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STEEDMAN HONEY MYRTLE — *Melaleuca steedmanii*

Bottle Brush Flowers are Showy Wildflowers

There are hundreds of Australian bottle brush wildflowers growing in all parts of Australia. They can be obtained in all colours and on bushes of all sizes to suit any position in your garden. They are very easy to grow. This issue provides a guide to dozens of plants with bottle brush type flowers with articles by competent gardeners of their cultivation.

SUN ORCHIDS—A feature illustrated on Page 261.

GROWING WARATAH—See page 259.

A NOTE ON BOTTLE-BRUSHES

by C. N. DEBENHAM

Up to the point of being asked, "Well, what *is* a bottle-brush?," most of us are prepared to accept quite happily that a "bottle-brush" is a bush plant with a very showy bloom which resembles the utensil of that name. To be more positive in our reply, however, there are two aspects which we must consider.

Firstly, does the name refer to a particular type of bloom (or inflorescence?) The answer can be only partly in the positive because, if in our bushland wanderings we sampled all that bloom which could qualify as typical "bottle-brush" encountered and examined closely the flower, a problem would arise. We would find, in fact, and to a degree according to the wealth of flora available, very dissimilar structure in the floral segments. For example, the chances would be that *Callistemon, Melaleuca* and *Banksia* were represented in the sample.

Second, does the name refer to a particular type of plant which bears a bottle-brush-like inflorescence? The origin of the term is lost from record so we cannot say really how the word became fixed in our vocabulary. But at least this approach would narrow considerably the list of candidates for the title. It would be reasonable to say that although many Banksias bear "bottle-brush" bloom, we prefer to refer to them as "Honeysuckles" and for bottle-brushes be guided by the prominence and number of stamens possessed by each flower making up the "bottle-brush" or spike.

Prior to the early nineteenth century, the genus *Metrosideros* of Joseph Banks provided a repository for the placing of many of the unique members of its family forwarded from 'Terra australis'. Later knowledge of this continent's flora gradually brought a sweeping change to the conception of the genus so that, after the removal of certain members to *Agonis, Angophora, Melaleuca, Eucalyptus* etc., a solitary Australian representative of *Metrosideros* remains. This is *M. eucalyptoides* F. Muell. of the tropical north.

CALLISTEMON

In the Appendix III to Matthew Flinder's "A Voyage to Terra australis" (1814) the great Robert Brown founded a genus *Callistemon.* " a genus formed by those species of *Metrosideros* that have inflorescence similar to that of *Melaleuca,* and distinct elongated filaments". Some 25 members now are accepted for this genus (although, as genetic studies show, the picture is far from satisfactory) with the bulk widespread in the eastern tropical and temperate regions. Western Australia is poorly represented in number, although not in floral wealth, for there are but two species here. Two other members are indigenous to New Caledonia. The members are remarkedly stable in their floral features except for a loss in some (e.g. *C. salignus)* of the rich-red pigment of the filaments, but there is some diversity in their habit (compare, for example, *C. sieberi* with *C. salignus).* In summing the character of his ten listed species, Bentham remarks "They might, indeed, almost be considered as varieties of one species." Characteristically, however, the members are robust, strongly-growing shrubs or trees bearing flowers closely sessile in dense spikes at first at the tips of the shoots, and fruit woody, long-persistent and containing seed which takes about 3 years to mature. This fruit is found at the base of new growth. The conspicuous part of the flower, of course, is made up by the lengthy stamens, profuse in number.

With this introduction to *Callistemon,* the next 5 pages will describe many species of *Callistemon* as bottle brushes. This is the generally recognised common name for these plants. However, many other groups of wildflowers with bottle brush type flowers will be generally introduced to the reader by Mr. Debenham in the continuation of the article on page 267.

How to know Bottle Brushes

by Ernest E. Lord

The beauty and usefulness of the Callistemons for garden growing is only matched by their bewildering variety.

More than a score of species are now recognised and the various forms of many of these often make it difficult for the ordinary grower and nurseryman to know just which are which.

Reference books are sometimes contradictory, and even the botanist at times hesitates to name a specimen.

This hesitance, of course, gives the ordinary grower renewed confidence in his own hard-learned knowledge. Nevertheless he rightly looks forward to the time when better definitions of species are available in publications he has access to (not obscure herbarium journals), and when the best of the many forms of these species now being grown are properly registered as "cultivars" under International Rules, and standardised.

Perhaps these notes from one who has tried to sort out his bottlebrushes will be of some help to others who want to be able to distinguish one from the other with some degree of certainty.

Take 6 to 8 feet as average height unless otherwise stated, and November as the main flowering month. Some species are in bloom by October and some extend into December or even later when grown in higher altitudes.

Callistemon acuminatus, N.S.W. has large crimson flowers with prominent overlapping leafy "bracts" all through the brush. Broad smooth wavy-edged long-pointed leaves are 3-4½ inches long by ½-¾ inch wide.

C. *brachyandrus,* S.A., Vic., N.S.W., has thin red flowers, 1-2 inches long, tipped with yellow anthers. Leaves are very narrow, stiff and sharp-pointed, about 1 inch by 1/16th inch.

A variety of this from U.S.A., with larger leaves (2 by 1/12th inch) which have incurved margins, is in Melbourne. The flowers are richer scarlet and a greater diameter (1½ inches). It could be called *'California'* unless a prior cultivar name is discovered.

C. *citrinus* (syn. *lanceolatus),* Vic., N.S.W., Q., blooms in autumn as well as spring, often in winter too. The flowers are deep red, in brushes 2-4 ins. long, not as dense as most others and tipped with dark anthers. Flat rigid pointed leaves are 1½-2 or even 3 ins. long, by 1/8-3/8 wide. The species is very widely grown, and is sometimes of tree dimensions.

A variety of this in Melbourne has pinkish red flowers (R.H.S. colour Tyrian Rose 24/1), many of them in conspicuous clusters of 6 or 7 brushes on 2-3 inch leafy stalks branching from the top of a common stem. A suitable name might be C. *citrinus 'Pink Clusters'.*

Another variety of the same species, raised at Kew Gardens, London, and grown in English glasshouses, is called *'Splendens.'* It has brilliant crimson flower-brushes 3 inches in diameter.

C. *flavo-virens,* N.S.W., has flowers of yellowish green (4 by 2 ins.) and larger leaves (2-4 by ¼-½ ins.), pointed, and dotted with oil glands.

C. *laevifolius,* S.A., N.S.W., sometimes considered to be a variety of *macropunctatus,* has very small broad leaves (1-2 by ¼-3/8 ins.) and red or pinkish flowers, yellow-tipped, 2-4 by 1¼-2 ins.

C. *lilacinus,* N.S.W., is one of the two Callistemons frequently called C. *'Violaceus',* a name which seems to have no valid basis. The purplish mauve or purplish violet flowers (RHS Magenta), sometimes smallish, are distinctive in colour. Leaves are very thin and sharp pointed, rather glossy, and wider towards the outer end (2-4 by 3/8 inch). This bottlebrush was

believed to have originated in Berlin from Australian seed in 1913, but had actually been collected by the botanist Betche near Como in 1894.

C. lilacinus 'Carmina' is a purplish red variety (RHS Tyrian Rose), 4

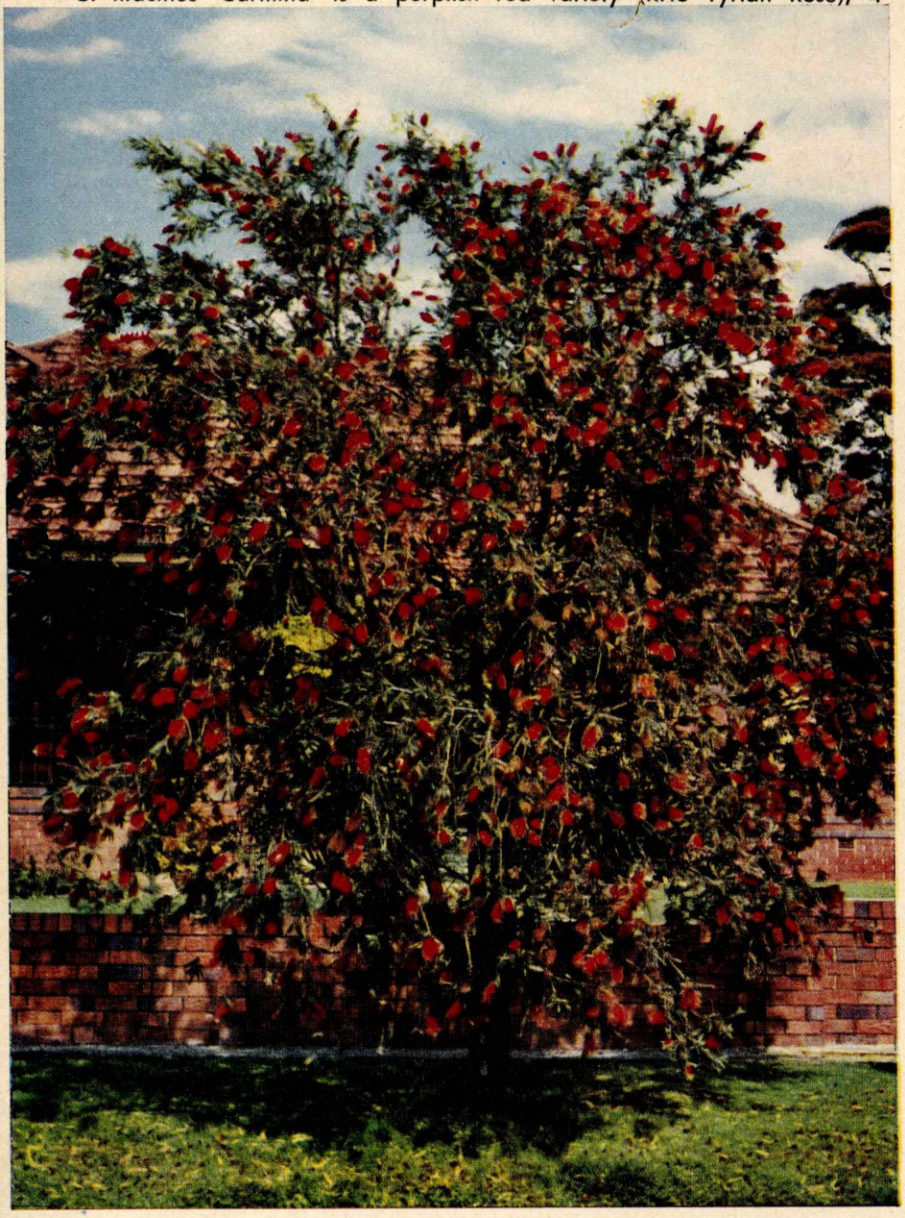


Photo: Quinton F. Davis *Blocks by Courtesy of Angus and Robertson*

Reprinted from that wonderful book on growing wildflowers in the garden, *"Australian Plants for the Garden,"* by Thistle Y. Harris. Enquire from your bookseller.

CALLISTEMON VIMINALIS

No articles on bottle brushes are complete without a colour photograph of a good free flowering specimen. This is such a good one that readers will forgive the Editor for repeating it. This is the weeping bottle brush. Other species are more upright but all should flower well, many with large flowers.

by 2½ ins., with dark anthers. It was raised by Edwin Ashby in S. Australia and named in 1925. There is a very large specimen in Melbourne Botanic Gardens.

C. *linearifolius,* N.S.W., has the bracts among the large crimson flowers in a similar way to C. *acuminatus,* and narrow (¼ in.) leaves to 3 inches or more long, with prominent side-veins.

C. *linearis,* N.S.W., is a popular and easily grown species with large red brushes (3-5 by 2½ in.), dark-tipped, and stiff narrow concave leaves 2-5 by 1/12th inch.

A dwarf form of this species, no more than 2 feet high, is called *'Pumila.'*

C. *macropunctatus,* S.A., Vic., was first called *coccineus,* and later *rugulosus.* Its red flowers, sometimes pinkish chiefly because of the yellow anthers tipping the bristles, sometimes bright scarlet, are 2-4 ins. long by 1½-2 ins. in diameter, not as densely packed in the brush as most others. The leaves are narrow, pointed and rough surfaced (1-2½ by 1/8-¼ in.). Much grown in Victoria, variable in height.

C. *pachyphyllus,* N.S.W., a bush of 3 to 4 feet, often found in swampy soils, has rather large deep crimson flowers (3-4 by 2½ ins.) and very thick smooth blunt leaves up to 4 by ½ inch, but often narrower.

A variety of the last named called *'Rubro-lilacinus'* is often labelled *'Violaceus'.* The flowers are reddish lilac, leaves are thick and narrow, quite unlike those of C. *lilacinus,* (the other 'Violaceus').

C. *pallidus,* Tas., Vic., N.S.W., is the Lemon Bottlebrush, an erect shrub or small tree with pale yellow 2-3 inch flower-brushes. Leaves hairy at first, later smooth, 1-2½ by 1/8-½ inch.

C. *paludosus, (C. salignus australis),* S.A., Tas., Vic., N.S.W., is a tall bush, sometimes a tree, in swampy ground. The brushes are usually creamy yellow, sometimes pale pink, 1-2½ by 1 inch, and the leaves smooth, narrow (under ¼ in.) and rather thick.

C. *phoeniceus,* W.A., is a splendid species with rich scarlet flowers (RHS Carmine), 2½-4 inches by 2 inches diameter, not densely packed, quite hairless. Narrow leaves, 2-4 by less than ¼ inch, are thick and greyish, with no visible side-veins, sometimes dotted with oil glands (under a lens).

C. *pinifolius,* N.S.W., is the Green Bottlebrush, with rather large flower-brushes of an uncommon shade of green, and needle leaves 2-4 inches long. Sometimes a tall bush of 20 feet.

A variety of the above with red flowers is *'Rubra',* not so tall and of more weeping habit of growth.

C. *rigidus,* N.S.W., Q., is a much grown and satisfactory species with large deep red flowers, 3-4 inches long, 2-2½ ins. in diameter. The flat stiff and pointed leaves 2-5 inches are very narrow (usually under ¼ inch).

A variety of this species has many of its flowers in attractive stalkless clusters of about 6 together, radiating from ends of main stems like spokes of a wheel. It might well be called *'Crimson Spokes.'*

C. *salignus,* S.A., N.S.W., Q., has been known as Pink Tips, from the rich bronze-pink of its young leaves. These are prominently veined, up to 3 or 4 inches long, by ½ inch. The pale pink flowers are in thin brushes, 1½-3 ins. long. Pink Tips is frequently used in street planting and in gardens. Under some conditions it can attain full tree dimensions.

There is a White Bottlebrush, it is C. *salignus 'Albus',* and has the same pink tips in its young growth as the parent species.

C. *salignus 'Rubra'* is a handsome form of this species with rich cerise-red flowers which darken to violet-red with age. It will reach 15 or 20 feet

at times, as has an old specimen in Melbourne Botanic Gardens (labelled *salignus phoeniceus).*

C. *shiressii,* N.S.W., is rarely seen in the south, but is worth growing for foliage alone. Small leaves 1-2 ins. by 1/6 in., with tapering points. The small brushes are pale yellow.

C. *sieberi,* Vic., N.S.W., is the Alpine Bottlebrush, a shrub of 4-6 feet or a tree of 15 feet. The small leaves are almost needle-like, ½-¾ ins. long, and the late-flowering blooms rarely exceed an inch long, pale yellow. It has little garden value except for cold wet climates.

