

Australian Plants

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Australian Flora For Horticulture

There is little doubt that much of the Australian flora contains many spectacular plants ideal for horticulture — if only we knew how to grow them reliably — if competent horticulturalists decided to apply themselves to selection and development — if much needed basic research was undertaken. But! We have arrived at the start of a new era, the era where scientists, horticulturalists and John Citizen are all working together on these problems.

The scientists want to proceed, the horticultural industry is hopefully ready to air its problems, but what about John Citizen. Will he acclaim the new era but leave it to Jane or Fred Someone-Else. This is the best chance you will ever get, John, to contribute to the conservation of our unique flora, to participate in an exciting era of discovery and of beautiful surroundings.

The Australian Flora Foundation

The issues of 1986 will be full of news and activities of this "doing", scientifically based, but practical organisation. For a start, a donation of \$25 (with full taxation deductibility) to the research fund will be a crucial contribution at this time. You can be assured that all the \$25 will go to a carefully selected research project and none will be "wasted" in administration. Yes John, if you as well as Jane and Fred and all our readers sent \$25, the results would be impressive.

The Dwarf Flowering Eucalyptus

A research programme to develop easily grown, spectacularly flowered, dwarf *Eucalyptus* is one Australian Flora Foundation project being initiated. See page 265 for details.

The Flowering Wax (Geraldton is one) Plants

Who bothered to try and help the request in our last issue?

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COVER PLATE

Lambertia formosa

Photography by Lois Sourry

The Honey Flower is often called 'Mountain Devil' because of the unusual shape of the seed capsule like a devil's head. This has the potential to be a huge success as a cut flower, see page 263.

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Lambertia

by Alec Blombery

There are nine species in the genus *Lambertia*, eight of which are confined to south-west Western Australia, with the remaining species, *Lambertia formosa*, occurring only on the east coast of Australia. The genus was named *Lambertia* by the English botanist, James Edward Smith (later Sir James) in 1798 after Almer Lambert, a horticulturalist and botanical writer of that period.

The plants in the genus consist of shrubs with spiny, entire or toothed leaves which usually occur in groups or whorls of three, rarely four, but may sometimes be scattered along the stems. The flowers are tubular with four rolled-back perianth lobes; there are usually groups of seven flowers, although one species, *Lambertia uniflora*, has single flowers. The groups of flowers are surrounded by coloured, overlapping bracts which may be short to longer than the flowers. The woody quaint fruit is beaked, two-horned and contains two round, flattened, brownish-black seeds, which are released when ripe.

Lambertia formosa

Honey Flower or Mountain Devil

This bushy shrub is one of the most attractive of the whole genus and flowers over an extended period. Growing from 2 to 3 metres high, this shrub has a number of stems arising from a ligno tuber at ground level and readily regenerates after bushfires. The stiff, linear to cuneate leaves are dark green, shiny above and greyish beneath, 2 to 5 cm in length and terminate in a stiff, sharp point. The attractive, red, tubular flowers, which are rich in nectar, are 3 to 5 cm in length, have four distinctly, rolled-back lobes and grow in groups of seven at the ends of the branchlets. The groups of flowers are surrounded by overlapping, red-coloured bracts with greenish-yellow tips, the inner ones of which are longer than the flowers. The quaint woody, head-like fruits are distinctly beaked and have two erect horns; the outer surface of the fruit may be smooth to rough; when ripe the fruits split and release two seeds.

This attractive shrub occurs on the coast of New South Wales north and south of Sydney and extends to the elevated areas of the Blue Mountains, west of Sydney. *Lambertia formosa* grows in well drained soils, chiefly derived from sandstone; it also grows in lateritic-type soils. The beautiful flowers of this shrub are at their best in sunny locations on the higher areas of the Blue Mountains, where the higher rainfall gives a greater array of flowers and intensity in colour; the fruits are also often larger and rougher.

Seeds of this plant germinate readily but growth is slow; propagation may also be carried out from hardened new growth but several months are required before roots develop.

The slow growth of this plant has no doubt acted against the cultivation of *Lambertia formosa*, as periods of five to 10 years or more may be required to reach flowering stage. A deep well drained soil in a sunny, protected position is necessary for satisfactory results. The use of a fertilizer such as blood and bone with free watering and a fungicide such as Terrazole at three to six monthly intervals will induce more rapid growth, but treatment must be maintained. ■



Macadamia tetraphylla

Photography by A. N. Rodd

The Queensland Nut, the Bush Nut or more generally known now as the *Macadamia* Nut. The commercial nut sold as Macadamia Nut has been developed from this plant. It is readily grown in the garden, producing long racemes of flowers as shown above. *Macadamia tetraphylla* belongs to the family Proteaceae and is found in rainforests on the north NSW coast on the Richmond River and north to Queensland. Hence it is included in the key to the Proteaceae of this area on page 243.



Conospermum taxifolium

A small erect shrub, also found on the northern tablelands and coast of NSW. This photograph is included for two reasons. It does not look well in a photograph so it is probable that it would not normally be presented — but why should we show only the showy photogenic flowers. In this case it rounds off our story on Proteaceae of the N.E. of NSW. However, sketches on page 247 give flower details and this stirs interest. Examine it closely next time you come across a *Conospermum* in the bush. Maybe the real reason is that I like *Conospermum*. White flowered character plants are valuable garden plants. Who has a few plants for me? — Editor.

Australia's Proteaceae

Notes from the Editor based on
"The Student's Flora Of North Eastern NSW"
— see page 271

The South African *Protea* have justifiably achieved world renown as spectacular plants to adorn the garden and to provide cut flowers. The Australian members of the Proteaceae family are equally spectacular in their own way but have not had the general appreciation that they deserve. Much prominence has been given to the Proteaceae of Western Australia and for a reference I would recommend many of our previous issues. The last few issues of Australian Plants have focused on the Proteaceae of Eastern Australia. It is often of value to place things in their correct perspective and study populations in specific areas.

This issue presents that portion of the Eastern Australian Proteaceae found naturally in north-eastern NSW. Anyone particularly interested in the flora of this area could use a copy of the series "Student's Flora of Northern NSW" (see page 271). Extracting from this series, we present (opposite) a key to the groups (known as genera) of similar plants in the plant family Proteaceae. Such a key is produced by botanists to enable them to classify plants into similar groups of plants that all have a common character, that sets them apart in a scheme of internationally adopted classification as belonging to a plant family, in this case, Proteaceae. To the non-botanist, this distinction is usually difficult to see. For instance all the flowers have four petals and four stamens, each stamen is attached in front of a petal and often attached to it as in B2 and B3, page 247.

Accepting that they know what they are talking about, a key such as that opposite provides a guide to plant identification and interest on bush rambles. Let us see what we can make of the botanist's "gobbledegook" opposite.

- A. Flowers in dense cone-like spikes or heads, the seed finishing up in a large woody head. We can readily recognise the rough woolly "banksia-man" type head of *Banksia* in seed. Our No. 104 issue described *Petrophile* with the cone-stick like seeding head, pages 152 and 171. Our No. 104 issue described *Isopogon* with the drum-stick like seeding head, pages 147 and 171.
- A*. Flower head (Inflorescence) surrounded by red bracts (modified leaves around the base of the flower head). The red bracts are easy to see in the flaming red flower head of Waratah (*Telopea*) and *Lambertia* as seen on the front cover of this issue.

Proteaceae In This Issue:

We present those groups of plants (genera), where the fruit is not a pod or woody capsule, but a one-seeded fruit that splits open when dry. This type of fruit protects the seed for many years.

For those keen to learn more we have continued, opposite, with the key and sketches from the "Student's Flora of N.E. NSW" and you will see how easy it is to learn botany from a student series such as this. Why not buy a copy?

Proteaceae Of North Eastern NSW

Let us see if we can understand a botanical key extracted from "The Student's Flora of North Eastern NSW". If some of the botanical terms are a little "heavy" refer to the sketches on page 247. Botanical keys are not easy to follow because of the strange botanical terms. A copy of our book "The Language of Botany" will help you.

- A. Flowers in dense cone-like spikes or heads.
Each flower is subtended by bracts becoming woody as the fruits develop.
- B. Leaves undivided, the margins sometimes toothed. Fruit a follicle. (See Issue No. 105) *Banksia*
- *B. Leaves pinnatisect or lobed. Fruit an achene.
 - C. After flowering the bracts persist firmly adhering to the axis to form a cone eventually opening to release the fruits. Perianth-tube split to the base. (See Issue No. 104) *Petrophile*
 - *C. After flowering the fruiting body resembles a drumstick, the bracts finally falling with the fruits, the cone breaking up. Perianth-tube not split to the base. (See Issue No. 104) *Isopogon*
- *A. Inflorescence not cone-like.
 - D. Inflorescence surrounded by an involucre of red bracts.
 - E. Flowers numerous, irregular, pedicellate. *Telopea*
 - *E. Flowers 7 in the inflorescence, regular, sessile. *Lambertia*
 - *D. Red bracts absent. *Conospermum*
 - F. Corolla 2-lipped. Fruit an achene. (See sketch on page 241).
 - *F. Corolla not 2-lipped.
 - G. Flowers solitary in the leaf-axils, rarely 2 or a few together. Flowers regular. Fruit a drupe. (See sketches on pages 244 and 262) *Persoonia*
 - *G. Flowers in spikes, racemes or umbels.
 - H. Flowers sessile in spikes, regular. Fruit an achene. (See page 246) *Symphionema*
 - *H. Flowers pedicellate (on a stalk, pedicel) regular or irregular. Fruit a drupe or follicle.
 - I. Fruit a drupe.
 - J. Leaf-blades pinnatisect. (See page 270) *Hicksbeachia*
 - *J. Leaf-margins entire or toothed.
 - K. Outer layer of fruit peeling off to expose the endocarp. Ovules 2, attached near the top. (See page 240) *Macadamia*
 - *K. Fruit not peeling. Ovules 2, attached near the bottom. (See Issue No. 105) ... *Helicia*
 - *I. Fruit a follicle.
 - L. Leaves opposite. *Xylomelum*
 - *L. Leaves alternate.
 - M. Ovule 1. Seed enclosed in an envelope. *Strangaea*
 - *M. Ovules 2 or more. Envelope absent.
 - N. Ovules 2.
 - O. Flowers in elongated, symmetrical racemes. *Orites*
 - *O. Flowers in umbels or in elongated, 1-sided racemes.
 - P. Inflorescences terminal or on short axillary branches.
 - Seeds with an annular wing or wingless, dispersed on maturity. *Grevillea*
 - *P. Inflorescences axillary.
 - Seeds with a single wing attached to one end usually retained on the bush in a woody capsule. *Hakea*
 - *N. Ovules several.
 - Q. Flowers in umbels or in a terminal, corymbose, compact inflorescence.
 - R. Leaves simple, the margins entire or lobed.
 - Flowers in umbels. *Stenocarpus*
 - *R. Leaves mainly compound (some simple).
 - Flowers in a compact, corymb-like inflorescence. *Oreocallis*
 - *Q. Flowers in pairs in elongated racemes. *Lomatia*

So it is too difficult to follow? You are just interested in simple notes about flowers or how to grow them? Forget this exercise and enjoy the rest of Australian Plants. Do not write off Australian Plants as being too technical for there are many who enjoy a little education and we do not do much of it. You are interested to learn more about plants the way botanists see them? Then turn to page 270 where this article is continued.



Persoonia chamaepitys (above and below). See page 262.

Photo by Mark Parks





Persoonia pinifolia, from The Australian Gardener's Guide to Australian Plants — see page 263.

Persoonia levis (below). See page 262.

Photography by Lois Sourry



Symphionema

by Alec Blombery

Amongst the lesser known genera in the family Proteaceae is the small genus *Symphionema*, with two species confined to New South Wales. The genus was named by Robert Brown in 1810 and received its name from the manner in which the slender filaments of the stamens are united around the style (Greek *sumphuo*, I unite; *nema*, a thread).

Both of the species of *Symphionema* are small undershrubs, somewhat of an herbaceous appearance; the leaves are divided into a number of small pointed segments. The small, white to cream flowers are tubular in bud and then split into four spreading segments, to which the filaments of the stamens are attached; the united filaments of the stamens often split as the segments spread. The flowers, which grow in slender terminal spikes, have a small 3-lobed bract at the base which persists after the floral segments have fallen and surrounds the small nut-like fruit. Both species flower in spring.

Symphionema montanum

This species is an erect shrub, .5 to 1 m in height, with several stems arising from ground level. The small parsley-like leaves are divided into a number of segments, each of which is further subdivided into three or more flattened segments, terminating in a short, pointed apex. The small, creamish-yellow flowers, 3 to 4 mm long, grow in terminal spikes, 25 to 40 mm in length. The fruit is oblong to egg-shaped.

Symphionema montanum occurs on the higher parts of the Blue Mountains and the Woronora Plateau, west and south of Sydney respectively, where it occurs on heathlands in soils derived from sandstone. In the more exposed, colder parts of the Blue Mountains, the leaves of this species become reddish-brown during cold weather.

