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THE GERALDTON WAX

A PUBLICATION DEVOTED TO THE PROPAGATION AND CULTIVATION OF
AUSTRALIAN WILDFLOWERS, ORCHIDS, TREES, ETC. FOR
THE HORTICULTURALIST

CONTENTS OF THIS ISSUE

As always the emphasis is on the presentation of advice to the home garden and horticulturalists on the propagation and cultivation of Australian wildflowers. Considerable detail based on actual garden experience and research by competent horticulturalists is presented on a few plants of proven horticultural value, in this issue the emphasis being on the well known "Geraldton Wax" and on the tiny terrestrial orchids *Microtis*. Articles are from all parts of Australia so that it does not matter where you live or how vigorous the climates. For the keen types many other wildflowers are described to broaden the interest but it is hoped that the beginners in this fascinating field will not be confused by so many plants but select only those of interest. To prevent confusion by the plant suppliers and to assist those keen students in the field we are forced to include some technical descriptions. These are kept as simple as possible and often in small type so as not to tire the reader.

CHAMAELAUCIUM—THE WEST AUSTRALIAN WAXES

"Species Grown in Perth Gardens" by E. Wittwer—page 143.

"Chamaelaucium" by H. M. Hewett—The common garden species are described—pp. 144. Special advice is given on "The Geraldton Wax", pages 147 and 182 and on "The Esperance Wax"—page 147.

BERRY PRODUCING PLANTS

"Berries for the Garden" by Kay Geeves—page 152 introduces a number of plants of exceptional value.

Other articles are—"More Tasmanian Berries" by A. M. Gray—page 155; "Berries for Rockeries"—page 156; "Snow Berries"—page 158; "Baw-Baw Berry"—page 157; "A Qld. Berry Tree"—page 175; "A W.A. Berry Tree"—page 175.

TERRESTRIAL ORCHIDS

"*Microtis*—The Genus" by Leo Cady—page 163 describes all the species but interest is added by "Babes in the Wood"—*Microtis* in Tasmania by Pat Palmer—page 167; "A Rare Tasmanian Orchid" by M. J. Firth—page 168 and "Growing *Microtis*" by R. C. Nash—page 170.

"*Burnettia Cuneata*—The Lizard Orchid" by M. J. Firth—page 171, followed by a description by Leo Cady.

EPACRID HEATHS—A series in each issue describing a genus in the family Epacridaceae.

"*Archeria* Hook. f." by Betsy R. Jackes describes the species—page 149; "*Archeria* in Tasmania" by A. M. Gray gives further interesting descriptions with details of cultivation and propagation—page 151.

Closely allied species described include "*Baw-Baw Berry*—*Wittstenia*" by B. R. Jackes and the family Ericaceae—page 157.

ERICACEAE

The Australian species are described under their genera "*Snow Berries*—*Gautheria*"—page 158 and "*Pernettya*"—page 156 with a reference to "*The Family Encaceae*" on page 156.

TREES—CHRISTMAS TREE—BERRY TREES—STREET TREES

"The W.A. Christmas Tree"—*Nuytsia floribunda* by J. S. Beard—page 176.

"A Native Fig—*Ficus hillii*", A Street Tree by H. Oakman—A series in each issue on Street Trees—page 174.

Berry Trees—"A Qld. Berry Tree—*Emmenospermum alphonseoides*"—page 175; "A W.A. Berry Tree"—page 175.

HIBISCUS-LIKE PLANTS—A series each on a genus of the family Malvaceae.

"*Pavonia hastata*" by A. Krapovickas, describes and illustrates the only Australian species.

PROPAGATION AND CULTIVATION

Propagation of *Chamaelaucium*—page 143. This mentions propagation by cuttings only briefly. Previous issues have described simple methods in detail. These plants seem to come fairly readily from cuttings with the simple techniques used by home gardeners. We are ashamed to admit that propagation by seed is as very erratic. Try the novel method that follows.

"Propagation of Wildflowers" by B. C. Kowald—page 179. A rather novel method that could represent a break through in seed and cutting propagation for the more difficult species.

"Wildflowers from Seed"—page 159. The method described as intended for "berry plants" but could be used equally as well with other natives (including *Chamaelaucium* if you have a green thumb).

Propagation of Native Orchids—We cannot do it. Multiplication by division of terrestrial orchid groups is the method used. Oh for a research project by competent botanists!

"Propagation of *Archeria*—*Epacrids*"—page 181.

"Seedlings" by R. C. Barnard—page 159. Meant principally for Eucalypts this article is a gem.

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AUSTRALIAN PLANTS — PAST ISSUES

Volume No. 1 (bound) issues 1-12, has now sold out. Except for issues 2 & 3 the remaining 10 issues are available at 40 cents each + 5c postage or \$4.00 + 20c postage for the Vol. 1 set. Supplies of Volume No. 2 (issues 13-20) at \$6.00 + 20c postage are still available, many of the issues being no longer available singly. Volume No. 3 (issues 21-28) is now available fully bound at \$6.00 + 20c postage. Issues prior to this issue and later than No. 29 are available singly at 40c + 5c postage.

Each bound volume also includes a special publication of the Society. Volume No. 2 has "The Language of Botany", a 60 page glossary of botanical terms now available separately at 40c + 5c postage as well as "West Australian Plants" described below. Volume 3 includes the book "A Catalogue of Cultivated Australian Native Plants", a publication of outstanding value available only with the bound volume No. 3.

WAXFLOWERS OF W.A.

CHAMAELAUCIUM GROWN IN PERTH GARDENS—by E. Wittwer, Perth

Chamaelaucium uncinatum Schau. "Geraldton Wax". This is the only species of the waxflowers which is extensively cultivated not only in W.A., but also in the Eastern States and in some overseas countries. Colour variations ranging from white over shades of pink to a purplish red, are available from nurseries. The shrub grows naturally on coastal sand in the Irvin district ranging from 4-8 feet high and tends to become rather loose with age. Variations as colour, flower size or growth habit are not uncommon in the bush. We found for instance a yellowish-green flowering form as well as a very dwarf variety with small dark red flowers. The flowering time extends from early spring to the beginning of summer, the flowers usually becoming pale or greenish towards the end of the season. Pruning after flowering will keep the shrub in good shape.

Chamaelaucium axillare F. Muell. A slender shrub 4-6 feet high with needle like leaves about one inch long. The axillary flowers are about half an inch in diameter, white but often change to pink or red. This is an attractive shrub flowering from spring to summer. It likes an open sunny position and well drained sandy soil. The plant is found in the Eyre district. Pruning will help to keep the shrub bushy.

We have in Perth a *Chamaelaucium* in cultivation referred to as a form of *C. axillare* but it is shortly to be described as a new species.

It is an erect, pyramidal shaped shrub 5-6 feet high, it usually has one main stem with many upward curving laterals. The opposite leaves are about half an inch long of a soft green colour, the foliage is dense. The small white flowers are axillary, the shrub is floriferous and flowers in spring.

Chamaelaucium megalopetalum (Benth.) F. Muell. An erect sometimes rather straggling shrub 2-4 feet high. The foliage is similar as in *C. axillare* but the creamy-white flowers are born in terminal "heads". Here again some flowers may change to pink or red. The flowering time is spring to summer. *C. megalopetalum* is a plant of the sand heath in the Stirling Eyre and Coolgardie districts. It should be grown in an open position in well drained sandy soil. A very showy species which also improves with careful pruning.

Chamaelaucium ciliatum Desf. A rather small spreading shrub 12-18 inches high with leaves about ¼ inch long. The small axillary flowers are white, pink and red. The flowering time is from spring to summer. Distribution is the same as in *C. megalopetalum*. A graceful little shrub for an open position.

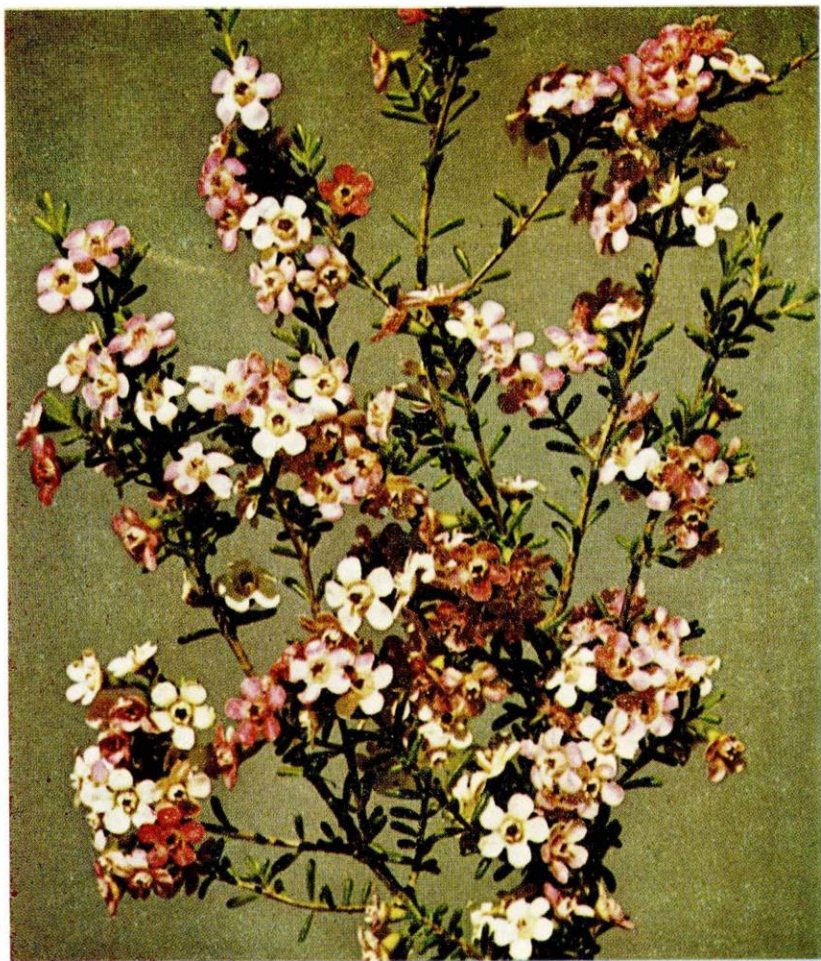
PROPAGATION

All the described species are best propagated by cuttings taken in late summer or autumn. Tips or heel cuttings are successful. Cuttings of *C. megalopetalum* are best taken from the lower branches of the shrub. The rooted cuttings should be potted when the roots are short and succulent. Longer roots are very brittle and break easy. Early planting out allows free root development and results in vigorous growing plants.

CHAMAELAUCIUMS

By H. M. Hewett, Plant Recording Officer, N.S.W. Region

The genus *Chamaelaucium* of the family Myrtaceae is confined in natural distribution to Western Australia and consists of some twelve species. Of these only four, to my knowledge have been tried in cultivation, viz. *C. axillare*, *C. ciliatum*, *C. megalopetalum* and *C. uncinatum*. The latter species has long been known, and having been the subject of a comprehensive survey in Sydney gardens will be discussed at length.



Photography by F. Humphreys

CHAMAELAUCIUM PAUCIFLORUM (Turcz.) Benth.

A widely distributed shrub of 1-2 feet in height found in both sandy and loamy soils. It occurs from Ajana southwards to Ravensthorpe and eastwards to Boorabbin. The leaves are approximately $\frac{1}{4}$ inch in length and borne in pairs along the stem. The flowers occur singly and although at first white, they change to red with age.

***Chamaelaucium ciliatum* and *C. megalopetalum*.** I can contribute very little on the growing of *C. ciliatum* and *C. megalopetalum* except to say that they are both most desirable species; I might even say magnificent, and that no effort should be spared to bring them under garden control. Both species flower profusely throughout the spring, opening white and ageing to pink and finally bright red, the three colours appearing concurrently giving the plants a most striking appearance. I observed both in open sandplain heath country between Lake Grace and Lake King where annual rainfall is in the vicinity of fifteen inches, and summers are very hot and dry.



Photography by F. Humphreys

CHAMAELAUCIUM MEGALOPETALUM (Benth.) F. Muell.

This is one of the largest flowered species of this genus, and although it does not usually produce an abundance of blossoms, it is noteworthy because of the size and quality of the flowers and the fact that they turn from white to red as they mature. It occurs in the eastern wheatbelt areas from Merredin and Southern Cross to the south coast and eastwards to the Great Australian Bight. It is a variable plant both as to its habit of growth and to the size of the flowers and leaves.

Chamaelaucium ciliatum was growing on roadside verges of light sand with evidence of a little gravel at a depth of two feet or so below surface. It grows to about 18" with a profusion of small flowers to about a quarter inch in diameter. While as yet I have no records of its having been tried in Sydney gardens, I have been advised of a satisfactory establishment at Myall Park, Queensland, approximately 200 miles west of Brisbane with an average summer monsoonal rainfall a little over 20".

With flowers larger than *C. uncinatum*, *C. megalopetalum* has sometimes been referred to as the most outstanding of the *chamaelauciums*, not an insignificant tribute. Plants I observed were up to 4 ft. high, growing on gravelly roadside edges, with the foliage almost completely obscured by the density of the bloom. Unfortunately I was a little early to see them in their full range of colour, and had to be content to let my imagination fill in the picture with the assistance of a colour plate of the species I have in a publication and my memory of a small quantity of the bloom seen at one of our Society's floral exhibitions.

While in Perth I was pleased to see plants established in several gardens growing in deep light sand and apparently doing very well. As with *C. ciliatum* above, this species should be regarded as a must for Sydney native garden enthusiasts.

Chamaelaucium axillare is a compact, low growing shrub which covers itself in springtime with myriads of small pink and white flowers. Records indicate numerous attempts to establish it in Sydney, but to date with little enduring success. As with many other W.A. natives and in particular some smallish members of the family Myrtaceae, one of the greatest hazards to be faced by the young plant seems to be the sudden springtime weather change from conditions of saturation in early September to the very dry warmer weather of late September and October. In its native environment, the southern coastal areas of W.A., *C. axillare* enjoys the benefit of cool off sea winds which continue an until much later in the year, gradually tapering off the humidity of the winter growing season, and providing "soft" conditions for the critical period of the growth cycle, when flowering and fruiting make additional demands upon the plants reserves.

We have found that specimens in containers, kept under humid nursery conditions seem little affected by the weather extremes noted above, but in the open garden, they frequently seem unable to adjust themselves and rapidly succumb. In gardens where protection from wind is good, and where a position can be selected offering a significantly high degree of humidity from the associated foliage of other plants, records show some improvement in performance, and several specimens have been recorded as surviving for a second season, only to fail in a manner suggesting fungal attack, after heavy monsoonal type rain storms in late summer.

While the picture to date has not looked very bright for *C. axillare*, I have no doubt that, as with many previous species with a reputation for difficulty, when much more experimental growing has been done and results and growers observations recorded and analysed, we will eventually be in a position to nominate growing requirements with a reasonable degree of confidence.

Chamaelaucium uncinatum, or as generally known, the "Geraldton Wax", needs little introduction, with its large delicate flowers ranging in colour from pure white, through varying shades of pink and red to a deep maroon, and while there are certainly more difficult species of Australian plants to establish there are few with such a record of frustration to Sydney members of our society.

I do not wish to imply by the foregoing that successful growings have not been achieved or are even rare, but rather that under some circumstances, an extensive degree of unreliability has been evident, particularly at about the two or three years old stage. Furthermore, the fact that flourishing specimens may be frequently observed in the gardens, sometimes neglected, by people who often do not even realise that it is an Australian native, does not relieve the chagrin of the S.G.A.P. member, who sees his "healthy" Geraldton Wax suddenly show loss of vigour and pass out.

(continued on page 182—THE GERALDTON WAX)

THE GERALDTON WAX

CHAMAELAUCIUM UNCINATUM by J. S. Seaton, Caulfield, Victoria

Chamaelaucium uncinatum which has been in general cultivation for many years, has a wide colour range and deserves its popularity as a garden subject.

