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Colour Photography by Frank Hurley

Blocks by courtesy of John Sands Pty. Ltd.

THYME HONEY-MYRTLE — *Melaleuca thymifolia*

A lovely dwarf shrub up to 3 feet, flowering profusely when only one foot high if well watered in summer. Suitable for loam, sand or gravelly soils, doing best in clay heavy soils or even swampy conditions.

MELALEUCAS IN CULTIVATION

By A. E. BROOKS

One of the most successful of all *Melaleucas* under garden conditions is the red honey-myrtle or Hillock Bush (*M. hypericifolia*). Often found growing under exposed conditions along the New South Wales coast and tablelands this plant seldom grows more than about eight feet so that it is not too large for most gardens. The flowers are orange-red brushes which are produced freely in late spring or early summer. The new growth is pendulous and as this species will stand hard pruning it is not difficult to keep it growing as a compact bush six or eight feet high and about the same distance across. And what more can we expect of any plant? Another name for this plant is red-flowering paperbark.

Scarlet Honey-myrtle (*M. fulgens*), Steedman's Honey-myrtle (*M. steedmanii*), a hybrid (by F. C. Payne), and the brick-red flowered Robin Red-breast Bush (*M. lateritia*) compare in the garden with their brilliance in springtime but the Showy Honey-myrtle (*M. nesophila*) is one of my favourites. It grows into a large shrub or small tree making a wonderful display of small mauve brushes around Christmas time and there is life in the compact dark-green foliage.

Shrubs or trees which have pleasing foliage throughout the year are more desirable in the garden than those which are grown only for spectacular flowers produced during a short season. If the two features can be combined then we certainly have a very desirable plant. Few plants provide more attractive foliage than the Grey Honey-myrtle (*M. incana*). The light-coloured hoary foliage provides a delightful contrast to the darker greens of other plants. In spring this shrub has a bountiful supply of small lemon-coloured brushes. It should be in every garden.

The last two species were from Western Australia but Bracelet Honey-myrtle (*M. armillaris*) grows in N.S.W. and Victoria. It is another species with pleasing foliage of much darker green than the Grey Honey-myrtle. It grows to the stature of a small tree and although the brushes are usually cream-coloured they are sometimes tinged with mauve. Although common near Mallacoota in Eastern Victoria it is highly esteemed for planting in the Wimmera in Western Victoria where it must withstand dry summer conditions.

One of the most delightful small melaleucas is certainly the Claw-flower (*M. pulchella*) in which each "petal" resembles a small claw.

Two other species, also from Western Australia like the last, which are worth special mention are Graceful Honey-myrtle (*M. radula*) and Rough Honey-myrtle (*M. scabra*). The first has flowers of delicate mauve which, however, fade to a much less pleasing colour; the second has really delightful flower-heads. Variety *trichophylla* has flowered profusely in my garden for years. So many beautiful purplish flower-clusters sprinkled with golden pollen show above the foliage that this small, compact shrub when in bloom is a sheer delight.

Crimson Honey-myrtle (*M. wilsonii*), which is common around Bendigo, is also worth special mention because of the attractive way in which the flowers of unusual colour grow along the stems. Cork-bark Honey-myrtle (*M. exarata*) from W.A. is another species which has this peculiarity.

EDITOR'S NOTE— A *Melaleuca* Study Section is being formed under the competent leadership of Mr. A. L. Hargrave, 13 Brynmawr Rd., Camberwell, E.6, Victoria. Readers wishing to grow these easily cultivated, rewarding plants and exchange seed should contact him. For all other readers, the dispatch to Mr. Hargrave of flowering specimens of *Melaleuca* growing naturally in your area, will assist presentation of our *Melaleuca* articles.

TEA-TREES, PAPERBARKS AND MYRTLES

C. N. DEBENHAM—Museum of Applied Arts & Sciences, N.S.W.

History tells us that the qualities of James Cook as leader of successful exploratory voyages were demonstrated by his concern for the health of his crew. His encouragement of the use of fresh vegetable products, whenever procurable, resulted in relative freedom from the dread disease of long voyages, scurvy. One of these products, infused from the leaves of a plant taken from Dusky Bay in New Zealand, provided a kind of tea and, when brewed with leaves of a spruce species, found favour as a beer. Other native plants were put to similar uses by the early colonisers of the Australian mainland and so the name tea-tree became established for many species of heath-like shrubs and trees, the foliage of each yielding, in greater or lesser measure, an ethereal oil. Some of these tea-trees and their allies develop strikingly beautiful spikes of flowers and became known as bottlebrushes, others develop a thick, spongy, decorticating type of bark and so were called paperbarks while others acquired the general designation myrtles.



EDITOR'S NOTE—There is a great deal of confusion over this group of plants which are shown in the above sketch. For those who are interested, and I know there are many keen to learn, Mr. Debenham has introduced us to the large family of plants Myrtaceae, page 17, the tea-tree group of plants shown above, page 19, and commences a treatment of the genus *Melaleuca*.

MELALEUCAS — Shrubs for Wet Conditions

MELALEUCAS IN SOUTH AUSTRALIA BY I. G. HOLLIDAY

Of the *Melaleuca* species described by C. N. Debenham in this issue, *Melaleuca acuminata*, *M. decussata*, *M. elliptica*, *M. gibbosa*, *M. hypericifolia* and *M. wilsonii*, could be described as extremely hardy shrubs which can be expected to succeed in any reasonable soil and situation. They all respond to summer watering, although once established, withstand dry conditions very well. They all flower in October to November in Adelaide.

Melaleuca wilsonii which is usually found in sandy soils, makes an ideal bushy garden shrub to 5 or 6 ft. high in the heavy red brown earths of the Adelaide plains. If cut back beyond the flowers each year directly after flowering it never becomes straggly or "corky looking" as it does in nature. This treatment ensures a handsome, free flowering, bushy evergreen shrub for years. In flower it is a delight, the deep mauve-pink blooms cluster along the branches for lengths of 2ft. making this *Melaleuca* one of the showiest of them all.

Melaleuca acuminata grows in association with *M. wilsonii* near Coonalpyn, S.A., and is very similar in its flowering habit, size, and general hardiness, although it is not so densely branched. The flowers cluster along the branches in the same manner but are cream in colour. If a cream or white *Melaleuca* is required for the garden, *M. acuminata* could well be a good choice.

Melaleucas decussata and *gibbosa* are very similar fine leaved handsome shrubs varying from 4 to 10 ft. high according to conditions. The flowers are small mauve brushes which rapidly turn to white. The general aspect of a bush in flower is of a profusion of white to mauve brushes and is quite pleasing. Some forms of *M. decussata* are particularly good, whilst others are almost insignificant.

Both shrubs are common along sandy water courses and would probably withstand quite wet conditions, although they are quite hardy under relatively dry garden conditions (20" or less rainfall and no artificial watering).

Melaleucas elliptica and *hypericifolia* have large red brushes very much like callistemons or bottle brushes, but not so prominently displayed. They are both useful hardy garden shrubs quite variable in size according to conditions. I have seen specimens of *M. hypericifolia* nearly 20 ft. high in Adelaide. This *melaleuca* is a very commonly grown garden shrub. Its foliage, which can be used all the year round for interior decoration, is its chief attraction.

Melaleuca elliptica could be bracketed in the small shrub group. Although sometimes reaching 10ft. or more it is so sparsely branched that it can easily be kept much smaller if desired. Some of the dark red forms are very attractive.

Melaleucas fulgens and *steedmani* are very closely related and often look identical to the untrained eye. An examination of the flowers shows that in *M. fulgens* the stamens are fixed to the edge or side of the flower claw, whereas in *M. steedmani* they appear from the surface or front of the claw. Physically the flowers of *M. fulgens* are often a little larger. Both have delightful flowers, quite large red brushes tipped with gold. They both seem to need similar growing conditions and are quite successful on variable soils provided they are not too alkaline. Despite this alleged dislike for alkaline conditions *M. steedmani* has been grown successfully at Port Augusta in the dry north of South Australia on alkaline soil (pH9).

They make handsome little shrubs, perhaps a little stiff, but easily controlled as to size requirements.