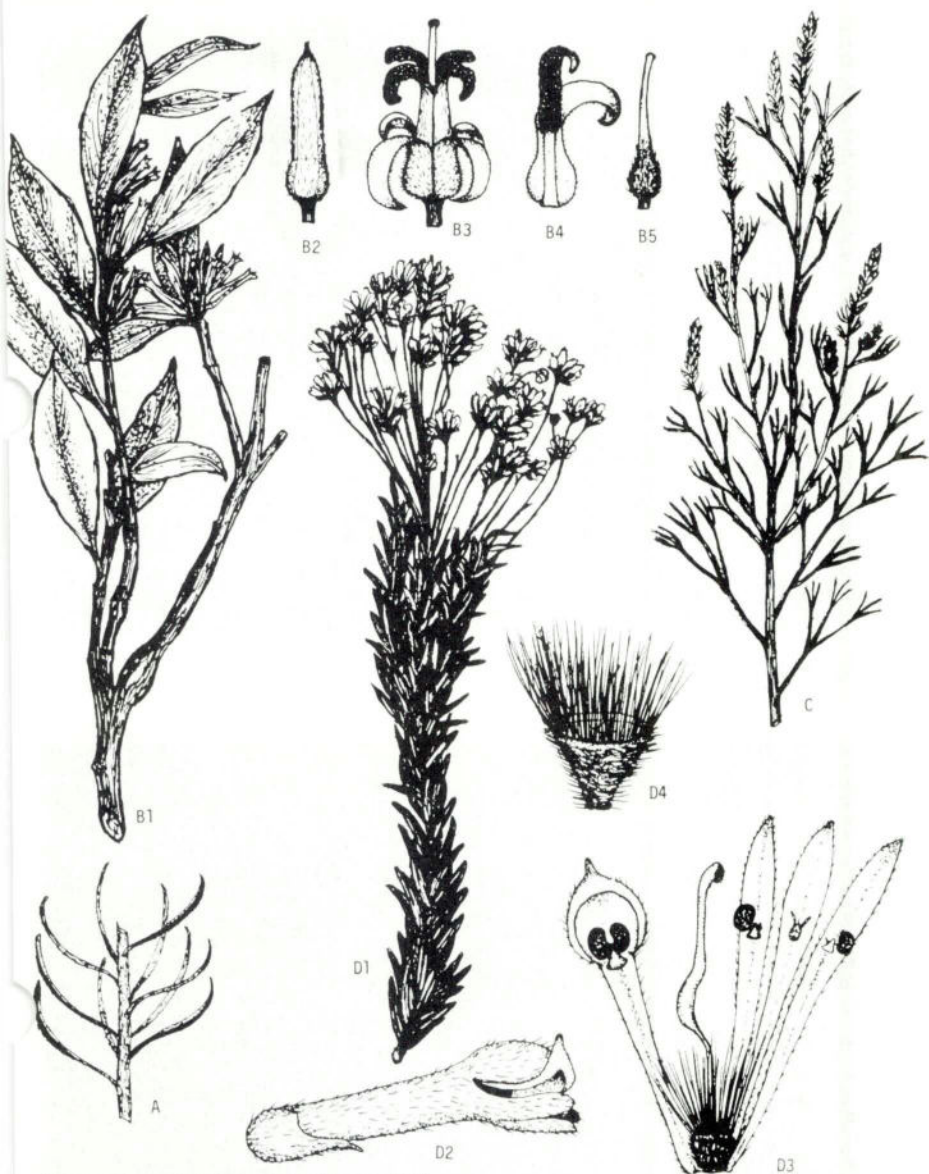
Symphionema paludosum

Closely allied to *Symphionema montanum*, this slender, spreading to straggling plant, differs chiefly in its more slender straggling habit of growth and the small leaf segments being almost terete. The tiny creamish flowers are more slender and occur on spikes about 20 mm long. *Symphionema paludosum* occurs in the coastal areas north and south of Sydney, where it grows on moist heathlands chiefly in soils derived from sandstone and of a peaty nature.

Growing *Symphionema*

Plants may be raised from seed or cuttings. Seeds are not usually available, and, for those who live near where the plants grow, it is necessary to keep them under close observation to collect seed, as they fall from the plant when ripe. The seed germinates slowly and seedlings require several years to flower.

Propagation is readily carried out using cuttings of hardened new growth. The resultant plants may flower within 12 months to two years after potting on the rooted cuttings. Under cultivation a sandy, peaty-type soil gives the best results in a protected position with regular watering. ■



Persoonia curvifolia: A, incurved leaves (x $\frac{2}{3}$).

Persoonia cornifolia: B1, flowering shoot (x $\frac{2}{3}$); B2, bud (x 2); B3, flower (x 3); B4, perianth-segment and stamen (x 2); B5, carpel (x $\frac{2}{3}$).

Symphonema paludosum: C, flowering shoot (x $\frac{2}{3}$).

Conospermum taxifolium: D1, flowering shoot (x $\frac{2}{3}$); D2, flower (x 6); D3, opened (x 6); D4, achene (x 6). See page 241.



Wildflower Gardens: These colour plates are reprinted from "The Gardener's Guide To Australian Plants" by Gwen Elliott. See page 266 for more gardening advice, and page 281.





Pultenaea capitata ▲ See page 257

▽ *Pultenaea subspicata* See page 256

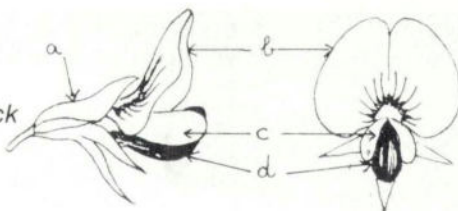


Bush Peas

The Genus *Pultenaea* —

Part 4 by C. E. & D. T. Woolcock

a — the calyx cupping the flower
b — large petal — the standard
c — two petals — covering keels
d — two petals — boat shaped keel

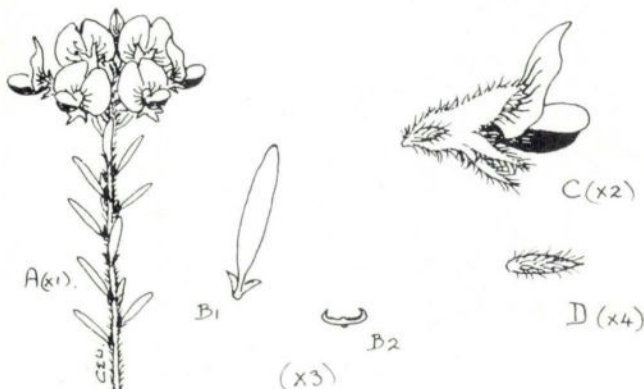


This group of *Pultenaea* species (pea flowers) has alternate leaves which are elliptical (see sketch B1 below) or oblong (more sausage shaped as in B1 opposite) and incurved as in sketches B2 below and opposite (i.e. the leaf edges turn up, not down). Part 1 of this series started in our No. 95 issue, describing how the 120 species of *Pultenaea* may be grouped, as here, for ready identification. If you see a pea-flowered plant with leaves as described in this group and flowers as above, then check it against the following sketches to determine its name.

Pultenaea cambagei Maiden et Betche

Cambage's Bush-pea

- Habit** An erect shrub from 0.5 to over one metre high as in A below. Stems pubescent.
- Leaves** Elliptical (B1), incurved (B2), usually glabrous (not hairy), but sometimes pubescent, 5-7 mm × 1-1.5 mm, obtuse (not pointed). Stipules (tiny leaves at point where the main leaves join the stem) 1 mm long or less.
- Flowers** Distinct terminal (at end of branches as in A below) heads, sessile (stalkless). The calyx (detail 'a' above — the modified leaves cupping the flower) is villous (hairy as in C below). Lower lobes acuminate. Floral bracts hairy. Small leaves attached to the outside of the calyx tube (and shorter than it) as in C below, linear and villous as in D below.
- Flowering** August-October.
- Distribution** Restricted to localities near Torrington and Henry River, NSW; swamps. Fills a similar ecological niche to *P. subumbellata* and *P. paludosa*.



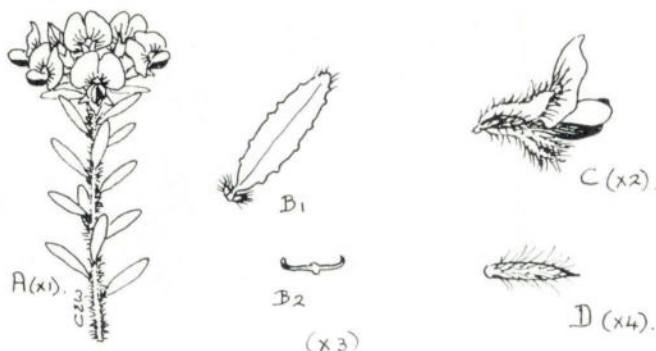
Wildflowers In Colour

I would like to thank those who offered their colour slides following a request for slides in a recent issue. Once again I am on the "crawl". I need good colour slides of Australian succulent plants, especially *Aptenia*, *Carpenthea*, *Carpobrotus*, *Conicosia*, *Disphyma*, *Drosanthemum*, *Lampranphus*, *Mesembryanthemum*, *Psilocaulon*, *Sarcozona*.

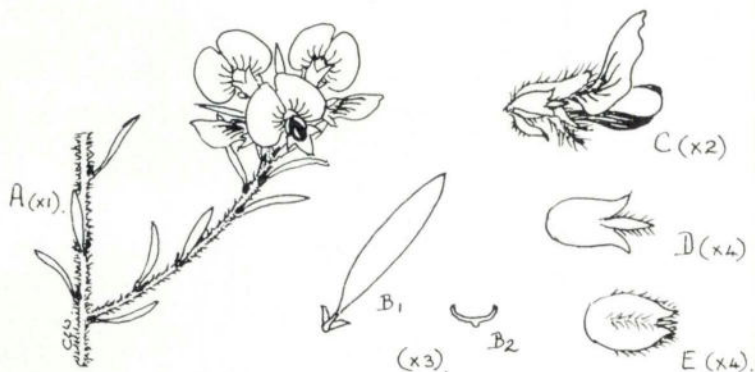
And another request, I need slides of Australian *Hoya* and *Dischida*. Who can help? — Editor.

Pultenaea paludosa* Joy Thompson*Mountain Bush-pea**

- Habit** Small undershrub (of wet places) to 40 cm high. Stems hairy. (A).
Leaves Elliptical, mainly flat, 6-8 mm long $\times$ 1-2 mm wide, usually glabrous but sometimes a few hairs on upper surface or near apex; margins minutely scabrid. Petiole small (< 1 mm) and stipules very small (0.5 mm) and almost hidden by hairs. (B₁, B₂).
Flowers Terminal heads of small flowers — subsessile. Calyx hairy, particularly on lobes, lower lobes acuminate and longer than tube. Keel reddish. (C).
Bracteoles Linear-lanceolate, villous, about as long as tube. (D).
Flowering October-December.
Distribution Vic. (E. Gippsland), NSW (Central Coast). Wet swampy areas.

***Pultenaea dentata* Labill.****Clustered Bush-pea**

- Habit** Wiry shrub from dwarf to 1 m high, usually with pubescent stems. (A).
Leaves Linear-elliptic, stiff, glabrous, incurved, distant, 7-10 mm long $\times$ 1-2 mm wide, apex obtuse. Stipules small 1-2 mm long. (B₁, B₂).
Flowers Compact sessile heads with brown, notched, ciliate bracts enclosing each calyx (E). Calyx silky villous. Keel red. (C).
Bracteoles Trifid, with three short acute lobes, the centre lobe ciliate (D).
Flowering Spring to early Summer.
Distribution Widespread in wet peaty ground. Occurs in S. Aust., Vic., Tas., NSW, Qld.





Pultenaea canescens △

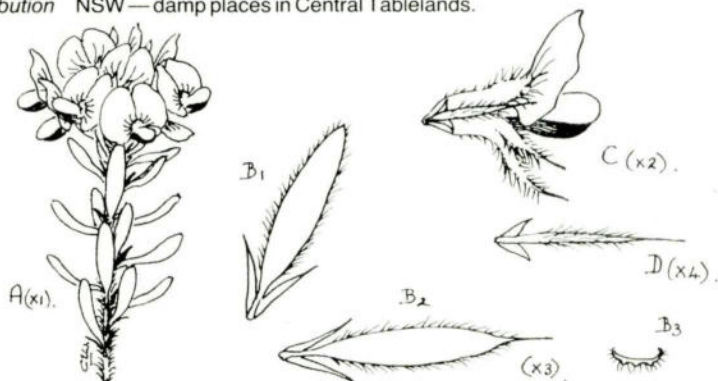
▽ *Pultenaea quadricolor*



***Pultenaea canescens* A. Cunn. (opposite, top)**

Plumed Bush-pea

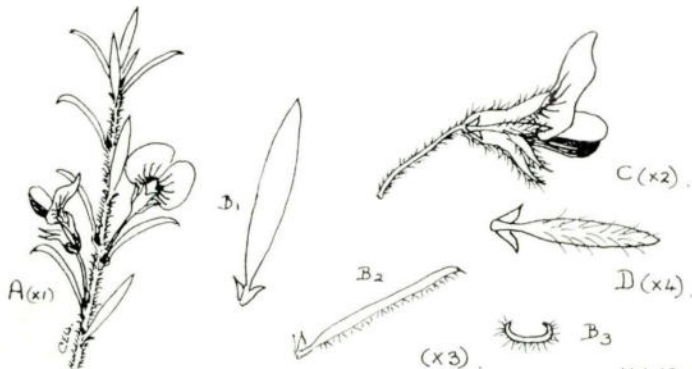
- Habit** Shrub to about 1 m high, erect, stems glabrous or pubescent. (A).
- Leaves** Oblanceolate to narrowly elliptical, concave, crowded, mostly 8-12 mm long, apex obtuse (B_1) or acute with a bristle (B_2), the lower surface usually villous and sometimes with small tubercles (B_3). Stipules prominent 4-5 mm long.
- Flowers** Sessile, densely crowded heads. Calyx lobes with long spreading hairs, acuminate, aristate (bristly) the lower lobes longer than the tube, which is less villous than the lobes. (C).
- Bracteoles** 3-lobed, the centre lobe linear, acicular, pubescent, longer than the tube, the lateral lobes scarious and usually glabrous, stipulate. Attached at base of calyx tube. (D).
- Flowering** September-November.
- Distribution** NSW — damp places in Central Tablelands.



