

What's in a Name?

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Friends of the Australian National Botanic Gardens

Introduction

This folder of articles is about a selection of the many thousands of native plant species growing in the Australian National Botanic Gardens, Canberra, ACT. It evolved from a series of articles published in the Newsletter of the Friends of the Gardens.

Criteria for selection included that a specimen of each species is easily accessible in the Gardens and that the species has a special botanical and natural history interest and its botanical name prompts the query "What's in a Name?"

I hope that this will be of interest to all visitors to the Gardens and particularly to those who have a special need for information, such as students and my fellow volunteer guides.

I am grateful to the Friends of the Australian National Botanic Gardens for funding the production of this publication and to the staff of the Gardens for their assistance with its preparation. I am especially indebted to Elizabeth Bilney, member of the Council of Friends, for her detailed assistance in the compilation of these articles.

Bernard Fennessy
Volunteer Guide
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Acacia beckleri

by Bernard Fennessy ©

In the Australian National Botanic Gardens there is a large specimen of Barrier Range Wattle, *Acacia beckleri*, in Section 77 near the Top Depot. There are smaller examples along the Main Path in the *Acacia* Section. It is a large shrub with thick, leathery lance-shaped phyllodes with thickened margins and a prominent central nerve. Characteristically the flowers are in very large, bright yellow balls about 1 cm in diameter.

This species occurs scattered throughout semi-arid to arid areas of South Australia in the vicinity of the Gawler and Flinders Ranges, and in western New South Wales on the bare hills of the Barrier Range near Broken Hill and across to Ivanhoe.

Acacia beckleri was named after Hermann Beckler who accompanied the first stage of the Burke and Wills transcontinental expedition, leaving Melbourne in 1860.

An historical curiosity is that he wrote the only substantial account of the expedition prepared by one of its members.



Acacia beckleri

© M. Fagg, Australian National Botanic Gardens

It remained in the possession of his family until it was deposited in a local museum in southern Germany in 1967. In 1993 it was published as a book *A Journey to Cooper's Creek* by Hermann Beckler, translated by Stephen Jeffries and Michael Kertz, Melbourne University Press.

Beckler was born in Bavarian Swabia in 1828. In Munich he studied medicine and also botany, zoology, mineralogy and mathematics. He studied medicine to make a living and to satisfy family expectations, but he wanted to become a botanical collector. He sought a free passage to Australia as a ship's doctor. He worked briefly in Tenterfield, NSW, and Warwick, Qld. In 1859 he travelled overland with a droving party from south-western Queensland. Arriving in Melbourne in July, he made direct contact with Dr Ferdinand Mueller, the Government Botanist, who had already received botanical specimens from Beckler. Mueller offered him employment, sponsoring him on a collecting trip to New England in Northern New South Wales.

He named the species *Ozothamnus beckleri* after him. Beckler was appointed to Robert O'Hara Burke's expedition to travel from Melbourne to the Gulf of Carpentaria. He was to be medical officer and botanical collector, but it was soon apparent that Burke would give little support to scientific endeavours and wanted Beckler to concentrate on the transporting of supplies, and the handling and use of the expedition's camels. Moreover Beckler knew that Burke had considered

replacing him with a personal acquaintance, Dr John Stuart from Bendigo. Though this did not eventuate it increased Beckler's dissatisfaction, and he resigned from the main expedition after hearing Burke dismiss his second-in-command Landells, who had charge of the camels. However, despite Beckler's formal resignation he continued to be closely associated with the expedition and particularly the group under William Wright, former overseer of Mootwingee Station, which was to take supplies from Menindie to the Cooper's Creek depot. Beckler's account describes vividly the travails of this support party, badly affected by sickness and a lack of water. Also, his observations give us a feeling for and understanding of the landscapes.

The late Dr J.H. Willis of the Melbourne Herbarium has provided a testimony to Beckler's botanical contributions which comprised 475 collections between Swan Hill and Koorliatto Creek; only 40 specimens were collected from beyond the 30th parallel after Beckler became restricted to tending to the needs of the sick members of the supporting party. Beckler's ability as a collector was acknowledged by George Bentham, principal author of the *Flora Australiensis*, who in the preface to the first volume in 1863 lists Beckler as the first of those collectors employed by Mueller who "have contributed most to the Herbarium".

Historically Beckler's role has been over-shadowed by another German, Ludwig Becker, who was engaged as artist, naturalist and geologist, and who died at Bulloo, eight miles south of Cooper's Creek in April 1861, eight months after the expedition left Melbourne. Some of his legacy of sketches and paintings of aspects of the trip are shown in Beckler's published account.

Beckler left Australia in January 1862 after giving evidence to the Royal Commission into the failure of the Burke and Wills expedition. He furthered his medical studies in Munich and Berlin and became a practitioner in the Bavarian country town of Hindelang. Later he moved to the remote alpine village of Fischer and died there in December 1914.



Acacia mearnsii

another Black Wattle

by Bernard Fennessy ©

One of the wattles is another Black Wattle, *Acacia mearnsii* (previously known as *A. mollissima*). The type of this species was collected by E. Mearns from a cultivated specimen in East Africa and named after him in 1925. It was not realised at the time that it was an Australian species. Edgar Alexander Mearns (1856–1916) was a doctor in the U.S. Army. In 1909 he was in charge of naturalists with the Smithsonian African Expedition.



Acacia mearnsii

D. Greig © Australian National Botanic Gardens

A. mearnsii is a small spreading tree of up to 15 metres high, with smooth greenish to blackish bark. The leaves are bipinnate and dark green and with a raised gland at the junction of each pinnae pair. The yellow flowers in globular heads can be seen in spring/summer. This species occurs scattered across most of southern Victoria and into New South Wales on the coast and tablelands to the north of Sydney. It also occurs in South Australia, Tasmania and Queensland.

A. mearnsii is a widely cultivated and fast-growing species. In South Africa it is a major pest along river banks, having escaped from cultivation for tanbark.

The first shipment of tanning material (extract of bark) was made from Sydney to England in 1823. The extract was made by converting small branches, thinnings and tops too small for stripping for the bark, into a strong fluid extract called tannage. The cut-up material was steamed and the fluid flowed on to evaporating sheets where a thick treacley extract was formed. To prevent the tannage contacting iron, wooden vats were used.

Bark was stripped from *Acacia* trees and harvested, particularly in Tasmania and Victoria. The first full cargo of bark was shipped from Westernport (adjacent to Port Phillip, Victoria) in 1835. The wattle bark industry developed very rapidly and there was concern that the indiscriminate stripping of trees caused by the increasing demand for bark in Continental and English markets was likely to lead to the early extermination of the species and a reduction in the supply necessary for the home trade. Hence in 1878 a Board of Enquiry was formed in Victoria to investigate and report on the situation (an early example of an environmental impact statement!). At that time there were 96 tanneries in Victoria, and these needed about 15,000 tonnes of bark annually.

The Board was extremely critical of the way in which the once plentiful wattle resource had been exploited in the absence of adequate regulations and law enforcement. It recommended that wattles be planted, that strippers be licensed, that the stripping season be fixed, and that there be a limit to the size of the trees to be stripped.

Much later the pressure on wild *Acacia* was reduced when leather tanning techniques were developed which did not require the use of wattle bark. Later, the need for tanning decreased because of the reduced demand for leather following the increased use of plastics for footwear, furniture and vehicle upholstery.

In the landscaped area outside of and to the left (south) of the main gates of the Australian National Botanic Gardens is a planting of 20 *A. mearnsii* close to the road leading uphill to the Telstra Tower. In this wattle's flowering season it provides a colourful backdrop to this area.

Allocasuarina portuensis

by Bernard Fennessy ©

Allocasuarina portuensis, a She-oak, is officially listed as a rare and endangered species. In the Australian National Botanic Gardens we have more specimens than exist in the wild. The surviving field specimens are in Nielsen Park, part of Sydney Harbour National Park, near Vaucluse.

The species was named *portuensis* (Latin for inhabiting a port) referring to its location beside Sydney Harbour (Port Jackson). When its name was first published (Vol. 3 of the *Flora of Australia*, 1989) only ten plants existed. Now none of those original plants survive there.

In the ANBG there is a male specimen in Section 221 close to the southern end of the Visitor Centre building; it is easily viewed from near the steps leading down to the car park. The metal sign indicating the plant is marked with two engraved lines denoting the endangered status of the species.



Allocasuarina portuensis

© M. Fagg, Australian National Botanic Gardens

There are other specimens at the top of the Eucalypt Lawn above the Burbidge Amphitheatre.

The genus *Allocasuarina* (meaning 'other' *Casuarina*) has been split botanically from *Casuarina*. The name *Casuarina* is from the Latin word *casuarinus*, meaning like a cassowary, *Casuarius*, because the long drooping, slender and wiry branchlets resemble the feathers of this flightless bird. The bird's name comes from its Malay name, *kasuari*. This bird occurs in areas immediately to the north of Australia as well as in north-east Queensland.

The branchlets of casuarinas are not leaves, although they function as such and photosynthesis occurs in them. The leaves are reduced to tiny papery teeth (bracts) arranged in whorls at intervals along the branchlets.

Only six species of *Casuarina* occur naturally in Australia. They are all tree species widespread across the continent except for Tasmania and parts of south-western and central Australia. Generally they grow on soils that are not nutrient deficient. *C. cunninghamiana*, the River Oak, is one of the best known of these. In contrast *Allocasuarina*, a genus of about 60 species comprising shrub and tree species, is an Australian endemic species found mostly in the south of the continent.

The most obvious difference between the genera is that *Allocasuarina* has seed that is dark brown to black and shiny, whereas *Casuarina* has seed that is grey to yellow-brown and dull. There are also technical differences in the structure of the cones. In *Casuarina* the seeds in the cones are carried between thin, weakly woody, simple valves, obviously protruding from the cone, but in *Allocasuarina* the fruiting cones are more complex and the short valves usually carry knobby appendages on their backs.

In *Casuarina* the valves remain closed for several years and the seed is long-lived. In *Allocasuarina* the cones generally open readily and have short-lived seed.

Allocasuarina portuensis (continued)

The family Casuarinaceae has an ancient Gondwana history, and once was more widely distributed. Fossil forms about 50 million years old have been found in New Zealand and South America, and fossil pollen in South Africa. The family was also once more widely distributed across Australia.

Allocasuarina portuensis is a struggling relict of a very interesting family. Its present precarious status should make us think deeply about our philosophy of conservation and particularly about the need to preserve diversity.



Bauera rubioides

by Bernard Fennessy ©

Bauera rubioides is called River Rose, Dog Rose and Wiry Bauera. It is a scrambling shrub up to two metres high with extensively branched stems. It flowers mostly in spring and summer, and has small pink, or occasionally white flowers. It occurs in all States except Western Australia, usually in moist, sheltered situations. In the Australian National Botanic Gardens a good specimen, 20 years old, is in Section 7 near the area labelled Monocotyledons (grasses, lilies, sedges).



