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Photography by Peter Uhlheer

BEARDED ORCHIDS

(Left to right): *Calochilus paludosus*, *Calochilus robertsonii* (a variety) and *C. campestris*.

BEARDED ORCHIDS—*Calochilus*. "The Genus", page 239; "Growing . . .", page 279; "Orchids in Tasmania", page 283.

HORNED ORCHIDS—*Orthoceras*. Field report, colour plate and description, page 240.

DOUBLE-TAIL ORCHIDS—*Diuris*. Cultivation, page 241; Propagation, page 243.

HIBISCUS — SPRENGELIA — EREMOPHILA

THE AUSTRALIAN CONIFERS

AUSTRALIAN ORCHIDS

We have in preparation a very extensive and complete book under the above title by Alex Dockrill. The scope of the book will be a complete description and detailed illustration of every species of epiphytic orchid native to Australia and every terrestrial species found in the tropical areas of Australia. The professional botanists have been very generous in their support and assistance in the mammoth task of checking specimens and records back to the very first collections. This is taking considerable work and time and it is not expected that the book will be available now until 1969. I am pleased with this delay because of one aspect in which the competent photographers come orchid enthusiasts who read this publication, have let the project down. We do not have sufficient colour slides of the required standard. Some photographers have gone to some trouble to get slides. Most are not good enough and the range of species photographed is very small.

This is a man's life's work and will have world standing for time immemorial. It behoves us to go to extreme efforts to see that it is adequately illustrated. 35 mm. slides are suitable for half the illustrations, but if you have equipment or know a competent photographer who has equipment to take good two inch square slides then please help us. Fill the slide with the subject and do not waste too much space around the slide edges. Be careful of the background. A pale blue board is excellent as a backing board. We do not want super close up shots of a single flower. As many species have such small flowers we must accept some magnification to get some detail but remembering that a slide will be enlarged six times, get as much of the head or a group of flowers with as much of the plant as possible. If you have a rare plant coming into bloom and cannot get it photographed then write to Mr. Deane as below.

We have extended the time for slides to be forwarded to Mr. R. Deane, 157 Beecroft Road, Cheltenham, N.S.W., until 30th November, 1968. This will give another flowering season to make amends. Please go to extreme lengths to support us.

CONTENTS OF THIS ISSUE

Terrestrial orchids are featured as indexed on the front cover. The main subject of this issue is however, our native conifers. The tragedy of the issue is that I have not been able to obtain suitable black and white photographs of specimen trees of the species described. The amazing diversity of foliage and shape of these splendid trees ranging in mature height depending on species from a foot to 100 feet is lost to many readers. Many make perfect specimen trees to give the garden character of its own and they are extremely hardy.

The objective of this publication is to advise on the cultivation of Australian wildflowers. If the layman will just forgive the wealth of very simply written, easily followed botanical descriptions of the many species involved (one day when you get a little more bitten with the bug to grow natives you will refer back to this botanical jargon to check on a desirable specimen), he will find considerable information on this subject.

GROWING WILDFLOWERS

ORCHIDS—These are well covered in the many articles, indexed on front cover.
HIBISCUS—244-245—A number of easily grown species are fully described and illustrated in colour.

SPRENGELIA—248-50—The beautiful swamp heaths. An article in a series on this family.
EREMOPHILA—252-54—Wildflowers of dry inland areas.

CONIFERS—255—With a further article on page 267.

BRUSH-BOX, *TRISTANIA CONFERTA*—274-75—A widely grown street tree. *T. conferta* and *T. laurina* also.

PROPAGATION OF WILDFLOWERS

Many wildflowers are so easily grown from seed. A very simple but effective method is: WILDFLOWERS FROM SEED—254—The method used by Kings Park, Perth.

PROPAGATION OF CONIFERS—255.

PROPAGATION BY AIR LAYERING—246-7.

DIVISION OF TUBERS—243—The method is described for *Diuris*, a native orchid but its adaption to all wildflowers with tubers would be very simple.

PROPAGATION BY CUTTINGS—272—The method described is for conifers but this method is also highly successful with most wildflowers.

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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. For overseas, postage x3.

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". 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.

BINDERS

If you value your copies of "Australian Plants", preserve them by keeping them in the beautiful plastic covered gold lettered binder available at cost price at \$1.20 + 20c postage.

WEST AUSTRALIAN PLANTS

This book lists all the wildflowers indigenous to Western Australia giving for each species, kind of plant, general size, flower colour, flowering months and localities. Price \$1.20 plus 20c postage and pack.

BEARDED ORCHIDS

AUSTRALIAN SPECIES OF THE GENUS *Calochilus* by Leo Cady, Kiama, N.S.W.

Australia has some extraordinary orchids and into this category falls the genus *Calochilus* or "Beardies". A genus of 11 species, Australia has 9 species, 3 extending into New Zealand.

The habitat of the "beardies" is usually swampy or damp areas alongside roads in tall grass or in open areas, the more robust types being found in these conditions; but it can also be found in dry ridge country or open forest areas. As to the type of soils, they mainly pertain to the sand-stone country, but can also be found at times in other types of soils.

CULTURE OF GENUS

The writer has not had much success with the culture of the commoner species, the plants only lasting one or two seasons before rotting. It could be that these plants require a fungus at the roots to assist them as quite a few others of our Australian species do. A suggestion for a compost to try these plants is as follows, 40% sandy leaf mould, 30% soil that the plants are found in, and 10% peat moss.

Watering should be as close to the natural rainfall as can be followed, the plants should get plenty of light and up to half sun as long as the roots are cool at all times as the plants usually are found in deep litter at the base of trees or shrubs.

DESCRIPTION OF AUSTRALIAN SPECIES

1. *Calochilus campestris* R.Br.

A robust or slender plant, to 60 cm. high. Leaf erect, rigid and fleshy, triangular in section. Flowers in a raceme up to 15, comparatively small yellowish-green with reddish brown or brownish markings, the labellum with its fleshy rectangular base extending to a widely triangular lamina which is extremely ciliate, the cilia at times even glandular; only the very extremities of the lamina are produced into a naked ribbon-like appendage, the basal $\frac{1}{3}$ is in this species entirely smooth. Petals with red brown stripes. The column is short and wide with a black or purple gland at the base of the column on either side, these not connected by a coloured ridge as in *C. robertsonii*.

Remarks: A fairly common species found in most types of habitats, it is closely related to *C. saprophyticus* but immediately separated by the fact that the former has a leaf and the latter has none.

Flowers: September to January.

Distribution: All States except Western Australia, also in New Zealand.

2. *Calochilus gracillimus* Rupp.

A slender to robust plant up to 35 cm. tall. Leaf slender, deeply channelled. Flowers up to 8, reddish brown or purplish brown, the sepals and petals conspicuously veined, these segments have a translucent look. The labellum long and slender giving the flower a slender appearance, the basal section of the lamina is densely crowded with glands extending then into a densely ciliate lamina roughly triangular in shape the extremity extending into a shortish ribbon which have a few calli. The column short narrow, wings fairly inconspicuous, a dark gland each side at base.

(Continued on page 276 where all species are described and illustrated).

THE HORNED ORCHID

ORTHOCERAS REDISCOVERED IN TASMANIA

by Pat Palmer, 319 Lenah Valley Rd., Hobart.

News announced with pride, and received with pleasure, at a recent photographic gathering on the West Coast of Tasmania, was that the elusive native terrestrial orchid, *Orthoceras strictum*, R.Br., has been found in two local areas by members of the Rosebery Camera Club. In Tasmania, the "Horned Orchid" has evaded most searchers for many years, although it was recorded from Trial Harbour, on the West Coast, and also near St. Helens, on the East Coast.—Report continued on page 275.



Photography by Pat Palmer

ORTHOCERAS STRICTUM

The plants range in height from 6" to 24", with flowers from one or two per stem to the more usual six or seven—somewhat similar in appearance to the larger species of *Diuris*, with stiff flower stems, and several narrow, upright channelled leaves (up to 10" in length) passing into one or two stem bracts. Flowers are predominantly green, with shadings of brown, in spiral spike. The dorsal sepal forms a hood over the labellum and petals (latter with notched apex). Lateral sepals conspicuously erect (sometimes wide-spreading), approximately 1" long. Labellum $3/8$ " long, smooth, three-lobed, green and red, brown-tipped, with prominent yellow lobe at base. Ovaries large, almost stalkless, deeply hidden in large leaf-bracts. The plant is fully described with sketches in the No. 18 issue.

DOUBLE-TAIL ORCHIDS

CULTIVATION OF THE ORCHIDS *DIURIS* by R. C. Nash

My experiences in the cultivation of the eight species of *Diuris* found in South Australia are as follows:



Blocks by courtesy of the Dept. of Agriculture of Western Australia.

DIURIS LONGIFOLIA

Diuris longifolia R.Br. Blooms September and October.

Habitat: Mt. Lofty Ranges where quite numerous in some areas and puts up many flowers after a bush fire has passed over the ground in these areas. Found also in the south-east of S.A.

Compost and culture as that used for *Diuris pendunculata*. The growing of many plants in a large pot will be more successful than growing a few in a small pot. Grows well with *Microtis unifolia*.

Diuris punctata Sm. Blooms October and November.

Habit: The lower S.E. of S.A. and very rare if not extinct.

I would suggest a culture as that used for *Diuris palachila* be tried.

Diuris pedunculata R.Br. Blooms September.

Habitat: In the lower and heavier soiled parts of the Mt. Lofty Ranges, Mallee lands edging the southern Mt. Lofty Ranges and the S.E. of S.A.

Compost: 70 to 80% coarse washed sand mixed with 20 to 30% sawdust for the top two-thirds of the pot's depth. The remaining one third of the pot depth is filled with coarse washed sand.

Place pots in a shady spot sheltered from wind. During the summer dormant period keep pots cool and do not water. This applies to all the *Diuris* excepting *D. brevifolia*, too much dampness causes tubers to rot.

Watering, keep the compost just damp during the growing period.

Diuris palustris Lindl. Blooms August and September.

Habitat: Mt. Lofty Ranges, Mallee lands, York Peninsula and the S.E. of S.A. Generally to be found in open areas amongst grass and low shrubs.

Compost: 90% coarse washed sand mixed with 10% of sawdust for the top one third of the pots depth. The lower two thirds of the pots depth is filled with coarse washed sand with broken pieces of pot and chips of limestone at the bottom. Place a half inch layer of sawdust on top of the compost after the tubers have been planted. Plant the tubers in a loose cluster and break up and repot when the plants have multiplied to a large number. Place pots in a moderately shaded open area sheltered from the wind.

Watering, keep the compost just damp and well drained.

Diuris maculata Sm. Blooms September.

Habitat: Open shaded areas in the damper parts of the State.

Compost as that used for *Diuris pendunculata*. Keep the pots well drained and in an open position, keep cool in summer. Break up into extra pots in preference to putting into a larger pot.

A hybrid most probably a cross between *D. maculata* and *D. longifolia*. Blooms late September.

Habitat: This plant is usually found as an isolated plant in the Mt. Lofty Ranges. It is large flowered and robust. It will not multiply vegetatively and the flowers appear to be infertile as it sets no seed. This plant will grow under the culture used for *Diuris maculata* for about 5 to 7 years.

Diuris brevissima Fitz., has been recorded recently for the S.E. of S.A., as this species is so close to *Diuris maculata* it could be grown under the same culture. There is much doubt about *D. brevissima* being a separate species and it may finally become a variety of *Diuris maculata*.

Diuris palachila Rogers. Blooms September.

Habitat: Isolated parts of the Mt. Lofty Ranges not common.

Compost and culture as that used for *Diuris pedunculata*. The pots should be placed in a well shaded open airy spot with moderate protection from the wind. Watering, keep the compost damp in the growing season and dry and cool in the summer.

Diuris brevifolia Rogers. Blooms November and December.

Habitat: Damp places and the swamps of the Mt. Lofly Ranges, not common now. Sometimes it will show many flowers after a bush fire. Multiplies well vegetatively under cultivation.

Compost and culture as that used for *D. maculata* but compost must be kept damp till after the flowering time and the plants start to die back.

Diuris sulphurea R.Br. Blooms November.

Habitat: Lower south-east of S.A. and Kangaroo Island.

Compost and culture as that used for *Diuris pedunculata* but compost must be kept a little damper longer in the season.

Feeding of *Diuris*

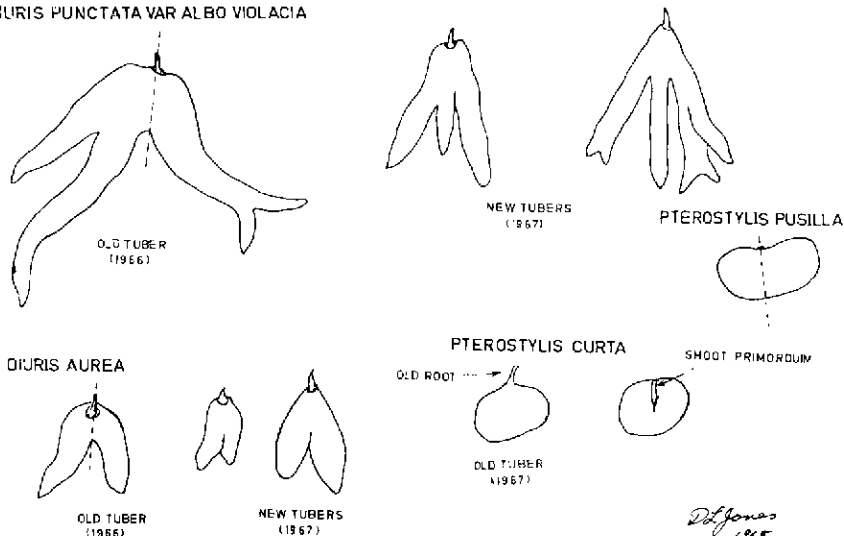
A light spraying of Urea about once a month in the growing season is beneficial. A light sprinkling of superphosphate once a year also helps.

DIURIS

A novel method of increasing *Diuris* plants by D. L. Jones

A method of vegetative propagation has been developed by the author which has proved to be quite effective for some species of terrestrial orchid. The method is quite simple. The tuber is cut longitudinally into two so as to split neatly the small dormant shoot present at its tip. The cut surfaces are then sealed by dipping into molten grafting mastic (beeswax) and the sections are potted up in coarse sand and allowed to develop normally.

