that the best way of dealing with its problems was to institute a Publishing Committee and make the editor answerable to it. Bill was self-motivated and took his own counsel. He would make great pretence at working with committees, such as the Publishing Committee, without however giving away too much and provided it did everything he wanted. Bill felt the weight keenly and did not like 'interference'. He was also very disappointed that some states ultimately adopted the niggardly approach of making receipt of the journal a voluntary part of their membership. Bill rightly felt that it threatened the viability of its own flagship journal by reducing economies of scale, and increasing the cost to those who continued. How could you be a member of a society and not receive its journal? Indeed.

Bill spent great amounts of his personal time in attending meetings and conferences where he would seek out and cajole potential authors to write for the journal. He was not afraid of approaching people from the top of the scientific ladder to the ordinary gardener. The *Flora of Australia* project was a great source of potential articles. He was keen to make the journal accessible to everyone, translating or even removing botanical jargon whenever he could. He could be stubborn, argumentative and difficult but he was a dedicated man to whom no problem was insoluble. His personal faults were also his strengths and, in the end, trivial by comparison with his life achievement. His legacy is the journals he edited now found in libraries throughout Australia and the world. How many can lay claim to such an achievement? Well done, Bill. The Australian flora has lost a great supporter. The Australian plant-loving community extend their deepest sympathy to his wife, Beryl, his four children, and several grand-children.

Southport Lagoon Conservation Area

A Very Special Place - Future Uncertain _____ Jean Taylor*

Standing at the top of the rise on the track to Blackswan Lagoon at the southern end of Southport Lagoon Conservation Reserve, one has the feeling time hasn't moved on too much from 1642 when Tasman sailed past the south coast of Tasmania to land further north at Marion Bay. Apart from the addition of the very important lighthouse on the south-western tip of South Bruny Island, there are no visible manmade structures. To the east one's view is drawn to the forested mountains of South Bruny as they sweep down to the Southern Ocean, then westward across the entrance of D'Entrecasteaux Channel, past peaceful Recherche Bay and on and upward to the rugged and often snow patched Southern Ranges.

The French were the first recorded Europeans to explore the D'Entrecasteaux Channel and the area is redolent with memories of them. The mountains, rivers, bays and indeed many of the plants bear their names. In 1791, the vessels Recherche and Esperance sailed from France under the command of Rear-Admiral Bruni D'Entrecasteaux. The primary aim of this expedition was the search for La Perouse; however it was also a research voyage. There was a crew of naval officers keen to explore and map and also a large group of naturalists employed to study the flora, fauna and ethnology of new areas.

After a turbulent passage of 64 days from the Cape of Good Hope, the expedition, which had been heading for Adventure Bay, finally anchored in a large bay they called Recherche. From the time they arrived on 21st April 1792 until their departure on 15th May, the French were busy. They created gardens in the 'wilderness', set up an observatory, forges and repair yards. They also explored extensively, collecting a large number of plants and animals. During a second visit 8 months later, in January 1793, they had several benign and mutually satisfactory contacts with a band of the local aboriginal tribe, the Lyluequonny. The ethnological records of these encounters, together with the encounters of the 1802 Baudin expedition, provide some of the most complete descriptions of the lifestyle of these people before their lives were changed forever by later waves of Europeans bringing disease and permanent settlements.

* Jean is currently secretary for APS Tasmania Inc region and Conservation Officer for both Tasmania region and Hobart group.

She lives in Kettering, 35 km south of Hobart on 1.9 ha that she and her husband have transformed from a degraded pasture block to a bush block capable of supporting many local species of plants and animals. Her main interest is bush regeneration.

The voyage botanist, Jacques-Julien Houtou de Labillardiere, led many expeditions ashore and collected thousands of specimens of the indigenous flora and fauna. The men were "filled with admiration at the sight of these ancient forests" and commented on the superb eucalypts, some with circumferences of up to 25 feet. Ninety-five percent of Labillardiere's Tasmanian collection of 5,000 specimens comes from this area and they were the foundation of his *Novae Hollandiae Plantarum Specimen*, considered to be the first general Flora of Australia. The specimens are now preserved in collections in Paris and Florence. Many of his collections are type specimens including *Eucalyptus globulus*, Tasmania's floral emblem, *Diplazena moraea* and *Exocarpos cupressiformis*. Of huge significance is the fact that all the plant species collected and recorded by this expedition can still be found in the area, much of which is now included in the Southport Lagoon Conservation Area.

In an interesting aside, in 1974 E. Charles Nelson published a paper warning that caution was needed in accepting Labillardiere's type locations as several specimens indicated to have been collected in Tasmania are actually endemic to Western Australia. Included among these is *Billardiera heterophylla* (named by Labillardiere *Billardiera fusiformis*). Ironically *Billardiera heterophylla* is now found in coastal Tasmania. An escapee from private gardens it is considered to be a serious threat to the coastal biodiversity.

Southport Lagoon Conservation Area (4,280 ha) lies on the south-east coast of Tasmania, approximately 80 km south of Hobart and shares boundaries with two other significant reserves. The George III Monument Historic Site (14.4 ha) is located on Southport Bluff on the eastern side of the Conservation Area and the Ida Bay State Reserve (425 ha) shares a boundary to the north. The topography of the reserves is gentle, providing easy walking for people of all ages and physical capabilities. Access from the north is via the Ida Bay railway starting from Lune River or by boat across the narrows from Southport. At present high clearance four wheel drive and other off road recreational vehicles can access the area to the south via the Leprena track and conventional vehicles can proceed via the South Cape Spur 1 forestry road to a locked gate.

Contained within the Conservation area are two significant wetlands - Southport Lagoon and Blackswan Lagoon. Both these lagoons are separated from the Tasman Sea by bay mouth spits, which are essential to the ecological integrity of the lagoon systems. Southport Lagoon supports extensive areas of seagrass communities and both areas are important sites for birds.

Photos of Southport Lagoon Threatened Species opposite

Top Left: *Euphrasia fragosa* - see pg 163

Photo: Wendy Potts

Top Right: *Euphrasia gibbsiae* spp. *psilantherea* - see pg 163

Photo: Tobias Smith

Centre Left and Bottom Right: *Prasophyllum pulchellum* and *Thelymitra jonesii* -

See pg 163

Photos: Annie and Hans Wapstra

Bottom Left: *Epacris stuartii* - see page 163

Photo: Greg Jordan



The three reserves are significant because of their:

- association, historically and botanically, with plant collections by the French and English in the late 18th and early 19th century
- important Aboriginal and European cultural heritage values
- importance to endangered, rare and vulnerable plant and animal species.
- significant Geoheritage values such as bay mouth spits and rare fossilised fern deposits.

The flora of the area is diverse and comprises a mix of forest, heath and sedgeland communities. At least 255 native plants have been recorded, nearly 10% of which are endemic. Drainage and underlying soil types determine the various plant communities which include forests of *Eucalyptus obliqua* with low shrub understoreys, *E. obliqua* with wet forest understorey, closed heath or sedgeland dominated by *Gymnoschoenus sphaerocephalus* and low open woodland characterised by *E. amygdalina* and *E. ovata* with a closed heath understorey. Tall forests of *E. globulus* grow close to the coast near Blackswan Lagoon and are thought to be where Labillardiere collected his original specimens. In addition, from the detailed descriptions left by Labillardiere's men, it is possible to follow in French footsteps along the buttongrass lead they took to move from their anchorage in Recherché Bay to Southport Lagoon.