Continued on Page 29

EMU BUSHES — Shrubs for Dry Conditions

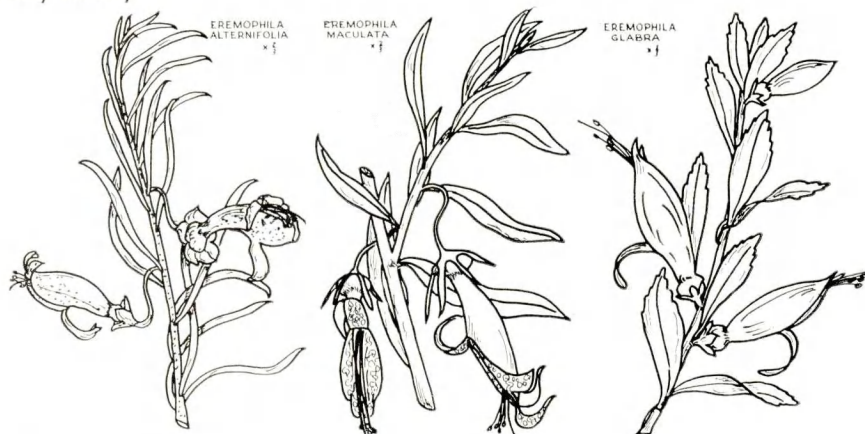
SOME SOUTH AUSTRALIAN EREMOPHILAS BY R. HILL

Whilst on a recent plant collecting trip to the Western Districts of South Australia, I saw many plants worthy of trials as garden plants, particularly in the drier areas of the State. However, none appealed to me more than the *Eremophilas* of which a wide variety was seen, all of them growing under similar conditions. These conditions which would probably prove fatal to many of our choice native plants prove the opposite to most of the *Eremophilas*. These include low rainfall, very dry atmospheric conditions and either sand on limestone or just limestone itself, as a growing medium. Such conditions I am sure would occur in parts of Western Queensland, Western New South Wales, the North Western corner of Victoria, a big portion of South Australia and inland Western Australia. In these areas I am sure many *Eremophilas* would make ideal garden subjects and this genus also warrants trials in all parts of Australia. Most of the species are non-existent under cultivation but because of their attractive appearance and drought tolerant characteristics deserve a place in our gardens.

Various species seen are listed below.

Eremophila alternifolia

A shrub growing to a height of 6-8 feet with terete, alternate leaves and large tubular flowers about 1 inch in length varying in colour from deep pink to cream. This species is widespread in South Australia. At the head of the Bight in South Australia limestone cliffs are its choice of soil and near Eucla in Western Australia the soil is sand and limestone. It is also found in many localities in the Flinders Ranges, north of Adelaide. In the Botanic Garden in Adelaide this species grows very easily on fairly heavy loam containing limestone and hardly a day goes by when it is not found in flower. In Adelaide cuttings appear the easiest method of propagation and these strike very readily.



Eremophila maculata

Already widely grown by native plant enthusiasts this attractive plant reaching a height of 3-4 feet with yellow to red spotted tubular flowers and green lanceolate leaves is found in many localities in South Australia, some of which are the Nullarbor Plain, Lake Eyre country, Flinders Ranges and most of the far north of the State. This plant is often seen in gardens, particularly in northern towns such as Port Augusta, Port Pirie and Whyalla.

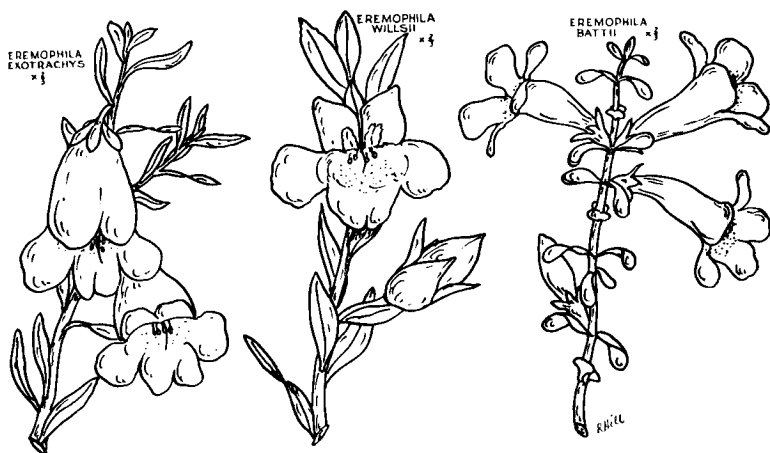
In Adelaide it does very well on the plains in most soils and soon forms a compact bush, flowering at odd times throughout the year. Cuttings strike very easily at most times of the year.

Eremophila glabra

A very variable plant and seen throughout the drier areas of South Australia. This *Eremophila* is usually found growing on limestone, reaching a height from 3-6 feet, with orange to red tubular flowers in spring. The leaves are very variable sometimes glabrous or tomentose and with or without serrations on the margins. Very often the foliage is very viscid to the touch. This plant has still to be adapted for garden use in Australia.

Eremophila exotrachys

This is a very lovely species and grows on sand on limestone in only a few localities in South Australia, but it is found in Central Australia and Victoria Desert in Western Australia. The plants I saw grew north of Watson in a similar location to the previous plant. The linear lanceolate leaves are deep green in colour and the large wide-mouthed flowers are deep purple which makes it one of the most attractive species I have seen. As far as I can gather it is not in cultivation.



Eremophila willsii

This is a similar plant to the preceding species but with wider, lighter green, very sticky foliage and with very deep reddish-purple flowers with a beautifully marked throat. Sandy areas are preferred by this species which is found from the Everard Range to the Western Australian border, but is not a common plant by any means. I have also found it south of Alice Springs on red sand dunes. It is also found in Western Australia.

Eremophila battii

Only one plant was seen of this species and that on the Nullarbor Plain near Fisher growing on pure limestone. A shrub 3 or 4 feet high with very small white tomentose foliage, it bears heads of light mauve flowers in great profusion. It is found in Central and Western Australia also, but it is apparently a rare plant in South Australia.

Eremophila decipiens

This plant is very similar in all respects to *Eremophila glabra* but without serrations on the leaf margins, and has longer curved petioles to the flowers which are held out away from the foliage. The flowers are bright orange in colour and the plant is distributed similarly to *Eremophila glabra*.



Eremophila delisseri

This beautiful growing shrub grows 3 feet high with small ovate grey-green leaves, and flowers of light mauve borne in profusion. At Ooldea in South Australia on the transcontinental line this plant grows in a few inches of soil on sheet limestone quite close to the railway line, in association with *Eremophila latrobei*. A few very small seedlings were seen and there was an abundance of seed under all bushes. Apparently a very small percentage of seed germinates under natural conditions.

Eremophila scoparia

This is possibly the most widely distributed species in South Australia as it is found in mallee areas in the Murray River area and extends to Western Australia, and also occurs in New South Wales. It is very graceful, and its habit suggests a "broom bush" of silvery grey appearance, with narrow leaves about half an inch long and massed with light mauve flowers during the warmer months of the year. It is growing well in Adelaide on dry, fairly heavy loam, quite successfully.

Eremophila polyclada

Found in the Murray Mallee areas and extending north to Coopers Creek, Queensland and New South Wales, this plant has proved very hardy under Adelaide conditions. It forms a low twiggy bush to about 4 feet high and most of the year bears large open mouthed white flowers with a spotted throat. The leaves are narrow, about one inch long and of a light green colour. Cuttings strike very readily. Several Adelaide gardens are proud of their plants of this species.

