

Australian Plants

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Dryandra formosa

DRYANDRAS FOR THE GARDEN . . . By Alf Gray, West Australia

It must be understood that this is not an attempt to classify the *Dryandras* botanically, but merely to give an idea of their appeal and potential to the culturist. Many noteworthy species cannot be dealt with here for it would take volumes to extol the virtues of *Dryandras* in detail. Confined entirely to

that portion of Western Australia west of a line between the Murchison River in the north, and Cape Arid, about one hundred miles east of Esperance, the Genus *Dryandra* contains more species than does *Banksia*, yet of these, few have to date been brought under cultivation in other parts of the Commonwealth.

Being closely related to the *Banksias*, to which they are "linked" by strange intermediate *Banksia ilicifolia*, particularly the rare inland form, *Dryandras* show several qualities for which they are deserving of wide popularity and cultivation:

- (i) Almost exclusively winter-flowering, graceful sprays of flowers and foliage of many species lend themselves admirably to indoor decoration when little else is available.
- (ii) They have much greater variety of foliage form than we find in *Banksia*, while the iridescent sheen in the blooms of some golden-flowered species is perhaps not approached by any other flower in nature.
- (iii) *Dryandras* in general favour inferior soil-types, such as the remnants of the original duricrust and gravelly laterite ridges of the Koodie-Woodie Ranges, the Dinner Hill, Hill River, and New Norcia districts. Some species are found in granite country, but generally in positions where few other plants can thrive. Such subjects are unlikely to be particular when introduced to gardens, while in the inland areas, where few *Banksias* are likely to be happy, the *Dryandra* has great promise.

From the cultural angle, *Dryandras* may be roughly divided into several groups. The first of these would include the tall, broader-leaved species such as are found forming dense thickets in the districts mentioned above. Foliage typically is rather stiff, sometimes holly-like, and not deeply incised. *Dryandra sessilis* (syn. *D. floribunda*) is undoubtedly the most familiar of this group, and favours superior soil types. *Dryandra praemorsa* has truncated oak-like leaves, and bright yellow flowers suffused with pink at the base, and is an easy species to grow. Others in this group include *D. patens*, *newardiana*, *serra*, *longifolia*, *foliolata*, etc. It is important to stress that practically all the tall, upright species are forest dwellers, and should welcome some shade and soil acidity under cultivation.

The second group contains a number of southern species, typically with long, very narrow and finely serrated foliage. *Dryandra formosa* is probably the tallest species, although it grows on the seafront around Albany as a very stunted shrub of the granite slopes. It is certainly one of the best for general use, with the characteristic metallic sheen in its flowers—more like a fine example of the gold beaters' art than a living flower. Closely related to *Dryandra formosa* is *D. nobilis*, the "Great *Dryandra*", with flowers of a rich golden colour, and as large as, or larger than, *D. formosa*. The foliage is dense, and a rich glossy green, the shrub well-shaped and 6 to 8 feet in height.

With upright growth, and very slender serrated leaves, light green and somewhat deflexed, *Dryandra polycephala* can for convenience be included in this group, although not a southern species. The flowers are borne in profusion, often well above the foliage, and are a particularly striking shade of lemon yellow. It favours the poorest lateritic gravels in common with many others, and is a very fine species.

Close to *D. polycephala*, *Dryandra seneciifolia* is another great curiosity. The leaves are deflexed down the stem, and very narrow, forming slender pyramids of light green foliage. It is an unforgettable sight to see a colony of this *Dryandra* on the sand plain immediately north of the Stirling Range. The flowers are rather small, with reddish bracts, and are borne in every

Dryandra In East Australian Gardens

By R. DONEY

It is probable that nobody has observed more *Dryandra* in the field than Mr. Alf Gray. Apart from my own experience in raising a few seedlings, most of the little knowledge I have of these plants in cultivation was gleaned from tending plants which he raised and planted in a Queensland Arboretum.

Foliage and form are perhaps the most attractive things about *Dryandras*, plus a profusion of flower during winter months when so few shrubs show colour. Can you imagine the effect shown by shiny dark teal saw-like leaves surrounding masses of canary yellow blooms, borne along canes making fantastic informal shapes? *Dryandra hewardiana* has this beauty. Though pruning would doubtless be possible on these plants, I consider such would be sinful spoliation, for irregular form is much of the beauty of many *Dryandras*.

Though I do not know of any *Dryandra* growing in Eastern Australia (other than as above) I feel that Qld., N.S.W. and Victorian areas of light to medium soils with good drainage, where Waratah and/or Proteas are satisfactory, should provide conditions suitable to *Dryandras*. Subject to damping-off when small seedlings, *Dryandras* appear to be hardy to frost, to heat, to shade, to full harsh sun and, I consider, to humidity, when established. It is probable (as with many other natives) that "good" soils would be appreciated by *Dryandra*, but possibly neutral or alkaline soils would not suit these plants. I consider a pH between 5.5 and 6.5 would be safe and satisfactory. May I repeat that I know little about growing *Dryandra* but the growing of many other natives has surely shown me that most of our plants grow in the field in spite of their environment and benefit from better conditions, provided drainage is adequate.

I note that Mr. Althofer, Nindethana Nursery, Dripstone, N.S.W., lists seed of *Dryandra formosa* and *D. baxteri*, both with showy foliage. He may be able to offer plants or seed of these and others suggested are as follows:—*D. fraseri*, *D. vestita*, *D. speciosa*, *D. hewardiana*, *D. patens*, *D. cuneata*, *D. praemorsa*.

Seed should be sown in a gently firmed open medium such as sieved compost of *Casuarina* needles or leaves (not Eucalypts) or a 75/25 mixture of rich light soil and peat moss, in late winter or early autumn. If without a glass-house use a wooden box with a bottom of fibro with holes for drainage, and a bottom layer of coke or stones, to a depth of one inch. Site the box in a position of partial shade such as under a tree or sparse bush but shelter from the wind and particularly from wog infestation from the ground by standing on a box. Cover the box with a sheet of glass suspending the glass about one inch above the box, until the seedlings emerge. The glass is then removed. At all costs avoid humid conditions. Do not hasten for results as germination may be irregular and pot up as early as possible (first set of true leaves). Pot up in the same mixture recommended above for the seed box. You could add a little gravel to keep soil open but this should not be necessary. Grow on and harden off for 3-6 months before planting. The best method for hardening off seedlings is to place in a position to receive early morning sunlight for half an hour each day for a week. Increase to 3-4 hours daily by half an hour increments a week apart when a location giving at least half a day of sunlight may be chosen to carry plants until firm sturdy growth is shown. This latter period of hardening is not to be judged by any limit of time and I am afraid it is a matter of experience. Water carefully and sparingly until established. Plants must be kept moist by watering as often as climate requires but not more often than daily. As Mr. Gray says. "The *Dryandra* has great promise."

DRYANDRAS FOR THE GARDEN Continued

axil from top to bottom of 5-foot specimens, the general appearance resembling a miniature pagoda.