C. *speciosus,* W.A., the Albany Bottlebrush, is one of the best. The flowers are magnificent brushes of deep red, 3-5 ins. long by 2-2½ ins., the calyxes very hairy and the main stalk downy. Leaves also are large, 3-5 ins. by ¼-½ in. Always worth growing but sometimes wrongly labelled.

C. *subulatus,* Vic., N.S.W., is a spreading shrub of 4 feet with rich crimson flowers 2-3 ins. by 1½-2, and very narrow sharp-pointed leaves (1½ by ¼ inch).

C. *teretifolius,* S.A., has crimson flowers, dark-tipped and bearded at their bases, 2-2½ ins. by 1½-2 ins. diam. The prickly needle-leaves, 2-5 ins. are not finely grooved as are those of *pinifolius 'Rubra'.*

C. *viminalis,* N.S.W., is the Weeping Bottlebrush, it grows the largest of all, sometimes a tree of 50 feet. The willow-like leaves are reddish whilst young, 2-3 ins. by ¼ in. and sharp-pointed. The red flowers (in 2-4 in. brushes) may be identified by the filaments (or bristles) being united in tiny rings at their bases.

So you see that each species or variety has distinctive features which in almost all cases should enable the ordinary grower to identify and name a plant without a special knowledge of botany. A word of advice: try to select mature leaves or other features that represent a fair average in size or shape. A small folding lens magnifying six diameters is a great help.

TWO NEW BOTTLE BRUSHES

by H. W. CAULFIELD, Curator, Brisbane Botanic Gardens

The genus *Callistemon* has provided many excellent garden shrubs and trees. However, despite the virtues of attractive flower form and the free blooming habit of the majority, along with the added attraction of encouraging nectar-looking bird life into the garden, they can generally be regarded as being of harsh or scraggy appearance when not in bloom. However, in recent years two new species have come under notice and promise to brighten up our garden landscape. Each is distinctly different and they lack many of the failings associated with other species already established as accepted garden subjects.

One is *Callistemon montanus* C. T. White ex S. T. Blake, the description of which was published by Dr. Blake of the Brisbane Herbarium in the Proceedings of the Royal Society of Queensland Vol. LXIX, No. 7, 1958. This plant is recorded as growing naturally about the cliff edges of sections of the MacPherson Range in Southern Queensland and Northern New South Wales. C. *montanus* can be classed as a shrub or perhaps a small tree of dense growth habit. The small leaves, which are at maximum 2 inches by ¼ inch, are close and clothe the full length of the stems. New foliage is at first of a light reddish brown to pink then bright green, eventually changing in maturity to a dull mid-green. The inflorescence when compared with C. *speciosus* could be regarded as short; 3 inches appears to be the maximum length. However, many of the brushes are much shorter, the stamens

are dark red with large deep yellow anthers, width of the brushes is from 2-2½ inches.

The plants growing in the Brisbane Botanic Gardens were raised from seed received from Dr. Blake in 1957. Growth rate of our plants cannot be classed as fast, as having been planted out in the Australian section for 3½ years the tallest bush is now only a little over 3 feet high. This slow growth rate may be due to local conditions as plants are sited along an exceptionally well-drained high river bank and have to withstand the competition of close-planted mature Bunya Bunya Pines. (Reports are to hand which indicate that it will move along at a faster rate).

Due to permanent restrictions on the use of sprinklers in Brisbane, plants in the Botanic Gardens can only be watered during their early establishment period. Once established they are at the mercy of nature, and should receive some assistance from heavy mulchings of wood shavings and occasional dressings of superphosphate and sulphate of ammonia.

Callistemon montanus has a definite future as a cultivated shrub and ere long this bushy free-blooming bottlebrush will be a much sought-after item in the floricultural world.

The other bottlebrush with a difference is *Callistemon formosus* S. T. Blake which was described in the same publication as C. *montanus*. This plant is a delightful free-flowering small with tree with decidedly weeping branches. In some respects it resembles C. *salignus*, however it must be regarded as a superior subject. It varies from salignus in that the bark is not papery and the branches more weeping. The length of the flower spikes average 3 inches and are a rich cream-white with tightly bundled stamens. Young foliage is decidedly ruddy and renders the tree most attractive when not in flower. Mature foliage is between 2 and 3 inches long and ¼ inch wide of a light to mid green colour with obvious dotting.

Three (3) plants are well established in the Brisbane Gardens. These were raised from seed collected from the type specimen; all are six years old and have been sited in different areas of the gardens. The plant in the much drier Australian Section has furnished well, is shorter, and as yet has not flowered. Another plant situated in the Curator's private garden has flowered but is somewhat spindly in growth due to a shady environment.

Callistemon formosus is aptly named, formosus "meaning" beautiful. This plant has much to offer the cultivator, firstly its delightful weeping habit with the accompanying pendulous flowers which are borne in abundance, and invariably over two distinct flowering periods, while ever-present are the beautiful pink to red tips of new growth. With such natural attributes C. *formosus* is much more than a collector's plant. The natural distribution of this plant is in the Burnett district of Southern Queensland around Biggenden and Kingaroy.

GROWING BOTTLE BRUSHES

This article by I. Holliday was written from years of experience in Adelaide but the conclusions reviewed could apply equally to garden conditions anywhere in Australia.

Callistemons or bottle brushes come into that hardy group of shrubs which can be expected to succeed in almost any soil or situation. They respond to fertilizers, but this is by no means essential. It is important to cut back beyond the flowers each year once the bush has attained the size desired, as this treatment ensures prolific flowering and eliminates the woody look which is common to many unpruned *Callistemons*.

A number of the larger shrub varieties make lovely small trees eventually, if the lower branches are trimmed and the top left to fan

Continued on page 287

PROPAGATION BY CUTTINGS

USING MIST SPRAYING & BOTTOM HEATING TECHNIQUES

by R. D. Johnston

Mist Spraying—

Previous issues have mentioned mist spraying techniques briefly. I have had considerable experience of misting systems both for watering glass-house plants and for propagation and I can appreciate the problems of setting up a small system for experimental work.

Perhaps the most difficult problem is to reduce the volume of water so that while the leaves are kept wet, the rooting medium is not overwatered. Excess water reduces rooting by restricting aeration and lowering the soil temperature and also bleaches out the nutrients so that the cuttings are starved.

The smallest spray I have found is the "Monarch" fogger, which delivers about one gallon of water per hour. The trouble with this jet is that, because of the fine droplet size, coverage is small (each spray covering an area of about two feet in diameter) and the sprays must be placed high in the glasshouse or bush-house to get the best distribution of spray. Also these units are difficult to adjust, as to volume or droplet size.

I have found that the "MacPenney's" atomiser is satisfactory for my requirements. The No. 1 jet gives about 3½ gallons per hour, with a coverage of 4 feet diameter and these units can be adjusted to some extent. (These units are distributed by L. P. Gough, Heatherton Road, Springvale, Vic., for 30/-).

The problem of excess water, as I see it, cannot be solved by using smaller jets as the smaller the jet the less the area covered, so one must use more jets to cover the same area. This is the reason why people have used intermittent misting. With a spray system operating for ten seconds every ten minutes, one can use only a sixtieth of the nominal throughput of the sprays and still keep the plants wet.

With an automatic controller, available from Watermatic Controls, Box 145 P.O., Chatswood, N.S.W. at £6/15/0 and a solenoid valve from Goyen Controls, Marigold Street, Revesby at £5/10/0, a spray system can be modified, to give intermittent misting for about £13.

Admittedly the intermittent spray system is more expensive than continuous misting and with a single spray jet the additional cost may not be considered justified, but as soon as multiple jets are used, the extra cost is relatively less, whilst the increased efficiency becomes more important.

Propagation with a Small Spray System—

The Editor has requested me to provide details of a small frame easily constructed, suitable for backyard propagation of native species. I have not had much experience with these, but I have seen references to units which were used successfully in Kent, England, in conjunction with mist spraying and soil warming.

If you consider that the main object in propagation is to reduce water loss from the tops of cuttings while inducing the development of roots, it will be realized that different temperatures are needed in the two zones — "warm feet, cool heads." By using mist spraying and soil wires, this difference in temperature can be achieved fairly simply.

The English frames are 2" x 1" hardwood, 6' x 4' x 3', with a sloping removable roof. This frame is covered with plastic, 0.002" clear polythene, 3 feet wide is available from most hardware stores (glass would be better as it retains the heat better at night). I would also suggest multiples of 4

feet in length to match the coverage of each spray unit. The top can be removed or partly opened, by day, to control temperature, and closed by night. U.K. reports suggest that light shade is better than full sunlight but this would be a matter for experiment with different species. "Saran" (a shade cloth also marketed as "Sarlon", or "Tygan" available at hardware stores and garden centres) provides a ready means of providing controlled shading. These are available in a range of densities (36%-90% shade).

The spray jets are mounted on 15" risers of ½" water pipe.

Several other types of propagating frames have been used overseas, but this is the simplest and appears to be effective. Other types used are:-

2. Clear plastic stretched over a semi circular frame of wire mesh, with the water supply pipe running along inside the top, has been used extensively both in Europe and U.S.A. These can be portable, but tend to have insufficient clearance along the sides.

3. Dutch lights (glazed frames about 5' x 2') on edge to form walls around the propagating bed, with coarse hessian cloth for shading. Dutch lights are used extensively in Europe but would not be readily available here.

4. An American firm is marketing the "Mistic Bubble," a plastic dome stretched over wire ribs. It is four feet in diameter and height with a centrally placed spray nozzle. The plastic must be shaped to fit, and this would be more difficult than a square frame.

Bottom Heating—

For soil heating, B.G.E. market a 100 watt soil heating unit (in England, probably available here), and a friend of mine has adapted a blanket element for a small seed germinating cabinet. I have used Pyrotenax cable with a thermostat. This is a 240 volt unit and there are good arguments for using a lower voltage. In fact I saw one set up several years ago, where 32 volt was put through a calculated length of galvanised fencing wire and it worked quite well for propagating Leptospermum species.

The heat load recommended is 10-15 watts per square foot, and cable should be laid about 4 ins apart. A suitable floor would be 6" cinders on the ground, 1" coarse sand on which the cable is laid and then 4" rooting medium. The latter could be sand and leaf mould (3:1) or sand, leaf mould and peat (3:1:1).

Pots, Flats or Beds?

I have described a bed above to receive cuttings. This is the method often used commercially because of the large quantities handled. For small batches of cuttings the use of pots has several advantages, not least being that this allows the cuttings to be moved without disturbing the roots. Roots tend to be rather brittle, especially if too much water is used, so the less disturbance, the less injury. If the cuttings are set in groups in 4 inch pots (terra cotta), then set the pots in sand on top of the 6 inch cinders.

Hot Beds—

I would like to suggest an alternative method of getting warmth to the roots, the old hot-bed method of burying a layer of fresh manure beneath the frame. This method calls for some judgement in deciding the right moment to start the cutings, but this should not be difficult for a good gardener. The length of time a hot bed lasts depends on the depth of filling and covering but is usually up to 4 months.

Pest Control—

If cuttings are clean to start with, then the general experience is that less disease develops under mist, possibly owing to the frequent washing

of the leaves. Should infested material be used (e.g. red spiders) then the build-up is rapid and hard to control. Virus infected cuttings usually develop symptoms more quickly under mist, and here again control is impossible. The moral is, use clean stock!

Ventilation is also important in the control of fungal diseases—damping off and mildew. Some growers use fans to aid circulation, and opening the top of the frame is necessary in hot weather. This can be done without reducing the effectiveness of misting.

Preparation of Cuttings—

This is where experiments are needed. I would suggest soft-wood cuttings should be tried under mist. Overseas experience has shown that softer cuttings can be used, and that these root more readily. Rooting hormones should also be tried, although with soul warming and intermittent mist, results are not likely to be improved greatly.

Hardening Off—

Plants should be hardened off by progressively reducing the time under mist. Thus switch the mist off at night, and gradually shorten the time it is on during the day, over a period of 10-14 days. At the same time, shade should be reduced and ventilation increased. After the plants have been potted up they should be returned to the mist for a few days.

Editor's Note: This article is intended for those keen types who wish to try and propagate some of the more difficult plants. Our last issue described a very simple method of propagation by cutting for the less ambitious, using a polythene covered, easily made box. I pack as many cuttings as I can into a 4" pot of very coarse, clean sand and stand this on a bench under a *Casuarina* tree. With filtered sun, protection from wind and frequent water to keep it moist, I get quite good results with most natives.

BOTTLE BRUSH FROM SEED

The very simple methods of germination of the bottle brush flowered bushes from seed have been described in past issues. As it is the policy to always publish simple methods of propagation of the plants featured in the issue to encourage readers to try and grow their own, one easy method is again described. It is so easy to get results with these plants.

Medium: It does not seem important. I use a sterile medium, vermiculite or pearlite, but others get equal results with sand or even bush soil.

Container: I use a 4" plastic pot, well crocked, with the medium 1" from the top. A piece of glass is placed on top.

Sowing: The very fine seed is sprinkled sparsley on top and just covered.

Watering: It is essential to keep the surface very moist. I sit the pot in a container of water about 2" deep until ready to plant out.

Aspect: Full sun for 2-3 hours per day. I sit mine on a rock in the yard. Remove the glass gradually as the seedlings grow and harden by giving more direct sun.

Potting: Pot on the seedlings to 4" pots when 1" high. — Editor.

BOOK REVIEW

SEASIDE PLANTS OF THE WORLD *by E. A. Menninger*

This fine book is an American publication. The problem of trying "to provide a setting where people can live by the sea" and even grow a picturesque or functional garden is world wide. The book describes how to provide obstacles to sand, wind and salt that will not detract from the ocean's loveliness when it is peaceful, yet will prove successful barricades against its violent moods. Hundreds of species of suitable trees and flowering shrubs are described with recommendations as to landscaping to meet the elements, but to preserve the scenic characteristic. Superimposed on this subtle bastion can be a beautiful but resistent flowering garden. Australian native plants are well represented and take their place with the world's finest exotics. To round off the book is a chapter by T. R. N. Lothian, Director of the Botanic Gardens, Adelaide. This chapter places the book squarely in focus for Australian gardeners and makes one realize what a fine job the author has indeed done and how well the book may be applied to Australian coastal conditions.

VICTORIA'S RESOURCES — A Wildflower Issue Vol. 6, No. 2, August 1964

This quarterly periodical is the official organ of the Natural Resources Conservation League of Victoria. The aim of this League is to encourage and interest the people of Victoria into the ways in which the soil, water, forest and wildlife are linked together and to recognise the need for their natural conservation. Each issue of their journal "*Victoria's Resources*", is devoted to an aspect of this work and August, 1964 issue is especially devoted to those wildflowers of Victoria. This 32 page issue contains many interesting articles for those lovers of the Victorian bushland. Obtainable from the League Secretary, P.O. Box 104, Springvale, Victoria for 2/- plus 6d. postage.

GROWING WARATAHS

by F. H. STONE

As a student of bush and cultivated waratah plants and a successful grower for some years, I feel the following observations maybe of interest and helpful to promote their cultivation in home gardens.

If half the thought and care that is given to exotic shrubs in the home garden was given to "Waratahs", I am sure every suburban garden would have and be very proud of this beautiful and interesting plant which with very little care and attention, during the first few years, will grow to 10 ft. or more and bear up to 100 flowers each year.

So many people have been disheartened with failures because so little publicity has been given to the essentials of cultivation.

Firstly seedlings must be grown in "mother" soil which inoculates the plant with the necessary micro-organism. Don't waste your money on soft young plants or stunted rubbish. The seedlings should be at least 6 ins. high and about 2 years old (or more) with a vigorous appearance and a little "knob" (which is the beginning of the bulbous root) at or just below ground level (preferably in 7 lb. tins).