Bauera rubioides

© M. Fagg, Australian National Botanic Gardens

Bauera is placed in a family of its own, Baueraceae, but for a long time was in the family Cunoniaceae which contains such different species as *Ceratopetalum apetalum* (Coachwood), *C. gummiferum* (NSW Christmas Bush), *Callicoma serratifolia* (Black Wattle) and *Vesselowskyia rubifolia* (Southern Marara).

The genus *Bauera* was named after the brothers Franz and Ferdinand Bauer. They were both botanical artists, sons of Lukas Bauer who was court painter to the Prince of Liechtenstein, and who died while his children were still in infancy. Franz Andreas Bauer, 1758-1840, went to England from Austria in 1788 and was employed as an artist by Sir Joseph Banks.

Ferdinand Lukas Bauer, 1760-1826, was engaged by Dr John Sibthorp in 1784 to accompany him on a voyage to Greece and the eastern Mediterranean as a natural history painter. The result of this journey was Bauer's *Flora Graeca*. In 1801 he was appointed by Banks as natural history draughtsman to the expedition of Matthew Flinders to Australia in *HMS Investigator*. He was to work under the direction of Robert Brown, a young Scottish medical practitioner and botanist.

The *Investigator* circumnavigated Australia, surveyed the southern coast and looked for possible sea routes into the interior of the country. The ship was then in such poor condition that it was condemned in Sydney. So Flinders, unaccompanied by Brown and Bauer, set out from there to get another ship in England. He left on 10 August 1803 in the *Porpoise*, but this was wrecked on the Barrier Reef. He managed to hitch a ride back to Sydney, and re-embarked on 20 September. At Mauritius he was held prisoner by the French for six and a half years and did not get back to England until 1810. (This sad story is told in Ernestine Hill's book, *My Love Must Wait: the Story of Matthew Flinders*, 1941).

Meanwhile, back in Australia Ferdinand Bauer continued to work diligently and with a colossal productivity. He made several trips within Australia and also voyaged to Norfolk Island. He and Brown returned to England in 1805, ironically on a 'repaired' *Investigator*. This was nearly five years after leaving England and five years before Flinders was finally freed and able to get home.

Bauer produced more than 2000 drawings and paintings of plants and animals. These are renowned for their meticulous detail and their beauty. There are many fine examples in *Ferdinand Bauer: the Australian Natural History Drawings*, by Marlene J. Norst, 1989.

The name Bauer has been perpetuated in several species of Australian plants, and Cape Bauer on the South Australian coast was named by Flinders. Bauer should be better known to Australians.

Callicoma

serratifolia

by Bernard Fennessy ©

Most Australians associate the word 'wattle' with any of the numerous species of the genus *Acacia*. These are shrubs or trees with spikes or globular heads of yellow or cream flowers, including Australia's official floral emblem *Acacia pycnantha*, the Golden Wattle, whose green and gold colours are recognised as our Olympic colours. But there was a much older use of the word 'wattle'.



Callicoma serratifolia
D. Greig © Australian National Botanic Gardens

It was used in Anglo-Saxon times to describe rods or stakes interwoven with twigs or branches of trees and used to make fences, walls and roofs. The basketwork formed by the woven 'wattles' was daubed with mud or clay and used as a building material. This technique was called 'wattle-and-daub', and was used by the early settlers in Australia to make their dwellings.

One of the rainforest trees, which produced the 'wattles' used in the 'wattle-and-daub' process, was called Black Wattle *Callicoma serratifolia*. The derivation of this name was from the Greek, *kalos* meaning beautiful, and *kome* the hair of the head, probably referring to the pretty, fluffy globular heads of the florets; *serratifolia* from the Latin *serratus* meaning saw-shaped, and *folium* a leaf, referring to the toothed margins of the leaves.

Black Wattle is a tree up to 25 metres tall and 60 centimetres in trunk diameter. The branchlets are slender and densely covered with brown or rust-coloured hairs. The leaves are opposite, simple, regularly saw-toothed, narrow-elliptical and 5-12 centimetres long. The flowers are cream in globular heads, 1-2 centimetres in diameter on hairy stalks, springing from the forks of the leaves on the ends of the branchlets. Flower heads may be solitary, clustered or several on a common stalk.

Callicoma serratifolia is in the family Cunoniaceae which also includes Christmas Bush *Ceratopetalum gummiferum* and Coachwood *Ceratopetalum apetalum*. *Callicoma* is a common secondary species in disturbed rainforest and along creeks. It is generally found in association with *Ceratopetalum*. It is widespread from southern Queensland to the Blue Mountains in New South Wales, usually in damp places and often forming thickets along stream banks.

The early settlers certainly used the pliable stems of *Callicoma serratifolia* for their wattle-and-daub construction. As *Callicoma* became less available, they may have resorted to using the pliable

Callicoma serratifolia (continued)

stems of various species of *Acacia*. This may be how *Acacia* species came to be commonly known as wattles.

In the Australian National Botanic Gardens there are good examples of *Callicoma serratifolia* (Black Wattle) in the Rainforest. In summer look for the distinctive serrated leaf and the small globular flower heads looking like those of *Acacia*.



Casuarina *cunninghamiana*

by Bernard Fennessy ©

Casuarina cunninghamiana, known as River Oak or She-oak, is a tree 15-35 metres high. It is probably the largest *Casuarina* of all. Its foliage consists of wiry and green drooping branchlets, each of which is jointed at regular intervals. Each joint (node) is ringed with 6-10 tiny papery teeth which are actually the leaves.



Casuarina cunninghamiana
© M. Fagg, Australian National Botanic Gardens

The term oak was used by the early Australian settlers because the timber had some similarity to that of the European Oak, but because it was of relatively inferior quality the tree was termed a She-oak !

Casuarina cunninghamiana grows mainly along permanent streams, usually on the banks just above water level or even in the water at the edge. Hence the name River Oak. Sometimes it may be the dominant feature of the river vegetation. When planted outside its normal habitat it grows well on comparatively dry soils.

It is found along the larger rivers in the higher rainfall areas of the Northern Territory, and it occurs in eastern Australia in a long crescent-shaped area starting from Laura, Queensland, to Bega, NSW, and inland in Queensland to east of Chillagoe and Augathella, and inland in NSW to Condobolin and Narrandera. In the Australian National Botanic Gardens there are some fine specimens around the pools downhill from the Cafe.

Casuarina, the name of the genus, is from the Latin word *casuarinus*, meaning like the cassowary, *Casuarus*. The long drooping branchlets of *Casuarina* resemble the feathers of this flightless bird which occurs in the tropical rainforests of Queensland and Papua New Guinea. The bird's Malay name is *kasuari*.

The specific name *cunninghamiana* honours Allan Cunningham (1791-1839), explorer and botanist. He accompanied Oxley's expedition in New South Wales in 1817, and took part in the coastal hydrographic surveys of P. P. King during 1817-22 when he did much botanical collecting in Western Australia, and on some of the islands of the Barrier Reef, Queensland, and in Tasmania.

In 1822 he resumed his botanical research in New South Wales, visiting Illawarra, the Blue Mountains and the Bathurst-Mudgee district. In other botanical explorations he discovered Pandora's Pass across the Liverpool Range, and discovered the Darling Downs and a route from there to Moreton Bay (Brisbane).

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Casuarina cunninghamiana (continued)

In 1831 he returned to England and spent nearly five years working on the material he had collected. In 1835 he accepted the post of Colonial Botanist in New South Wales, including responsibility for the Sydney Botanic Garden, succeeding his brother Richard who had died that year. Late in 1837 Allan Cunningham resigned because of dissatisfaction with his working conditions; he resented having to provide vegetables to supply government officials. Shortly after that he applied to be appointed as Government Botanist with no responsibility for the Botanic Gardens, but the negotiations with Governor Gipps fell through.

In 1838 he left Sydney to botanise in New Zealand. Seriously ill with consumption he returned to Sydney and died there in 1839 in a cottage at the Botanic Gardens, where in 1901 his remains were placed in an obelisk erected in his memory. His name is honoured in other Australian species including *Blandfordia cunninghamii* (Mountain Christmas Bell), *Araucaria cunninghamii* (Hoop Pine), *Archontophoenix cunninghamiana* (Bangalow Palm) and *Nothofagus cunninghamii* (Myrtle Beech).



Dicksonia antarctica

by Bernard Fennessy ©

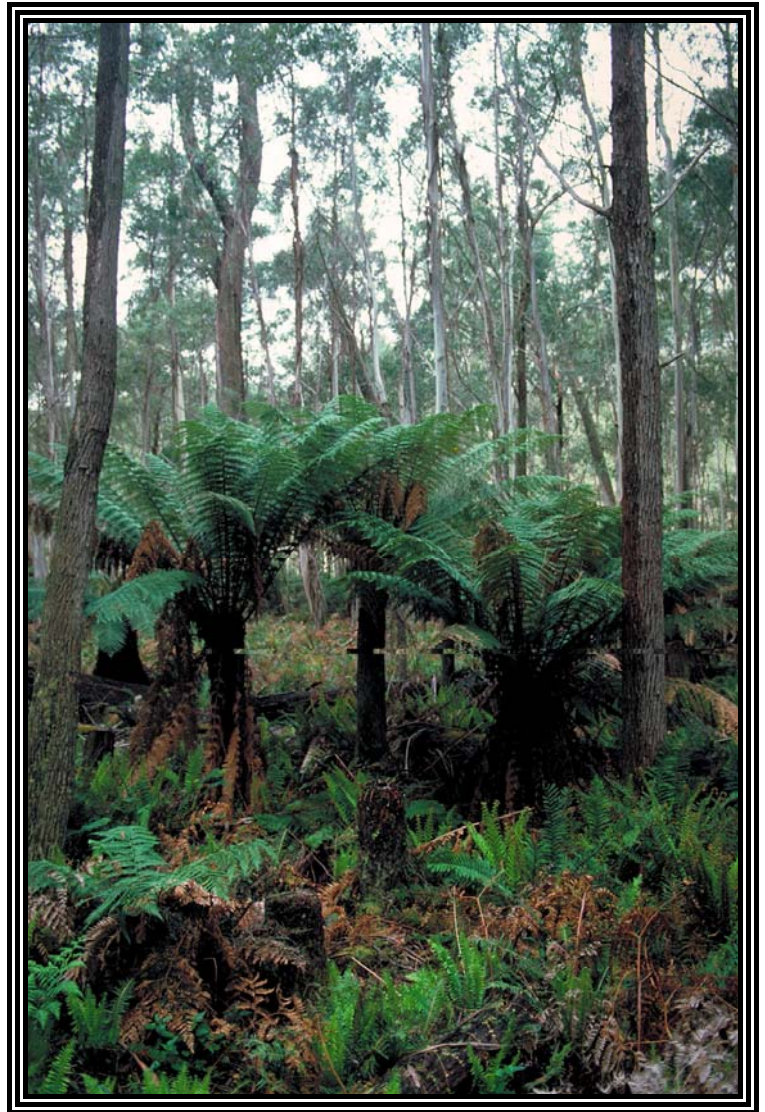
Dicksonia antarctica, the Soft Tree Fern, occurs in wet gullies and on moist mountain slopes in south-eastern Australia from southern Queensland, through eastern New South Wales, eastern and southern Victoria, and Tasmania. It is extinct in South Australia.