Coming now to the dwarf species, we find a whole series of prostrate or semi-prostrate habit, seldom above three feet in height in even the largest-growing ones. The flower colour varies from wine red to cream or white. Some have finely-serrated foliage similar to *D. formosa*, others, such as *D. pteridifolia*, *D. runcinata*, and *D. preissi* are fern-leaved, with novel flowers of entrancing beauty. *Dryandra pteridifolia* would indeed be accepted by the uninitiated as a fern—until the creamy-white flowers were revealed, clustered at the base of the stem. In fact, the elfin beauty of the flower and foliage is a notable feature of the dwarf *Dryandras*, many of the group being indeterminable except by a trained botanist, and then of necessity one familiar with the flora of Western Australia. *Dryandra bipinnatifida* is a curious prostrate species with finely-divided upright leaves, both flower and fruit being usually quite hidden in the soil. For its leaves alone it is a worthy subject, and where conditions are favourable, these may develop an intricate compound form, projecting 18 inches or more from the ground.

Some outstanding species defy grouping. *Dryandra speciosa* can be likened to no other species. Foliage is simple and almost heath-like, not serrated. The shrub, rounded and compact, reaches 5 feet under a 15 inch rainfall in light sand plain scrub. Flowers are pendant and bell-shaped, the brownish-grey outer bracts shielding the true delicately-shaded salmon pink flowers within. From any point of view—shapeliness of the shrub, or the unique beauty of the flowers—this species is outstanding. It is rather tender in the seedling stage, and seed, if available, should be sown in the late summer or autumn to avoid the damping-off to which many dry-climate plants are prone. It is quite hardy when a few months old.

This by no means disposes of the unusual in *Dryandras*. *D. horrida*, *D. vestita*, *D. conferta*, *D. shuttleworthiana*, *D. kippistiana*, *D. fraseri* and *D. ashbyi* are a few more with highly ornamental foliage and flowers. *D. vestita* has stiff curling serrated leaves in whorls, set at perhaps 4 or 5 inch intervals on erect stems, surmounted in autumn by long, straight, coloured shoots. The whole effect is eye-catching, even to those who might be expected to be indifferent about the flora. *D. fraseri* has glaucous foliage, and does not exceed 4 feet in height, producing its large yellow flowers in June and July. The species is widespread, and is used for winter decoration by appreciative farmers' wives.

The *Banksia* and *Dryandra* are closely related and very similar in appearance. They may be distinguished from each other as follows:

FLOWER—The *Banksia* has dense cylindrical spikes (with the exception of *Banksia ilicifolia* which has more or less hemispherical heads closely subtended by foliage), while the *Dryandra* has dense "shaving brush" or protea type heads often surrounded by bract-like leaves.

SEED—*Banksia* valves are set at right angles to the cone axis (or laterally to the vertical axis of the cone) and are usually embedded in a compact mass of styles. *Dryandra* valves are irregularly set in the top of the ripened flower amongst styles and surrounded by bracts so that they are more or less hidden until they open to shed seed. Many *Dryandra* cast seed annually, but most *Banksia* retain seed until drought, fire or death releases them.

CARPELS—In *Banksia* the woody valves of seed follicle are firmly fused to the receptacle whereas with *Dryandra* the valves are lustrous and horny forming a capsule resembling an apple seed or miniature bi-valve shell and are loosely attached to the receptacle.

continued on page 17

THE GENUS *DRYANDRA*

By R. D. ROYCE—Government Botanist Western Australia

The genus *Dryandra* was named by Robert Brown in honour of Jonas Dryander, a Swedish botanist, who was a student and close friend of Linnaeus, and who was closely associated with botany and the scientific societies in England between 1782 and 1810. The genus consists of some 50 species of xerophytic shrubs which are completely endemic in south western Australia. The genus assumes several distinct life forms, from lowly prostrate subshrubs to small trees, and together they comprise one of the most interesting and spectacular, though one of the most difficult genera amongst the Western Australian endemics.

The genus was first described as *Josephia* by R. A. Salisbury in 1809. This name was not taken up, however, and Robert Brown's name published in the following year has been accepted by botanists throughout the world. In 1830 Brown proposed to divide the genus on the character of the fruit. In *Dryandra falcata* he observed that the capsule was "one seeded by abortion, the abortive ovule forming a wing-like appendage to the dividing plate of the capsule". This was the character of his genus *Hemiclidia*. However, this one-seeded condition of the capsule occurs to a greater or lesser extent in many species of *Dryandra*, and appears to be quite common in a number of species of *Banksia* and *Hakea* and occurs occasionally in *Grevillea*, but is never a constant feature.

In life form the species of *Dryandra* fall into three well defined groups of subshrubs, shrubs and small trees. The subshrubs, as typified by the Couch *Dryandra* (*D. nivea* R. Br.) are low spreading plants of less than a foot in height. The typical form is found in sandy soils in which the stems are always underground, only the leaves and flowers appearing above the ground. In the harder gravelly soils of the Darling Range and the interior, the aerial stem development is much greater, and the plants may attain 18"-24" in height. Some nine species of this type occur, and with the exception of the Couch *Dryandra* are rather restricted in distribution.

The vast majority of the species are shrubby in character, and attain heights of up to 6-7 feet. They are usually erect in habit with short lateral branches, as for example *D. carlinoides* Meissn. and *D. polycephala* Benth. or densely bushy plants such as *D. armata* R. Br. and *D. cirsioides* Meissn. A few species assume an untidy habit with several divergent stems densely covered with long leaves which give the shrub a very shaggy appearance. Such a plant is *D. nobilis* Lindl.

The taller shrubs or small trees are few in number but include the most widely distributed species in the Parrot Bush, *D. sessilis* (Knight) Domin. This tree attains a height of 18-20 feet and is usually of a pleasing shape. *D. cuneata* R. Br. of the south coast is a very similar plant but has larger flowers and a more spreading crown.

To be continued next issue.

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By W. E. BLACKALL and B. J. GRIEVE

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This two volume work with instructions on how to use the key contains 3,000 species of Western Australian flora—the line drawings assist in the identification and the illustrated glossary together with indices of common and scientific names completes these handbooks of the wildflowers of the State.

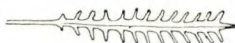
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Key to the Species of *Dryandra*4. *DRYANDRA*

A. Leaves pinnatifid divided almost or quite to mid-rib



B. Lobes separated by sinuses with intervening leaf margin parallel to mid-rib



C. Lobes almost flat

c. Lobes revolute



f.s. of lobes

Intervening leaf margin

SECT. 1.

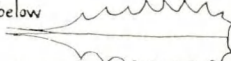
SECT. 2.

B. Lobes contiguous or intervening leaf margin not parallel to mid-rib



SECT. 3.

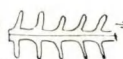
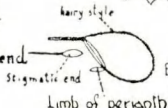
A. Leaves with teeth or lobes hardly reaching below 1/2 way to mid-rib, or leaves entire



SECT. 4.

SECT. 1.