Of particular conservation importance is the coastal heath, which is poorly reserved in Tasmania's parks. In late winter through to summer, this heath has wondrous displays of wildflowers. Masses of *Blandfordia punicea* appear during late spring to early summer. The area is rich in orchid species, thirty eight species have been identified from the reserves. *Euphrasia fragosa*, *Euphrasia gibbsiae* spp. *psilantherea*, *Corunastylis morrisii*, *Thelymitra jonesii*, *Westringia brevifolia* var. *raleighii* and *Comesperma defoliatum* are all rare, threatened or vulnerable species found in the conservation reserve. The small historic reserve has the only known population of the rare and endangered *Epacris stuartii* while the critically endangered *Prasophyllum pulchellum* is found in the state reserve. The most endangered of these species are discussed below.

***Euphrasia* species (eyebrights):**

In general these plants are relatively short-lived and are reliant on seed for population persistence. Due to a requirement for light to germinate, recruitment from seed is dependent on open habitat with patches of bare ground. They also require relatively high moisture levels in spring to allow seedlings to establish and form parasitic root attachments with surrounding vegetation. Populations can be transient, surviving only as seed in the soil. Soil stored seed may require specific germination cues compared with freshly shed seed and it is possible that new populations will emerge after fire. Management actions to protect the *Euphrasia* species include attempting to restrict access of recreational vehicles to prevent both direct damage and indirect damage via the spread of *Phytophthora cinnamomi* and slashing small patches near flowering plants to promote the recruitment of seedlings. Although eyebrights are not susceptible to *Phytophthora* if their host dies, so do they.

Euphrasia fragosa (Shy Eyebright) is a lowland short lived (1 to 3 years) eyebright found in coastal areas in heathy, grassy or sedgy open woodland or at the forest edge. It is endemic to this part of Tasmania and the three known populations at Southport and Bruny Island are separated by the port of Southport and the De Entrecasteaux Channel. The populations extend over an area of 20.5 square kilometres and occupy a total of only 0.11 hectares.

Euphrasia gibbsiae ssp. *psilantherea* (Swamp Eyebright) is a lowland short lived (3 to 5 years) eyebright found amongst low sedges in open wet coastal heathland that is frequently waterlogged in winter. It is known only from a 0.25 hectare site near Blackswan Lagoon. It was originally collected in the 1850s and was presumed to be extinct until its rediscovery in 1985. There are two main flowering seasons in September/October and March/April.

Epacris stuartii (Stuart's Heath) is likely to be a long lived shrub (probably in the order of decades) and occurs exclusively in heathland. It has only ever been known from a single locality on Southport Bluff and the population occupies an area of approximately 0.3 ha over a range of about 300 m. Threats to *E. stuartii* include *Phytophthora cinnamomi*, fires of high frequency, fires repeatedly followed by drought and severe storms that can cause physical damage and excessive salt loads.

Thelymitra jonesii (Sky Blue Sun Orchid) is a newly described species previously included in *Thelymitra azurea*. It is endemic to Tasmania and has been recorded from seven populations in four widely distributed coastal localities from the north, north east, east and south east coasts. Only two populations have been observed in recent years. Populations are characteristically small, the largest with about 32 plants. It is estimated to occupy less than 1 ha. in total. The species has been recorded growing in moist coastal heath on sandy to peaty soils and in *Eucalyptus obliqua* forest in deep loam soil over dolerite. It flowers from October to early December.

Prasophyllum pulchellum (Pretty Leek Orchid) is endemic to Tasmania and is known from widely scattered coastal localities in the north and south of the state. It occurs in dense low sedgy heath with pockets of paperbark or teatree on poorly to moderately drained sandy or peaty loam. Populations of the pretty leek orchid are small and compact and occupy an area of less than 0.3 ha. in total. There are five known populations of this orchid with the two largest populations having only about 50 plants each and a total number of mature individuals estimated to be about 130. The plant needs a regular fire to stimulate emergence and flowering.

There are two major threats to the integrity of these reserves – irresponsible and inappropriate access by off road recreational vehicles and too frequent fire. The benign nature of the terrain allows vehicle tracks to be created at will. This physical damage causes soil, peat and dune erosion, damage to Aboriginal heritage sites, vegetation loss including a significant threat to *Euphrasia gibbsiae* ssp. *psilantherea* colony, and spread of weeds and disease. One of these tracks is now only 2 metres away from the *Euphrasia gibbsiae* ssp. *psilantherea* colony. Many areas of the three reserves have been frequently burnt over the past few decades - almost certainly more frequently than in Aboriginal times. Many of these fires appear to be deliberately lit. High intensity and frequent fires have reduced plant species diversity and the habitat for animals.



Above: Southern corner of Southport Lagoon with Recherche Bay in the background.
Photo: Bob Brown

Below: Damage caused by Four Wheel Drive vehicles at Southport Lagoon Conservation Area September 2005.
Photo: Denis Abbott





Above: Pale Beard Orchid
Calochilus herbaceus

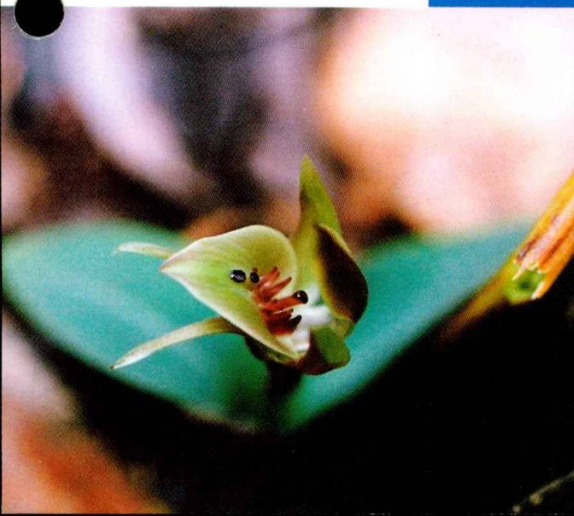
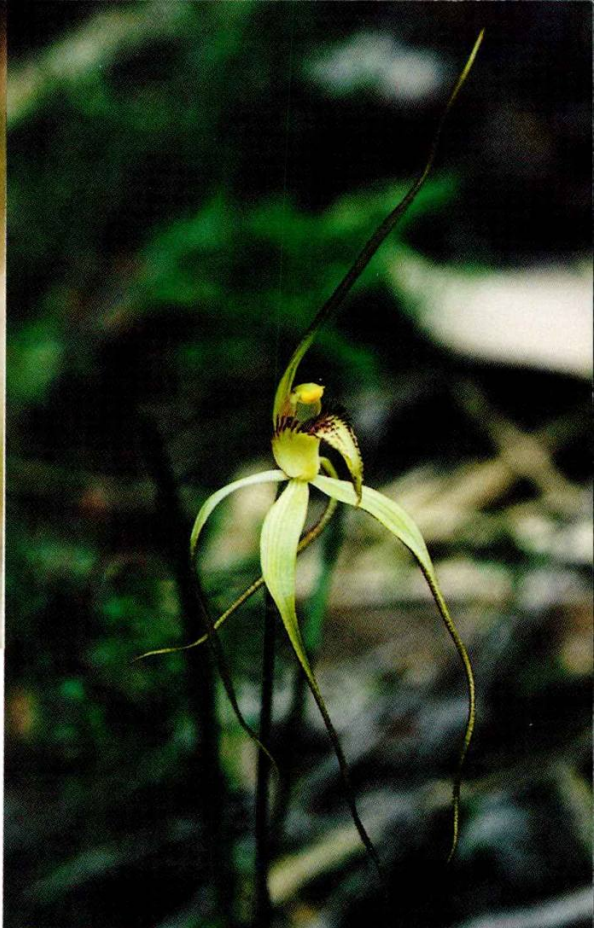
Right: Fawn Spider Orchid
Caladenia echidnachila