At this stage the plant is firmly established, past the "damp off" stage and ready to transplant. Choose if possible a position where some shade is available, particularly in the afternoon (too much sun tends to dull the color of the flowers) but shade is not essential providing the top soil is kept cool and is kept from drying out.

The first essential is any well drained friable soil. If the soil is a very heavy loam or clayey, plant on sloping ground if possible, and dig in a couple of buckets of river sand and gravel to provide drainage downhill. If water tends to "lie around" on flat ground, build up 6 ins. or more with odd bits of sandstone or rock so that the surface roots have good drainage as the waratah as it grows accumulates a mass of fibrous roots close to the surface.

Do not dig around the plant but give it a liberal mulch preferably of leaves or leaf mould. This will keep the top soil and the fibrous roots cool and moist and help to keep down the weeds. As the plant grows it will shed leaves and these should be left around the plant. A handful of blood and done sprinkled and lightly raked amongst the mulch in early spring and late summer will work wonders. Increase the quantity each year.

The plant should flower at four years on one tall stem (one or two small suckers may also appear). When the first flower is spent, cut back to 4 or 5 eyes above the "ring" which plainly marks the seasonal growth at a convenient height to prevent straggly growth. Two or more shoots will quickly appear and produce flowers usually the next year but in colder climates it may take 2 years for the flowers to develop.

If the suckers (do not leave more than two or three) are weak leave them alone but if they are vigorous you must choose whether to cut the old stem right back to the bulb or cut out the strong suckers.

When the plant is 5 to 6 years old, and the growth is vigorous the flowers maybe left unpruned, when seeds and shoots will appear from the woody centre of the spent flower and produce often two or three flowers each next year.

This will 2 or 3 years later, give a beautiful mass display of anything up to a dozen flowers. Don't crowd your "Waratah", give it plenty of air and root room. If the plant after some years becomes "staggy," don't be afraid to cut it right back to the ground after flowering. This is equivalent to a

"bush fire". Burn around it if you like. In either case vigorous suckers will soon appear and commence flowering one or at most two seasons later.

I have seen in home gardens pure white waratahs growing, also bright red flowers with each tiny tip pure white (of which I have colour slides as proof). These beautiful specimens are no doubt "sports" or mutations and with thousands in cultivation what variations maybe produced?

Treat your Waratah not as a freak or an invalid, but as one of the hardiest and most beautiful flowers in your garden. Don't be afraid to water it or feed it or smother it with mulch, but don't let the grass grow all over it — don't dig deeply or disturb the top soil around the perimeter anymore than necessary.

Don't shove it in some out of the way corner where nothing else will grow. Give it pride of place with plenty of room amongst your exotics.

"WARATAHS"
3,000 Vigorous 2nd Year Seedlings in prune tins — Bush grown in Native Soil — 12/6 each
APPLY WEEKENDS— "Waratah Park", Valley Ridges Road, off Bells Line Rd., 4½ miles west of Bilpin, or 'phone, F. H. Stone, XW 6619.

GROW OUR "SUN ORCHIDS"

LEO CADY, Kiama, N.S.W.

"Sun orchids" or *Thelymitra* genus consist of some of our loveliest ground orchids, having a colour range unsurpassed by any of our other terrestrials, ranging from white through green, yellow, pink, purple, reds, blue and in some cases variegated. The genus is one of our larger ones, containing an extraordinary varied array of floral types, consisting of species single flowered and rarely over ½in. across, to many flowered types of brilliant colour, having florets of up to 1½in. across.

They are found to habit varied types of soils and conditions. From alpine bogs to the dry ridge area of the western slopes, to swampy coastal tracts, this variation in habit makes the selection of a suitable compost somewhat difficult to arrive at, but the Terrestrial Orchid Study Group have had some success with the following compost: 50% peat moss, 30% sharp sand and 20% natural leaf mould. This genus at present has presented quite an amount of difficulty in its culture, owing to a susceptibility to tuber rot in its dormant period. If this is found to occur, we suggest that more sand be added to the compost, making sure that you have provided perfect drainage to your pot.

The size pot recommended for the general culture of *Thelymitra's* are 6in., as the plants appear to require plenty of room, the larger types of plants, e.g., *T. ixiodes, T. medea* and *T. grandiflora,* no more than two tubers per pot: but for the smaller types, e.g., *T. pauciflora, T. carnea* and *T. rubra,* which in nature appear to grow in clumps, I would suggest up to six or eight tubers in the centre of the pot.

Thelymitra's DO NOT like artifical manure's but apparently they receive enough nourishment from the accumulation of leaf mould in the pot, so it is often wise to place say a small handful of well rotted leaf mould on the top of the pot when the plant is dormant.

Watering may require the grower to do an amount of research with his plant, but as a general rule the plants should be kept moist in their growing period, and somewhat drier in the dormant period.

Being "sun orchids" they require a goodly supply of sun, and a position where the plants can get all the morning sun with the roots still in the cool is ideal.

SUN ORCHIDS

THE COMMON SPECIES OF THE GENUS THELYMITRA

by L. CADY, Kiama

The genus *Thelymitra* (from the Greek, Thelys. women—mitra a cap) is scattered widely over the Commonwealth of Australia, extending also to New Zealand, New Caledonia, Timor, Java and the Philippines. It is though, mainly an Australian genus having somewhat above 50 species named for this country. This genus contains some of our most colourful ground orchids with a colour ranging from white through green, yellow, red brown, purple to blue.

Being such a large genus we find an amazing variation in habitat, size (with plants from a lowly 6" to giants of 3' 6" to 4' high with florets of 1 to 1½" across) and floral structure; which often, causes differences of opinion in Botanical circles.

For a genus that has such variations(it only stands to reason that their habitat is also variable) some species pertain themselves to one particular habitat e.g. *T. venosa* and its Var. are rarely found out of highland moss bogs whereas *T. ixioides, T. media, T. pauciflora* and its allies can be found from swamp lands to dry hard ridges, of course the plants found on the dry ridges are by far inferior to those collected in damp swampy areas, but they usually improve when placed with the other plants.

Note: *Thelymitras ixioides* Sw. and *T. venosa* R.Br. are protected flora in N.S.W. and should be treated as such.

DESCRIPTION OF SPECIES—

1. *T. ixioides* Sw. "Spotted Sun Orchid"

One of the commonest species in Australia extending to New Zealand and possibly New Caledonia.

A robust or slender species to 60 cm. high. Leaf singular, linear to broad linear. Flowers to 12 or more to 5 cm. across, colour most variable violet-mauve-blue-pink or white. Segments usually broad and rounded to 16 mm. long, the upper 3 spotted with darker dots. Column erect, secondary lobes ciliate the primary wings divided into 3 cristated sections.

Note: This species can be found without spots, and then if not checked properly can be mistaken for No. 2 species.

Distribution: All states, New Zealand, and possibly New Caledonia.

Flowering: August to December.

There are also 2 varieties named—

1a. var. *subdifformis* Nich.: A rather robust plant with large flowers with green sepals — a striking contrast to the spotted lavender colour petals of the type.

Dist.: Victoria.

1b. var. *truncata* (Rogers) Nich. A small or robust plant distinguished by its truncate mid lobe to the column.

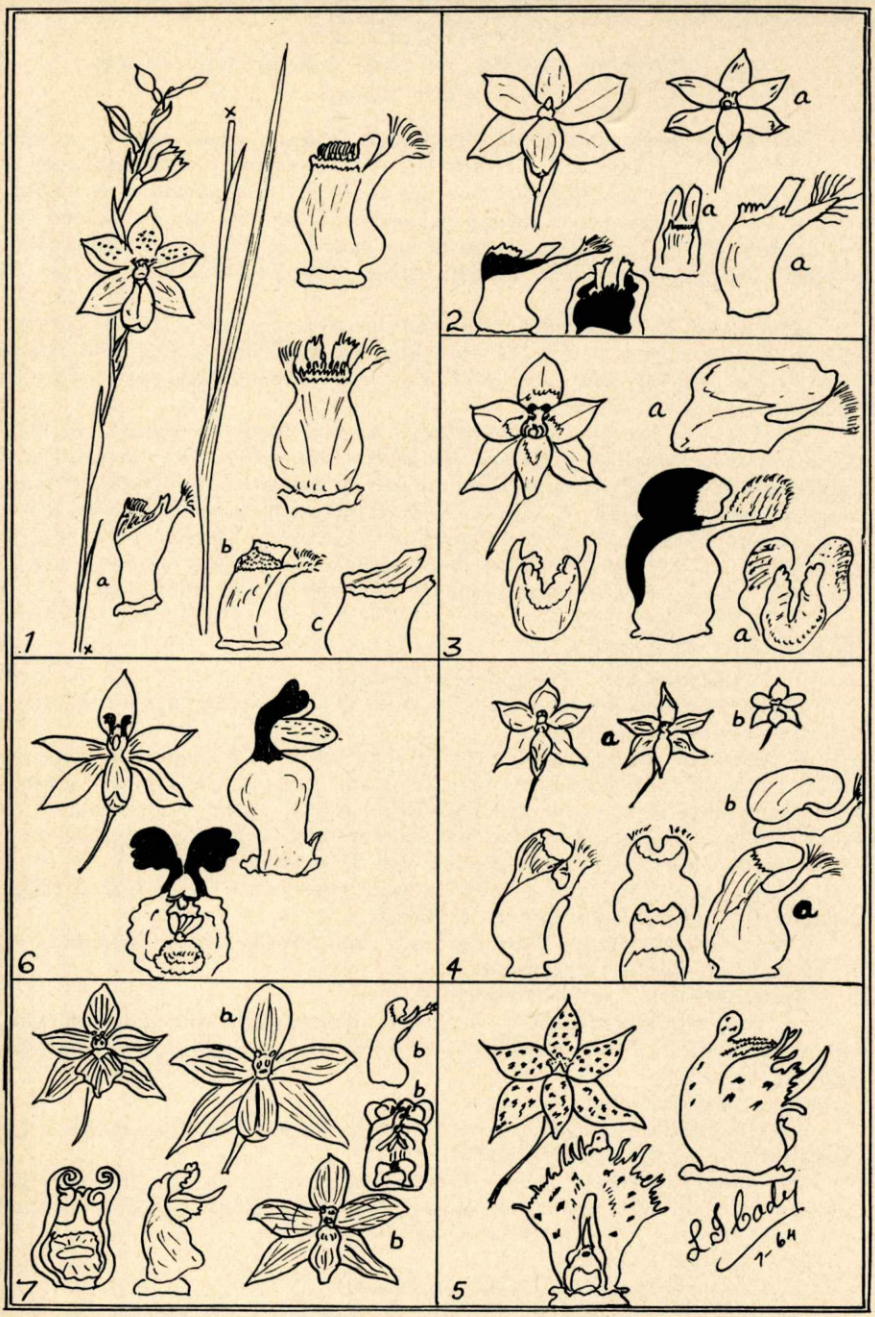
1c. forma *merranae* (Nich). Nich. Appears to be an intermediate between 1b. and the type form, having its column midlobe widely dilated at summit and less truncate than in var. *truncata*.

Dist: Victoria (rare).

2. *T. media* R.Br. "The Tall Sun Orchid"

This species resembles *T. ixioides* but is easily separated by the lack of spots to upper segments and a dark "collar" at top of column.

A slender to extremely robust plant to 100 cm. high. Flowers numerous pale blue to deep blue with purple markings rarely white, to 3.5 cm. across. Segments elliptical-lanceolate. Column erect, not hooded, appendages mostly at horizontal to column, pencillated, the midlobe tripartate front lobe usually



KEY TO PLATE

1. Plant showing typical *Thelymitra* habit: *T. ixioides* var. *ixioides*, column—side and rear.
   a. column side *T. ixioides* var. *subdifformis*
   b. column side *T. ixioides* var. *truncata*
   c. column side *T. ixioides Forma merranae*
2. *Thelymitra media* var. *media*, showing flower-column side and apex of column from rear.
   a. *T. media* var. *cornea-lutea*, showing flower-column side and apex of column from rear.
3. *T. aristata* var. *aristata* showing flower-column side and from above.

a. *T. aristata* var. *megcalyptra*, showing column top side, from above.
4. *T. pauciflora* var. *pauciflora*, showing flower column side from rear (variations).
a. *T. pauciflora* var. *holmesii*, showing flower and column side.
b. *T. pauciflora* var. *pallida*, showing flower and apex of column side.
5. *T. fusco-lutea*, showing flower column side and front.
6. *T. antennifera*, showing flower column side and top of column front.
7. *T. venosa* var. *venosa*, showing flower column side and front.
a. *T. venosa* var. *magnifica*, showing flower.
b. *T. venosa* var. *cyanea*, showing flower-column side and front.
All flowers half not size — other segments variously enlarged.

shorter than the rear, a conspicuous dark band or collar encircling midlobe.

Dist.: Victoria, N.S.W. and Western Australia.

Flowering: October to January.

2a. var. *cornea-lutea* Nich. Perianth segments pink, the sepals marked yellow externally, column pink and yellow.

Dist.: Victoria, N.S.W. (one plant only found and checked with type by Mr. J. H. Willis, Melbourne Botanic Gardens).

Flowering: October-November.

3. *T. aristata* Lindl. "The Scented Sun Orchid"

A plant resembling *T. media* in flower shape only. Its main dionostic features are its beautiful scent and the hooded midlobe to column with the toothbrush like hair tufts.

A variable plant, slender with few flowers or robust to 100 cm. with 35 flowers. Leaf sheathing at base, short, broad to 25 cm. long. Flowers (usually scented) in shades of mauve, purple or pink. Segments elliptical-lanceolate. Column erect, hooded, hair tufts white (rarely yellow) resembling a small toothbrush midlobe, cap shaped, darkly coloured towards the back, yellow towards apex, with a V notch in centre.

Dist.: All states and New Zealand.

Flowering: August to November.

3a. var. *megcalyptra* (Fitzg.) Nich.

Colour pinkish with largish flowers. Column hood usually large and inflated.

Flowering: October.

4. *T. pauciflora* R.Br. "Slender Sun Orchid"

This species is the commonest Thelymitra in Australia being found in all states and also in New Zealand. It may be collected in most types of soils and in many different habitats and shows an enormous variation, from diminutive plants with one flower a few centimetres high to plants 50 cm. with 15 or 16 flowers. The leaf varies from slender terete to broad and fleshy. Colour is from white to deep purple with all the intermediate between.

This species is a self pollinating species and therefore as often as not it does not open its flowers except in a very favourable period, i.e. in hot sunny weather.

Dist.: All states and New Zealand.

Flowers: August to January.

There are two named varieties.

4a. var. *holmesii* Nich. Flowers deep violet, the perianth more acute than in the type, often veined. Column hood large, hair tufts yellow.

Dist.: S.W. Victoria (Portland).

4b. var. *pallida* Nich. A wholly dull sage green plant, with purplish markings, the flowers yellowish.

Dist.: Bell area N.S.W.

Flowering: November.

5. *T. fusco-lutea* R.Br. "The Blotched Sun Orchid"

This species is common in Western Australia but also extends to South

Continued on page 266

TERRESTRIAL ORCHID SEEDLINGS II

WARREN P. STOUTAMIRE, *Cranbrook Institute of Science, Bloomfield Hills, Michigan, U.S.A.*

In the Sept. 1963 issue of *Australian Plants* I described the early growth stages of Australian terrestrial orchids as they appeared in culture. The present article is a follow-up report of these seedling cultures, after another year of aseptic growth in nutrient agar. Many of the seed cultures which were illustrated last year have continued to grow, and are now being transferred to pots in the greenhouse. Individuals who provided me with seed also furnished information on growing conditions, and this has helped in preparing appropriate soil mixtures. Some, but not all, plants are beginning to grow. Many more seed samples have been received and have been started during the year, using the same cultural methods outlined in the previous paper. Some of these are now in the protocorm stage and their growth will provide additional information on the early developmental stages of terrestrial orchids. I am engaged in research on the seed germination and growth of terrestrial species and the seed collections from Australia have produced some of the most interesting seedlings.