DIURIS PUNCTATA VAR ALBO VIOLACEA



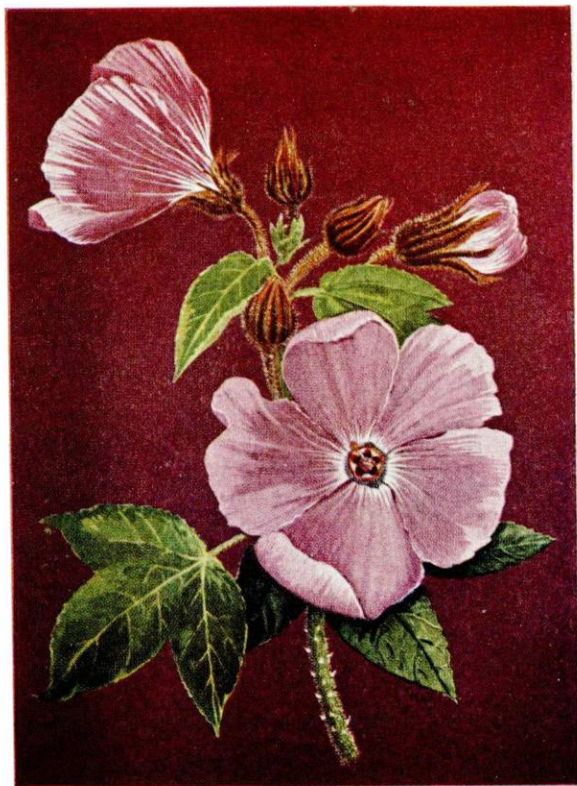
The method is more suitable for some types of tubers than others. The smaller the area of the cut surface the better and for this reason forked or palmate tubers as found in many *Diuris* species are very suitable (see illustration). As many of the more desirable species of *Diuris* do not increase rapidly by vegetative reproduction this is a valuable method. Other types of tubers give only fair results but if this method were used under carefully controlled conditions, e.g. sterilization, then results could be much more promising. *Pterostylis* cut this way generally end up by one side dying although on occasions it is successful for both halves.

(Continued on page 273)

HIBISCUS

Some Queensland Hibiscus by Vera Scarth-Johnson, Bundaberg, Qld.

I wish to contribute to your series on native Hibiscus by describing four species of special horticultural value. Although the flowers only last for a day they are produced in such abundance that they make a pleasing splash of colour over the period when the summer is becoming intense and other wildflowers have finished blooming. The plants described are so easily grown from seed, flourish under garden conditions and have such large delicate coloured flowers, no garden should be without them.



HIBISCUS SPLENDENS

Colour plate from "Wildflowers of the Warm East Coast" by Vera Scarth-Johnson, by courtesy of The Jacaranda Press. Price \$1.95 from your bookseller.

Hibiscus splendens—"Native Rosella"

Found in open eucalypt forests this tree used to often be seen at the sides of roadways. It is now becoming quite rare in these parts. It varies in height from ten to twenty feet. It often becomes a rather straggly shrub although when cared for in the garden is quite nice shaped tree. The leaves are variable being heart-shaped, three lobed or even five-lobed. The five petals of the corolla are a bright rosy pink shading off into white in the centre. The flowers are larger than of most hibiscus. The seed capsule is silky-hairy and as with most native hibiscus, the shrub is very prickly.

Hibiscus tiliaceus—"Coitonwood"

See colour plate and caption on rear cover.

Hibiscus diversifolius

A vigorous shrub five to eight feet in height, the plant makes an attractive undershrub. In some forms the flowers are only a very pale yellow to lime green but in other the very abundant bright yellow flowers with a dark red centre are very attractive. Be wary of the stems that are very prickly and hairy. It grows in open forest, often in damp places and gullies. "*Diversifolius*" means various-leaved and refers to the considerable variation in leaf shape from narrow and entire, sometimes three or five lobed, but generally toothed.



HIBISCUS DIVERSIFOLIUS

Colour plate from "*Wildflowers of the Warm East Coast*" by Vera Scarth-Johnson, by courtesy of The Jacaranda Press. Price \$1.95 from your bookseller.

Hibiscus heterophyllus

The large five petalled flowers of this small tree are white or pale pink with a reddish thread. The leaves are very variable from heart-shaped but more usually lanceolate, often three lobed and toothed. It grows in sheltered positions in open forest to often dense bush country and as it is quite hardy may often be seen on roadsides.

Editor's Note: Will readers who can supply specimens of the various forms of *Hibiscus sturtii* and the species previously known as *H. spenceri* now *Urena*, send them to P. A. Fryxell, Dept. of Soil & Crop Sciences, College Station, Texas, 77843, U.S.A. I want reports and slides of all species of *Urena*.

Acacia baileyana — Propagation by Air Layering

by Robert Boden, Research Arboriculturist, Canberra, A.C.T.

Marcottage, or Chinese air layering, is an ancient art developed in China centuries ago. Nowadays the method is often used by home gardeners and some nurserymen as a means of vegetatively propagating a variety of plants including Rhododendrons, Magnolias and some indoor decorative species.

One of the main advantages with air layering is that the plant produced will flower the following season; another is that unlike cuttings no special equipment is needed, and as the air layer is part of the parent plant no extra care by way of watering is needed during the rooting period. The method is not suitable for large scale propagation but is ideal for producing small numbers of selected plants.

Essentially, air layering involves removing a complete ring of bark, approximately 1" long, from the stem of a small branch $\frac{1}{4}$ - $\frac{1}{2}$ " in diameter, and wrapping this region in a wad of peat or sphagnum moss held in place by polythene film. Roots which emerge from the stem on the upper side of the cut portion grow into the moist sphagnum, and when developed well the air layer is removed from the parent tree and potted up, giving a healthy young plant, which will form buds and flower the following season.

In Canberra, most trees of *Acacia baileyana* flower in August although flowering times for individual plants range from June to September. Time of flowering is under both genetic and environmental control and it is possible to propagate individuals with known flowering times. After flowering the young pods develop, and grow quickly until the seed is shed, during the last two weeks of December. As soon as the seed has fallen, there is a rapid burst of vegetative growth and within a few weeks the tree is a mass of young soft shoots and immature flower buds formed for the next spring display.

It has been found that air layers made just prior to the rapid burst of new growth will root within 4-6 weeks. The roots formed on the air layer tend to be rather brittle, sometimes breaking easily; sphagnum moss seems preferable to peat as the rooting medium as it does not tend to pack tightly and allows better root development.

STEPS IN AIR LAYERING:

1. Select a young branch about $\frac{1}{4}$ - $\frac{1}{2}$ " in diameter and remove leaves and side shoots over the portion to be layered.
2. With a sharp knife, remove a full circle of bark about 1" in length—the bark should lift easily if the plant is growing well. (Fig. 1).
3. Wrap a large handful of moist peat or sphagnum around the cut area and wrap firmly in polythene tying above and below the cut zone. The peat moss should be squeezed free of excess water but still be quite moist.
4. Wrap in brown paper, towelling, or similar material to prevent overheating and sweating. Birds will often pick at the polythene and the covering helps to prevent this.
5. Within 4-6 weeks roots should be obvious through the moss. At this stage the branch is cut from the parent plant, the polythene removed, and the air layer potted up. It may be necessary to trim off a few leaves to help the plant become established quickly.

6. Keep moist in a cool place until well established and growing.

Air layering is an interesting technique and a simple way of propagating a few plants of a particularly attractive specimen, or one which may be growing old, or too large for its present site.

Unfortunately results to date with *Eucalyptus* have been rather disappointing as only a few species have been rooted successfully. This presents a challenge to readers and the writer would be most interested to hear of results of air layers on *Eucalypts*, *Acacias* and other native plants.

Fig. 1

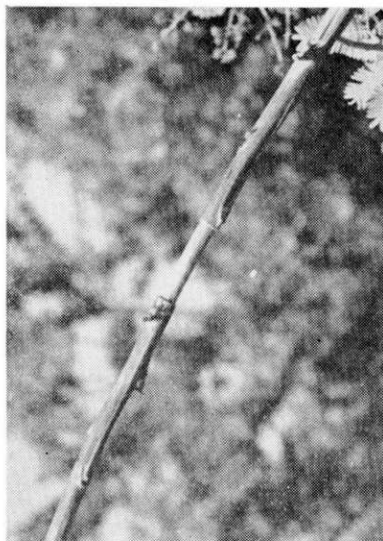


Fig. 2



Fig. 3

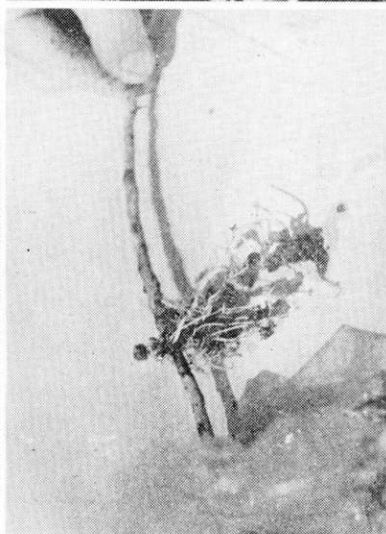


Fig. 4

Fig. 1—Stem prepared for air layering. Circle of bark 1" in length removed.

Fig. 2—Roots well formed and easily visible through polythene. Newspaper prevents bird picking.

Fig. 3—Polythene removed. Dense root growth in peat moss.

Fig. 4—Peat removed to show type of roots. To avoid root damage it is better not to remove peat when potting up.

SPRENGELIA Sm.

Betsy R. Jackes (Townsville University College)

This genus which commemorates the German botanist and physician Kurt Sprengel (1766-1833), occurs in all the Eastern States. It is relatively easy to grow, provided the locality is fairly moist. *Sprengelia incarnata* is particularly attractive with the flowers grouped in the species so as to resemble a panicle, in addition the flowers last well as "cut flowers".

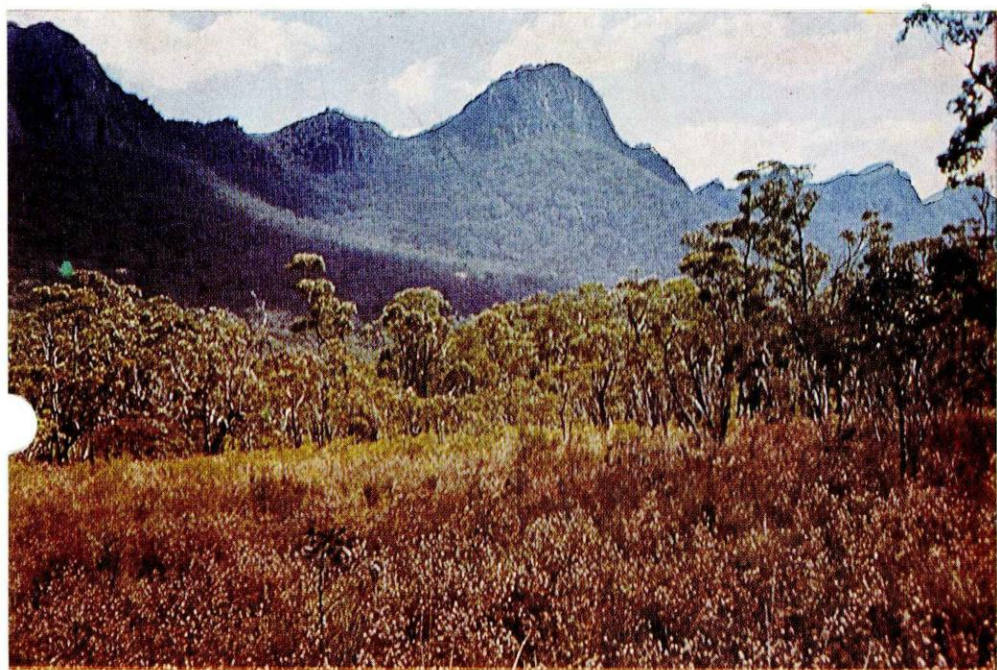


Colour photography by Frank Hurley

Block by courtesy of John Sands Pty. Ltd.

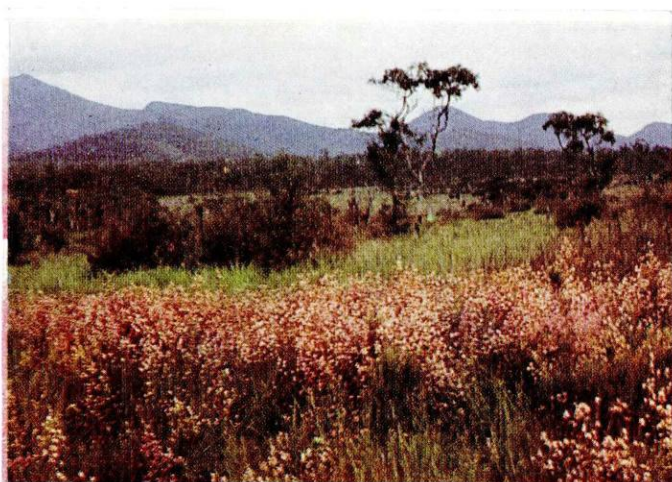
SPRENGELIA INCARNATA—"SWAMP HEATH"

Editor's Note: An article in a series on the plant family Epacridaceae, each article describing a genus in the family. Previous issues have described other genera such as *Epacris* in the first article in the series in our No. 25 issue. Full details of propagation and cultivation of these native heaths are given in these previous articles. The next in the series will describe the genus *Andersonia*. Will readers please forward their colour slides or experiences in the cultivation of these plants.



Photography and block donated by N. B. Thomson.

Serra Range Grampians, Victoria, with "Swamp Heath" in valley.



Photography and block donated by N. B. Thomson.

SWAMP HEATH—*Sprengelia incarnata*

In all four species the glabrous corolla-tube is very short, sometimes completely separating into distinct petal-claws. The five spreading lobes open out to give a star-like appearance to the flower. The anthers which are enclosed within the corolla may be free or connate around the style. The filaments are free and markedly incurved. It is these features in particular which distinguish the genus from *Andersonia*. There is no hypogynous disc around the ovary.

Habit varies from procumbent to erect, the branches may be completely covered by shortly sheathing, often membranous leaf-bases which fall off leaving the branches smooth and without scars.