Below: Three-horned Bird Orchid
Simpliglottis triceratops

Photos: Christine Howells

Below Right: Masses of *Blandfordia punicea* appear in late spring to early summer.

Photo: Kay Geeves



On Southport Lagoon spit, the death of many *Eucalyptus obliqua* trees is leading to erosion and there is concern for the long term stability of the bay mouth spit. Areas of heathland have also been degraded with impacts on the populations of *Epacris stuartii* and *Euphrasia fragosa*.

An additional threat to Black Swan lagoon, a proposal to clear forest on a block of land immediately adjacent to its western border, has now been averted. In October 2005 the north eastern peninsular of Recherche Bay (which includes Southport Lagoon conservation area) was placed on the National Heritage List because of its outstanding historic and cultural significance. However forest, outside a strip of 100 m from high water mark and areas protecting the site of the 'French Garden' and the observatory, on the southern and western side of the peninsular was still earmarked for logging. This would have resulted in a loss of the significant and historically important vegetation found in this area and the potential introduction of *Phytophthora cinnamomi*, increased runoff into the lagoon and increased erosion. It was also probable that undiscovered artefacts of the French visits to this area would be inadvertently destroyed. Thankfully the Tasmanian state government agreed to provide some funding for the acquisition of this property. This act by the government has helped to de-politicise the situation and a deal has now been brokered between the owners of the property and the Tasmanian Land Conservancy, a not for profit, non political organisation that will own and manage the property on behalf of the Tasmanian people. The bulk of the money is being initially provided by Dick Smith, and an appeal has been launched to repay this loan.

Members of the Australian Plants Society Tasmania Inc, and in particular life member Kay Geeves, have been trying to protect the Southport Lagoon environs since the early seventies. It is to be hoped that those in charge of this exquisite area can be persuaded to make the hard decision to exclude off road recreational vehicles from the reserves and to more actively manage these reserves. Without this we feel the values of these reserves will be lost forever.

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The Tasmanian Section of the Tasmanian Arboretum

Dick Burns*

About the Arboretum

The Tasmanian Arboretum Inc. was established in 1984 at Eugenana, a settlement that is a short drive south of Devonport. The Arboretum developed out of the vision of two Devonport men, Stephen King and David Richmond. Their aim was to establish a scientific collection of woody plants in a setting that would bring joy to visitors. Stephen and David saw the need to place emphasis on plants with Gondwanan origins.

The site of the Arboretum was previously a 47 hectare farm. Limestone had been quarried from some parts. It was acquired through the generous assistance of the Tasmanian Government, Devonport City Council and the Federal Government via a Bicentennial grant. In 2004, negotiations commenced to acquire an adjacent old limestone quarry that has an important place in the understanding of Tasmania's geological history. Backfill sediments in old caves have been dated, setting a benchmark for much of Tasmania's geological history.

Plantings started in 1986. Trees and shrubs were mostly grouped according to their geographic origins. There are collections for New Zealand, South America, North America, Europe, Eastern Asia, etc., and of course Tasmania.

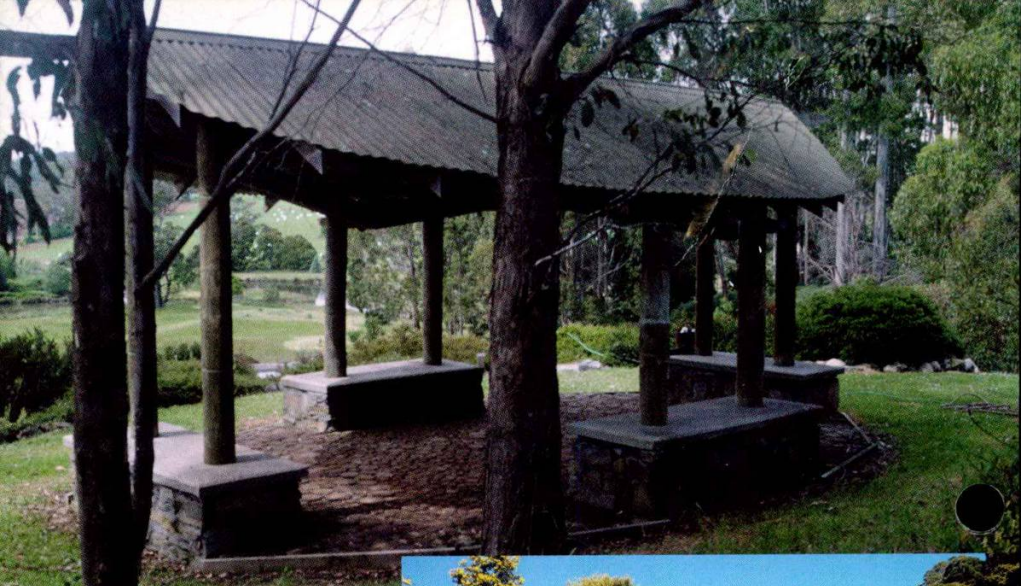
Establishing and running the Arboretum has been a voluntary venture and continues as such. Over the years, assistance in construction and maintenance has come from service clubs, many local businesses, nurseries, government grants, government-funded workforces, etc.

The Don River and Melrose Creek flow through the Arboretum. Trees of Crack Willow, *Salix fragilis*, that infested the stream-banks have been removed; riparian planting with local species is an ongoing project. The other large weed that infested the site's flats and slopes was Hawthorn, *Crataegus monogyna*.

A low mesh and electric fence has been constructed around the major collections to keep out *Trichosurus vulpecula*, the Brushtail Possum. Plant damage has become insignificant since, despite the presence of other herbivores such as rabbits and wallabies.

*Dick Burns has bushwalked in most areas of Tasmania. Early on, it became obvious how important the vegetation is in creating the distinctive Tasmanian landscape. His identification skills were honed over a ten-year period when he collected Tasmanian material for the Australian National Botanic Gardens of Canberra. He has been responsible for the Tasmanian Section at the Arboretum since he retired in 1999.





Above: Arbour at
Tasmanian Arboretum

Left: Wet Forest Gully
Acacia dealbata (yellow),
A. melanoxylon (cream),
Olearia argophylla and
Lagarostrobos franklinii
(Huon Pine) in foreground.

Below: Frog pond with
Villarsia reniformis and
Arbour in background

Photos: Dick Burns





Above:

Path through alpine beds showing white quartzite pebble mulch.