A. Style 7-8cm. hairy with ovoid stigmatic end.

I. D. nana
Dwarf Dryandra

A. Style under 5cm.

B. Fl. heads axillary.

NINDETHANA NURSERY

BOX 5, DRIPSTONE, N.S.W.

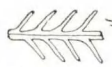
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All Australian natives with special supplies of plants and seed of West Australian species.

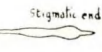
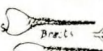
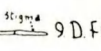
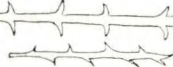
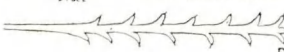
THE PIONEER NATIVE PLANT NURSERY

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DRYANDRA, SECT. I. CONT'D

- C Bracts glabrous with woolly ciliate margins.   2 D. serratuloides
- C Bracts villous: lobes recurved at margin.   3 D. cirsioides
- B Fl-heads terminal.
- C Bracts glabrous or loose rusty tomentose.  4 D. Preissii
- C Bracts densely white villous.  5 D. pteridifolia

SECT. 2

- A Lobes regularly pinnate, the sinuses narrow
- B Leaves mostly bipinnate at end  6 D. bipinnatifida
- B Leaves all once pinnate
- C Lobes oblong obtuse  7 D. obtusa
- C Lobes linear acute
- D Outer bracts oblong glabrous margins ciliate    8 D. arctoides
- D Outer bracts narrowed into long densely hirsute points    9 D. Fraseri
- D Outer bracts narrowed into glabrous points   10 D. Ashbyi
- D Outer bracts narrow lanceolate villous.  11 D. conferta
- A Lobes distant sinuses broad
- B Lobes linear, short (under 6mm)
- C Bracts glabrous  12 D. comosa
- C Bracts with long plumose points.   D. erythrocephala
- C Bracts with villous points
- D Heads concealed in dense floral leaves & bracts   13 D. seneciifolia
- D Heads not concealed   14 D. horrida
Prickly Dryandra
- B Lobes linear, above 6mm
- B Lobes triangular  11 D. conferta

bracts—reduced upper leaves of a plant in flower.

pinnate leaf—a compound leaf whose leaflets are arranged on opposite sides of common.

bi pinnate—twice pinnate.

style—joins stigma to the ovary of a flower.

acute—pointed.

ciliate—bordered by hairs.

glabrous—a surface wholly destitute of hairs

hirsute—covered with rather long spreading hairs

lanceolate—broadest below the middle and tapering to each end

linear—long and narrow with parallel sides.

obtuse—blunt

plumose—applied to hairs invested with fine branches like a feather

tomentose—covered with closely matted short hairs

villous—covered with long weak hairs

DRYANDRA, SECT. 2. CONT'D

C Involucre 4-8cm long.

D Limb of perianth glabrous.

D Limb of perianth hairy

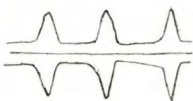
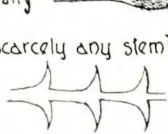
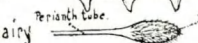
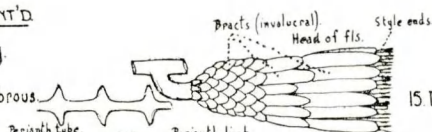
E Dwarf shrub. [scarcely any stem].

E Tall Shrub.

C Involucre under 1cm.

D Bracts broad obtuse lobes ± 1 cm

D Bracts narrow with long subulate points lobes 3-4mm

15. *D. proteoides*16. *D. runcinata*17. *D. longifolia*
Long-leaved Dryandra18. *D. patens*19. *D. polycephala*
Many headed DryandraSECT. 3.

A Lobes not completely contiguous.

A Lobes contiguous.

B Lobes almost flat } 15 lobes

C Lobes not divided to mid-rib

C Lobes divided to mid-rib

D Leaves 3-5cm in breadth.

D Leaves narrow, under 1cm in breadth.

E Fl-heads terminal.

E Fl-heads axillary or terminating short axillary branches.

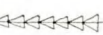
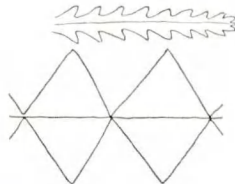
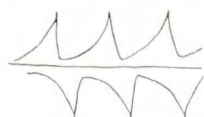
F Lobes sharply recurved at margin only

F Lobes quite flat } 15 lobe

G Style above 3cm.

H Leaves 15-25cm

H Leaves 5-8cm: very variable.

20. *D. Hewardiana*21. *D. foliolata*22. *D. calophylla*23. *D. formosa*
Showy Dryandra24. *D. Baxteri*25. *D. nobilis*
Great Dryandra26. *D. armata*
Prickly DryandraTO BE COMPLETED NEXT ISSUE

axillary—in the axil formed by leaf and branch

involucre—one of several whorls of bracts (reduced upper leaves) surrounding a head of flowers or a single flower.

perianth—the floral envelope of the flower.

recurved—bent under

style—joins stigma to the ovary of a flower

subulate—narrow and gradually tapering to a fine point

terminal—situated at the extremity of some part

HOW TO GROW AN EPIPHYTAL ORCHID

By R. F. LEANEY, F.R.H.S.

When the editor asked me to write an article under the above heading, my first reaction was to wonder how anybody could cover such a vast subject in anything less than a good-sized book. After studying the heading, the simple change to "HOW I GROW AN EPIPHYTE" appeared to bring the picture within workable limits.

First, let us understand thoroughly what an epiphyte is. Basically an epiphyte is a plant, not necessarily an orchid, with its roots or rhizomes attached to the outer surface of the trunk or branches of another plant, but not penetrating as a parasite does, into the living tissues of its host. (The opposite to this is terrestrial, growing upon or within the ground.)

Throughout the world and indeed, amongst the Australian native plants too, there are a large number of epiphytes which are not orchids. Some of them look so much like orchids in the plant that they are often collected mistakenly.

For growing Australian native epiphytal orchids, I find that slabs or blocks of tree-fern fibre, wrist thickness paper-bark branches and Casuarina branches in that order substitute for the host. This does not detract in any way from slotted terra cotta pots used as a great standby for many years and in which most epiphytes thrive. Under bush-house conditions anyway, I think the branches and rafts look more in keeping with the general surroundings.

One point is most important. Whatever method is used, all plants must be very firmly potted or attached. I would say it is not possible to fasten them too tightly. With the rafts and on the branches, I have lately been using a fairly solid gauge of nylon fishing line, it has a lot of give, it is reasonably cheap, has no effect on the plant and best of all is everlasting. Prior to this I used copper wire 22 gauge, and the only drawback was that to get the plants tight enough damage was frequently done to the plant and the wire often snapped with the last pull.

When using wood as a base, use the natural branch about wrist-thickness a little more if you wish. Preserve the bark when collecting and you will find a branch more lasting and more ornamental than a trunk (it is also better for the tree!). I cut these pieces into 6" to 18" lengths depending on how many plants it has to accommodate. Bind the bark onto the wood with a band of copper wire top and bottom as this seems to be the points at which the bark commences to let go. Once the bark starts to peel off and deteriorate, the plant inevitably starts to loosen and this is one of the fatal mistakes. Epiphytes just cannot stand floating around. This I must say with reservation because I have in mind at this moment one or two of the *Sarcophilus* family and indeed also, the *Sarcanthus* family, some of which appear to hang in the breeze by a thread in their native state.