***Pultenaea quadricolor* J. M. Black (opposite, bottom)**

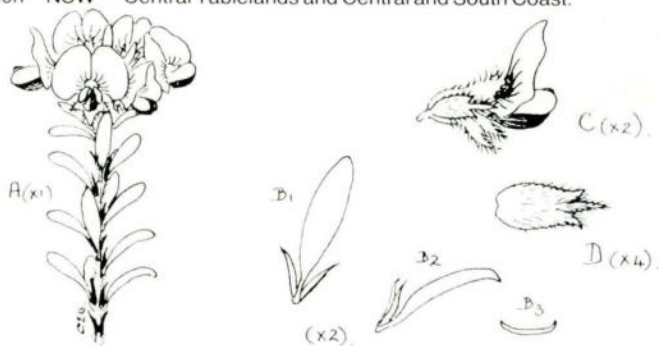
Stalked Bush-pea

- Habit** Small, erect, slender shrub, 20-30 cm high, branching from near base. Young branches appressed, pubescent.
- Leaves** Lanceolate-linear, distant, 6-14 mm long $\times$ 1-2 mm wide, concave, glabrous above, pubescent undersurface, slightly recurved tip. (B_1 B_2 B_3). Petioles and stipules c. 1 mm long.
- Flowers** Solitary, axillary, on pubescent peduncles c. 7 mm long. Calyx sparsely pubescent with lanceolate lobes. Keel dark red. (C).
- Bracteoles** Leaf-like, central lobe green, subulate, sparsely pubescent, about as long as calyx (tube and lobes). Two stipulate wings. (D).
- Flowering** October-December.
- Distribution** S. Aust. — Southern Mt Lofty Range.

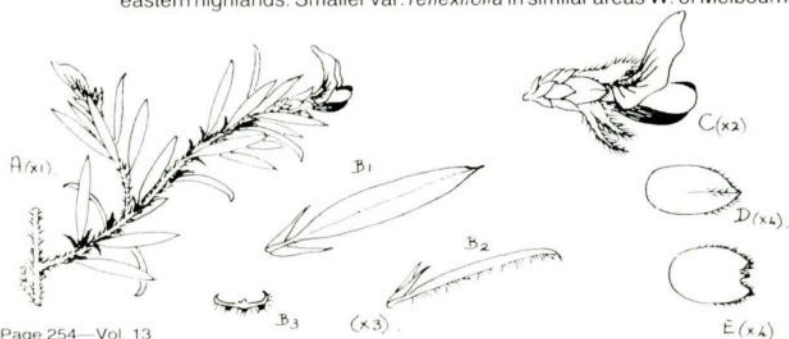


Pultenaea elliptica* Sm.*Wreath Bush-pea**

- Habit** Erect shrub usually about 1 m tall, sometimes to 2 m. Stems sparsely pubescent. (A).
- Leaves** Elliptical, incurved margins, variable in size, sometimes to 20 mm long, usually 8-12 mm, upper surface glabrous, lower surface glabrous or with hairs. Leaves adjacent to flowers often broader and hairy with longer petioles (to c. 4 mm). Stipules 3-5 mm, appressed to stem. ($B_1 B_2 B_3$).
- Flowers** Crowded in axils near the end of branchlets, giving appearance of a head. Calyx often glabrous on tube, but villous on lobes, subsessile. Flowers often with reddish colours. (C).
- Bracteoles** Usually 3-lobed, attached to base of calyx-tube, villous at least on central lobe, longer than the calyx-tube. (D).
- Flowering** Late Spring-Autumn.
- Distribution** NSW — Central Tablelands and Central and South Coast.

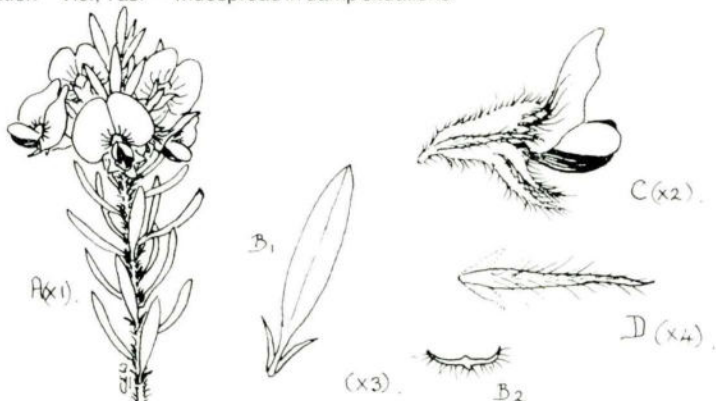
***Pultenaea muelleri* Benth.****Mueller's Bush-pea**

- Habit** Tall shrub to 2 m high, in eastern highlands of Vic., with pubescent branches; a smaller variant to 30 cm high (var. *reflexifolia*) in hilly areas to west of Melbourne. (A).
- Leaves** Narrow lanceolate, incurved, acute, with recurved mucro, usually 7-15 mm long, underside sparsely hairy. Stipules c. 2 mm long and prominent (moderately). ($B_1 B_2 B_3$) *P. muelleri* var. *reflexifolia* has reflexed leaves, giving a withered appearance.
- Flowers** Predominantly single, terminal on main branch and branchlets, subsessile (C). Calyx hairy, partly enclosed in shortly ciliate bracts (E). Lower lobes acute. Keel red.
- Bracteoles** Large, oval, slightly ciliate towards tip and longer than calyx tube. (D).
- Flowering** Mid-November-January.
- Distribution** Appears endemic to Vic. on moist, forested hillsides in the central and eastern highlands. Smaller var. *reflexifolia* in similar areas W. of Melbourne.

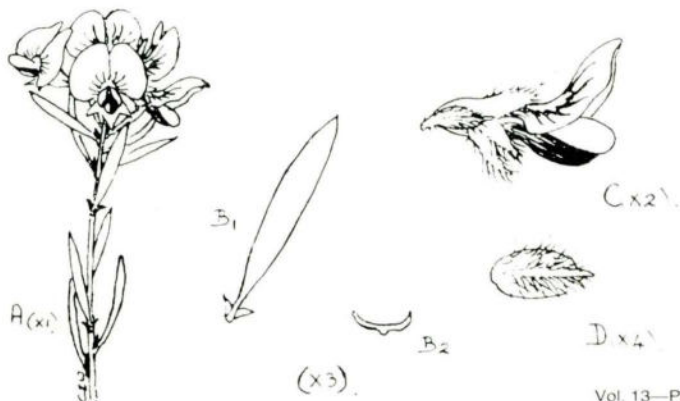


Pultenaea humilis* Benth. ex Hooker*Dwarf Bush-pea**

- Habit** Small erect shrub to about 30 cm high. Stems pubescent.
- Leaves** Linear-lanceolate, incurved, crowded, about 10 mm long $\times$ 2 mm wide, glabrous above, varying degrees of hoary undersurface. Petioles 1-2 mm long, stipules c. 2 mm long. Stipules of floral leaves sometimes enlarged. ($B_1 B_2$).
- Flowers** In congested leafy spikes towards end of branchlets, subsessile. Calyx villous with subulate lobes longer than the tube. Flowers often orange with dark red keel. (C).
- Bracteoles** Linear, subulate, villous, longer than calyx-tube and sometimes stipulate. (D).
- Flowering** October-December.
- Distribution** Vic., Tas. — widespread in damp situations.

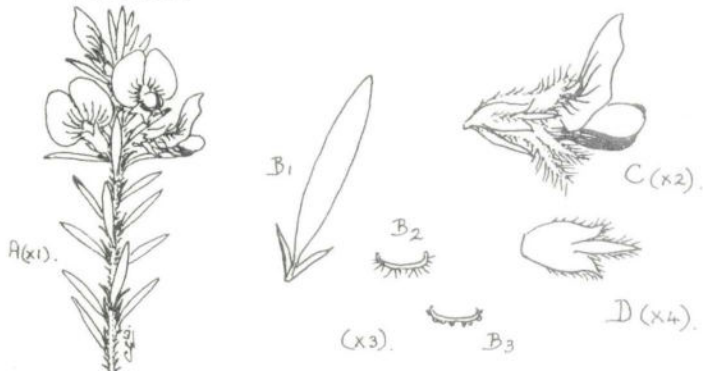
***Pultenaea subumbellata* Hooker****Wiry Bush-pea**

- Habit** Slender, often trailing swamp shrub, 30-60 cm high with yellowish, glabrous branchlet stems. (A).
- Leaves** Lanceolate, incurved, acute, 5-12 mm long $\times$ 1.5-2 mm wide, glabrous and with minute stipules. ($B_1 B_2$).
- Flowers** Sub-sessile in terminal heads. Calyx villous on lobes tending to glabrous on tube, lobes as long as tube. Keel red. (C).
- Bracteoles** Oblong with ciliate margins, about as long as calyx tube, attached at base of calyx. (D).
- Flowering** Spring — October/December.
- Distribution** Vic., Tas. — swampy areas in coastal and mountain parts.



Pultenaea subspicata* Benth.*Low Bush-pea**

- Habit** Small or procumbent shrub, usually 30-40 cm high; pubescent branches. (A).
- Leaves** Linear-elliptic, concave, 7-12 mm long $\times$ 1-1.5 mm wide, glabrous above, often villous or minutely tuberculate beneath. Stipules c. 2-4 mm long. (B_1 , B_2 , B_3). Colour photograph on page 249.
- Flowers** Crowded in upper axils appearing as a terminal head, sessile. Calyx tube glabrescent, calyx lobes villous, acuminate. Calyx partly enclosed in enlarged stipules of subtending leaf. Keel reddish. (C).
- Bracteoles** Trifid, central lobe subulate, pubescent, lateral lobes brown, ciliate on margins; attached at base of calyx and longer than the tube. (D).
- Flowering** October-December.
- Distribution** Dry sclerophyll forest and woodlands at low to medium altitudes — Vic., NSW, A.C.T.

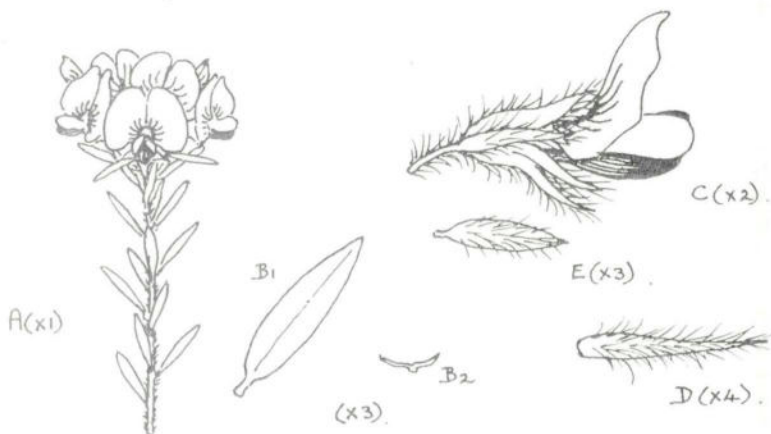
***Pultenaea euchila* DC****Large Flower Bush-pea**

- Habit** Erect glabrous shrub, 2-3 m high. (A).
- Leaves** Narrow-oblong to narrow-ovate (B_1), usually incurved (B_3) but sometimes almost flat (B_4), glabrous, mainly 10-30 mm long (but somewhat variable), obtuse to emarginate (B_2), slightly recurved tip without mucro, prominent midvein on undersurface. Short petiole and small stipules.
- Flowers** Solitary, axillary, on pedicels to 10 mm or more long. Calyx glabrous, lower lobes acuminate and longer than the tube. Keel yellow. (C).
- Bracteoles** Small, simple, linear, attached just below calyx base, glabrous. (D).
- Flowering** Late Winter to Spring.
- Distribution** Open forest near coast from Hunter Valley, NSW to South-eastern Queensland.



Pultenaea capitata (Turcz.) Druce

- Habit** Small shrub to 30 cm high, stems glabrous or hairy. (A).
Leaves Alternate, dense, slightly incurved or flat, oblong, elliptical or narrowly elliptical, 4-10 mm long, 1.5-2.5 mm wide, short petiole, usually glabrous, with acute apex. Stipules absent. (B₁, B₂).
Flowers Terminal heads of many flowers, which are large, (standard to 16 mm across), on pedicels 3-4 mm long. Calyx and pedicel densely hairy. Calyx lobes longer than the tube, the upper two lobes ovate, and all five acuminate. (C). Floral bracts hairy. (E). Colour photograph, page 249.
Bracteoles Linear, attached below base of tube, longer than the tube, densely hairy. (D).
Flowering September-December.
Distribution W.A. — widely distributed in sand heath in the S.W. from Morawa to Newdegate.



Australian Orchids

There are a number of books on Australian orchids. One, "Growing Orchids" by J. N. Rentoul is mentioned on page 273. Our previous issue mentions "Tropical Orchids of Australia" by Lavarack and Gray (available from Editor for \$49.95 plus \$3.05 post) and "Australian Terrestrial Orchids" by Woolcock (available from Editor for \$40.00 plus \$3.00 post). Others confine the treatment to local areas or are "pretty picture" books of limited reference value. There is only one complete, world-wide recognised reference to our tropical orchids, "Australian Indigenous Orchids, Vol. 1", by Dockrill, see page 277.