However, for best results it requires a situation facing north or west and whether in light or heavy soil it must be well drained. A vital aspect of its cultivation is pruning and the number of specimens seen that are woody and lack depth of foliage indicates neglect in this direction.

The flowers are excellent for cutting so this can act as a minor pruning but when the flowering period is over it should be cut back hard.

I have an excellent pure white form which although over 25 years old, is still very healthy, has good habit and is very floriferous.

There are several very large flowered forms available so that growers have a choice in both the colour and size of the flower.

"THE ESPERANCE WAX"

Chamaelaucium axillare by D. E. Simmons, Henley Beach, S.A.

Chamaelaucium axillare, "Esperance Wax" is growing well here in the extremely poor coastal sand, slightly alkaline, one third of a mile from the beach on an elevated ridge of sand. It enjoys some protection from the westerlies from other shrubs and a side fence 5 ft. high.

Now 5 years old and 5 ft. high and about the same through, it has attractive green foliage and is a picture in flower—Sept.-Oct.—when it is covered with small white wax flowers. It has plenty of competition from surrounding shrubs but I water well periodically as the sand seems to dry out quickly.

The well-known "Geraldton Wax", *Chamaelaucium uncinatum*, grows very freely here also of course, but inland sometimes becomes slightly yellowed in the foliage when growing on the heavier clay soils.

DO YOU KNOW THESE PLANTS?

Chamaelaucium brevifolium Benth. A slender shrub, flowers?

C. darwinioides Turcz. A shrub to three feet with pink flowers.

C. halli Ewart. A small dense shrub with white to pink flowers.

C. heterandrum Benth. A small spreading shrub from salt flats?

C. micranthum (Turcz.) Domin. A slender shrub, flowers?

C. virgatum Endl. A large shrub 3'-5' with white to pink flowers.

Will any reader who can help with reports or colour slides on these plants please forward them to the Editor.



Photography by F. Humphreys

CHAMAELAUCIUM DRUMMONDI Meissn.

A shrub of 1-2 feet producing an abundance of flowers during the spring. The leaves are crowded irregularly along the stem, and the edges are ciliate with long hairs. The flowers are borne on very short pedicels in the upper leaf axils. They are white when they first open but turn red with maturity. The species occurs in sandplain from Northampton in the north to Mogumber and Wyalkatchem in the south and eastwards to the Yalgoo Rabbit Proof Fence.

ARCHERIA Hook. f.

A series of articles each on a separate genus in the plant family Epacridaceae, by Betsy R. Jackes (Townsville University College).

Although this genus is found in New Zealand and Tasmania, the individual species are endemic to each country. The four Tasmanian species occur in relatively inaccessible montane areas.



ARCHERIA HIRTELLA

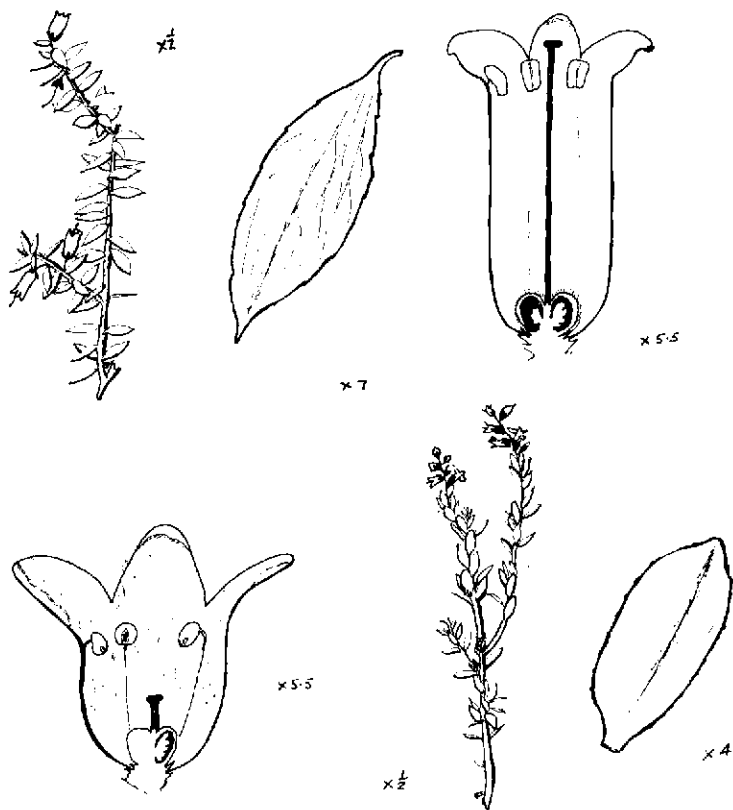
A very variable shrub in size according to exposure. It can be kept quite compact and the flowering improved by pruning the leading tips after flowering. A prostrate form is ideal for rockeries. *Archeria eriocarpa* is very similar, the difference being the velvety hairy ovary. The other species are similar but have blunt leaves, not acutely pointed as shown above.

This genus is similar to *Epacris*, the main differentiating features being the deciduous bracts, and the almost basal placentation.

Archeria. Much branched shrubs, the leaves of which are usually flat, sometimes dislichous; in a New Zealand species *A. racemosa* they appear whorled until examined closely. The axillary flowers are borne towards the end of the branch, they may even be in a small raceme. The subtending bracts and frequently the bracteoles are deciduous. Stamens are epipetalous on the cylindrical or campanulate corolla. A small hypogynous disc surrounds the deeply lobed ovary.

KEY TO SPECIES

- | | |
|--|----------------------------|
| A. Leaves apparently distichous, acute, often sharply pointed | B |
| Leaves crowded, blunt, but often mucronate | C |
| B. Sepals obtuse, ovary and capsule pubescent | 1. <i>A. eriocarpa</i> |
| Sepals acute, ovary and capsule glabrous | 2. <i>A. hirtella</i> |
| C. White flowers in short terminal racemes. Corolla-tube bearded inside | 3. <i>A. serpyllifolia</i> |
| Pink flowers solitary, axillary. Corolla-tube glabrous inside | 4. <i>A. comberi</i> |



Top left to right *A. eriocarpa*. Habit Lower surface of leaf -- Half flower.

Bottom l. to r.—*A. serpyllifolia* — Half flower — Habit — Lower surface of leaf.

NOTES ON THE SPECIES

1. *Archeria eriocarpa* Hook. f.

A straggling shrub 1-4 m. high growing in the western and south-western rainforests up to an altitude of 3,500 feet. The corolla is cylindrical, white or pale pink.

2. *Archeria hirtella* Hook f.

Found in the same localities as *A. eriocarpa*, this species forms a tall shrub or small tree with spreading branches, the tips and young leaves of which are often reddish. The flower is similar to that of *A. eriocarpa*.

3. *Archeria serpyllifolia* Hook. f.

A rigid, bushy shrub often closely clinging to rock faces on the summits of Central and Western Tasmanian mountains.

The throat and lobes of the campanulate corolla are hairy. The short style is inserted in the glabrous ovary. Bentham describes a variety; var. *minor* as being generally smaller, and with sepals about 2.5 mm. long as against 4 mm. long.

4. *Archeria comberi* Melville

A montane species up to 1 m. high with rather obese spreading leaves. The leaves show a greater development of mesophyll tissue than in the other species. The leaves are crowded, green or tinged purplish red above, and paler green below. The cylindrical corolla is pink; the style is deeply sunken in the ovary and is as long as the corolla.

ARCHERIA IN TASMANIA

An article in the series on "Wildflowers of Tasmania" by A. M. Gray

There are four species of *Archeria*, endemic in Tasmania—*A. comberi*, *A. eriocarpa*, *A. hirtella*, *A. serpyllifolia*. All are very attractive shrubs occurring in forests or on mountain tops in the west and south-west of the State. It is because of their distribution, chiefly in forests or on exposed situations on mountains, that relatively few people have had the opportunity to see these most attractive shrubs with their large delicately coloured flowers. However if it is possible to procure cutting material of any of the four species, they should be grown. The method of propagation is described later.

Archeria comberi Melville is most commonly found at altitudes above 3,500 feet on mountains of the Central plateau and some mountains of the West and S.W. An erect or somewhat straggling shrub, one to four feet high. Flowers cylindrical, slightly broader at the base, corolla pink, half an inch long with lobes spreading. The large delicately coloured flowers of this species and the rather unusual formation of the leaves make this, in my opinion, the most attractive of the four.

Archeria comberi Melville, an erect or somewhat straggling shrub, 1' to 4' high; branchlets sparsely hairy. Leaves with short stalks, erect or sometimes appressed; blade spreading, ovate or almost orbicular about 1/8" long, margins entire, apex blunt, substance thick. Raised circular scars are visible on the older stems from where the leaves have fallen. Flowers on very short stalks, usually singly in the axils of the upper leaves, mostly on 2nd year wood. Bracts small persistent, separate from the sepals. Sepals 5-7, small, blunt, each with a small rounded protuberance near the point of attachment. Flowers cylindrical slightly broader at the base, corolla pink, about 1/2" long, lobes small more or less spreading. Anthers joined to the tube except for a small portion near the throat of the corolla. Style equal in length to the tube, stigma slightly lobed. Ovary and capsule are a characteristic feature of the genus. Ovary with five distinctly defined locules (compartments). Fruit a capsule, dehiscing by five valves.

Archeria serpyllifolia Hook. f. A strongly growing, bushy shrub, 18" to 5' high, quite erect but in exposed situations somewhat prostrate, creeping against the surfaces of boulders, logs, etc.; all vegetative parts quite glabrous. Flowers are pink or white in terminal racemes which are short and very crowded.

A. serpyllifolia is fairly common at higher altitudes in the west and on many mountains of the central plateau. Mostly at home amongst the boulders of the most exposed summits.

Continued on page 181

BERRIES FOR THE GARDEN

by Kay Geeves

In Tasmania the berries are a colourful feature of the bushland in Autumn and there seems no reason why they should not become very useful and attractive garden plants. In most cases the berries are carried for long periods and they could provide colour and interest at a time when most gardens are drab. The following species occur naturally in the Geeveston district.

Gaultheria hispida (Snow Berry, Cluster Berry), endemic. This is a beautiful small shrub, usually 3'-4' and is very worthy of a place in the garden. It is fairly compact in habit and has glossy, dark green, serrated leaves that are quite attractive. Reddish bristles occur on the branches and on the midrib of the under surface of the leaves. Dense panicles of small white flowers are produced about Christmas time. The calyx segments enlarge and form a false fruit that completely encloses the fruit capsule. These false fruits have a purity that has given rise to the common name of Snow Berry and as they are borne in such profuse panicles they make a wonderful display against the deep green foliage. The fruits are borne through the Autumn months for a long period. It occurs in rain forest and wet Eucalypt forest and seems to prefer a medium loam. This plant would make a very useful addition to a shrubbery and would be particularly effective if massed. It could also be used to effect in a rock garden.

Cyathodes parvifolia. Endemic 2'-4'. This is another small shrub that is very eye-catching. It is widespread in many habitats but likes well drained soil. In nature it is found in porous sandy soils or very rocky hillsides but will grow on medium loams. It is a member of the Epacridaceae of compact habit with small pungent leaves and is dioecious. The flowers are insignificant but the fruits are borne in such profusion that the bushes are covered. Their colour ranges from pale pink to deep red and from late Autumn into winter they strike a very colourful note. The mountain form is a dwarf to one foot with smaller leaves. The varying colours from pink to deep red and its extensive growth in the Central Highlands, present an unforgettable picture. *Cyathodes juneripina* is very similar but larger in all parts, than *C. parvifolia*.

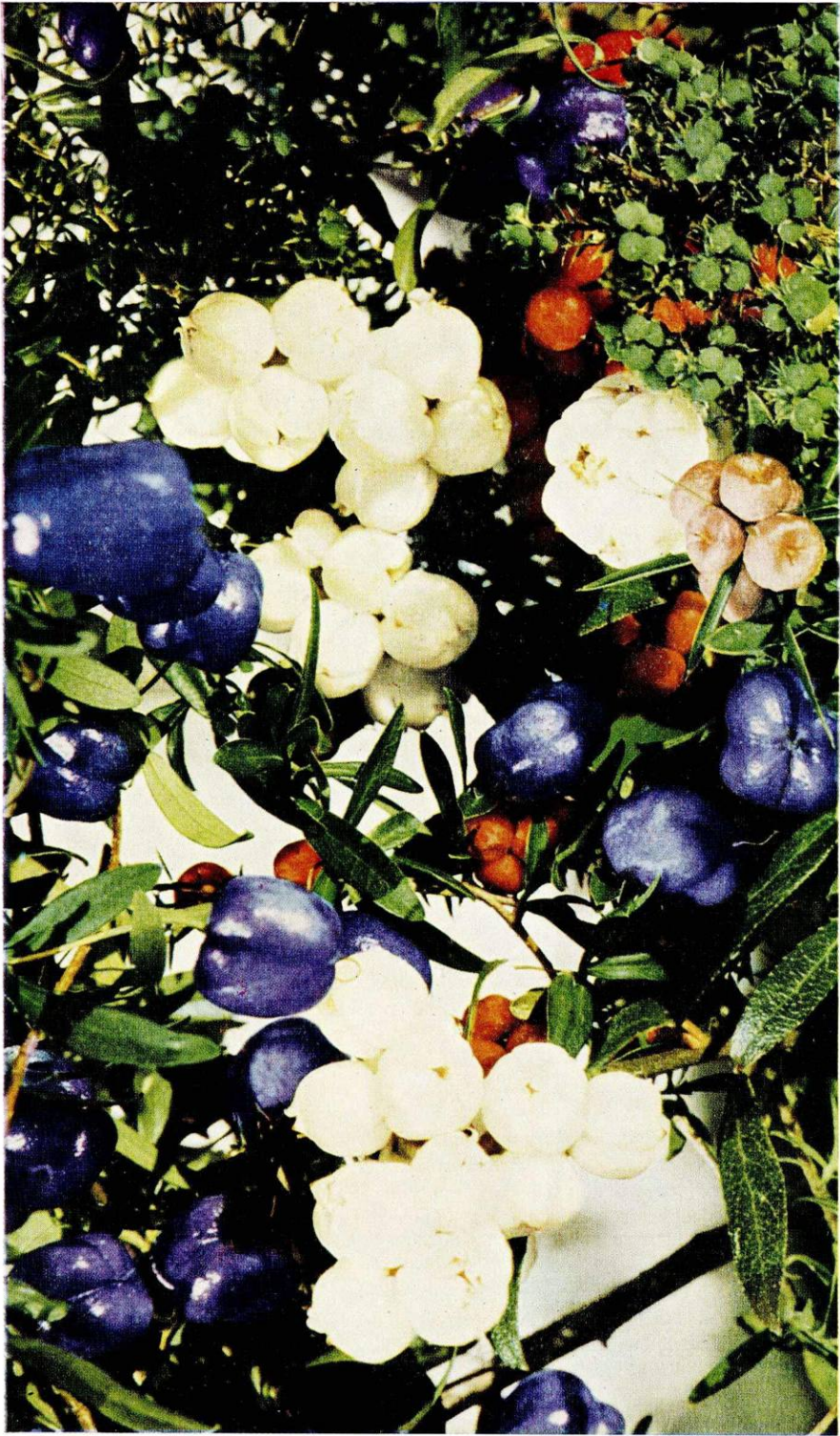
Cyathodes glauca (Cheeseberry). Endemic 3'-10'. A robust shrub with branches tending to rise in false whorls. It is widespread and sometimes grows with *C. parvifolia* but is often found in loamy soils where it does very well. Fruits are somewhat flattened and are usually mauve but may be pink or white. The fruiting period varies but usually is Winter into Spring.