Most epiphytes which grow on rocks in their native state, *Dendrobium kingianum*, *D. linguiforme*, *D. speciosum*, etc., take quite kindly to firm potting and this makes it so much easier to transport to shows and for indoor decoration. Rafts and branches are a little awkward at these times but can generally be perched in empty pots or propped up against a wall.

EDITOR'S NOTE: Because of circumstances it was not possible to present a full colour plate of a native orchid in this issue, so it was decided to make a start on this often keenly debated subject. Native orchid growers from all parts of Australia are invited to submit comments, either in the form of a few paragraphs on any one aspect or under the heading "How I Grow Native Orchids".

SPECIAL RELEASE OF NATIVE PLANTS—By EASTERN PARK NURSERY

Agonis juniperina (upright willow myrtle) a very graceful, slender upright tree of 10-12' with masses of white starry flowers on the tip of the branches during autumn, winter and spring. Maximum spread at maturity is generally 3'. It is a very informal tree but compact and bushy unless crowded and forced to grow upwards too rapidly. Where ample moisture is available it can grow 6-10' in 12 months.

Pultenaea peduncularis is an excellent carpet or mat plant for hard conditions on dry walls, rockeries, banks and edges of pathways, etc. Forms a thick mat of dark green foliage with showy orange and yellow flowers similar to "egg and bacon" in spring, summer and autumn. Will thrive under a variety of hard conditions but requires good drainage.

Melaleuca pentagona var. *subulifolia* a shrub of 4-6' with branches cascading at the tips. Large clustered heads of deep pink flowers.

Acacia aculeatissima a really prostrate wattle, bright yellow flowers in spring, dark green fine foliage, forms a mat of up to 3' across.

I find the foregoing method very accommodating because a large number can be suspended near the bush house roof. It is easy to water them, they drain well and they help to shade each other somewhat. All my epiphytes grown in the above manner receive two or three generous helpings of chicken-manure per year. Sometimes it is a bit hard to keep it in, but a good handful poked well down in amongst the base of the bulbs seems to provide the periodical stimulus necessary.

If plants are too large for any of these methods as sometimes they are, baskets of varying size can be easily and cheaply made from criss-cross one inch garden stakes, with a solid hardwood base. Use the same growing material as for pots, only in larger chunks. Sometimes, to get a firm enough "fixing" in a very large basket, two or three solid sticks jammed across the basket on top of the plant will help matters considerably. If you use sappy sticks, they are quite strong enough for twelve months by which time their necessity will have passed. Just leave them there, they will rot away. Many readers may already know of my large wooden basket of *D. delicatum* nm. *kestevenii*. It has appeared often in shows, never with less than a hundred spikes of flower. It takes two men to carry it and I have had it in cultivation using the above method, for 32 years. It is so well established now that there is nearly as much of the plant growing out through the rungs of the basket as there is on the top. Incidentally, I had the pleasure of collecting this plant myself in 1929 in company with Dr. Kesteven and his sons.

I feel I should not conclude this article without mentioning how I have seen other people grow epiphytes. Many epiphytes, not only Australian natives, and not only orchids for that matter, can be grown very simply by firmly attaching to various types of growing trees. Those that come to mind first are frangipanni, jacaranda, citrus of any kind and a number of our native trees which have bark of a rough texture and not shed or cast. I have quite recently taken up this method experimentally and I must say that so far anyway they look fine. Of course this method saves any future care but has two drawbacks, the plants can never be taken to a flower show and they are a bit vulnerable to pilfering. So far I have placed only *Epidendrums* but they are doing splendidly on our native honey flower, *Lambertia formosa*, and on frangipanni and lemon trees. I think the further north one goes, the more suitable this live-tree method would be but it is quite successful round Sydney and I know of examples where many imported epiphytes from Mexico and Central America and indeed also hybrids, are thriving on trees.

To give full credit where it is due, the first time I saw this method used, was at Chatswood some 35 years or more ago. The late Mr. Hamilton senior, had a number of Australian native epiphytes growing freely on lillipilli trees, *Eugenia smithii*.

Grow From Seed Without A Glasshouse — by H. Boyd

The writer has been aware for some time, that, if Waratah seedlings are grown in a medium of bush soil in a well crocked pot or box in FULL light, damp off does not occur. It is only when the humidity rises as it might in a glasshouse or a covered container that the organisms of the "damping off", several species are parasitic fungus, are able to multiply to cause the seedlings to collapse and die in great numbers.

With some co-workers it was decided to use this technique of full light and outdoor propagation on a large number of Australian plant species to attempt a biological control of damp off. "Vermiculite" had been used as a medium in many glasshouse experiments of a different type and had given good results, so it was decided to use this material. The type decided upon was "World Brand Vermiculite", the type commercially available in small packets in most gardening stores, as it has a particle size similar to that of propagating sand. "Vermiculite" is exploded mica particles that have a low germ count, and hold eight times their own weight in water.

A large number of plant species, 79 of 21 genera, were propagated in this experiment, including many desert species of Eucalypts and Wattles. All *Acacia* seed had been treated with boiling water before sowing. The periods of the experiments were the summers of 1960 and 1961. As Sydney water contains a lot of Algae, it was decided to use only boiled water for watering the small seedling plants. The four inch terra cotta pots and the crocking were boiled before use. The "Vermiculite" was wetted with a nutrient solution of "Aquasol" according to the makers directions, also containing a few drops of "Formula 20" to the gallon. The pots were well crocked, filled with wetted "Vermiculite" and the seed sown to twice its diameter below the surface. Very fine seed is not covered.

The pots were stood on a stand well above ground and in full sunlight. At no time were they taken indoors. Whilst germination was taking place, it was necessary to water the pots twice a day because the first quarter of an inch of "Vermiculite" tends to dry out. If this happened the germinating seeds would also be dehydrated.

Germination was good and rapid. There was no plasmolysis (drying out) of cotyledons or plumule. Some temperatures were in excess of 100 degrees Fahren. Many of the seedling plants produced a red pigment in the cotyledons. This is a protective masking pigment and may also be seen on the new red foliage of gum tips. They were wetted fortnightly with a nutrient solution. Growth rate was rapid and plants remained healthy and DID NOT DAMP OFF. A proportion of seed in each packet was sown in this manner. In seven pots germination was absent or bad. The remainder of the seed of these species from the same packets was then tested under ordinary conditions and there was no germination at all. During heavy rain, a piece of wire fly gauze was placed at an angle over the pots to break the force of the rain. Plants were transplanted at different sizes into wooden tubes and some small terra cotta pots, and kept in darkness for two days before being exposed to full light. It is possible to grow as many as 24 seedling plants in a single 4 inch pot to the height of eight inches with the use of nutrient, then carefully remove and plant out without potting on.