Work on "Australian Indigenous Orchids, Vol. 2, "The Terrestrials of South-Eastern Australia", is now well in hand. We need as many good slides as possible so if you have any or wish to share in this project by taking some photographs, then please contact the Editor. In particular we need slides of the following:

Acianthus amplexicaulis, *Arthrochilus irritabilis*, *Bulbophyllum bracteatum*, *B. crassulifolium*, *B. exiguum*, *B. minutissimum*, *B. tuberculatum*, *Burnettia cuneata*, *Caladenia aurantiaca*, *C. dimorpha*, *C. echidnachila*, *Calanthe triplicata*, *Calochilus gracillimum*, *C. grandiflorus*, *C. richae*, *Cheirostylis ovata*, *Corybas acanitiflorus*, *C. pruinosus*, *C. undulatus*, *Cryptanthemis slaterii*, *Cryptostylis hunteriana*, *Dendrobium mortii*, *D. schneiderae*, *D. x. suffusum*, *D. tenuissimum*, *Diuris punctata forma striata*, and *forma sulphurea*, *D. secundiflora*, *Epipogium roseum*, *Galeola cassythoides*, *Genoplesium bauerii*, *Geodorum densiflorum*, *Liparis coelogyoides*, *L. habenarina*, *L. simmondsii*, *Malaxis lotifolia*, *Papillobium beckeri*, *Peristeranthus hillii*, *Phaius australis*, *Phreatia crassinicula*, *Plectorhiza brevilachis*, *Petrostylis x congllosa*, *P. x furcillata*, *P. laxa*, *P. longipetala*, *P. russellii*, *Prasopphyllum albigrans*, *P. ansatum*, *P. apostasoides*, *P. brachystachyum*, *P. buptonianum*, *P. eriochilum*, *P. exiguum*, *P. filiforme*, *P. firthii*, *P. hopsonii*, *P. laminotum*, *P. longisepalum*, *P. mollissimum*, *P. morganii*, *P. mucronatum*, *P. nichollsianum*, *P. nudiscapum*, *P. obovatum*, *P. parvicallum*, *P. plumosum*, *P. reflexum*, *P. transversum*, *P. ruppii*, *P. trifidum*, *P. unicum*, *P. viride*, *P. wilsoniense*, *P. woollii* and *Rimocala elliptica*.

Propagation By Cuttings

by R. Aitken
Wildflower Nursery, Wanneroo, W.A. 6065
*Extracted from "Horticulture of Australian Plants"

The recommendations on propagation from cuttings made here have arisen from 38 years of amateur propagation followed by 12 years of commercial propagation. They have not resulted from carefully controlled experiments but from the keeping of performance records on millions of plants over that time. It should also be noted that a method is regarded as successful when the 'strike' is about eighty-five percent. This is based on material obtained from 'stock plants'.

Cutting Material

The selection of suitable material for cuttings will vary according to the conditions of propagation. For example, very high humidity conditions in a comparatively cool greenhouse seem to favour the production of plants from softwood cuttings. As a rule, when these optimum conditions can be achieved, the subsequent plant is of a higher standard and performance than those produced under less humid conditions. Material which is beginning to mature is frequently referred to as 'half-hard'. For many native plants, successful cuttings under sub-optimal conditions are a combination of comparatively soft wood on a 'half-hard' or 'near-hard' base.

One cannot over-emphasise the importance of using stock plants rather than those in the wild. The ideal time for taking cuttings may be tested and propagation is no longer controlled by the timing of field trips. If stock plants are well maintained, cuttings will be uniform in size and maturity. Given these advantages, there still remains an unexplained favourable factor. The evidence suggests that native plants become "tamed" with each new generation and that successful propagation of cuttings rises accordingly.

Use of Hormones

The use of 'hormone' aids in producing roots on native plant cuttings is now widespread. The major substance is IBA (Indolebutyric acid). Commercially available materials are generally mixtures of IBA and NAA (Naphthalene acetic acid) in varying proportions, but generally have about 800 ppm of each. These are supplied in a talcum powder carrier or as a liquid.

The hormone powders are used in many nurseries though some propagators prefer liquid dips of 5-10 seconds. From my records there is no evidence favouring liquid against powder. However, some cuttings have shown a slight adverse reaction to the alcohol necessary to dissolve the hormones initially.

*Horticulture of Australian Plants

Edited by Byron Lamont and Philip Watkins

This 112 page (245 x 185 mm) book is a valuable reference, no pretty colour, all valuable text. It is, principally, a collection of papers presented at a symposium on the Cultivation Of Australian Plants during the 53rd ANZAAS Congress held in Perth in May, 1983. The researched opinions of Australia's leading scientists and horticulturalists deeply involved in the development of the Australian flora for horticulture are presented. Extracts from two of the papers are presented in this issue as a guide to value and readability. No vague remarks here, no play on words to fill a book depending on the use of pretty pictures; these are hard, practical, facts. Excellent value from \$8.99 from the Australian Institute of Horticulture, P.O. Box 163, Bentley, WA 6102 including postage and handling costs.

Choice of Propagation Medium

A medium essentially has to be well drained and have a high water retention capacity. As one who produced his first rooted cuttings in washed yellow sand enclosed by a cellophane tent, it became difficult for me to cast away from the sands which are so often recommended. It is true that coarse river sand in particular may be a useful component in propagation media. However, the evidence suggests that media containing sand are more susceptible to water-borne pathogens. Since the aim of the propagator must be to create aseptic conditions, sand has its hazards.

Most media described in the horticultural literature contain varying ratios of perlite, peat and sand. The perlite is used for drainage and the peat for water retention. Justification for the use of sand is not so clear. I have found a sound medium for native plant propagation to be: three parts perlite to one part peat. Used over a lengthy period, this medium has proved comparatively disease free. It reduces the need for fungicides and helps maintain greenhouse hygiene. Similar media are standard practice in Israel. Some species in this medium, particularly plants with comparatively thick stems such as *Grevillea* 'Robyn Gordon', sometimes over-callous. In such cases root production is slow and the root somewhat feeble. To avoid this problem, the quantity of peat should be increased. ■

Propagation By Seed

by I. R. Dixon
Kings Park and Botanic Gardens, Perth
(Extracted from "Horticulture of Australian Plants")

Bob Dixon first details the general practices to be observed for good germination of seed in the above book and then gives examples, as follows, of successful methods he has found with a range of species.

Grevillea bracteosa (Proteaceae)

This is an open shrub 1-1.5 m high with pink flowers in rounded heads from August to October. The attractive narrow leaves are about 7 cm long and contrast well with the flowers. In its natural habitat *Grevillea bracteosa* grows in sandy, lateritic soil and has restricted distribution.

Fresh seed sown in autumn with no pretreatment failed to germinate the first season or the second season after a baking in the full sun during the summer. Two year old untreated seed sown in autumn also failed to germinate.

Two year old seed scarified just before sowing and sown on the same day as the untreated seed above gave a germination rate of 71%. The best method of scarification was to lay the seed, rounded side downwards, then place a finger on the seed and break off a portion of the coat with the blade of a knife. Cutting off this portion rather than breaking it gave very poor germination, possibly due to damage of the seed.

After scarifying, the seed was soaked in unsterilised warm water for 30 minutes, then sown in pots and placed in a cold frame with polythene film and newspaper on top. The first seedlings emerged in 15 days, the last seedling appeared three weeks later.

Seedlings were pricked out when one day old. Even at this stage the tap root was long and brittle. Several seedlings were lost through damping off disease.

Hibbertia miniata 'Orange Hibbertia' (Dilleniaceae)

This attractive shrub is 20 to 40 cm high, but occasionally reaches 80 cm. It grows in loamy to sandy lateritic soils in the northern jarrah forest. The flower colour varies from dark orange with a black centre (stamens) to light orange or yellow with pale centres. Flowers usually appear from August to early October. It is a gazetted rare species.

Hibbertia miniata produces fairly large seed, but is attacked by a small predator whose entry and exit holes are very difficult to detect. I find the best method to locate the viable seed is to place the seed in the jar of water, shake it well and allow it to settle. The seeds which sink are usually viable whilst those that float are dead.

Fresh seed sown without pretreatment in autumn resulted in only 4% germination in the first season. The second autumn after sowing, the germination rate was about 50%. Seed pots were kept for a third season which produced a germination rate of 20%. The seed pot was baked out in the sun during each summer and left there throughout. Seeds took three to four weeks to germinate after autumn watering started.

Seedlings were pricked out when only one or two days old with a high survival rate using the usual mix. However, when they reached about 7 cm, their leaves gradually became covered in reddish-brown spots which caused defoliation and eventual death of the plants. This appears to be a nutritional problem, as plants grown with the usual mix plus a regular but very weak solution of liquid fertiliser survived. Addition of pine bark chips to the standard mix also gave healthy plants. (Editor's note: Failure to form mycorrhizas may have been involved in the initial losses as all other *Hibbertia* studied have been shown to be mycorrhizal, Lamont 1982).

Crowea angustifolia 'Swamp Crowea' (Rutaceae)

This 0.5 to 3 m high shrub has spear-shaped toothed leaves 2 to 3 cm long. The pure white to pink flowers may be seen from September to October. Plants occur naturally in fairly high rainfall areas often in swampy conditions and usually in karri or jarrah forest between Albany and Pemberton in Western Australia.

This species is in a family notorious for its poor germination. The seeds of some members are known to build up inhibitors as the seed ages. Fresh seed of *Crowea angustifolia* with no pretreatment was sown in the late summer and the pots were placed in the full sun with no water. In early April the seed pot was watered and left in the open. Germination was about 70%. First emergence took 21 days and was complete after a further two weeks.

Seedlings are best pricked out when only a few days old. During winter, seedlings can be grown in full sun; in spring and summer they require light shade. However, seedlings are best planted out during the winter of their first year rather than grown on in pots.

Persoonia comata (Proteaceae)

This shrub is about 1 m high with narrow flat leaves about 7 cm long. The bright yellow flowers arranged in terminal spikes are produced in December and January. It grows in sandy to sandy lateritic soils 100 km north of Perth. It has a large lignotuber which suckers after bush fires.

Several batches of fruit had their flesh removed by fermenting them in water for a few days and then rubbing with newspaper. Other treatments included scarification, removing a small portion of the woody seed coat, and leaching the seed in running water for three weeks.

All seed were sown in autumn but none germinated in the first year. The second autumn, after over-summering in full sun, the following results were obtained: fruit removed 8%, scarified 40%, leached 46%. Time from the first autumn watering to germination was twenty-four days. Further seed germinated the following autumn: fruit removed 36%, scarified 2% and leached 6%.

Calectasia cyanea 'Tinsel Lily' (Xanthorrhoeaceae)

This rhizomatous perennial herb is about 30 cm high to 60 cm across. It is widespread on sandy, sandy lateritic or sandy granitic soils. The blue flowers, with gold stamens that age to red, are produced from June to October, although the odd flower can occur at almost any time of year. *Calectasia* is very slow growing but long-lived in its natural habitat and may live for 50 to 100 years.

Most flowers do not produce viable seed and much of the good seed is predated by insects. Although good seed may be produced at other times of the year, the best time for the seed collecting in the Perth area is early December.

Batches of seed sown in autumn in full sun without pretreatment had a 58 to 71% germination. Seedlings appeared after 28 days.

Prick out the seedlings when one to two days old. They are very susceptible to damping-off disease and should be kept moist but not wet. Seedlings are very slow growing, but the growth rate increases if they are grown on in pots for one year and given light shade or broken sunlight. Eight-month-old seedlings grown under these conditions were 4 to 5 cm high. ■

Kings Park Native Plant Annual

The first annual to be produced by Kings Park Botanic Garden, West Perth 6005 (available from that address for \$5.50 including postage) will be of wide interest. The 55 glossy pages (265 × 210 mm) contain 55 beautiful colour plates. Of exceptional value is the well written easily read text on *Boronia*, *Leschenaultia*, *Hypocalymma*, *Eucalyptus*, *Cephalotus*, *Xanthorrhoea*, *Xylomelum*, *Nuytsia*, *Byblis*, *Anigozanthos*, *Banksia*, and the underground orchid *Rhizanthella*.

The author of the above article, Bob Dixon, is a principal author of the annual.

Banksia

Corrections advised by Alex George

The paper "Banksia — The Seedling Leaves" attributed to Alex George was as stated, an extract from Alex's paper 'The genus *Banksia* L.f (Proteaceae)' that was published in *Nuytsia* Vol. 3, No. 3 (1981).

1. The heading should read *Banksia cotyledons* (i.e. the primary leaves of the embryo are the first to appear above ground. The term *seedling leaves* is used for the first leaves that develop after the cotyledons).
2. In the caption on page 209, No. 32 should be *B. elderiana* (the insertion of 'i' after 'er' in specific epithets was adopted at the XIII International Botanical Congress in Sydney in August 1981); and No. 39 should be *B. lemanniana*. The latter name has often caused confusion since a number of plants have been named after Johann Georg Christian Lehmann (1792-1860), a professor of botany at Hamburg, but this *Banksia* was named after Charles Morgan Lemann (1806-1852), an English amateur botanist. No. 48 in the figure is now *B. seminuda*, following the elevation of the variety to specific rank by Barbara Rye in 1984.

Persoonia

Some NSW *Persoonia* For Cultivation

by Peter Olde

Persoonia have often been admired but rarely cultivated. Mostly, comments about them relate to their attractive foliage, which is often an eye-catching light green. If not about their bright colour, then the conversation might refer to their texture which may be fine and delicate, or large and fleshy, downy pubescent or crisply smooth. The leaves themselves are always entire even though they vary greatly in shape and texture. This feature is one of the characteristics of the genus as a whole.

Another feature, is the "green" grape-like cluster of fruits, called a drupe which Aborigines knew by the word JIBBONG. The common name Geebung is still used today to refer to the genus. Early Australians referred to these oval fruits as SNOTTYGOBBLE, a name which has fortunately fallen into disuse.

The flowers themselves are individually small and are usually displayed singly or in pairs in the leaf axils. However, in some species e.g. *Persoonia pinifolia* they aggregate into long terminal racemes. Most flowers occur in early to late summer, a time when the bush garden is usually in need of a colourful lift.

For these and many other reasons, I find the hardy *Persoonia* a fascinating addition to the Australian Native Garden.

Persoonia chamaepitys — This is a beautiful prostrate plant 1 m × 1 m with fine terete leaves from the Upper Blue Mountains of NSW. In cultivation it forms a rounded mat and is extremely hardy. It deserves a place in any garden. See the colour photograph on page 244.

Persoonia curvifolia — This is a low shrub to 1 m from the ridge tops on the Western Slopes of NSW. The foliage is noticeably curved in and is extremely attractive and unusual.