KEY TO THE SPECIES

- | | |
|--|-----------------------------|
| A. Petal-claws completely fused into a short tube, lobes broad | B |
| Petal-claws free or lightly cohering at the base, when cohering the lobes are narrow | C |
| B. Leaves imbricate, alternate, N.S.W. and Q'land | 1. <i>S. sprengelioides</i> |
| Leaves closely imbricate, arranged in two rows, Tas. | 2. <i>S. distichophylla</i> |
| C. Petal-claws free and broad; anthers connate and glabrous | 3. <i>S. monticola</i> |
| Petal-claws free or somewhat cohering, narrow; anthers usually connate and hairy, but sometimes free and maybe hairy or glabrous | 4. <i>S. incarnata</i> |

NOTES ON THE SPECIES

1. *Sprengelia sprengelioides* (R.Br.) Druce

This species is mainly found in coastal swamps from around Sydney north to Brisbane. It is a wiry erect shrub up to 1 m. high. The whitish corolla has a short tube which does not separate. The corolla-lobes are broad, imbricate and almost cordate at the base. The anthers are glabrous and do not cohere around the style although they are connivent.

2. *Sprengelia distichophylla* (Rodw.) W. M. Curtis

Endemic to Tasmania on west coast mountains, this species forms an erect shrub 0.5-1 m. high. It is characterised by the short distichous leaves which are infolded with a thick central portion and a rounded keel.

3. *Sprengelia monticola* (A. Cunn. ex DC.) Druce

This small, diffuse shrub is found in the Blue Mountains area of N.S.W., usually associated with wet rocks. Petal-claws are free, the lobes are broadly imbricate. The glabrous anthers are connate.

4. *Sprengelia incarnata* Sm. "Pink Swamp Heath"

A highly variable species located mainly in swampy areas in N.S.W., V., Tas., and S.A. Habit, coherence of anthers, coherence of petal-claws and degree of hairiness are all variable and these characters may be combined in many different ways.

The two extreme forms were originally described as separate species; at one end was *S. propinqua* A. Cunn., a robust plant with free hairy anthers; at the other *S. montana* R.Br., a small much branched shrub with free glabrous anthers, between these two forms are many intermediate ones. The following list gives some indication of character variations.

Habit: Diffuse to erect, 5 cm. to 2 m.

Leaves: 4 mm. to 20 mm. long, common range is 7-14 mm.

Flowers: Solitary in one variant, but usually grouped into heads at the ends of the main branches.

Calyx: Greenish, white to pale pink.

Corolla: Segments free or united to form a short tube; in all forms lobes are long, narrow and spreading, almost valvate; colour varies from white through to pink.

Stamens: Often reddish; filament flattened to varying degrees; anther adnate or lobes free at base from filament; anthers and upper portion of filament hairy or glabrous; anthers free or cohering in a tube around the style.

Pistil: Style shorter or longer than the stamens.



Upper: *Sprengelia monticola*—habit, full size—leaf x 9—half flower x 6.

Lower: *Sprengelia incarnata*—habit, full size—leaf x 5—half flower x 10.

BOOK REVIEW

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

MORE ABOUT BUSH GARDENS by Betty Maloney and Jean Walker — — Price \$1.00

This book is complete in itself but follows a book "Designing Australian Bush Gardens" by the same authors, that received such wide support. Objectives of the book are to "preserve your own little corner of bushland", "establish a garden of native wildflowers on a bare block" and to "enjoy a garden which requires little maintenance, very little weeding and no lawnmowing". The authors have not tried to fit wildflowers into your garden but describe how you can create a little bush setting in your yard. Not a formal concept of a garden but a natural appearing shady nook that you come across now and again in virgin bush. To do this requires a feeling, an artistic touch and appreciation of the wonders of nature. Betty Maloney is the artist who drew the magnificent sketches in this issue of the journal. As well as the artistic flair, the authors are professional landscapers and quite practical, realising that space on this earth is a gift we should treasure. Actual layouts and lists of plants are given as a guide. The emphasis in this book is on ferns for those small shady nooks and on the splendour of trees requiring possibly a little more space than the garden designs in their first book. 120 pages.

SUPPLEMENT TO THE CHECK LIST OF PLANTS AND SOIL NEMATODES by A. C. Tarjan.

A technical nomenclatorial compilation available for \$6.00 from University of Florida Press, 15 N.W. 15th Street, Gainesville, Florida, U.S.A.

EREMOPHILA

A report by Dr. J. S. Beard, Director, Kings Park, Perth.

At King's Park we have taken a special interest in the genus *Eremophila* as it appears to have very good horticultural potentialities. The genus belongs to the *Myoporum* family and consists of woody shrubs mostly with showy and attractive flowers and some also with attractive foliage. The range of variation is enormous. The flowers which are tubular and zygomorphic can be of almost any colour in the corolla, either self or spotted. Blue and mauve predominate but there are also pinks, reds, yellows and whites.



Plant photographed by Ron Hill at Koonamore in the N.E. corner of S.A.

EREMOPHILA STURTII

Eremophila sturtii is generally found in the under 15" rainfall regions. It is a shrub 6-8 ft. high with flowers which vary in colour from pale lilac through to pinky lilac. The foliage is narrow, curved, usually sticky or viscous. Out of flower it is an insignificant plant but in flower it is magnificent. Individual flowers are small, about $\frac{1}{2}$ " in diameter but they literally cover the outside of the plant making it visible for miles. It is propagated by cuttings and is normally found on the heavy, sandy, clay soils in the arid regions often on flood-outs.—T. R. N. Lothian, Director, Botanic Gardens, Adelaide, S.A.

Some species feature a coloured calyx which expands when the corolla falls and remains fresh and brightly coloured while the fruit is developing, a relatively long period during which the bush looks as if it is still covered with flowers. Leaves vary from long and thin to short and broad. Some species have the leaves covered with silver hairs and resemble salt bushes (e.g. *E. pterocarpa*), others have the leaves coated with a sticky substance which may give them a glossy look (especially *E. fraseri*, the "turpentine bush").

Eighty-four species of *Eremophila* are listed for Western Australia in the Descriptive Catalogue, but the genus is not well-known and there are undoubtedly many more. Several new species have come to light in our field work and await description. They are essentially creatures of the arid inland, occurring typically as undershrubs in mulga country where the average rainfall is 8 to 10 inches annually. Mulga soil is normally a friable red loam underlain by a dense siliceous hardpan. To the station people, *Eremophilas* are "poverty bushes" or "emu bushes". The implications of the former name are that the *Eremophilas* are unpalatable to stock and are the last plants to remain when the whole station has been eaten out. A very few species extend outside this habitat. *E. bignoniiflora* is found in the tropical north, in the Kimberley; *E. latrobei*, *E. gilesii* and some others enter the desert; *E. glabra* comes right down to the Swan Coastal plain and a few others belong also to the south-west.

At first much effort was devoted to obtaining cutting material of *Eremophilas* in the field, as they were popularly held to be difficult to raise from seed. It frequently took much ingenuity to get cuttings to Perth from remote areas and many consignments took too long on the journey, but by enlisting the help of light aircraft serving remote mining camps, or of passing motorists and truck drivers, miracles were often accomplished. Cuttings have been got to Perth from as far as the Rawlinson Range, 1000 miles away on the Northern Territory border. On the whole, reasonably fresh material has shown good ability to strike, even to the extent that cuttings taken at the end of the growing season remained alive but inactive in the propagation bed and only initiated root development with the arrival of the normal winter growing season. Material collected early in the growing season normally rooted quickly. The prostrate and the more succulent species of *Eremophila* have given fair to very good results but villous and tomentose forms are more difficult. They appear to rot due to water retention by the hairy covering.

Owing to the prevailing impression about germination of seed, in 1965 a trial was carried out to determine whether acid treatment of the extremely hard testa of *Eremophila* seeds would improve germination. 27 seed lots representing 21 species were tested. Half of each seed lot was soaked for 2 hours in 50% sulphuric acid and thoroughly washed before sowing. Treated and untreated seed was sown simultaneously in the same seed box separated by a wooden divider.

Germination occurred in only 12 lots, and in 10 of these there was no difference between treated and untreated in time to germinate or percentage germination. The other two seed lots produced only two seedlings (treated) and one seedling (untreated) respectively. In one species, *E. leucophylla*, 3 different seed lots from different collections were included, and the germination was good both treated and untreated in two of these but not in the third.

It is concluded that there is no seed-coat dormancy in *Eremophila*. Failure of germination appears to be due to lack of viability, which is dependent on other factors such as, possibly, maturity of the seed at time of collection or favourability of the current season when fruiting occurs.

The initial growth-habit of *Eremophila* is typical for most woody plants from arid areas. The young succulent seedling grows fast and changes quickly to the mature woody form. A spreading root system develops which soon becomes rather wiry.

It is not surprising that in cultivation some of the species flowered at an early age. The following species flowered during the first sixteen months after germination:

Eremophila angustifolia, *E. clarkei*, *E. cuneifolia*, *E. decipiens*, *E. georgei*, *E. hastieana*, *E. leucophylla*, *E. margarethae*, *E. maitlandii*, *E. scoparia*.

Species propagated from cuttings which flowered in their first year: *E. calarhabdos*, *E. cuneifolia*, *E. densifolia*, *E. decipiens* (in different forms), *E. glabra* (in different forms), *E. leucophylla*, *E. maculata*, *E. margarethae*, *E. punicea*.

WILDFLOWER FROM SEED

The best sowing time is from the beginning of middle August, i.e. shortly before the soil temperature rises (the sowing time has to be adjusted to local soil conditions).

Germination will occur in 20 to 58 days with some stragglers later.

For soil in the seedboxes we use a sandy compost with some loam mixed in. The seed is only lightly covered and a thin layer of 1/8 inch gravel is used as a mulch. The seedboxes are placed on an open bed and only on hot days, light shade is given with 48% sarlon shade cloth. Watering is done when necessary. The seedlings grow quickly and potting must be done at an early stage. We increase the proportion of loam in our potting soil (2 parts compost and one part loam). The young plants are watered regularly. During summer most plants are ready for transfer into 6-10 inch pots. Quite a few species flower in their first year.

Here in King's Park we germinate and grow all native plants in the open with a minimum of protection. To assess the best time for sowing a certain species the conditions this plant experiences in its natural environment must be considered.

EREMOPHILA RECOMMENDED

Actually the most colourful and interesting species for growing are:-

E. calarhabdos—Leaves green; corolla deep red.

E. clarkei—Leaves green; corolla blue-purple.

E. cuneifolia—Leaves dense, green; corolla red to blue, expanding mauve calyx.

E. fraseri—Leaves shiny-sticky; corolla pinkish, spotted, expanding mauve calyx.

E. glabra—Very variable, leaves green to glaucous; corolla orange to scarlet.

E. leucophylla—Leaves silver-tomentose; corolla pink.

E. mackinlayi—Leaves tomentose, green; corolla lilac.

E. macmillaniana—Leaves silver-tomentose, narrow; corolla pink, spotted.

E. pterocarpa—Leaves silver-tomentose, narrow; corolla red.

E. spectabilis—Leaves green, narrow; corolla lilac.

GROWING CONIFERS

by A. M. BLOMBERY

Although some species of the Australian conifers have been cultivated as garden plants, there are many attractive native species which can rival the large number of exotic pines which are widely cultivated.

The species of *Araucaria* and *Agathis* grow into large trees and with adequate space are excellent when planted as specimen subjects. These coastal species are more at home with a plentiful supply of moisture and require protection from heavy frosts. Species of *Agathis* are particularly prone to frost damage. Where space and conditions for growth in the garden are not satisfactory, the larger species can be used as pot plants for both indoor and outdoor use for a number of years. As the growth of conifers is generally slow, plants of all the native species may be grown for several years as pot plants before planting out into the garden if so desired. Species such as *Callitris rhomboidea* make an attractive hedge in protected positions and may be trimmed if so required.

With the faster growing and softer foliated species there is a tendency to the loss of foliage as the plants become older. Where grown in exposed positions, the side of the shrub or tree facing strong prevailing winds often becomes defoliated.

Regular pruning of the smaller species is desirable as this stimulates new growth and maintains an attractive appearance.

For the best results in cultivation, a well drained position is desirable. A plentiful supply of water is required for the coastal, Tasmanian and alpine species.

The hardier inland species are able to withstand hard conditions when well established.

During establishment in the garden watering should not be neglected.

PROPAGATION

The propagation of conifers may be carried out either by seed or vegetatively. As seed is not always available, propagation by cutting may be more convenient and is readily carried out.

The method of propagation from cuttings recommended by A. M. Gray in this issue of the Journal will give excellent results and should be closely followed. A mixture of 50% coarse river sand and 50% peat moss makes an excellent medium for striking cuttings. The use of bottom heat with the recommended methods will reduce the time required for root development.

Raising plants from seed is readily carried out; germination usually takes from 3 to 8 weeks. In the case of *Agathis* and *Araucaria*, it is essential to sow the seed when fresh as it rapidly deteriorates. In all the species there is usually a quantity of infertile seed and allowance should be made for this when sowing seed.

Seed requires no treatment and may be sown into seed boxes, tins, pots, etc. following the simple rules so frequently described in this journal. Seedlings are best transplanted while small into containers such as tins, pots etc., where they should be allowed to develop into fairly large plants before transferring to the garden.

Finally let us grow more Australian conifers in our gardens.

AUSTRALIAN CONIFERS

by A. M. BLOMBERY

Although Australia is not regarded as a land of conifers or pine trees and the Eucalyptus and Acacia species dominate the tree population, there are no less than 4 families of conifers naturally represented in Australia, with 11 genera and approximately 35 species.

Many exotic species of conifers and some native species are commonly cultivated; the exotic genus *Pinus* is widely used for tree planting and the species *Pinus radiata* is widely used as a quick maturing timber tree for the purpose of reafforestation in Australia.

The pines or conifers (coniferales) belong to a group of plants known as Gymnosperms which are "naked seeded", that is, the seed is not enclosed in an ovary as in the flowering plants which belong to the group of plants known as Angiosperms.

The Coniferales is the largest order of the Gymnosperms. In these cone bearing plants there are cones instead of flowers and the male and female cones are often on separate plants. Most of the conifers have woody cones and the seed is situated between woody scales formed from the seed bearing megasporophylls; however in the genus *Podocarpus*, the cones are not woody and the receptacle of the "fruit" is often fleshy and edible.

The four families of pines and their genera and Australian representatives are as follows.

Cupressaceae.

Actinostrobus: 3 species endemic to W.A.

Callitris: Approximately 16 endemic species, widespread on the mainland of Australia and also in Tasmania.