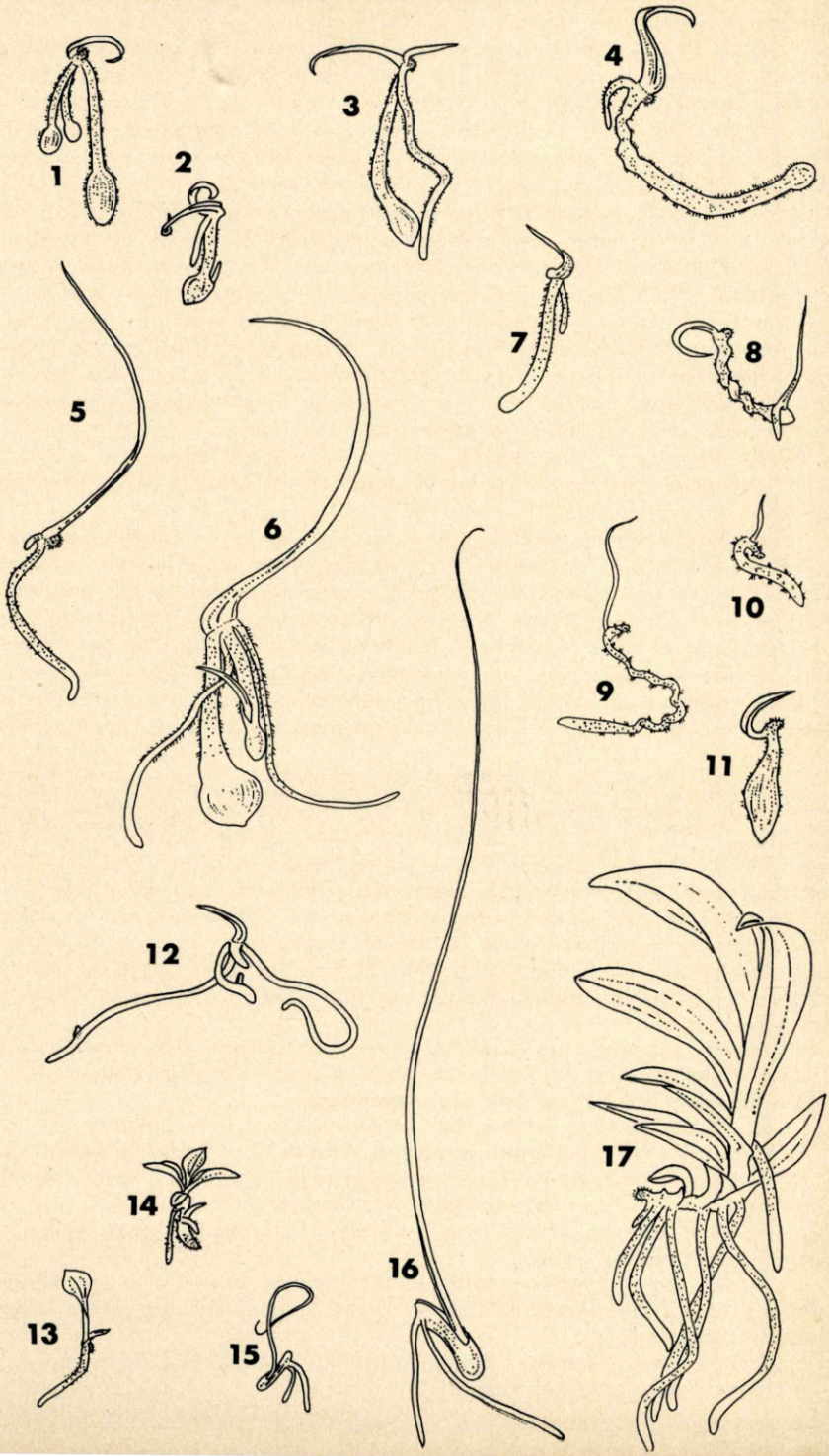
The greatest problem which has appeared during the past year has been the high mortality of seedlings in the protocorm stage. Over 90% of the plants in some cultures have turned brown and ceased development. Too many protocorms in a limited volume of medium, and improper light and temperature conditions, are possible contributing factors. Many protocorms do survive, however, and their rapid growth in fresh media sometimes makes me wish that the protocorm mortality were still higher. The rapid die-off of very small seedlings is characteristic of orchids in nature as well as in the laboratory. Protocorms have been found in large numbers in the vicinity of mature plants in Europe and in North America, but very few of these protocorms ever grow to mature plants.

The camera lucida drawings illustrated here are from seedlings growing in Knudson C agar medium. Root position has been influenced by the form of the culture bottles and is not necessarily the position roots might assume in native habitats. Inter-specific variation in protocorm growth was described in the previous paper, and more variety has appeared in later growth stages of the same species. Leaves of most species are dark green except in the *Caladenia* cultures, which have failed to develop normal green structures: the leaves here are cream to pale green. Most plants of *Thelymitra, Caladenia,* and *Caleana* species have developed a single thickened, awl-like leaf while *Pterostylis* and *Spiculaea* species have produced a larger number of wider and thinner leaf blades.

Legend for figures: All seedlings are natural size. The number following the species name is my accession number, followed by seed collector and number of months seedlings have been in culture.

1. *Thelymitra* sp. 4126. L. I. Cady. 18 months.
2. *Thelymitra flexuosa* 4162. B. J. Dudman. 18 months. New shoot developing.
3. *Thelymitra ixioides* 4179. E. B. Mills. 18 months.
4. *Thelymitra fuscolutea* 4224. F. Coate. 16 months.
5. *Thelymitra nuda* 4178. E. B. Mills. 18 months.
6. *Thelymitra pauciflora* 4161. B. J. Dudman. 18 months. New shoot developing.
7. *Thelymitra rubra* 4196. B. J. Dudman. 18 months.
8. *Thelymitra rubra.* 4182. E. B. Mills. 18 months. New shoot developing.
9. *Caladenia carnea* var. *gigantea* 4181. E. B. Mills. 18 months.
10. *Caladenia carnea* 4163. B. J. Dudman. 18 months.
11. *Caladenia patersonii* 4156. E. B. Mills. 18 months.
12. *Caleana major* 4165. S. Clemesha. 18 months. Root buds forming.
13. *Pterostylis falcata* 4194 S. Clemesha. 17 months.
14. *Pterostylis nutans* 4160. H. C. England. 18 months.
15. *Microtis media* 4223. F. Coate. 14 months.
16. *Microtis unifolia* 4167. S. Clemesha. 11 months.
17. *Spiculaea irritabilis* 4259. S. Clemesha. 14 months,

FULL SCALE SKETCHES OF SEEDLINGS OF AUSTRALIAN TERRESTRIAL ORCHIDS, 11-18 MONTHS, AFTER GERMINATION OF THE SEED.



Root systems are highly specialized in most of these species. The first root which appears in *Thelymitra* and *Caladenia* produces numerous root hairs as it grows through the medium. It frequently develops a spiral as it grows and then begins to swell near the end. These swollen tips contain buds which have started growth in culture in some cases, and are now producing new shoots. The roots of *Caleana major* produce vegetative buds along the roots without accompanying corm-like swellings, at least at this stage of development. The root system of this orchid resembles that of the North American *Pogonia ophioglossoides,* which produces a wide-spreading root system and new shoots at considerable distances from the parent shoot. Roots of *Pterostylis, Microtis,* and *Spiculaea* at their present stage appear to function only as roots, and not as vegetative reproductive structures.

Plants of *Microtis unifolia* and *M. media* develop structures which draw the growing points downward into the soil. A long, thread-like leaf is initially produced from one end of each protocorm and this is followed by two slender roots from the vicinity of the leaf base. The tissues at the junction of the roots and leaf then elongate rapidly in such a way that the leaf is pulled downward. Plants of *Microtis unifolia* which have been potted in sand and peat mixtures for a month are now developing roots from this lowered growing point.

Spiculaea irritabilis seedlings have grown rapidly in culture, and their growth at this time is less specialized than that of the other species described here. Leaves follow each other in quick chronological succession, and roots develop from the leaf bases. No corm-like structures have been produced.

Seedlings of these Australian orchids exhibit a variety of growth forms, and several specializations for vegetative reproduction. More knowledge of these early growth stages, both under laboratory conditions and in natural habitats, should ultimately help in our attempts to preserve these unusual plants.

Footnote: I would like to correspond with anyone having access to ripe seeds of terrestrial orchid species. Any seed received here will be used for experimental growth of these highly specialized plants. I would also like to thank Dr. A. G. Norman of the University of Michigan Botanical Gardens for placing a controlled temperature room at my disposal.

COMMON SPECIES OF THELYMITRA — Continued from page 262

Australia and Victoria. It is a distinct species and very handsome.

Appears to like a well watered ground but still with good drainage.

A slender to robust plant to 45 cm. high. Leaf large and leathery ovate-lanceolate to oblong lanceolate. Flowers to 11 in a loose raceme yellow or yellowish brown, heavily spotted and marked with dark or red brown.

Perianth segments broad-oblong-lanceolate. Column with conspicuously fringed wings, forming a mantle on both sides of the club shaped dorsal appendage. Anther with a finer like appendage.

Dist.: W.A., S.A. and Victoria. *Flowers:* October to January.

6. *T. antennifera* (Gunn ex. Lindl.) Hook. f. "Rabbit's Ears"

A common species in its distribution favouring open forest country and heathland scrubs. Often emitting a rose like scent.

A slender plant to 23 cm. high. Leaf terete. Flowers to 3 pale yellow to deep yellow opening widely.

Perianth segments yellow inside sepals with red brown strip on exterior, elliptical or oblong elliptical. Column erect, topped by two erect brown spathulate appendages.

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

Flowers: August to November.

OTHER BOTTLE BRUSH FLOWERS



Continued from Page 250 — *"A Note on Bottle Brushes"*

The plants *Callistemon* already mentioned as usually bearing the common name of "bottle brush", belong to the large plant family *Myrtaceae*. Other Australian plants with a bottle brush type flower are closely related botanically, belonging also to this plant family, in fact, to the same division or sub-family of *Myrtaceae* known as *Leptospermeae*, and even further, to two of the sub-tribes of this sub-family, namely *Leptosperminae* and *Calothamninae*.

A common feature of all plants in these sub-tribes is the type of fruit or seed capsule. It is hard and woody with two or more compartments, which, when mature, splits along indefinite lines at the top into segments (or valves). These woody seed capsules usually stay on the bush until the plant dies or is damaged after which the seed is released, one of natures ways to try to preserve the species. If the older seed capsules are removed from the bush and placed in a warm dry position, they will shortly open and spill out the very fine seed for planting.

The sub-tribe *Leptosperminae*, comprises the genera *Agonis, Sinoga, Leptospermum, Kunzea, Callistemon, Lamarchea, Melaleuca* and *Conothamnus*.

The flower types are shown in the sketches above. It will be noted that in the first three, the petals are prominent or conspicuous in the flower, but in the remaining genera, which are the plants we are interested in on this occasion, the petals appear to be absent, and the stamens are the conspicuous part of the flower. It is when a number of these flowers are clustered around the stem, that the assembly of stamens from the many flowers, give a bottle brush type of flower head.

The sub-tribe *Calothaminae*, comprises the genera *Calothamnus, Eremea, Phymatocarpa, Regelia* and *Beaufortia*. Here again the petals are inconspicuous and the flowers, clustered on the stem, could give a bottle brush like flower-head.

Comments on a few of these genera follow before we proceed in greater detail with "bottle brush flowered" forms of *Melaleuca*.

MELALEUCA

Taken together, the size of the inflorescences and their terminal position make the genus distinctive. There is a general resemblance to at least two of the species of *Melaleuca* represented by the pictorial art of Miss Elma Ham in her sketches showing the diversity of the spike-bearing Melaleucas and close allies treated in previous articles. The two are *M. lateritia* and *M. elliptica*, for these also have conspicuous spikes of flowers and stamens above half-an-inch long. The two represent a well-defined group likened by name to *Callistemon*. i.e. the Callistemoneae. Inflorescences of this group are formed by new growth from the past season's growth, as shown by the sketches. More important, however, is the union of the stamens in five bundles, with filamentous parts (filaments) variously freed from the united part (the claw). On the other hand, stamens of *Callistemon*, although filamentous, are quite free except in the western C. *speciosus* and C. *viminalis* of the east where they are united in a short ring by their base. Thus, on the character of the stamens, the link of *Callistemon* and the series Callistemoneae is strong, suggesting an evolution from *Melaleuca* through the Callistemoneae to *Callistemon*.

There are other *Melaleucas* beside the *Callistemonene* group which have what may be termed a "bottle brush" inflorescence. In general, they rarely attain the same size of flower although the brushes are often long. Such members together with certain others not so "bottle brush" like, form the first part (Section A) of the *Melaleuca* series. Please turn to page 282 for more details.

LAMARCHEA

The monospecific *Lamarchea* of the west again is close to *Melaleuca* but here the stamens, although grouped in five bundles, are united to a single tube up to at least half the bundle length. The flowers are scattered singly on the past season's growth and the term Bottle-brush scarcely applies here.

CONOTHAMNUS

Conothamnus, also confined to the west, provides a link with a third Bottle-brush group, the Beaufortias. In *Conothamnus* the flowers are in terminal globular heads. The stamens are either in five clusters of three un-united filaments (2 species) or are united (1 species) as in *Melaleuca*.

Illustrated in colour on the top are *Calothamnus quadrifidus* and *Calothamnus sanguineas*, "one-sided bottle brushes". See page 270 for notes.

The lower photographs show *Melaleuca scabra* and *Melaleuca radula*. *Melaleuca radula* is described on page 271 and is an example of the bottle brush flowered *Melaleucas* of section A of the genus—see pages 282-6. *Melaleuca scabra* is an example of the flower type to be described in Section B of the genus in future issues.





Colour plates reprinted from "How to Know Western Australian Wildflowers" by W. E. Blackall and B. J. Grieve — by courtesy of The University of Western Australian Press.

The number of ovules per loculus, one only, separates the genus from *Melaleuca*.

KUNZEA

Kunzea are usually noted for their terminal pom-pom flower heads but one species in particular, *Kunzea baxteri*, shown in colour on page 272, has a very magnificent bottle brush type flower. The stamens are free in *Callistemon*.

BEAUFORTIA

In *Beaufortia* (15 western species) it is the anther which provides a generic distinction, although again the solitary-ovuled loculus is in evidence. The staminal arrangement is that of *Melaleuca* but, whereas the anther of *Melaleuca* is divided to two loosely-attached (i.e. versatile) lobes which open by longitudinal slits, the anther of *Beaufortia* is of two much smaller, parallel lobes which are attached to the filament by their base and open by a valve at the top. Blackall's "Western Australian Wildflowers" gives the names Sand Heath Bottlebrush *(B. squarrosa)* and Gravel Bottle-brush *(B. sparsa)*. Gardner mentions the latter as the vermillion-flowered swamp bottle-brush of the Albany-Denmark district. Flowers of the genus are in dense heads or short spikes.