Persoonia hirsuta — This is a fairly uncommon species albeit with a wide-spread distribution. The flowers on this species, which only grows to 0.5 m, are densely hairy and it has short linear leaves.

Persoonia lanceolata — This species is widely seen and very common in the Sydney region. It grows to about 2 m and is very compact in its habit. The lance-shaped leaves with their distinctive mid-vein and light green colour are readily observed. A form with glaucous leaves occurs in the southern Blue Mountains.

Persoonia levis — Similar in many ways to *P. lanceolata*, *P. levis* has larger yellow green leaves with three distinct veins. The species is widespread along the East Coast of Australia in dry sclerophyll forest. The bark on this species is also interesting being papery and black and peels off to a deep red colour inside. See page 245 for a colour photograph.

Persoonia oxycoccoides — This plant is part of the *P. nutans* complex and varies considerably in its habit, from prostrate to erect. The plant I know in cultivation is prostrate with short lanceolate leaves and is extremely attractive as a ground cover. Showy flowers occur thickly in early summer.

Persoonia pinifolia — Probably the most attractive of all. Its fine weeping foliage is surmounted by large terminal clusters of yellow flowers in summer, followed by persistent grape-like bunches of drupes in winter. Sometimes the spine-like leaves are a dull purple colour in winter. This may be retained throughout summer. This species can attain a height of 4 m and is often confused with *P. linearis* which it superficially resembles. The flowers in this species occur in the leaf axils and not in terminal racemes. See the colour photograph on page 345.

Other species worthy of cultivation are *Persoonia mollis*, *P. marginata*, *P. myrtilloides*, *P. sericea*, *P. subvelutina*.

At the present time the genus is being revised and a number of undescribed species will be brought to our attention, many of which are horticulturally worthwhile.

The absence of *Persoonia* in household gardens is probably attributable to their difficulty of propagation. It is a strange species to propagate being at times, and in some species, very easy to root and at other times impossible. The best way to grow *Persoonia* is to bare root seedlings which come up by themselves — these should be moistened and treated like ordinary cutting material after being pulled up. They are potted up, roots and all, in the hot house just like cuttings and in a very short while are ready to pot on. It is *not* recommended that plants be pulled up from the wild. However, sometimes plants can be found in cleared areas or old gardens which can be treated in this way.

Refer to page 261 for a report on propagation from seed.

Max Hewett used a novel approach when he dug over the seed of his *Persoonia pinifolia* after seeing it lie on the surface for twelve months. The following year, seedling regeneration was rampant. This indicates that patience is required due to the time taken to break down the inhibitor in the drupe. Rodger and Gwen Elliott propagate *Persoonia pinifolia* readily from cutting using coppiced new growth which has just begun to grow firm. This is achieved in a standard hot house situation. This method should be tried for all *Persoonia* species, although some will continue to prove very recalcitrant.

Other species which root reasonably reliably are *Persoonia oxycoccoides* and *P. nutans*.

Most *Persoonia* have rarely been tried in propagation. It is certainly time work was done by members to learn more about this fascinating genus. ■

Lambertia

A valuable Proteaceae

Lambertia formosa is pictured on the cover and described on page 239. Here Alec Blombery has noted "The slow growth of this plant has no doubt acted against its cultivation". Another problem is that it often does not flower abundantly, or even very often!

But! We have The Australian Flora Foundation to refund research. There is little doubt, that with careful selection and competent research, plants of Honey Flower (or Mountain Devil if you wish, because of the shape of its seed capsule) could be produced which would take the cut flower trade and the ornamental horticulturalist by storm. The plant has enormous potential for the export market. Scientists, who will take on this project? — Editor.

Hicksbeachia

A valuable Proteaceae

Hicksbeachia pinnatifolia

This magnificent plant receives only a brief mention on page 270. This plant has potential as an ornamental shrub and as a commercial crop plant. Who will undertake its development?

East Coastal-1

Part 1 of a series
by Brian Walters

One of the aims of "Australian Plants" has always been to strike a balance between scientific articles and those of a more basic nature (i.e. the "dig a hole, bury it in and water it" type!)

I've always supported this aim, so when I was asked to write a semi-regular series of articles on growing plants in coastal NSW, I had no choice but to agree. In any case it was a chance to indulge myself . . . for which I apologise in advance!!

So here goes . . .

One of the most enjoyable aspects of the Australian flora to me is seeking out interesting forms of plants in the bush. As a fairly active participant in the *Banksia* Atlas Project, I've been doing a lot more of this in recent months . . . the garden is suffering from a bad case of the "galloping greenies" (weed invasion to you!) but, I mean, if you're not there you don't have to look at it, do you? Anyway, if you try hard enough, it's possible to convince yourself of the aesthetic qualities of oxalis!!

Where was I? . . . Oh, yes!

Banksia are my favourite group of plants and one species that I've found particularly interesting during my travels is *Banksia paludosa*. Like many Australian plants it can be quite variable both in habit and in the size of the flower spikes.

The eastern *Banksia* of the *integrifolia* group are described in some detail in our last issue. A good colour photograph of *Banksia paludosa* appears on page 200.

At Greencape in southern NSW it grows in coastal heath as a compact, almost prostrate plant no more than 300 mm in height with relatively short flower spikes. In contrast, some 200 km north, near Nerriga, I observed plants growing up to 1.8 m in height with flower spikes about 160 mm in length. This particular form had an appearance similar to *Banksia conferta* var. *penicillata* from the Newnes Plateau area although, unlike the latter species, *Banksia paludosa* always has a lignotuber (a woody, basal swelling . . . I believe you can take pills for it!)

Banksia paludosa is not widely grown, even by enthusiasts. This is unfortunate because it approaches the "ideal" garden plant . . . attractive even when not in flower, interesting lemon-yellow flowers, reliable, attractive to honey-eating birds. OK! OK! So its attractions are a little bit subtle . . . but at least its going to be alive tomorrow which is more than can be said for most of the western *Banksia*, even if some of the latter are more strikingly flamboyant. Dried *Banksia* foliage may look wonderful in a vase but most people prefer garden *Banksia* to be green!!

Banksia paludosa is sometimes referred to as the "Swamp Banksia". However, in the field, I have not observed the species growing in or near anything that could remotely be called a swamp. Under garden conditions then, I'd be wary about growing the species in poorly drained positions. *Banksia robur* or *Banksia oblongifolia* would probably be better propositions in such situations. *Banksia*

paludosa should, however, thrive in any reasonable garden soil. I've never found it necessary to use fertilisers on any *Banksia* species and I wouldn't expect *Banksia paludosa* to be any different in this respect.

Banksia paludosa is usually available from specialist native plant nurseries but I suspect that it is often overlooked by most buyers. If you want a particular form you will probably have to propagate and grow it yourself. Propagation of *Banksia paludosa* from seed presents few problems.

I am not sure that the semi-prostrate coastal forms will retain the low habit in cultivation. Is the low habit simply a response to the harsh, windy environment or has evolutionary selection favoured low growing forms and, if so, is the low growth habit genetically fixed???

Sounds a bit like the "cliffhanger" at the end of a soap opera, doesn't it?

Don't miss the next exciting episode . . . ■

Dwarf Flowering *Eucalyptus* Trees The Australian Flora Foundation

Many have seen them and wished they could grow them. Trees with a mature height varying from 2 to 4 m, covered with large (huge for a gum tree, to 10 cm across) red, pink, orange or bright yellow flowers. You will be able to grow them and have them adorn your home, one day. What is needed to develop easily grown plants is:

1. Scientific research. The Australian Flora Foundation is initiating the first research project but needs your help.
2. A report and careful study of previous experience in the cultivation of dwarf flowering *Eucalyptus*. If you have grown some or can offer any suggestions, write to the Australian Flora Foundation, c/- The Editor Australian Plants.
3. An assessment of present populations of dwarf flowering *Eucalyptus*, to select those of desirable characteristics such as flower size, colour or flowering period, tree stature, size, shape and general appearance. Possibly of greater significance, specimens you have noted as being more hardy, flowering out of season, etc. Please look for the best plants and report.
4. Initially, some plants. Who has small plants they would make available?
5. And for you John Citizen, Jane and Fred Someone-else, obtain some plants and see if you can grow them. One of you may grow a plant that shows desirable characteristics for the scientists to inspect and possibly use in future breeding trials. In any case it will be fun.

It is possible that this could become a huge national venture with thousands of Johns, Janes and Freds growing thousands of small trees all over Australia.

6. Continuing Study. The scientists are prepared to carry out a continuous series of studies possibly developing into a vast national project. Those who bother to enter the first stage, item 5 above, and report results, the majority of which will be "tales of woe", will each receive a second generation batch of plants for trial next year, and the next and the next. This project will be so massive that we will need thousands of trees grown, trees carefully selected and developed each year. We do not need experts, just people prepared to grow a few trees. Why not help Australia? ■

Coping with Drought in the Garden

by Gwen Elliott
(from "The Gardener's Guide to Australian Plants", see end of article).

Australia is an extremely dry continent over much of the total land area.

Because our continent is so arid, a large percentage of the native plants has evolved to cope successfully with very dry situations. This is a tremendous advantage when we are planning low maintenance gardens if only we can learn to use these plants to their full potential.

Low maintenance Australian gardens can be established by grouping together plants which require a high level of moisture intake throughout the year. The rest of the garden will, with adequate planning, be able to cope with minimal or no hand watering, even during extremely dry periods.

The time of the year when planting is carried out is of considerable importance. Small plants, if they are planted in autumn with an initial light application of slow-release fertiliser at the time of planting, will usually be able to cope from that time onwards, when suitable species have been chosen.

The following charts provide details of Australian plants which will tolerate extended periods of dryness. These species can be useful both for low maintenance gardens in urban areas and for farms and other broad-acre planting.

(a) Groundcovers and plants to around 1 m high: A selection of 20 species.

| Plant Name | Height × width | Brief comment — for further description see Section 2 |
|---|----------------------------|--|
| <i>Acacia cometes</i> | 0.2-0.3 m × 0.5-0.8 m | Low, spreading wattle with globular yellow flower-heads. |
| <i>Acacia depressa</i> | 0.1 m × 1 m | Cushion-like dwarf shrub with yellow flower-heads. |
| <i>Acacia pravissima</i>
'Golden Carpet' | 0.3 m × 3-5 m | Has a profuse display of bright yellow flower-heads. |
| <i>Acacia pulviniformis</i> | 0.3-1 m × 0.5-2.5 m | Dwarf, spreading shrub with profuse cream to yellow flowers. |
| <i>Cheiranthra alternifolia</i> | 0.5-1 m × 0.5-1 m | Flowers are deep blue with yellow anthers. |
| <i>Clianthus formosus</i> | Prostrate × 1-4 m | Sturt's Desert Pea. Has showy red and black pea-flowers |
| <i>Crinum flaccidum</i> | 0.5-1 m | Member of the Lily family. Flowers white or yellow. |
| <i>Dampiera rosmarinifolia</i> | 0.4 m × 1-3 m | Has dense spikes of light blue or mauve flowers. |
| <i>Dampiera teres</i> | 0.3-0.5 m × 0.5-1 m | Dwarf shrub with blue-mauve or pink flowers. |
| <i>Enchylaena tomentosa</i> | 0.3-1 m × 0.5-1.5 m | Foliage is bluish-green. Has colourful fruits. |
| <i>Frankenia pauciflora</i> | Prostrate × 1 m | Has, small greyish leaves. Flowers are commonly deep pink. |
| <i>Glishrocaryon behrii</i> | 0.3-0.5 m × 0.5-1 m | A clump-forming plant with bright yellow flowers. |
| <i>Grevillea ilicifolia</i> | Prostrate to 1 m × 1.5-3 m | Has deeply lobed leaves and cream with red flowers. |
| <i>Grevillea juniperina</i> ,
prostrate forms | Prostrate × 1-5 m | Variable. Foliage prickly. Flowers buff, yellow or red. |
| <i>Grevillea repens</i> | Prostrate × 2-4 m | Has holly-like leaves and deep red flower-heads. |
| <i>Kunzea pomifera</i> | 0.5 m × 1-3 m | Dense spreading plant with white to cream flowers |
| <i>Myoporum parvifolium</i> | 0.2-0.4 × 1-3 m | Has bright green or purplish leaves. Flowers white or pale pink. |
| <i>Phyla nodiflora</i> | Prostrate | Spreading plant useful as a non-mow lawn. Flowers pink |
| <i>Rhagodia spinescens</i> | Prostrate to 1 m × 1.5-3 m | Dense groundcover with greyish foliage. |
| <i>Spyridium parvifolium</i>
'Australora Nimbus' | Prostrate × 0.5-1 m | Has decorative foliage and white to cream flowers. |

All plants do need to be watered thoroughly when first planted.

Mulching around garden plants is a valuable help to moisture conservation. One test reported in the CSIRO publication *When Should I Water* indicated that a layer of straw 4 cm thick can reduce evaporation from the soil by 73 percent.

There are various types of mulching materials from which you can choose.

The maintenance methods used within the garden have a considerable bearing on whether plants will survive during drought conditions.

New growth occurs on plants only when there is adequate water available. In their natural environment plants from dry areas generally grow quite slowly, at a rate well below that which we often seek to achieve in our gardens.

If we apply liberal amounts of fertiliser and water to garden plants, the result is likely to be seen in new foliage growth or profuse flowering. Such growth must then be sustained by continued watering, or the fresh young tips will wilt and perhaps die back beyond recovery.

Fertilising and watering only to the level where healthy and sturdy plants can be maintained is therefore recommended, as this will ensure their ongoing good development. In many cases there is no need to fertilise at all if the soil is of good quality.