Diselma: 1 species, endemic to Tasmania, *D. archeri*.

Araucariaceae.

Agathis: 3 species endemic to N.E. & S.E. Queensland.

Araucaria: 2 endemic species, *A. cunninghamiana* endemic to the N. coast of N.S.W. and E. Queensland, and *A. bidwillii* endemic in a limited area of S.E. Queensland.

Podocarpaceae.

Dacrydium: 1 species endemic to Tasmania, *D. franklinii*.

Microcachrys: 1 species endemic to Tasmania, *M. tetragona*.

Microstrobos: 2 species, *M. niphophilus* endemic to Tasmania and *M. fitzgeraldii* endemic in a limited area of the Blue Mountains in N.S.W.

Phyllocladus: 1 species endemic to Tasmania, *P. aspleniifolius*.

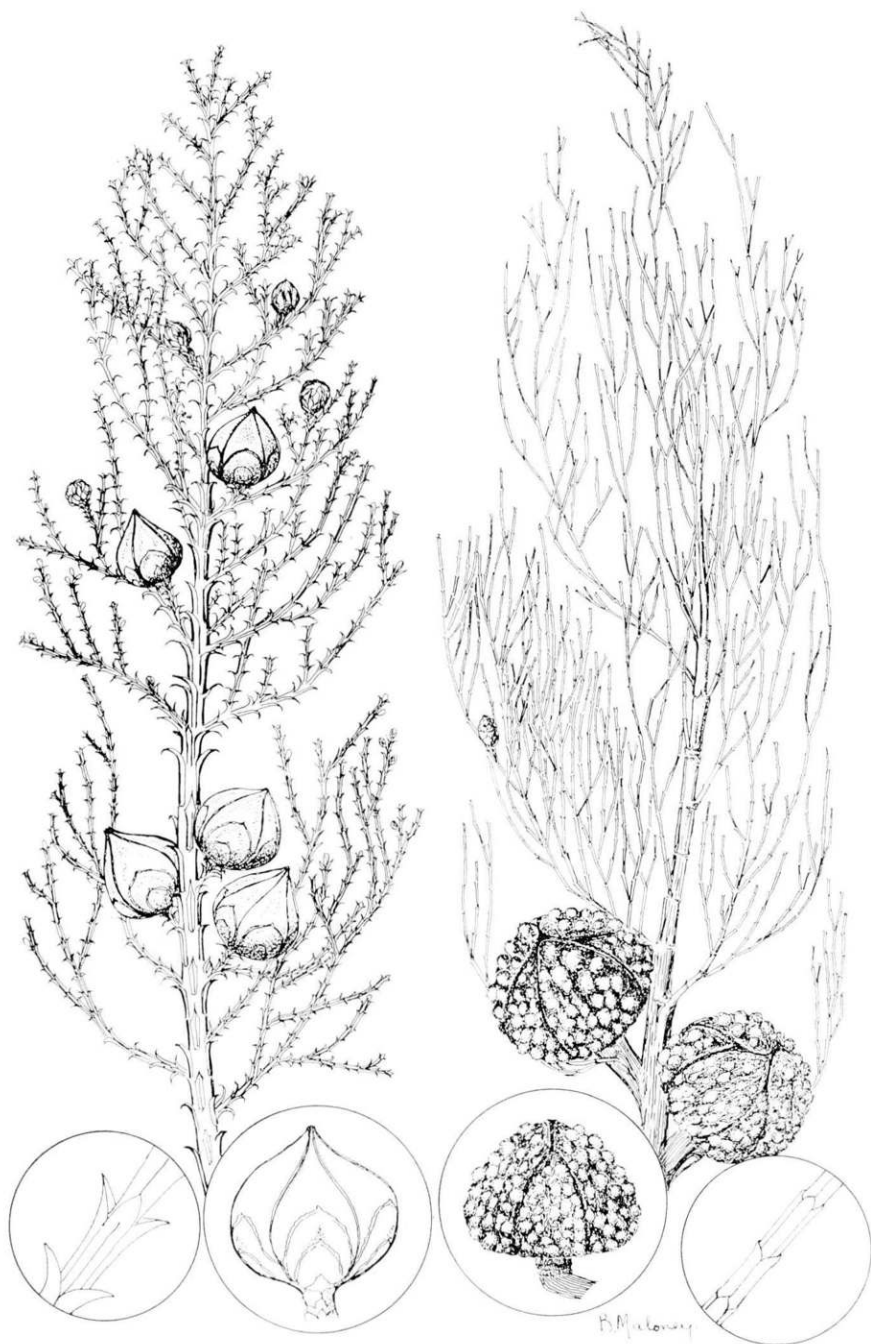
Podocarpus: 6 endemic species; 1 endemic to S.W. Western Australia; *P. lawrencei* endemic to the alpine regions of Tasmania, Victoria and southern N.S.W.; *P. spinulosus* endemic to Central and S. coast of N.S.W.; *P. elatus* endemic to Central and N.C. of N.S.W. and E. Queensland; 2 endemic to E.C. Queensland.

Taxodiaceae.

Athrotaxis: 3 species endemic to Tasmania.

From the above it will be seen that apart from *Callitris* which is widespread in Australia, the remainder of the conifers have a somewhat limited distribution.

The Tasmanian species are fully described by A. M. Gray and will not be further discussed.

Left: *Actinostrobus arenarius*

Inset: leaves enlarged—cone enlarged.

Right: *Callitris preisii* spp. *preisii* (*Callitris robusta*)

Inset: cone enlarged—leaves enlarged.

In N.S.W. species the cones are less tuberculate.

Scale—Full size $\times \frac{2}{3}$.

A description of the genera and species is as follows:

Actinostrobus: This genus of 3 species is endemic to Western Australia and consists of densely branched shrubs with small, thick, stiff, keeled leaves in alternate whorls of threes. The genus is closely allied to *Callitris*, but may be simply separated by the physical characteristics and by the imbricate bracts at the base of the "fruit" cone, clearly shown in Betty Maloney's illustrations. The "fruit" cone is rather ovoid in shape and remains on the plant for an indefinite period. After removal from the plant, the woody cone scales dry, open and release a number of rough brown seeds.

A short description of the species is as follows.

A. pyramidalis: An erect somewhat pyramid shaped shrub or small tree, with closely packed rigid branchlets; the fruit cone is ovoid.

A. acuminatus: A small spreading shrub with closely packed branchlets; the top of the "fruit" cone is contracted into a neck.

A. arenarius: A dense shrub with numerous branchlets; the "fruit" cone is broader than in *A. acuminatus* and the top is not contracted into a neck.

Callitris: This genus which provides the well known timber, Cypress Pine, extends beyond Australia to New Caledonia. There are approximately 16 endemic species, some of which have a wide distribution. The species are rather symmetrical, dense shrubs and trees with numerous branches and branchlets with small decurrent leaves arranged in regular whorls of three leaves. The bark is usually hard and furrowed, but in one species, *C. macleayana*, the bark is fibrous. The "fruit" cones, which are chiefly globular, ovoid or pyramidal, are formed by 6 to 8 woody scales, which enclose a number of brown winged seeds; many of these are frequently infertile. The fruit cones remain on the plant for an indefinite period and when removed from the plant dry and release the seed.

Within the genus are a number of most attractive species which should be more widely cultivated. Of the approximate 16 species, the following may be regarded as representative of the genus.

C. preissii sub-species *preissii* (syn. *C. robusta*): A large pyramidal shaped tree with light green foliage. The fruit cones are globular with prominent tubercles. This species is found in W.A., S.A., Vic. & N.S.W.

C. preissii sub-species *verrucosa*—Mallee Pine. A bushy shrub to small tree with attractive light green foliage. The fruit cones have prominent tubercles. This is a most attractive species which has received little attention for cultivation to date; it is found in W.A., S.A., Vic., N.S.W.

C. columellaris—White Cypress. A symmetrical tree with greyish green leaves and smooth globular fruit cones. This species is found in all states except Tasmania.

C. rhomboidea: An upright small tree with dark green, fine foliage, resembling a large Pencil Pine; the new growth is pendulous and attractive; the fruit cone is globular. The species is often cultivated and is best grown in a protected position. S.A., Vic., N.S.W., Qld.

C. macleayana: Stringybark Pine. An erect, shapely, small to medium sized tree with brown stringy bark; the leaves are soft and light green. The leaves are dimorphic and the awl-like juvenile leaves (shown in drawing) predominate on trees up to a considerable size. The "fruit" cone is ovoid pyramidal in shape; in young trees up to approx. 10 years there are 8 scales in each cone and in mature tree the cones have 6 scales. This species extends from the North Coast of N.S.W. to Queensland.



Scale Full size $\times \frac{1}{2}$

Left: *Actinostrobus pyramidalis*—insets: leaves and cone enlarged.

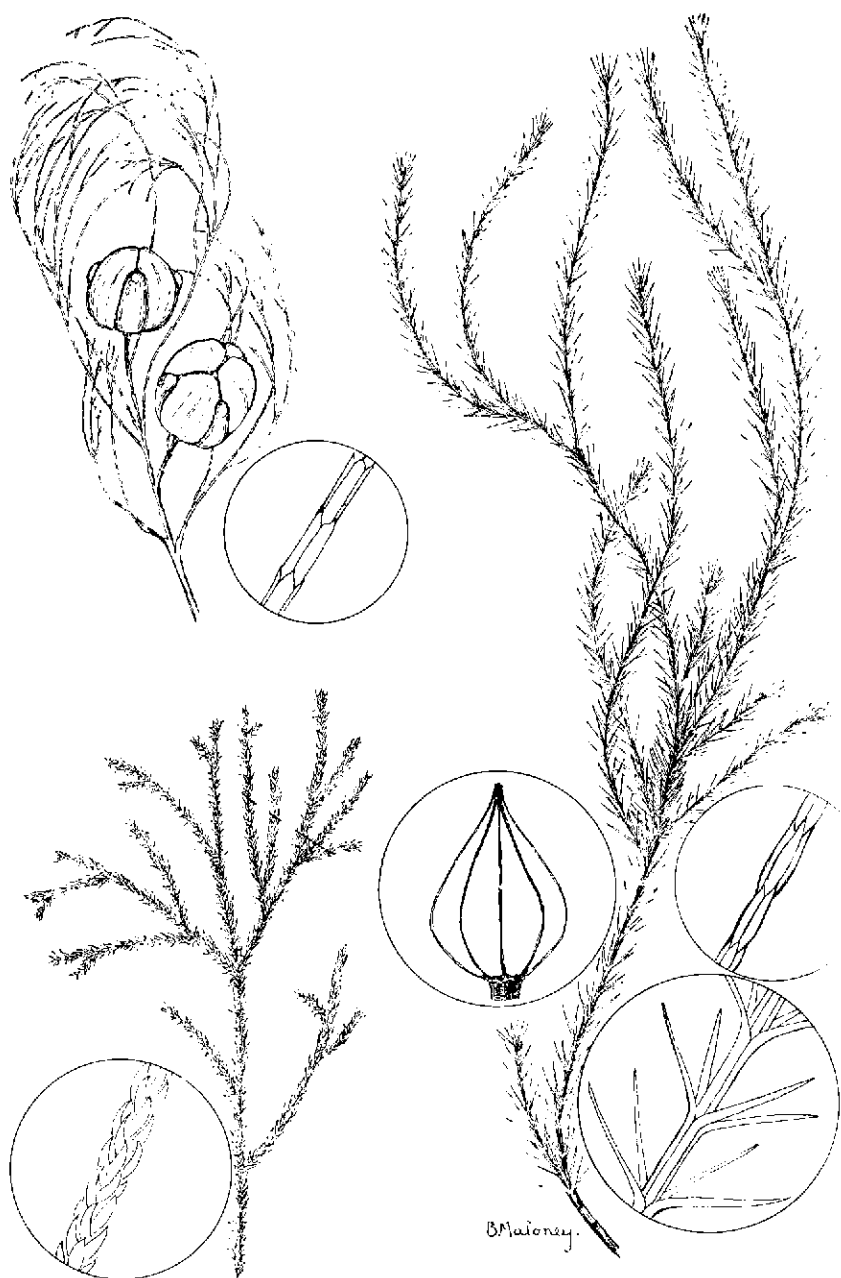
Right: *Actinostrobus acuminatus*—insets: cone and leaves enlarged.



Scale—Full size $\times \frac{2}{3}$

Left: *Callitris preisii* ssp. *verrucosa*—inset: cone and leaves enlarged.

Right: *Callitris rhomboidea* with cones—inset: leaves enlarged.



Scale—Full size $\times 2$.

Top left: *Callitris columellaris* with cones (inset: leaves enlarged).

Bottom left: *Microstrobos fitzgeraldii* (inset: leaves enlarged).

Right: *Callitris macleayana*—a branch with juvenile foliage (inset left: a juvenile cone; inset right lower: juvenile leaves; Inset right upper: mature leaves).

Agathis: (Kauri Pine). This genus is represented in Australia by 3 species in Queensland and is also found in New Zealand, the S.W. Pacific and Malaysia. The species are large trees and are found in rainforest areas and provide the timber Kauri Pine. These large trees do not resemble the typical pine and have long, flat, spirally arranged leaves; the trunk is long and straight with smooth to rough fawnish brown to dark brown bark. The fruit cone is a typical pine cone 4 to 5 inches in length and 3 to 4 inches in diameter and requires almost two years to develop. When ripe, chiefly in December, the whole cone falls from the tree and when dry the cone scales open releasing the seed. Occasionally the cone scales open on the tree and release the slightly winged seeds. Frequently a quantity of the seed is infertile and, in any case, deteriorates rather quickly and should be sown while fresh for satisfactory results. Growth of seedlings is slow in the early stages and plants are particularly susceptible to frost.

The following is a description of the Australian species.

A. robusta: A large tree with a long, straight trunk with fawnish brown to dark brown smooth to rough bark. The leaves are flat, 4 to 6 inches in length, ovate to lanceolate or linear in shape. This species is found in S.E. Queensland. See page 266 for a sketch.

A. palmerstonii: A large tree with smooth, shiny leaden coloured bark often dappled with fawn. The leaves are narrower than in *A. robusta*, obtuse and not lanceolate. This species is found in elevated areas of N.E. Queensland.

A. microstachya: A rather uncommon species which is smaller than *A. palmerstonii*; the bark is dark brown, rough and scaly; the leaves are smaller and narrower than in *A. palmerstonii*.