CALOTHAMNUS

This brief sketch of the Bottle-brush group is not yet complete for the rather aptly-named "one-sided bottle-brushes" remain to be given attention. There are some two dozen of these, all confined to the west and united in the genus *Calothamnus*, and they also are noted for the richness in colour of their bloom.

Strictly, a botanic approach to *Calothamnus* from *Beaufortia* should be made through the western-confined genera *Phymatocarpus* and *Regelia* and, to complete the sub-tribe Beaufortiae typified by the Beaufortias, *Eremaea*. These, in the main, have the floral features of the Beaufortias and some could well qualify as Bottle-brush. To deal in detail with them, however, would involve too technical a discussion and they are left for a later date.

Editor's Note: Special reference must be made here of the hardiness and adaptability of the "one-sided bottle brushes", species of *Calothamnus*. Once established they will survive very poor conditions. They will repay any reasonable attention by thriving and flowering well. They should be cut back well if growing too well and will survive very severe pruning.

For summing the generic differences of what may well qualify as the Bottle-brush Group, we can do no better than follow the key of Bentham.

Stamens longer than the petals and indefinite in number, either free or united in bundles, opposite the petals. Leaves small or narrow, or rarely large and multi-veined. Flowers closely sessile.
Anthers versatile, with parallel lobes, opening longitudinally.
Stamens free or rarely united at the extreme base.
Flowers in spikes at first at the ends of the shoots.
Ovary 3 or 4-locular, with several ovules to each loculus .... *Callistemon*
Stamens united in 5 bundles.
Staminal bundles united high up in a tube .... *Lamarchea*
Staminal bundles distinct from one another for the greater part of their length.
Ovules several in each loculus .... *Melaleuca*
Ovules solitary in each loculus .... *Conothamnus*
Anthers erect, attached by the base. Stamens united in bundles opposite the petals, or almost free in some *Phymatocarpus* and *Eremaea*.
Ovules 1 to 4 per loculus, peltate and laterally attached
Anther-lobes opening at the top in transverse valves. Ovules 1 per loculus .... *Beaufortia*
Anther-lobes placed back to back, and opening outwardly in longitudinal slits. Ovules 4 per loculus .... *Regelia*
Ovules 2 or more per loculus, erect or ascending, linear or cuneate.
Anthers obovoid, the lobes back to back, opening outwardly in transverse valves. Ovules 2 to 4 per loculus. Leaves small, opposite .... *Phymatocarpus*
Anthers oblong or linear, the lobes parallel, turned inwardly, opening in longitudinal slits. Ovules per loculus several. Leaves long and narrow, alternate. Flowers unilateral .... *Calothamnus*
Anthers obovoid, the lobes back to back, opening outwardly in longitudinal slits. Ovules several. Leaves small, scattered. Flowers 1 to 3, almost terminal .... *Eremaea*

BOTTLE BRUSH MELALEUCA

— A RESIDUUM OF SPECIFLORAE

This series of articles on The Genus Melaleuca is continued by C. N. Debenham

The title of this present part is used to indicate that the remainder of the spike-bearing melaleucas (i.e. of series *Spiciflorae)* includes members not aligning readily either as a group nor to those groups already treated. A span from the west to the east coasts of the temperate sector of the continent is taken to link the species for, while the majority predominates in the South-west Province, two eastern members must be included. To some degree a parallel development is shown, e.g. M. *armillaris* is not unlike M. *hamulosa* in certain detail although widely separated by distance, and the second eastern representative has been considered a sub-species of a western parent but again disjunct from it in distribution. Nevertheless, most are summer-flowering, slender-branched shrubs up to 9 ft. high, qualifying for the euphony 'Honey Myrtle' which we in the east use perhaps with greater freedom than is warranted.

Along the narrow plain forming the south-west coast of the continent, ranging as far north as Geraldton and south to Flinder's Bay, occurs in varying intensity M. *heuglii*. In the north the plant commonly forms extensive thickets (R.R.) but southward it appears much more scattered. Its growth is erect and diffuse, sometimes reaching 12 ft. but more usually 3-6 ft. high, and its distinctive feature is the slender and dense spikes of mauve (almost purple) buds which forerun the white filaments of the opened flower during October to December. The spikes may be as long as 3 or 4 inches and reflect a slender and lengthy branching system. The bloom is of value as a source of pollen and nectar to the bee-keeper, who may know the plant as Purple-topped Tea Tree. Baron Charles von Huegel, an Austrian plant explorer, is honoured in the botanic name. He visited the Swan River Colony in 1833 and forwarded from here a collection, including this member, to Endlicher in Vienna, who published its first description.

While M. *huegelii* shows preference for the low limestone hills which characterise the south-west coast, M. *radula* within this area keeps to the granite-derived soils. It occurs as far north as the Murchison River and south to the Darling Range escarpment but is more an inland species. The granite soils extend well into the Eremaean and, wherever sufficient winter rain provides adequate moisture for shallow soils over the hard granite, in particular through the Northam — Merredin — eastward to Kalgoorlie transect, M. *radula* occasionally appears, often in some profusion. Diels (1905) in fact records an extension to the salt lake depression known as Lake Cowan.

The source of John Lindley's M. *radula* again is the Swan River area, the specimen being among Drummond's first collection there. The Latin *radula* implies roughness, and it was the roughening of the long, narrow leaf-surfaces by protruding oil-glands which appealed to Lindley. As a plant for cultivation, M. *radula* is well known. Its flowering in September to December of lilac, mauve or pure white bloom highlight a pleasing, graceful effect. Seldom are the flowers borne in regular spikes: they form pairs on either side of the shoot but most frequently the pairs are scattered. The fruit is distinctive for it is large, woody and smooth.

Within the inland tract of M. *radula,* mainly within the Cowcowing Lakes — Cunderin — Merredin area, disposed more to alkaline yellow sands, M. *laxiflora* has been noted. It is reported generally as a slender, up to 6 ft. high shrub, colourful in flower because of its reddish filaments, and has been catalogued as a subject for cultivation. Drummond's fifth collection

included the plant (but no precise locality was given) and his distribution of this collection initiated two independent validly published descriptions from the botanists of Europe. Turczaninow's description, however, predated Bentham's (as *M. crassifolia)* by more than ten years. In bestowing the names, Bentham appears impressed by the thickness of the leaves, while Turczaninow seems to have found the looseness of the spike distinctive.



Photo: W. H. Payne KUNZEA BAXTERI

Kunzea are very hardy shrubs that welcome garden conditions. See page 268.

In his classic memoirs of the western flora, Diels (1905) used as an example for *M. laxiflora* a collection by his co-worker Pritzel from the western boundary of the Avon district. Later (1920), Moore reviewed the botanic details of Pritzel's specimen and found them sufficiently divergent from *M. laxiflora* to base his *M. arenicola* (sand-dwelling). The major distinctions outlined by Moore are left to the key following but little can be added as to habit and habitat. If Diels refers specifically to the later-formed species, then a translation of his notes — 'Shrub up to 9 ft., erect and slender-branched. Flowers white, October. On alkaline yellow sand' — might apply to *M. arenicola*. Moore does not give such details.

The second species of Moore, *M. spicigera* (spike-bearing), was based on a Drummond specimen (no. 122 of his 1843 collection) but no field details are furnished in the diagnosis except an inference that the plant was









Photographs by Ron Hill

Melaleuca oldfieldi
Melaleuca lateritia

Melaleuca huegelii
Melaleuca incana

a bushy shrub. Mr. Royce generously has provided material which has been matched with the type specimen held at Kew and, in addition to being the model for the illustration, provides details (*viz.* fruit) not given in Moore's diagnosis. The source of the material is the vicinity of Lake Grace (within the eastern wheat-belt), the plant being found by W. E. Blackall in September, 1938.

Referring again to Diel's 'Phytogeographic Fragments of Western Australia' we find the note: Shrubs of amazingly profuse branching habits, from the distance comparable with certain Acacias, at times attaining the dimensions of small trees, comprise such species as *M. acuminata, M. hamulosa, M, uncinata, M. pauperifolia, M. thyoides* and others, either in pure stands or in admixture with foreign components, which give the character to the loamy Ereamean and especially there in the depressions and salt-pans frequently in soils rich in chlorides. This, then, is a background for *M. hamulosa,* a shrub which has occupied in extent much of the South-west Province and the southern Eremaean. The most westerly point noted by Diels is Dandaragan, a few miles west of Moora and well within the more temperate region. Present records indicate a greater prevalence within the Eremaean from about Mt. Churchman in the north, south to the Pallinup River, thence eastwards in decreasing occurrence to north (e.g. Coolgardie) and south (e.g. Dundas) of the extensive salt-pan systems of Lefroy and Cowan. Apparently the eastward course in the species' evolutionary history was much further than this for Ising (1956) notes a singular occurrence at Wudinna Hill in the Eyre Peninsula, about 1,000 miles from the western range.

Features of *M. hamulosa* include its dense, 1½ in. long spikes of white-coloured flowers (Oct.-Dec.) and the erect, slender-branched habit characterising the members of this section. No popular name appears to be in general use for the plant although doubtless some strictly local names have been applied. Turczaninow, in his naming of the species, referred to its hook-like leaf-tips.

A conjecture as to why such western species as *M. hamulosa* occupy outposts, in retreat as it seems, at great distances from their normal range has a basis in the geologic changes and consequent periods of extreme aridity and reconstruction of edaphic factors during the history of these species. In even more startling manner than that shown by *M. hamulosa, M. adnata* provides a further case. Should research, particularly genetic lines, reveal no more than has the morphological approach in fixing a demarcation between the western and eastern forms, then surely here is material for the plant geographer. The possibility that a parallel development has arisen from distantly-removed ancestors must not be overlooked, however.

The mapping of *M. adnata* (in its broad sense) indicates the possibility of a once transcontinental distribution which now is broken very markedly west and east except for a remnant within the Eyre Peninsula. Closest 'points of retreat' are the Victoria Desert in the west, and west of Bourke in the east. The small area within the Peninsula includes the location of Ising's discovery of *M. hamulosa,* hence a note of the conditions here would seem appropriate.

Black (1952) confines the extent of *M. adnata* in South Australia to north of Cowell, and between Kimba and Wudinna, districts within the 10-15 in. rainfall isohyets and typified by the mallee-broombush formation. The districts are largely of sand-ridges and flats, the soils — whether shallow red-brown earths, loams, or sand over hard clay — usually associated with limestone or at least high alkalinity. The basic rock of the Peninsula

is granite, but this is covered in the greater part with more recent deposits, including limestone. A theory has been advanced that deposition by prevailing wind of calcareous soils originally set down by marine flooding some 20 million years ago created the conditions for the development of the present mallee soils, so it is not improbable that the direct ancestors of both M.



M. huegelii



M. laxiflora



M. spicigera



M. radula

adnata and *M. hamulosa* found refuge here.

The true home of *M. adnata* (adnate, in relation of leaf to stem,) now is the sclerophyllous woodland of the Eremaean and South-west Province. The Murchison River is given by Bentham as a locality for Mueller's now-displayed *M. eleutherostachya* (freely spike-bearing) and this would be the most northward point, while possibly Northam is close to the southern limit. It is a complex species of at least two elements, in one (as shown by the sketch) the floral shoot is not extended as a normal leaf-shoot beyond the spike. The divergencies from the 'type' are not consistent enough, or known enough, to fix thresholds, and, for the present, *M. adnata* remains a complex demanding resolution.



Photo: R. Hill

MELALEUCA VIOLACEAE

More consistent, perhaps because of a more uniform and restricted environment, is the variety *aspera* of Cheel. It is within the species' range of form and may be simply an ecotypic variant, but it is relatively stable in the length and narrowness of the leaf besides the length of the slender spike. Moreover, at times it acquires the dimensions of small trees with a greyish or whitish, rather papery bark, points not evident with the western species. The varietal name *aspera* refers to the small protuberances raised from the leaf-surfaces and caused by protruding oil-glands, a feature noticeable



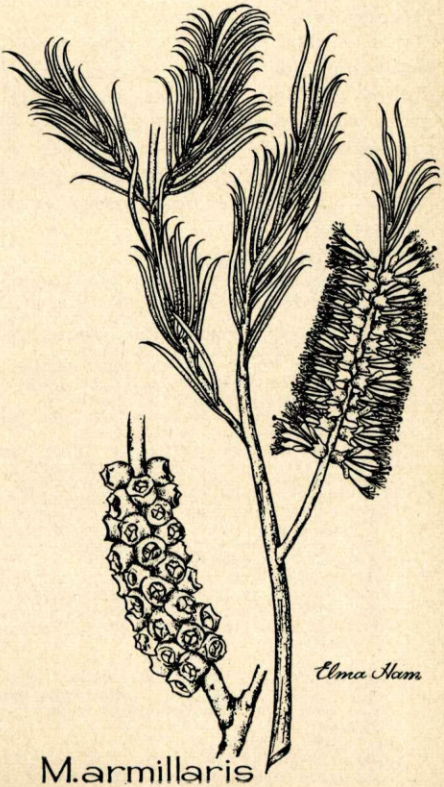
M. adnata



M. adnata var. aspera



M. hamulosa



M. armillaris

throughout the species. Known locations are Wanaaring on the Paroo, Bourke, Pilliga, Warialda, thence the Darling Downs of south-east Queensland, its habitats including clay pans and brackish swamps. December appears the main flowering time for both species and sub-species, the flowers are white-coloured.

With the closing of the present part, it is appropriate that the sojourn from west to east should end at the verge of the eastern coast. The salt-swept headlands are, in fact, home to the Bracelet Honey Myrtle and, although it has appeared a few miles inland from the shore, it is the sandstone escarpment from Port Stephens (further north,) to Green Cape in the south which provides the stronghold of the species.

Mention has been made already of the occurrence of species astonishingly isolated from their known range and the Bracelet Honey Myrtle is no exception. Bechervaise (1947) notes the luxuriant covering by melaleuca of the 'mile-square, Bass-like rock, of Rodondo Island, just eight miles south of Wilson's Promontory and an island described by Laseron (1954) as a monolith of red granite, rising almost sheer to 1,500 feet above the sea.' The melaleuca has been positively identified by Willis (1948) as the present species.

In its better-known habitat, this Honey Myrtle has also luxuriant thicket-like growth. Often it reaches small tree size and personal experience in its use as a sea-side shelter hedge has shown growth to be rapid. The plants forming this hedge soon acquired a single dominant stem and a pyramidal shape. Also luxuriant is the bearing in November and December of white-flowered spikes. Altogether a plant not to be overlooked, worthy as a representative overseas.

The link with our early history of the Bracelet Honey Myrtle is significant, for it was represented in the collections from the shores of Botany Bay by Solander and Banks. Solander's name (unpublished) was taken by Gaertner in his classic *De Fructibus et Seminbus Plantarum* (1788) as *Metrosideros armillaris* Soland. It remained for John Smith to place correctly and substantiate the name (meaning 'bracelet-bearing' in allusion to the bracelet-like appearance of the spikes) we know now so well as *M. armillaris*.

KEY TO THE SPECIES—

Shrubs, rarely small trees, erect and slender-branched, mainly of the western inland. Spikes well-developed (but not in *M. radula*) below a produced floral shoot (the shoot terminal in some *M. adnata*, the flowers predominantly white-coloured. Hairs present only in *M. spicigera* (short, ashen) and *M. adnata* (woolly).