Its growth form is upright, like a tree, and it is commonly four to five metres high, sometimes reaching 15 metres. It has a crown of fronds, each one to three metres long. New fronds appear in spring. At first these have a crosier-like appearance but within a few weeks they expand into full-length fronds.

A few years ago in the Rainforest Gully at the Australian National Botanic Gardens I talked about the very young fronds to a group of students from Mercedes College, Adelaide. Their primary interest as students was in writing, and one of them later composed an expressive poem about the emerging fronds. He had seen them in a way completely different from my pragmatic and botanical view.

His poem was a haiku, a Japanese verse form containing 17 syllables:

Fronds of the future
Shaped like a question mark
Waiting for their day.



Dicksonia antarctica
© M. Fagg, Australian National Botanic Gardens

At the ANBG, the bridge across the Tasmanian rainforest gully provides a bird's-eye view of the tree ferns throughout the year. In late winter, Crimson Rosellas can be seen feeding on the fronds, stripping off the ultimate segments to feed on the minute spores contained in small round sori about 1mm in diameter on the under-surfaces of the segments.

The genus *Dicksonia* is named after James Dickson (1738-1822), a Scottish nurseryman and seedsman who had settled in London and was an enthusiastic student of the British flora, especially mosses. Its naming was by the French magistrate and botanist Charles Louis L'Héritier de Brutelle (1746-1800) who has another claim to fame in that in 1788 he coined the name *Eucalyptus*. *Dicksonia* has 25 species widely distributed around the world. Three are endemic to Australia.

The species *antarctica* is probably called so because of its very southern distribution in Australia. It was named *antarctica* by the French naturalist and botanist Jacques Julien Houtou de la Billardière (1755-1834) who was a member of the d'Entrecasteaux expedition of two ships (*Recherche* and *Espérance*) searching the coasts of southern Australia in 1792 for the missing expedition of La Pérouse. La Billardière was the first to bring to scientific notice *Eucalyptus globulus* and the genera *Exocarpos* (Native Cherry), *Richea* and *Anigozanthos* (Kangaroo Paw).

Eucalyptus benthamii

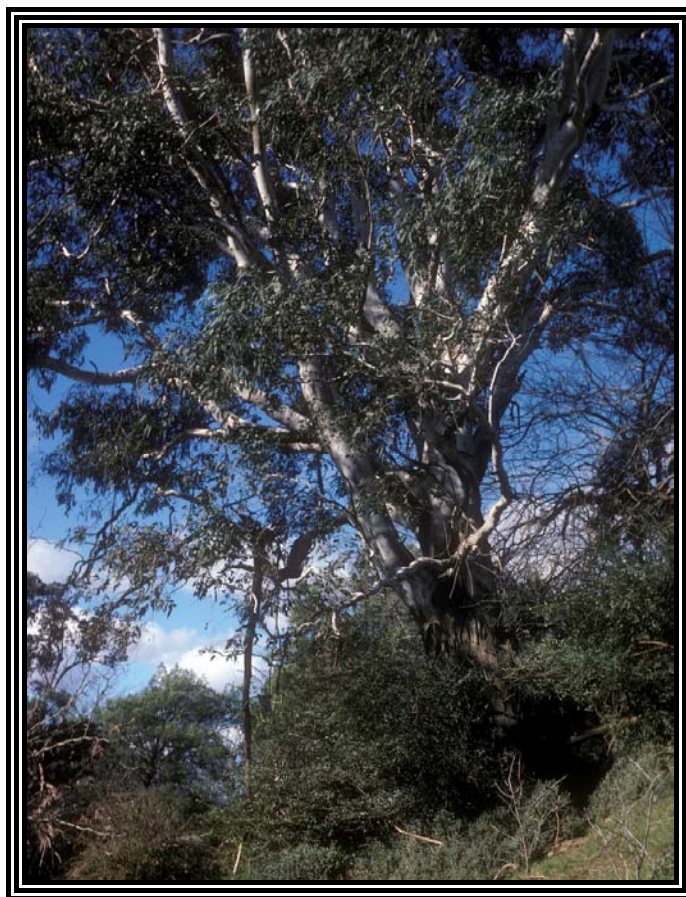
by Bernard Fennessy ©

Eucalyptus benthamii (Camden White Gum) is a tall, graceful tree in Section 1 near the Eucalypt Lawn of the Australian National Botanic Gardens.

The bark of *E. benthamii* is persistent at the base of the trunk, but is shed in ribbons from the upper trunk and branches during summer and autumn, leaving a smooth white surface.

This endangered species is confined in the wild to two fairly small areas, one near Camden, NSW, and the other on the Dorrigo Plateau extending to Springbrook in south-eastern Queensland.

The specific name commemorates George Bentham (1800-1884) who is probably unknown to most Australians, but made an important contribution to Australian botany. He was born in Stoke, Plymouth, England, but spent much of his early life away from England as his father was involved in naval administration in various places.



Eucalyptus benthamii
M. Crisp © Australian National Botanic Gardens

George became a lawyer but never practised. He was a person of independent means, and by his early thirties had developed a deep interest in botany.

He made numerous contributions to botanical literature. In his middle age he was particularly associated with a series of books sponsored by the Herbarium at Kew, England, about the details of the flora of the colonies. The first of these was the *Flora of Hongkong* (1861) and then, *Flora Australiensis* (1863-1878) in seven volumes.

It was originally planned by the English botanists that Ferdinand Mueller be brought to London to prepare the *Flora Australiensis*, but this proposal was not supported by the Colonial Office. Eventually it was decided that Bentham should undertake the task and that Mueller should collaborate with him.

For years Mueller had had an ambition to write the work himself. He felt that because of his efforts in collecting and naming plants from many regions in Australia, he had a right to carry out his ambition. However, the English botanists felt that Mueller could not prepare the *Flora* unless he visited herbaria in England, France and elsewhere in Europe to work with all the botanical specimens collected in Australia by Banks and Solander, Baudin, Freycinet, d'Urville, Brown and Cunningham. Mueller felt that as Bentham had never visited Australia, he was therefore not qualified to undertake the task.

../Continued

Eucalyptus benthamii (continued)

Mueller generously gave way to the judgement of his English colleagues and unreservedly made his own collection material and observations available to Bentham, and sequentially over 16 years lent him the contents of the Melbourne Herbarium. So, the title page of the *Flora Australiensis* indicates that it is "A Description of the Plants of the Australian Territory by George Bentham, FRS, assisted by Baron Ferdinand von Mueller, CMG, FRS, Government Botanist, Melbourne, Victoria."

Bentham started work on the *Flora* when he was 60. His output was phenomenal. The finished work of seven volumes covers 1400 genera and 8400 species in a total of 4200 pages. For more than a century it served as the main guide to the Australian flora.



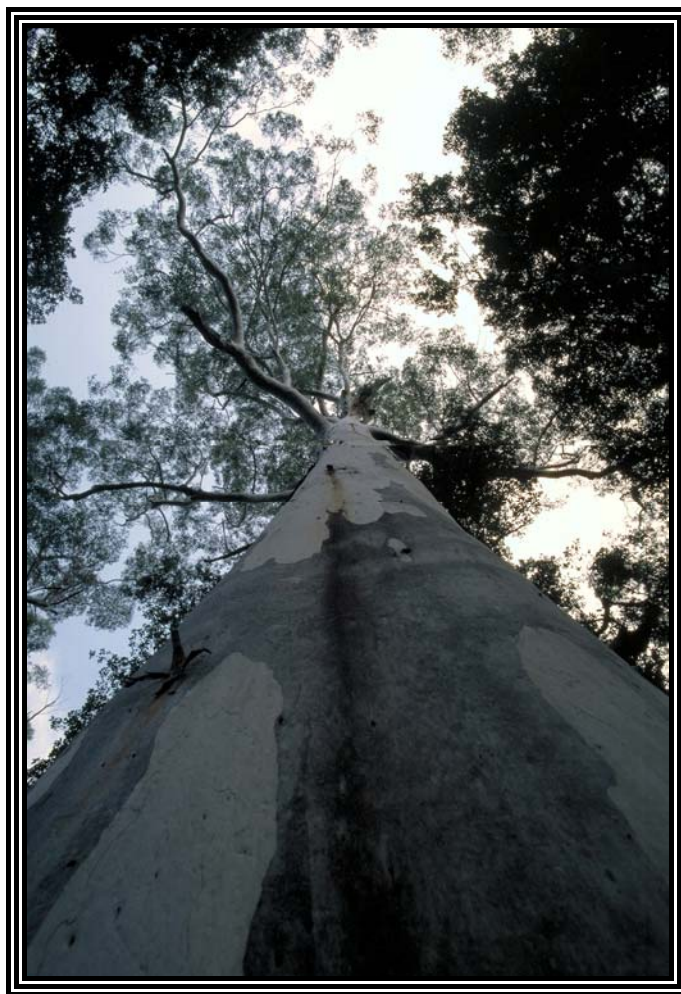
Eucalyptus deanei

by Bernard Fennessy ©

In the Australian National Botanic Gardens in Section 240, just outside the Friends' Room in the Ellis Rowan Building is a nice specimen of *Eucalyptus deanei* (Deane's Gum, Round-leaved Gum, Mountain Blue Gum). This species is among the tallest of the eucalypts in New South Wales. It occurs in two main areas: from near Picton northwards to near Singleton, and from south-east of Armidale extending northwards into south-eastern Queensland.

In 1904, R. H. Maiden, Director of the Sydney Botanic Gardens and government botanist, named this species "in honour of my old friend Henry Deane, M.A., M.Inst.C.E., Engineer-in-Chief for railway construction of this State, my coadjutor in much work on the genus ... whose stimulus and counsel in botanical work I have enjoyed for twenty years."

Deane was born in England in 1847 and trained as an engineer in Galway, Ireland, and in London. He became involved in engineering construction in England, Hungary and the Philippines.



Eucalyptus deanei
S. Douglas © Australian National Botanic Gardens

Because of poor health he migrated to Sydney in 1880 and was involved in construction of new railways, including the Gunnedah-Narrabri extension and the northern line from Homebush to the Hawkesbury River. Later, as Inspecting-Engineer he covered every line in the colony, and during these travels became interested in eucalypts.