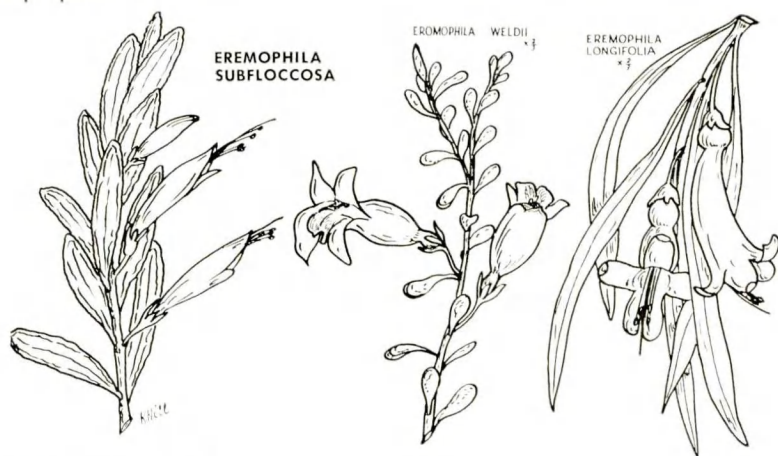
Eremophila subfloccosa

An unusual variety it has been found in localities on Eyre Peninsula and particularly in the Ceduna area of South Australia where it was found growing on light soil on limestone in great profusion. The foliage is densely woolly and the flowers which are borne profusely are vivid green in colour. At the Botanic Garden in Adelaide this plant has been grown successfully from cuttings but after about 2 years collapsed, possibly from overwatering. It is a most attractive plant and warrants further investigation as to its adaptability to garden conditions.

Eremophila weldii

This plant was seen at its best on limestone escarpments near Eucla in Western Australia, but it also occurs all along the coast to Kangaroo Island in

South Australia. It forms low compact bushes to about 2 feet high with neat blue-green foliage, similar to *Myoporum parvifolium*, and small flowers of light purplish blue. This species could be useful in gardens and should prove hardy, especially for seaside conditions but has yet to be adapted for such purposes.

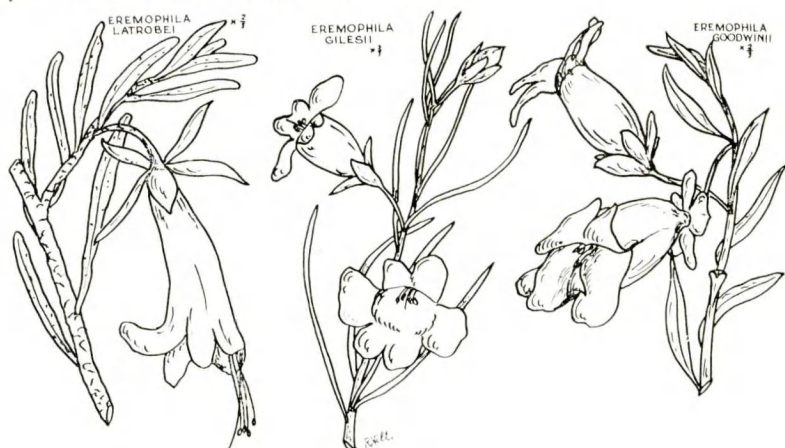


Eremophila longifolia

Forming small trees, this plant is often seen growing in dense thickets in most of the drier parts of Australia where limestone is present in the soil. The flowers are tubular and of a soft pink colour borne profusely during odd times throughout the year. This species should make ideal shelter belt plantings in dry areas and trials are warranted for this purpose as well as being a very ornamental small tree for the home garden.

Eremophila latrobei

Also growing in profusion at Ooldea as well as being found throughout the Northern and Central Australian area, this lovely plant bears tubular scarlet to orange flowers on a very shapely bush to about 4-6 feet in height. The deep green, tuberculate leaves are about 1 inch long. Sand and light soil on limestone seem to be its preference as to soil. This form found at Ooldea is by far one of the best forms I have seen.





Blocks by courtesy of Lothian Publishing Co. Pty. prepared from an original photo and coloured by H. T. Reeve. Reprinted from "Shrubs and Trees for Australian Gardens", by E. E. Lord.

Coolgardie or Coral Gum

EUCALYPTUS TORQUATA by E. J. THOMPSON

In its habitat of Coolgardie, W.A., and southwards to Higginsville and Norseman, and westwards to Bullabulling, *Eucalyptus torquata* may be found growing in red, stony loam, on hills and on rising ground. A tree of medium height 14-20 feet in some areas and 20-35 feet in W.A., with blue-grey leaves that contrast sharply with the deep grey of the rough and furrowed bark. The full beauty of the tree is seen when it is in bud and flower, from November to January. The distinctive corrugated buds hang in clusters and are shiny red, almost wax like, with pointed caps. Flowers are in showy bunches from red to a delicate combination of pink and white.

The flowering period is from November to January, beginning at a very early stage. It will flower in pots and it is recommended for garden planting. It is also suitable for light to medium soils (gravel) in inland areas.

As branches are borne close to the ground it will provide a fine break if planted closely in a row. By easy pruning this Mallee may also be grown as a single stemmed tree and reaches a height of 14-20 feet. Many Councils are using this tree for street planting.

STREET TREES

As announced last issue, Mr. E. J. Thompson has formed a Study Section devoted to the investigation and application of native trees for street planting. Local Government authorities (over 100 so far) from all over Australia have declared their active support for this project and most have agreed to planned experimental plantings. It is too early yet to report on the voluminous reports already received and firm conclusions will not be reached for some time, in many cases years. The above article, the first in a series on trees for street planting, is offered with advice of caution in the application of this very fine, but variable subject. Those pioneers in street planting who wish to engage in an experimental planting should first contact Mr. Thompson.

EUCALYPTS STUDY SECTION

A study section under the leadership of Mr. R. Mears Public School, Nevertire, N.S.W., is being formed and interested readers should write to him. A specialised interest in dwarf flowering Eucalypts, for example, would be a fascinating and rewarding hobby.

HAVE YOU GROWN THIS EUCALYPT?

Will readers please advise me or Mr. Mears of their experience with growing *Eucalyptus torquata* and *Eucalyptus erythrocorys*, the species for our next issue.—EDITOR.

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Preserve Australian Orchids

The response from those interested in the preservation and development of our native orchids has been very encouraging, especially from the Orchid Societies and their publication, *Australian Orchid Review*, a very fine periodical for those interested in orchids. There is still much that others can do in the collection and propagation of seed. Who else will help? This applies particularly to the collection and germination of terrestrial orchid seed from all parts of Australia. One suggestion has been to try the bog method of seed germination set out in this journal.

Help us save Australian orchids from extinction.

CORRECTION: Issue No. 9, page 29—In some copies the stigma and pollen mass on the sketch of the *Cymbidium* flower were incorrectly labelled. In the last paragraph it was intended to warn readers—NOT TO PLACE A PLASTIC BAG OVER A SEED CAN/EL OR STORE SEED IN A PLASTIC BAG. Seed will be ingested by fungi under these conditions.

EDITOR'S NOTE: Each issue will feature native orchids, alternate issues being on epiphytal and terrestrial orchids, as in this case. The printing of colour plates is severely restricted by the availability of suitable colour slides. If you will send your slides for inspection they will be returned promptly. In particular I want colour slides of *Dendrobium speciosum* and species of *Dipodium*.

I also want comments from readers on their experience in growing orchids particularly species of the above and *Glossodia*. The June, 1963, issue will be devoted to the cultivation of *Dendrobium bigibbum* var. *phalaenopsis*, the "Cooktown Orchid", Queensland's State flower. Please grow this beautiful plant and report results. Some interesting correspondence on terrestrial orchid growing.

From Mr. L. Carman, Eden Hills, South Australia:

I started growing native orchids some 2 or 3 years ago, firstly in pots and because this method did not prove as successful as was first hoped they were transferred to a special patch in the garden, now the plants appear to be progressing well.

We now have the following plants in culture: *Caladenia* (3) *Corybas*, *Acianthus*, *Thelymitra*, *Glossodia*, *Diuris* and *Microtis*.

From Mr. K. Bursill, Campbelltown, N.S.W.

I have had good results with the growing of our native orchids, having the following genera in culture: *Pterostylis* (3 species), *Thelymitra* (3), *Calochilus* (3), *Caladenia* (2), *Corybas* (2), *Cryptostylis* (2), *Glossodia* (2) *Chiloglottis*, *Lyperanthus*, *Rimaecola*, *Caleana* *Phaius* and *Calanthe*.

One pot of *Pterostylis eurta* was a picture this season, having no less than 45 flowers. This pot was originally planted with 12 tubers 5 or 6 years ago.