Leaves spirally-arranged, or alternate *

Leaves opposite. In *M. adnata* close together and decussate ******

*Leaves oblong, oblanceolate or linear, not concave at base (which usually is narrowed) but sessile or almost so. **

Leaves ovate or ovate-lanceolate, the base broad and closely attached to the stem, acute, closely imbricate. *****

Spikes at least 30 mm. long, often dense. Leaves linear, acuminate, recurved at the tips, 1- or inconspicuously-veined, punctate with glands. *

Spikes below 30 mm. long, either dense when short (about 10 mm.), or loose when longer. Leaves oblong, oblanceolate, or linear. ****

***Leaves 5-15 x 1 mm., terete. Filaments white (or faintly pinkish), 12-15 from a claw longer than the free parts. Fruit 3-5 mm. dia., the orifice broad and rarely lined by persistent small sepals, in long slender and dense spikes.

E, E-K D (isolated) 74. *M. hamulosa* Turcz. (1847)

Leaves 15-25 x 1-1.5 mm., flat or sub-terete. Filaments white, 9-15 pinnately free from the upper half of a claw longer than the free parts. Fruit 3-5 mm. dia., the orifice broad and often lined by the teeth-like persistent small sepals, forming dense or interrupted spikes up to 80 mm. long.

C. (coast) 75. *M. armillaris* (Soland. ex Gaertn. Sm. (1797)

****Leaves 4-5 x 1-2 mm., flat, obtuse, mucronate, rounded at base, inconspicuously veined, thick. Spike abt. 7 mm. long, dense, somewhat globular. Filaments white, 10-12 free and slightly longer than the claw. Fruit 2-3 mm. dia., somewhat globular.

E. (east, inland) 76. *M. arenicola* S. Moore (1920)

Leaves 6-15 x 1.5-3 mm., flat sometimes falcate, obtuse, with a hook-like mucro, narrowed at base, thick 1-3 or obscurely veined. Spikes loose. Filaments

reddish, 20 or more free from the end of, and slightly shorter than the rather broad claw. Fruit 3-4 mm. dia., ovoid, with orifice somewhat contracted and at first lined by the short and broad, persistent sepals.
E (inland), E-K 77. *M. laxiflora* Turcz. (1852)

*****Leaves 2-6 x 1-2 mm., 3-5 veined. Spikes dense, slender, up to 75 mm. long. Filaments white, 6-12 at the end of, and shorter than the slender claw. Fruit 3-4 mm. dia., globular, in long dense spikes, the sepals not persistent. Buds mauve or purple.
E (coast) 78. *M. huegelii* Endl. (1837)
Leaves 7-10 x 4-6 mm. obscurely 3-veined, with an ashen down when young. Spikes 10-15 mm. long, somewhat loose, lateral and produced during late flowering. Receptacles 2.5 x 2 mm., pubescent; sepals shorter and acute. Filaments white, the free parts longer and pinnately-arranged on a short broad claw. Fruit 3-4 mm. dia., globular, the orifice contracted, sepals long persistent as minute teeth, in short dense spikes at the base of leafy shoots.
E (inland) 79. *M. spicigera* S. Moore (1902)

*****Leaves 4-12 x 1-3 mm., lanceolate to narrowly lanceolate, with a recurved point, rigid, decussate, amplexicaul, with inconspicuous venation. Spikes dense, lateral, from 10 to 40 mm. long on a woolly-haired shoot which is either developed beyond the spike or remains terminal. Receptacles about 1 mm. dia., campanulate; sepals obtuse, about the length of the receptacle, striate-veined. Filaments white or pale yellow, 12-15 free and slightly shorter than the broad claw. Fruit about 3 mm. dia., with sepals not prominent but persistent, compressed but distinct in long dense spikes up to 40 mm. long.
E, E-K, D. 80. *M. adnata* Turcz. sub sp. *adnata*
Leaves 8-12 x 1-1.5 mm., narrowly lanceolate. Spikes up to 45 mm. long, the shoot frequently produced during flowering.
B-H sub sp. *aspera* Cheel
Leaves 15-30 x 1-1.5 mm., linear, acute, narrowed at base and sessile, concave or with involute margins, with inconspicuous venation or the mid-rib obscurely visible. Flowers oppositely and usually distantly arranged, occasionally forming spikes towards the base or below the tips of the shoots, the shoot without hairs. Receptacles 3-4 mm. dia., the base truncate; sepals obtuse, much shorter than the receptacle. Filaments lilac, mauve or white, more than 20 free and longer than the narrow claw. Fruit usually scattered, 6-10 mm. dia., thick-walled, flat at base, becoming compressed globular, the orifice small, the sepals not persistent.
E, E-K 81. *M. radula* Lindl. (1839)

NOTE on use of common names: Mr. Royce (Curator, W.A. Herbarium) has drawn attention to a misconception we easterners sometimes hold in regard to the use of common names for western plants. In particular, Heath Myrtle (e.g. as listed for *M. huegelii* and *M. radula*) has no significance in W.A. hence use of the term in this text is restricted. Other valuable comment and continued support by Mr. Royce and Dr. B. Briggs (Sydney) are acknowledged with much gratitude.

GROWING MELALEUCA

This article is presented by I. Holliday and R. Hill, from considerable experience in South Australia, but will apply equally well to garden conditions anywhere in Australia. Reports from our members from all parts of Australia indicate that these fine garden shrubs are very adaptable and are most rewarding. This article adds to species already recommended by one of the authors in an article in our No. 10 issue.

The genus *Melaleuca* contains a vast number of trees and shrubs suitable for garden culture. The shrubby species, in particular, can be used to fill a whole shrub bed entirely with various Melaleucas and with very pleasing results. With careful selection they can be used to blend exceptionally well both in foliage and form and look attractive all the year round. Some species possess striking blooms, but this should not be a governing feature in their selection as the blooming period is relatively short, usually in spring time.

The following descriptions cover species which are known to be growing under varying conditions, either in the Adelaide region or in country areas in South Australia. Some of them have not been grown in more than a few isolated gardens and evidence of their adaptability to harsher conditions is not known. Most species, however, will grow successfully under a wide range of conditions. Although neutral to acid soils are generally preferred, many Melaleucas are quite successful on Adelaide's calcareous soils except, perhaps, in extreme cases such as the estuarine clays and coastal sand dunes of the beach areas. Artificial watering is appreciated but by no means essential.

Melaleuca armillaris (Bracelet Honey Myrtle)

An Eastern States species which has received favourable consideration

from local Council gardeners as well as private enthusiasts. An attractive small tree with dark green lacey foliage and numerous small white brush flowers in late spring. Grows well on most soils but resents dense limestone.

Melaleuca cardiophylla (Umbrella Bush)

A Western Australian sand plain species. A welcome addition to any shrubbery, growing about 6 ft. tall with dense ground cover and small white flowers in lateral clusters. Prefers acid or neutral soils.

Melaleuca cordata

A stiff shrub from the Western Australian sand plains and arid rocky soils, usually about 4 ft. high with shiny heart-shaped leaves and terminal heads of mauve or reddish flowers. Little evidence to date, but young plants are growing well on both acid and heavy alkaline soils.

Melaleuca densa

A Western Australian species growing 4-6 ft. high with small leaves and yellow flowers. Appears tolerant of most soils in Adelaide and being compact in growth is a useful species for the smaller garden. It often takes quite a few years to flower, from seed, but flowers are produced in profusion when it does.

Melaleuca erubescens

A tall shrub from the Eastern States, sometimes considered a variety of *M. ericifolia*, this plant produces reddish brushes and narrow leaves about ½ inch long. Tolerant of most soils it prefers a reasonably moist situation.

Melaleuca filifolia

A Western Australian sand plain species growing to about 6 feet high with long linear leaves to 3 or 4 inches, which bears terminal globular heads of large pink flowers with gold anthers, in spring and early summer. A choice plant which requires well drained neutral to acid soil.

Melaleuca halmaturorum (Kangaroo Island Paper Bark)

A coastal species from Victoria and South Australia usually inhabiting salt swampy areas where it forms large spreading trees to about 15-20 feet. Foliage is dark green which, during flowering, is covered with small creamy flowers. A most useful species for coastal planting and very tolerant of most soils.

Melaleuca hamulosa

A dry inland species from South Australia and Western Australia. Upright shrubs to 8 ft. or more high with fine, attractive foliage and small pink or white flowers. Does well on heavy alkaline clays as well as most other soils.

Melaleuca huegelii (Chenille Honey Myrtle)

A tall upright shrub from Western Australia which occurs on both coastal limestone and acid soils. White flowers are in long handsome spikes resembling candles. Does well in Adelaide gardens on most soils.

Melaleuca nesophila (Showy Honey Myrtle)

One of the large shrubs or small tree Melaleucas which occur naturally on Doubtful Island, Western Australia. A very hardy species which will grow in practically any soil or situation, but varying considerably in size according to conditions. At its best it reaches 20 ft. in height with branches to ground level. The flowers which appear at the ends of the branches in late November are globular, mauve with yellow anthers, and very lovely. The plant strikes very readily from cuttings.

Melaleuca polycephala

Lovely compact shrub to 6 ft. high from the Western Australian sand plains. Small leaves and dense heads, one of the very best Melaleucas when in bloom. Favours dry acid to neutral soils, but gives promise on clay limestone marls (pH 8).

Melaleuca polygaloides

Handsome medium-sized shrubs from Western Australia with soft green foliage and deep sulphur yellow terminal flower brushes about one inch long, which retain their colour well. One of the best yellow flowering Melaleucas. Prefers a light acid soil and plenty of summer watering.

Melaleuca pubescens (Moonah)

Common species in South Australia, Victoria and, to a lesser extent New South Wales. Occurring naturally along exposed coast line as well as dry inland areas. A handsome densely crowned small tree to about 15 ft. high which thrives on limestone soils and is particularly useful for seaside gardens. Flowers are numerous creamy white brushes.

Melaleuca radula

A Western Australian species growing to about 6-8 ft. high with linear leaves to about one inch long which bears pale mauve bottlebrushes during spring and summer. Some forms can be disappointing but a good form is outstanding. Tolerates most soils except those which are extremely alkaline.

Melaleuca scabra (Rough Honey Myrtle)

One of the best of the dwarfs from Western Australia, growing 2-4 ft. high which, in spring, covers itself with masses of deep pink terminal flowers with gold anthers. For massed or cover planting this is ideal and excites attention wherever seen in flower. Tolerates most well drained soils.

Melaleuca scabra* var. *trichophylla

This variety of the above species has glaucous foliage which is an ideal foil for the pink flowers that are produced in abundance during spring. Most well drained soils suit this lovely dwarf. Often found growing in association with M. *scabra* in Western Australia.

Melaleuca squamea

A tall growing species from the Eastern States and South Australia, mostly found growing under swampy conditions. Small leaves and handsome pink flowers make this an attractive species for growing in soils tending neutral to acid where an abundance of water is assured.

Melaleuca squarrosa

Another species found in similar situations to the previous one, but having large creamy yellow brushes and neat 'squarrose' leaves. A handsome plant for moist or damp situations or where water can be given during dry periods. This plant usually grows to a height of 8-10 ft.

Melaleuca styphelioides (Prickly Paper-bark)

From the Eastern States comes this handsome tree which is often found inhabiting low lying or swampy areas. In cultivation this species is tolerant of most soils, provided some water can be given especially in its younger stages. Small leaves, creamy flowers and a spectacular paper-bark trunk make this a useful tree for park and large garden planting.

Melaleuca suberosa (Cork Bark Honey Myrtle)

Small shrub seldom exceeding 2 or 3 feet in height, from Western Australia's south coast regions. Tiny alternate leaves, unusual corky branches and masses of purplish flowers clustered along the branches. Does well on acid sands and gives promise on the more alkaline clay soils.

THE GENUS MELALEUCA

Section A of the series concluded by C. N. Debenham

Treatment in serial form of the 150 or so Melaleucas follows a pattern in which there is an initial separation into two large parts. This issue completes the first part, Section A, which might well be called the "Bottle Brush" group because of the predominance of the spike or "brush" type of flowering. Section B could be the "pom-pom" group because here the predominant floral type is a globular head which remains in a terminal position during a large part of the flowering period.

The following sketches have been selected as representing the diversity in form of the *Melaleuca* treated in Section A. They are reproduced again by Miss Ham as a guide to what we may call the bottle brush group of *Melaleuca*. *Melaleuca lateritia* (Colour Plate on page 273) and *M. elliptica* are both from the series *Callistemoneae*, a group of *Melaleuca* closely related to *Callistemon* (see page 268). *M. thymifolia* is typical of the next group *Basiflorae* with a small head or cluster of flower along the previous season's branches (see colour plate on the front cover of our No. 10 issue.) *M. violaceae* shown in colour on page 276 is also of this group. *M. undulata* and *M. teretifolia* are also in the same group, in a further subsection for alternate leaved species. Other flowering forms are well illustrated in this issue on page 277 and the "claw flower" on page 290.

All species in Section A are listed over the page, grouped as they occur naturally. The terminal or "pom-pom" flowered species is represented by *M. scabra* on page 269 and *M. oldfieldi* on page 273, will be described under Section B in latter issues.

BOOK REVIEW

SHRUBS AND TREES FOR AUSTRALIAN GARDENS *by E. E. Lord* Price £7/7/0

A revised edition is now available following many years work by the author. Unfortunately the price has increased but this excellent book is of even greater value and in this case the price is a positive guide to quality and coverage. No effort has ben spared to make this book a complete gardening guide to every garden grown variety of shrub and tree likely to be met. The index contains over 6,600 names. Not only are the many exotic trees and shrubs from other lands fully described with full details of their cultivation but there is an exceptionally wide coverage of Australian native plants. Of special value are detailed lists and tables of recommendations for all conditions and purposes in the various Climatic Zone of Australia.

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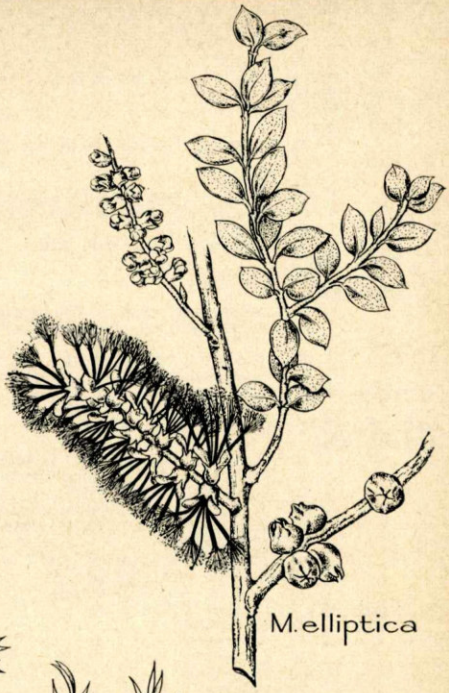
Australian Seed Co., Robertson, N.S.W. Bulk or packet lots. Stamped envelope brings lists.

Western Wildlife Supply, Gilgandra, N.S.W.—Bulk supplies of natives and exotic tree and shrub seed to the trade—Special collections to order.

King's Park Seed Supply, King's Park, Perth, Western Australia—Seed list 1/6 post free, seed 3/- pkt.



M. lateritia



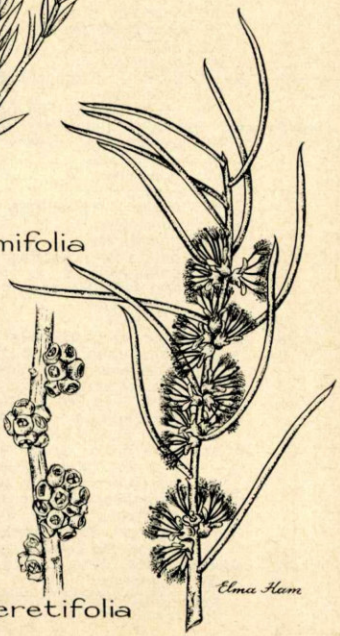
M. elliptica



M. thymifolia



M. undulata



M. teretifolia

Elma Ham

DISTRIBUTION OF THE MEMBERS OF SECTION A OF THE GENUS MELALEUCA
with some localities of sample populations

NOTE: Unless stated otherwise, where a species is listed for a region it can be taken that it is general for that region in greater or lesser frequency yet to be determined.