In 1891 he became Engineer-in-Chief for railway construction, and under his leadership 500 miles of track were constructed. From 1899 he was responsible for electrifying the Sydney tramways, and building the first generating station at Ultimo (now the Powerhouse Museum).

In 1903 he was chairman of the conference of engineers-in-chief assessing various proposals for a transcontinental railway to link east and west Australia.

After 'retirement' in 1907, at age 60, he entered private practice as a consultant engineer, and designed and directed the building of the Wolgan Valley Railway through some of the wildest terrain in the Blue Mountains to reach the shale-mining centre of Newnes, north of Lithgow.

In 1912, at age 65, he became Engineer-in-Chief and the first employee of the Transcontinental Railway, and took a very active role in its design and construction. In early 1914 he resigned, probably frustrated by bureaucrats and politicians, and retired to his home in Sydney where he collapsed and died, in his beloved garden, in 1924.

Eucalyptus dwyeri

by Bernard Fennessy ©

Eucalyptus dwyeri is a small, rather insignificant looking tree in Section 11 of the Australian National Botanic Gardens. Known as Dwyer's Red Gum or Dwyer's Mallee Gum, it occurs in the field as a small tree up to six metres high or in a mallee form.

It grows usually on small stony ridges in well-drained sandy soils. It is widespread west of the Divide in central New South Wales, and occurs mostly from the Narrabri area southwards to Beechworth in north-east Victoria. There is an outlier of the species west of Warwick, Queensland. It seems to be of little value as a timber producer, but is a useful plant for apiarists.

This eucalypt was given the name *dwyeri* in 1925 by botanists Maiden and Blakely, "In honor of the Right Reverend Joseph William Dwyer, Roman Catholic Bishop of Wagga Wagga, New South Wales, who, when parish priest of Temora, collected this species on several occasions, and who has been an acute observer of native plants for many years".

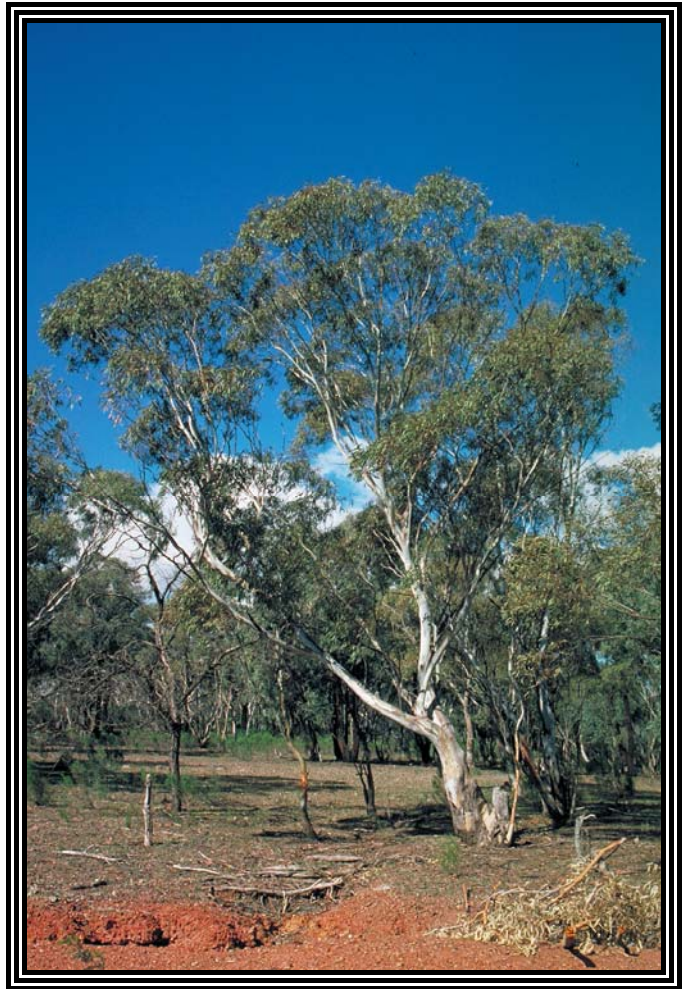
Dwyer had observed and collected plants in an area about 10 to 15 miles on each side of the railway line from Stockinbingal to Wyalong.

He described his findings in a paper "A Floral Survey of the South Western Slopes of N.S.Wales around about Temora and Barmedman", published in *The Australian Naturalist* Vol 4, 1918-21.

Joseph Wilfred Dwyer was born of Irish parents at Maitland, NSW, in 1869. His father, William, was a school teacher and inspector of schools. Joseph attended St Aloysius College, Sydney, and St Patrick's College, Goulburn. He studied for the priesthood in Dublin and in Rome where he was ordained a priest in 1894.

He was appointed to St Patrick's College, Goulburn, and then worked at Gundagai and Wagga Wagga. For a time he was diocesan inspector of schools. He also worked at Albury and Yass, and was appointed parish priest at Temora in 1912. When Wagga Wagga diocese was split off from Goulburn diocese Dwyer became its first bishop in 1918. (His brother Patrick Vincent, who was 11 years older, also became a priest and was appointed bishop in the diocese of Maitland, becoming the first Australian-born member of the Catholic hierarchy).

During Joseph Wilfred Dwyer's period in Goulburn he became interested in Australia's flora. He was a member of the Linnean Society of New South Wales from 1920 until his death in 1939. Some pressed specimens from his collection of plants are held in the herbarium at the Australian National Botanic Gardens. The library at the Gardens holds Bishop Dwyer's set of the seven volumes of the *Flora Australiensis* 1863-1878 produced by George Bentham (1800-1884) assisted by Baron Ferdinand von Mueller, Government Botanist, Melbourne.



Eucalyptus dwyeri
Brooker & Kleinig © Australian National Botanic Gardens

Eucalyptus *luehmanniana*

by Bernard Fennessy ©

Eucalyptus luehmanniana has a mallee habit of growth with a large rootstock and usually several stems. It has yellow twigs, giving rise to its common name, Yellow-topped Mallee Ash. The leaves are thick and leathery. The flowers are white to cream, each about two centimetres across, and are so profuse that the branches are weighed down when it is in flower. The fruits are hemi-spherical and ribbed, and are depicted on the 'old' five dollar note accompanying the portrait of Joseph Banks, along with several other native plant species.

In the Australian National Botanic Gardens there is a good specimen in Section 34a on the edge of the road leading past the old Nursery, just uphill from the toilet block.

This mallee species is endemic to New South Wales. It has a very restricted distribution on sandstone ridges in coastal scrub around Sydney, within 25 kilometres of the sea, and in a small population near Nowra.



Eucalyptus luehmanniana
R. Hotchkiss © Australian National Botanic Gardens

Because of the restricted distribution of *E. luehmanniana* it is on the List of Australian Rare or Threatened Australian Plants (ROTAP).

E. luehmanniana was named in 1878 by Ferdinand von Mueller, Government Botanist of Victoria, to honour Johann Georg Luehmann who was his loyal assistant for 30 years. Luehmann was born at Buxtehude near Hamburg, Germany, in 1843 and died in Melbourne in 1904. He was a modest, self-effacing person who published nothing during von Mueller's lifetime, but he was a botanist in his own right, and after the latter's death began the publication of *Reliquae Muellerianae*, about specimens which had been collected by von Mueller. He also prepared a key to Victorian eucalypts. After von Mueller's death in 1896 he followed him as Victorian Government Botanist and as Curator of the Melbourne Herbarium.

Other species commemorating Luehmann are *Eugenia luehmannii* (= *Syzygium luehmannii*), *Casuarina luehmannii* and *Pultenaea luehmannii*.

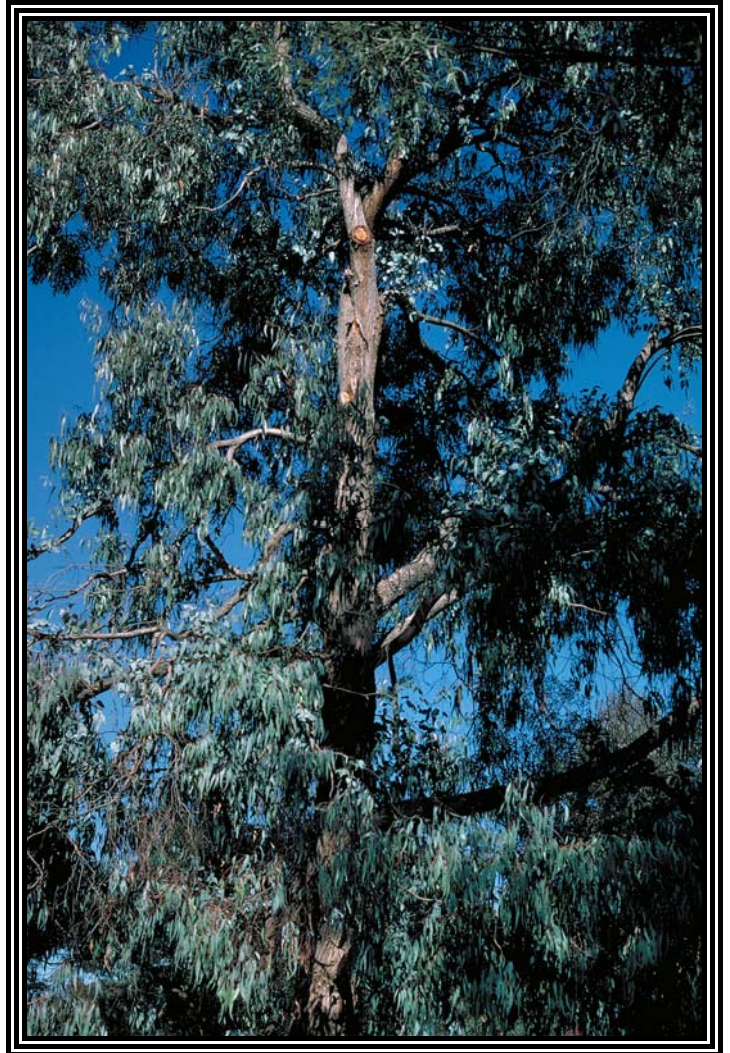
Eucalyptus nova-anglica

by Bernard Fennessy ©

Eucalyptus nova-anglica in the Australian National Botanic Gardens is in Section 4, downhill from the sundial in the Rock Garden. There are two large specimens. This species, New England Peppermint, is also called Black Peppermint. It has a finely fibrous bark.

Its natural distribution is in the New England tablelands of New South Wales (hence the specific name of *nova-anglica*), extending into the adjacent high country of south-eastern Queensland. Its altitudinal range is 500 to 1500 metres, mainly above 750 metres. The climate is cool to cold, with frequent frosts and snow in winter, and a rainfall of about 1000mm. In colder sites it grows with the Snow Gum (*E. pauciflora* subspecies *pauciflora*), Black Sally (*E. stellulata*) and Candlebark (*E. rubida*), but on drier and slightly warmer sites it occurs with New England Blackbutt (*E. andrewsii* subspecies *andrewsii*) and various stringybarks.