My method of growing this plant is as follows, I provided very good drainage, used the best loam that was available in its natural habitat, grew the plant in full shade in moist air conditions near ground level, I kept the pot as wet as possible during the growing period, feeding sparingly with "Urea", then during the dormant period the only water the pots received was that of the rain.

Genus *Spiculaea* Lindl. in Australia

L. CADY, Kiama, N.S.W.

A small genus of three most unusual plants, all species being endemic to Australia. Although widely distributed in Australia, they are not generally known, but in the writer's opinion they present a challenge to those growers interested in growing our fascinating ground orchids. The plants are usually well hidden in their growing and owing to their smallish habit are hard to see, but when found they often occur in some numbers. The following notes are offered to those who would like to try their hand at this unusual genus.

A mixture which has proved successful is, 60% Eucalyptus leaf mould, 40% loam, or the soil that the plants are collected in is preferred, 10% charcoal and powdered cow manure. Special care should be used with the drainage, for only a very small minority of the ground orchids will stand wet feet. The plants appear to require checkered morning sun, and should not be placed in a draught.

The labellum in this genus has often been referred to by authors of various articles as being "irritable", but in the writer's experience such is not the case, for this segment cannot reflex under its own power, as in say the "Greenhoods" (*Pterostylis*) or "Duck Orchids" (*Caleana*) but the segment is certainly movable and is used apparently as an attracting agent to aid the plant in its pollination by insects.

In *Spiculaea ciliata* most of its nourishment appears to be stored in the flowering stem, for as the plant matures it dies from the base upwards and if the plant is cut and left without water it will still continue to open the remaining buds before dying.

DESCRIPTION OF SPECIES

1. *S. ciliata*, Lindl. "Elbow Orchid" CIL-I-ATA.

Plant up to 19 c. high, base of stem often withering after flowering. Leaf sometimes present at flowering, ovate acute. Flower greenish, marked with red. Sepals and petals narrow, deflexed. Dorsal sepal following the contour of the column. Labellum on a narrow claw hinged to the base of the column, oblong with a glabrous gland at the largest of the lamina, the basal end shortly ciliate. Column with rudimentary foot or wanting wings slender prominently reflexed on the upper half of the column.

Flowers:—October to January. Endemic to West Australia.

This plant is known for its amazing durability ("Orchids of the West", Erickson, 1951) and when pressing this species, it often opens a bud during the period of drying out.

2. *S. irritabilis* (F. Muell.) Schltr. IRRIT-A-BIL-IS.

Plant up to 37 cm. high. Leaves in a basal rosette, separate from flowering stem, but occasionally connected to it, persistent after flowering. Flowers greenish colour, is often difficult to find.

Labellum hinged to the column foot, lamina on a thin claw, hammer shaped, densely ciliate on upper surface. Column long and slender, at 90 degrees to the axis of the ovary column winged on upper half, foot approx. as long as column.

Flowering:— January to April. From N.S.W. to N. Qld.

This species usually contains the most amount of florets of any species in the genus, although not as robust as in *S. ciliata*.

3. *S. huntiana* (F. Muell.) Schltr. HUNT-I-ANA.

A slender plant up to 15 cm. high. Leaves reduced to sheathing bracts. Flowers up to 5, greenish, with darker markings. Perianth segments all approx. 4-5 mm. long, petals narrower than the sepals all deflexed. Labellum on thin claw, hinged to the column foot, the lamina hammer shaped, densely ciliate at the anterior end, this extending into two long hairs. Column short, winged at top by two pairs of narrow appendages, column foot three times as long as column, stigma reniform.

Flowers:— Summer to autumn, Victoria and N.S.W. but rare.

A very unusually shaped plant, which owing to its small habit and greenish colour, is often difficult to find, in N.S.W.

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GENUS *SPICULAEA* IN AUSTRALIA



KEY TO PLATE

A. *S. huntiana* and labellum.

B. *S. ciliata* and labellum.

C. *S. irritabilis* and labellum.

Refer to description for size of plants, labella greatly enlarged.

KEY TO AUSTRALIAN SPECIES

A. Column foot rudimentary. Labellum shortly ciliate, column wings conspicuously reflexed. West Australia. 1. *S. ciliata*

AA. Column foot almost as long as column. Labellum densely ciliate, column wings not conspicuously reflexed. N.S.W. to Qld. 2. *S. irritabilis*

AAA. Column foot 3 times as long as column. Labellum with 2 filiform hairs. Victoria and N.S.W. 3. *S. huntiana*

This genus was united with *Drakaea* Lindl. (this genus now being confined to West Australia) by the German botanist Reichenbach, f., who was followed in this opinion by Benthham but Schlechter in 1920 restored *Spiculaea* to generic rank.

I Grow Melaleuca from Seed

Correspondence from J. S. Howard, Nunawading, Victoria:

I have made use of Mr. Boyd's wet septic method for propagating seedlings with good results particularly with bottle brushes and eucalypts, although not knowing the viability count of the seeds employed. The following have been propagated from seed with fair to excellent success on basis of the yield. Bush soil was used.

I have been troubled by the slow growth rate of all but the eucalypts. The *Callistemon* at two months after germination were less than two inches high with partial morning sun received. About 70% of eucalypts planted out into veneer pots and under a tree, have died (3" high on planting cut) and survivors, though obviously healthy, are spindly.

Further correspondence from J. S. Howard subsequent to receiving Mr. Boyd's advice.

The planting-cut techniques you advise are the "missing links" I have been looking for. Subsequent to my first letter I put the trough enclosed pots into full sunlight. Unfortunately on a very hot day of century temperatures most seedlings scorched and died. The pots were covered with glass and had not dried out, but the water was hot to the hand.

In the following spring, glass covered pots were placed in a position where partial sunlight was received in the morning and full sunlight in the afternoon. Germination was normal in a medium of rotted *Casuarina* leaves only until the onset of a spell of very hot weather when a number of seedlings about a month old were lost. Older larger pots were unaffected. Soil temperatures several inches below the surface were found to be very hot to the finger. A screen has now been erected to cut off the high afternoon sun. I employ plastic bags with the corners cut off over the pots once the seedlings demand more height than provided by the pots. After using "Aqual" in water, no more spindly plants have developed though there is often overcrowding in the pots. Drooping of plants due to weak stems is avoided and the plants are strong and vigorous. The results of an interested neighbour show that even using "Aqual", heavy shading, behind a fence, from the sun gives rise to very spindly growth.

The variation in propagating medium from bush soil to almost pure organic matter is in my opinion quite irrelevant in so far as results are concerned.

FROM THE EDITOR: Many readers do not appear to have realised the value of this method of seed propagation. For seed of species of the genera mentioned above results are certain. ANYONE CAN GROW BOTTLE BRUSHES AND TEA TREES FROM SEED AND BE CERTAIN OF ALMOST 100% GERMINATION. No experience is necessary. A glasshouse or special equipment is not necessary. When I first tried this method I had a little trouble similar to Mr. Howard above but I found that simple precautions gave maximum results. I use aluminium ice cream trays, the upper one to hold the seeds having holes in the bottom and the lower pushed out a little to hold the upper one and leave a space on all sides for water. I fill the upper tray with "vermiculite" (this is a sterile exploded mica and is readily available in all sizes at the local gardening store) and saturate it with boiling water, compressing it to a level of about $\frac{3}{8}$ inch below the sides of the tray. The seed is sprinkled on top and a little more "vermiculite" sprinkled on the seed. A piece of glass is placed on top of the seed tray and the lower container filled with water. The whole lot is placed on a large rock in the yard where it receives full sun all day. The rock is kept clean, keeping all ground insects well clear. (I am convinced that a frequent cause of failure with seeds is due to insects, etc., entering seed pots and boxes from the ground under them. All my seed pots are placed on this large clean rock.) I top up the outer tray water level each day with water direct from the tap. This would be the only source of fungi or bacteria if the seed was clean and if trouble is experienced the water could be boiled as suggested by Mr. Boyd.

EVERY VIABLE SEED WILL GERMINATE. You may think this statement exaggerated until you try it. If too much seed is sown the new seedlings will grow up so close together that they will look like a thick moss or grass. However, they can be easily separated when tall enough using the immersion method described by Mr. Boyd above. When the seedlings reach the glass I raise it at one end each day so as to be just clear of the seedlings so that when they are about one inch high the glass is removed altogether and the seedlings are hardy and growing in full sunlight.