CAPTION FOR COLOUR PLATE OPPOSITE—VIEW PLATE FROM SIDE

White berries—*Gaultheria hispida* which has the large leaves on the bottom left.
Blue berries—*Billardiera longiflora* which has the leaves on the top left.
Bright red berries—*Cyathodes parvifolia* which has the prickly leaves at the bottom right.
Flesh pink berries—*Cyathodes glauca* shown with its leaves at bottom just right of centre.

CAPTION FOR COLOUR PLATE ON REAR COVER WHERE MORE BERRIES ARE SHOWN

Bright red berries—*Cyathodes parvifolia* shown with its small prickly leaves.
Blue berries—*Billardiera longiflora*. Its leaves are on extreme right bottom.
Flesh pink berries—*Cyathodes glauca* shown surrounded by its leaves in middle bottom.
White berries—*Gaultheria hispida* shown with its large leaves just right of centre.



Trochocarpa cunninghamii. Endemic. This is a straggling shrub 3'-4' high or sometimes procumbent and often rooting. The flowers are campanulate, pink borne in spikes. It is an informal subject but worth growing for the attractive purple fruits 10-12 mm. in diameter produced in Autumn.

Trochocarpa thymifolia. Endemic, 1'-3'. This is a small alpine shrub. The leaves are small, ovate or elliptical and the flowers are crowded in recurved spikes, pink or red. The fruit is bluish-purple. This could be a useful rockery plant in cool areas.

Aristotelia peduncularis. Endemic. This is a straggling shrub usually 2'-3'. The leaves are opposite about 1" long, serrate. The leaves are widely spaced and when not in berry it is inconspicuous. However, the berries are well worth waiting for. They are produced in late Summer into Autumn and are favoured by birds. The fruits are quite large and striking and are coloured white, various shades of pink and red and also black. A shady place in a fernery or shrubbery with medium loam would be ideal for this plant.

Dryophila cyanocarpa (Turquoise Berry), Tas., Vic., N.S.W. The Turquoise Berry is very widespread here and has established itself on a variety of soils and habitats. This is a very dainty perennial 1'-2' depending on locality. The leaves are distichous and widely spaced and the small white flowers borne in the axils hang beneath the branch. The blue, or occasionally white, berries are produced mainly in late Autumn and Winter. It grows on poor sandy soils here amidst the heaths and pea-flowers but reaches best development on medium loams and prefers shady conditions.

Billardiera longiflora (Climbing Blueberry), Vic., N.S.W., Tas. This lovely creeper is, no doubt, familiar to many of you but I feel I must include it as it is such a notable plant and so widespread here. The leaves are alternate, usually narrow elliptical and the flowers are creamy or greenish tinged with purple, almost tubular and about 1" long. The ovoid deep blue berries are large (nearly 1" long) and are very handsome. They occur in Autumn remaining into Winter. There are red and white forms but I've only seen blue and purplish here. It grows almost anywhere even on the sea-shore at Southport where it would receive plenty of spray.

Drimys lanceolata (Pepper Berry), Tas., Vic., N.S.W. This is a widespread shrub or small tree occurring from sea level to mountain tops. The stems are bright red and leaves are thick and elliptical. Flowers are in terminal umbels and plants are dioecious. The black fruits are produced in Autumn.

Dianella tasmanica, Tas., Vic., N.S.W. The leaves of this plant are 1'-2' long and the flowers are blue with yellow stamens and they are borne in inflorescences in Summer. Deep blue berries follow in late Summer and early Autumn.

Cenarrhenes nitida. Endemic. This is a large handsome shrub of south and west Tas. The leaves are 3"-4" long, shiny and serrate. The small cream flowers are produced in terminal and axillary spikes 1"-2" long in Nov.-Dec. The fruit occurs in Autumn and is quite large, purplish black.

Coprosma moorei, Tas., Vic. This is an attractive little perennial suitable for the miniature garden or rockery. The leaves are tiny and ovate. The fruit is blue, spherical and almost hides the foliage.

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MORE TASMANIAN BERRIES

by A. M. Gray

May I add to the article by Kay Geeves by describing more plants of Tasmania that produce berries for their striking colour and form. Plants in a section of the family *Epacridaceae* are noted for their striking berries but as these will be described fully in future issues in the series on this family, they will only be mentioned briefly.

Cyathodes. There are eight species of this genus in Tasmania, those appearing in the foregoing article being the most attractive; the remaining are widely dispersed throughout the Island from sea level to alpine situations. The berries, when ripe form a marked contrast to the usually sombre underscrub.

Monotoca, Brachyloma, Lissanthe and Trochocarpa. All possess berries with differing colours, and in the majority of these, although small, they make vivid displays when seen en masse.

Whilst the majority of the berries to be found in the Tasmanian bush belong to the family *Epacridaceae* quite a fair selection are to be found in other families.

Coprosma Some very attractive berries belong to the *Coprosmas*, particularly *C. hirtella* and *C. nitida*.

Pernettya. Lovely rockery plants. Described on next page.

Rubus gunnianus (described in Dec. '66 issue).

Hymenanthera angustifolia "Tree Violet". This plant belongs to the family *Violaceae*. Quite common on the mainland as well as Tasmania, a shrubby plant up to 6' high, branches rather spiny, leaves small $\frac{1}{4}$ - $\frac{3}{4}$ " long; berries oval, about $\frac{1}{8}$ " long, white when young, turning purple on ripening.

Editor's Note: I have requested that this plant be described in a later issue in a series of articles to be devoted to the family *Violaceae*. Will readers please advise of their experiences of knowledge of the plants in this family *Clelandia*, *Hybanthus*, *Hymenanthera*, *Rinorea* and *Viola*.

Astelia alpina commonly known as "artichoke plant" or "pineapple plant" here as well as the mainland. The rather inconspicuous flowers of this plant (which belongs to the *Liliaceae* family) are replaced by quite large berries, about $\frac{1}{2}$ " long and light crimson in colour, the substance is very slimy in consistency but like many of the brightly coloured berries found at high altitudes they are relished by the Currawongs and Wallabies.

Alyxia buxifolia a common shrub in the mainland States as well as in Tas., commonly called "raspberry jam" plant, presumably on account of the taste of its large, edible berries.

Some representatives of the families *Myoporaceae* and *Chenopodiaceae* also possess succulent fruits, although not necessarily berries in the true sense of the word. Both families are well represented in most mainland States and the reader is referred to other issues of "Australian Plants".

Some plants are mentioned as possessing berries as their fruit but upon critical examination it may be seen that not all are true berries but drupes or Pseudo-fruit as in *Gaultheria*, etc., where the functional appearance has been taken over by the grossly deformed calyx or corolla.

Some plants have fruits which at first glance might be taken as "berries", but are really the enlarged and succulent pedicels or flower stalks. A good example of the type with succulent pedicels is the very common "native cherry", *Exocarpus cupressiformis*, and other species of this genus; a closely related plant, *Leptomeria glomerata*, and other *Leptomeria* species have fruit of this nature.

Another group of plants belonging to the Conifers, is quite conspicuous in the Tasmanian highlands, the fruits having a superficial resemblance to berries. The pedicel or stalk of the seed develops into a large and fleshy outgrowth called an *aril*, and in some cases almost or completely encloses the seed. These conifers are *Podocarpus lawrencii* (syn. *P. alpina*); *Phyllocladus aspleniifolius* and *Microcachrys tetragona*; all these species will be fully described in a future issue on the Australian conifers.

Berries for Rockeries

Wildflowers of Tasmania by A. M. Gray

THE GENUS *PERNETTYA*

The only other genus in the family *Ericaceae* occurring naturally in Tasmania is *Pernettya* of which there are two species, endemic in this State. Both occur on high plateaux and mountain summits or on high marshy ground in the N.W., W. and S. of the State. Their descriptions are as follows:

Both *Pernettyas* have interesting possibilities as rockery specimens or in the case of *P. lanceolata* a specimen shrub. However, pending further investigation into "propagation toleration" and habits of growth etc. little is known of their worth.

***Pernettya tasmanica* Hook. f.** A small shrub, creeping but with the tips ascending, forming dense mats 6-12" in diameter. Leaves shortly stalked, narrow-elliptical, blunt 1/8-1/4" long, margins obscurely toothed. Flowers solitary in the axils of the upper leaves. Fruit succulent, red or yellowish white, spherical—1/4" in diameter, surrounded at the base by the enlarged succulent calyx which is the same colour as the fruit.

***Pernettya lanceolata*.** A small, upright shrub about 18"-2' high, branchlets covered with coarse hairs. Leaves narrow elliptical-lanceolate 1"-2" long, 1/4"-1/2" broad, margin serrated with blunt teeth—shining and the veins impressed on the upper surface. Fruit with a thin succulent skin, pink in colour about 1/4" in diameter and half enclosed by the enlarged calyx which is also the same colour as the fruit.

THE FAMILY *ERICACEAE*

The only other representatives of the family *Ericaceae* in Tasmania are *Erica* and *Calluna* both of which are introduced plants.

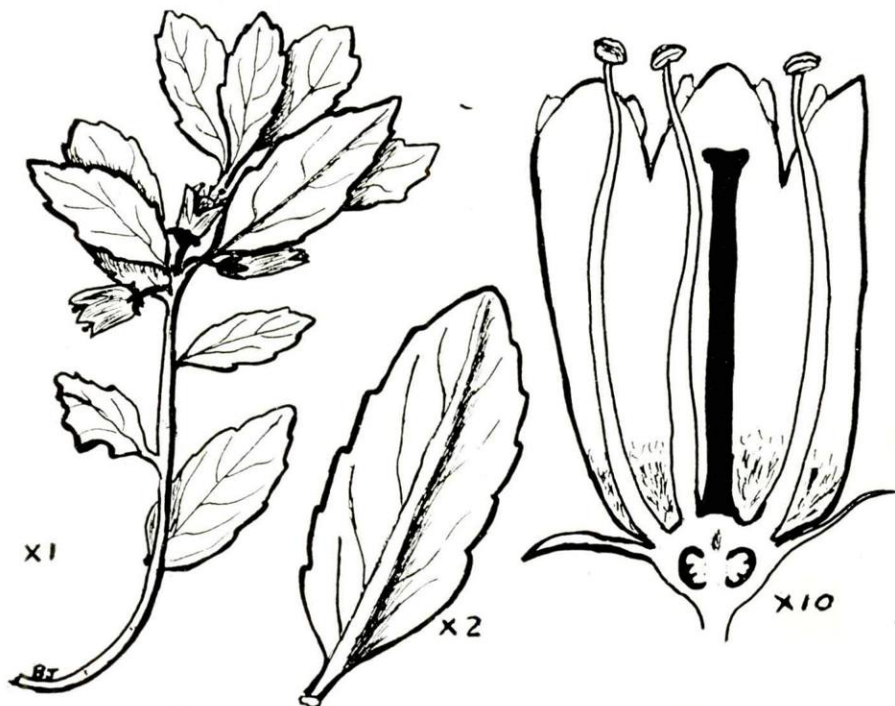
The only four genera of *Ericaceae* in Australia are *Gaultheria*, *Pernettya*, *Agapetes* and *Rhododendron*. *Wittsteinia* is now considered a member of *Epacridaceae*. *Vacciniaceae* is considered as a sub-family under *Ericaceae* and comprises only the genus *Agapetes* of two Australian species endemic to N.E. Qld., which will be described by another author. The only Australian species of *Rhododendron* has been adequately described and illustrated with a full colour plate in the No. 9 issue of "Australian Plants."

BAW BAW BERRY

WITTSTEINIA F. Muell. by Betsy R. Jackes (Townsville University College)

A series of articles each on a separate genus in the plant family Epacridaceae

This is a rare genus represented by a single species *Wittsteinia vacciniacea* F. Muell., occurring in Victoria on the summits of Mt. Baw Baw and Mt. Donna Buang. This genus had been ascribed to various tribes of the Ericaceae but in 1948, R. L. Burt considered that it was better placed in the Epacridaceae, where it showed a "significant resemblance to *Prionotes* and *Lebetanthus* two rather aberrant genera of Epacridaceae."



Wittsteinia vacciniacea—Habit—Lower surface of leaf—Half flower

The two main features responsible for its inclusion in the Ericaceae were the inferior ovary and the fruit, which is a berry rather than a capsule or drupe as found in the other genera of the Epacridaceae. However as Burt says "the change from superior to inferior ovary is, in fact, now generally accepted as a normal evolutionary progression and cannot warrant the separation of *Wittsteinia* from the genera *Prionotes* and *Lebetanthus* to which on other grounds it is evidently related."

In addition, the leaves show characteristics which are distinct from the other genera. Watson (1962) found that this was the only genus in which the stomates are randomly orientated with respect to the longitudinal axis of the leaf, also that there was a remarkable lack of sclerenchyma.

Wittsteinia vacciniacea F. Muell. A semi-prostrate shrub 15-30 cm. high, with coarsely-toothed, obovate-oblong leaves often in clusters of 2-3. The solitary, axillary, pendulous flowers are either yellowish-green or reddish, as is the globular berry. The filaments are free or slightly adnate to the campanulate corolla-tube. The inferior ovary has 2-3 locules with several ovules in each.

SNOW BERRIES

Wildflowers of Tasmania by A. M. Gray.

THE GENUS GAULTHERIA

There are two species of *Gaultheria* occurring in Tasmania, *G. hispida* and *G. depressa* which is found also in New Zealand though it does not occur on the mainland of Australia. A third species, *G. appressa*, is endemic in the higher elevations of eastern N.S.W. and Victoria.

Gaultheria hispida — Snowberry. This very attractive plant is so named because of the masses of snow-white berries which appear in March and last until late June. So thickly clustered are they that they appear like solid masses of snow on the ends of the branches. Although they are called berries, they are not so in the true sense of the word. Rather, the conspicuous white part is really an enlarged and succulent calyx which completely surrounds the small dry fruit within. See colour plate on page 153.

Gaultheria hispida is a very common shrub in sub-alpine forest regions of Tasmania, growing in areas of fairly high rainfall 50-80" p.a. and tolerating soils from neutral to moderately acid in nature. The most usual situation for *Gaultheria* to grow is on the margins of wet Eucalypt forests and sub-alpine shrubberies. It grows best in fairly well drained soils. However, so long as the soil is not waterlogged, it will grow under most conditions and aspects.

Gaultheria hispida R.Br. An upright and spreading shrub about 3' high, occasionally reaching 6' in favourable positions. The twigs and undersurfaces of the leaves hispid with rigid, spreading bristles, reddish green in colour. Leaves elliptical to lanceolate, 1½-2" in length and from ¼-½" in width; leaf margins serrated with blunt teeth; young leaves slightly hairy, the older leaves shining with the veins impressed on the upper surface. Flowers in compact terminal panicles in the axils of the uppermost leaves and branchlets, the peduncles usually shorter than the leaves. Calyx segments at the time of flowering ovate 1/16-1/8" long but rapidly enlarging. Corolla broadly urceolate, petals white about ¼" long. Fruit a capsule, the pericarp dry and containing many small seeds, surrounded by the enlarged and succulent white sepals—the false fruit about ¼-½" in diameter.

Gaultheria appressa of the Australian mainland is closely related, and of the same stature, but may be distinguished by its hairy vestiture which is flattened against the stems instead of spreading widely as in *G. hispida*.

Gaultheria depressa Hook. f. A small, spreading, prostrate shrub, creeping or ascending, occasionally 12" high. Leaves almost orbicular or broadly elliptical, margins serrated, the teeth tipped with conspicuous reddish bristles. Flowers similar to *G. hispida*. The fruit is not as completely enclosed by the succulent calyx as in *G. hispida*. The fleshy calyx is red in colour, rarely white and is about 1/16-¼" in diameter. It occurs on marshy ground on plateaux and in the shelter of boulders on mountain summits in Tasmania and New Zealand. Its habit under propagation is not known though I should imagine it would make a most attractive specimen in an "alpine" rockery if given proper attention and study was given to its behaviour under propagation.