In the past few decades the growth of *E. nova-anglica* on the New England tablelands has been adversely affected by 'rural decline' associated with heavy grazing by insects, particularly beetles such as chrysomelids and scarabs.



Eucalyptus nova-anglica
D. Greig © Australian National Botanic Gardens

E. nova-anglica was named by Henry Deane and Joseph Maiden.

Henry Deane (1847-1924), engineer and scientist, was born in London and educated as an engineer in Ireland. Soon after graduation he worked on the construction of Hungarian railways. He came to Sydney in 1880 and became a railway surveyor and worked on the construction of the railway from Homebush to Hawkesbury River. Later he worked as a consultant engineer in private practice for the Commonwealth Oil Corporation Ltd, and constructed a railway to a shale-oil mine in the Newnes district. In 1908 he was appointed consulting engineer for the survey of the transcontinental railway between Port Augusta and Kalgoorlie, and in 1912 he became engineer-in-chief for the construction branch of the new Commonwealth Railways.

Deane was also an accomplished botanist and worked on the Tertiary fossil flora of eastern Australia. He published many papers, often with J. H. Maiden, on botany and palaeontology and made a special study of Australian timbers. *E. deanei*, which occurs in the Blue Mountains, is named after him.

Joseph Henry Maiden (1859-1925), botanist and public servant, was born in London, completing a science degree at the University of London. He came to Sydney in 1880 and became curator of the

Eucalyptus nova-anglica (continued)

new Technological Museum there. He became an expert in economic botany and encouraged research into the properties of Australian timbers and essential oils. In the late 1880s he published *The Useful Native Plants of Australia* and *Wattles and Wattle-barks*. He became superintendent of technical education in 1894 and in 1896 director of the Botanic Gardens, Sydney, and Government Botanist. One of his major achievements was the promotion of the National Herbarium of New South Wales, opened in 1901. In 1902 he visited Europe and returned with nearly 600 botanical specimens collected by Joseph Banks in 1770 and hitherto stored in the British Museum.

Maiden's major works were *A Critical Revision of the Genus Eucalyptus*, appearing in over 70 parts from 1903, in which he recognised 366 species, and his *Forest Flora of New South Wales* in 77 parts from 1904. He published a life of Joseph Banks in 1909, and helped to found Wattle Day.

In March 2004 a grove of *E. nova-anglica* near Armidale on the New England tablelands was incorporated into a memorial to poet Judith Wright by a local community group. She was born there in 1915. Her words "Country that built my heart" are carved on one of the trees in the memorial. She wrote evocatively of the New England area in her poem *South of my days*:

"part of my blood's country,
rises that tableland, high delicate outline
of bony slopes wincing under the winter
Low trees blue-leaved and olive, outcropping granite
Clean, lean, hungry country".

Eucalyptus

obliqua

by Bernard Fennessy ©

One of the most important hardwoods of Australia is Messmate Stringybark, *Eucalyptus obliqua*. It is used in construction, joinery, flooring, furniture and pulp production. It occurs in Queensland, New South Wales, Victoria, South Australia and Tasmania, often on hilly sites in moist cool climates. Its name 'messmate' may have resulted from the fact that it is associated, or mess-mates, with other stringybarks and fibrous-barked eucalypts.



Eucalyptus obliqua
D. Greig © Australian National Botanic Gardens

It is a large tree, up to 90 metres. It has fibrous stringy bark extending up the trunk and along the small branches. The bases of the large glossy adult leaves are markedly asymmetrical because the leaf edges join either side of the leaf stem at different levels i.e. obliquely. (This also occurs in eucalypts known as 'ashes'). Hence the specific name *obliqua*. In the Australian National Botanic Gardens there are two specimens, about five metres apart, in Section 195, downhill from the Sydney Basin flora.

This species was the first to be given the name *Eucalyptus*. The French botanist L'Héretier coined the name of the genus in 1788 from two Greek words: 'eu', well, and 'kalyptos', covered. This refers to the cap or lid (operculum) that covers the stamens in the bud.

L'Héretier had noticed the presence of this cap in all the eucalypt material collected during Captain Cook's visit to Australia.

The first eucalypt specimens were probably collected by Joseph Banks and Daniel Solander at Botany Bay. The specimen given the name *Eucalyptus obliqua* was collected during Captain Cook's third expedition to the Pacific in 1777. William Anderson, a surgeon and botanist, and David Nelson, a young gardener from Kew, sent by Banks as a collector, landed at Adventure Bay, Bruny Island, off the south-east coast of Tasmania. They were from the *Adventure*, the second ship in Cook's expedition, under the command of the Royal Navy Captain, Furneaux. Anderson died on the voyage, but Nelson arrived home safely with material for the Banks collection. The type specimen of *Eucalyptus obliqua* in the British Museum was collected by Nelson and Anderson on 26 January 1777 at Adventure Bay.

The published description by L'Héretier was accompanied by a scientific illustration—the first known drawing of a eucalypt—by Pierre Joseph Redouté, later famous for painting roses.

Charles Louis L'Héretier de Brutelle (1746-1800) was a botanist and magistrate in France. He and Redouté visited London and examined the Banks collection, and L'Héretier published descriptions of 13 new genera in the collection, including *Eucalyptus*. He returned eventually to work in France but was murdered mysteriously in the street at night by a blow from a sabre.

Eucalyptus regnans

by Bernard Fennessy ©

A specimen of Mountain Ash (*Eucalyptus regnans*) can be seen in Section 158 of the Australian National Botanic Gardens. This is in the Rainforest part of the Gardens.

The species was named in 1870 by Ferdinand von Mueller, the Government Botanist of Victoria. The 'regnans' part of the name, meaning 'reigning', refers to the spectacular height of the species. The Guinness Book of Records (1977) stated that, based on official and authentic records, the Mountain Ash at Thorpdale South in Gippsland, Victoria, was the tallest tree in the world. It was measured by a qualified surveyor and was 375 feet (14 metres) high. Probably because of the activities of timber millers there are no modern day giants of this size. In Melbourne's water supply catchment area there are some fine stands of Mountain Ash, some nearly 90 metres in height.

This species is the tallest hardwood (flowering plant) in the world. The record for the tallest tree in the world is now held in the USA by a softwood, the California Redwood (*Sequoia sempervirens*)

The main distribution of *E. regnans* is in the hills and mountains east and south-east of Melbourne, in the Otway Ranges south-west of Melbourne, and in the north-eastern and southern regions of Tasmania. Its altitude range is from sea-level (in Tasmania) to about 1100 m.

Mature growth forests of this species, possibly two hundred or more years old, are really awe-inspiring. The crowns, which do not touch each other, are supported by smooth, cream, grey or greenish trunks, the lower parts of which shed long ribbons of dead bark.

A lower storey in the forest includes Silver Wattle (*Acacia dealbata*), Blackwood (*A. melanoxylon*), Hazel Pomaderris (*Pomaderris aspera*) and Blanket-leaf (*Bedfordia arborescens*) providing a good habitat for lyrebirds.

Because *E. regnans* is very susceptible to fire and has no capacity to recover by growth from epicormic buds as do many other eucalypt species, the problem of managing it for regeneration has been difficult, particularly as little was known about its ecology. In 1949 Professor John Turner, head of the Melbourne University Botany School, initiated a long-term investigation by David Ashton who established regeneration blocks, sowed Mountain Ash seed in the mature forest, in



Eucalyptus regnans
Ian Brooker and David Kleinig ©
Australian National Botanic Gardens

Eucalyptus regnans (continued)

cleared areas and under bracken fern. He studied how fast *E. regnans* grows, how deep its roots are at various stages, how often it flowers, how viable the seeds are, and what happens to them. He found that many seeds are carried off by ants. Also, wallabies and wombats eat seedlings. He found that seed is released but not destroyed in a crown fire, and is produced in such vast amounts that some escape predation by ants. Fire makes the ash bed suitable for seed germination. Hence, oddly, Mountain Ash forest needs a catastrophic event - a fire - to ensure regrowth of the forest.

Ashton's PhD thesis "Studies in the Autecology of *Eucalyptus regnans* F.v.M." was published in 1956. He was awarded a D.Sc. in 2002 by the University of Melbourne for his work and continued his interest in this species until his death in November 2005. In 2002 he had published a review of the botanical changes that had occurred in his main study area over nearly 50 years. Such long-term studies are very rare; they provide a sound basis for long-term management for conservation. During his long academic career at Melbourne University, David Ashton inspired many students - future ecologists - as he involved them in many study projects with his *Eucalyptus regnans*.



Eucalyptus

rossii

by Bernard Fennessy ©

A distinctive eucalypt in the Australian National Botanic Gardens is scribbly or scribble gum, which has characteristic graffiti-like marks caused by moth larvae on the smooth white bark.

This gum is *Eucalyptus rossii*. It is one of several scribbly gums but is the only one with a major inland distribution.



Eucalyptus rossii

G. Manley © Australian National Botanic Gardens

It occurs in New South Wales on the western slopes of the Great Dividing Range and on parts of the adjacent tablelands from near the Queensland border (Tenterfield) almost to Victoria (Cooma). It's mainly a species of low ridges in foothills of mountainous areas, such as on the slopes of Black Mountain in Canberra.

In 1902 *E. rossii* was given its botanical name by Richard T. Baker and Henry G. Smith of the Technological Museum, Sydney, who did taxonomic and chemical studies on *Eucalyptus*. With the name they wanted to honour William John Clunies Ross who "has rendered material help in procuring specimens for this research, and who has given considerable attention to the Bathurst flora".

Clunies Ross was born in London in 1850. In 1827, his father Robert (a sea captain) and his uncle, John, established a settlement on the Cocos-Keeling Islands, with John becoming the first 'King of Cocos', a tiny Malay kingdom.

In 1864 William visited Australia in one of his father's ships. Later he studied science in London, and became a Fellow of the Geological Society. He migrated to Australia about 1884, and the next year went to Bathurst, NSW, and started the Technical School there. In 1904 he became lecturer-in-charge of chemistry and metallurgy at Sydney Technical College. He published scientific articles based on his field observations in the Bathurst area.

William's youngest son, Ian (later Sir Ian Clunies Ross) became Professor of Veterinary Science at Sydney University. In 1949 he was appointed first Chairman of the CSIRO. When the Australian fifty-dollar note was issued in 1972, it bore his portrait. The name of Clunies Ross (Sir Ian's) is closely linked to the ANBG, which fronts onto Clunies Ross Street in Acton, ACT.

Sir Ian's mother has an *Acacia* named after her — *A. clunies-rossiae*. An interesting inter-relationship of names!