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Grow *Melaleuca* from Seed

THE TREATMENT OF SEEDLINGS By H. BOYD

Letters have been passed to the writer by the Editor from readers requesting more information regarding the "growing on" of plants propagated by the "Bog Plant Technique", *Australian Plants*, June, 1960.

"Bog Plant Technique" for germination of seed of bottle brush species of *Callistemon*, *Melaleuca*, *Beaufortia*, *Kunzea* and *Regelia*, the net bush species of *Calothamnus* and the tea trees, *Leptospermum*. Reprinted for your convenience.

A simple method for the germination of this seed is to treat them as bog plants. Take a well crocked pot almost filled with rich bush soil, wet and tap down making sure the surface is level. Sow the fine seed sparsely from the point of a knife, and in the same manner distribute over it a very light covering of sand. The pot is now immersed in a non-ferrous container to a depth of about two-thirds its height in water or until the surface is wet but not inundated. The water level of the outer container might have to be experimented with. The outer container must not be of iron as rust in strong concentrations is poisonous to seedlings. A piece of glass is then placed over the pot without allowance for ventilation and the experiment placed in a sheltered position in about half or filtered sunlight. It is advisable, but by no means essential, to use cold boiled water to wet the soil and fill the outer container, to reduce infestation by algae as tap water has a relatively high content of this lowly plant. The water level of the outer pot must be topped up each day as it is lessened by evaporation.

When the seedling plants are well established, say with four leaves, the glass covering the pot or tray can be removed for short periods each day or raised a little each day, until it is no longer required. The tray is then gradually moved to a position of full sunlight thus hardening the plants and strengthening the hypocotyl (stem).

At this stage a dressing of magnesium sulphate (Epsom Salts) can be given, about three grains in weight on the surface to a four inch pot (as much as will cover the surface of a sixpence). The salts are sprinkled on the surface dry. This causes a greater growth rate and produces stronger plants with thicker stems. Treat some seedlings and not others of the same species, and note the difference.

It is optional as to whether the plants are removed when small, four (4) to six (6) leaves, or grown to a height of six inches if the tray or pot is not less than three inches deep. If the plants are grown on in the seedling pots, a nutrient must be added in the form of a fertiliser, such as "aqual" (or nitrogen, phosphorus, potassium mixture). A strong solution is prevented from building up in the outer container by washing out this container once a week.

When many plants are grown to size in a small pot the roots will be found to have matted up between the pot and the medium in which the plants are growing. If the root growth is very great it is better to cut down one side of the root mass with a sharp razor blade. Then place the tangled mass in a tub of water to which has been added a few drops of root stimulant, such as Formula 20 (or naphthalene Acetic acid) to reduce shock and give the new plants a good start. With the plants completely submerged in the water, move them about and with this method of digital manipulation they can be readily separated.

Plant the seedlings in a suitable container for "growing on" such as tubes or four inch pots using soil similar to that in which they are to eventually be planted. The soil should contain, in addition, one third decayed leaf mould that has been passed through a sieve. Place the potted plants in a dark room for two or three days and then gradually increase the light on the plants until they are in full light. By placing a plant in darkness, photo synthesis is stopped and so there is not a great demand made on the unestablished root system. The method used by the Native Plant Propagation and Research Society is to place the tubed plants in a box with several sheets of paper over the top for 2-3 days. With this technique, chemical fertilizers in solution can be used at any stage.

The Family Myrtaceae

C. N. DEBENHAM—Museum of Applied Arts & Sciences, N.S.W.

Some 90 genera are included in this economically important family. They are unified, among other things, by their fruit which is a compound structure; a floral tube (receptacle) enclosing a true fruit. The texture of the receptacle provides a convenient sub-division and two types may be recognised. In the first, the fruit form a fleshy, succulent berry (e.g., the fruit of the guava and lilly-pilly) or, in a few species, a drupe. Members bearing this type have other characters sufficiently constant to form a sub-family, *Myrtoideae*, of a single tribe, *Myrteae*. The *Myrteae* are chiefly characters, sufficiently constant to form the sub-family, *Myrtoideae*, of a single tribe, *Myrteae*. The *Myrteae* is chiefly tropical South American in distribution with a smaller centre in south west Asia. Australia is not well represented but has seven genera (*Rhodamnia*, *Decaspermum*, *Rhodomyrtus*, *Austromyrtus*, *Pilidistigma*, *Eugenia* and *Acmena*) all occurring in eastern Australia.

The second fruit-type is general throughout the almost Australian-confined sub-family, the *Leptospermoidae*. Here the receptacle is more or less hardened, often woody. Their true fruit is of two kinds and provides a further division of the sub-family. One fruit type is formed from a single (rarely 2) carpelled ovary within which is developed a single seed (rarely 2). Members with single-carpelled ovaries usually are dense-foliaged, small-leaved, heath-like shrubs, all confined to Australia, and are designated the tribe *Chamaelaucieae*. The members (*Actinodium*, *Darwinia*, *Homoranthus*, *Verticordia*, *Chamaelaucium*, *Pileanthus*, *Calycotrix*, *Lhotzkya*, *Wehlia*, *Calythropsis*, *Homalocalyx*, *Thryptomene* and *Micromyrtus*) are particularly well presented in temperate south-western Australia but a few (e.g., *Homalocalyx* of 2 species) reach the tropics and quite a few are eastern temperate species.

The second kind is formed from a two or more carpelled ovary which, when mature, dehisces (or splits) along definite lines at the top into segments (or valves). Members with dry, dehiscent fruit comprise a tribe *Leptospermeae* and with few exceptions are of Australasian distribution. Their ovary cells are termed locules and within the inner angle of each locule is found the seed, either few in number or in clusters of several; the partition of each carpel is mid-way to the lines of dehiscence, hence the fruit is termed a loculicidally dehiscent. capsule.

Several sub-tribes make up the *Leptospermeae* and since many members are ubiquitous elements of the Australian scene, an enumeration is given of their extent.

Backhousinae

Backhousia: 9 eastern Australian and New Guinea trees and shrubs.

Osbornia: 1 tropical north shrub.

Metrosiderinae

Pleurocalyptus: 1 large tree from New Caledonia.

Syncarpia: 2 trees from eastern temperate and tropical Australia.

Choricarpia: 2 eastern Australian tree.

Lysicarpus: 1 tropical Queensland tree.

Moorea: 6 New Caledonia trees.

Tepualia: 1 tree from Chile.

Spermolepis: 2 New Caledonia trees.

Xanthostemon: about 50 shrubs and trees mostly from New Caledonia also in the tropical north of Australia, New Guinea, the Celebes and the Philippines.

Mearnsia: 3 trees from the Philippines and New Guinea.

Tristania: about 50 shrubs and trees from temperate and tropical eastern Australia, the tropical north, Malaysia, Burma and the Philippines.

Basiperma: 1 Papuan tree.

Eucalyptopsis: 2 large trees from Papua and the Moluccas.

Metrosideros: 20 shrubs and trees from South Africa, Polynesia, and New Zealand including 1 from the tropical north of Australia.

Eucalyptinae

Angophora: 7 small to large trees from temperate and tropical Australia.

Eucalyptus: about 600 species and vars. with status unchanged but perhaps half are definite species, practically confined to Australia. While *E. deglupta* is confined to New Guinea, New Britain, the Molucas and Mindanao, a few cf. *E. alba*, *E. papuana*, *E. tessellaris*, *E. tereticormis* extend northwards from the mainland.

Leptosperminae

Agonis: 10 shrubs or small trees confined to Western Australia.

Sinoga: 1 shrub or small tree from tropical Queensland Papua and the Moluccas.

Leptospermum: about 50 shrubs or small trees from temperate and tropical Australia, New Guinea Malaysia and New Zealand.

Kunzea: about 15 shrubs confined to Australia.

Callistemon: about 25 shrubs or trees widespread in Australia, 2 in New Caledonia.

Lamarchea: 1 temperate Western Australian shrub or small tree.