Left:

Road through Tasmanian section.

Below:

Grevillea australis - East Coast upright form.

See page 170

Photos: Dick Burns



A scientific collection

Cost, availability and tolerance of the growing conditions at Eugenana are a few of the factors that have hindered the Arboretum collection from becoming fully comprehensive. But exchange with other arboreta, donations and the resourcefulness of curators has meant that there are many interesting and rare plants on site.

For example, around the time of establishment, a local botanist was collecting and germinating seed of *Nothofagus* species. The Arboretum now has a mini-forest of *Nothofagus*, both evergreen and deciduous, from Australia, New Zealand and South America. Over the years, a strong link has been forged with the Royal Tasmanian Botanical Gardens in Hobart. Several major plant donations have come from these Gardens, including some rare Tasmanian species and a large 'Southern Conifer collection'.

To aid in selecting appropriate sites for the many sections, soil types and average temperatures were determined. The valley is subject to frost, so the Queensland conifers are doing well on the crest of one of the hills.

Before planting started, the site was divided into a 20 m square grid, marked by metal plates fixed at ground level. Each new plant is mapped and its accession details, including provenance, are recorded. The plant then gets its accession tag. In 1986, all this involved cards, record books and reams of graph paper. Now the site is GPS mapped and data is recorded electronically. A computer program locates each new plant on the master map.

The Tasmanian Section

I am lucky to have a large area allocated to the Tasmanian flora. The section set aside consists of a ridge running roughly west-east, sloping down to the east. Behind that is a hollow, running parallel. The soil is based on an impoverished clay. Beyond the planting area, a slope covered in natural forest drops down to the Don River. Within this forest are outcrops of a hard sandstone. Some mature trees of *Eucalyptus viminalis* were left by the farmers.

There are two constructions, an arbour at the crest of the ridge, above an artificial pond. One of the major vistas of the Arboretum is from the arbour, looking across the pond, with avenues through sweeping grass to the lake and old quarry. Photos on page 168 and back cover.

Tasmanian plantings started in 1988.

Around the arbour and pond, the planning was for alpine species. Down the slope, copses of a number of Tasmanian *Eucalyptus* spp. and *Acacia* spp. were planted. In the sheltered hollow, wet forest and rainforest plants were tried. At the bottom of the hollow, a grouping of *Lagarostrobos franklinii* was started.

The alpine bed was originally covered with organic mulch. Plants survived, but did not flourish. After some years, white quartzite pebble (photo p. 169) mulch was tried. The response from the plants was phenomenal. The species that continue to grow are, in the majority, more sub-alpine than truly alpine. Some, such as *Boronia citriodora*, *Grevillea australis* (photo p. 169) and *Leptospermum rupestre* relish the conditions so much that they have layered.

The wet forest gully (photo p. 169) was initially densely planted among the farm grasses. Those that have survived and grown on will provide good shelter for the next generation of planting.

Established beds are mostly not watered.

Beds started since 1999 are a small bed of West Coast plants, a large collection of East Coast species, with a high proportion of rare plants, and a coastal bed containing the best and varied Tasmanian forms of *Correa alba*, *C. backhouseana* and *C. reflexa*. The main 2005 planting was a grouping of all Tasmanian species of *Allocasuarina* spp. A long-term plan is to slowly fill in the hollow to become rainforest. See *Australian Plants* vol. 22 no 181, p362.

Some of the notable plants

A most attractive pendulous form of the Tasmanian endemic *Eucalyptus amygdalina* occurs naturally, but only occasionally, at Eugenana.

Of the Tasmanian conifers planted in the 1980s, *Microcachrys tetragona*, *Podocarpus lawrencei* and the hybrid *Athrotaxis* X *laxifolia* seem most successful. Different selected forms of the *Podocarpus* form dense low hedges. The hybrid conifer grows more successfully than either of its parents, *Athrotaxis cupressoides*, Pencil Pine, and *A. selaginoides*, King Billy Pine. The Botanical Gardens recently donated a selection of the hybrid *Athrotaxis* from Mt Read, near Rosebery. These cutting-grown plants show the range from near-pure King Billy to near-pure pencil pine. Mt Read is also the site of the 10,000 year-old plant of Huon Pine, *Lagarostrobos franklinii*. The Arboretum is lucky enough to have a few cutting-grown specimens.

The *Flora of Australia* recognises hybrids between *Lomatia tinctoria* and *L. polymorpha* (volume 16, p381). Some seed-grown from a local nursery are growing in the West Coast bed, showing obvious hybrid variation, and spectacular floral display.

Mainlanders may not get too excited, but *Hakea decurrens* ssp. *physocarpa* is very rare on the main island of Tasmania. A specimen was collected in 1915 at Sulphur Creek, a coastal town on Bass Strait. A member of the North West Group of APS Tasmania has a childhood memory of it growing at Wynyard. Its only known location now is further west at Rocky Cape, where a miserable grove grows on poor quartzite. A most vigorous plant grows at Eugenana with spectacular white and pink flowers.

For a time, *Phelialium daviesii* and *Argentipallium spiceri* were thought to be extinct. In the 1990s, small relic populations were discovered. The *Phelialium* thrives in the East Coast bed, growing as a dense rounded shrub covered in cream stars in spring. The daisy probably prefers a damper site than offered at Eugenana. Two other endemic daisies of note in the same bed are *Olearia archeri* and *Ozothamnus purpurascens*. The *Olearia* is a small bush of great garden potential, with large deep green leaves and dense heads of relatively large white daisy flowers. The *Ozothamnus* is a selected form with greyish foliage and red flower buds.

More photos overleaf

Article continued on page 187



Above: Newly planted *Correa* bed at Tasmanian Arboretum.

Right: *Acacia dealbata*, *Eucalyptus viminalis* and Coastal bed with *Correa reflexa*.

Below: *Correa reflexa* 'Georgetown Pink' - a Dick Burns discovery.

Photos: Dick Burns





Above: *Eucalyptus risdonii*

Right: East Coast Bed with *Eucalyptus risdonii* trees.

Below: East Coast Bed. *E. risdonii*
Ozothamnus costatifructus
(front), *Nematolepis*
squamea ssp. *retusa*

Photos: Dick Burns



Bedfordia genus in Tasmania

Dick Burns

I can remember being surprised on the Galapagos Islands to see daisy flowers on trees, forgetting for the moment that we have them here in Tasmania. Among the best of the large-growing daisy plants are *Bedfordia* species. Individual flower-heads are small yellow tufts, but the display, their perfume, the interesting leaves and the size of the plants are all factors that point to interesting garden features.

Bedfordia is a genus within the family Asteraceae. The three species of *Bedfordia* have flowers with a structure similar to *Senecio*, but are aromatic small trees or shrubs with axillary inflorescences, and hairs on the young branches and the undersurface of leaves¹.

The genus has close affinity with *Brachyglottis* of which there is one species endemic to Mt Wellington and Mt Dromedary in southern Tasmania, and about 30 species in New Zealand, Chatham Islands and probably South America and Madagascar². Recent molecular studies indicate that there is a close relationship between Tasmanian *Bedfordia* spp. and the Tasmanian *Brachyglottis brunonis*³.