Eucalyptus viminalis

by Bernard Fennessy ©

In the Australian National Botanic Gardens, there are 23 trees labelled *Eucalyptus viminalis*, Manna Gum or Ribbon Gum. Most of these are growing along the edges of the Rainforest Gully. They are handsome, tall, white-barked trees with bark hanging from the branches in long ribbons.

Until about two years ago the trees labelled *E. viminalis* included one which looked decidedly different from the others. It is in Section 5, just downhill from the Rock Garden. This specimen has a relatively short trunk and is covered with a rough bark extending to the branches.

Recently this tree has been carefully examined by Andrew Lyne, botanist at the ANBG Herbarium, which is now part of the consolidated Australian National Herbarium. He decided that this specimen is actually another species, *Eucalyptus pryoriana*, and that is the label which it now has.



Eucalyptus viminalis
Brooker & Kleinig © Australian National Botanic Gardens

It is the only well-developed specimen of this species in the Gardens (Reg. No. 51484).

E. viminalis had previously been considered by botanists to include a diversity of forms including the variety *racemosa* occurring in southern coastal Victoria in open dry sclerophyll forest. It is the form of the species said to be most relished by koalas. In 1962 this variety was raised to species rank as *E. pryoriana*, Gippsland Manna Gum, by L. A. S. Johnson, a botanist at the National Herbarium of NSW, Sydney, in honour of Professor L. D. Pryor, "who has contributed so much to the understanding of *Eucalyptus* and who has drawn attention to the distinctions of this species in the field".

It is fitting that the ANBG should include a species which honours the name of Pryor since he, from a practical viewpoint, was the founder of the Gardens and its associated Herbarium.

Lindsay Pryor, born 26 October 1915 in South Australia, was a forester who became Director, Parks and Gardens, Canberra, from 1944 to 1958. He was foundation Professor of Botany at the Australian National University, 1958-1976.

When he was appointed Director, Parks and Gardens in the Australian Capital Territory in 1944, the Botanic Gardens did not exist. The Dickson Report of 1935 recommending the establishment of a Botanic Gardens had not been implemented, mainly because of the Second World War. Pryor carefully considered the Dickson Report, and early in 1945 initiated the collection of specimens for a herbarium which had been implicit in that Report. In September 1945, a few weeks after the

end of the war, Pryor recommended that a start be made immediately on the proposed Botanic Gardens. His proposal was approved by the Consultative Committee for Parks and Gardens.

The Gardens were slow in getting under way, but there is evidence that accumulation of material for plantings commenced long before the formal planting in September 1949 of two trees by Prime Minister Ben Chifley and Sir Edward Salisbury, Director of the Royal Botanic Gardens, Kew. For example, in Section 27, there is a specimen of *Eucalyptus amplifolia* with a registration number of 45200 indicating that it came into the collection in 1945.

Professor Pryor had a special relationship with the Friends of the Gardens. He formally launched the Friends in 1990 and was an Honorary Life Member of the Friends.



Grevillea *barklyana*

by Bernard Fennessy ©

Grevillea barklyana subspecies *barklyana* is growing in the Australian National Botanic Gardens at the steps leading down into the Victorian section of the Rainforest Gully (Section 125). It is a medium-size to tall shrub with the common name of Gully Grevillea or Large-leaf Grevillea.



Grevillea barklyana
L. Vallee © Australian National Botanic Gardens

There are another four specimens in Section 221 at the top right-hand side of the steps leading down on the north side of the Visitor Centre.

This species, which occurs naturally in moist mountain gullies that are tributaries of the Bunyip River in West Gippsland, has deeply toothed leaves 10-30 centimetres long by 2.5-11.5 centimetres wide. The racemes of the pale pink flowers look like toothbrushes.

Populations of this species are small and may be threatened by changes in land-use, hence its conservation status is rated as vulnerable.

It was named by Baron von Mueller in honour of Sir Henry Barkly (1815-1898). An Englishman, he was appointed Governor of Victoria (1856-1863), and had the highest governor's salary in the Empire because the Colonial Office considered the post particularly difficult!

He became patron and one of the more active members of the Philosophical Institute of Victoria in the late 1850s. It was a private institution devoted to scientific studies. It had no authority in government affairs, and yet it was a kind of club within the Government—it was part of the Establishment! It organised the ill-fated Burke and Wills expedition across Australia from Melbourne to the Gulf of Carpentaria, and Sir Henry Barkly became familiar with the details of the expedition with which von Mueller also had a close association.

In Victoria he helped to found the National Gallery, the Acclimatization Society and the National Observatory. In 1863 he was moved to Mauritius, in 1870 to the Cape of Good Hope and later he became British High Commissioner to South Africa. He was elected a Fellow of the Royal Society in 1864 and of the Royal Geographical Society in 1870. In retirement he devoted himself to scientific pursuits and to committee work for the London Library.

Grevillea *beadleana*

by Bernard Fennessy ©

In the Australian National Botanic Gardens one of the many showy Proteaceae is *Grevillea beadleana*, which flowers in spring. There is a particularly good specimen in Section 25. The flowers are purplish-red, almost black, and in a toothbrush formation. The softly textured leaves are much divided.



The species occurs in only two localities which are both on the Northern Tablelands of New South Wales.

Grevillea beadleana
© M. Fagg, Australian National Botanic Gardens

One is in Guy Fawkes River National Park, north of Ebor. The other is at Binghi, 115 kilometres to the north-west, separated from the Guy Fawkes locality by the Guy Fawkes River gorge system and the high altitude section of the New England Tableland between Glen Innes and Tenterfield. It was first collected in 1887 near Walcha but has not been rediscovered there in recent years.

The species is considered to be endangered and seriously at risk of becoming extinct over the next few decades. There are less than 1000 individual plants in conservation reserves.

G. beadleana was named in 1986 by D. J. McGillivray to honour Noel Charles William Beadle, Professor of Botany at the University of New England, Armidale, NSW, from 1955 to 1979, who had a long association with Australian botany, and pioneered much botanical work in the New England district.

In 1939 Beadle was commissioned by the NSW Soil Conservation Service to make a survey of soil erosion in the Western Division of NSW. For six years he worked from a base at Condobolin. He had no assistant, and had to use his own car, a 1937 Chevrolet.

He produced a DSc thesis, published as *The Vegetation and Pastures of Western New South Wales, with Special Reference to Soil Erosion*. It contains, apart from detailed descriptions of soil erosion types and vegetation formations, a large map of the vegetation of the Western Division, a region previously only little known to botanists.

He became a dedicated and inspiring teacher of botany, particularly in relation to the arid zone in Australia. He was joint author of the *Handbook of the Vascular Plants of the Sydney District* and of the *Flora of the Sydney Region*. He produced a series, *Student's Flora of North-Eastern New South Wales, Parts 1-6, 1971-87*. His book, *The Vegetation of Australia*, published by Cambridge University Press in 1981, is comprehensive and authoritative. In retirement he wrote a very readable, interesting and amusing story of his life, edited by Gordon J. White, *Botany in the Backblocks from 1939*.

Professor Beadle died in the spring of 1998 at the age of 84.

Grevillea

willisii

by Bernard Fennessy ©

Grevillea willisii is in Section 27 of the Australian National Botanic Gardens, close to the Main Path, about three metres downhill from the sign: 'Family Proteaceae. Banksias, waratahs and grevilleas'. It is a sprawling shrub, about 2.5 metres by 3 metres across, with divided grey leaves. The cream to pale yellow flowers in toothbrush-like racemes occur profusely in spring and attract large numbers of honeyeaters of several species.



Grevillea willisii subsp. willisii
© M. Fagg, Australian National Botanic Gardens

G. willisii, a rare species, occurs in north-eastern Victoria in the Upper Murray River system. It is named in honour of Dr James H. Willis (1910-1995), who had a long and distinguished career at the National Herbarium of Victoria. He was Assistant Government Botanist when he retired in 1972. For his research and publications (more than 800) he received the Research Medal of the Royal Society of Victoria, the Australian Natural History Medallion, and a Doctorate of Science from the University of Melbourne. He was an Honorary Life Member of the Friends of the Royal Botanic Gardens, Melbourne. He was made a Member of the Order of Australia in 1998.

Jim Willis, as he was universally known, was born in Oakleigh, Victoria. He spent his early childhood in north-west Tasmania, then moved to Melbourne for high school education, and to Creswick, Victoria, for a forestry course. He was a forestry officer until 1937 when he began his 34-year career as a taxonomic botanist with the National Herbarium of Victoria. While there he studied part-time at the University of Melbourne for a science degree. During 1958-59 he was Australian Botanical Liaison Officer at Kew Herbarium, England.

He developed a very detailed knowledge of the flora of Victoria, and this culminated in 1962 and 1973 in the publication of his two-volume *A Handbook of Plants in Victoria*. The previous *Flora of Victoria*, by Professor A. J. Ewart had been published in 1931.

He had many and wide interests in natural history. He produced a book *Victorian Toadstools and Mushrooms*. In 1982 he produced the 5th (revised) edition of *Shrubs and Trees for Australian Gardens* by the late E. E. Lord. For the ten volumes of *The Australian Encyclopaedia* he wrote 452 separate entries, chiefly botanical. His meticulously compiled files on botanists, collectors, explorers, collecting localities and the handwriting of collectors and botanists are a valuable resource for taxonomists. His own handwriting was exquisitely neat.

../Continued

Eight plant species with the species epithets *willisii*, *willisiana* and *jamesiana* have been named in his honour. In his taxonomic role he described 42 new plant species himself, and a further 22 species with co-authors.

The prodigious energy of Jim Willis and the breadth of his scientific work were truly remarkable, but his admirable personal qualities and his assistance to voluntary natural history organisations really distinguished him. Because of his phenomenal memory and capacity for meticulously compiled biographical, historical and floristic data he had a vast storehouse of knowledge which he cheerfully made available to professionals and amateurs alike. He was unstinting in giving his time and knowledge to those seeking help. Only a few weeks before his death in 1995 he had delivered the opening address to the National Conference of the Society for Growing Australian Plants. He was one of the great men of Australian botanical and natural history science.



Grevillea wilsonii

by Bernard Fennessy ©

In the Australian National Botanic Gardens there is a planting of *Grevillea wilsonii* in Section 27 at marker No 37 on the Main Path. It is growing under a spreading Cabbage Gum *Eucalyptus amplifolia*, which is downhill from the Main Path opposite a long, spreading specimen of *Grevillea* 'Poorinda Peter'. A garden seat is nearby.

G. wilsonii is a small, low spreading shrub with prickly, bipinnately lobed leaves.

In spring it has a brilliant floral display of erect clusters of red flowers. Its natural distribution is in the south-west of Western Australia. It occurs in the Darling Ranges where it grows in sandy gravelly soils.