CONCLUSION: These plants are in families ranging from *Liliaceae* to *Compositae*. There was no loss from heat exhaustion or damp off. For the propagation of Australian plants from seed A GLASSHOUSE IS NOT NECESSARY. These "hardened" or "hard" grown plants transplant better.

Description of Plants on Colour Plate

By A. J. Gray, with comments by W. A. Strutt

Dasypogon bromeliaefolius —Related closely to the "Grass Trees" the inflorescence of *Dasypogon* resembles *Kingia australis*, "Black Gin". Compact globular heads on long straight bristly stems. Of the two species in the genus, the one above is far commoner occurring at least from New Norcia to Albany. It blooms in mid-spring with numerous pineapple scented white flowering "Drum Sticks" which are very popular with West Australian wildflower enthusiasts under that name. The foliage is grass like, much like slender leaved pineapple plants except that the bristles can be highly irritant. This should be a fine subject for culture.

Since the colour plate of *Dasypogon bromeliaefolius* could easily have been taken in any one of a hundred situations alongside *Dryandra sessilis* around the Metropolitan area of Perth, the south western coastal plain or the light clay soils of the Darling Ranges, more detailed comments on suitable soils is hardly necessary. However, mention could be made that it is less evident in the ironstone and laterite regions, but continues further into the depressions where subsoil is of a swampy, peaty nature and porous clay, lightly covered with sand, retains moisture until early summer as with *Verticordia nitens*. It is worth noting that on the higher elevations in poor sandy soil, and also in the light clay soils of the foothills, closely related genera grow in association, namely *Calectasia cyanea* (the blue tinsel lily) and two of the *Amarylhidaceae*, *Conostylis candicans* and the catspaw *Anigozanthus humilis*. Frequently, these four exclusively feature considerable areas in the shade of scattered *Banksias*, *Casuarinas* and *Dryandras*.

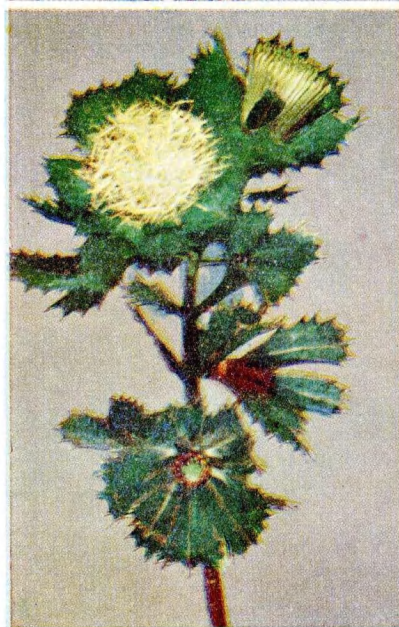
Xanthorrhoea gracilis is one of six species listed by C. A. Gardner in his "Enumeratic Plantarum". It is found close to Perth in the Darling Range in open forests where a six foot slender green stalk surmounted by a delicate 9 inch spike of small greenish white flowers may be seen waving in the October winds from the sea.

Other species of "Grass Trees" like "Black Boy" (*X. preissii*) are not unlike those we know in the Eastern States but the distinct *Kingia australis*, "Black Gin" is a great botanical curiosity. The common name is derived from its appearance, particularly on lonely roads in the eerie dusk, to an aged and emancipated gin standing by the roadside. The foliage resembles straight grey hair down to the shoulders, the inflorescence like outsize hair ornaments (hat pins) sticking out on top, and the slender black form below completes the illusion. *Kingia* (only one species) is found widely from Cape Arid to Murchison River at least, and usually grows at a definite level on certain residuals and mountains which suggests it was once a very common feature of the landscape a very long time ago.

The graceful grass-tree—*Xanthorrhoea gracilis*—could very easily be overlooked by the casual bushwalker amid the abundance of its fellow "Blackboy", *X. preissii* in its natural habitat, the Darling Ranges. Having a common characteristic in that they do not flower until subjected to burning, the slender stalks of *X. gracilis* that carry a short head of blossom, differ appreciably from the tall thick stick, often six feet tall and flowering for two thirds of its length, that makes *X. preissii* outstanding in the infinite variety of soils to which it is adapted. *X. gracilis* can by no means be considered a prolific member of the family favouring as it does the small areas of sand, light clay shot with gravel and freer soil of the more level situations throughout the hills.

Dryandra sessilis formerly known as *Dryandra floribunda*, known by the common name of "Parrot Bush" is generally a glaucous to glabrous pyramidal bush or small tree to 12 feet, the inflorescence and foliage resembling the "Holly Banksia", *Banksia illicifolia*. The variety *D. sessilis* var. major is found on gravels and granite in open forests. The smaller shrubby variety occurs on the coastal dunes from North Fremantle to the mouth of the Moore River (West Coast). Leaves and flowers are much smaller and more numerous. It favours the limestones whereas the other variety is confined to neutral or acid conditions. There are probably intermediate forms but near the sea 5ft. would be the maximum height of this latter form.

Dryandra sessilis is growing extensively on West Australia's coastal sandplain from just south of Dongara to Busselton. It also extends through the light textured porous clay soils of the foothills and into the gravel pits and laterite sections of the Darling Ranges. Poor quality soils promote prolific growth so its cultivation should present no problems. As a host to



Colour plates above and line blocks of "Key to the Species of Dryandra" reprinted from "How to Know Western Australian Wildflowers" by W. E. Blackall—by courtesy of The University of Western Australia Press.

Dasypogon bromeliaefolius
(Pineapple-leaved Dasypogon)

Dryandra sessilis syn. *D. floribunda*
(Parrot Bush)

Xanthorrhoea gracilis
(Graceful Grass Tree)

Banksia sphaerocarpa
(Round Fruit Banksia)

DESCRIPTION OF PLANTS ON COLOUR PLATE — continued

our spectacular W.A. Christmas Tree, *Nuytsia floribunda*, it probably has no equal and after successful establishment of *D. sessilis* if seeds of *N. floribunda* can be germinated the young plants should be given an opportunity to foster on this medium. Well known to bee keepers as "Parrot Bush" it has, along with the Eucalypts, *E. diversicolor* (Karri) and *E. calophylla* (Marri), played an important part in the development of West Australia's lucrative honey industry. The Government has allotted areas to apiarists for "agistment" during the flowering season in the limestone coastal crown lands some 100 to 200 miles north of Perth.

Banksia sphaerocarpa—"Round fruit *Banksia*". The illustration depicts what is probably the type form of this, the most widely distributed of W.A. scrub *Banksias*. It ranges from Jurien Bay to the Mt. Barrens occurring alike on the mountain and sand plain soil types. The species is variable, some varieties having not round but ovoid flowers, and sometimes ovoid fruits also. The typical globular forms are found in the Darling Range and the South East. *Banksia sphaerocarpa* var. *pinifolius* grows from Katanning towards the Mt. Barren Ranges and is usually a four-foot glaucous, pine leaved shrub with globular honey-bronze flowers. The showiest variety appears to be the Stirling Range type, which is dwarf and sparse and carries many bright golden globes of flower at the one time. From Albany to the Porongorup Range a three-foot form has purple bronze flowers well above the foliage in mid winter. The variety *B. sphaerocarpa* var. *major* (C. A. Gardner) is much the largest reaching six feet at Watheroo with correspondingly large flowers cones. All forms are worthy of garden culture.