Brachyglottis brunonis differs from *Bedfordia* in being essentially glabrous, but with copious dark embedded glands on the upper leaf surface. These exude a resinous glossy material that coats the surface. *Brachyglottis* flower-heads have ray florets around their rim, to resemble a yellow *Olearia*. *Bedfordia* spp. have no ray florets (see photos).

Bedfordia was named in 1833 by Augustin Pyramus de Candolle, a Swiss botanist (1778-1841) whose two sons also became botanists. The name recognises a generous patron of botany, John Russell, 6th Duke of Bedford⁴. The Bedford estate, Woburn Abbey, is perhaps more well known nowadays as the first of the British aristocracy's homes opened up to the public after World War II, to raise maintenance money in their cash-strapped country.

Labillardiere, botanist with the French Baudin expedition, identified the two Tasmanian species previously, in 1806, as *Cacalia salicina* and *C. linearis*³. *Cacalia* was a name developed by Linnaeus for what seems to have been northern hemisphere plants that have since been assigned to three other genera².

The third *Bedfordia* species was recognised as being different from *B. salicina* in 1934 by another Swiss botanist (and theologian), Benedict Hoehreutiner (1873-1959). His paper naming *B. arborescens* was published in the European journal *Candollea*, and the type specimen is lodged in the Geneva herbarium. This naming was overlooked in Australia until Alan Gray found the paper in 1974.

The Species

The rest of this article is based on the descriptions in Curtis¹ and the paper on the genus by Orchard², with some personal observation.

All *Bedfordia* species are generally understorey plants in communities ranging from wet tall open forest to dry sclerophyll shrubland.

Bedfordia arborescens grows as a small tree, generally 5–8 m tall. It is widespread in eastern Victoria, south-east New South Wales and the Australian Capital Territory. The only herbarium collection of this species for Tasmania is from Cape Barren Island, in Bass Strait near Flinders Island.

In the field, it apparently resembles *B. salicina*. Two reliable field distinctions are noted in Orchard³.

- a) The leaf scars on young stems of *B. arborescens* are raised but not peg-like. Leaf scars on *B. salicina* are peg-like.
- b) The undersurface of *B. arborescens* leaves is covered with hairs in two distinct layers, the outer layer being cotton-woolly. Veins are largely obscured. *B. salicina* leaves have only a single matted covering of hairs, which does not obscure the prominent midrib and lateral veins.

Bedfordia salicina is endemic to Tasmania, widespread and abundant in a range of altitudes from near-coastal to montane. Most herbarium specimens are from central and eastern Tasmania, but it is listed for the North West, e.g. in the Savage River National Park. In open sheltered sites it will grow to a well-shaped tree with a short trunk and a dense narrow conical crown. Growth is more irregular when competing with other plants or on dry sites. The trunk and older branches have a cream-coloured bark formed in papery strips. Branchlets are covered in short white hairs. Older plants develop a stout trunk. In my garden at Penguin, a 20 year-old tree is about 5 m tall. In some sites in the wild, *B. salicina* will become the dominant plant. See *Australian Plants*, vol 22 p 214.

The lanceolate leaves, 5–15 cm long, are shiny to dull green above, hairy white below. The hairiness gives rise to the common name, blanketleaf. The foliage is dense, but only retained on the upper branches. Squeezed leaves emit a most pleasant perfume. The same odour surrounds the plants at flowering time.

In spring, branched spikes (panicles) with bright yellow 5–25 flowers each form in upper leaf axils. See photo. Old flower heads are often retained, which may affect the appearance.

When this species grows near *Bedfordia linearis*, hybridisation can occur. Large swarms are found on the slopes of Mt Wellington, near Hobart. Hybrids have also been collected from the Central Highlands, on the East Coast, and in the Tamar region in the north of the State. Leaf shape of hybrids range in size and shape between those of the two species. Viable seed has been reported, with some plants showing backcrossing.

The third species, *Bedfordia linearis*, has the greatest potential as a garden plant. Its distribution across Tasmania is similar *B. salicina*, from the North West and Central Highlands to the East Coast and South East, but not as common. It copes with drier conditions than the previous species. *B. linearis* grows as an open shrub 1–3 m tall, sometimes erect, commonly somewhat straggly.



Above (left and right):
Bedfordia linearis ssp.
linearis

Left:
Bedfordia salicina

Below (left and right):
Bedfordia linearis ssp.
oblongifolia var.
oblongifolia

Photos: Dick Burns



Young branches are covered in dense white hairs. Stems are thin and flexible, often curved.

Leaves are generally narrow linear, 10–70 mm long and up to 3 mm wide. The upper surface is glossy green with the mid-vein impressed; margins are revolute. The lower surface has a variable growth of white hairs. The odour from squeezed leaves is nice, but not as pleasant as that from *B. salicina*.

The narrow leaves of this species allow for a more striking floral display. Flowering again occurs in spring or early summer in leaf axils. Single yellow daisies form in upper axils but multiple inflorescences often form in lower axils.

Labillardiere's type specimen, collected from south-east Tasmania, has long leaves. Forms with shorter leaves occur. Orchard found sufficient differences to establish two subspecies. Plants with characteristics the same as the type specimen are now referred to as *Bedfordia linearis* subspecies *linearis*. The shorter-leaf form is *Bedfordia linearis* subspecies *oblongifolia*.

Bedfordia linearis ssp. *linearis* has narrow-linear leaves 35–70 mm long, rarely shorter. The tip is bluntly acute and slightly reflexed. The flower stalk (peduncle) is 4–6 mm long. This subspecies is found across the range stated above in several habitats, often on stony soils, these being derived from a variety of rock types. In the wild it prefers wetter areas, but copes well with the dry conditions in summer at Penguin.

The most obvious difference of *Bedfordia linearis* ssp. *oblongifolia* is in the leaf length, mostly 10–20 mm, rarely shorter or longer. Width is 2–3 mm. Because of the relative sizes of length and width, the leaf shape is given as narrow-oblong. The blade is straight from base to tip, which is rounded to blunt with a terminal tuft of hairs. Differences in the inflorescence are described in Orchard³: a hand-lens would be required.

Orchard found regular differences within the collections of *B. linearis* ssp. *oblongifolia*. Plants from the East Coast, Mt Wellington, Central Highlands and Ben Lomond have leaves 10–20 mm long and flower stalks 5–7 mm long. This variation has been called *Bedfordia linearis* ssp. *oblongifolia* var. *oblongifolia*. Those plants growing on the Tasman Peninsula generally have shorter leaves 10–12 mm long, and the leaf tends to curve up towards the tip. The flower stalk is shorter, 2–4 mm long. This variation is *Bedfordia linearis* ssp. *oblongifolia* var. *curvifolia*. See photo *Australian Plants*, vol. 22 p. 212.

Availability

Propagation of *Bedfordia* from seed seems more reliable than from cuttings. In Tasmania there are some nurseries that specialise in Tasmanian plants, for example at Liffey, Buckland, Hobart and Oldina, near Wynyard. *Bedfordia*, most frequently *B. salicina*, can sometimes be obtained from one of these.