This species was named by Allan Cunningham, botanist-explorer, to honour his friend and fellow explorer Dr Thomas Braidwood Wilson (1792 - 1843). The latter was born in Braidwood, Lanarkshire, in Scotland. He became a surgeon in the navy in 1815 and later served as surgeon-superintendent on several convict transports bound for New South Wales and Van Diemen's Land. He made nine voyages in this role.



Grevillea wilsonii
Murray Fagg © Australian National Botanic Gardens

He had great success in preserving the lives of convicts under his care; he insisted on cleanliness and a daily issue of lime juice and wine. Prior to the appointment of surgeon-superintendents who were given absolute authority and responsibility for the welfare of convicts on the transports, almost half of the convicts who left England on the Second Fleet did not survive the voyage or the first week of their arrival in Sydney Cove, so great were their privations.

In 1829 Wilson commenced exploration work in the southwest of Western Australia, particularly in the region of King George Sound. He named the Denmark River after one of his naval surgical colleagues, Alexander Denmark.

Wilson was a keen botanist and brought seeds and plants, including *Grevillea wilsonii*, to the botanist Allan Cunningham. Wilson is credited with bringing to Hobart Town in 1831 the first hive of bees to survive in Australia. In 1835 he published a narrative of his voyages and included in it a description of *Grevillea wilsonii* by Cunningham.

Wilson was given a grant of land in Tasmania in 1822 but later transferred this to New South Wales. Part of the land granted to him there was called Braidwood and became the site for a township.

Wilson brought his wife, daughter and son to New South Wales in 1836, on his eighth voyage to Australia. They settled at Braidwood and Wilson became noted for the management of his farm and for his efficiency as a magistrate. He took a leading role in the affairs of the district. His wife died in 1838. During the depression of the early 1840's his health declined. He became bankrupt in 1843 and died that year; he is buried on a hilltop overlooking the town of Braidwood.

Helmholtzia glaberrima

by Bernard Fennessy ©

In the rainforest at the Australian National Botanic Gardens, in the section labelled McPherson Range Rainforest, the boardwalk along the floor of the gully is edged by numerous 'stream lilies'. These are not lilies but *Helmholtzia glaberrima*, a rhizomatous perennial with tough linear leaves up to two metres long and seven centimetres wide. It has a tall (one to two metre) flower spike with a plume-like head of small white to pale pink flowers in summer. It flourishes in shady, damp positions and occurs in rainforests of Queensland and northern New South Wales.

This genus, in the family Philydraceae (plants of aquatic or damp habitats) is named in honour of Professor Hermann Ludwig Ferdinand von Helmholtz (1821-1894). The name was conferred by his compatriot Ferdinand von Mueller, Government Botanist of Victoria.

Von Helmholtz, one of the greatest scientists of the 19th century, made fundamental contributions to physiology, optics, electrodynamics, mathematics and meteorology.

He is known for his statement of the law of the conservation of energy: the sum total of energy in the universe remains unchanged no matter what events take place; i.e. energy cannot be created or destroyed.

He was born at Potsdam near Berlin, and because of his delicate health was confined to his home for his first seven years. His father was a teacher of philosophy and literature, and his mother was descended from William Penn, the founder of Pennsylvania. Von Helmholtz received a free medical education in Berlin on condition that he serve eight years as an army doctor. His obvious scientific talents led to his release from military duties. He became a teacher in anatomy at the Academy of Arts in Berlin and was appointed Professor of Physiology and Anatomy at Koenigsberg in East Prussia.

In 1842 von Helmholtz first demonstrated that nerve fibres rose from ganglion cells. In 1850 he was the first to measure the speed of electrical transmission of the nerve impulse. In the same year he invented the ophthalmoscope, an instrument for viewing the interior of the eye or examining the retina. In 1867 he published *Handbook of Physiological Optics*.

He was a founder of the scientific study of music and in 1856 first demonstrated that tone, colour and the concept of music are related to the ordered mathematical arrangements of harmonies in scales and chords. In 1863 he published *On the Sensations of Tone as a Physiological Basis for the Theory of Music*. Thus the genus *Helmholtzia* commemorates someone of many talents.



Helmholtzia glaberrima

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Marsilea drummondii

by Bernard Fennessy ©

At the Australian National Botanic Gardens, in the pool at the lower end of the Rock Garden, there are thickly clustered plants which look like four-leafed clovers. These are unusual ferns, *Marsilea drummondii*, Common Nardoo.

The genus name *Marsilea* was given in 1753 by Carl Linnaeus (1707-1778), the Swedish botanist and physician who developed the uniform system of having two names (one for genus and one for species) for naming plants and animals. With the name *Marsilea* he honoured Luigi Ferdinando Marsigli (1656-1730), an Italian botanist. *Marsilea* is a genus of more than 60 species widely distributed in the world. The seven species occurring in Australia usually grow in permanent water, swamp or areas subject to intermittent flooding.

The name of the species *drummondii* was conferred by Alexander Carl Heinrich Braun (1805-1877), a German professor of botany.



Marsilea drummondii

© M. Fagg, Australian National Botanic Gardens

James Drummond (1784-1863), a botanist and plant collector, was born in Scotland but came to Australia and settled in the Swan River colony in 1829. Part of his income was derived from the sale of botanic specimens. He named several Western Australian plants and 119 more were named after him. He was the first Government Botanist in Western Australia.

Plants of *Marsilea drummondii* vary in size and texture depending on whether they grow submerged, with floating leaflets, or on land, in mud or damp soil. In water forms the leaves may be smooth; under drier conditions they may be covered with hairs. They are perennial plants spreading through rhizomes. The spores are borne in sporocarps, each being a separate, almost nut-like and bean-shaped structure on a long stalk attached near the base of a leaf stem. Common Nardoo occurs in all States except Tasmania and is most abundant in the drier inland areas. Aborigines living in the inland areas used the ground-up sporocarps for food.

Nardoo is associated in Australian history with the names of the explorers Burke and Wills who died at their depot on Cooper's Creek in 1861, on the final stage of their epic 1650-mile crossing of the Australian continent from Melbourne to the Gulf of Carpentaria and return. Their deaths are usually ascribed to exhaustion and starvation, but in 1994 two Sydney scientists, John W. Earl and Barry McLeary, in a paper in *Nature* said that, "It is now clear that the explorers suffered from beriberi, a disease caused by dietary deficiency of thiamine (Vitamin B1). They developed the disease while consuming food [Nardoo] containing large amounts of thiaminase I, an enzyme that breaks down thiamine. Wills's diary, recovered from their final camp at Cooper's Creek contains a text-book account of the disease - probably the first and only complete description of thiaminase poisoning in humans."

Short of food, Burke and Wills followed the example of the local Aborigines by collecting the sporocarps of Nardoo and pounding them into a flour which was then made into a cake. But how did the local Aborigines avoid beriberi? They, when preparing their Nardoo had, unlike Burke and Wills, mixed it with water. This reduced the activity of the enzyme and so the food they prepared did not have low levels of Vitamin B1.

Melia azedarach

var. australasica

by Bernard Fennessy ©

In the Australian National Botanic Gardens, in Section 206, downhill from the lawn next to the Rock Garden, are three White Cedar trees. One of these has a striking coating of lichen.

The White Cedar is one of the few Australian deciduous species - it loses its leaves completely in winter and develops fresh ones in late spring. It inhabits the brush forests of the east coast, extending from the Illawarra district in New South Wales north to the coastal brush forests of Queensland. It also occurs in New Guinea.

It is in the family Meliaceae and the genus *Melia*. This is the classical Greek name for the Ash (*Fraxinus*) which has similar leaves. The name came originally from Greek *meli*, honey, as several ash species have a sweet sap. *Melia azedarach*, known as Bead Tree, China Berry and Persian Lilac, is distributed through much of Asia.



Melia azedarach* var. *australasica
D. Greig © Australian National Botanic Gardens

The specific name *azedarach* is from Persian *azad-darakht* meaning noble tree. The leaves are used medicinally and the fruits are used as beads.

The Australian variety is *Melia azedarach* var. *australasica*. In its natural habitat the tree grows very tall, up to 30 metres with a spread of six metres, but when cultivated it has a shorter and more spreading appearance. The foliage is a bright glossy green. The alternate compound leaves are usually bipinnate with numerous leaflets. Individual leaflets are ovate and prominently toothed on the margins. The flowers are lilac and are chocolate-scented in large sprays in spring. The fruits are yellow, globular berries, 10-15 millimetres. They are poisonous to some livestock, eg sheep and pigs, and to dogs and man. They are very attractive to some parrots.

White Cedar is an extremely adaptable tree that can be grown in most soils and even in low rainfall areas. It has been used as a street tree in areas of Australia with an annual rainfall of 350-440 millimetres; most of these street trees originate from India.

A seat near these White Cedars in the Gardens helps one to appreciate the seasonal changes in their appearance, and particularly the cool shade they provide in summer.

Ogmograptis scribula

by Bernard Fennessy ©

Ogmograptis scribula is the scientific name of the moth whose larva causes the scribble pattern on the bark of the Snow Gum (*Eucalyptus pauciflora*) in the higher parts of the ACT. It is not known if this species of moth causes the scribbles on other species of eucalypts or if there are many other species of closely related moths with similar habits.

E. D. Edwards of the Division of Entomology, CSIRO, has supplied information about the life history of the moth. The moth lays eggs onto the smooth bark of the tree and then the newly hatched larva bores into the bark and commences its characteristic tunnelling which in the later sections has a marked zigzag form. The larva 'mines' within a single layer of the tree, the cambium, and the scribble does not become visible until the bark sloughs off a year or more later.

As the larva grows, so the mine is lengthened and widened. When the larva is somewhat over half-grown it dramatically reverses the direction of its tunnelling. It loops around (the loop can be seen like a large eye of a needle at the far end of the thicker section of the tunnel) and turns back and burrows close to and almost exactly parallel to its former track so that the two tracks appear as one relatively wide track. Sometimes there are slight deviations and the two separate tracks are visible. Nobody knows why the larva reverses its track.

When the larva is fully grown, it bores out of the trunk and spins a small brown cocoon in debris or loose bark around the tree. The length of the lifecycle is unknown—one year is likely. The adult moth is small, about one centimetre across the wings, and is grey with some darker speckling. The hind wings are very narrow with long hair-like scales. The moths from the Snow Gums fly in February and March, but others may fly at other times in other places.

In the ANBG the most obvious Scribbly Gum is *Eucalyptus rossii* which occurs naturally on the slopes of Black Mountain.

Other Scribbly Gums include:

- E. haemastoma* (NSW Central Coast and Tablelands);
- E. fraxinoides* (East side of the Southern Tablelands from Moss Vale to the Victorian border);
- E. dendromorpha* (Blue Mountains; Wollongong to Batemans Bay);
- E. racemosa* (NSW Central Coast);
- E. signata* (Coast from Nambucca Heads to Tin Can Bay, Queensland); and
- E. sclerophylla* (Blue Mountains and near Nowra).