PROPAGATION—A method recommended by A. M. Gray for "Berry-plants"

The most successful method is from seeds, which are collected just as the succulent calyx begins to wither. The seed is sown in a mixture of light compost and fine gravel, kept well watered and placed in a cool but sunny position. After the seeds have germinated and are about $\frac{1}{4}$ " high they should be pricked out into small pots or seed boxes. Any coarse soil with plenty of light humus will suit these plants. Watering should be done regularly and on no account should the soil be allowed to dry out or on the other hand become thoroughly waterlogged. A cool sheltered position is the most favoured for planting out. No manures or fertilizers are necessary. Light pruning after fruiting assists in maintaining a compact shape and ensures larger crops of berries for the next season. The picked berries are ideal for indoor floral decorations, but outdoors, against a background of deep green, the white berries make their finest display.

SEEDLINGS

Reprinted from Vol. XCI, Part 5 issue of the "Journal of the Royal Horticultural Society" England, with permission — Part III of a series.

SOME GARDEN EUCALYPTS by Richard C. Barnard

Editor's Note: Although the following article is written for Eucalypts, the advice contained is applicable to all wildflower seedlings particularly those that develop a main tap root. This entire series of articles is of very high standard. Written by an obviously competent English horticulturalist for English conditions, they show not only the versatility of our Eucalypts but give a guide to the cultivation of our plants in rigorous climates.

Various containers are used for raising eucalypts. Bottomless tubes made of lengths of bamboo, tin-plate, galvanized iron, wood veneer, plastic sheet and treated paper have all been proved excellent in the type of plant produced. Sizes vary from $1\frac{1}{2}$ inch to $3\frac{1}{2}$ inches in diameter and 6 inches to 9 inches deep. Similar-sized black polythene "bag" pots are now commonly coming into use but roots may become restricted in the base with harmful effects, and the compost in the lower half of the pot can easily become, and remain, too wet. Red "whalehide" and paper composition pots, through which roots can grow, have given good results but diameter and depth are usually equal. Peat pots I have failed to manage satisfactorily as they easily become too wet or too dry. Clay pots should never be used for eucalypts which are to be planted out. They cause a check to growth as soon as roots reach the side of the pot and the growth of roots around the inside of the pot appears to inhibit strong root development after planting. I have been given a few pot-bound eucalypts and their performance has been very variable. They take longer to, or have not yet, become windfast: a proportion shed most of their leaves year after year in late summer: some which I dug up 4 or 5 years later had a tangled "knot" of roots, no tap root and few strong horizontal roots. The traditional advice to "tease out" some of the roots of plants ex-clay pots is inadvisable in the case of eucalypts as damage is inevitable. Deep tubes and polythene pots need to be in deep trays for convenient handling and standing out.

When potting-off great care is essential to avoid root damage, to get the roots straight down in the compost and establish good contact between roots and compost. Seedlings should be planted slightly deeper than they were growing in the seed box. No delays should occur between lifting and

replanting, during which roots will dry off, or between planting and watering-in (ball-watering). My practice is to rid the seedling of most of the adhering compost by dropping a clump of seedlings gently on the potting bench, fill the pot to the rim and compact the compost by dropping the pot on the bench, open a slit in the compost with a small (4 inch) mason's pointing trowel held vertically and pulled towards me with a slight lift, place the roots of the seedling held (thumb-upwards) by one cotyledon or leaf into the slit behind the trowel, hold it at the correct depth and withdraw the trowel. If the compost is of the right moisture content it falls onto the roots. The trowel is then pushed in vertically, to the same depth, about $\frac{1}{2}$ inch on the near side of the seedling, gently pushed (still vertical) towards the seedling to establish good contact between roots and compost from top to bottom, the trowel withdrawn and the slit which it has made filled up. I give it another tap on the bench to settle in, then water. The pot must be held firm and a hole of a suitable diameter in the potting bench is the best method. I have used, and taught, this method for many years with small seedlings of all kinds and failures are very rare.

CARE OF SEEDLINGS AFTER POTTING-ON

For a few days after potting-on, seedlings should be shaded from direct sunshine. Temporary muslin shades during periods of sunlight only are recommended. As soon as seedlings are seen to be growing again no more shading should be given. Light intensity has an important effect on the growth of eucalypts (and other Australian plants) and maximum light appears essential in the production of good planting stock. Watering, after the first ball-watering, should be on the same lines as seed boxes, i.e. frequent light overhead watering (preferably mist irrigation), to keep the upper layers of compost moister than the lower layers to encourage the development of surface roots, and spraying (not shading) during periods of hot sunshine. Lights should be off the frames during daytime except to protect plants from heavy or excessive rain, frost and strong winds which will soon loosen seedlings. Provided the temperature is above freezing, or frost not expected, frames should always be ventilated when lights are on. When frost is no longer likely and rain or gales not expected frames should be left open at night. Seedlings in pots, which have become water-logged at any time, may be seriously checked. Once seedlings have recovered from transplanting, I move them from a Dutch-light frame, where I have an overhead high frame for muslin shading when required, to all glass and metal frames on rails which admit more light and can easily be pushed off or over the plants with weather changes. When raising plants in 6-inch to 9-inch deep tubes or pots, it is important to check that water is penetrating sufficiently to keep the compost in the lower parts of the pot from becoming dry. Seedlings transpire larger quantities of water than most plants of similar size.

The sowing of seed in late summer to produce stock for planting the following spring presents some additional problems. I have always had very heavy casualties amongst seedlings potted-off late in autumn when growth is slow. It appears advisable to pot-off in late summer at the latest which means sowing in early summer when most frequent shading and watering are necessary. If the autumn is mild and sunny, the plants may grow too large for a cold-frame and the top-to-root ratio becomes unbalanced in small pots. It seems difficult to keep seedling

GROW WILDFLOWERS

New books available from the Editor, 860 Henry Lawson Drive, Picnic Point, N.S.W. 2213
THE CULTIVATION OF NATIVE PLANTS Price 25 cents, post free

This 48 page booklet was produced principally for school use in Western Australia. It is so ideally suited to the needs of the beginner-home gardener that it is recommended to the reader of "Australian Plants" that has not yet produced his own plants from seed and cutting but is willing to try. There are some sections on "Garden Care of Natives" but the sections on propagation are outstanding. A very suitable title for the book would have been "A Comprehensive Guide to the Techniques of Propagation and their Application for Beginners."

WILDFLOWERS OF THE NORTH-WEST Price 85 cents, post free

A beautifully presented 30 page booklet with 58 full colour plates that captures the far north coast of Western Australia with magnificent scenes and close-ups of wildflowers. The flora is described as one journey north along the highway and then rambles in the Wittenoom Gorge and Hamersley Range.

WATTLE TREES—ACACIA

This Society will always be indebted to Dr. Allan Keane for his life's work in the cultivation and study of our wattle trees. His passing has left many with a deep sense of loss. It is essential that we obtain the services of a reader to carry on his fine work as leader of the Acacia Study Section. It is unlikely that we shall find another with his dedication and love for our wattles but if anyone reading this has the enthusiasm I have a very competent student of the Acacias to advise and assist them with this task. It involves correspondence only and would be a very good interest for someone, particularly one of our country members. Please contact the Editor.

SOME GARDEN EUCALYPTS—cont.

eucalypts healthy under cool and cold glass. At minimum temperatures of 45°F. or more growth continues steadily and plants become too large for small pots. For tender and moderately hardy species to be grown as foliage or flowering plants and stood outside in summer, a minimum temperature of 50°F. was recommended by the late Mr. L. Stenning, Curator Royal Botanic Gardens, Kew, who also emphasized the need for large containers and copious watering when the plants are in active growth.

ROOT PRUNING

Eucalypts are quickly checked by root restriction but not by root-pruning provided this is done regularly and frequently. In my opinion, root-pruning appears to stimulate root development and result is a more vigorous young plant, but the roots must not be allowed to grow more than 2 or 3 inches through the bottom of tubes or pots before cutting off. It has been observed that eucalypts, and other fast-growing evergreens such as Leyland and Lawsons's Cypress, following two or three root-prunings at 10-day intervals start developing some vigorous "fat" roots $\frac{1}{8}$ inch or more in diameter from the main root up inside the pots which grow at a remarkable speed in warm weather. It is not known whether this type of root (possibly "anchoring" roots) is formed without root-pruning at a certain age or as a result of root-pruning, but this development is considered an indication that the plant is ready for putting out. These roots will lengthen by $\frac{1}{2}$ inch a day in damp sand or gravel in summer and, after planting, will form an extensive root system by autumn. Some seedlings planted in summer 1962, killed during 1962-3 winter and grubbed in spring 1963 had one or more main roots finger thick at 18 inches depth where they broke off, on levering the plant out with a dock-grubber. Such root growth makes it understandable why seedlings must be planted young, why transplanting is rarely successful and why root restriction in a clay pot rapidly causes deterioration. It is recommended that plants should always be stood on (not plunged in) a free-draining aggregate, such as sand, and roots pruned regularly. Large numbers can be root-pruned quickly on raised beds of sand by drawing a fine steel wire through the sand just below the pots (a technique originated, I believe, by the Kenya Forestry Department).

MY NATIVE GARDEN

by C. R. Davies

My home is situated about two miles back from the coast at Mandurah, about 40 miles south of Perth. On retiring to my home, I planted many more shrubs, trees and plants about fourteen months ago. The growth has been very satisfactory. In fact the neighbours call the back part of the block "The Jungle". It comprises a bushlike mass of Hakeas, Acacias, Grevilleas, Banksias, Anigosanthos, Boronias, Eucalypts, etc. All are West Australian natives. On either side of the block are more natives including also Melaleucas, Dodonea, Leptospermum and Leschenaultia etc. I left a fairly large tree of *Dryandra sessilis* which was there when the block was cleared for the house. On it I have three creepers growing vigorously, namely *Kennedya coccinea* and *K. nigricans* and *Hardenbergia complaniana*. The soil is a sandy overlay on limestone and I judge that it has been at one time a river bank as there is about a 3 ft. depth of sand black with humus before reaching the yellow sand subsoil. The water level is at about 30 ft. and I have a bore and pump on to sprinklers delivering 50 gals. per min. at a good pressure.

During the summer months regular watering is essential as without it many trees would wither and die. It may be that as they grow bigger and more mature less watering may suffice, but at present after a hot day the sprinklers give them a good shower which is also enjoyed by many and varied types of birds. No evidence has been noticed of "wet feet" with the possible exception of *Anigosanthos manglesii* which suffered badly from the black leaf fungus due perhaps to too much water. At present flowering (24-1-67) are *Eucalyptus torquata*, *E. eremophila*, *E. tetragona* and *E. kruseana*. In bud are *E. lehmanni*, *E. stoatei*, *E. tetraptera* and *E. leptopoda*. Trees of *Hibiscus farragei* and *Alyogyne hakeifolia*, both about 7 ft. high are a mass of blooms and *Hibiscus panduriformis*, the beautiful large yellow species is in bud. *Cassia sophora* up near the house has been flowering for about two months. *Calythrix fraseri*, *Anigosanthos pulcherrima* and *A. flavida*, *Chorizema ilicifolia*, *Melaleuca steedmanii* and *Sollya fusiformis* are also blooming, so in all there is as interesting a variety as one would wish for in one's home garden and all natives.

However my main interest is in the Banksias of which there are 33 species all thriving and growing. Of course, like all members of the Proteaceae, they may at any time decide to wither and die unaccountably. With the members of this species I expect to have flowers all the year round as they become more mature. At present blooming, are lovely specimens of *B. occidentalis* and *B. speciosa*. Just finished are *B. hookeriana* (which bloomed from June to October with nearly 4 spikes) and *B. calevi*. In bud at present are *B. baxteri*, *B. menziesii*, *B. coccinea* and perhaps *B. tricuspis*.

To me my native garden is an absorbing and fulfilling hobby which not only holds my interest and enthusiasm but already is attracting many other folk. It also attracts many feathered friends who come regularly to enjoy the blossoms and when the sprinklers are going to enjoy a shower in the hot weather. Perhaps, as the situation suits me in my retirement it also suits the plants because from June to the beginning of October, I had eight beautiful flowers on my Qualup Bell plant, *Pimelea physodes*.

MICROTIS

THE GENUS *MICROTIS* IN AUSTRALIA by L. Cady, Kiama, N.S.W.

Microtis, called by many the little "Ear Orchids", a name that stems from the auricles or protrudenes situated on the column of the plant. This genus closely resembles the "Leek Orchids" (*Prasophyllum* spp.). When not in flower the single leaf is usually found in damp areas beside the road, in swamps, on hillsides; in fact it is a very cosmopolitan genus and the writer finds not very demanding on a soil in which to grow. *Microtis* are not for the general horticulturist, but for the orchid grower who likes to accept the challenge to grow these miniature gems to perfection, the reward is a perfect pot full with all plants in flower. Then the magnitude of these floral gems can be seen. Although the flowers require a lens to see their beauty, they are borne in great abundance and in some species are rather fragrant.

The genus has a wide range being found in South China, Japan, Philippines, Formosa, Java, New Caledonia, New Zealand and Australia. The Australian species number 14 with the major selection being concentrated in Western Australia.

CULTURE

As stated above *Microtis* isn't particular as to its soil requirements, so a soil fairly rich in humus, but still well drained, will suffice. They prefer a place to grow where they get broken light, thus a bushhouse or a place in the garden beneath a bush where they receive a fair amount of water when growing and only rain when dormant seems best.

DESCRIPTION OF SPECIES

1. *Microtis unifolia* is the commonest species in the genus. A slender or robust plant up to 40 cm. high with a spike of greenish to yellowish-green flowers. Because of its wide range (all States and north to China) it is only to be expected that the plant has a very wide range of forms, but if the following points are considered it is not a difficult plant to identify. 1. Petals small enclosed in dorsal sepal. 2. Lateral sepals hardly revolute, about $\frac{1}{2}$ to 2-3rds length of labellum. 3. Labellum rarely more than half the length of the ovary, its tip emarginate (notched) with 3 well-defined calli on the lamina, these calli are usually not tuberculate but have a minute glandular roughness on the upper surface.

Microtis unifolia (Forst.) Reichb. f. A slender or robust plant up to 40 cm. high. Spikes rather dense, usually not tapered to the top, flowers greenish to yellowish green. Dorsal sepal broad but acute about 2 mm. long. Lateral sepals obtuse, slightly rolled at the apex. Petals short enclosed in the dorsal sepal, relatively wide oblong-oval much shorter than the lateral sepals. Labellum oblong *not as long as ovary*, the margins crisped and uneven, the blunt apex emarginate, the lamina contains two raised basal calli and one apical raised callus. The apical callus varies much in shape from almost wanting to a very conspicuously raised one taking up much of the lamina; the basal calli can in some instances be joined, forming a semi-circular raised ridge. Column small, anthers almost hemispherical, mucronate, stigma prominent.

Flowers: October-January.

District: All States New Zealand north to China.

2. *Microtis truncata* resembles the more common *M. unifolia* but differing in the following points. Labellum truncate at the tip and not notched. Petals linear-falcate, as long as the lateral sepals, tightly revolute. Dorsal

sepal broad, exceeding 3 mm. It is a slender plant up to 24 cm. high, with flowers of light green.

M. truncata Rogers. A slender plant up to 24 cm. high with about 40 distant flowers of a light green hue. Ovaries much twisted, about 5 mm. long. Lateral sepals tightly revolute, oblong-lanceolate. Dorsal sepal cuculate, apex acute and slightly recurved, erect. Petals erect bluntly linear falcate. Labellum almost oblong contracted laterally about the middle, margins slightly crenulate but entire, 3.7 mm. long with an average width of 1 mm. but expanding beyond the centre constriction to a breadth of 1.5 mm. Lamina 5 nerved with 3 calli, a large anterior callus usually hastate or oval-hastate extending almost to the tip, basal calli 2 oblong-oval, but owing to abortive changes often assuming various crescentic or cuspidate forms, each occupying the basal area between the mid and marginal nerves. Another pointed, its apex considerably higher than the rostellum; auricles (Little Ears) large and prominent rounded with a small basal lobe on the posterior margin, reaching to about the same level as the rostellum.