The two latter species are sometimes regarded as forms of *A. robusta*.

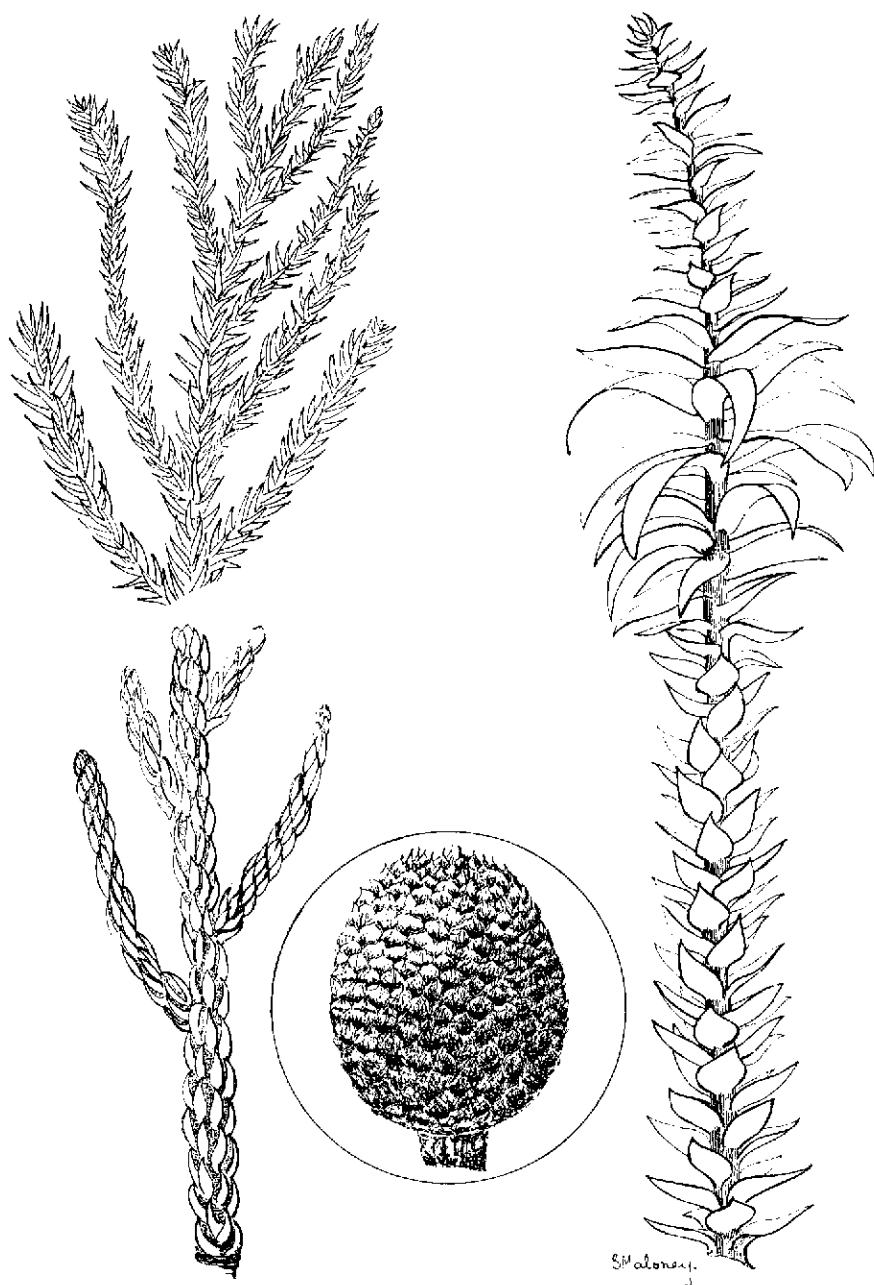
Araucaria: A genus found in South America, Pacific Islands and Australia. There are two endemic species, one of which is found on the N. coast of N.S.W. and Eastern Queensland and the other on a limited area of S.E. Queensland. The species are large symmetrical pine trees with rough brown bark. The leaves are sharply pointed, crowded and spirally arranged. The fruit is a typical pine cone and requires approximately 2 years to develop and is often irregularly produced. When ripe, usually from January to June, the whole cone falls from the tree and as the cone dries, the seeds are released. A quantity of the seed is often infertile; seed deteriorates rapidly and should be sown while fresh. As with pines generally, growth is slow in the early stages and they can be grown for a number of years as pot plants for both indoor and outdoor use.

The following is a description of the species:

A. cunninghamiana: Hoop Pine. A large symmetrical attractive pine tree with brown rough bark and small sharply pointed crowded leaves; the fruit cone is approx. 4 inches long and 3 inches in diameter; this species is found on the N.C. of N.S.W. and S.E. Q.

A. bidwillii: Bunya Pine. A large symmetrical tree with a dome-shaped top, with numerous sharply pointed ovate to lanceolate leaves. The fruit cone is huge, being approximately 1 foot in length and 9 inches in diameter; this species is confined to the Bunya Mountains, S.E. Q.

The species, *A. heterophylla*, from Norfolk Island is commonly cultivated along the east coast beachfront. *A. columnaris* of New Caledonia is also commonly cultivated.



Scale—Full size $\times \frac{2}{3}$

Left: *Araucaria cunninghamii*—Above: juvenile leaves; Below: adult leaves; Inset: cone reduced.
Right: *Araucaria bidwillii*.

Podocarpus: A genus found in E. Asia, tropical and temperate regions of the southern hemisphere and Australia. There are 7 species found in Australia, consisting of shrubs and trees with simple, usually alternate leaves, with a prominent midvein. Most species are unlike the typical pine tree in appearance. The fruit cone differs from the usual pine cone and consists of a seed at the end of a modified fleshy receptacle, which is frequently edible. When ripe the fruit falls from the plant; this usually occurs in autumn.

The following are representative of the genus.

P. elatus: "Plum Pine", "Brown Pine". A medium to large tree with brown fibrous bark; the leaves are flat, oblong, linear, from 2 to 6 inches in length, with a prominent midvein; the fruiting receptacle is blue black, fleshy and approximately 1 inch in diameter and bears a globular seed approximately $\frac{1}{2}$ inch in diameter. This species is found in the rainforest areas of N.S.W. and Queensland.

P. spinulosus: A bushy shrub to small tree with linear, acute, sharply pointed leaves up to 3 inches in length. The blue black fruiting receptacle is fleshy and edible, the seed oval to globular. This species is found on the central and south coast and valleys of the Blue Mountains of N.S.W.

P. lawrencei (Syn. *alpina*): A bushy prostrate to erect shrub or small tree with small oblong to linear oblong rather blunt leaves. The fruiting receptacle is red and less fleshy than in *P. spinulosus*. This species is found in the sub-alpine and alpine regions of the southern tablelands of N.S.W., in Victoria and Tasmania.

Microstrobus: This genus of 2 endemic species, one in N.S.W. and one in Tasmania, consists of attractive low growing pendulous shrubs. The leaves are small and numerous, loosely or closely imbricate. The fruiting receptacle differs from *Podocarpus* in that the female cone scale is slightly thickened at the base but is not fleshy; the seed is small.

M. fitzgeraldii: A bushy attractive shrub with slender pendulous branches; the small leaves are whitish on the upper surface and give a bluish grey appearance to the shrub. This is a rare species and is confined to a limited area in the Blue Mountains of N.S.W.

The Tasmanian species are described in A. M. Gray's article.

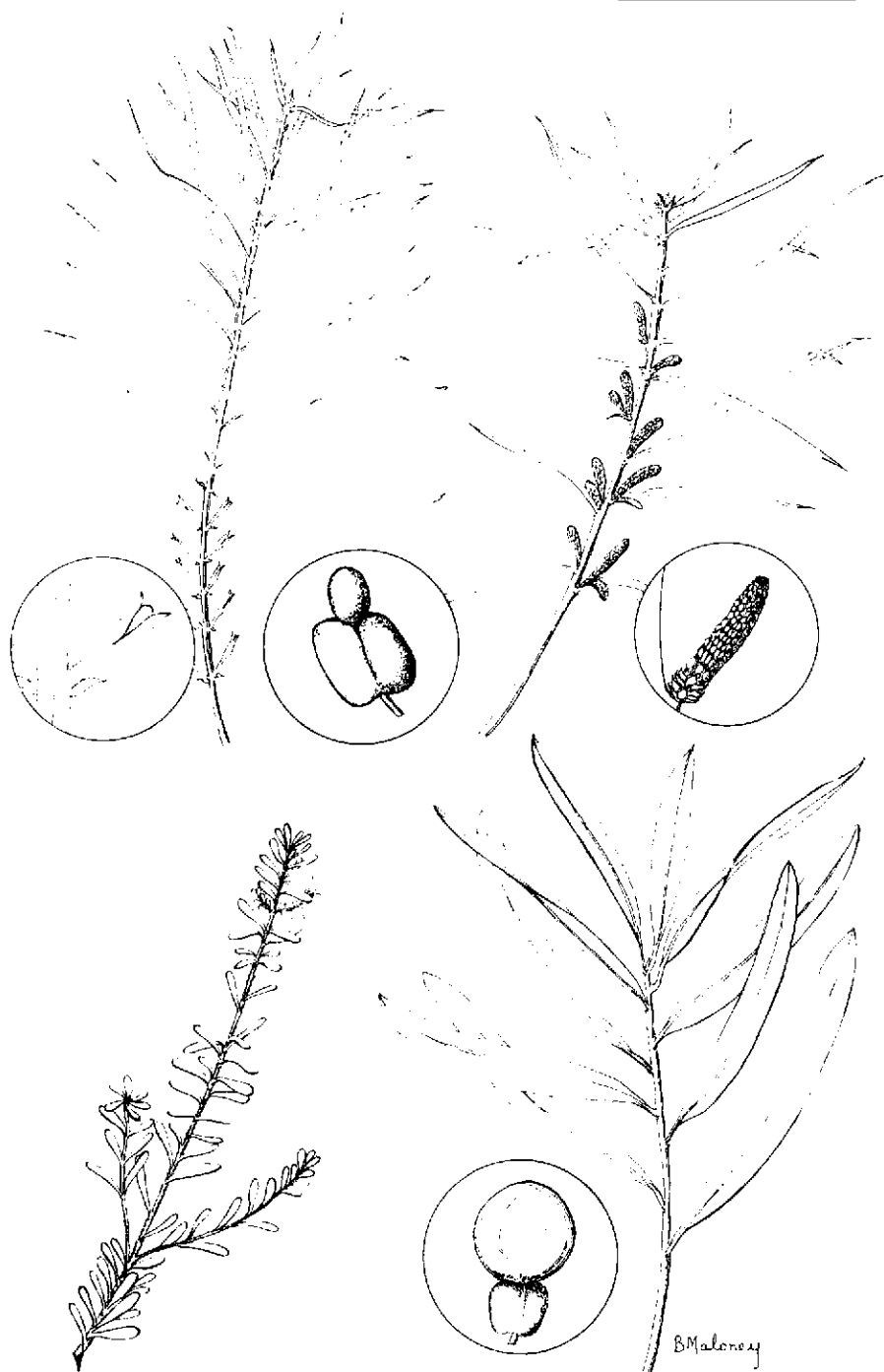
I am indebted to Betty Maloney for her many line drawings which readily illustrate the characteristics discussed.

BOOK REVIEW

A Guide to Native Australian Plants by A. M. Blombery Price \$15.00

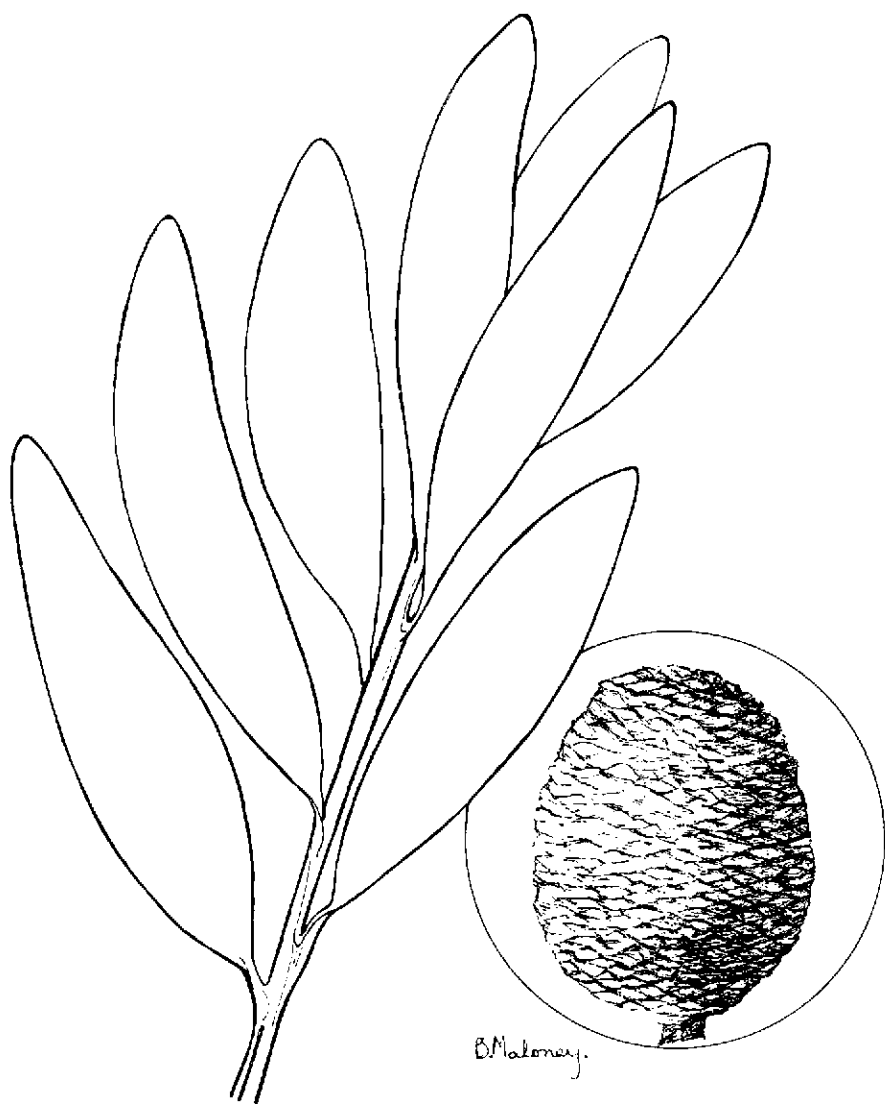
The Australian flora comprises many thousands of species, similar species (botanically) being grouped in genera and the genera being grouped in plant families. Never before has an attempt been made to present the entire flora in a popular book. The author Alex Blombery, is also the author of the article in this issue on the conifers and this alone speaks for his competence and his ability to produce such a large difficult subject in a general knowledge, but accurate reference, readable form. The book is produced in three sections—ferns, orchids and the remaining flowering plants. Each section is then produced in three parts—1. the families being described in alphabetical order with references as to how the families are divided into the various genera; 2. the genera are then described in alphabetical order and many species in each genera are described; 3. the propagation by seed and cuttings and the cultivation of the plants in that section are very simply and clearly described.