The name *Ogmograptis scribula* means, literally, 'the scribe who produces the wavy writing'.

In Irish mythology Ogma was a god of poetry and eloquence, and was the supposed inventor of ogam writing which was an alphabetical script known as 'ogam' or 'ogham' and used by some Celtic races.

The earliest extant Irish writings are inscriptions on stone monuments in this script. It was a cumbersome system of writing in which letters were shown mainly as a series of short lines set at different angles to a chief line or spine. This chief line was sometimes the edge of the material, usually stone, on which the ogams were incised.

../Continued

Ogmograptis scribula (continued)

This script dates from the 4th century AD and until round about the middle of the 6th century was the only form of written Irish. Of the more than 500 ogam inscriptions known nearly all are accompanied by Latin translations or equivalents.

It is interesting to have Ogma's name perpetuated in the scientific name of a moth which leaves distinctive tracks on some eucalypts in the Australian National Botanic Gardens.

During a guided walk of the Gardens in 1992, I met Noela and Bill Jones of Pymble, NSW who put me in touch with Graham Alcorn of Medlow Bath, NSW. He was head ranger for many years for the nature reserves and walking tracks controlled by the Blue Mountains City Council, and was a member of the Upper Blue Mountains Conservation Society.

He has cheerfully given us permission to publish some verse about the Scribbly Gum Moth, *Ogmograptis scribula*. It was composed during several bush outings by his Society, and Graham wrote it all down. It 'anthropomorphises' some of the puzzling natural history of these fascinating moths.

The Scribbly Gum Moth (*Ogmograptis scribula*)

Ogmograptis scribula,
The bush graffiti artist,
Of the order Lepidoptera,
Family Yponomeutidae,
Long ago has found a way
To avoid the strife
Of graffitists' life,
For it lives in the dark
Under the bark
Of various species of gum tree.

It is easy to see where Ogmo went
Chewing and chomping and scribbling away,
Long after Ogmo's days are spent,
Off to the left for a week or two,
Gulping and gorging as Ogmos do,
Then to the right for a similar time,
Gormandising along the line,
There in the dark
Under the bark
Of various species of gum tree.

Eucalyptus sclerophylla,
Racemosa, rossii,
Haemastoma and *signata*,
Pauciflora, dendromorpha
And *dalrympleana* -
Here come the Ogmos, doing fine
Chewing the left right, right left line,
Delicate calligraphy,
Ogmograptis graffiti,
On all these species of gum tree.

../Continued

Some chew up and some chew down,
This the philosophers might explain,
But the thing that causes me to frown,
The thing that I'd dearly love to learn
Is what makes every Ogmo turn?
Off to the left, then to the right,
Another about turn, very tight,
Chomping a track,
Forward and back,
On various species of gum tree.

Very young Ogmos tend to wander,
Skittish, no doubt, as young folks are,
Filled with the spirit of adventure.
Suddenly they get much fatter.
Adventurings no longer matter.
But what I yearn and yearn to learn
Is how they now know just when to turn
There in the dark
Under the bark
Of various species of gum tree?

At last there comes that glorious day
When this gyrating artistic grub
Turns into a moth and flies away.
No more chewing and scribbling and shoving,
Now is the time for dancing and loving.
Having thus drained life's cup to the dregs,
Before it dies it lays its eggs
Into the dark
Beneath the bark
Of its chosen species of gum tree.

Although the new Ogmos can't be seen,
Next year when the gum tree sheds its bark,
It becomes quite obvious where they've been.
Off to the left for a week or two,
Gulping and gorging as Ogmos do,
Then to the right for a similar time,
Gormandising along the line
There in the dark
Under the bark
Of various species of gum trees.

Poa

fawcettiae

by Bernard Fennessy ©

Smooth-blue Snow Grass *Poa fawcettiae* occurs in the alpine and sub-alpine tracts of the Australian Alps and associated ranges from the Brindabella Range in the ACT to the Baw Baws in Victoria, with an outlier in the Grampians, and eastern mountains of Tasmania. In the Australian National Botanic Gardens there is a specimen in the Rock Garden (Section 15Q).



Poa fawcettiae
C. Totterdell © Australian National Botanic Gardens

Poa fawcettiae is a perennial 20-60cm high and the leaves are bluish-green, glaucous, tightly folded and moderately stiff and sharp-pointed. Its bluish leaves distinguish it from *P. costiniana*. It is an important component of tall alpine herbfields, but also occurs in other communities including drier areas in sod tussock grassland.

Poa fawcettiae is named after Maisie Carr nee Fawcett (1912-1988), a distinguished botanist and ecologist. She was born in Melbourne and attended Melbourne High School (1925-28) where the only science subjects taught to girls were mathematics and physics, until her final year when she did geology. She obtained a secondary teaching scholarship and majored in botany at Melbourne University. She joined the McCoy Society and went on several expeditions - Julia Percy Island, Banks Group and Lake Purrumbete in Victoria's Western District. For her MSc she worked on the coral fungi Clavariaceae. Her PhD studies were later interrupted by an injury leading to hospitalisation and a long convalescence. Because of her medical setback she was advised to do outdoor work rather than microscopy, and she commenced studies on the ecology of the Dandenong Ranges, east of Melbourne.

Following the setting up of the Soil Conservation Board in Victoria, she accepted secondment to the Board as its first field officer, with the task of reporting on the state of the catchment of the Hume Reservoir. She was stationed at Omeo in eastern Victoria. Fire in 1939 had burnt over the high country causing massive soil erosion and threatening siltation of the dams proposed for the Kiewa Hydroelectric Scheme, then under construction. In Omeo she integrated into the life of the district and became interested in the farmers' soil erosion and pasture problems. She came to know the entire Hume Catchment (5374 square miles) very well, travelling over much of it on horseback. She identified signs of incipient erosion on the Bogong High Plains, caused partly by summer cattle grazing, and partly by fires lit by the cattlemen to 'control shrubs'. She was a quiet leader helping to get the cattlemen who ran their cattle on the High Plains in the summer to understand the fragility of the native vegetation and particularly of the moss beds which played an important role in the hydraulics of the catchment.

Poa fawcettiae (continued)

With Professor J.S. Turner of the Botany School, Melbourne University, she started long-term botanical studies of large plots of vegetation protected against cattle grazing, matched with observations in non-enclosed areas. These studies led to a series of published papers on applied ecology.

In 1955 she married Denis Carr, a plant physiologist, and over the next 30 years the pair collaborated in research on eucalypts and particularly in scanning electron microscopy of the microanatomical features of the epidermis in relation to taxonomy. They also became interested in the history of botany in Australia, co-editing two books *People and Plants of Australia* and *Plants and Man in Australia*.

Maisie Carr died in 1988 after being involved in the production of over 70 papers and five books. Because of her detailed involvement with the vegetation of the Bogong High Plains it is appropriate that an important component of the alpine vegetation, *Poa fawcettiae*, is named after her.



Rhododendron lochiaie

by Bernard Fennessy ©

Rhododendron lochiaie in the family Ericaceae is one of two Australian representatives of a genus extremely widespread in the world and well known in horticulture where there are probably thousands of varieties.

In 1852, Ferdinand Mueller, attracted from Adelaide to Victoria by the gold rush, decided to open a chemist's shop there.



Rhododendron lochiaie
K. Thaler © Australian National Botanic Gardens

Coinciding with this was the decision of Governor LaTrobe to appoint a Government Botanist in Victoria. Mueller was selected for the position and became intensively involved in exploration and botanising. He became aware of the absence of *Rhododendron* species in plant collections in Australia despite the large numbers of species in areas just to the north of Australia. This was puzzling in view of the affinities between the flora of these areas and of Australia. Mueller predicted that a native *Rhododendron* would be discovered in mountain areas in tropical Australia.

In 1887, in *Victorian Naturalist* he described, in somewhat florid language, how this *Rhododendron* was ultimately discovered in the area he had predicted:

"When in 1855 the writer of these notes saw (on his passage with Mr Gregory to what is now called the Kimberley-Country) from near the coast also the bold outlines of Mount Bellenden-Ker, the highest mount of tropical Australia, towering 5000 feet, he was led to think, that the upper regions might be the home of *Rhododendron*, *Vaccinium*, *Quercus*, *Begonia* and *Impatiens*, forms of plants characteristic of cool Malaysian sylvan regions, yet these anticipations became not realized. But Messrs Sayer and Davidson, while accomplishing quite recently the only ascent hitherto made of Mount Bellenden-Ker, have now demonstrated by their botanical collections, that really a *Rhododendron* and a plant akin to *Vaccinium* do exist on the summit of that mountain as an entirely new feature in the flora of this part of the globe."

"The dedication of the only Australian *Rhododendron* to Lady Loch, is in special recognition of the patronage, given by her Ladyship to Victorian Horticulture, and in particular to that very group of plants, the occurrence of which in Australian vegetation is now only rendered known, more than 80 years after the discovery of Mt Bellenden-Ker."

This *Rhododendron*, found not far from Cairns, was named by Mueller *R. lochae* after Lady Loch who was the wife of Sir Henry Brougham Loch, who was Governor of Victoria 1884-89. Its official name is now *R. lochiaie*.

../Continued

Rhododendron Lochiae (continued)

The word *Rhododendron* is from the Greek *rhodon*, rose, and *dendron*, tree, in reference to the terminal bunches, in this genus, of often red-coloured flowers, literally 'rose-tree'.

R. lochiae is an evergreen shrub growing to a height of 0.8 metres with a spread of one metre. The leaves are dark green and thick. There are only about six flowers in each head, and each flower hangs like a bell. The trumpet-like flower has a brilliant red waxy appearance and is about five centimetres across the mouth and seven centimetres long.

The detail of *R. lochiae* is shown in a beautiful illustration on the front cover of the book *Australia: 300 Years of Botanical Illustration*, by Helen Hewson, (CSIRO Publishing, 1999). The illustration is from an original watercolour painting, by Australian artist Margaret Stones in 1973, from the Ian Potter Museum of Art, the University of Melbourne.

In the Australian National Botanic Gardens about 40 *Rhododendron* were planted a few years ago. A minority of these are *R. lochiae*. The others are New Guinea species or hybrids between them and *R. lochiae*. Canberra's climate is generally too cold for them but the plantings have been in well-sheltered sites, eg in the Queensland section of the Rainforest Gully. Some of these have flowered in spring and summer, providing a promise of a spectacle in future years.

The other Australian species of *Rhododendron*, *R. notiale*, was recognised in 1996. It occurs in the Bellenden Ker Range near, but south of, *R. lochiae* which it resembles. Hence the specific epithet *notiale* from Latin, *notialis*, southern.