Flowers: November-December.

District: South of Western Australia only.

3. *Microtis parviflora* is a slender but often robust plant to 60 cm. high, with a spike of dense light green flowers. The species is not at all common in its typical form and is remarkably variable, particularly in the labellum shape and calli arrangement, the anterior callus is in the true type entirely absent but a thickening or very slight raised callus can often be found, especially where the plants are found intermingling with *M. unifolia*. The major points to look for are the lack of apical callus and the oval-shaped labellum. In the hybrid forms with *M. unifolia* it is extremely difficult to distinguish.

This species has been united with *M. unifolia*, but if seen in its type form it differs markedly from *M. unifolia*.

M. parviflora R.Br. A slender plant but at times rather robust up to 60 cm. high. Leaf lamina exceeding the inflorescence. Spike usually rather dense, flowers very small, light in colour. Dorsal ovate under 2 mm. in length, its point short and recurved. Lateral sepals shorter, obtuse, recurved or revolute. Petals oblong-linear, obtuse, still shorter. Labellum oblong or ovate, blunt in front. Less than 2 mm. long, margins quite entire; 2 calli on the upper surface at the base, but none in front. Column under 1 mm. long with distinct and rather prominent rounded auricles on each side of the anther. Anther hemispherical. Pollinia 2, each bilobe attached to the viscid disc by a very short caudicle, stigma semilunar, situated transversely between the auricles.

Flowers: September to January.

District: All States and New Zealand through to South China.

4. *Microtis media* is a robust species up to 40 cm. high. White flowers, rarely green, are numerous in a dense spike. This species resembles *M. alba* but the different labellum shape and the 2 groups of glands at the apex are hard to mistake. The writer has examined specimens from Bunbury, W.A., and found the labellum shape variable, the margin calli were at times wanting and in one instance only, one group of glands was present instead of 2 on the apex of the labellum. The plants were also greenish in some cases.

M. media R. Br. A robust species up to 40 cm. high. Flowers numerous in a dense spike. Leaf lamina longer than the inflorescence. Flowers white or rarely green. Dorsal sepal 2.5 mm. long, broad and concave. Lateral sepals revolute. Labellum roughly rectangular, the centre somewhat restricted broadening to a rounded emarginate apex, the margins with tuberculate glands towards the apex, two basal calli are present, the apical callus is modified to two groups of tuberculate glands. Column short.

Flowers: September to December.

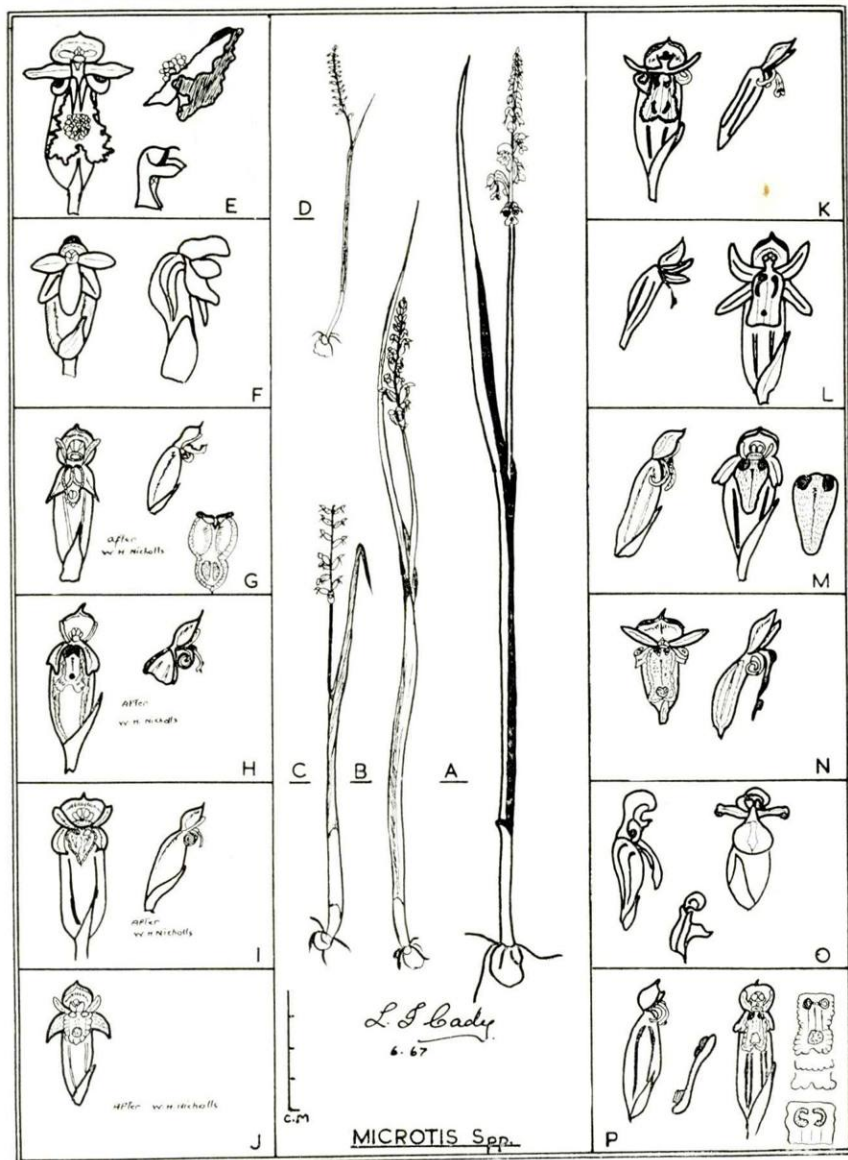
District: Western Australia only.

5. *Microtis alba* is another of the white-flowered species, differing from *M. media* in the labellum shape with its diverging apex and the one group of glands. It is a slender but tall plant.

M. alba R. Br. A slender but tall plant. The leaf lamina often exceeding the spike. The inflorescence not really dense, flowers white. Lateral sepals revolute. Dorsal sepal cuculate, upwards of 3 mm. long, acute at apex. Petals almost as long as dorsal sepal, narrow. Labellum oblong, the apex expanding into two longish divaricate lobes, the lamina with two long basal calli and the apical callus consisting of a group of tuberculated glands. The margins with tuberculated calli also. Column short.

Flowers: October to January.

District: Widely distributed over the coastal plains and a little inland in Western Australia only.



NOTE: It is regrettable that *M. truncata* and *M. pulchella* could not be illustrated but no material was available to the author to sketch.—L.C.

KEY TO PLATE

- A. *M. alba*. Typical plant.
 B. *M. unifolia*. Typical plant.
 C. *M. biloba*. Typical plant.
 D. *M. atrata*. Typical plant.
 E. *M. alba*. Showing flower-labellum, side and column side.
 F. *M. atrata*. Flower side and front.
 G. *M. bipulvinaris*. Flower, front and side labellum above.
 H. *M. biloba*. Flower, front and side.
 I. *M. holmesii*. Flower, front and side.
 J. *M. magnadenia*. Flower front.
 K. *M. media*. Flower, front and side.
 L. *M. gymnadonoides*. Flower, front and side.
 M. *M. parviflora*. Flower, front and side, labellum top.
 N. *M. oblonga*. Flower, front and side.
 O. *M. orbicularis*. Flower, front and side, column side.
 P. *M. unifolia*. Flower, front and side, labellum side and above with variation of calli and tip shape.
 A. to D. Natural size to scale, all other plates greatly enlarged.

6. *Microtis oblonga* closely resembles *M. unifolia*, but can be separated from this by the labellum shape the comparative length of the lamina, the longer and more erect petals. It is usually a slender plant to 50 cm.

M. oblonga Rogers. A variable plant usually slender but up to 50 cm. high. Leaf lamina often greatly exceeding the spike. Spike 15 to 22 cm. long, fairly loose. Flowers very small on slender ovaries. Usually very pale green. Dorsal sepals about 3 mm. long, almost erect and narrowly hooded, acute, the apex slightly recurved, lateral sepals tightly revolute. Petals erect, obtuse or truncate, linear-falcate the base overlapping the dorsal sepal. Labellum about 2.5 mm. long, usually almost as long as the ovaries, reflexed, narrowly oblong, the margins crenulate, the lamina with 2 large basal calli and a conspicuous one at the apex. Column stout, very short with relatively large auricles.

Flowers: October to December.

District: N.S.W., Victoria, South Australia and Tasmania.

7. *Microtis magnadenia* is a very rare species allied to *M. uniflora* and *M. oblonga*, but the much larger florets, different labellum shape and the pendulous lateral sepals separate them. A tall plant to 45 cm. with green flowers that are large for the genus.

M. magnadenia Rogers. A tall plant, somewhat slender, to 45 cm. high. The sheathing portion of the leaf usually low down on the stem, the lamina elongated and reaching to the base of the inflorescence about 13 cm in length, loosely multi-flowered. Flowers green, rather distinct, large for the genus, with moderately long, slender pedicels sub erect. Dorsal sepal erect, rather wide, nearly hemispherical, very concave, minutely apiculate, about 3 mm. long, 2.75 mm. wide. Lateral sepals free, rather widely lanceolate, slightly channelled on the upper labellum. Petals oblong-linear: tapering, very blunt at the apices, erect, a little shorter than the sepals and not concealed by the latter except at the base. Labellum sessile when spread out, oblong in outline, retused at the apex, the anterior margins otherwise regular and slightly upturned at the corner so as to give a rounded appearance, lateral margins crenulate, spreading more or less horizontally, about 3 mm. long, 1.75 mm. wide, the lamina provided with a very large pale green conspicuously raised subconical callus near the apex and two very large conspicuously raised confluent dark green calli at the base. Column rather long for the genus, terete, auricles relatively large.

Flowers: November.

District: N.S.W. only and New Zealand.

8. *Microtis bipulvinaris* is closely allied to *M. parviflora*, differing in the shape of the lateral sepals, labellum and lamina calli arrangement. Flowers are also green to 40 cm. high.

M. bipulvinaris Nicholls. A slender plant to 40 cm. high. Leaf sheathing at base, lamina varying in length but usually long. Spike somewhat lax, 12-15 cm. long. Flowers numerous green, the pedicels moderately long, suberect. Dorsal sepal wide, erect, concave over the labellum or somewhat hemispherical with a minute point about 2 mm. long. Lateral sepals free lanceolate divergent on each side of the labellum or somewhat recurved, about 2.5 mm. long. Petals erect, oblong-linear, acute (obtuse in some flowers), the apices sometimes reflexed, 1.5 mm. long. Labellum sessile, tongue shaped, channelled, apiculate, about 1.5 mm. long, the lateral margins entire or sometimes crenulate, lamina marked near the tip with a slightly raised mass of granulations and bearing towards the base 2 conspicuous cushion-like elevations, at the extreme base 2 inconspicuous horizontal glands (in some flowers these glands were obsolete). Column very short, terete, auricles conspicuous.

Flowers: September to October.

District: Victoria only.

9. *Microtis holmesii* is a rare species allied to *M. parviflora*, differing in the labellum shape in the 3 lamina calli and the tightly revolute lateral sepals. It is a slender plant to 30 cm. with green flowers.

M. holmesii Nicholls. A slender plant up to 30 cm. high. Leaf sheathing at the base of the lamina, this lamina about 12 cm. long. Spike in a compact, fairly loose arrangement of about 8 to 12 cm. Flowers numerous with rather large ovaries, green, the pedicels short. Dorsal sepals erect, concave, minutely apiculate, about 2.5 mm. long. Lateral sepals oblong-lanceolate, tightly revolute (in many flowers), about 3.5 mm. long. Petals oblong-linear erect, apices obtuse or somewhat acute, often concealed within the hood of dorsal sepal or quite free and prominent, about 2 mm. long. Labellum sessile, cordate, recurved, about 3 mm. long, margins entire, undulate, 2 dark green calli at the base and a minute pale green one at the tip. Column short, anthers obtuse, the auricles relatively large. Viscid disc prominent.

Flowers: November to January.

District: Victoria.

10. *Microtis biloba* is a remarkable little species to 25 cm., having a prevailing colour of yellowish-green and easily distinguished by the bilobed apex to the labellum.

M. biloba Nicholls. A smallish species up to 25 cm. tall, similar in habit to *M. unifolia*. Spike rather short to 5 cm. Dorsal sepal erect, concave, with a prominent acuminate apex, about 3 mm. long. Lateral sepals free, revolute on each side of the labellum, oblong-lanceolate, obtuse about 3.5 mm. long. Petals erect, linear, obtuse, about 2.5 mm. long. Labellum oblong-quadrate, 3.5 mm. long. Lamina green, margins irregular, pale yellow apex prominently bilobed,

the lobes angular, 2 large dark green calli at the base and a minute one near the tip. Column short, anthers obtuse, auricles small.

Flowers: December.

District: Mostly Victoria.

11. *Microtis orbicularis* is a very distinct species with a favour for very damp places in Tasmania. Plants were collected in up to an inch of water.

M. orbicularis Rogers. A very slender species to 30 cm. high. Leaf lamina shorter than the spike. Spike fairly loose. Flowers green, minute, sessile. Dorsal sepal obtuse, hooded, gradually narrowing towards the base about 1.25 mm. long. Lateral sepals about same length, linear-oblong, blunt, concealed below the labellum. Petals rather narrower than the lateral sepals, spreading transversely, slightly recurved. Labellum orbicular, margins entire, lamina somewhat concave, reflexed about as long as the lateral sepals, no calli present on the lamina. Column very minute with distinct linear auricles.

Flowers: September to October.

District: Western Australia, South Australia, Victoria and Tasmania.

12. *Microtis atrata* is another water-loving species and by far the smallest in the genus, unmistakable. The green flowers are very minute in a dense spike reaching only to 15 cm. high.

M. atrata Lindl. A minute species up to 15 cm. high. Leaf lamina exceeding the spike. The plant a yellowish green in colour. Flowers very minute in a fairly dense spike, 1.3 cm. long. Dorsal sepals very obtuse, widely hooded, about 0.08 mm. long. Lateral sepals oblong, blunt, spreading but not recurved, nearly as long as the dorsal sepals. Petals rather shorter than lateral sepals but similar spreading. Labellum about 0.8 mm. long, oblong or quadrate, spreading or reflexed, the apex quite blunt, margins entire, lamina with two nerves but no calli. Column about .6 mm. long, rugose and glandular. Anthers hemispherical, auricles fairly long.

Flowers: September to November.

District: Western Australia, South Australia, Victoria and Tasmania.

13. *Microtis pulchella* resembles *M. gymnadenoides* but is separated by the labellum lamina calli. In *M. pulchella* there are only two, while *M. gymnadenoides* has the three calli.

M. pulchella R. Br. A slender plant up to 30 cm. high. Spike loose about 9 cm. long. Dorsal sepals blunt, hardly broader than the lateral sepals about 2 mm. long. Lateral sepals not reflexed as long and almost as broad as dorsal sepals. Petals incurved over the column, similar length but much narrower. Labellum entire oblong contracted in the middle, a broad callus at the base and a small oblong thickening towards the apex. Column short, almost as long as the petals.

Flowers: September.

District: Western Australia only.

14. *Microtis gymnadenoides* resembles *M. alba* but differing in the labellum, having two basal appendages in place of the calli. It favours wet places, in sandy flats, rising to 45 cm.

M. gymnadenoides Diels. A slender species up to 45 cm. high. Leaf lamina much shorter than the spike. The spike about 6 cm. long, moderately loose. Flowers white on rather prominent ovaries. Dorsal sepal broad with a small point at its apex. Lateral sepals rather blunt, similar to the petals, narrow oblong, almost as long as the labellum. Petals similar to the lateral sepals but a fraction shorter. Labellum quadrangular-oblong, contracted somewhat about the centre. Margins somewhat crisped, the tip notched, lamina with two basal appendages and one small swelling at the tip. Column shorter than the petals.