Melaleuca: about 150 shrubs or trees widespread in Australia, Malaysia and Burma, New Caledonia.

Melaleuca: about 150 shrubs or trees widespread in Australia, also in New Guinea, the

Calothamninae

Calothamnus: 20 Western Australian shrubs.

Eremaea: 6 Western Australian shrubs.

Phymatocarpus: 2 Western Australian shrubs.

Regelia: 3 Western Australian shrubs.

Beaufortia: 15 Western Australian shrubs.

Baeckea

Scholtzia: 12 Western Australian shrubs.

Baeckea: about 100 shrubs and small trees from temperate and tropical Australia, Malaysia China and New Caledonia.

Astarea: 5 shrubs from Western and Northern Australia.

Hypocalymma: 13 Western Australian shrubs.

Balaustion: 2 Western Australian shrubs.

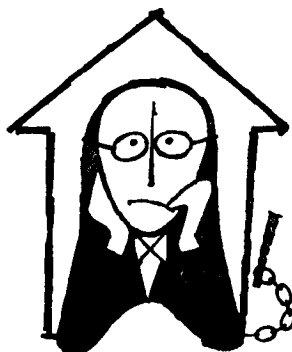
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THE TRIBE LEPTOSPERMINAE

TEA TREES, PAPER BARKS AND MYRTLES—Continued from Page 2

A failing with common names is that, in time, the original source of the name becomes vague so that other species, often quite unrelated, acquire the name. This is partly so with the name tea-tree but only to an extent that one would expect in the use of a collective term. In its strictest sense, it appears desirable that the term tea-tree should be applied only to *Leptospermum* species. In popular usage a broad sense of the term has, in the past, been freely applied to designate a particular type of habit. The terms bottlebrush and paperbark should cause no doubt except perhaps bottlebrush should apply strictly to *Callistemon* and paperbark to *Melaleuca*.

The tribe *Leptosperminae* are characterised by a predominance of single, sessile flowers which develop within the angle (or axil) formed by either a foliage leaf or a bract in relation to the stem, the numerous stamens either free from each other or united, the several ovules within each loculus, and the frequency of alternately arranged, narrow and coriaceous leaves. As in most taxonomic groups, exceptions of single characters are frequent and the main divergencies are: pedicellate flowers occur in *Leptospermum*; 2-4 ovules per loculus are present in *Agonis* and *Sinoga*, 1 per locule in *Conothamnus*; oppositely arranged leaves are frequent in *Melaleuca*. Two main types of staminal arrangement appear: the filaments are either free from each other, regularly spaced or in clusters, or with the basal parts collectively fused and forming 5 bundles. The number of locules per ovary are 3-10 in *Leptospermum*, 2-5 in *Kunzea*, 3-4 in *Callistemon* and 3 in the remainder.

Before beginning a discussion of some members of the greatest and most widespread genus of tea-tree, *Melaleuca*, it will be of interest to relate briefly the occurrence of the other tea-tree genera—at least one member of each will be familiar to the lover of Australian plants. Taxonomically, they make up two main groups, the first with stamens shorter than the petals and hence the petals are the conspicuous feature of the flower. *Leptospermum* is the most widespread of this group with perhaps 50 species in all, mainly dispersed in the eastern section of Australia from Tasmania to Queensland. *Agonis*, with flowers densely crowded in globose heads, has 10 species confined to the south-west of Western Australia—the Willow Myrtle *Agonis flexuosa* is well known. *Sinoga*, a genus until recently confused with *Agonis*,—a single species in northern Queensland, the Moluccas and Papua, sufficiently in abundance to have acquired the name Turkey-bush tea-tree and Kennedy's heath.

The second group, with stamens the conspicuous part of the flower, has the stamens either free from each other or collected in clusters or bundles. With stamens free are *Kunzea* and *Callistemon*. *Kunzea*, with flowers sessile and in heads, has about 15 shrubby species principally in south-western Australia, but also in temperate and sub-tropical southern and eastern Australia, from coast to tableland. The familiar *Kunzea peduncularis* of south-east Australia has been assigned to *Leptospermum* and has been found conspecific with *Leptospermum ericoides* of New Zealand—the correct name for both is *Leptospermum phyllicoidium* (A. Cunn. ex Schau.) Cheel. *Callistemon* with about 25 not very clear-cut species often attains large tree size and produces the familiar "bottlebrush" type of inflorescence. It is widespread in temperate and tropical Australia and is represented in New Caledonia and New Guinea. Of those with stamens collected in clusters,

EDITOR'S NOTE—A *Leptospermum* Study Section is being formed under the leadership of Mr. M. Reilly, 114 Lawn Street, Holland Park, Brisbane, Qld., Readers interested in growing tea-tree and exchanging seed are welcome to join.

there are three types of arrangement marking their identity—(1) union of filaments forming separate, usually flattened, "claws"—*Melaleuca* with about 150 species widespread in Australia, present also in Malaysia, New Guinea and New Caledonia, and 1 species of *Conothamnus*: (2) union of filaments forming a continuous tube—a single tall shrub or small tree from south-west Australia with single, sessile flowers, *Lamarchea hakeaefolia* Gaud., and (3) stamens in 5 clusters of 3 un-united filaments—the remaining two species of *Conothamnus*. This latter genus is endemic to south-western Australia and comprises shrubs with flowers collected in terminal globular heads.

BOOK REVIEW

THE TOXIC PLANTS OF WESTERN AUSTRALIA

By C. A. GARDNER and H. W. Bennetts

Price 50/- plus 4/- postage.

This is a very well produced book of 275 pages, including 48 line drawings and 52 full colour plates. One of these colour plates is on the rear cover of this journal. It is an essential reference for people in the country areas of Western Australia and inland Australia. It is also of considerable value to the keen native plant grower and collector as the hundreds of species are described and illustrated so clearly for the layman home-steadier that there is no difficulty in identifying them. The degree of toxicity, the probable limit of damage to stock depending on the period of growth, and the treatment for poisoned stock, is clearly laid down.

I value my copy as a book of reference particularly to the yellow-pea flowered plants of Western Australia, the main offenders.

Published by Western Australian Newspapers Ltd., Perth, W.A.

AUSTRALIAN NATIVE PLANTS FOR HOME GARDENS

By A. E. Brooks

This outstanding book on the growing of Australian plants does not need an introduction to the hundreds of native plant enthusiasts who already have a copy which they undoubtedly value highly. A new edition has just been issued. There is very little change from the first edition, but those gardeners who do not already have a copy are assured of a reliable up-to-date reference book.

The pleasing style of the author Mr. A. E. Brooks can be noted from his interesting article in this issue of the journal. The book is presented very clearly in alphabetical form and provides a reliable guide for planting your natives, particularly in the south-east temperate region.

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BORONIA PINNATA Smith

By D. SANDS

Boronia pinnata is a coastal species found throughout temperate Eastern Australia. The species is a very variable one being found as a tall shrub in forest areas, but only a few feet high behind sand dunes in the coastal areas.



Photography by Frank Hurley

Block by courtesy of John Sands Pty. Ltd

The *Boronia* is relatively easily grown from cuttings if small soft wood stems are taken, leaving only two or three leaves on each stem. The best time to take cuttings is November but rooting may be slow, and an average striking time of two months can be expected. Cutting medium consisting of equal parts of coarse sand and sphagnum moss should be sterilised (boiling water for 20 minutes will suffice) and placed in a well-washed porous container about two inches in depth. The mixture should be kept moist but not wet, and never allowed to dry out. A plastic bag over the container will serve this purpose if a glass-house is unavailable. When the

roots have reached at least an inch in length, they can be potted up in three inch pots containing equal parts cutting medium and sandy loam, and must be kept under the same conditions as the cuttings until new growth is apparent.

When planted out a spot with perfect drainage should be prepared, otherwise a tub or kerosene tin will do. A sandy loam is preferred and the plant will thrive in shade or direct sun if sheltered from winds. Tip pruning is advisable after flowering and helps to produce a shapely shrub.

The variable pink or white flowers may be up to one inch across in good varieties and the plants may reach twelve feet in height. The rare white flowering varieties have a beautiful crystalline texture.