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1. Curtis WM, *The Student's Flora of Tasmania*, Part 2, Government Printer Tasmania, 1963, p 371.
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3. Orchard AE (Tony), A revision of *Bedfordia* DC (Asteraceae), *Muelleria*, vol 19, pp 81–94, 2004
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Good riddance to termites

Suzie Vlaming, Senior Media Officer University of Western Sydney

Good riddance to termites, as scientists uncover a natural solution to a home-owner's nightmare.

They may be small, but the insidious destruction caused by termites has been known to reduce many a builder, home-owner and pest controller to tears. But no more: scientists have discovered a natural plant extract that can knock out these tiny terminators, and it's all thanks to a humble Aussie fence post.

Associate Professor Robert Spooner-Hart, Director of the Centre for Plant and Food Science at the University of Western Sydney, is working with a team - which includes Southern Cross University - to investigate a revolutionary new anti-termite product extracted from a native plant found in southern Queensland. The pioneering research is being undertaken in partnership with Australian publicly listed company, BioProspect Limited.

The miraculous plant extract has been found to not only kill termites, but also repel them and prevent further infestations.

It's a breakthrough which is set to revolutionise the building, treated pine, and pest control industries; and potentially save the millions of dollars currently spent trying to protect new and existing homes from the vast termite problem, both in Australia and overseas.

Associate Professor Robert Spooner-Hart says the natural extract could spell the end to hazardous poisons and other chemicals being used to treat houses and pine products.

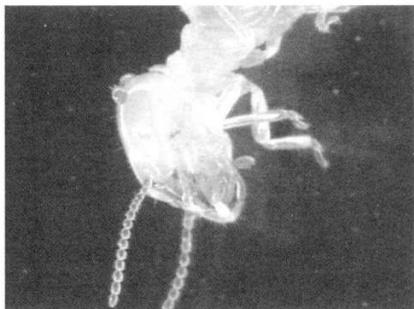
The anti-termite extract evolved from studies carried out by UWS and SCU on a lone fence post spared by termites in a paddock where surrounding posts had been devoured, he explains.

After analysis by the UWS and SCU team, the wood and its extract were found to be from a native *Eremophila* species (*Eremophila mitchellii*) often thought to be a sandalwood, but not actually part of the sandalwood family.

The discovery of this extract and its anti-termite properties couldn't come at a better time, given the concerns over treated pine and the ban on treated pine product in many areas.

Copper chrome arsenate, which is currently used to treat pine products, is now banned from areas like kids' playgrounds, and most people now no longer want treated pine in their backyard.

Right: a termite worker



Associate Professor Spooner-Hart says the extract could become a multi-use pest control product.

At the moment the only chemical treatment to kill termites is chlorpyrifos a nerve poison, which affects nerves in humans and other animals. It's quite a hazardous chemical, and is a very special limited-use product available to pest controllers for major termite infestations, he says.

Other preventative measures to ward off termites, such as steel mesh around concrete housing slabs, have proved to be very expensive; and can often be ineffective because if the mesh is surrounded by plants close to the house, the termites simply climb up the mesh.

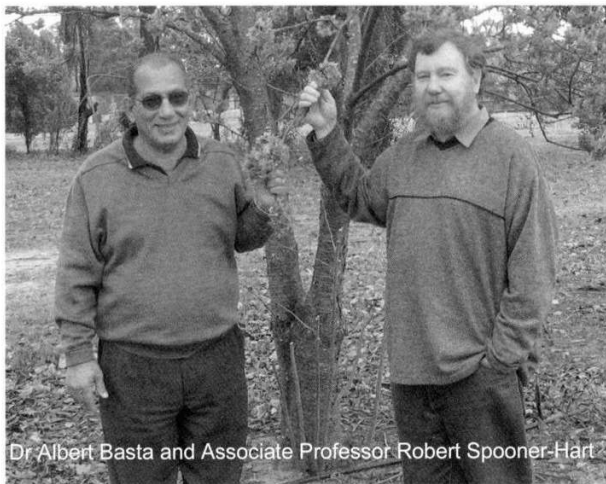
We believe the extract has three beneficial uses: as a termite barrier under people's houses; as a method of killing termites directly when there are incursions; and to impregnate and protect wood used in new housing or other wood constructions.

It could also be used on existing houses to protect them from termite infestations if it's applied to the substructure.

Associate Professor Spooner-Hart recently returned from a termite testing site in Narrandera, NSW, where the treated and untreated stakes had been in the field for a year.

He says the results from the field experiments over the last 12 months are incredibly promising.

This pioneering research is being carried out with my UWS colleague Dr Albert Basta and Associate Professor David Leach at the Centre for Phytochemistry and Pharmacology at SCU, Associate Professor Spooner-Hart says.



Dr Albert Basta and Associate Professor Robert Spooner-Hart

Together with SCU's experts, we were able to treat different stakes as part of the controlled experiment. As a result we've discovered the particular chemical component that causes the anti-termite effect, and confirmed that the extract works.

A number of the untreated 'control' stakes had fallen over, totally eaten through; while other stakes, although still-standing, had, also been eaten. However, not a single stake treated with the extract - even those treated with the lowest concentration - had been eaten.

The anti-termite extract is not available to the public yet as scientific analysis is ongoing, however BioProspect hopes to have commercial products available after further development trials have been completed.

Associate Professor Spooner-Hart says there are different termite species around the world, and so far the extract has proved to be successful against three termite species in NSW, including the two most common.

Further research is set to be carried out, including testing the product on the Giant Termite, *Mastotermes darwiniensis*, which is found in the Australian tropics.

This will be the litmus test to ascertain the strength of the extract, and whether it will work as a termiticide not only in Australia, but also around the world, he says.

Errata: Colour Variation in Cycads

In *Australian Plants* Vol. 23 No. 182, March 2005, there is a consistent error in the naming of *Cycas silvestris* (from Cape York), which should be ***Cycas calcicola*** in all cases (pp.26 & 28).

These 2 species are among the most distinctive, & ***Cycas calcicola*** comes from Litchfield Park & some areas near the Daly River, all in the Top End of the NT.

The colour reproduction of most of the slides has muted the true colour differences somewhat, making the juvenile foliages less distinct.

Errata: *Melicope elleryana*

There were a number of errors in Richard Logan's article in *Aust. Plants* Volume 22, 176, September 2003. The title of the article should have been *Melicope rubra* as should the caption of the photos on page 128. The first sentence of the article should have read:

The Little Evodia (now correctly called *Melicope rubra*, previously *Evodiella muelleri*) grows to about 6 m in the forest and from the height of my cultivated specimen, I do think this is achievable in the garden environment.

The error was introduced by the Publishing Committee during name checking against the APNI database which is used as the names reference. The APNI database unfortunately contained an erroneous entry for this plant.

In summary, *Evodiella muelleri* is now correctly called *Melicope rubra* and *Melicope elleryana* is still *Melicope elleryana*.

It was incorrect to cite *Evodiella muelleri* as a synonym of *Melicope elleryana*.

Eremophila mitchellii in Profile

False Sandalwood, Buddha _____ From the ASGAP Web Site

Eremophila is a large genus of over 250 species, all endemic to Australia. They are generally plants of inland and arid areas and are popular with Australian plant enthusiasts.