To many readers the sections on propagation and those on cultivation of wildflowers will be of first interest. These sections are extensive and cover the subjects very well. The section on ferns is all that anyone could ever want on this subject being the best reference and guide I have ever seen. The section on orchids is a good guide for beginners. The section dealing with propagation of flowering plants is complete and very well presented. If you are keen on growing wildflowers and cannot wait until we cover the whole subject in "Australian Plants" (this will be many years yet), then this is the book you need.



Top: *Podocarpus spinulosus*—Insets—left: female cone enlarged; centre: "Fruit"—a single seed at the end of a fleshy receptacle; right: male cone enlarged.

Below Left: *Podocarpus lawrencei*—Right: *Podocarpus elatus*—inset: Fruit—a single seed at the end of a fleshy receptacle. Scale—Full size $\times \frac{1}{2}$.



Scale—Full size $\times \frac{1}{2}$.

Agathis robusta; inset: cone reduced.—See description on page 262.

Callitris tasmanica (Benth.) Baker & Smith. Syn. *C. cupressiformis* var. *tasmanica*.
C. rhomboidea.

A fairly tall tree, sometimes reaching 50' but usually about 25'. Branches slender, spreading or somewhat drooping, the tree with an overall pyramid shape. Leaves in groups of 3, very small $\pm 1/16''$ long, keeled, the keel continuous down the branchlet making the branchlet triangular in section. Female cones spherical $\frac{3}{4}''-1''$ dia., in clusters on short branchlets, ripe cones may remain on the tree for some years. Cone scales rhomboidal, thick and woody, the 3 inner scales larger than the outer 3 (scales are in two whorls), rough on the outer surface and with a short spur at the apex. *C. tasmanica* is common on much of the east coast of Tasmania in areas of low rainfall and poor soils. It is also widespread in Vic., N.S.W. and S.A. Large trees are often used as telegraph poles as the timber is durable in the ground.

TASMANIAN CONIFERS

by A. M. GRAY, Hobart, Tasmania

The conifers or cone-bearing plants are well represented in Tasmania, there being eleven species with no fewer than nine of them endemic to this State. The well known family *Araucariaceae* is not represented here, nor is the *Cupressaceae* genus, *Actinostrobus* which is confined to West Australia.

The Tasmanian conifers are listed as follows:-

Cupressaceae. Of this three are two sub-families—*Callitroideae*, 11 genera and about 40 species; confined to the Southern hemisphere excepting one species. *Cupressoideae*—contains nine genera and about $\pm$ 100 species; confined to the Northern Hemisphere, the well known *Cupressus macrocarpa* is included in this section.

In Tasmania, the *Callitroideae* is represented by two families—*Callitris* and *Diselma*. Only two species of *Callitris* occur in Tasmania, *C. tasmanica* and *C. oblonga*. *Callitris tasmanica* was once combined with the Mainland species—*C. rhomboidea*. *Callitris oblonga* is endemic to this state.

Diselma is a genus with a single species—*D. archeri* syn. *Fitzroya archeri*, confined to Tasmania.

Podocarpaceae. There are five genera and as many species.

1. *Phyllocladus aspleniifolius* syn. *P. rhomboidea* (Celery Top Pine). There are six species of *Phyllocladus*, these occur in N.Z., Philippine Is., Borneo and New Guinea. The single Tasmanian species is endemic.
2. *Microstrobos niphophilus* syn. *Pterosphaera hookeriana*. Two species of *Microstrobos* endemic in Australia, one in N.S.W., *M. fitzgeraldii*, the other *M. niphophilus*, endemic in Tasmania.
3. *Microcachrys*, a genus with a single species confined to Tasmania, i.e. *Microcachrys tetragona*.
4. *Dacrydium*. There are about 20 species of *Dacrydium*, chiefly in New Zealand, Malaysia and Chile. The Tasmanian species *D. franklinii*, "Huon Pine", is confined to this state.
5. *Podocarpus*. This is a large genus including as many as 70 species. They are widely distributed in the Southern Hemisphere and Tropics as well as in China, Japan, West Indies and Mexico. The single species occurring in Australia, *Podocarpus alpina* syn. *P. lawrencii*, is found in Tasmania and Victoria.

Taxodiaceae. Consists of about 10 genera and approx. 17 species. *Athrotaxis* is the only genus occurring in the Southern Hemisphere and is confined to Tasmania. The three species *Athrotaxis cupressoides*, "Pencil Pine"; *A. selaginoides*, "King Billy Pine" and *A. laxifolia*, are described later.

CALLITROIDEAE

Callitris oblonga Rich. "Esk Pine"

Usually a tall tap-shaped tree or shrub 6-15', but occasionally up to 30'. Branches erect, leaves in whorls of 3 and very small 1/16" long with the bases decurrent, giving the branches an angled form, green to subglaucous. Cones occur singly or in clusters on short branches. Oval in shape, 1"-1½" long, ½"-1" broad. Thick woody scales in two whorls, the scales elliptical, the apex narrowed and obtuse. The 3 inner scales almost twice as long as the outer ones. Seeds winged. Found on the banks of the South Esk river in N. Tas. also in isolated patches on the East Coast. Both *Callitris* sp. grow well from seed, which is easy to collect.

***Diselma archeri* Hook f. "Cheshunt Pine"**

An erect or spreading shrub, mostly 3'-6' high, sometimes 6'-12'. Leaves very small closely imbricate and appressed, thick, the apex obtuse, keeled, opposite and decussate, making the branches "square" in section. *Diselma* is dioecious, male and female cones on different plants. Female cones on small branches, terminal and small; the cone consists of 2 pairs of scales surrounding a columella or small central projection, the inner scales containing 2 small erect ovules, outer scales barren. The male cones very small and differing little from the tip of a normal branch. The seed coat becomes expanded to form 2-3 wings. When ripe they exceed the scales which have become hard and brownish in colour. The mature female cone is roughly spherical and about 3/16" in diameter. Occurs in wet, subalpine situations 3000-5000' in the W., S.W. and central highlands; forming small stands.

PODOCARPACEAE**1. *Phyllocladus aspleniifolius* (Labill.) Hook. f. syn. *P. rhomboidea*. "Celery Top Pine".**

A fairly large tree 20'-80' high, the lower branches whorled and spreading. Juvenile leaves narrow-linear about 1/2" long. In the adult plant the leaves become reduced to small, deciduous scales, the axillary branches then forming into cladodes which may be opposite, alternate or whorled; rhomboid or cuneate, apex blunt, base narrowed, thick and leathery. Female flowers 3 or 4 in clusters at the apex of a cladode or on an unflattened branch. Ovules borne in the axils of the bract scales which at maturity become fleshy and pinkish in colour. Seeds hard, black, becoming surrounded by a fleshy, white oril. Integument ripening with the seed. Male flowers in long cones $\pm$ 1/4" long, terminating lateral branches. Abundant in wet forests, state-wide from sea level to 2500'.

2. *Microstrobos niphophilus* Garden & Johnson. Syn. *Pherosphaera hookeriana*.

A shrub 3-6' high, branches short and dense. Leaves tightly imbricate, appressed, very small and in 4-5 rows, $\pm$ alternate and not opposite as in *Diselma* and *Microcachrys*. Concave with a rounded keel, thick and blunt the apex incurved. Dioecious, female cones terminal, solitary on short drooping branchlets; $\pm$ 1/8" long with 3-5 fertile scales, the bract scales bearing the ovules on the upper surface. Bract scales brownish, seeds and integument hard, brown, ripening together. Male cones spherical, terminal and solitary, very small. Occurs in sub-alpine areas usually at the margins of tarns and creeks in the West, S.W. and Central Plateau at 3000-4000' altitudes.

***Microcachrys tetragona* (Hook.) Hook. f.**

A low straggling shrub, usually prostrate, spreading over boulders and cushion plants. Leaves very small, thick, keeled, apex obtuse, closely imbricate and appressed, opposite and decussate, resembling branches of *Diselma*. Female cones terminal with very numerous fertile scales, about 1/2" long when mature. Ovule surrounded by integument and more or less by an ovule-bearing scale. Bract scale becoming fleshy and red in colour with a seed embedded in the substance. Male cones small, terminal and ovoid. Occurs in alpine and sub-alpine situations usually on wet moors and ridges at 3500-5000' on mountains of the W, S.W. and Central Plateau.

***Dacrydium franklinii* Hook. f. "Huon Pine".**

A large tree 50-100' high, branches spreading and the tips pendulous. Adult leaves very small, imbricate and appressed, $\pm$ alternate as in *Microstrobus*, concave, keeled, the apex blunt. Conspicuous stomatal pores visible on the lower surface. On young trees or branch tips, the leaves may be spreading, linear. Female cones small, terminal, having 9 or 10 fertile bract scales, dispersed and not imbricate. An integument and part of an ovuliferous scale surrounding the ovule. Bract scales and the axis of the mature cone more or less fleshy differing little from a normal branch tip. Male cones cylindrical, terminal, about $\frac{1}{8}$ " long.

Top Left: *Dacrydium franklinii* "Huon Pine"Top Centre: *Phyllocladus aspleniifolius* "Celery Top Pine"Top Right: *Microcachrys tetragona* "Creeping Pine"Bottom: *Microstrobus niphophilus*

Dacrydium was once a fairly common tree in the west and south-west, but due to the excellence of its timber for boat-building etc., it has been "cut-out" to the stage where it is now fairly rare except in very inaccessible localities. It occurs mostly on river banks and the margins of swamps, at altitudes from sea level to 2000'.

***Podocarpus lawrencei* Hook. f. Syn. *P. alpina*.**

A low spreading shrub growing over boulders and mounds or in some situations a tree up to 15' high. Leaves linear, straight but sometimes falcate, rigid, apex acute or obtuse, the bases $\pm$ decurrent, spirally arranged. Female flowers solitary on short branchlets. Seed and ovuliferous scale ripening concurrently, dark green in colour. The stalk with the bracts becoming rather swollen, fleshy, red in colour. Male cones small solitary in the axils of the upper leaves, sometimes 3 or 4 together on short axillary branches; scales red.

A common shrub on most mountains in Victoria and Tasmania, in the latter state growing over boulders on stabilised talus, from 3000-5000'.

TAXODIACEAE

***Athrotaxis selaginoides* Don. "King Billy Pine".**

A tree 40-100' high according to the situation. Branches many, compact, small branches sometimes distichous. Leaves spreading, somewhat incurved, loosely imbricate, thick, obscurely keeled, oblong-lanceolate, acute or acuminate. Female cones roughly spherical, about $\frac{3}{4}$ " in dia. Scales 10-20, imbricate, thick, woody; base narrowed, apex lanceolate. Bracts fused to the ovuliferous scales. Ovuliferous scales taking the form of a small, thick disc on the upper surface of the bracts. Scale bearing 3-6 inverted ovules. Seeds with 2 wings formed from the expanded integument. Male cones small with numerous scales, imbricate on a narrower stalk the free end expanded. Two small pollen receptacles. *A. selaginoides* is found on mountains of the Central Plateau, west and south-west, 2500-4000' in areas of high rainfall. Sometimes forming pure stands. The timber of this tree is much sought after, being extensively used in boat-building and joinery.

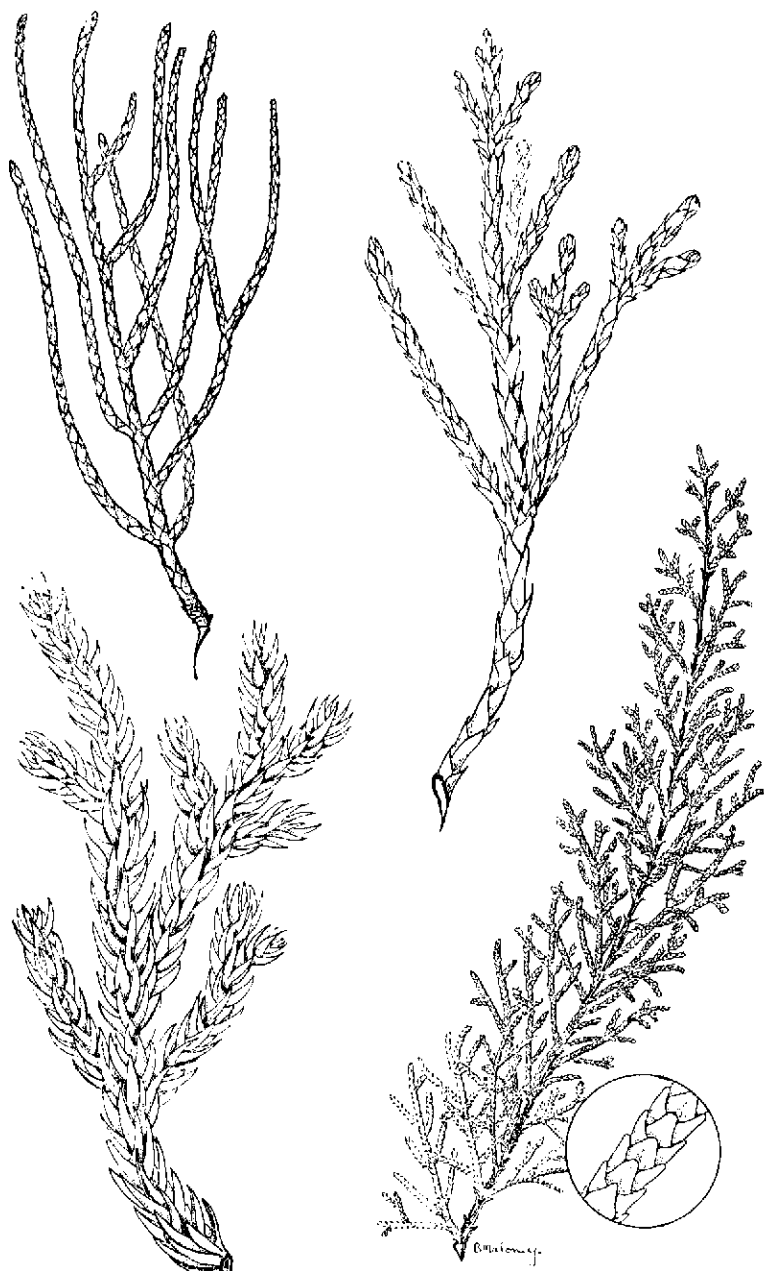
***Athrotaxis cupressoides* Don. "Pencil Pine".**

A tree up to 50' high. Much branched. Leaves imbricate and closely appressed, rhomboid-ovate, thick, keeled, margins near the apex $\pm$ hyaline. Apex blunt $\frac{1}{16}$ "- $\frac{1}{8}$ " long, almost as broad at the base. Female cones roughly spherical, smaller than those of *A. selaginoides*. Scales much narrowed at the base; apex expanded, thick and roughly orbicular, the bract scale making a short triangular point on the outer surface. Male cones similar to *A. selaginoides*. This tree occurs on mountains from 3000-4000' in the Central Plateau, W. and S.W., usually in wet soils and alpine moors on the margins of tarns and creeks. The timber is similar to that of *A. selaginoides*.