(b) Medium shrubs around 1-4 m high: A selection of 20 species

| Plant Name | Height × width | Brief comment — for further description see Section 2 |
|----------------------------------|---------------------|---|
| <i>Acacia redolens</i> | 1-4 m × 3-8 m | Has grey-green foliage and yellow flower-heads. |
| <i>Allocasuarina muelleriana</i> | 1-4 m × 0.5-1.5 m | Tall, shrubby she-oak with grey-green foliage. |
| <i>Atriplex rhagodioides</i> | 0.5-2 m × 1-2 m | A very hardy shrub with silver foliage. |
| <i>Banksia baueri</i> | 2-5 m × 2-4 m | Bushy shrub with large mauve-grey or orange-brown flower-heads. |
| <i>Beaufortia orbifolia</i> | 2-3 m × 2-3 m | Flower-heads are lime-green with red tips. |
| <i>Calocephalus brownii</i> | 0.2-2 m × 0.5-3 m | Has silvery foliage and yellow and white flower-heads. |
| <i>Calothamnus gilesii</i> | 2-4 m × 2-4 m | Has clusters of red flowers tipped with gold. |
| <i>Cassia artemisioides</i> | 1-2 m × 1 m | Has silvery, ferny foliage and yellow bell flowers. |
| <i>Chamelaucium uncinatum</i> | 2-5 m × 2-6 m | Open-petalled flowers are white to reddish-purple. |
| <i>Eremaea beaufortioides</i> | 1-2 m × 1-2 m | Has showy, orange flower-heads. |
| <i>Eremophila denticulata</i> | 1-2.5 m × 1-3.5 m | Tubular flowers are yellow then age to red. |
| <i>Eremophila maculata</i> | 0.5-3 m × 1-3 m | Variable species with tubular flowers in several colours. |
| <i>Eucalyptus kruseana</i> | 3-4 m × 3-4 m | Has oval, blue-grey leaves. Clusters of yellow flowers. |
| <i>Eucalyptus preissiana</i> | 2-5 m × 3-10 m | Spreading plant with smooth bark and yellow flowers. |
| <i>Grevillea lavandulacea</i> | 0.5-2.5 m × 0.5-3 m | Variable species. Has greyish foliage and pink to red flowers. |
| <i>Grevillea pinaster</i> | 1.5-2.5 m × 2-4 m | Has narrow green leaves and bright red flowers. |
| <i>Hakea cinerea</i> | 1-2 m × 1-2 m | Foliage is blue-green. Flowers yellowish-green. |
| <i>Melaleuca wilsonii</i> | 1-2.5 m × 1-3 m | Has clusters of lilac to reddish-pink flowers. |
| <i>Petrophile serruniae</i> | 2-3 m × 2-3 m | Has finely divided, prickly leaves and pink to yellow flowers. |
| <i>Regelia velutina</i> | 2.5-4 m × 1-2 m | Has a decorative, greyish foliage and bright red flower-spikes. |

(c) Tall shrubs or trees over 4 m high: A selection of 20 species

| Plant Name | Height × width | Brief comment — for further description see Section 2 |
|--|------------------|---|
| <i>Acacia jibberdingensis</i> | 3-5 m × 3-4 m | Has long, narrow phyllodes and deep yellow flowers. |
| <i>Acacia lasiocalyx</i> | 3-5 m × 4-6 m | Stems and branches silvery. Has bright yellow flower-heads. |
| <i>Acacia rossei</i> | 2-5 m × 1-3 m | Has deep yellow, globular flower-heads. |
| <i>Acacia salicina</i> | 4-10 m × 3-5 m | Branches pendulous. Has pale yellow, globular flower-heads. |
| <i>Acacia victoriae</i> | 3-12 m × 4-6 m | This wattle often has spines on the branches. Flowers pale yellow. |
| <i>Brachychiton discolor</i> | 10-30 m × 5-15 m | Has pink to red, bell-shaped flowers. |
| <i>Brachychiton rupestre</i> | 10-20 m × 5-15 m | Has bottle-shaped trunk, decorative foliage and yellowish flowers. |
| <i>Callitris rhomboidea</i> | 3-6 m × 2-3 m | A conifer-like tree with green or glaucous foliage. |
| <i>Casuarina cristata</i> | 8-25 m × 5-10 m | Has fine, green to greyish foliage. |
| <i>Eucalyptus eremophila</i> | 3-5 m × 3-6 m | Has reddish buds and cream to yellow or red flowers. |
| <i>Eucalyptus gardneri</i> | 2.5-9 m × 3-6 m | Leaves green or bluish-purple. Flowers cream to yellow. |
| <i>Eucalyptus lansdowneana</i> | 3-6 m × 3-6 m | Slender tree with smooth bark. Flowers crimson. |
| <i>Eucalyptus macrandra</i> | 5-10 m × 3-6 m | Has smooth trunk and large clusters of yellow-green flowers. |
| <i>Eucalyptus sideroxylon</i> | 10-20 m × 5-10 m | Bark is black and deeply furrowed. Flowers pink. |
| <i>Eucalyptus stricklandii</i> | 6-12 m × 5-10 m | Has smooth trunk and bright yellow flowers. |
| <i>Eucalyptus websteriana</i> | 3-6 m × 3-6 m | Has decorative trunk and profuse cream to yellow flowers. |
| <i>Geijera parviflora</i> | 4-9 m × 5-9 m | Foliage is pendulous. Has small, white flowers. |
| <i>Grevillea robusta</i> | 10-25 m × 6-15 m | Has attractive foliage and bright orange flowers. |
| <i>Melia azedarach</i>
var. <i>australasica</i> | 6-8 m × 4-6 m | Deciduous tree with purple and white flowers and yellow-orange berries. |
| <i>Pittosporum phylliraeoides</i> | 3-6 m × 1.5-3 m | Has pendulous branches with yellow flowers and fruits. |

The Gardener's Guide To Australian Plants

by Gwen Elliott

Another general book on gardening with Australian plants. How many are there? This one claims on the cover "All the Practical Gardener needs to know about gardening with Australian Plants in One Volume". They all hope to do this. What makes this one different from the rest is the style of Gwen Elliott. This book of 242 pages has 174 pages of advice in cultivation and 50 on plant descriptions, plants that are given detailed reference in the cultivation section. There are chapters on all the usual subjects: watering, mulching, pruning, etc. Others unique to this book are those similar to that produced in part in this issue "Coping with Drought Condition In The Garden". There are others on "Coastal Planting . . .", "Encouraging Birds . . .", "Wet Areas . . .", "Wind Protection . . .", "Screening . . .", etc.

Available from your bookseller for \$24.95. We stock the previous book by Gwen Elliott, "Colour Your Garden", a real gem for \$30.00 plus \$2.50 postage.

Colour Your Garden With Australian Plants

by Gwen Elliott

There are many general books on the cultivation of Australian Plants with a wide range of practical value. There is none so cleverly devoted to bringing colour to the garden. Available from The Editor for \$30.00 plus \$2.50 post.

Maidenhair Ferns In Cultivation

by Christopher Goudey \$59.95 plus \$2.05 post.

A 336 page (25 × 18 cm) book presenting 165 species of maidenhair fern from all parts of the world. The nine Australian species included. The introduction covers methods of propagation, cultivation and disease control. The bulk of the book describes the plants opposite a colour plate presented in such a way that you should readily identify the plants you come across. A pricey book but of value to keen fern growers. Available by mail from Editor, Australian Plants.



Lechenaultia formosa △

▽ *Acacia adunca*

Reproduced from "The Gardener's Guide to Australian Plants".



Proteaceae of North Eastern NSW — Continued from page 243

For those who may care to extend their knowledge on the botanists view of plants we continue selected from the "Students Flora of North Eastern NSW" by N. C. W. Beadle. This will be of special interest to readers in NSW. Should this inspire some to venture out into the bush areas to look at plants anew, they can obtain the series of student books as directed opposite.

The following notes are extracted largely as written in the book to give a guide as to what will confront you. If too difficult to follow then turn to page 262 where the descriptions of *Persoonia* are in our usual style.

The Genus *Persoonia*

Shrubs or small trees. Leaves alternate, entire, sessile or shortly pedicellate. Flowers solitary (rarely 2 or a few in a cluster) in the leaf-axils, or in a terminal raceme. Perianth regular, yellow, the tube cylindrical, the lobes spreading and the segments finally separating. Anthers on short filaments inserted near the middle of the perianth-segments. Ovary stalked; ovules 2 or 1. Fruit a drupe. 72 spp., confined to Austr., except 1 in New Zealand. Mainly SW. Province of W.A. and S.E. Q. to Vic. and Tas. 1 sp. in Trop.

A. Leaves linear and up to 2 mm wide to terete or needle-like.

Leaves with recurved margins, becoming almost terete, 15-30 mm long. 1. *P. curvifolia*

Leaves grooved on the upper surface, convex below *3. Unnamed species.

Leaves terete, flat or with recurved margins. Leaves 25-35 mm long, 1½-2 mm wide, usually flat

..... 4. *P. virgata* R.Br.

Leaves 10-15 mm long, 1-1½ mm wide. Prostrate or decumbent glabrous shrub

..... 5. *P. chamaepeuce.*

Erect, to c. 30 cm high. Leaves terete, with a narrow channel above, 15-20 mm long, ½ mm diam.

..... 6. *P. tenuifolia.*

*A. Leaves flat, 3 mm wide or wider.

H. Leaves spatulate (widest in upper half). 7. *P. sericea.*

The key goes on to key in a total of 17 species.

Hicksbeachia pinnatifolia

Monkey Nut

Tree to 10 m high. Leaves alternate, up to 60 cm long, deeply pinnatisect, or pinnate, the segments c. 25 cm long, c. 4 cm wide, prickly-toothed; rachis winged or bearing prickly lobes; petiole c. 5 cm long. Flowers sessile or very shortly pedicellate in pairs in spikes or racemes 20-40 cm long. Perianth regular, c. 15 mm long, purplish. Fruit a hard drupe, c. 3 cm long, ovoid-angular, red or bright orange. Mainly rainforest, sometimes found on cleared rainforest areas. Bellingen R. and northward. Q. Flowers in winter. Seed edible known as Monkey Nut. See page 263.

The Genus *Macadamia*

Trees. Leaves alternate or whorled, the margins entire or toothed. Flowers in pairs in terminal or axillary, simple racemes. Perianth regular or slightly irregular. Anthers on short filaments. Ovary sessile, with a long straight style; stigma terminal; ovules 2, laterally attached at or near the top. Fruit a globular drupe (or follicle, see below) with a thin mesocarp; seed solitary and globular, or 2 and hemispherical. 10 spp. (1 Madagascar, 1 Celebes, 3 New Caledonia). Austr.: 5 endemic spp. NE. Q. to NE. NSW.

Macadamia tetraphylla

Queensland Nut or Bush Nut

Leaves in whorls of 3 or 4, more or less sessile, mostly 10-20 cm long, 3-5 cm wide; margins entire or prickly-toothed. Racemes up to 20 cm long, many-flowered. Perianth c. 6 mm long, yellow. Fruit globular, c. 25 mm diam. Outer more or less fleshy, part of the fruit splits on one side (fruit therefore sometimes regarded as a follicle), leaving a globular "nut" with a stony shell enclosing the seed or seeds. (The stony shell could also be interpreted as the endocarp of a drupe). Tree to c. 20 m high. Rainforest Coast, Richmond R. and northward. Q. Flowers in spring. The seed is edible and the species is cultivated in Q. and NSW. for its seeds, and also in Hawaii. Queensland Nut or Bush Nut. (Formerly known incorrectly as *M. ternifolia* F. Muell.).

Macadamia praealta

Ball Nut, Possum Nut or Beefwood

Leaves alternate, 10-25 cm long, 2-4 cm wide, the margins wavy. Racemes 5-12 cm long. Perianth c. 15 mm long. Fruit globular, to 5 cm diam. Tree to 20 m high. Rainforest Coast Clarence R. and northward. Q. Flowers in summer. Ball Nut, Possum Nut or Beefwood.

Books and Booklets available from the University of New England, Armidale, NSW 2351.

| | |
|--|--------|
| STUDENTS FLORA OF NORTH EASTERN NEW SOUTH WALES by N. C. W. Beadle | |
| Part I. PTERIDOPHYTES: 64 pp including 28 text-figures. 155 g. | \$3.00 |
| Part II. GYMNASPERMS, ANGIOSPERMS: Key to the families of the gymnosperms and 46 families of angiosperms. 350 g. | \$8.00 |
| Part III. ANGIOSPERMS: 240 pp and line drawings, 22 families. 445 g. | \$8.00 |
| Part IV. ANGIOSPERMS: 210 pp and line drawings, 30 families. 370 g. | \$8.00 |
| Part V. ANGIOSPERMS: 196 pp, many line drawings, 34 families. 346 g. | \$8.00 |