Flowers: November to December.

District: Western Australia only.

BABES IN THE WOODS

MICROTIS IN TASMANIA by Pat Palmer

Microtis flowers are often likened to little beetles, but they remind me of a miniature baby show, with dozens of little faces in bonnets and bibs. The upper sepals are the bonnets, the columns the faces, the lateral sepals pairs of little arms, and the labellums frilly bibs.

Five species of *Microtis* are now recorded for Tasmania, the most common being *M. unifolia* and *M. parviflora*. These two, favouring wooded areas or heathlands, usually with heavy soil, are difficult to tell apart, unless one has a very good knowledge of the identifying features of the

plants and also has a powerful magnifying glass (say 15X or 20X), or, better still, a microscope.

The other three species are more easily identified, but, to make up for this advantage, are almost impossible to find, being recorded from localised areas in the north only. Very few collectors in Tasmania have seen the rare species of *M. orbicularis* or *M. atrata*, and *M. oblonga* can scarcely be regarded as common.

Microtis have not flourished in pots, whenever I have tried to cultivate them. Most attempts have been with *M. unifolia*, and in no case have tubers increased, although spasmodic flowering has taken place. The lack of success could be due to poor drainage in the pots (a matter to be checked); alternatively, I have noticed that in their natural conditions *M. unifolia* have not been prolific or free-flowering in recent seasons, and in some localities where once abundant now seem to have disappeared. This may be due to unusual and unsuitable seasonal conditions, affecting also the plants in pots.

Plants of *Microtis atrata*, in flower, were given to me in 1965. In the 1966 season the plants appeared, but none flowered. This, I find is a fairly typical occurrence with orchids which are moved, and may indicate that adjustment to new conditions is necessary. On the other hand, I have noted that many plants in the field also show a tendency, after a good flowering season, not to produce flowers the next year or so, putting up leaves only.

Bearing large families, often 40-60 flowers per stem, it is little wonder that *Microtis* plants often rest for several seasons after each flowering—possibly this is their own inbuilt form of birth control! This is quite feasible, as with so many flowers per plant, producing perhaps millions of seeds after pollination, a locality could well become overpopulated and be unable to support the plants growing in it.

A RARE TASMANIAN ORCHID

by M. J. Firth

If you have found a rare orchid in a little patch of ground on a plain of about 1200 acres, how do you proceed to mark the area so that you are able to return to the same spot a year later? To add to the difficulties the surrounding vegetation is quite dense and from 2 to 4 feet high, and there are no natural landmarks within the plain. But let me relate how the problem arose.

On the North West Coast of Tasmania there is a cape jutting out into Bass Strait, and forming one of the nearest points of land to the mainland of Australia. From the Cape a low range of hills runs inland rising to a height of some 1100 feet ten miles inland. To the west of this range is a considerable area of low-lying plain, which, in its most westerly extension broadens out into thousands of acres making up most of the N.W. corner of Tasmania. About 2 square miles of this plain are enclosed between natural boundaries flanked to the east by Sisters Hills, to the north by the sea, and enclosed to the south and west by Bass Highway, the main sealed road providing an outlet for the rich farmlands of the far nor' west.

Australian Plants in Cultivation

Readers, especially people who are new to the cultivation of natives, often enquire after a reference book that will give them a guide to all Australian natives that are grown in the garden. A simple description giving height etc., is usually all that is sought. The Society has now produced a book that not only lists and describes the thousands of wildflowers recommended for cultivation in the garden, but groups them under headings such as "Windbreak Trees—Dwarf or Low Growing", "Windbreak Trees—Medium", "Windbreak Trees—Tall", "Shade Trees", "Ornamental Native Trees—Tall", "Ornamental Native Trees—Medium", "Ornamental Native Shrubs", "Ornamental Native Shrubs—Dwarf", "Native Climbers and Creepers", "Native Ground Cover Plants", "Native Rockery Plants", "Native Indoor Plants" and "Native Tub Plants." The index lists more than 1500 species. The first section of this new and outstanding publication provides a planting and cultivation guide under such headings as Planting Techniques, Mulching, Staking, Pests, Soil Treatment, Spacings, Windbreaks, etc.

This book is the most complete reference to Australian wildflowers in cultivation ever produced but is available only in the bound Volume No. 3 of *Australian Plants*. See below.

Volume No. 3—*Australian Plants*

Price \$6.00 + 20c postage

This bound volume comprises issues 21-28 of the periodical "Australian Plants" together with a special book, "Australian Native Plants in Cultivation" (see above). We have gone to lengths to make this volume of special value as only by selling copies of each issue in this way can we hope to maintain the standard of "Australian Plants." This Volume No. 3 is fully sewn in a strong binding with green plastic hard cover and gold lettering on front and spine. They sit beautifully on a book shelf and would make ideal presents and gifts to your friends. Even if you receive "Australian Plants" issues regularly, you would be wise to purchase a bound volume for future reference.

The vegetation on this plain is mostly wet hummock sedgeland, running into small areas of wet scrub. The main components of the vegetation are *Mesomelaena*, *Melaleuca*, *Sprengelia*, *Leptospermum*, and some stunted eucalypts—*E. simmondsii*, and a few patches of *Bauera*. Scattered over the plain many species of native orchids are to be found, with *Thelymitra* yielding the most spectacular examples. Several of our rarer orchids occur on this plain, notably *Burnettia cuneata* and *Prasophyllum odoratum* var. *album*.

In December 1964, my wife and I walked about a mile across the plain towards the sea. On our return journey we located a small patch of *Diuris palustris*. This was quite an event as we had not seen this orchid for many years. I duly photographed the little colony, and we then set off splashing our way through the shallow water of a low-lying swampy area back to our car. Then came another surprise, *Microtis atrata*, the Swamp Onion Orchid, a little yellow-flowered species seldom found in Tasmania. Amongst the numerous little orchids there appeared a stranger, quite different from any other orchid recorded for this State; a little orchid some 10 to 15 cms. tall, with an almost circular labellum, and with its spike of flowers sharply angled where it emerged from the leaf-sheath. Reference to mainland literature confirmed the first sighting of *Microtis orbicularis* on Tasmanian soil.

In Dec. 1965, we went back to the plain but were unable to find our little colony of orchids. There is hardly a landmark on the whole plain, so a small patch some 20 ft. by 10 ft. is hard to locate. Reference to my field book gave the following directions which had seemed adequate the year before, but which, this year, proved quite inadequate:

"From where the car is left follow a line a hand's breath to the right of the Nut, about 600 yards (*Diuris palustris*). Turn back towards the car, and, deviating 30 degrees left, *Microtis orbicularis* is within 50 yards." The Nut appears on the horizon across the sea. It is a spectacular monolith rising abruptly 900 feet from sea level, thus providing a landmark.

In Dec. 1966, I was again in the area, spending quite a few hours on several different occasions searching for the elusive patch of orchids. I had almost given up in despair, when, two years to the day from my first discovery, I happened once more to locate the little patch of Swamp *Diuris*. From them the location of the *M. orbicularis* proved relatively easy.

GROWING MICROTIS

Methods Used With S.A. Microtis by R. C. Nash

The genus *Microtis* has 5 known species in South Australia, some very common while the others are as rare.

Microtis unifolia (Forst.) Reich. Blooms October to December.

Habitat: Throughout the better watered areas of the State, in some places it is found in large colonies. This specimen multiplies well by seed and vegetatively.

Compost: The top 2/3rds of the pot is filled with a compost composed of the following mixture, 70 to 80% coarse washed sand and 20 to 30% of sawdust/leaf mould. The lower 1/3rd of the pot is filled with coarse sand and pieces of broken pot. The pot should be almost a 6 inch pot. Place pots in a moderately shady position sheltered from wind. Watering, give enough to keep the compost damp. As plants multiply, break up and repot.

Note: In the swamps near Mt. Compass I have found a form with a very long labellum not unlike the eastern *Microtis oblonga*.

Microtis parviflora R.Br. Blooms November to January.

Habitat: In damp places in the Mt. Lofty Ranges, south-east of S.A. and possibly on Kangaroo Island. This species is quite common in its habitat and forms colonies.

Compost and culture as for *Microtis unifolia*. During the later months of the season the compost must be kept damp to ensure a good flowering.

Microtis oblonga Rogers. Blooms November and December.

Habitat: A few isolated areas of the Mt. Lofty Ranges, rare. From information I have this plant may not be the same as the plant found in the eastern States under this name. The only colony I knew of was destroyed many years ago by clearing of the area for grazing.

Culture: I would suggest that as used for *Microtis unifolia*.

Microtis orbicularis Rogers. Blooms November and December.

Habitat: Swampy areas of the Mt. Lofty Ranges, very rare. I have only seen a few plants of this species in the swamps near Mt. Compass long before these lands were drained and cleared. Another plant near Longwood could have been a member of this species.

I have no suggestions for compost or culture for this species as it is a swamp orchid and many of these are difficult to grow.

Microtis atrata Lindl. Blooms November.

Habitat: Damp and sheltered places in the Mt. Lofty Ranges, damp areas in the S.E. of S.A. Forms small colonies, a very small plant with very small yellowish flowers.

Compost consists of 90% coarse washed sand with 10% sawdust/leaf mould mixed in with the sand. Place broken pieces of pot in the base of the pot and place the compost above these pieces of pot. Place pots in a moderately shady and sheltered spot. Watering, keep the compost moderately damp all the year except for the dormant period when it may be allowed to dry out a little.

AUSTRALIAN ORCHIDS — PHOTOGRAPHERS

We are preparing a 750 page book on our Australian orchids. In order to adequately illustrate the book in colour we need many colour slides. Will all competent photographers please photograph every orchid that they see, terrestrial as well as epiphytic, between now and November and send the slides together with those they already have to Mr. R. Deane, 157 Becroft Rd., Cheltenham, N.S.W. They will be returned promptly. The book will be world famous. Please help us to get the best colour illustrations possible.

THE LIZARD ORCHID

ORCHIDS IN TASMANIA—*Burnettia cuneata*—by M. John Firth

This orchid is also to be found in Victoria and New South Wales but in these States it is very rarely seen. The more severe southern conditions of Tasmania seem to suit this orchid better. Even so, it is not to be found among the more closely settled parts of the State. With a few notable exceptions one has to go to our west coast to find this orchid in profusion. This part of the State, apart from mining settlements is almost uninhabited. Notable exceptions to this general pattern of distribution are to be seen near Rocky Cape where there is a magnificent colony within easy reach of a metalled road, and several more but a short distance from farming land. Around Smithton the orchid is also not uncommon.

A peculiarity of the growth of *Burnettia* is that it seems to favour only the one type of soil. Many of our other orchids seem to care little where they grow. They may be found amongst Eucalypts, or drooping over a chattering stream a polite listener to its incessant babble. Again they may parade the moors, almost completely hidden by button grass and heath, or invade the hillsides, storming the slopes and colonising rocky hilltops, quite different from their usual habitats. Nodding Greenhood is one of the orchids which seems to be able to withstand many differing types of soil and micro-climates in this way. Another Greenhood which appears to care little where night falls upon it is *Pterostylis parviflora*. Often they hide amongst the heath; then again they are to be found in full view on rocky ledges, or breaking through a dried up peat bog. Another extreme example showing the range of some of our orchids is to be found in Autumn Orchid (*Eriochilus cucullatus*). I have found these on an extremely dry plain within a few feet of sea level, and in peaty bogs in an area watered by perpetual springs, 4,000 ft. up on our central plateau.

Unlike the above mentioned orchids with their catholic tastes in soil and climate, Lizard Orchid appears to favour only one kind of location; and, although somewhat tolerant of climate, prefers our wet west coast to other parts. Rainfall of the Rocky Cape area is just over 30 inches per year, while on our west coast it may reach 120 inches. But no matter what the rainfall, Lizard Orchids are seldom to be found except in wet hummocky soil, where the soil never dries from one year to another.

BURNETTIA CUNEATA Lindl

By Leo Cady, Kiama, N.S.W.

It is strange how some plants rarely ever adapt themselves to a general habitat, and become the everyday run of the mill types that can be found in every type of bushland. The species being considered inhabits only high altitude swampy areas or the swamp edges in N.S.W., while in the southern States, although it inhabits swampy areas also, it is still not to be considered a common plant anywhere. In N.S.W. one could almost count the times it has been found on one's fingers.

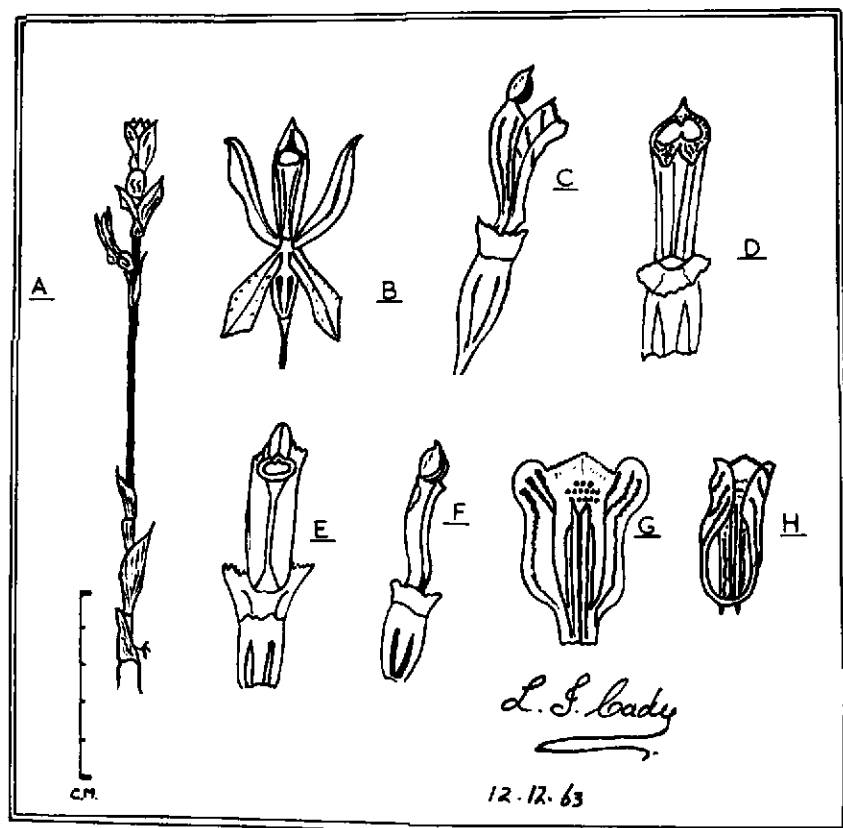
It follows that the culture of this plant is almost unknown. The author has on one occasion tried a plant but this grew for a short period and then rotted at the base, suggesting that too much stagnant moisture was present.

Being a swamp plant it was thought that the plant would want it damp, but apparently not.

Burnettia cuneata Lindl. A dwarf plant, terrestrial, with a globular tuber, a rosette of leaves which are absent at flowering time, or reduced to small sheathing bracts. Flowers 2 to 5, large for the size of the plant, purplish-brown outside, white or pinkish inside with conspicuous darker veining. Dorsal sepal broad, lanceolate, concave but hardly cucullate; lateral sepals and petals lanceolate, the petals smaller overall than the lateral sepals, all segments very fleshy in texture. Flowers open very shyly. Labellum sessile, short, undivided, erect at the base, broad, truncate or obscurely sinuate at times, even fringed at apex, the lamina with 2 longitudinal ridges or raised plates broken up into calli above the middle. Column about 7 mm. long, incurved, winged.

Distribution: Confined to the south-eastern area of Australia, i.e., Tasmania, Victoria and rare in N.S.W.