***Athrotaxis laxifolia* Hook.**

A tree up to 40' high. Loosely branched, the branches spreading with the tips somewhat drooping. Leaves imbricate, erect and the tips incurved but not appressed. Similar in shape to those of *A. cupressoides* but somewhat larger— $\frac{1}{8}$ "- $\frac{3}{8}$ " long, keeled, apex acute. The margins narrow and $\pm$ hyaline. Female cones spherical or roughly ovoid. Similar in size to *A. cupressoides*. Scales thick, broad narrowed at the base, the apex fine, acuminate. Male cones similar to those of the other species. A rare tree, found in similar localities as *A. cupressoides* and *A. selaginoides* and usually occurring as isolated trees among stands of these species. It was once thought that

A. laxifolia may be a hybrid of the other two *Athrotaxis* species, however recent research has discounted this possibility.



Top Left: *Athrotaxis cupressoides* "Pencil Pine"

Top Right: *Athrotaxis laxifolia*.

Bottom Left: *Athrotaxis selaginoides* "King Billy Pine"

Bottom Right: *Diselma archeri* "Cheshunt Pine"

PROPAGATION & CULTIVATION OF CONIFERS

All of the Tasmanian conifers may be successfully propagated from seed or cuttings. However cuttings are the surest method as seed can be hard to obtain and is often non-viable, an exception to this would be *Callitris*, good seed of which is easy to collect and grows readily. If seed collected from other conifers is viable it will grow quite easily. However cuttings would be the surest way of obtaining a specimen; in most cases they strike readily and form a large root system within a reasonable time. Exceptions to this are *Athrotaxis selaginoides* and *Microstrobos niphophilus*, these may callus quite readily but seem to be rather loath to form roots. The best results ensue from tip-cuttings i.e. those taken from the strongly growing tips of branchlets, in all cases 1"-2" is an ample length. The cut should be clean and unbruised. In such species as *Podocarpus* and *Athrotaxis selaginoides* it may be desirable to remove, with a sharp knife or razor blade, the leaves for approx. half the length of the cutting. When making cuttings of *Phyllocladus* (remember that the apparent leaves are really expanded branchlets or cladodes), a cutting may be made from one large cladode; cut off cleanly, no heels necessary, remove the lower half of the "leaf"—leaving the lower half of the "midrib" bare. Fresh young branchlets with one or two small cladodes may also be used; remove any cladodes from the lower portion of the stem. All cuttings should be planted to about half their length. After experimenting with numerous types of mediums I have found that the most successful one is made up as follows—Mix two parts of fine "vermiculite", two parts of fine "blue metal" chips or clean, washed, graded gravel to one part of coarse clean sand. All parts by volume. Mix thoroughly and water until thoroughly damp and leave to drain if necessary. Five inch terra-cotta pots are the most convenient containers to use, crock-well!, fill to within $\frac{3}{4}$ " of the top, water again and allow to drain, make the holes for the cuttings large enough to be able to insert them without abrasion to the cut. Firm the cuttings lightly then water again, this will wash the medium around the cuttings, thus firming them sufficiently. Keep the cuttings moist but do not over-water at any stage.

The use of misting apparatus is recommended, however if this is not possible a bell jar (ventilated) or plastic bag with the corners removed, placed over the pot will serve; in any case protect the cuttings from hot sun and wind, as conifers transpire rather freely and are therefore subject to drying out more rapidly than a lot of other plants. The cuttings should form adequate roots within 6-9 months; when rooted, but not sufficiently enough to pot, very light applications of "Aqasol" may be given. The soil for potting should be light, but rich in well decayed humus, good drainage is essential. When the plant is sufficiently large and well-grown enough to plant out, choose a position sheltered from hot sun and drying winds, with good drainage and plenty of moisture, especially during the summer months.

Conifers for the Garden

Very attractive garden specimens can be obtained by growing these conifers.

Callitris tasmanica is already extensively used in many gardens and on quite a few farm properties as it makes a fine wind-break specimen. It is a very rapid grower in conducive situations. The other Tasmanian conifers are not very well known to the "gardening" public. Their use as timber

bearing trees is about the only way in which people get to know these trees and even then it is only by the common names—"King Billy Pine", "Huon Pine" and "Celery Top Pine" etc. Public education as to the possibilities of these plants as garden specimens is very meagre. Such species as *Diselma*, *Microstrobos*, *Microcachrys* and *Dacrydium* are virtually unknown to the public. Many gardens would benefit if nurserymen could be induced to grow these plants and offer them for general sale. Trees of *Athrotaxis* sp. and *Dacrydium* are rather slow growing but usually live to an immense age. Their use as "Bonsai" subjects is unlimited, indeed all the conifers can be used for this type of work.

Most species may be pruned to any shape desired when sufficiently grown, the exception to this would be *Phyllocladus* as it is not a compact growing tree, however the top may be removed to contain the tree to a reasonable size.

DIURIS—Multiplication—continued from page 243

Cutting is done by something sharp—a new razor blade or preferably a scalpel with exchangeable blades. The blade should be first sterilised by running through a flame. The tuber should be washed clean or disinfected in hypochlorite solution first. As soon as possible after cutting the exposed surfaces should be dipped into the molten grafting wax. This solution should be at the right temperature. If too hot tuber damage will result. This can be easily tested. If you can dip your finger in it comfortably then it is okay. If the solution is too cold a thick layer will set on the tuber which will be easily dislodged. If the seal is not complete rapid dehydration of the tubers occurs. This was one of the early problems while we were casting around for the ideal sealant. Do not allow too long before planting as the tubers can shrink and the wax coating falls away. Water immediately after planting. Coarse sand by itself has been found to give the best growing medium in the post operative period. The plants may get a stunted hungry look above ground but they usually do well. It is a good practice to pinch out any flower buds that appear as all energy should be directed to tuber development. Our results show that dormant tubers perform better than shooting tubers. The latter tend to dehydrate very easily no matter how well they are sealed.

This method can also be used as a form of surgery to save damaged tubers. Accidents in repotting or pests, sometimes damage a valuable tuber which later becomes infected and rots. If the damaged area is cut off cleanly and sealed with the wax the tuber is generally okay. Propagation by this method may also avert disaster for at least one species of orchid—*Diuris punctata alba violacea*. Numbers left of this species are so few that it cannot be very far to its level of extinction—that period where there are insufficient genes left to avoid inbreeding depression. By building up the population vegetatively we can build up the gene pool physically, and also increase the probability of mutation to new genes which may help offset this crippling process.

We now want as many people to try the method on as many species as possible and send in the information so as modification etc. can be developed. The following species have been propagated in this way—*Diuris aurea*, *D. punctata* var. *alba violacea*, *D. punctata* var. *punctata*, *D. pedunculata*, *D. maculata*, *Thelymitra pauciflora*, *T. aristata*, *Pterostylis pusilla*, *P. nutans*, *P. curta*.

"Brush Box", *Tristania conferta*, as a Street and Park Tree

by Robert Boden, Research Arboriculturist, Canberra, A.C.T.

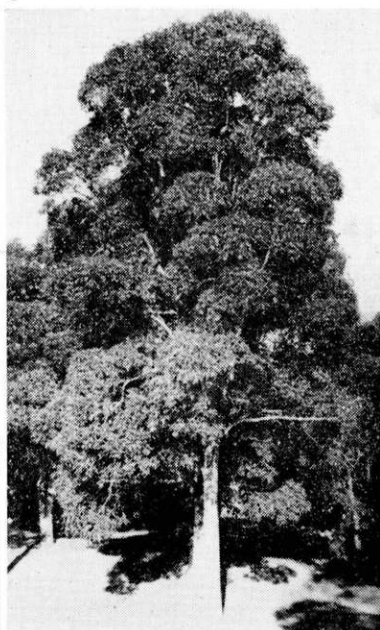
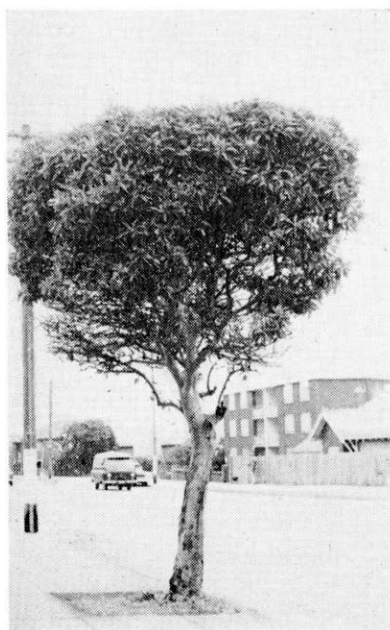
"Brush Box" is one of the hardiest, and most widely planted Australian trees in streets and parks.

Unfortunately, the very feature which has led to the widespread use of this species, namely its great adaptability, has been its undoing, for "Brush Box" has the unenviable distinction of being the most abused and maltreated of our native trees.

In its native state, *Tristania conferta* grows in moist coastal forests of N.S.W. and Queensland in association with flooded gum, turpentine and blackbutt. Under conditions of high rainfall and in rich soils it grows to the majestic height of 150 feet, and 3-6 feet in diameter.

Fig. 1

Fig. 2



TRISTANIA CONFERTA—"BRUSH BOX"

Fig. 1—"Toffee Apple" pruning, which destroys the natural form and beauty of the tree.
Fig. 2—A well grown "Brush Box", 60 feet high planted in open parkland, where it can develop fully without pruning.

Contrast this to the miserable specimens seen in many city and suburban areas, where regular and repeated lopping restricts growth to a tenth of its potential size and reduces the forest giant to a "toffee apple" street tree.

Planting of "Brush Box" should be restricted to wide streets or open parkland where it can develop to its full beauty; a well grown tree is a most beautiful specimen. The dark green somewhat leathery leaves, small but attractive white flowers followed by woody capsules closely resembling those of *Eucalyptus* are attractive features of this tree.

"Brush Box" is in fact related botanically to the Eucalypts, Angophoras and Syncarpias all of which belong to the large family known as Myrtaceae.

The genus *Tristania*, named after the French Botanist Tristan, consists of more than twenty species occurring in the warmer parts of Australia, New Zealand, New Caledonia and Malaysia. *Tristania conferta*, so named to describe the dense flower clusters, is the most commonly planted species although, as mentioned above, certainly not the most suitable unless it has adequate room to develop.

T. laurina "Kanuka" is a smaller tree with narrower leaves than *T. conferta* and has the advantage of attractive yellow flowers. The common name "Kanuka" comes from New Zealand where this tree also occurs naturally. In Australia it is found in brush gullies in Queensland, New South Wales and Victoria. *T. neriifolia* "Water Gum" is a much smaller tree growing to a height of 15-20 feet, making it a suitable specimen for street tree use. It has dark glossy leaves with paler reverse, and yellow flowers similar to those of "Kanuka". Native to mountains and coastal gullies of central N.S.W. "Water Gum" is more frost tolerant than either of the other two species mentioned.

All *Tristanias* are easily propagated from seed and grow rapidly in the young stages. There is a variegated form of *T. conferta* which is propagated by budding.

T. conferta will grow in a wide variety of soils and withstands considerable dryness even though in its native habitat it receives 50-60" rainfall. It is also tolerant of poor root aeration and compacted soils which are common in street planting sites.

Successful growth of *T. conferta* has been reported to the Street Tree Study Group from all mainland states, and *T. laurina* from Bellingen and Willoughby, N.S.W. and Morwell, Victoria, and the writer would be interested to learn of results with "Brush Box" and other *Tristanias* in street and park plantings throughout Australia, particularly experience with any of the West Australian species.

One final plea to street tree planters is to choose the site for "Brush Box" with great care; do not take advantage of its hardiness and reliability by planting in unsuitable sites, but rather choose a smaller species and reserve *T. conferta* for planting where it can develop to its full beauty.

ORTHOCERAS REDISCOVERED IN TASMANIA continued from page 240

Mr. R. Malone, President of the Rosebery Camera Club, organised an "Orthoceras hunt" for visiting photographers in an area of swamp on the road to Trial Harbour. Keen searchers soon found a number of *Orthoceras* plants, as well as *Microtis unifolia*, *Spiranthes sinensis*, *Pterostylis parviflora*, *Prasophyllum archeri*, *P. australe* and *Cryptostylis subulata*. Two areas with *Orthoceros strictum* growing happily were located in red soil close to but not in bog conditions. These plants appear to favour the raised areas sloping at the edge of swamps, and Mr. Molone pointed out that in both areas the soil contains the green rock known as serpentine—he believes that it may well be worthwhile to seek in other serpentine areas for *Orthoceras*. Is there any report from the mainland of similar habitat?

CALOCHILUS—Australian Species—continued from page 239

Remarks: This species is very close to the commoner *C. robertsonii*, in fact in its more robust forms is extremely difficult to separate. The major points of differences lie in the column and the labellum, one important point is the column glands. In *C. robertsonii*, these are joined by a coloured ridge, which is absent in the above species.

Flowers: November to January.

Distribution: N.S.W. and South Queensland.