General Rainforest Guides

| | |
|---|--------|
| RAINFOREST TREES AND SHRUBS: A field guide to trees and shrubs of rainforests in NSW and south-eastern Queensland using leaf features. 57 pp, with 348 line drawings. By J. B. Williams and G. J. Harden. 230 g. | \$4.00 |
| A CHECKLIST OF THE RAINFOREST FLORA OF NEW SOUTH WALES: 39 pp. By J. B. Williams. 165 g. | \$2.00 |
| RAINFOREST CLIMBING PLANTS: A field guide to the rainforest climbing plants of New South Wales using vegetative characters. A key to the 140 species in N.S.W. with drawings of each species. By J. B. Williams and G. J. Harden (1980) 47 pp. 119 g. | \$3.00 |
| A KEY TO THE COMMON FAMILIES OF TREES AND SHRUBS USING VEGETATIVE CHARACTERS: 13 pp. By J. B. Williams and G. J. Harden. 65 g. | \$1.00 |
| FRUITS: A guide to some common and unusual fruits found in rainforests. By G. J. Harden and J. B. Williams 12 pp. 30 g. | \$1.00 |
| HOW TO IDENTIFY PLANTS: (An introduction to methods of studying flowers, fruits, stems and leaves with the aim of understanding the use of standard keys and floras. Includes sections on lower plants, plant names, collecting methods, keys, common native plant families and genera, rainforest plants and a glossary. Many line drawings are included). 41 pp. By G. J. Harden and J. B. Williams. 110 g. | \$3.50 |
| A FIELD GUIDE TO MANGROVES OF NEW SOUTH WALES: 7 pp. By J. B. Williams and G. J. Harden. 50 g. | \$1.00 |
| A GUIDE TO THE COMMON TREES AND SHRUBS FOUND IN RAINFORESTS IN DORRIGO NATIONAL PARK, N.S.W. 16 pp, with line drawings. By G. J. Harden and J. B. Williams. 105 g. | \$1.50 |
| THE PLANTS OF DORRIGO NATIONAL PARK: A checklist of the vascular flora. 16 pp. By J. B. Williams. 80 g. | \$1.00 |
| THE VEGETATION AND FLORA OF BRUNSWICK HEADS, N.S.W. 12 pp. By J. B. Williams and G. J. Harden. 80 g. | \$1.00 |
| FLORA OF THE NEW ENGLAND NATIONAL PARK: A checklist. 30 pp. By J. B. Williams. 180 g. | \$2.00 |
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| NEW ENGLAND EUCALYPTS: A key to the indigenous species. All 55 species are keyed out and illustrated. 28. pp. By J. B. Williams. 82 g. | \$2.50 |
| PLANTS OF COASTAL HEATH SCRUB AND SWAMP-HEATH IN NORTHERN N.S.W. 19 pp. By J. B. Williams. 112 g. | \$2.00 |

Booklet other than rainforest

| | |
|--|--------|
| METHODS IN PLANT MICROTÉCHNIQUE: Common fixing, staining and other procedures for anatomical, embryological and cytological study of vascular plants. 60 pp. By N. Prakash. 176 g. | \$3.00 |
|--|--------|

Postage and packing

| | Books up to 500 g | 500 g to 2 kg | 2-5 kg | 5-10 kg |
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| Delivery in NSW | \$1.30 | 3.20 | 3.70 | 5.00 |
| Outside NSW | \$1.75 | 5.50 | 6.50 | 11.00 |

Eastern Australian Proteaceae

Call from The Editor

Reference to the key on page 243 will show that we have yet to present many beautiful plants: *Xylomelum* — The Woody Pear, *Strangea*, *Orites*, *Grevillea*, *Hakea*, *Stenocarpus* — The Fire-Wheel Tree, *Oreocallis* and *Lomatia*. We need good slides and, especially, reports on their cultivation.

The Australian Mint Bush — *Prostanthera*

Our mint bushes, known botanically as *Prostanthera* are a group of plants that are excellent garden shrubs in all temperate areas. Most are easily grown and all are very rewarding, covering themselves with flowers, usually lilac to purple, in season. The *Prostanthera* Study Group proposes to create an arboretum in a number of places, and to maintain a live collection of all recorded species. This is their Bicentennial project culminating in a display of potted plants of all species at the displays in 1988.

Would you like to join the group? Write to the leader, Mr Brian Timmis, 53 Northcote Ave, Caringbah, NSW 2229.

What a fantastic idea. An arboretum of all *Prostanthera* would not be difficult to create or maintain given the support and plants from the Study Group. It would be nice to have them in many areas in each of the southern States.

To learn more about these plants we recommend the excellent book "The Cradle of Incense" by George Althofer, now available from the Editor at half price of \$7.50 plus \$1.50 postage.

Potting Mixes For Terrestrial Orchids

by J. N. Rentoul
Reproduced from "Growing Orchids"

Potting mixtures for terrestrial orchids should be based on two points, first that they relate to the genus even down to species level and second the nature of the habitats. Some species such as *Corybas* may come from damp habitats and others such as *Thelymitra* from semi-arid areas in which one would not expect terrestrial orchids to survive over Australia's summer months.

Corybas and *Thelymitra* may be the extremes, but it is possible to grow them in a general type potting mixture and flower them, as their basic needs are the same. Both depend to an extent on decayed material of some type for nutrient content in the potting mixture. Drainage of free water from potting material would be needed more by *Thelymitra* while *Corybas*, a difficult genus to cultivate, would possibly tolerate more moisture retained in pots or containers.

Most terrestrial genera depend on forms of mycorrhiza or fungus not only for germination of seeds but also for general plant health. It is known as a symbiotic relationship or a state of life where one needs the other to survive. Many of these mycorrhiza live in the roots.

It will be noted from this that the principal requirement for continued existence in any habitat is renewal of decayed material, whether from leaf drop or any other natural vegetation such as grasses or plants. This decayed material may be gathered in the area where the plants grow or may comprise leaf and grass detritus from compost bins. Lawn clippings which have been composted down for a year or more to a black tilth, preferably compacted and hard, are ideal for the purpose, particularly if old animal or bird manure has been added. This hard dry material should be rubbed through a sieve and reduced so that it will go through a 3 millimetre mesh (about one-eighth of an inch). This is the food source and should comprise only one-fifth of the total bulk.

Another part of the material may be made up from small weathered pine bark or similar roughage which will go through a 3 millimetre mesh. All dust and fine material which will go through fly-wire should be discarded. This also should comprise about one-fifth.

Two-fifths of the remainder should be a form of drainage material composed of fine gravel or coarse sand, with the remainder light sandy soil or sawdust combined with light sandy soil. The sawdust could be replaced by peat moss if it could be subject to any suspicion.

A filter base above the crocks should be formed which will allow free water through but bar the wash-down of any potting material. It could take the form of a light layer of chopped blackened pine needles or casuarina needles or any leaves which will not mat down to form a water trap. Pulverised eucalypt leaves and bark are suitable materials. They frequently comprise the growth bed of many terrestrial orchids. They do not break down as quickly as leaves from deciduous trees such as maples or oaks.



***Pterostylis vittata*.** A colourful *Pterostylis* species. It is a most variable plant. This one came from a dry scrubby area of the coastal region of South Australia. Most of the seventy species are green as shown typically below.



Growing Orchids

by J. N. Rentoul

Book Four — "The Australasian Families", in this series of books is devoted to growing our Australian orchids. The three previous volumes in this series; Book One, Cymbidiums and slippers; Book Two, the cattleyas and other epiphytes; Book Three, vandas, dendrobiums and others have been very well received and like Book Four are each available for \$22.50 (hard back bound and jacketed) or \$16.95 with a coloured card cover. You may order all by mail through the Editor, Australian Plants, adding \$2.00 per copy for postage. The four paper back books in a slipcase are available \$72.00 post free.

As a measure of content the articles opposite and on page 276 have been extracted together with their associated colour plates. These indicate the well-presented style and the extensive, practical competence of the author.

Boronia pinnata

by Allan Black, Toronto, NSW.

My early recollections of *Boronia pinnata* was one of contempt. It grew prolifically in close proximity to our home, and when wandering in the bush we would ignore it as though it was a leper. For some unknown reason we referred to it as 'dog rose'. Our eyes were invariably seeking the white petalled crystalline-textured *Boronia*, which in those days was more coveted. Regrettably, the passage of time and the developers' scythe have left their mark by rendering this species extinct in this region. My disdain for *Boronia pinnata* has mellowed with maturity and to assist in minimising further destruction of this species I decided to attempt to grow it in my garden. See photograph on page 284.

In the early 60's I built a rockery or brick pit, 3 metres long $\times$ 0.76 metres wide $\times$ 0.51 metres in depth above ground level against a garage wall. A number of weep holes at the bottom of the brickwork provided for water release. The inside of the walls were lined with sheet plastic to prevent contact with the cement joints, whilst at the base of the rockery was deposited charcoal to a depth of about 80 mm for drainage. This was covered with many bags of grey dune sand.

Being aware of the preference of *Actinotus helianthi* (Flannel flower) for grey sand I planted a number in the rockery in company with a few *Boronia pinnata* (purchased). Some of the flannel flowers attained a height of 1.6 m touching the guttering of the garage. The *Boronia* never progressed, and always looked anaemic and appeared to be ailing, and, as expected, died prematurely after a few months. The flannel flowers prospered for some 18 months, but then suffered the same fate as the *Boronia*.

In preparing the rockery I studied the behavioral pattern of these plants to ensure that my efforts would be conducive to good growth and longevity, but, alas, my inexperience overlooked one important aspect — insufficient sunshine.

The rockery was facing North, but the garage totally obscured the sun and therefore the plants received no sun at all in the winter. In mid spring and summer one end only of the rockery facing west received a little sun at midday and late afternoon.

As I was frustrated and disappointed the rockery remained disused for plants for close on 20 years. Then in December, 1982, I purchased two more *Boronia pinnata* plants and placed one in the sunny corner of the rockery. This plant died in a few months. I transplanted the other seedling (about 20 cm) to a 25 cm plastic bag and placed it under 70% Sarlon shade cloth in a media of river sand, clay loam and German peat moss, where it grew to twice the height of the original seedling in nearly nine months.

In the interim I dug out all the grey sand from the sunny corner of the rockery facing west to about 1 metre in length and down to the charcoal. I filled this area with two parts of river sand, one part of clay loam and some German peat moss. In November, 1983, I transplanted the seedling that was under Sarlon (43 cm) to the sunny corner of the rockery, after which I applied Osmocote pellets as a fertilizer, but no mulch. On the square of this corner I erected 1 metre high of green corrugated fibre glass to provide for wind protection.

In the wild this species is partial to shaded gullies, and this shrub now receives some light, and ample shade the year round. More than half of the plant area is exposed to rain, and is watered, depending on weather conditions, about once a week in summer. In early October, 1985, the plant was 1 metre high, $\times$ 0.9 m wide, and flowering prolifically. Light pruning was carried out on the 20/11/1985, with some cuttings taken.

The comparative development of this plant to the previous one was noteworthy, and my observations of this exercise will establish a few points of interest, namely:

- (a) Appears partial to the current medium.
- (b) Shaded area but some light vital to its well being.
- (c) Wind protection essential.

Smilax

Notes on the propagation of *Smilax australis*
by J. G. Conran.

Department of Botany, Monash University, Clayton, Victoria 3168.

Smilax australis R.Br. is a common and reasonably attractive vine in the rainforests and sclerophyll forests of Northern and Eastern Australia, and is one of approximately six native species forming part of the family Smilacaceae (Conran and Clifford, in press). They have large alternate leaves with dicot-like venation patterns, and the new foliage is an attractive reddish-pink in *S. australis*. The plants are dioecious and have numerous small greenish-white flowers in axillary umbels. As part of a current study of the taxonomy of the Australian species, efforts were made to ascertain efficient methods of propagation.

Seed: The seeds of *S. australis* are borne singly, or a few, in succulent black berries which are probably animal dispersed. Seeds were removed from ripe berries, washed free of any adhering tissue, and planted in 1:1 sand/peat. Kept under a 50% shadehouse in Brisbane they were found to take about 12 months to germinate, but with only about 10-20% germination. Seedling growth was also slow.

Cuttings: Mature stem sections, each bearing 3 whole leaves, were treated at the cut stem surfaces with a rooting hormone powder, placed in 10 cm pots of 1:1 sand/peat, and sealed in plastic bags. The cuttings were kept at c. 25°C with heavy (70%) shade, and provided with bottom heat at c. 30°C. Within a month of planting, callus tissue formed in the axils of many of the leaves, and after six weeks, those leaf axils planted at or below soil level, developed roots and shoots. After a further 3-4 weeks, the aerial calli developed roots and shoot buds, but these developed much more slowly than those calli in the soil. About 60% of the cuttings successfully established, most cuttings producing several shoots.

These results suggest that the more efficient method of propagation would be by cuttings. Higher strike rates and/or faster development of calli might be encouraged by laying the cuttings flat on the potting mixture rather than vertical planting as was used here.

Species such as *Smilax australis* (select forms), *S. glycyphylla* Sm. and *S. calophylla* Wall. ex A.DC (the *Smilax* sp. of Williams (1984)) would be worth including into cultivation.

Dendrobium tetragonum

by J. W. Rentoul
Extracted from "Growing
Orchids", see page 373.

Dendrobium tetragonum (Cunningham), 1839. Flowering season, September to January, variable. Habitat, central coastal NSW to North Queensland.

This *Dendrobium* is one of the most peculiar of the genus with pseudo-bulbs tapering from wiry at the rhizome to a completely square section for the remainder of the length to the two to four or five leaves at the apex. It is completely pendulous. There are several distinct types, all from separate regions and none are easy to cultivate because it is almost impossible to grow them in containers. They must be attached to wood, cork or treefern mounts. Tree branch sections cut from melaleuca, casuarina or other hard-barked trees are also suitable. The root system is fine and rather sparse.

The type form of *D. tetragonum* usually has pseudo-bulbs about 30 centimetres (about 12 inches) long. This form is frequently coastal or swamp loving, growing mostly on melaleuca. The shortest may be found in inland gullies of open nature and seldom in heavy timber areas, while *D. tetragonum* var. *giganteum* is mostly found in Queensland, particularly in the northern sector, where it may grow at all elevations but principally in the low to middle altitudes.

Around the Clarence River basin in New South Wales to about the vicinity of the Queensland border several variants are common, with the best of them bearing flowers almost as large as *D. tetragonum* var. *giganteum*, mostly growing in wet moist areas on melaleuca trees. In the more out-of-the-way places it is common to find plants with up to 100 or more pseudo-bulbs. Unfortunately these patches are becoming rarer and the thick populations are almost stripped bare.

Alan Cunningham, who named this orchid, must have seen it in unspoiled thousands of plants when on his exploratory travels in this area. Most of the coastal plain of the northern New South Wales region is now almost bare of the swamp *Melaleuca* forests and other trees of the past.

Dendrobium tetragonum (Cunningham) is allied taxonomically to *Dendrobium speciosum* (Smith) and *D. falcorostrum* (Fitzgerald) among others, and as Dockrill remarks, it should be reclassified, if only for morphological reasons exemplified in growth and flowers.