Flowers: September to November, chiefly October.



KEY TO PLATE

- | | |
|---------------------------------|--|
| A. Plant natural size to scale. | E. Column front x5. |
| B. Flower opened out x4. | F. Column side x5. |
| C. Column and labellum x4. | G. Labellum flattened out to show interior x6. |
| D. Column less anthers x5. | H. Labellum in natural form x6. |

PAVONIA HASTATA Cav.

by A. Krapovickas, Facultad de Agronomía y Veterinaria Corrientes, Argentina.

A further article in our series on "hibiscus-like" plants.

The *Pavonia* genus has more than 200 species of which two-thirds grow in the Americas and one-third in the Old World (chiefly in Africa).

The only known species for Australia is *P. hastata* Cav., which belongs to the *Lebretonia* section. This is an exclusively American section comprising some 40 species and its centre of variation is in S.E. Brazil and Paraguay.



Colour plate by courtesy of Angus & Roberston Ltd.

Plant and flower size variable—drawing and colour plate half full size.

While the genus is centred in South America, it is interesting to note that *P. hastata* was collected by several of the earlier collectors, e.g. "Nepean Hawkesbury and Patterson rivers, R. Brown" (1802-5), "Liverpool Plains, A. Cunningham" (1791-1839). On the basis of these early discoveries it is generally regarded as a native to Australia as well as South America. In South America the first collections were made by Commerson in 1767 from the banks of the River Plate.

In S. America, as in Australia, it grows along the rivers, near the east coast, between Lat. 22°27' and 35°S. while in Australia it is found between 26°32' (Kingaroy, Qld.) and 35°36' (Victor Harbour, S.A.).

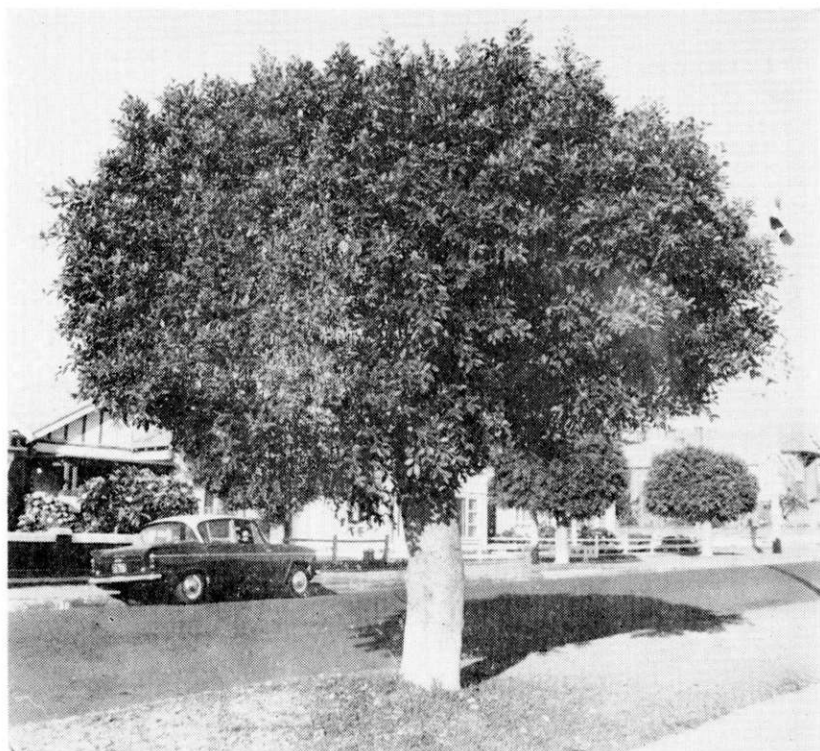
It is a bush which can reach a height of 2 metres with hastate leaves and isolated flowers along the branches, peduncle 1 to 5 cm. long; calyculus generally has 5 bractlets a little shorter than the calyx; calyx 6 to 9 mm. long; attractive corolla with 5 petals 25 mm. long x 20 mm. wide, lilac pink with a red mark at the base and red veins.

FICUS HILLII

Australian Trees for Street Tree Planting—A series by H. Oakman

Over the past twenty years considerable use has been made of Hills Fig for street planting, particularly in the Sydney suburbs where this tree has gained favour on the assumption that it is a small, tidy and non-veracious fig, unlikely to cause the damage for which its close relative the Moreton Bay Fig is so notorious.

It should be made clear however that this is only true under the difficult conditions obtaining in most suburban streets, and that in different circumstances this tree will grow almost as big as the Moreton Bay and have all of its disadvantages in equal measure.



Photograph by Robert Boden showing *Ficus hillii* growing in a Sydney street.

Hills Fig is one of the most attractive of the Fig trees; it is an evergreen, has dense foliage, small, glossy deep green leaves which are attractive throughout the year. As a rule it develops a short stem with light grey bark that is uniform throughout the branches. It has a rather angular branching habit which tends to give it an irregular spreading outline. It makes an excellent shade tree and from the point of view of street tree requirements, has many characteristics that make it suitable for this purpose. It is hardy although for preference it should be given good soil conditions with plentiful moisture. Regular pruning resulting from proximity to overhead

wires or the need to restrain growth away from the street will not affect it, nor will severe lopping, providing this is done in early summer. Spraying is seldom necessary as it is not subject to diseases, the only insect that seems to affect it is Scale and very occasionally Lerp.

Complaints are sometimes made about the root damage caused by Hills Fig, but these have not been more numerous than the average of complaints lodged against Brushbox, Camphor Laurel and other trees that have been commonly used in suburban streets. In the northern part of the State and in Southern Queensland this tree has in a few instances been planted as a street tree but these plantings date back a considerable time and as a result of the experience gained, current plantings exclude the use of this fig as a street tree. Its growth under conditions of warmth and deep soil is rapid and its roots are voracious feeders with a tendency to lifting kerbs and pavements; the tree has a further disadvantage because of its invading root system, buttress type stem and huge crown which may have a spread to 100 feet in diameter.

The origin of this Fig is the brush forests of Northern New South Wales and Queensland. Occasionally it is confused with *Ficus nitida* to which it bears a superficial resemblance.

Most of the *Ficus* are sub-tropical or tropical with some exceptions such as the Moreton Bay and Port Jackson Fig which grow quite well in temperate areas. Hills Fig will stand light frosts but it cannot be recommended for inland dry areas or the colder districts.

A QUEENSLAND "BERRY" TREE

EMMENOSPERMUM ALPHITONIOIDES by C. H. Hewitt, Bellingen, N.S.W.

I often wonder why *Emmenospermum alphitonioides* is not grow in parks and gardens as it is one of, if not, the best of all our "berry" bearing trees. My tree has had fruit of bright orange in great sprays for four or five months each year borne above the foliage. It is quite easy to raise from seed. The foliage is dark glossy green forming a rounded head.

The tree has grey, slightly wrinkled bark, the branchlets are green and grow in a slightly zig-zag way, leaves are elliptical, glossy dark green above and paler below, two to three inches long and one inch wide. Flowers are white and small in panicles at the end of branchlets. The fruit is globular $\frac{3}{8}$ inch diameter, shiny green changing to orange, two-celled and when ripe, falling away leaving seeds $\frac{3}{16} \times \frac{1}{8} \times \frac{1}{16}$ attached to the stalks. These seeds are bright red and glossy.

Seed germinates freely and plants handle quite well in tubes. The tree is fairly hardy and does not seem to mind considerable cold, at any rate when established.

A W.A. BERRY TREE

The only other species of *Emmenospermum* native to Australia is *E. cunninghamii* Benth. This is a tree from the north-west of Australia that produces red fruits and seeds. Very little is known about this tree. Who can report on it and supply seed? I would also appreciate reports on the species of *Diospyros* and apparently a very fine tree *Hollandaea sayere*. Seed of the latter is urgently required.

THE W.A. CHRISTMAS TREE

NUYTSIA FLORIBUNDA—contributed by Dr. J. S. Beard, Director

Nuytsia floribunda, the West Australian Christmas Tree, is one of the finest flowering trees in the world and should be widely cultivated. That it is not, is due to certain inherent peculiarities of the species, but work carried out at King's Park since 1962 shows that the difficulties can be overcome. In fact we are now confident that given time and patience and correct treatment, *Nuytsia* can be grown successfully to the flowering stage.



Colour photography by Frank Hurley

Block by courtesy of John Sands Pty. Ltd.

The genus *Nuytsia* has only one species which is confined to south-western Australia, occurring generally on sandy soils with a rainfall exceeding 20 inches per annum. It belongs to the mistletoe family (Loranthaceae) and retains to some extent a parasitic habit. Its roots attach themselves to the roots of other plants by means of little collars called *haustoriogena* which dissolve the bark and absorb materials from the root tissue of the host. They have been found also to attach themselves to plastic-covered electric wires underground and, dissolving the plastic, cause shorting of the current.



An Early Christmas Tree growing north of Gin Gin, W.A. The colour here is not quite true. The trees are never red but yellow to orange as shown on opposite page.

Photography and block donated by N. B. Thomson

Besides being a parasite, *Nuytsia* has other peculiarities. The seedling has 4 to 6 cotyledons instead of the normal 2, and the trunk has an anomalous internal structure which may be described as alternate rings of wood and bark tissue. When burnt in a bush fire this enables the trunk to slough off outer layers killed by the heat and to resume diameter growth from deeper layers inside.

Nuytsia produces great masses of brilliant yellow flowers in December. Seed is produced copiously within 3-4 months in papery winged fruits $\frac{3}{4}$ inch in diameter. These germinate readily if sown soon (say within 6 months) but viability is quickly lost in storage. This is the first important point about *Nuytsia*. You should have no difficulty in germinating from fresh seed.

The second important point is that seedlings will only survive if provided with a host plant to which to attach their roots. Thanks to prior research by Professor B. J. Grieve at the University of Western Australia, our own work began based on that assumption. The Professor had shown that seedlings could be kept alive for as long as three years without a host but would not survive longer or make growth without one, no matter what artificial feeding was applied. Apart from some tests to confirm the result, our work concentrated on growing in association with a host, and it seems that *Nuytsia* can be grown with almost anything but that couch grass is one of the easiest to establish and control. A stolon of grass planted in the pot when the *Nuytsia* seedling is pricked out will provide a satisfactory root system and can be clipped if it threatens to suppress the *Nuytsia*.

All attempts to propagate *Nuytsia* from cuttings and suckers have failed, but a large number of seedling plants has now been raised in King's Park without significant losses up to 4 years of age. Some were held in containers and some planted out in the nursery, arboretum and botanic

garden. Survival is satisfactory provided the plants are copiously watered in summer; this is the third important point. The tallest seedling in King's Park at the time of writing is 2½ ft. high.

A note must be added on the growth habit of the plant. The initial seedling will attain a height of 3-4 inches, then stagnate and turn yellow. Soon, however, several new shoots are produced from the base, which grow to perhaps double the height of the first one, then stagnate and are replaced in their turn. This process is repeated apparently until the root system has become sufficiently well established, after which the plant will produce a single vigorous stem and make rapid height growth. Several leaf changes accompany this process. The initial seedling has its leaves succulent and fleshy, cylindrical or flattened above, ¾ inch long, linear, pointed at the tip, alternate and densely crowded. In the second stage leaves increase to 1½ inch long, and in the third when elongating stems are being produced the leaves reduce to ½ inch long and become thin and appressed to the stem with ½ inch internodes. The leaf of the mature tree is again different.

Publicity given to work on *Nuytsia* during the past year led to contact with private gardeners in Perth who had handled the species and two cases were verified where plants had been grown to flowering stage, which was reached in seven years both times. We now therefore have no doubt that *Nuytsia* can be grown. It may be slow, but is worth waiting for.

WILDFLOWERS AND BIRDS

Wildflowers come alive and seem to sparkle when a dainty bright wild bird is flitting among them. Birds love wildflowers and trees and we would all like to attract them to our gardens. "Australian Plants" issues 25 and 27 describe how to feed these wild birds artificially and we wish to know which plants and trees are especially attractive to birds in the various times of the year. Mr. L. K. Bates, 27 Page Street, Mareeba, North Queensland, is especially interested and has undertaken to compile records for eventual publication. Will readers please forward to him a list of plants that they have observed appear to give special joy to native birds with any notes they care to add.

EUCALYPTS AS DYE PLANTS

The previous issue Vol. 4, No. 31, describes dyeing processes using the oils of Eucalypts. The details of the ALUM-TIN-IRON-COPPER process were omitted but are given as follows:

Once the four basic mordants have been dyed the next step is to add one-half ounce of TIN to the bath. Then proceed to dye the basic, alum, copper, and iron mordants again. When these are dyed, there will be seven dyed samples as well as any hues that were made. These are also rinsed and marked. Start using a shorthand here. It can go something like this — ALUM = A; TIN = T; COPPER = C; IRON = I. Thus the samples are marked; A + T, C + T, and I + T, in that order. At least this is the order in which they are dyed. The shorthand denotes the mordant in the wool first, and the mordant in the dye bath second.

Next, COPPER, is added to the dye bath. The wool mordanted with alum and iron is then dyed, rinsed and marked. It is marked thusly: A + T + C, I + T + C.

Then IRON is added to the dye bath. Wool mordanted with alum is dyed. This is marked: A + T + C + I. There is no necessity to dye the other wool samples at this point. It has already been done in previous steps, but in another order.

The only remaining mordant to dye with is CHROME. Until now, chrome has not been used. There is good reason for this. Chrome is very sensitive to light. The dye bath should be covered for the remainder of the dyeing. If not, there is a chance that the wool will streak.

With chrome in the bath, proceed to dye the four basic wool samples. Rinse thoroughly and mark. In sequence, they would be marked like this: A x T x C x I x Ch, C x T x I x Ch, I x T x C x Ch, and T x C x I x Ch.

PROPAGATION

A novel technique by B. C. Kowald, Katanning, W.A.

I was desperate. Those beautiful wildflowers were being ploughed in at our new farm. I had tried cuttings and seed propagation with very little success. Many were transplanted to my garden but few survived, especially those from gravelly hills. Meanwhile the ploughed area extended, wiping out some species of our wildflowers.

While trying to transplant plants from the gravelly hills, I noted that all of them had a "white spidery web fungus" at the base, and in the top soil litter. On reading about this, I found that many fungi live with plants supplying them with nourishment. In another reference I noted that plants like vitamin B so I thought this "webby stuff" may be like yeast supplying vitamin B. I then gave my plants some yeast and have had considerable success with many plants I could not get to grow before. I have been successful with about 100 species with this method so far. Now I have 190 different species.

The mixture is prepared by mixing 1 teaspoon of Tandaco yeast with 2 teaspoons of sugar or glucose in a half cup luke warm water; let it work for about one hour. This will be enough for one dozen plants at 1 teaspoon each, applied at their base after watering, at transplanting time and again in a few days. Difficult plants such as *Verticordia rugilli* and *Leschenaultia* need treatment every 6 months or they will die out. I place racks around each plant to shade the roots and help to keep yeast alive.

W.A. WILDFLOWERS FROM SEED

My failure with pots turned to success, when I sprinkled the seed on coarse black creek sand under a tree and threw away the pots. I covered the seed with sheoak leaves and sheltered these with a square wooden frame 6 in. high covered with netting and plastic held down with few stones. This was the end of September and I watered every day. When the seedlings were 4-leaved they were ready to transplant and water from bottom. Bigger plants have a tendency of damping off when watered from the top. I got scores up and had to give lots away. Dig and force a bottomless fruit or jam tin down into the soil round the clump of seedlings. Dig out the tin which will be almost full of soil with the seedlings on top and if necessary to top up the soil in the bottom. Hold the soil in with the lid while moving.