3. *Calochilus paludosa* R.Br.

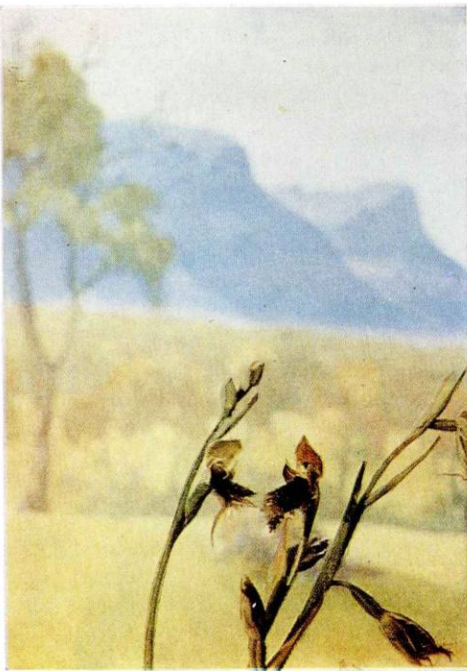
A slender plant up to 40 cm. high. Leaf linear, rigid channelled. Flowers to 8 mediate size, wholly reddish with some green marks, dorsal sepal prominently hooded. Petals conspicuously veined. Labellum broad rectangular

at the base broadening into a triangular lamina, the basal section finely covered with short calli with two conspicuous glands, one at each side right at the base of the lamina, the lamina proper is densely covered with fine cilia then extending into a long trap-like appendage. The column short, very broadly winged, no glands at the base.

Remarks: This is another one of the commoner types found in almost any type of habitat and not restricted to swampy areas as its name suggests.

Flowers: September to November.

Distribution: All Australian States except Western Australia, rare in South Australia and Queensland, also in New Zealand.

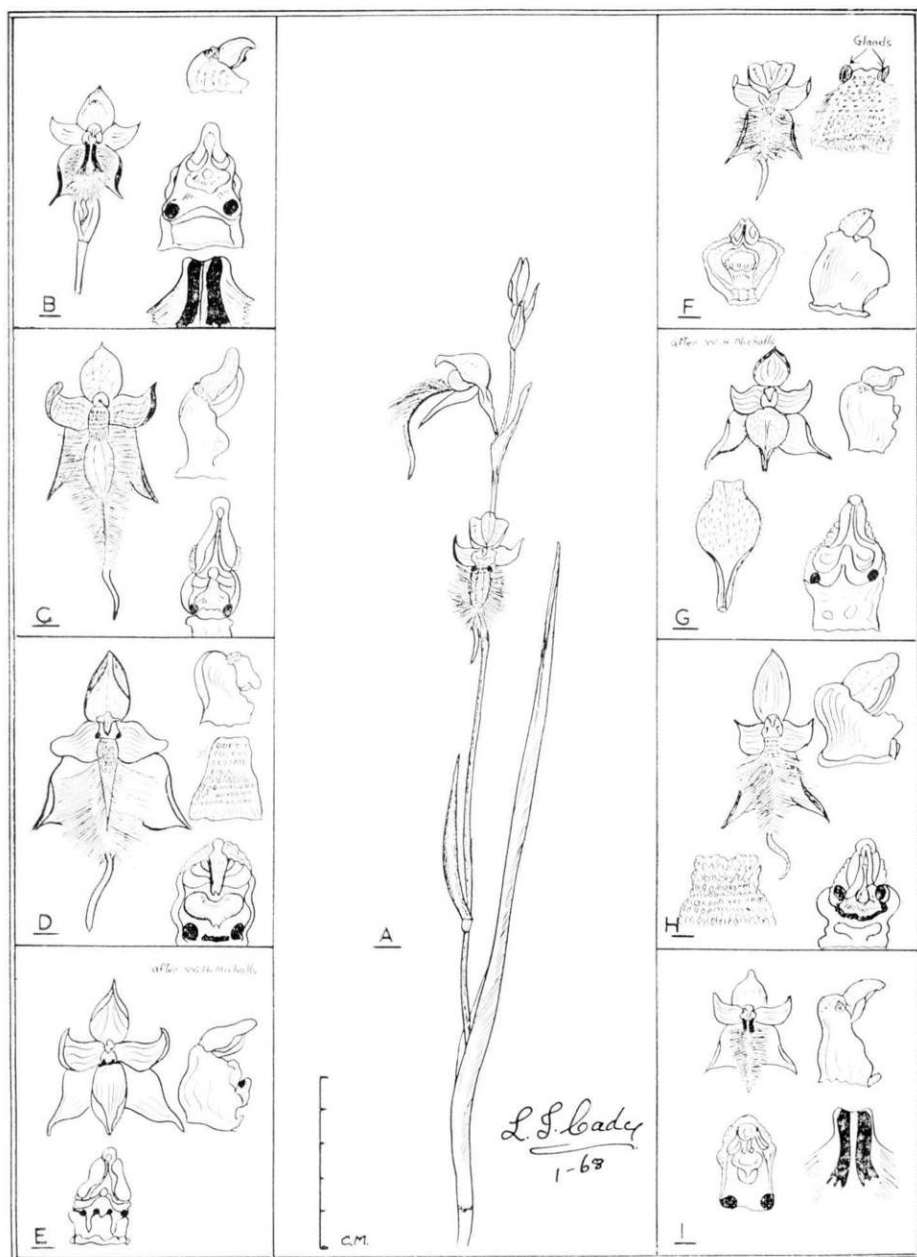


Photography and block donated by N. B. Thomson
CALOCHILUS PALUDOSA

4. *Calochilus grandiflora* Rupp

A slender plant with large flowers for the genus, up to 60 cm. tall. Leaf filiform triangular in section. Flowers up to 10, golden yellow and purple. Petals and sepals veined. Labellum triangular extending into a somewhat papillose ribbon, the basal portion of the lamina beset heavily with calli then extending to the heavily ciliate lamina, the hairs are covered with shining papillae. Column squat widely winged with a dark calli each side at the base, these calli connected by a coloured bar.

Remarks: By far the largest and the most attractive species in the genus, the species was described from Queensland material and is found mainly on the upper north coast of N.S.W. but the writer has collected it in



KEY TO PLATE

- A. *C. paludosa*—natural size to scale.
 B. *C. campestris*—flower front column side and front, labellum basal section.
 C. *C. gracilimus*. Flower front, column side and front.
 D. *C. grandiflora*. Flower front, column side and front.
 E. *C. imberbis*. Flower front, column side and front.
 F. *C. paludosa*. Flower front, column side and front.
 G. *C. richae*. Flower front, column side and front.
 H. *C. robertsonii*. Flower front, column side and front.
 I. *C. saprophyticus*. Flower front, column side and front.
 All flowers and section of flowers much enlarged.

the Jervis Bay area which is a large jump in its distribution—surely it is found in between.

Flowers: September to November.

5. *Calochilus imberbis* Rogers

An extremely rare plant, rather robust to 35 cm. tall. Leaf fleshy and rigid. Flowers in a loose raceme to 5, green with purplish brown striae. The labellum in this species is unique for the genus in so much that it is without any form of cilia at all, lamina is petaloid, sessile ovate acute, margins entire. Column short but very stout, the wings connected in front by a high shield-like plate, a purple gland at the base of each.

Remarks: Dr. Rogers remarks that this species could only be a petaloid form of the commoner *C. robertsonii*, could be the reason for the plants' very disjointed distribution.

Flowers: September to November.

Distribution: Victoria and Tasmania.

6. *Calochilus richae* Nicholls

A slender plant up to 25 cm. tall. Leaf unknown. Flowers 2, reddish with green marks, all sepals and petals veined. Labellum rectangular at the base extending into a somewhat orbicular lamina then abruptly narrowing to a more acute apice the margins on this rolled inwards, the whole labellum covered with short purplish calli. The column erect conspicuously winged, two basal glands joined by a purplish ridge.

Remarks: One of the rarest plants in the genus very localised in its distribution, it differs also in having a parti-barbate labellum.

Flowers: September-October.

Distribution: Wahroo near Rushworth, Victoria.

7. *Calochilus robertsonii* Bentham

A fairly robust plant up to 45 cm high. Leaf rather thin triangular in section, upright, and channelled. Flowers to 9, green with reddish brown marks. The labellum basal section is fleshy rectangular, heavily covered with purple glands, then extending into a widely triangular lamina which is crowded with long cilia, then extending into a short naked ribbon. The column is short, widely winged, with two basal black glands which are connected by a purple coloured ridge.

Remarks: This would be the commonest species and possibly the most collected.

Flowers: September to January.

Distribution: All Australian states although it appears to be rather localised in Western Australia, South Australia and Queensland, extending to New Zealand.

8. *Calochilus saprophyticus* Rogers

Often a robust plant up to 55 cm. high. No leaf to speak of as it is a saprophyte. Plant resembling *C. campestris*. Flowers up to 15, pale green with the segments suffused with yellow and marked with red brown. The labellum with two raised metallic blue basal plates, these extending to a somewhat rhomboidal lamina, this heavily beset with fairly coarse cilia, the appendage is short and glandular. The column short, broadly winged with the two basal black glands.

Remarks: This plant is in the rare class, rarely being found in any quantity. It is thought that it would be an impassible species to grow as it would rely on a fungus at its roots for the main part of its sugar and starch supply.

Flowers: Late October to December.

Distribution: Victoria, Tasmania and N.S.W., not common in any place.

9. *Calochilus holtzei* F. Muell.

Very little to nothing is known about this species, the only data the writer has on this species is as follows. A plant resembling *C. campestris* in habit, flowers similar except that the petals in *C. holtzei* are as long as the lateral sepals. The species hails from the Northern Territory and to the writer's knowledge this plant hasn't been collected since it was first found, and the writer would like to hear from any one collecting any *Calochilus* in the Northern Territory or the far north of Queensland.

GROWING CALOCHILUS ?

by R. C. Nash

In South Australia we have three recorded species of the genus *Calochilus* R.Br. and I think a fourth, *C. saprophyticus* R. S. Rogers, also occurs in this state. I have seen some material collected from near Comaun in the south east of S.A., a few miles from the Victorian border, that could be this species. This material was collected from swampy ground.

Calochilus campestris R.Br., recorded from McLaren Vale; parts of the south east and Eyre's Peninsula. Flowers in October and November.

C. saprophyticus is similar in appearance to *C. campestris*, it can be said to be a little more robust than the later species and has no leaf or if there is one it is very small, the tuber is very large and bulky.

C. robertsonii Benth., distributed throughout the damper parts of the Mt. Lofty Ranges and moderately common in some areas; also the south east of S.A. Flowers in October and November.

C. paludosus R.Br. recorded only from Willow Creek and therefore should be looked for between Cape Jervis and Victor Harbour. I have heard that it has been found in other parts of the state, so an eye should be kept open for it in other areas. Flowers in October and November.

The Cultivation of *Calochilus*.

C. robertsonii is the only member of this genus that I have ever tried to cultivate. To date I have had no success at all with this species. I believe this species, and probably others in the genus too, to be partly saprophytic in nature and this could be the reason why I have failed.

Many people have reported that they have members of this genus growing but after a few years they fade away. Much research is required to be done on the *Calochilus* species before we can say that they can be cultivated successfully. One very important step I would like to see happen, would be the successful germination of seed of any *Calochilus* species and then the plants grown to the flowering stage. Here is a challenge for some one.

To grow any terrestrial orchid successfully one must have the one plant or its direct tuber descendants growing strongly and flowering for a number of years or the plants must multiply freely.

SEPTEMBER ISSUE—The Green Hoods—*Pterostylis*. Reports please.

ST. ANNE'S NURSERY

56-62 WARRIEN RD., CROYDON, VIC.
Native trees and shrubs, Creepers,
Mat Plants, Rockery and Ferns
Large specimen garden to view.
L. M. Read, Prop.

TELOPEA VALLEY NURSERY

69 Cumberland Avenue, Collaroy
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BEARDED ORCHIDS IN TASMANIA

by M. J. Firth

The naturalist maintains into adulthood that capacity, that children have, to wonder at the peculiarities of Nature. Shakespeare condemned the non-musical by suggesting they were "fit for treasons, stratagems, and spoils". I would prefer to see such whole-hearted condemnation reserved for those who have lost their capacity to wonder. For instance, the Philistine who, seeing someone with a bunch of wild flowers asks what he is doing with "those weeds"—I would not trust such a person.

A wildflower which usually arouses this wondering admiration even in the most hardened is the Bearded Orchid. How like little old men they are with their bristly beards! And how delighted are children who find their little bearded friends appearing in the spring!

We have five species of *Calochilus* in Tasmania; the most remarkable being the beardless, bearded orchid. This peculiar plant has all the features of the *Calochilus* but lacks a beard. It is found only in small numbers in the southern part of our State, along D'Entrecasteaux Channel near Woodbridge and Snug. Its name is *C. imberbis*.

Two of our other *Calochilus* have purple plates at the base of the labellum, and only the forward half of this organ is bearded. One of these is the "Pale Beard Orchid", *C. saprophyticus*; and the other is the "Peaked Beard Orchid", *C. campestris*. The former is distinguished by the absence of a basal leaf to the flower stalk. Until recent years only *C. campestris* was recognised; consequently no one is quite sure where these two orchids are distributed throughout the State. I have sighted many *C. saprophyticus* in the N.W., N., and E., of Tasmania but, strangely enough, I have not sighted a single specimen of *C. campestris* in recent years.

"Red Beard Orchid", *C. robertsonii*, and "Strap Beard Orchid", *C. paludosus* are our remaining Bearded Orchids. The former is a rather robust species, with a copiously bearded labellum running out at the tip into a short, bent ribbon. The latter has the basal half of the labellum well-coated with hairs but the distal end runs out into a beardless strap.

C. paludosus and *C. saprophyticus* both favour wet, acid soils whereas other members of the genus can often be found in quite dry locations.

So there you have them, our little bearded men of the bushlands, with one rather shy, clean-shaven brother, ashamed of his beardless state.

EDITOR REFLECTS

The success of this publication in 1967 has been dimmed considerably for me by the passing of three of our most dedicated contributors. These include the above author John Firth, Fred Humphreys and C. F. Davies. If it had not been for the fine support of men such as these and others who have gone before them such as Alan Keene and Frank Hurley, this publication could never have existed. As time catches up with us all, people who have been privileged to know them will follow, but I like to think their work will be immortalised in this publication.

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