While botanists and taxonomists are inclined to subdivide species into too many sections, *Dendrobium tetragonum* is better kept to three. The largest is the north Queensland form, *D. tetragonum* var. *giganteum*, which is half as big again as the type form. It also has more colour in general and transfers it well into hybrids. A pale larger than normal form has also been used with success, producing some very fine clones of the hybrid *Dendrobium* 'Hilda Poxon' (*D. tetragonum* × *D. speciosum*), and the hybrid *Dendrobium* 'Star of Gold' (*D. tetragonum* × *D. falcorostrum*). It is a most dominant species in cross-pollinations, particularly in the matter of the flowers, and transferring the almost square cross-section of the pseudo-bulbs. Few, if any, have the drooping habit of *D. tetragonum*, and they present the flowers very well, as the illustrations show.



Dendrobium 'Hilda Poxon' (*D. speciosum* $\times$ *D. tetragonum*). This is one of the outstanding hybrids produced from the Australian catalogue. It is very large, rather spidery, but happily getting the combination of flower numbers midway between the two species. This is one of the more brightly coloured forms, the flowers measuring about 8 centimetres (about 3¼ inches).



Dendrobium 'Aussie Ira' (*D. 'Ellen'* $\times$ *D. tetragonum*). Back-crossing to obtain size of the original with added colour frequently opens up an avenue to improvement. This hybrid, if used correctly, could be used to gradually improve the spidery petals and sepals. The flowers are about 8 centimetres top to bottom (about 3¼ inches). The leafage of *D. 'Ellen'* and *D. 'Aussie Ira'* is notable because it resembles that of *D. kingianum*, not *D. tetragonum*.

Australian Orchids

The recognised, world wide, reference to Australia's tropical orchids is "Australian Indigenous Orchids", Vol. 1 by A. W. Dockrill. It is to be reprinted at the end of this year. We are now calling for suitable colour slides to illustrate it adequately. Who will help?

Soil Care

Part 5 of Eco-Garden
a series by Coralie Whitby

Many of our garden soils have been impoverished by prolonged, natural leaching and bushfires and by removal of timber or crops without compensation for elements robbed in this way. What does the forest example show, as to how we should improve the general health of garden soil, before and after planting?

Forests can re-establish themselves on abandoned farmland, following successions of weed plant communities culminating in a diverse flora which includes legumes. (Legumes restore the nitrogen status of the soil.) The succession from abandoned farmland to forest may take a hundred years or more, but the step, abandoned farmland to garden, must be accomplished much faster.

Application of this secondary succession to gardens

Some of our soils are too eroded and compacted to carry even a crop of weeds: they have far poorer fertility and structure than abandoned farmland. They should first be dug to below the compacted layer; then rock dusts and organic residues should be added and incorporated (if necessary, with calcium carbonate to correct the pH by one unit). (There is a table of quantities in chapter 8 of my first book*, and this will be repeated in my second.) Then a cover crop should be planted. This could be a clover or lupins, field peas or tick beans — all of these will add organic matter and nitrogen to the soil if they grow (but ryecorn is best while the pH is very low). Dig in the resulting crop, however poor, before it seeds, and a fortnight later add rock dusts and other soil amendments at the same rate and sow again. Repeat the additions and sowings until at least two abundantly healthy cover crops have been sown and recycled. When the last plant residues have completely broken down, it is time to put in your Australian and local native plants. This sequence applies the forest's method of re-establishing itself on a despoiled area, but the improvement to the soil will have been pushed far more intensively and over a shorter period.

Use of rock dusts and wood products

In general, the minerals in rock dusts and organic residues are at the most sparingly soluble, as are the minerals in soil under forests. A forest makes use of mycorrhizas and bacteria to ensure that it is supplied with just sufficient solubilized mineral for optimum growth — in this way, it avoids the fluctuations in the soil mineral balance and pH which result when more dissolved mineral is present in the soil than the plants can take up immediately. Rock dusts which can be added to an Australian garden include rock phosphate (for phosphate and calcium), feldspar (for potash), and dolomite (for magnesium and calcium). These rock dusts are available from companies specializing in minerals and mineral earths. Trace elements are most naturally obtained by the use as litter of untreated hardwood sawdust or woodshavings, mixed with rock dusts and blood and bone to satisfy bacterial needs during decay.

At least once a year during late spring it will be necessary to add two or three inches of such a mulch; and this routine should be maintained until the trees and shrubs have reached maturity, or longer if omission produces signs of starvation. After that, the garden should be able to exist on its own recycled litter.

***Eco-gardening: the six priorities.** Australian Plants will publicise when available.

***Grevillea* 'Winpara Gem'**
Grevillea olivacea
Grevillea thelemaniana

The Development Of
A Cultivar
by Tony Clark

Grevillea "Winpara Gem" is a vigorous upright shrub which grows to about 2 m × 2 m. Its parents are *Grevillea olivacea* and *Grevillea thelemaniana* (upright green leaf form) two West Australian coastal species from north of Perth. Winpara is the name of a dairy farm near Jervois S.A. where this plant first originated. The cultivar has been registered at the ACRA; accession No. 340.

Grevillea olivacea is a large upright shrub to 4 m × 4 m in S.A., which has been mistakenly sold as *Grevillea argyrophylla* here for a number of years. The cutting-grown form, seen most often here, has dark green oval leaves with a silver reverse and as its name implies resembles a young olive tree. The flowers are orange, wheel shaped when the styles are released and displayed just inside the foliage. *Grevillea olivacea* has a good frost tolerance, grows well in sand, clay or limestone, thrives near the coast and grows satisfactorily in a 350 mm rainfall area once established. There are also forms about with three lobed leaves and George Lullfitz has collected a number of finer-leaved forms between Greenhead and Lehman in W.A. *Grevillea olivacea* is a good bird attractor but tends to hide its flowers.

Grevillea thelemaniana is a variable species with upright and prostrate forms; some with grey and some with green leaves; flower colour orange but mostly red. Most forms are terminal flowering and good bird attractors. In South Australia the new tips can be killed by severe frost but this only serves as a form of natural pruning which induces the plant to branch and grow more densely. *Grevillea thelemaniana* seems to need the equivalent of 500 mm (20 inches) of rainfall to grow really well but is happy in most soils including sand, clay and alkaline loam to pH 8. It is our experience here in a state which has large areas of alkaline soils, that plants that are lime tolerant usually grow well in neutral or acid soil, but plants from acid soils often fail here. For this reason many beautiful eastern states cultivars fail to produce satisfactory growth without major soil modification here.

Grevillea 'Winpara Gem' is a spontaneous seedling which arose in a garden between mature plants of *Grevillea thelemaniana* and *G. olivacea*. A number of seedlings arose at the same time and were transplanted to other sites. The initial seedling leaves were oval resembling those of *Grevillea olivacea* but by about the fifth pair were three pointed like those of *Isopogon trilobus*. When the plants were about 400 mm tall (16 inches) the foliage began to resemble that of our cutting-grown plants. When the plants were about one metre tall in 1982 we experienced two lots of 8 black frosts with temperatures going below -5°C, killing thousands of plants and bankrupting some nurserymen in this state. Needless to say *Grevillea* 'Winpara Gem' made active growth through this period and was completely untouched by the frost. The flowering begins in the centre (like *G. olivacea*) and proceeds up the stems till the plant flowers all over terminally. Flowers are pink in bud, turn red as the styles release and fade to orange. Last year the original plant was in heavy flower from the first of April till the end of November with sporadic flowers at other times. Presumably the larger the specimen the longer the flowering period because the flowers open progressively up the stems.

One seedling growing in saline soil near Tailern Bend has golden yellow flowers and another at Peake has very dark red flowers. We started growing this plant from cuttings in March last year and experienced more than 90% strike with cuttings taken most months since. One plant sent to Ray Page in Sydney is about one metre tall growing strongly in heavy soil and was unaffected by the fungi which plague *Grevillea* growers in Sydney over summer. Four plants in Roger Elliot's garden in Montrose are thus far doing well and appear to be good growers in his part of Melbourne. Several plants are also doing well in Perth in sandy soil with the consistency of sugar and one would expect the plant to be reliable there also. The key word is "reliable" because if a plant needs special soil preparation, protection with fungicides and insecticides, in my opinion it would need to be a very remarkable species to justify continuing to grow it.



I believe *Grevillea* 'Winpara Gem' (photographed above) is an F1 hybrid more vigorous than either of its parents. The original plants set a lot of seed last year but we have not tried to germinate it to see if it is viable. Since taking cuttings the original plant has improved its form considerably and I would recommend fairly hard pruning to anyone who cares to grow it. In South Australia we will be releasing it at the International Garden Festival in March this year (to be opened by the Queen) and interstate nurseries will be releasing plants when they have built up sufficient stock numbers.

Any commercial growers interested in propagating this cultivar can obtain material and labels by contacting me at Nellie Nursery, 46 Randell Street, Mannum, S.A. 5238 or (085) 691 762 or (085) 32 5188 or (085) 69 1204 A.H.

Australian Bicentennial Stamps To Be Released Shortly

Australia Post will be issuing the stamps shown below to commemorate Cook's voyage of discovery and the discoveries of his botanist, Joseph Banks.



Floral Emblems of Australia

by Anne Boden

An unusual little book (30 pages 250 × 175 mm) produced by the Australian National Botanic Gardens and available from the Australian Government Printing Service bookshop for \$3.60. The text describes the historical background leading to the adoption of each state emblem and includes a description and interesting notes about the nine well-known plants involved.

Wildflower Gardens

It is hoped to include in each issue of Australian Plants, colour photographs of wildflower gardens, or sections of gardens featuring certain plants to present a pleasing setting, and we hope a picture. The photograph on the top of page 248, is a pleasing picture and this is no doubt a pleasant garden we would like the owner to describe. The photograph on the bottom of page 248 is undoubtedly of a picturesque section of a garden but as a photograph it is cluttered. Are there any photographers who will take up this challenge to produce good slides of wildflower gardens over the coming season? — Editor.

Our Books At Special Prices

To relieve pressure on our storage facilities the following books are to be available at half price.

West Australian Plants for Horticulture — Parts 1 and 2 by K. Newby. A valuable guide to the plants with horticultural potential. Normally \$12.00.

Cradle of Incense, The Genus *Prostanthera* — by G. W. Althofer. The only reference to our Mint Bushes. Normally \$15.00.

Acacias of New South Wales — by I. Armitage. Normally \$12.00.

Wildflower Nurseries in Queensland

Fairhill Nurseries — Fairhill Rd., Yandina, 4561. Tel. (071) 46-7193, P.O. box 100. Large range of trees, shrubs, ground covers, climbers, ferns, palms and orchids for the sub-tropical and tropical east coast. Extensive display gardens 8.30 a.m. to 5 p.m. any day. New comprehensive catalogue now available \$2.00 posted.

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Wildflower Nurseries in New South Wales

Bundara Native Nursery — 37 Carters Road, Dural, Sydney, 2158. Tel. 651-1962. Specialising in *Grevillea*. Open weekends. Weekdays please ring first.

Cranebrook Native Nursery — R23 Cranebrook Road, Cranebrook, N.S.W. 2750. Tel. (047) 77-4255. Five km north of Penrith, between Tadmore and Taylor Roads. Open 10.00 a.m.-8 p.m. Closed Sundays.

Denovans Nursery — 188 Marco Ave., Panania, 2113. Tel. 77-8891.

Sydney Wildflower Nursery — Branches at Duffys Forest 450-1785, Heathcote 520-3335, Marsden Park 637-4585.

Floralands — Parry's Nurseries Pty. Ltd. Kariang via Gosford, 2250. Tel. (043) 40-1142. Preservation by cultivation. Send \$1.50 for descriptive catalogue.

Kentlyn Native Plants — 96c George's River Rd., Campbelltown, 2560. Tel. (046) 25-1583. Open 7 days.

Telopea Valley Nursery — George Downes Drive, Kulnura, 2250, 1.5 km past Kyola Road. Rare and unusual natives. Phone: (043) 76-1318 (best at 9.00 a.m.). Send S.A.E. (230 x 100 mm) for list. Regret no mail orders. Closed Tuesdays.

Wirrimbirra Native Nursery — Hume Hwy, between Bargo and Tahmoor E. side 2574 (3 km from Freeway entry). Wide range including unusual plants. Tel. (046) 84-1112.

Wirreanda Nursery — End of Wirreanda Rd., Ingleside, 2101. Tel. (02) 450-1400. Growers of advanced and semi-advanced native trees and shrubs. Open 7 days.

Deanes Orchid Nursery — Specialist in Australian Native Orchids, 29 Hemers Rd., Dural, 2158. Tel. (week-days) (02) 651-1798. Nursery closed Friday. Plants sent anywhere. Please send for descriptive list.

Wildflower Nurseries in South Australia

Les and Kay Nesbitt — 18 Cambridge St., Vale Park, S.A. 5081. Tel. (08) 261-1550. Specialists in the propagation of Australian terrestrial orchids. S.A.E. for list and culture notes.

Nellie Nursery — 46 Randell St., Mannum, S.A. 5238. Tel. (085) 691-762. 129 Adelaide Rd, Murray Bridge, S.A. 5253. Tel. (085) 325-188. Rare plants — over 1000 species grown including 120 eremophilas. Stock changes weekly, so enquiries should be by phone. Hours of business — Tuesday to Friday 9-5, Saturday 9-12.30, Sunday 10-2. Other times by appointment.

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Pomonal Wildflower Nursery — At the foot of the Grampians. Sign opposite Grampians Store Pomonal. Follow Robins Road and turn left into Wildflower Drive. We have a large range of plants including local species at reasonable prices. Open most of the time but phone (053) 56-6250 to check. Visitors are welcome to browse round our gardens and natural heathland.

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Boronia pinnata

Photography by H. A. Morrison

For cultivation of this beautiful plant, see page 274.