Eremophila mitchellii is a large shrub or small tree to 10 metres high with flaky bark. The leaves are linear or lance-shaped up to 60 mm long by 5 mm wide with an acute, hooked apex. The flowers are usually white or cream but pale pink forms are known. They are about 10 - 18 mm long, tubular in shape and with spots within the throat. They occur in the leaf axils and are mainly seen in spring. The fruits are egg shaped and about 7 mm long.

In the 1970's it was considered a serious pest over 30 million hectares of NSW and Queensland. (*Eremophila* Study Group newsletters 1972-1985).

It is not permitted to be grown in Western Australia.

Eremophila mitchellii is not widely cultivated but, like most *eremophilas*, it would be best suited to dry climates but should also be reasonably adaptable to more humid, temperate areas. It should grow on a variety of well drained soils, preferably in a sunny position.

Propagation from seed of *Eremophila* species is unreliable. A number of treatment methods have been tried including sowing the ripe fruits, sowing of aged and washed fruits and splitting the fruits to extract the seeds prior to sowing. The latter involves splitting the fruits in halves and quarters but some seeds are inevitably damaged during the process.

Eremophila mitchellii can be grown from cuttings of hardened, current season's growth.

Family: Myoporaceae

Distribution: A variety of habitats in northern NSW and Queensland.

Derivation of Name: *Eremophila* from Greek, eremos, desert and phileo, to love, ie "desert loving", referring to the habitat of many of the species, *mitchellii* after the explorer Sir Thomas Mitchell.

Conservation Status: Not considered be at risk in the wild.

Have you been to the ASGAP Website yet?

<http://farrer.csu.edu.au/ASGAP> and coming soon at <http://asgap.org.au>

It is a valuable resource for all native plant enthusiasts.



Going Native

Living in the Australian Environment* _____ Book review by Mick Forster

The Australian environment and economy is at a crossroads. Increasing technological advances have seen efficient agricultural output as never seen before yet jobs in the bush are as scarce as ever, the family farm is becoming ever rare, and biodiversity is being lost by the day. Clearly something must be done to maintain economic wealth in rural Australia while simultaneously maintaining and eventually increasing our biological wealth. *Going Native* by Michael Archer and Bob Beale is at last an attempt to turn the tide to creative and ingenious ideas that will hopefully preserve and improve the Australian environment.

The backbone of Archer's and Beale's thesis is we must, as owners of Australia, start to truly think as though we are going to be on this land forever. Up to now the mindset has largely been profit now, worry later. Archer and Beale argue that a revolution is needed in the way we think about the land. Thankfully, though, this proposed revolution is not one where we turn the economy upside down, slaughter all the hard-hoofed animals, stop immigration and return to the Stone Age. It is a revolution where we keep all the perks of modern day living but we keep them in a way that is smarter and more in line with the true principles of ecological sustainable development (ESD).

Thankfully, also, Archer and Beale do not just provide rhetoric like politicians running for office: they offer real and practical solutions some of which can be done or have already be done. An example given from the plant kingdom is that of the mallee. Although in the past the mallee and mallee country was much despised, and much cleared, it has become apparent that the mallee can provide multiple sources of income including Eucalypt oil (which potentially has many different uses in itself), carbon credits due to its re-sprouting abilities, activated carbon pellets for use in mining, and the ever-increasing interest in bio-energy sources. Furthermore, belts of mallee interspersed with traditional wheat farming can lower water tables and abate that costly degradation, salinity. Archer and Beale offer many other examples from both the plant and animal kingdoms that can also be implemented in the urban environment.

Some of the ideas given in *Going Native* are, however, controversial. For example, there is practically an all out endorsement of Genetically Modified crops. However it is not a blind endorsement of such ideas with the impression that Archer and Beale are being secretly sponsored by Monsanto. The reasoning they provide is sound and with a little reflection may change the mind of even the most ardent greenie. All in all *Going Native* is a must on the shelf for any person serious about the future of Australia's environment and economy.

**Going Native: Living in the Australian Environment* by Michael Archer and Bob Beale. Published by Hodder Headline Australia 2004, RRP: \$35.00

Our Garden 48: Bondura

Marcia Bonham*

It was 1958. "You can make the garden, I can only hold a hose." So said my mother-in-law when they moved into their new house on the farm, Bondura, on the Bridle Track Road at Duramana, 17 km from Bathurst, NSW.

What a challenge! The house paddock was just that, a paddock, full of Clover, Paspalum, Couch and sundry grasses. The only water supply was from one tap, which delivered dam water, and finances were very limited. But the soil was good and the land had a northern aspect, sloping down to the east.

We splurged on *Cupressus torulosa* trees (the exotic Bhutan Cypress) in 4" pots for a windbreak from the freezing westerlies, and they have proved to be a real boon, helping to create a micro-climate which protects the whole garden from heavy frosts. It's also fortunate that we are much higher than the frosty riversides of most of Bathurst, even though we still have occasional snow.

Next I dug up seedlings from my mother's garden, anything I could get for nothing - Cotoneasters, Hawthorn, Euonymus, Nandina, Red Hot Pokers, Agapanthus - all now considered to be weeds, plus cottage plants and annuals. Trees followed - Prunus, Liquidamber, Crab-apple and even some *Melaleuca armillaris*! Of course a rose garden was a must.

Later my daughter became a herbalist, so I began learning about herbs, growing them, selling them in pots, and on Sundays I served afternoon teas and sold home-made jams from the old original orchard fruits.

By about 1964, we had moved onto the farm and I was very happy (though never really satisfied) with my garden. Water pipes had been laid in all directions with trickle irrigation where possible so the garden was nearly drought-proof. Nearly, but not completely, as in the last two big droughts the dam has been absolutely, completely, horribly, bone-dry, and all the plants have just had to cope or die. I began to realise that there was plenty of food for all the seed-eating birds, but the habitat and food supply for honey-eaters was dwindling, so I began planting Grevilleas and Callistemons. Somehow that triggered my growing interest in Australian plants and began a consuming passion for the little darlings!

I managed to convince my husband ("Why on earth would you want MORE garden?") to move the fence to include the adjoining paddock, and I began my Bush Garden in 1997. Out went the one miserable left over Cypress in the middle of the paddock, and I set to work on the assortment of weeds and grasses again. Some spray was used, but mainly I wielded my favourite gardening tool, an old rabbit setter which now has a metal handle.

* Bondura will be shown as part of the "Around the Blue Mountains World Heritage Area" tour for ASGAP Conference in 2007.



Above: *Pandorea pandorana*
Wonga Wonga Vine at
entrance to Bush Garden.

Right: *Clematis aristata*
covering the tank.
Prostanthera ovalifolia
(variegata) in foreground.