Much work has been attempted on the germination of seed of this and other eastern coastal species with little success. Anyone hitting upon a technique that brings consistent results from seed should notify the S.G.A.P. so that the plants in the genus which are fast becoming rare may be grown in sufficient quantities to make extinction unlikely.

EDITOR'S NOTE—A Borenia Study Section is being formed under the leadership of Mr. D. Sands. Although Borenia is notoriously hard to grow, the effort is fully rewarded and with competent advice of Mr. Sands much work and success should be achieved.

Emu Bushes for Dry Conditions — cont. from page 8

Eremophila gilesii

This very graceful shrub is always found growing on the sand dunes and widely in the northern areas of South Australia. The linear viscid leaves are sticky to the touch and it bears large tubular pale blue flowers, about an inch long in great profusion. The plant grows to about 8 feet high. It is very doubtful if this plant has ever been tamed for garden use.

Eremophila goodwinii

This is apparently very rare in South Australia, and was found growing in sand-dune country north of the transcontinental line near Watson. Six feet is about the maximum height for this shrub, which has oblong leaves and mauve-blue flowers. It is very attractive species and is found in Queensland, New South Wales, and Central Australia generally.

I am sure these lovely plants will become better known in the future if not for their individuality or handsome flowers then for their great tolerance of dry conditions which exist in so many parts of Australia.

THE TOXICITY OF EREMOPHILAS

Eremophilas generally are considered to be poisonous to stock at certain times of the year. However, the main offender in this category is recognised as *Eremophila maculata* which is one of the most attractive of the species. Other species are suspected but apparently little has been done as far as proof is concerned as to which other species fall into this group.

However, as far as garden plants are concerned, this is no reason why they should not be used as such, as many of our popular exotic plants contain certain poisons.

Correspondence from Mrs. C. Sinclair, River Street, Deniliquin, N.S.W.

Eremophila longifolia is growing on our property in inland N.S.W. There are only two trees on sand ridges on the saltbush plains area but quite big clumps are growing on parts of the Bundyulumbah which bounds us on one side, with lots of young ones coming up all around. The seeds are cleaned up quickly by the friar birds and the "Black Honey Eater" loves the flowers. This is 13 to 14 inch rainfall area. Miss J. Chalmers, living nearby, has both *E. longifolia* and *E. maculata* growing and flowering quite well in her garden and it appears species of *Eremophila* will make good garden subjects in dry inland areas.

Some of these sand hills where they grow were, in the early days, pine forests before the axe took them. Still they grow on heavier soil too and I have moved small trees some years ago and planted them in heavy clay on the river. They flourished and grew so big.

When grown near homes etc. however, some attention is necessary for scale prevention. EDITOR'S NOTE: Mrs. Sinclair will initiate a Study Section in *Eremophila* to see what other lovely species can be grown in her garden. Other readers in dry areas may wish to correspond with her and I hope, others will send her seed of various species. Here is a garden shrub for the dry inland to develop.

THE GENUS MELALEUCA

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

While the majority of melaleucas are rarely far from water and usually follow watercourses or line the banks of lagoons, some actually at home in swamps where their roots must stand long periods of immersion, a few (e.g., *M. lasiandra*, *M. loguei*, *M. ciliosa*, *M. cordata*, *M. polycephala*) thrive in arid, sandy soils. Others, (e.g., *M. cordata*, *M. macronchia*, *M. ciliosa*, *M. filifolia*, *M. sclerophylla*, *M. pungens*) are at home on dry, rocky or gravelly sites. Their preference for soils derived from sandstones is evident, but a few (*M. cordata*, *M. thymoides*) are found on granite soils, and *M. groveana* was found on the top of a high, dry, volcanic ridge. They are not forest elements, but frequently form in their pure stands dense and extensive thickets (*M. ericifolia*, *M. uncinata*). They are not elements of the dry interior of the continent for less than 10% of all species would be regarded as truly Eremaean. About 15% of their total species occur in the tropics, their greatest endemism is reached in the south-west of Western Australia (about 80 species of coast and inland) while a few are almost transcontinental in distribution, e.g., the primarily tropical inland *M. bracteata* and *M. trichophylla* and the primarily temperate inland *M. uncinata*, *M. adnata* and *M. glomerata*, or follow for wide distances the coast *M. acacioides*, (*M. quinquenervia*). Their extra-Australian representation is not great (8 species) but it is interesting to note that in such a characteristically Australian genus, the plant upon which the genus was founded was a plant cultivated in India with very small representation in the southern continent.

The generic name has been derived from the Greek *melas*, black, and *leucos*, white, and the founder of the name, Carolus Linnaeus, was induced to give this name to a tree noted to possess a black trunk (probably charred by fire) which contrasted with its white branches (the very pale colour of the papery bark). Prior to Linnaeus noting the specimen, however, an enthusiastic plant collector, the Dutch merchant George Rumpf (better known by the equivalent Rumphius) resident in Ambon had published a flora of the island. ("Herbarium Amboinense", Vol. 2, 1742-50). A contributor to his second volume, J. Burmannus, classified the White Tree as *Myrto-leuco-dendron* while Rumphius noted that a locally produced essential oil came from a form of this White Tree and he referred to it as *Arbor Albo Caju-Puti*. This oil, Rumphius found, was known by the Malays and Javanese and used by them long before the Dutch took possession of the Moluccas. The oil acquired the name Oil of Cajeput and a quantity was purchased as a novelty by a physician of Nuremberg from a ship's physician returned from the East Indies about (1717)—this was the introduction of Oil of Cajeput for medicinal use in Germany and Europe. Linnaeus gave the binomial *Myrtus leucadendra* to the White Tree from Abon (or Amboina) and in the following year the French systematist Adanson (*Familles des plantes*) included the genus Cajuput (this then is the earliest acceptable generic name). Later, in 1767, Linnaeus included a name for a second species of White Tree, this time from India, *Melaleuca leucadendron*, and although the *Cajuputi* of Adanson predated the Linnaean name, *Melaleuca* has become a substantive conserved name by virtue of its almost singular use.

As colonisation of the mainland of Australia progressed, it became known that a plant very similar to the White Tree yielded an oil similar to that of Cajeputi—for many years this plant was referred to as *M. leucadendron*, then *M. viridiflora*, and finally *M. quinquenervia*. As research into the

The Cajuput White Tree of Rumphius was accepted by Smith (1819) as a species *M. minor*, but Specht (1958) has drawn attention to a prior binomial, *M. cajuputi* of Powell (1809), giving as its range from Malaysia and Burma to Arnhem Land and Cape York.

essential oils of the *Melaleucas* developed it was found that *M. quinquenervia* gave rise to two distinct types of oil, one form similar to the cineole type of oil yielded by the Cajuput, the other form yielding the valuable components nerolidol (up to 90 per cent.) and linalool (up to 30 per cent.) used in the perfumery industry. A second valuable source of linalool is the Eastern Australian *M. ericifolia* which yields up to 40 per cent. of this component. Production of oils on a commercial scale, both locally and overseas, has resulted from the exploitation of *M. bracteata* and *M. alternifolia*. Oil from *M. bracteata* is a phenolic-ether type, used as a basis for certain isolates; that from *M. alternifolia* is a terpenic type of value for its germicidal activity. Commercial production of Oil of Niaouli (the source of which appears to be *M. quinquenervia*) in New Caledonia rates highly in its trade relations with France.

KEY TO THE SPECIES OF MELALEUCA

Series 1. CALLISTEMONAE. Inflorescences typical "bottlebrush" spikes with long, brightly coloured stamens; fruiting-spikes dense, oblong or cylindrical, with fruit comparatively large. A group of 8 western and 1 eastern temperate small shrubs predominating in sand-heath formations. Receptacles broad and rounded at the base, usually without hairs; sepals obtuse, usually broad and shorter than the receptacle. Fruit-receptacles globular to urceolate, 6-10 mm. dia.

i. Leaves alternate. Spikes dense and long.