The regions follow the map appearing in Vol. 1, No. 10 and subsequently described in some detail.

THE EREMAEAN (interior and inland of the continent).

i. North West.
42. *lasiandra* (eastwards of the Kimberleys)

ii. North.
61. *bracteata*
64. *daleana* (type locality Connor's Wells)
63. *dissitiflora* (type locality between Bonney River and Mt. Morphett)
42. *lasiandra*
62. *linophylla* (e.g. Pine Hill)

iii. North East.
61. *bracteata*

iv. South East.
80. *adnata* var. *aspera* (Wanaaaring, Bourke)
66. *pubescens* (e.g. Lake Papilta)

v. South.
65. *corrugata* (type locality Mt. Woodroffe)
67. *monticola* (type locality Ernabella Creek, Glen Ferdinand)

vi. South West.
66. *pubescens* (e.g. Ooldea)

THE TROPICAL ZONE.

i. North West.
33. *alsophila* (e.g. Derby, Wyndham, Carlton)
41. *argentea* (type locality Kimberley)
63. *dissitiflora* (Kimberley)
32. *graminea* (type locality unknown)
42. *lasiandra* (type locality Upper Victoria & Fitzmaurice Rivers)
35. *leucadendra*
43. *loguei* (type locality south of Fitzroy River, Kimberley)
40. *nervosa* (e.g. Kimberley)
39. *saligna* (e.g. Kimberley)

ii. North. (i.e the "Gulf Country")
34. *acacioides*
61. *bracteata*
36. *cajuputi*
62. *linophylla*
39. *saligna*
48. *trichostachya*
37. *viridiflora*

North Tropical — Eremaean Interzone.
61. *bracteata*

iii. North Eeast. (Tropical coast and sub-coast, Queensland)
61. *bracteata* (including type locality Moreton Bay)
56. *cheelii* (type locality Traverston, Burrum River district)
47. *linariifolia*
40. *nervosa*
38. *quinquenervia*
48. *trichostachya*
37. *viridiflora*

North East Tropical — Eremaean Interzone. (Inland and Interior Queensland)
61. *bracteata*
48. *trichostachya* (including type locality Belyando River)

Sub-tropical Interzone (south-east Queensland and Far North Coast, N.S.W.)
80. *adnata* var. *aspera* (Darling Downs)
45. *alternifolia*
61. *bracteata*
46. *decora*
54. *irbyiana* (including type locality Casino)
49. *lanceolata*
47. *linariifolia*
66. *pubescens* (Darling Downs)
38. *quinquenervia*
53. *styphelioides* (south from Richmond River)
13. *thymifolia*

THE TEMPERATE ZONE

i. South East (coast and sub-coast N.S.W. and eastern Victoria)
45. *alternifolia* (south to Stroud)
75. *armillaris* (Port Stephens to Green Cape Rodondo Island)
61. *bracteata* (south to Stroud)
46. *decora* (south to Nowra)
9. *hypericifolia* (Newport to Bermagui, Mittagong, Wentworth Falls)
49. *lanceolata* (south to Broken Bay)
47. *linariifolia* (south to Jervis Bay, including type locality Sydney district, Lawson, Moss Vale, Hill Top)
50. *pauciflora* (south of Newcastle to Jervis Bay)
38. *quinquenervia* (south North Head, Sydney)
55. *squarrosa* (south of Georges River, Robertson, Mittagong)
53. *styphelioides* (south to Shoalhaven)
13. *thymifolia* (south to Ulladulla, Blue Mts., Mudgee, Gulgong, etc).

ii. South. (Central and western Vic., southern South Australia).
20. *acuminata*
80. *adnata* (Cowell, Kimba to Wudinna)
10. *decussata*

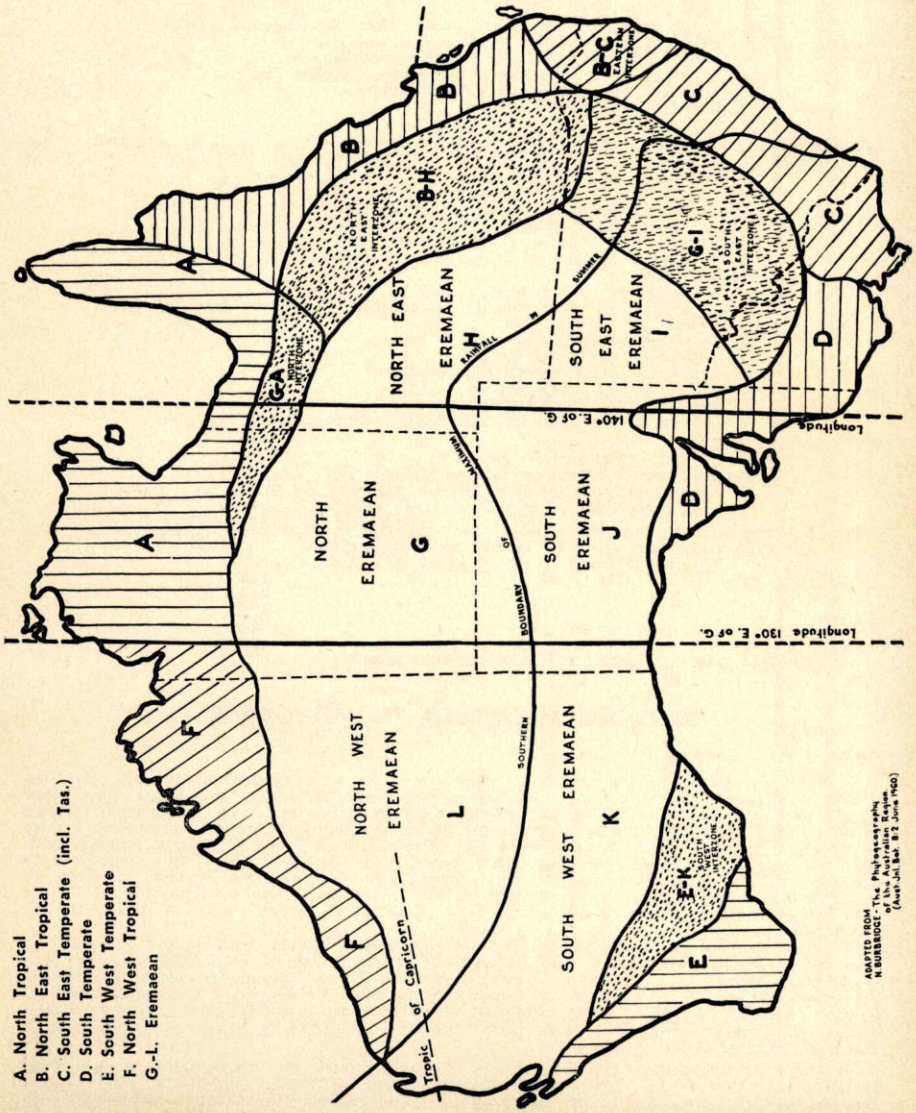
11. *gibbosa* (including Flinders Island and Tasmania)
74. *hamulosa* (Wudinna)
29. *neglecta* (the type locality Dimboola, Grampians, Torrens Gorge)
30. *oraria*
66. *pubescens*
55. *squarrosa*
16. *wilsonii*

South East Temperate — Eremaean Interzone. (north west Vic., western slopes and plains N.S.W.)

80. *adnata* var. *aspera* (e.g. Pilliga Warialda)
61. *bracteata* (south to the Warrumbungle Ranges)
66. *pubescens* (e.g. type locality Lachlan, Wyalong, Dubbo district)

iii. South West (South West Province, W.A.)

20. *acuminata* (e.g. Albany district)
80. *adnata*
26. *apodocephala** (*et affin.*)
76. *arenicola* (type locality western margin of district Avon)
15. *basicephala* (type locality unknown)



5. *blaeriaefolia* (type locality unknown)
2. *calothamnoides* (type locality Oolingera, Murchison River)
22. *cardiophylla* (including type locality Port Gregory)
73. *cliffortioides* (type locality Phillips River)
21. *depauperata* (e.g. Fitzgerald River)
3. *diosmaefolia* (type locality King Georges Sound)
6. *fulgens* (e.g. Albany district)
68. *glaberrima* (e.g. Ravensthorpe and type locality Middle Mt. Barren)
74. *hamulosa*
78. *huegelii* (south from Geraldton to Flinders Bay including type locality Swan River)
23. *lateriflora*
1. *lateritia*
77. *laxiflora* (e.g. Cowcowing, Cunderin, Merredin)
14. *leptoclada* (type locality King Georges Sound)
4. *macronychia* (e.g. Caroling, Merredin)
12. *platycalyx* (type locality Moore River near Wathroo)
52. *preissiana* (south from Murchison to Stirling Range)
66. *pubescens* (Rottnest Island, south and west coasts)
72. *pulchella* (eastward from King Georges Sound)
81. *radula*
51. *rhaphiophylla* (west coast south from Murchison)
25. *suberosa* (Cape Riche to King Georges Sound)
7. *steedmanii* (Watheroo, Irwin River districts)
31. *teretifolia* (e.g. Guildford, Serpentine, Harvey River)
24. *undulata* (e.g. Kelleberrin, Cowcowing)
17. *violacea*
19. *websteri*

South-West Temperate — Eremaean Interzone (including the "eastern wheatbelt" and "goldfields")

20. *acuminata* (e.g. Coolgardie)
80. *adnata*
18. *agathosmoides* (type locality Hatter Hill)
26. *apodocephala** (or *affin.*) (e.g. Queen Victoria Spring)
70. *conferta* (e.g. Nyabing)
8. *elliptica* (e.g. Fraser Range, Israelite Bay)
74. *hamulosa*
4. *macronychia* (e.g. Southern Cross)
72. *pulchella* (e.g. type locality Lucky Bay, Esperance, Israelite Bay)
81. *radula*
71. *seorsiflora* (type locality Mt. Ragged)
79. *spicigera* (e.g. Lake Grace)
69. *subfalcata* (e.g. Bremer Bay, Scadden)
24. *undulata* (e.g. Esperance)
19. *websteri* (e.g. Coolgardie)

*apodocephala here includes both *bracteosa* and *brevifolia.*

EXTRA-AUSTRALIAN

36. *cajuputi* (Malaysia to Burma)
44. *gnidioides* (indigenous to New Caledonia)
35. *leucadendra* (northwards through Malaysia to Burma and Indo-China)
37. *viridiflora* (New Guinea, New Caledonia)

Note: the number preceding the species refers to the position where treated in previous text. The numbers correspond to the issues as follows:-

Vol. 1,	No. 10	(March 1962). *Melaleuca* species	1-20
2.	13	(Dec., 1962)	21-34
	14	(March, 1963)	35-44
	17	(Dec., 1963)	45-56
	18	(March, 1964)	61-67
	This issue		68-81

(Due to error, numbers 57-60 were left vacant)

GROWING MELALEUCA IN MELBOURNE

FROM IVO C. HAMMET Melbourne—

Melaleucas could be grown almost anywhere. They seem to favour moisture, although I have seen some which tolerated dry places very well. *Melaleuca steedmanii* was rather erratic. Favourites amongst the smaller species were *Melaleuca scabra var. tricophylla,* purple to red flowers with gold tips—a hybrid cross between *M. fulgens* and *M. steedmanii* known as "Payne's hybrid"—*Melaleuca scabra,* 4 feet with terminal heads in shades ranging from pink to purple—*Melaleuca pulchella,* two forms, one upright about five feet and a prostrate variety—*Melaleuca wilsonii,* very showy with purplish red flowers, growing to about 5 feet and enjoying dry conditions round Inglewood, Victoria—*Melaleuca acuminata* with white brushes—*Melaleuca teretifolia* with deep pink flowers with an inclination to a weeping habit.

Other shrubs worth special mention were *Melaleuca radula* with purple flowers (cut back hard after flowering as it was inclined to become "leggy"),—*Melaleuca lateritia* with bright red flowers tolerating swampy ground as well as dry conditions; *Melaleuca megacephala* with cream flowers that did well on a hard dry hillside; *Melaleuca gibbosa,* pink flowered, growing well in swampy ground; *Melaleuca hypericifolia,* a quick grower with aromatic foliage and bright crimson brushes and *Melaleuca nesophila* growing to 10 feet with terminal heads of purple flowers.

Melaleucas were most reliable shrubs. To supplement the above notes a fine bush of *Melaleuca steedmanii,* 7 feet tall flowering from September until the winter time, growing in stiff clay and receiving drainage from under the concrete pavement was recalled. *Melaleuca acuminata* flourished in clay pans in the Little Desert, Victoria.

GROWING BOTTLE BRUSHES — Continued from page 255.

out. This is particularly so where a specimen is crowded and is forced to grow taller and more slender.

The Adelaide Botanic Garden has a very beautiful specimen of C. *acuminatus* growing under these conditions—a truly lovely slender tree with rich carmine pink pendulous brushes in profusion and rich green foliage.

There are four species of *Callistemons* which grow naturally in South Australia. C. *salignus,* which grows along the Torrens Gorge near Adelaide, C. *brachyandrus* from the Murray Mallee, C. *rugulosus* (syn. *coccinea,* syn. *macropunctatus)* which is found in low lying swampy country, usually sandy, and C. *teretifolius* from the dry north of the State.

All of these have been successfully cultivated in Adelaide gardens, although the plants of C. *salignus* would probably not have originated from the local form of this species.

C. *salignus* makes an attractive tree to 20 ft. high with cream flowers and very beautiful bright pink new growing tips.

C. *brachyandrus* has quite small brushes, red dusted with gold, and forms a medium shrub with prickly foliage.

C. *rugulosus* is also a medium to large shrub with prickly foliage but delightful large red brushes (sometimes carmine) tipped with gold.

C. *teretifolius* in the Flinders Ranges grows to only about 3 ft. high, somewhat prostrate, but in Adelaide will make a smallish shrub to 6 or 7 ft. high. The red flowers are numerous and attractive.

The two Western Australian *Callistemons,* C. *speciosus* and C. *speciosus* var. *phoenicius* or C. *phoenicius* as it is usually called, are also well known in Adelaide. Both have forms which undoubtedly possess the brightest red flowers of any of the species. The fiery red of some plants of C. *phoenicius* is breathtaking when viewed from a short distance away.

The well-known C. *citrinus* (or *lanceolatus)* from New South Wales is a commonly grown shrub, although many of the garden specimens now in existence are variants with C. *citrinus* probably a parent.

C. *viminalis,* the weeping bottle brush, makes a very ornamental small tree in Adelaide, quite successful in heavy clay or even beach sand. This species could be used more as a street tree.

Finally there is another *Callistemon* originating in South Australia which has attracted a great deal of attention. This is the so-called C. *"Harkness* Hybrid" or "Gawler Hybrid." This bottle brush first occured at Gawler, S.A., in a local garden. To date it has proved sterile, all plants having been propagated by cuttings and hence true to label.

This plant in bloom is a treat for any garden lover. The brushes are extremely long (up to 10"), bright red in colour, and prolific, often clusters of 10 to 12 brushes will emanate from the one point. Added to this is the soft weeping habit when in bloom, with the new growth (greenish bronze in colour) protruding from the ends of the flowers.