Banksia sphaerocarpa, not so well known as some of the more illustrious of the 56 species of this genus, is nevertheless prevalent enough in the swampy and low lying areas of the coastal plain and Darling Ranges. Growing in association with *Leptospermum* and *Kunzea* species, *Eriostemon spicatus*, *Leucopogon stellatus* and *Anigozanthos viridis* the peaty or clay subsoils underlying a top soil of drifted sand produces an attractive shrub to delight the lover of native flora whether keen gardener or photographer.

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FERTILIZATION By HELEN PURNELL

The previous article dealt briefly with pollination and the germination of a pollen grain to the point at which the two male gametes or sperms were lying in the end of the pollen tube. (See Figs. 1 and 2 in this article.)

STRUCTURE OF THE OVULE

In part 4 of the series of articles on the flower, the ovule was mentioned as consisting of a tissue known as the nucellus which is surrounded by layers of cells called the integuments. The many stages in the development of the ovule will not be described here. When the ovule is mature the nucellus surrounds a structure called the embryo sac containing a group of cells which take part in the process of fertilization. The arrangement of these cells is illustrated in Fig. 3.

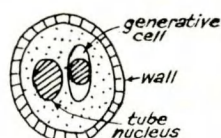


FIG. 1
DIAGRAM OF A
POLLEN GRAIN
(magnification
about 400x)

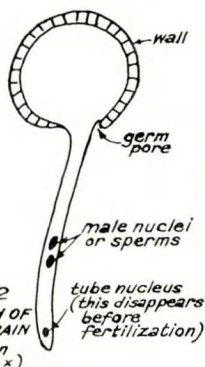


FIG. 2
GERMINATION OF
A POLLEN GRAIN
(magnification
about 400x)

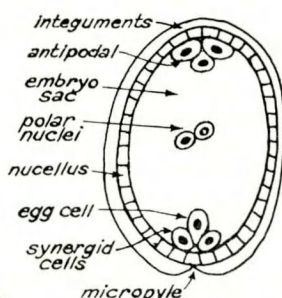


FIG. 3
DIAGRAM OF THE ARRANGEMENT
OF CELLS IN THE EMBRYO SAC
OF THE MATURE OVULE
(magnification about 500x)

When the pollen tube reaches the ovary it grows toward one of the ovules and then through the micropyle and the nucellus into the embryo sac. At this stage, the end of the pollen tube is thought to break, releasing the two male gametes. One of these approaches the egg cell and fuses with the egg nucleus to form what is known as the zygote nucleus. The other male gamete fuses with the two polar nuclei of the primary endosperm cell. Only one pollen tube is concerned in the fertilization of one ovule. If the ovary contains many ovules, a different pollen tube must grow into each one for fertilization to occur.

After these nuclear fusions have taken place, the antipodal cells and synergid cells disintegrate. The zygote develops to form the embryo plant and the endosperm cell grows into a tissue called the endosperm. The integuments change their form to become the seed coat or testa. While these changes are occurring in the ovules, the ovary tissue develops to form the fruit. Sometimes part of the flower, such as the receptacle, petals or sepals, may also grow and become incorporated in the fruit or these may wither and die after fertilization.

Normally the fruit will not develop unless one or more of the ovules have been fertilized. Sometimes, however, normal fruit development occurs without fertilization and such fruits are called parthenocarpic. Pineapples, bananas and navel oranges are common examples of parthenocarpic fruits. Seedless fruits are not necessarily parthenocarpic as fertilization may have occurred but the ovules may not have developed.

Cultivation, A Good Method of Preservation — By E. M. M. Boddy

Although, it is most desirable that our native flora should be preserved, this is a matter that presents quite a deal of difficulty. For example, in the Brisbane Ranges, which approximate Geelong, Victoria, there are three very desirable classes of native shrub growing at Anakie. They are the "Bendigo Wax Flower", *Eriostemon obovalis*, the "Golden Grevillea", *Grevillea chrysophaea*, and a prostrate *Grevillea steiglitziana*. In another area of the ranges approximately twenty miles distant there is another very desirable plant in a prostrate form of *Baeckea ramosissima* only growing in a very small area. Elsewhere may be found the prostrate *Acacia aculeatissima*. To control or preserve these five plants it would be necessary to have at least three reserves, or take in the whole of the Brisbane Ranges, which is not practicable. All these are lovely garden subjects. Preserve them by propagation and cultivation.

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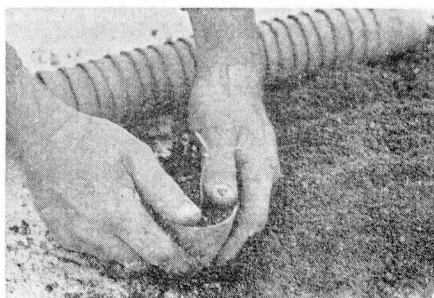
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continued from page 4

With so many representatives of one genus (over 50 species are recognised to date) all in one corner of the state, it is most confusing to attempt to recognise and remember them all. But they will not always exist for us to see and enjoy, and a more forthright and energetic attempt must be made to rescue them from possible extinction. As with many other plants, the only way this can be achieved, and the plants preserved for posterity, is to introduce them to our gardens, both public and private, before it is too late. A host of experts in Cactus, Dahlia, Carnation and other groups are found all over the world—where are the specialists in *Dryandra*?

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THE GENUS *ANGOPHORA*

By C. N. DEBENHAM—Museum of Applied Arts and Sciences, Sydney.

Considering the diversity in life-form of the ubiquitous eucalypt throughout the eastern section of the Australian mainland, it is not surprising that a small group of trees is often regarded by the superficial observer as its co-equal. This generically distinct group, referred to collectively as the Apples, bears the name *Angophora*, (pronounced An-goph-or-a), derived from the Greek *angos*, a vessel, and *phero*, to bear, in allusion to the goblet-shaped fruit of its species. The relationship between *Eucalyptus* and *Angophora* is a close and interesting one.

Eucalyptus receives its name from the operculum or "lid" of its bud which covers the stamens until they unfold. The operculum of most species is a single layer of either sepals or a fusion of sepals and petals. Exceptional species have either: (1) an operculum formed of petals, with the sepals represented by persistent lobes or teeth prominent on the rim of the bud's receptacle—a series known as *Eudesmieae* and (2) a distinctly double-layered operculum of separate sepals and petals—a series known as *Corymbosae* from the predominant type of inflorescence, and which includes the well-known "bloodwoods". For several reasons, these series are considered to be the most primitive of the eucalypts. *Angophora* has no operculum, its sepals are of the same order as those of the *Eudesmieae*, and its petals (constantly white coloured) are quite distinct and free from each other. To the *Corymbosae*, and particularly to the bloodwoods, its similarities are found in the particular type of inflorescence (a corymbose panicle of umbels); in the regular, closely-set, widely divergent veins of the leaves which, in *Angophora*, are almost constantly opposite; in the anther type; in the large, flat and broad seeds which are few in number in the fruits; in the pinene-type of essential oil found in the leaves; and in the kino or "gum" veins of the timber. There is also a close correspondence in pollen, seedling-leaves, bark and timber. *Angophora* has a characteristic fruit with a ribbed wall of usually thin texture, surmounted by prominent teeth representing the hardened sepals, and enclosing a 3 or 4-valved capsule.