Below: Wattles in the snow.
May 2000

Photos: Marcia Bonham





Above: Yellow *Xerochrysum* spp. in front of *Persoonia pinifolia* - Jan 2003 drought

Right: Another work in progress - Oct 2005

Below: *Prostanthera nivea* - Snowy Mint Bush, *Xanthorrhoea* spp., correas, *Callistemon* spp. Scarecrow on the fence, exotics in the paddock

Photos: Marcia Bonham



Once the ground was cleared I put loads of eucalyptus mulch on it, and later began planting. I wanted to grade it down from the windbreak to the house, so that I can enjoy the view from my living-room in my old age. (I'm nearly there now!) Acacias, then melaleucas, callistemons and grevilleas. When they were established, in went the smaller plants and then groundcovers, forbs and grasses. Four eucalypts self-seeded, so they have stayed. Who am I to tell them they're in the wrong place? Now I have lots of local plants, plus Kangaroo Paws, *Eriostemon*, *Leptospermum*, kunzeas etc, all flowering and entrancing me. Gradually I have been widening garden beds - less mowing and more space for Aussie plants. This year I picked my first waratahs, and the *Olearia* daisies were gorgeous. Since joining Australian Plants Society, I have had great advice, practical assistance, tube stock, and the fun and outings and friendships are an added bonus. These days I seem to have much more success in planting and propagation and my list of *Have's* is getting longer than my *Must have's*.

In my newest garden extension I had to get rid of copious amounts of Ivy, Japonica, dead trees, weeds etc. so I put down thick layers of newspapers, then ten centimetres of mulch, watered it and left it for a month or so. Into the mulch went lots of plants. In two years it has grown beautifully. The *Hardenbergia* gave me a purple fence, the *Clematis aristata* is stunning over the old concrete tank, the Wonga Vine is covered with creamy bells, and all the small foreground plants are doing well. The season has been wonderful with all dams and tanks overflowing for the first time in ten or twelve years. So I have water for the next two summers. After that, who knows?

I'm planning on replacing a bulb bed with various *Correa* ssp., and wondering how I can get rid of the Cotoneasters, but then when I see the King Parrots eating the berries in the autumn, I might weaken. Oh well, the Australian plants and the exotics from overseas seem to co-exist very well. It's a pity we humans can't do the same. I love all my plants, but I must admit I have a very soft spot for those tough little Aussie Battlers. May they live long.



Work in progress, Oct 2003. Gone are the wattles, japonica, ivy and periwinkle. Tank covered in dead ivy. See the change on page 184.

Photo: Marcia Bonham

Tasmanian Arboretum

continued from page 171

One of Tasmania's icon genera is *Richea*. As you approach the Tasmanian section, a bed of the mainland species, *Richea continentis*, has been planted, so visitors can move on and see what a *Richea* should really look like. The Arboretum has about half the Tasmanian species, including healthy *R. pandanifolia*. A complete collection is a future project.

Eucalyptus perriniana, the spinning gum, grows healthily with a few spreading branches, but near-by is the Tasmanian endemic *Eucalyptus risdonii*. It is also a 'spinning gum', a small tree, always with connate glaucous leaves, but it has a full trunk and a dense crown.

The Arboretum has a few plants of the endemic *Asterotrichion discolor*. This member of the family Malvaceae is an extremely fast grower. The profusion of small white perfumed flowers in autumn makes a spectacular display. Male plants tend to be more showy.

A pink form of *Epacris impressa* grows naturally in road cuttings in the Tasmanian Section. The large-flowered *E. grandis* is growing well. Some other Tasmanian endemic species recently planted are *E. franklinii* (previously *E. sp. aff 'Union Bridge'*), *E. barbata*, *E. paludosa*, recently discovered on the Tasmanian mainland and a strange *Epacris* found by the Royal Tasmanian Botanical Gardens near Trial Harbour.

There are many more species with spectacular display or restricted distribution, but we also have at the Arboretum some of the more widespread plants that make the Tasmanian bush so distinctive. Bushwalkers may curse Button Grass, *Gymnoschoenus sphaerocephalus*, Cutting Grass, *Gahnia grandis*, and horizontal, *Anodopetalum biglandulosum*, but a Tasmanian collection would be incomplete without them.

Coppicing and Pollarding

Joanne Caldwell

I am sure that you are all familiar with the practice of coppicing, where trees are cut off at or near the base to encourage a bushy, multi-stemmed or mallee habit. Coppicing has been practised across the world to rejuvenate a forest and start a new process in regeneration, since Roman times. In agriculture it allowed for periodical cutting or harvesting of the branches.

I have noticed that another word, pollarding, has appeared in the popular press in the last few months, and it is also mentioned in Ivan Holliday's article in this issue. Pollarding is similar to coppicing except that the tree is cut at head height (or lower). Any branches on the main trunk may also be removed. This may be a new word to many of our readers but this practice also originated in agriculture where this habit allowed a bushy form for harvesting branches whilst allowing stock to graze underneath.

There are some examples of pollarded street trees in Broken Hill. Pollarding leaves a short trunk with sucker (or coppice) growth some distance above ground level. All of this growth is secondary, is not part of the original trunk, and is dangerous in an urban environment, because the branches are not windfirm (pers. comm. Dick Turner).



Above:
Lomatia polymorpha

Right:
Hakea decumbens
ssp. *physocarpa*

Below:
Olearia archeri

Photos: Dick Burns





Above:
Bauera rubioides Double Pink

Right:
Richea curtisiae

Below:
Asterotrichion discolor

Photos: Dick Burns



Wildflower Nurseries in Queensland

Fairhill Plants and Botanic Gardens — Huge range: rainforest plants, grafted grevilleas, rare plants, wildflowers, ferns, orchids, revegetation trees. Extensive display gardens. Open every day 8.30 a.m. to 5.00 p.m. Fairhill Native Plants, Fairhill Rd, Yandina, Qld 4561. Tel. (07) 5446 7088.

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Wildgems Native Plants — PO Box 89, Cobargo, NSW 2550. Ph/Fax (02) 6493 7398, Mob. 0427 937 398. Wholesale nursery open by appointment. Huge range including rare species.

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Wildflower Nurseries in Tasmania

Plants of Tasmania Nursery — 65 Hall St, Ridgeway 7054. SAE catalogue. Tel. (03) 6239 1583. Open 7 days.

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Kurunga Native Nursery — NEW BRANCH OPEN at 118 York Rd, Mt Evelyn 3796. Melway 52 K3 Tel. (03) 9760 8100. www.kurunga.com.au Charming setting, beautiful building, café and of course Australia's largest range of Australian flora. Delivery to all mainland states and free stock list on request.

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Orange Valley Nursery — 20 Patricia Rd Kalamunda 6076. Eremophila plant specialist. Phone (08) 9293 2569 Email: ovnjames@iprimus.com.au

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Wildflower Society of Western Australia (Inc.) — PO Box 64, Nedlands 6909. A range of seeds available, labelled and packed, at \$1.50 (plus postage) per packet. Send for a **current** Descriptive Seed List (\$3.00 posted) to: The Seed Sales Officer, Eastern Hills Branch, PO Box 111 Glen Forrest, WA 6071. Also available a book *Hints on Growing Native Plants* (\$6.00 posted).

The Grevillea Book, volumes 1, 2 and 3 by Peter Olde and Neil Marriott, is a complete reference to all species of *Grevillea*. The Australian Plants Society NSW ensured that they were published to a very high standard with at least one large colour photograph of each of the 340+ species, an easily read description of each species and details of its occurrence and cultivation. They are available from the Australian Plants Society NSW, PO Box 744, Blacktown NSW 2148, at \$44 per volume plus postage and handling of \$9.50 for 1 volume and \$15.50 for 2 or 3 volumes within NSW.

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