The tins are placed under wire netting covered with hessian 4 ft. high, in a corner formed by two sheets of iron. The iron is arranged to let morning sun get right underneath and leave a strip for a little afternoon sun too. Soil is filled in round the tins, so that one inch of tin is visible. Water base of plant once only lightly and then give one teaspoon of working yeast to each plant at base. This will be warm weather so water the soil outside the tins well. Do not water inside the tins or on the plants at all or they may damp off. To let hose run slowly is safest, then once a week.

Plant cut in May into permanent positions, with one inch of the tin still sticking out of ground. Light watering at base with more yeast followed by good watering outside the tin is necessary until established. Leave the tin in the ground. I have dozens of tins still in the ground after 2 years. Make sure that you water once a week with the hose running slowly so

that the water will soak to the bottom of the tin. Do not spray foliage or the base of the plant; not a little drop as it teaches roots to come right up.

W.A. WILDFLOWERS FROM CUTTINGS

Success with seed and the care of small plants spurred me on to seek suitable method with cuttings. Cuttings were taken early in winter (end of May). As I cut the cuttings they were put straight into a tin with yeast and water in it and of course sugar. The six inch and longer cuttings grew best. Next day the cuttings were pushed (with all the leaves on the top half) into black creek sand in a large drum two feet high. I poured working yeast here and there. They were sheltered in with my tins of plants. I put plastic sheeting over them for 2 or 3 days only. If hot and windy, I covered them.

The rain gets on them and also dew through a grass covering instead of hessian. I did not water them much and repeated yeast 2 or 3 times.

I got just about all to grow. One piece of *Pityrodia*, 8 in. long, grew and flowered in 6 months out in the open in gravel with 3 lots of yeast, whereas I could never transplant it before. It had lots of fungus on it in the wild.

The same with *Damperia wellsi* which was my very first success. Cats paws, kangaroo paws, red beak orchids, etc., always went black and immediately died before the yeast method. I am very thankful as I just had to make them live somehow. I even give all my tropical orchids some working yeast every time I transplant or repot them and that is often as they are growing well.

I believe yeast turns to alcohol. Could this act more as a safeguard against disease or fungal attack? It may prevent rotting or stimulate the formation of roots?

BOOK REVIEW

These books are not available from the Editor or the Society, but from your bookseller.

Australian Native Plants by A. E. Brooks Price \$4.50

This is not a new book but a new edition of one that has had a wide demand from followers of our Australian flora. Hundreds of native plants are described in simple layman terms with advice on their planting and cultivation. Unfortunately most of the illustrations are black and white but these are very clear. The colour plate on the rear cover of this journal is reproduced from the dust jacket of the book by permission of the publishers.

Wildflowers of Victoria by Jean Galbraith Price \$4.75

This well-known wildflower book is now in its third edition. New features in the revision include the illustrated glossary and many pages of sketches of ground orchids. The book is written by a botanist but for all who know her, a botanist with a difference; a sensitive awareness of the beauties of nature and an appreciation of what simple features must be used to allow the non-botanist to readily identify plants of their fancy. Bush lovers of Victoria are very fortunate to have such a dedicated naturalist to prepare this 163 page book for them.

Wildflowers of the Warm East Coast by Vera Searth-Johnson Price \$1.95

The Jacaranda Pocket Book Guides are well-known to many. These are really pocket books, 4 x 5 inches, designed to slip into the pocket, in this instance, when you wish to take a stroll through the scrub on the coast between Brisbane and Rockhampton. This is the first of ten volumes each on wildflowers of a different area, each to show fifty flowers in colour. Because of the special nature of the book one must forgive the small size of the colour plates (after all they are full page size) and welcome this little book as a valuable guide to the people visiting the area represented.

Tropical Plant Types by B. L. M. Jamieson and J. F. Reynolds

This book gives the layman an opportunity to learn the fundamentals of botany. It was written for pupils in the final two years of their secondary education and for first year university students in countries with a temperature and a tropical climate. The title is odd—the presentation is so clear and simple that any student or layman must easily get a good grasp of botany, and an understanding of the various types of plant life their evolution, manner of growth and reproduction, provided they are prepared to read and assimilate the text slowly.

ARCHERIA IN TASMANIA—EPACRID HEATHS—Continued from page 151

Leaves ovate to elliptic, flat or slightly concave, sub-erect, crowded; $1/8''$ to $1/4''$ long and on short stalks, margin very finely serrate towards the apex, which is quite blunt. Flowers pink or white in terminal racemes which are short and very crowded. Pedicels very short, with small persistent bracts at the lower end and larger, deciduous bracts toward the upper end. Sepals blunt, ciliate, about $1/8''$ long oblong-elliptical in shape. Corolla cylindrical and slightly constricted at the throat, or broad and almost campanulate, tube hardly extending beyond the calyx. Lobes spreading and shorter than the tube. Both the inner surfaces of the lobes and the corolla velvety. Anthers on short filaments, level with the throat of the tube. Style short, half as long as the corolla tube; stigma 5-lobed. Capsule glabrous.

Archeria eriocarpa Hook. f. is a sprawling or somewhat upright shrub from three to twelve feet high. It is fairly scattered in the dense forests of the west and south west, occasionally extending to 3000' in areas of rich soil and extensive rainfall. Although this plant reaches 12' or more in height it is usually because it grows in such dense forests.

The flowers of this species are most attractive when seen in a dark, rainforest as, apart from the "climbing heath" (*Prionotes*), no other species makes such a display.

Archeria eriocarpa Hook. f. A sprawling or somewhat upright shrub from 3 to 12' high; young branches roughly hairy. Leaves flat or slightly recurved, very short stalked, obscurely distichous, spreading blade ovate-lanceolate or elliptical, margin very finely serrate, upper surface displaying a few conspicuous longitudinal veins; apex pungent, acuminate or acute.

Flowers solitary in the axils of the upper leaves, or in obscure racemes; pedicels short, hairy and somewhat recurved. Bracts confined to the base of the pedicel, small and falling early. Sepals about $1/8''$ long, blunt, oblong. Corolla creamy white or pink, cylindrical and constricted at the throat, tube about $1/4''$ long. Lobes small, spreading, the tips somewhat recurved. Anthers with short filaments, slightly enclosed or level at the throat of the corolla tube. Style as long as the corolla tube, stigma flattened, 5-lobed. Capsule hairy, the hairs mostly confined to the base.

Archeria hirtella (Hook. f.) Hook. f. A rather large shrub or occasionally a tree 5 to 15' high, branches spreading, the young branchlets roughly hairy, and with the very young leaves, occasionally reddish.

A. hirtella is found in much the same situations as *A. eriocarpa*, the two often being found together. However *A. hirtella* will tolerate far greater exposure than *A. eriocarpa*, and for this reason is often found on the summits of some peaks, prostrate and creeping over large boulders, and at the first glance may be mistaken for *Trochocarpa cunninghamii*.

Leaves flat or somewhat recurved, spreading and more or less distichous; $1/4$ to $1/2''$ long elliptical to ovate, the apex acute, acuminate, margins finely serrate, thick, shining, the midrib quite prominent above and below.

Flowers in short terminal racemes or solitary in the axils of the leaves at the ends of the shorter branches; pedicels short, finely hairy, recurved. Bracts very small, the upper ones falling early, the lower ones persistent. Sepals acute, broadly ovate, about $1/8''$ long. Corolla very similar to that of *A. eriocarpa* but the lobes are usually a little more spreading. Anthers slightly exsert or level with the throat of the corolla tube, filaments very short. Capsule quite glabrous; style as long as the corolla, fine, stigma 5-lobed.

Propagation of *Archeria* species—

The most successful method of propagation is undoubtedly by means of cuttings or layering. In the natural state *Archeria* proliferates most rapidly by "self layering" or by seed; however as both these methods are impracticable to the home gardener due to the difficulty entailed in being able to collect seed just at the right time etc., cuttings offer the most convenient way out.

In *Australian Plants* volume 2, no. 15, page 103, an article by W. N. B. Quick, describes a successful method of propagation for some members of the Epacridaceae; this method is also very successful for the *Archeria* species and after some trial I can not report any method of propagation giving superior results to this one.

When planted as garden specimens all species of *Archeria* do well in moist, well-drained situations, protection from frost, sun or wind is not important.

THE GERALDTON WAX

by H. M. Hewett—Refer to "*Chamaelaucium*" on page 144 for other species.

This beautiful species was one of the first Australian natives whose value was recognised by world horticulturists, and it is not surprising that many of our Australian public regard it in the same light as numerous common garden shrubs bearing familiar old world names, rather than as a desirable wildflower. Here perhaps lies the secret to the abovementioned frustrations experienced by so many members of our Society. Being to say the least, enthusiasts and in some cases like myself, probably more aptly described as cranks, the natural tendency, when attempting to grow any native species is firstly to consider its place of origin and then, lacking positive knowledge, to conjure up some mental picture of its climatic and soil conditions, and proceed, as closely as possible to attempt to reproduce same. To most Sydney-siders the name Geraldton suggests, rightly or wrongly, sand, heat, and a very low annual rainfall, confined in the main to the winter months. It is understandable then, that many of our members when planting *Chamaelaucium uncinatum* have selected the hottest and most barren section of the garden for the purpose, and I firmly believe that this is where the first mistake has frequently been made.

On my recent trip to W.A. I acquired some enlightenment on many of my preconceived ideas. One of them being that Geraldton Wax, was confined in natural distribution to Geraldton or its immediate environs. In fact, except for a few garden specimens, I was not able to discover any evidence of it at all in this district the closest naturally growing plants being found at Kalbarri, some fifty miles north, and below Dongera, a similar distance to the South. The species was also to be observed in the coastal regions a little to the north of Perth, where annual rainfall is considerably higher.

Generally speaking, plants grew in sandy locations where roadside drainage would obviously assist in the provision of deep capillary moisture in subsoil and where also surface grasses and low cover would tend to keep the soil a little cooler.

When I was elected Plant Recording Officer, N.S.W. Region, in 1964, this was one of the first species I chose for intensive investigation and my recent observations in W.A. did nothing to contradict the opinions I have formed for its satisfactory establishment in Sydney gardens.

Firstly, let me say there are some general factors pertaining to growing which have become evident.

(a) *Chamaelaucium uncinatum* does appreciate a warm sunny position such as against a northern or western wall, although under most other conditions of exposure except southerly and full shade, it will give a reasonable performance.

(b) It is highly resistant to serious effects from exposure to salt laden winds, and hence is very suitable for planting in close proximity to the sea.

(c) It is very sensitive to restriction of its root system in the nursery stage, particularly when grown in tapered pots, and hence should be removed from same before the main root has commenced to circle the pot. I have had the experience, as have several others of our members, of such specimens, upon planting out, continuing to make satisfactory growth for up to three years before finally failing under seemingly adverse weather conditions. Upon

examination, it has been found that the root system had not overcome the initial spiralling effect induced in the nursery and obviously had been inadequate in drying weather to maintain a sufficient supply of nourishment to the plant beyond a semi-mature age. I do suspect that this species is so root sensitive that this condition, even when only existent in a partial state could provide the explanation for the occasional inexplicable failure of a plant of even much greater age among adjacent happily established specimens.

(d) *Chamaelaucium uncinatum*, unlike many of our Australian natives does not seem to suffer adverse effect when the foliage is allowed to become wet during the heat of a summer day.

(e) Provided drainage is good, healthy specimens show favourable growth reaction to rainy weather at any time of the year, even when prolonged such as frequently occurs in Sydney during late summer.

(f) Care should be taken under all garden conditions to ensure that the root system is not permitted to dry out excessively until the plants have become deep rooted with maturity. This is not easily determined by observation and will be influenced by many growing factors, but evidence of this trouble can be detected in dry periods by yellowing of the lower leaves. It can be corrected by a prolonged watering such as permitting a hose to trickle for say 24 hours, or using a five gallon drum of water with a nail puncture in the bottom, placed in different positions for three or four consecutive days so as to give reasonable coverage to the whole of the root system. The frequency for the necessity for this treatment will vary greatly according to soil types and drainage conditions of the particular specimen. I would warn against the substitution of foliage and frequent surface watering for the above treatment, as this does little to encourage the development of a deep root system, which I believe is so essential for this species. In fact evidence to date suggests that unless other ground covers are present the plant does better with the surface soil maintained in a dry condition during periods of dry weather.

(g) Plants show improvement in vigour and appearance from reasonably heavy pruning during or at the close of the flowering season, but although same records are available of plants making new growth from near ground level and from other old wood, I am not as yet sure that it is always safe to cut back beyond the previous season's growth. I suspect that the "luck of the season" is sometimes a more significant factor in the production of the abovementioned new growth, where plants have been very heavily cut back.

Following in order of reliability, is a list of the conditions under which satisfactory establishment of this species has been recorded in Sydney gardens.

1. Deep coastal sands with a water table several feet below surface, providing such water table does not rise too near ground level during periods of heavy rain.

2. Several feet of light sand over sloping shelf rock where house drainage or seepage provides a moisture track on the rock.

3. Similar moisture conditions where garden has been built up by filling with medium textured soils, ballast, etc., over the rock or alternatively in natural soil situations where a subterranean moisture track occurs within 4 or 5 feet of the surface. In medium textured soils it seems to be very

desirable to maintain surface in as dry condition as possible by mounding or rockery treatment in order to afford maximum protection from fungal attack.

4. In medium textured soils, on the crest of a slope which falls steeply to the south and where a significant degree of capillary moisture is retained on the slope by rockery or other means.

5. In very dry well drained situations where sub-soil is sufficiently open to allow rapid root penetration.

6. In clay soils against a house wall where surface is naturally dry by virtue of roof overhang, but where roots may obtain some permanent dampness by penetrating to the underside of house footings.

7. In clay soils kept permanently moist, but where soil at base of specimen is kept reasonably cool by protection from the sun.

In cases 1 and 2, 100% success may reasonably be expected with extreme vigour and profuse flowering when situated in a sunny position.

In cases 3 and 4, reasonable vigour and flowering should be attained, but fungal attack is sometimes difficult to avoid, even when precautions as mentioned above have been taken. C. A. Gardner in "Wildflowers of Western Australia" notes that *Chamaelaucium uncinatum* prefers a red sand and I decided to experiment in my own garden with a deep red form grown as case 4. In mid-summer each year, a 1" top dressing of a fine textured dark brown loam was placed over a diameter of 4 ft., taking care to avoid contact with the butt of the specimen or disturbance to the existing soil surface. Favourable growth reaction has ensued fairly quickly after each dressing, obviating the necessity to carry out artificial watering. It could well be of course that the soil colour was not significant, and that the application of a dry mulch tended to protect the basic soil from excessive summer heating, and in so doing may have helped combat fungal attack, as well as assisting to retain some soil moisture.

In case 5, the plants tend to grow very slowly and sparse of foliage, and I consider the chances of successful establishment bear some relationship to the weather pattern during the first two or three years.

In cases 6 and 7, a faster but otherwise similar form of growth ensues although reasonable flowering is usually obtained where foliage is in a warm position.

Summarising, it would seem that for the satisfactory growing of *C. uncinatum*, a common denominator, permanent subterranean capillary moisture is highly desirable.

PAVONIA HASTATA—continued from page 173

The spring flowers are cleistogamous, that is the calyx opens only when the fruits are ripe and the corolla reduces greatly in size. Because of this characteristic F. von Mueller named this plant *Greevesia cleisocalyx* after a specimen from "eastern tropical Australia."

The fruit has 5 indehiscent, reticulate, carpels with a prominent dorsal rib, seeds with two tufts of hair.

P. hastata can be grown as a hedge in the same way as privet and it responds well to pruning. It reproduces by seed and cuttings.

Editor's Note: The reference to cleistogamous flowers brings unpleasant memories to many who have watched buds grow and fatten but form seeds without flowering. Other growers with plants in harder situations get many flowers over long periods. It seems that if you treat your *Paronia* too well so that it tries to flower in spring, you will not get flowers but be harsh on it and delay flowering until summer and you will be rewarded with an abundance of flower.

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