It is probable, then, that the early eucalypts and the Apples arose from a common ancestral stock. Evidence suggests that the primitive Apples had their centre of origin in the southern temperate portion of the continent and were forced by conditions of increasing aridity to retreat eastwards to a narrow coastal fringe, later, to some extent, re-invading the interior. It is unlikely that their response to changing environmental conditions led to the same degree of differentiation as the *Corymbosae* and this inflexibility appears to have contained the genus within restrictive distributional barriers. Today, *Angophora* has few relics and while hybridisation within the genus is known, its members form generally stable, comparatively well-defined species.

BRIEF DESCRIPTION OF THE SPECIES

A. cordifolia (from the heart-shaped leaves). Dwarf or Scrub Apple. Usually found as a shrub but occasionally reaching 20ft. in height as a twisted tree, confined to Hawkesbury Sandstone of the central coast of New South Wales. Bark rough, somewhat loose and flaky; leaves heart-shaped at the base and without stalk; flowers and fruits up to 0.75in. in diameter. Recommended as an ornamental flowering shrub for poor sandstone sites of the coast with summer-autumn rainfall. Flowering time for this and other species is mid-summer.

A. cordifolia hybridises with *A. bakeri* within the Sydney area (the hybrid known as *A.x. clelandii*) and with *A. costata* in several localities of the central coast (the hybrid known as *A.x. dichromophloia*).

A KEY TO THE SPECIES

A. Leaves typically without stalk (sessile) and heart-shaped at the base. Bark rough, somewhat loose in *A. cordifolia*.

B. Flowers larger than in other species, the receptacle opening out to about 0.5 in. in diameter. Fruit becoming very hard up to 0.75 in. in diameter. Leaves 2-4 x 1-2 in., rounded at the apex, ovate or oblong. Shoots and inflorescences with bristles of reddish hairs. Tall shrubs or small trees confined to the central coast of New South Wales. *A. cordifolia* Cav.

B.B. Flowers small, the fruit about 0.35 in. in diameter, thin and fragile. Leaves pointed at the apex. Leaves 2-4 x 1-2 in., ovate or ovate-lanceolate. Trees of the temperate to sub-tropical east coast. *A. subvelutina* F. Muell.

Leaves 2-2.5 x 0.25-0.6 in., lanceolate, often with a short stalk. Trees confined to inland New South Wales and Queensland. *A. melanoxylon*, R. T. Baker.

A.A. Leaves typically stalked (petiolate), not heart-shaped at the base.

C. Bark smooth and deciduous. Leaves 2-5 x 0.5-1 in., lanceolate, on short stalks. Fruit slightly woody, up to 0.6 in. in diameter. Tall trees of the temperate to tropical east coast. *A. costata* (Gaertn.) Britten

C.C. Bark rough and persistent. Leaves 2-5 x 0.5-1.0 in., oblong to lanceolate, denser on the branches than in other species. Fruit up to 0.5 in. in diameter. Tall trees widespread in the east. *A. floribunda* (Sm.) Domin

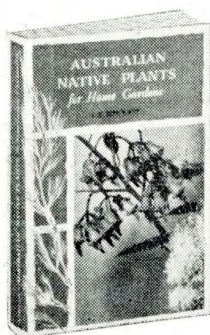
Leaves 4-7 x 0.5-1.5 in., lanceolate, thick-textured, on relatively long stalks. Flower stalks up to 1.25 in. in length. Fruit up to 0.75 in. in diameter, the five ribs prominent. Trees restricted to a few localities of southern Queensland and the north of New South Wales. *A. woodsiana* F. M. Bailey

Leaves 1.5-3.0 x 0.25-0.45 in., narrowly lanceolate. Trees of the coastal districts of New South Wales. *A. bakeri* C. Hall

A. subvelutina (from the somewhat velvety appearance of the leaves). Broad-leaved Apple. A tree, frequently crooked, attaining 80ft. or more in height, with a rough, furrowed bark and a spreading, densely-foliaged crown. Appears to intergrade with *A. floribunda* from which it differs mainly by the adult leaves retaining the heart-shaped, stalkless leaf-form of the juvenile foliage. It prefers alluvial and fairly heavy, loamy soils or naturally irrigated flats and occurs in the central and north coast of New South Wales and in forest country of south-eastern Queensland.

Broad-leaved Apple is recommended as a shade and shelter tree for areas of cold winter—warm summer with summer rainfall but is only moderately drought resistant. It is a valuable source of pollen.

A. floribunda (abundant flowering) Rough-barked Apple. (Formerly known *A. intermedia*). A tree attaining 40-70ft. in height with a usually short, rough-barked trunk 1.5-3.0ft. in diameter, frequently crooked branches, and a spreading crown. Widely distributed in the temperate and tropical areas, it prefers alluvial soils and deep sandy loams on flats and along watercourses. In Victoria it is restricted to the extreme east coast and in New South Wales is scattered throughout the central and northern divisions of the western slopes, occurs within the northern tablelands, and is frequent in the central coast. It has a discontinuous distribution throughout the north coast but is frequent on alluvial flats of south-eastern Queensland with narrow extensions inland.



Australian Native Plants for Home Gardens

By A. E. BROOKS, B.Sc.

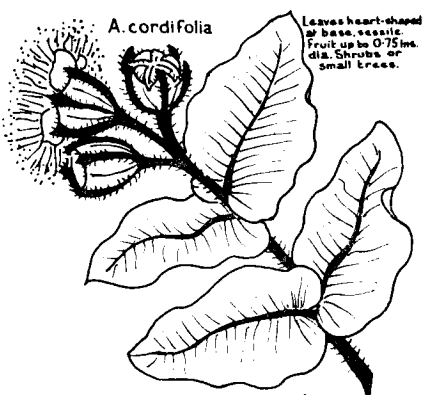
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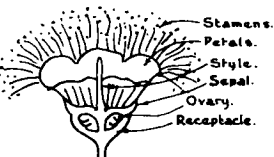
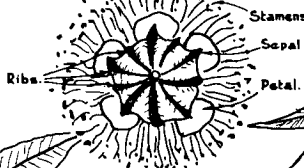
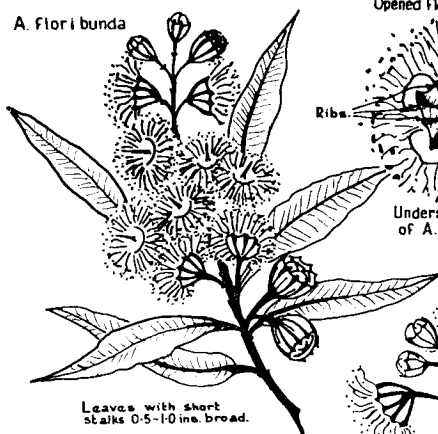
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1 FLEMING PLACE, MELBOURNE, C.1

A. subvelutina*A. cordifolia**A. melanoxylon**A. bakeri**A. costata*

Leaves with short stalks 0.5-1.0 ins. broad. Bark smooth & deciduous.