GALEOLA CASSYTHOIDES

An observation by Geoff Ward, Toowoomba, Qld.

L. P. Butt wrote a few notes on Galeola species, page 123, Vol. 2, No. 16. In September, 1963, I found a plant in full bloom in hilly country about 12 miles north of Helidon (Qld.) The "vine" straggled across about 3 ft. of ground to reach a dead Casuarina trunk, up which it climbed to a height of about 10 ft. The actual inflorescence covered the terminal 3 ft., this being on the western aspect of the trunk.

I returned to the site recently and found the dead remains of the "vine" still securely fastened to the tree trunk. I also found that a new "vine" had emerged from the ground in the same position as last year and after straggling across the intervening 3 ft., it had already climbed about 5 ft. up the *Casuarina* trunk this time on the eastern side. It looked like confining its growth to the same height as last year. I shall be happy to have any one who wishes, accompany me on my return pilgrimage to see this amazing flower again this September.

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The Claw Flower and its Allies of the Heath

This small group is drawn from members confined to the heath of the south coast, South-West Province. Features shared are the dwarf habit (rarely over 3 ft. high), rather crowded and spirally-arranged leaves (seemingly almost decussate) and a general reduction in inflorescence. The group should prove of interest to the small-garden or large-pot-plant enthusiast for the majority have brightly-coloured flowers in addition to a small stature.

Our key member, the Claw Flower, takes its name from a curiously distinct flower, a minor change in form occasionally displayed by the florally-stable *Melaleuca*. Its five long staminal bundles curve, hook-like, towards the centre of the flower, an effect suggestive of a clasping claw or talon. But equally distinctive is the absence of the spicate inflorescence which typifies its botanic series. A solitary or few-flowered inflorescence is a key feature of the group, although it is not absolute for all.

For the group, the Claw Flower has the greatest representation as it is dispersed over much of the coastal heath, its boundaries approximating King Georges Sound near Albany, and Israelite Bay to the east (material for the sketch is from Esperance). Gardner (1942) remarks that the sand heath is the real home of the indigenous flora of the west. While the heath is scattered throughout the South-West Province wherever soil is of a sandy nature 'whether a loose detritus or the more compacted yellow or red sand of the interior', the present area and that between the Hill River and the Murchison contribute the bulk of true indigens. This is accounted for, at least partly, by the sharp separation from the conditions of the surrounding Eremaean. The sand heath formation of Gardner typically merges into a band of dwarf *Melaleucas* interspersed with a few mallees which increase in intensity until the open woodland is reached (in this case, the sclerophyllous woodland). From the woodland to the Bight, whether in the sub-coastal hills or at sea-level, occur in varying intensity the Claw Flower and its immediate allies — true dwellers of siliceous sands. The inference must not be taken, however, that they are unique among melaleucas either as psammophytes or as indigens of the region. Several (e.g. *M. diosmaefolia, fulgens, elliptica, suberosa, basicephala)* already have been mentioned and several more will follow, these species of the southern heath. One further observation of Gardner with interest here is the possession by the heath shrubs of very deep rooting systems. To quote 'It is not uncommon to find shrubs less than 15 cm. high with a root system extending to a depth of over 60 cm. Most of the plants have a strong primary vertical with deep horizontal secondary roots, the tap-root being as a rule remarkably strong, with a fibrous cortex.'

In referring the Claw Flower to its correct botanic name, we have two points of view. It has long been known as *M. pulchella* from the time Robert Brown gathered and described material from Lucky Bay. It is included (as *M. pulchella)* in the Prodromus of De Candolle but here is equated with a name given by the compatriot, Du Mont de Courset, in his Le botaniste cultivateur (Vol. 5. 1811). Hence corroboration of De Candolle's view and alignment with the present laws of nomenclature may necessitate displacement of the familiar *pulchella*. Both names have pleasant associations— beautiful *(pulchella)* and thyme-leaved *(serpyllifolia)*. The plant already is established in horticultural favour for its dwarf habit, unique and bright pink flowers (Oct.-Nov.) and ease in cultivation.

Apart from staminal detail and leaf-shape, M. *conferta* (dense, in reference to its branching habit) has much in common with the Claw Flower. Its range, however, is much more restricted. The model for the illustration came from a few miles north of Nyabing (south of Lake Grace), the plant flowering in September when no more than 18 in. high. In fixing a type locality, not much help is given by Bentham's citation 'in the interior, J. S. Roe.' A reasonable guess would be a similar location as that of the model for the vicinity was *en route* for Roe's 1848 expedition from Perth south-eastwards to the rivers Pallinup, Fitzgerald and Phillips when about 2,000 miles were traversed in seach of new grazing lands. The early development of the south-west was much influenced by this first Surveyor-General of W.A. (John S. Roe) and, *inter alia*, we are told that the holding in reserve of land which we know now as King's Park was due primarily to his foresight.

The river Gardner flows by the hills of Mt. Barren at a few miles from the coast and from this vicinity the botanic collector Maxwell brought back two plants to which F. von Mueller gave the names M. *brachystachya* (short spiked) and M. *glaberrima* (quite glabrous), the first from near the river and in the valley north of West Mount Barren, the second from Middle Mount Barren. The names are appropriate enough for both bear short but distinctly spicate inflorescences, but only the second is completely without hairs. Equally distinctive is the name *subfalcata* which now displaces *brachystachya;* it alludes to the frequent vertical curvature of the leaves (i.e. they are often semi-falcate). One of the suites of specimen which Drummond made available to the botanists of Europe was acquired by the Russian Turczaninow and his published description was earlier than that of Mueller, so M. *subfalcata* must stand.

The source of the illustrations for both M. *subfalcata* and M. *glaberrima* is material derived from a more easterly point than the Gardner River — near Esperance (or precisely 2 m. south of Scadden) for M. *subfalcata* and the Ravensthorpe district for M. *glaberrima*. Both plants were flowering in November. A point of note for M. *subfalcata* is the length of the staminal bundles, almost half an inch long. Not a great deal is known about the species in cultivation but it would appear to have a high potential as a garden subject.

From the colourfully-flowered members, attention must now be given to the white-flowered M. *cliffortioides (Cliffortia*-like, i.e. resembling in appearance some of the heath-shrubs of the South African *Cliffortia)* and M. *seorsiflora*. The latter name alludes as does the previously-mentioned M. *dissitiflora,* to the distantly-placed flowers along the shoots. The M. *cliffortioides* of Diels (also solitary-flowered) came from the vicinity of the Phillips River near Ravensthorpe and occurred as a low, bushy shrub about 3 ft. high, flowering in October. Mueller did not know the shape and stature of his M. *seorsiflora* from Mt. Ragged of the Russell Ranges just west of Israelite Bay, and forwarded to him by a Miss S. Brooke. He was impressed, however, by the strong odour of the plant which reflected its 'anti-septic value.'

KEY TO THE SPECIES

Shrubs, rarely above 1 m. (3 ft.) high, endemic to the south east and sub-coastal ranges of the south-western province (W.A.). Leaves spirally-aranged, closely set, rigid, erect, or recurved with inconspicuous venation (striate-veined in *M. cliffortioides*).
Flowers several close together and forming spikes 2-4 cm. long, at first at the ends of short lateral shoots which are produced during their development. Filaments pale-red. Leaves linear. *
Flowers solitary (or, in *M. conferta*, 2-3 together), axillary on lateral terminal shoots. Filaments pale-red or white. Leaves linear, ovate, or elliptical. **

* Leaves 4-6 x 1.5 mm., flattened or somewhat terete, erect or recurved, obtuse or with a minute point. Floral receptacles about 3 mm. dia., campanulate, glabrous, much longer than the obtuse sepals. Filaments 8-12 at the end of the broad claw



M. pulchella



M. glaberrima



M. conferta



M. subfalcata

about as long as the free parts. Fruit 3-4 mm. dia., globular, the orifice contracted and at first lined by the obtuse but very short sepals, forming loose spikes. E (south)

68. *M. glaberrima* F. Muell

Leaves 15-20 x 2 mm., flattened, erect or sickle-shaped, acute, densely silky-pubescent when young. Floral receptacles about 2 mm. dia., truncate at base, densely silky-haired, about as long as the somewhat pointed sepals. Filaments 20 or more, up to 12 mm. long, at the end of a narrow claw shorter than the free parts. Fruit 3-4 mm. dia., ovoid, the orifice somewhat contracted and at first lined by the prominent sepals, forming dense spikes.
(E (south)

69. *M. subfalcata* Turcz. (1852)



Photo: R. Hill

MELALEUCA PUCHELLA

Leaves linear, somewhat terete *
Leaves ovate or elliptical. ****

***Filaments pale red 20 or more from a claw shorter than the free parts. Leaves up to 5 x 1.5 mm., obtuse and minutely pointed, erect or recurved, greyish-green. Receptacles 2-3 mm. dia., urcedate, the base enveloped by ovate herbaceous bracts more persistent than in other species, longer than the ovate sepals. Fruit 5-6 mm. dia., globular but somewhat flattened at their base, the orifice not constricted and the sepals not prominent on the rim.
E (south coast), E-K. 70. *M. conferta* Benth (1866)

Filaments white, 10-14 from a claw shorter to as long as the free parts. Leaves 6-12 x 1.5 mm., obtuse. Receptacles somewhat cylindrical, about 2 mm. dia. and three times longer than broad, longer than the pointed sepals. Fruit not described.
E-K (south coast, restricted) 71. *M. seorsiflora* F. Muell (1886)

****Filaments pale-red, 10-15 forming a talon-like, inwardly curved 12 mm. long bundle, the free parts shorter than the long, broad claw and mostly concentrated below its end and then shorter than the terminal free parts. Leaves 3-5 x 2-3 mm., obtuse recurved. Receptacles 3-4 mm. dia., the base truncate, without hairs, about the length of the pointed sepals. Fruit 7-8 mm. dia., globular-urceolate but truncate at base, surmounted by prominent long-persistent sepals.
E (south coast) 72. *M. pulchella* R.Br. (1812)
M. serpyllifolia Dum.-Cours. (1811) on authority of D.C.)

Filaments white, about 12 forming bundles about 12 mm. long, the free parts about the length or slightly longer than the claw. Leaves up to 25 mm. long, pungent-pointed, recurved. Receptacles about 3 mm. dia., finely haired, longer than the pointed sepals. Fruit 5-6 mm. dia., the sepals prominent and persistent.
E (south coast, restricted) 73. *M. cliffortioides* Diels (1905)

THE SOCIETY FOR GROWING AUSTRALIAN PLANTS
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YOUR JOURNAL FROM THE EDITOR—

This issue completes Volume 2. We have come a long way since we first started but I am far from satisfied. It became obvious early that the correct naming and description of our wild flowers was essential to stem the growing tide of confusion. The professional Botanists from all parts of Australia have rallied most enthusiastically and our journal has become a valuable bridge between the professional and the layman.

The correct page size is 32. We have added an additional 8 pages per issue, usually in supplement form for these plant taxonomic reviews, so those who are ever ready to classify our publication as too technical should, in fairness, remove 8-10 pages and then look a little closer. However, we need more simply presented articles. Please send in those small tit-bits of information about wildflowers and how they grow. They are of invaluable assistance. Please do not leave it to the next person. Below are a few suggestions.

FROST HARDY NATIVES:

A severe problem to many growers is frost. What plants have you found can survive through severe frosts?

AUSTRALIAN PLANTS FOR GARDENS NEAR THE SEA:

Those who live near the coast know only too well how difficult it is to have a garden that will defy rigorous conditions that can occur. Under the book review section elsewhere in this issue, reference is made to an excellent book on this subject from America. As described in this book many Australian native plants are ideally suited for these conditions. Will all readers living near the sea please give me a few details of any plants they have found to flourish or even survive the hardships imposed by nature.

MULCHING THE NATIVE GARDEN:

Two years ago we had an issue featuring the mulching of gardens. Will any reader who has had experience in this regard, please send in a few details. It is not generally realised that correct mulching is essential for most of our native plants.

GROWING NATIVES IN CLAY OR HEAVY SOIL:

Many readers consider that they cannot grow wildflowers because the soil in their garden is too heavy. Little do they realize that they could have a considerable advantage over the people with the misfortune (?) to have a light sandy soil. We plan an issue on this subject. I would like all owners of native gardens with heavy soil to advise me how they grapple with this problem and the range of plants that they find successful.

GROUND COVERS:

Plants that give good ground cover are much sought after for various purposes. Will readers who know of a good ground cover plant, please advise the Editor of details.

SMALL PLANTS FOR ROCK GARDENS:

It is possible to form beautiful minature gardens with wildflowers. Many exquisite natives are quite small plants. Will readers plase advise me what plants they would recommend or details of their small garden plants. We plan a special issue on this subject.

NATIVE ANNUALS:

Spring is here! If you look around, you will find that some of the most floriferous wildflowers are annuals. The last issue featured our everlastings and daisy plants. Another more colourful issue is planned. Can you contribute a few notes on the annuals you have grown?

PHOTOGRAPHERS:

Our No. 18 issue gave details of our Photographic Competition. I desperately need good colour slides of wildflowers so whether you want to enter a competition or not please take as many photographs as possible and send them to me. I will return them promptly after inspection.

WILDFLOWER SHOWS

Each spring there are special showings of wildflowers. This society supports only those shows that exhibit wildflowers that have been garden grown and actively campaigns against the picking of wildflowers from our bush. The shows listed below are by reputable organisations whom we believe, agree with these views. Australian wildflowers make excellent garden subjects and often ideal cut flowers and the exhibition of garden grown blooms, will, we hope encourage more people to cultivate them in their gardens. On page 282 you will find competent, reputable nurserymen listed who have, by careful selective propagation, produced from the best forms of wild flowers, plants that will adapt to garden cultivation.

"Australian Wildflowers and Ikebana"

An excellent exhibition of flower arrangement, using wildflowers, in the modern Japanese or Ikebana style will be given at the Georges Gallery, 162 Collins St., Melbourne, from September 16th to 23rd. Flowers will also be adequately named.

Other Wildflower Shows:

West Australia: Perth—Kings Park, September 12th and 13th—Special competitive exhibition.
West Australia: Perth—September 19th-20th—Armadale Hall, Armadale.
Victoria: Melbourne—August 31st-Sept. 2nd—Lower Melbourne Town Hall.
N.S.W.: Sydney—September 9th-12th—Anthony Horderns Main Gallery.
South Australia: Adelaide—October 17th-18th—Community Hall, Main Road, Belair.

CORRECTIONS

THE GENUS ERIOSTEMON — Part 5. Correction to Issue No. 18, Page 180-181, Vol. 2. Delete the first line commencing with L and concluding 16. *E. linearis* on Page 180 and the two top lines on Page 181 commencing with P and concluding Q, T, and add on top of page 181:

P. Stems more or less tuberculate. Filaments concealed by long hairs. 16. *E. linearis*
P. Stems glabrous, usually tuberculate. Filaments with hairs, but not concealed Q.
P. Stems downy or hairy, not tuberculate. Filaments with hairs but not concealed T.

Rear Colour Plate of Issue No. 18, Page 208, Vol. 2. A form of *Boronia pinnata* is shown not *Boronia ledifolia* as named.

SPOTTED SUN ORCHID



Colour Photography by Frank Hurley *Block by courtesy of John Sands Pty. Ltd.*

THELYMITRA IXIOIDES

Sun Orchids are some of our loveliest native terrestrial orchids with a colour range from white through green, yellow, pink, purple, reds, blue and in some cases variegated. The flower size is often up to 1½ inches across. The common species are described on page 261 and a special article on their cultivation appears on page 260.

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