Opened flower of *A. floribunda**A. floribunda*Underside of flower of *A. floribunda*.*A. woodiana*

Leaf, flower & fruit stalks long & slender. Fruit 0.75 ins. in diameter.

Species of *ANGOPHORA*

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LETTERS TO THE EDITOR

From M. McAllister, Box Hill, Victoria.

Acacia pycnantha, except when young, may not be attractive in the bush I agree. Coming from the goldfields, my plants responded too well to moist heavy loam by becoming willowy. Even the main top growth drooped downward. I cut everything really hard. One tree was left without a leaf. Now five years old, my four trees are ten feet high, dense and shapely on slim straight trunks. A group of *Leptospermum laevigatum* nearly blew over in high wind but the golden wattles remain firmly erect. Shiny pale bronze tips are most attractive and people unfamiliar with native plants mistake the trees for young Eucalypts except, of course, in early spring when they are truly golden wattles:

From Wayne Mitchell, Port Lincoln, South Australia.

Our soil is very sandy, very alkaline, water runs straight through it and evaporates very quickly in summer. I think I would have more success if I started a compost heap and mulched all plants well.

Mr. R. Doney offered this advice:

I suggest Wayne should make some endeavour to prove his statement "very alkaline", for his own satisfaction at least because he could not be certain of this without a pH test. For instance, many people assume that soil over limestone country will be alkaline, but this does not necessarily follow. Leaching is often free in such soils.

If, in fact, his soil is alkaline, then I suggest that he should stick to *Banksia*, *Grevillea* and *Prostanthera* for shrubs and trees, with possible use of some *Melaleuca*, *Olearia* and *Callistemon*. Creepers such as *Sollya*, *Pandorea* and *Clematis* might serve as ground cover plants. These plants are not necessarily known to tolerate alkaline soils, but I think they would be adaptable. However, the pH may be lowered by various means such as use of sulphates of iron, aluminium, magnesium (ammonia not wise because of excess of nitrogen supply) or Flowers of Sulphur. The introduction of much compost of organic matter—grass, leaves, peat moss, etc., would achieve results more slowly than chemical salts, though more permanently, but first pH must be established and quantities for recommended treatment assessed accordingly. Without knowing, I think that Waratah would fail if soil is truly alkaline, i.e., pH 7.1 or more.

THESE PLANTS ARE WANTED

From Tasmania—*Blandfordia marginata*, *Telopea truncata*. Seed required.

From the West—*Byblis* both species, *Pileanthus* all species, *Dryandra* all species.

From the South—*Telopea oreades*, *Telopea mungaensis*.

This section is available to all readers who are seeking a special plant for a fee of 5/- per line. This service is available gratis to the special Study Sections. All replies c/o Editor.

For Effective Pest and Disease Control Use

Yates Garden-master

MULTI-PURPOSE SPRAY

Rough-barked Apple is regarded as a valuable shade and shelter tree with some fodder properties, able to withstand lopping of its fairly dense foliage. It is suitable for inland planting in areas of warm climate with summer rainfall although it is not drought-hardy, and for the coast it is recommended as a shelter or street tree for areas of summer-autumn rainfall or cold winter-warm summer. The species is a valuable source of pollen and honey. *A. ochrophylla*, once regarded as a distinct species, is now accepted as a form of *A. floribunda*. The form appears confined to the Clarence River district of New South Wales.

A. woodsiana (in honour of Rev. Tenison-Woods F.G.S.) Smudgee. A tree, up to 40ft. in height, with a flaky, and rather brittle bark, and a large spreading crown; leaf, flower and fruit stalks slender and long, larger in these parts than in *A. floribunda*. It occurs in forest country on sandstone or deep sandy soils of the Moreton district of southern Queensland and extends to the north coast of N.S.W.—regarded as a valuable source of honey.

A. melanoxylon (referring to the very dark brown, almost black, colour of its timber). Coolabah Apple. A somewhat ragged, crooked tree up to 40ft. in height with a rough bark and a particularly leafy crown. While some of the adult leaves are not heart-shaped at the base and so connect the species with *A. floribunda*, the predominant leaf-form is that of *A. subvelutina*. Coolabah Apple is confined to scattered localities of the western slopes and plains of New South Wales with an extension to south-western Queensland and is recommended as a drought-resistant shade and shelter tree for inland planting in areas with as low as 12in. annual rainfall.

A. costata (in reference to the ribbed receptacle). Smooth-barked Apple. (Formerly known as *A. lanceolata*). A tree attaining 60-70ft. in height with a frequently short trunk and twisted, somewhat gnarled branches under the exacting conditions of poor sandstone soils but under better conditions reaching a height of 90ft. with a straight bole 4ft. in diameter; crown large, spreading and rather open. Bark smooth, deciduous in spring and leaving the trunk with a characteristic pinkish, usually kino-stained surface; leaves lanceolate and on short stalks.

The present distribution of smooth-barked Apple appears to have its centres from Sydney to north of Newcastle (often on poor, confined sandstone soils or pockets of soil) and in forest areas of south-eastern Queensland on sandy soils or along stony ridges. It has an isolated occurrence in poor sandstone country of the north-western slopes of New South Wales, and coastwards, intermits as far south as Nerrigundah, and north to Queensland. It is widespread along the coast of Queensland as far as Rockhampton, with inland extensions. *A. costata* is recommended as a park and avenue tree for warm, moist, coastal climates with summer rainfall, especially suited for poor sandstone soils. Establishment is sometimes difficult and development comparatively slow. Its timber, typical of the Apples, is strong and moderately heavy but is not durable and is often kino-veined; it finds limited use for construction but provides a freely-burning fuel. The tree flowers December to January and is a valuable source of pollen. Red and Rusty Gum are names given to the species.

A. bakeri (in honour of the Australian botanist, R. T. Baker) Narrow-leaved Apple. A rough-barked tree attaining 50ft. in height but found usually smaller, occurring on poor sandy soils of the central and northern coasts of New South Wales with a particular centre around Sydney. Growth habit is shorter and broader than that of *A. floribunda* and the narrow lanceolate, stalked and drooping leaves are characteristic features.

Narrow- (or Small-) leaved Apple is recommended as an ornamental or shade tree for poor sandy soils of the coast with summer-autumn rainfall.

A DWARF FLOWERING TREE



Photography by Frank Hurley

Block by courtesy of John Sands Pty. Ltd

Angophora cordifolia

Dwarf or Scrub Apple—Recommended as an ornamental flowering shrub for poor sandstone sites of the coast with summer-autumn rainfall.