The extent of the alternate-leaved *Callistemonae* can be ascertained from two only of the five members for the remainder apparently represent survivors from now extinct populations, known mainly from the single collections of the early 19th Century from coastal locations of the south-west Murchison River (*M. calothamnoides*), King George's Sound (*M. diosmaefolia*), and unspecified (*M. blaeriaefolia*). Robin Red-breast Bush (*M. lateritia*), from the Darling District, predominates on damp, sandy flats of the coast and near-coast while Long-claw Paperbark (*M. macronchia*) is an inland species, often favouring dry, rocky conditions, and extends from the eastern zone of the south-west province to the western zone of the Eremaean. Both species are known to horticulture as summer-flowering "bottlebrushes".

Claws of the staminal bundles short, divided into 6-12 filaments. Leaves linear, not exceeding 25 mm. in length with inconspicuous venation.

Leaves flat or concave, acute

E. (South-west corner, mainly coast)

Leaves somewhat terete (cylindrical, tapered), obtuse. E. (north-coast restr.)

1. *M. lateritia* Otto & Dietr (1834).

2. *M. calothamnoides* F. Muell (1862).

Claws of the staminal bundles short, divided into 3-7 greenish-yellow coloured filaments. Leaves ovate-lanceolate, not above 15 mm. in length, the mid-rib alone conspicuous. E. (South-east coast, restr.)

3. *M. diosmaefolia* Andr. (1867)

Claws of the staminal-bundles long and narrow, divided into 10-30 filaments.

Leaves above 25 mm. in length (sometimes up to 50 mm.), lanceolate to oblanceolate, mid-rib prominent and often with two laterals clearly visible.

Filaments 20-30. E. E-K

4. *M. macronchia* Turcz (1852).

Leaves seldom exceeding 5 mm. in length, linear to narrowly lanceolate, mid-rib alone obscurely visible. Filaments 10-20 or more.

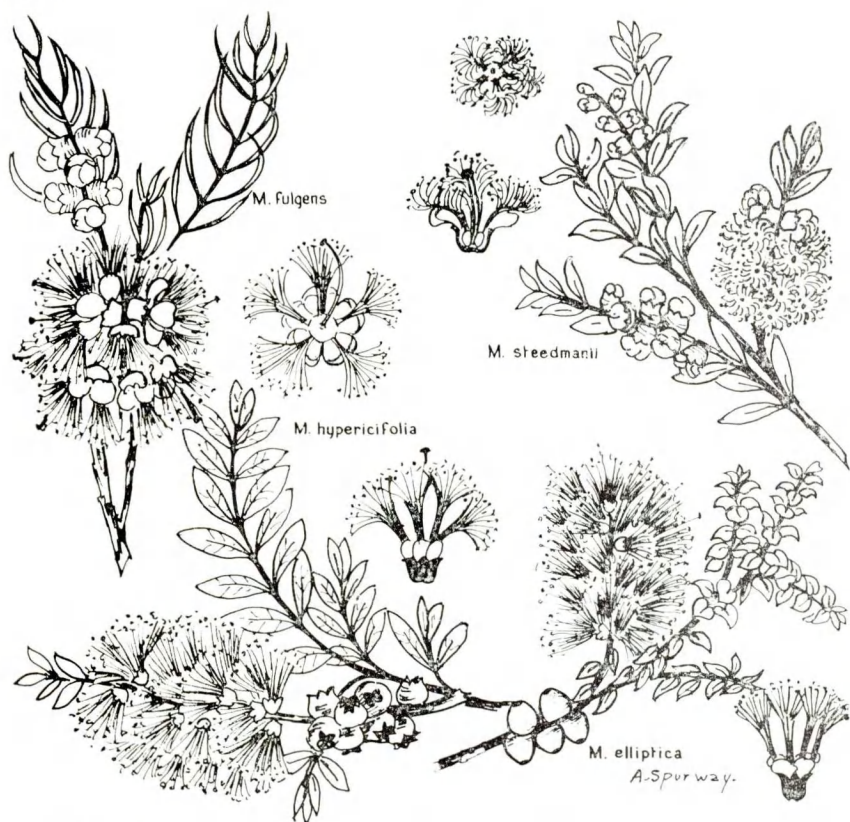
E (west coast restr.)

5. *M. blaeriaefolia* Turcz (1847).

ii. Leaves opposite. Filaments exceeding 15 in each bundle.

Inclusion of the single sharply divided eastern species suggests that the *Callistemonae* originally were dispersed over a wide southern coastal range. Of the western species, the summer-flowering Scarlet Honey-myrtle (*M. fulgens*) is confined to the coast of the south-west province while the spring-flowering Steedman Honey-myrtle (*M. steedmanii*) and Granite Honey-myrtle (*M. elliptica*) are of inland distribution. *M. steedmanii*, a shrub up to 6 ft. in height, is found in the western zone of the southern Eremaean (i.e., the Irwin and Watheroo Districts) and has been successfully crossed with *M. fulgens* to produce a hybrid known to horticulture as

M. x paynei. *M. elliptica*, a spreading shrub up to 15 ft. in height, extends from the eastern zone of the south-west province to the western zone of the southern Eremaean. Hillock Bush, or Red-flowering Paperbark (*M. hypericifolia*), a summer-flowering spreading shrub to 9ft., is essentially a component of sand-dune and sandstone floras, confined to the central and south coasts and the central tablelands of N.S.W. A cineole type of oil has been extracted from its foliage (average yield 1.2%) but the oil has no commercial value.



Western species.

Leaves linear and concave, up to 30 mm. in length. Spikes lateral loose, the shoot produced after flowering. Staminal claws long.

E. (south-east coast)

6. *M. fulgens* R.Br. (1812).

Leaves lanceolate to ovate, flat, venation inconspicuous. Spikes on lateral shoots.

Leaves up to 30 mm. in length, lanceolate to elliptical.

Spikes short and loose, at the base of leafy shoots;

staminal claw short. Fruit urceolate with sepals erect.

E. (west, inland) E-K

7. *M. steedmanii* C. A. Gardn. (1929)

Leaves up to 12 mm. in length, elliptical to ovate.

Spikes dense, long (up to 75 mm.), the shoot rarely produced;

staminal-claw long and narrow. Fruit ovoid, densely packed,

with sepals connivent, almost enclosing the orifice.

E. (south-east coast and inland).

8. *M. elliptica* Labill. (1806).

Eastern species.

Leaves lanceolate to broadly lanceolate up to 40 mm. in length, flat, obtuse and often mucronate; mid-rib prominent on the undersurface and obscurely pinnately-veined. Spikes dense the shoot continuing growth as a normal leaf-shoots. C. (south and central coast, central tablelands).

9. *M. hypericifolia* (Salisb.) Sm. Britton

Series II.

(A) **BASIFLORAE** C. A. Gardn. Inflorescence a small head or cluster along the previous season's branches or a cluster or loose spike on short lateral

shoots (the stem produced early as a leafy shoot). Stamens not exceeding 12 mm. in length (except in a variety of *M. cardiophylla*). Terminal spikes of male flowers have been noted in *M. decussata* (var. *ovoidea*) and terminal heads of male flowers occur in *M. violacea*.

(a) *Decussatae* Benth.: Leaves opposite. Floral axis and receptacles without hairs.

i. Spikes (often much reduced) at the base of new shoots. Flowers oppositely arranged.

A key feature in the recognition of this group is the position of the fruit which is borne at the base of newly-developed leaf-shoots, oppositely placed, and usually partially sunken within a thickened axis. *M. platycalyx* is an inland species of restricted distribution, recorded from the western zone of the southern Eremaean. Cross-leaf Honey-myrtle (*M. decussata*) is dispersed throughout the Yorke and Eyre Peninsulas, Kangaroo Island, and the north and south-west of Victoria, including the Grampians. The range of Slender Honey-myrtle (*M. gibbosa*) extends from the south-east of South Australia and Kangaroo Island over much of the western half of Victoria and from the south coast, reaches Tasmania, where it is found mainly on the east and south-east coasts. Both species are summer-flowering lovers of damp situations, well-known to horticulture. A pinene-cineole type of oil has been extracted from *M. gibbosa* but is of no commercial interest.



Flowers oppositely arranged; receptacles flat-based with sepals much shorter and obtuse. Filaments purple or pink, in bundles of 12-20 from a claw much shorter than the petals. Fruits partially immersed in a thickened, woody stem (occasionally almost fully in *M. gibbosa*); sepals quickly wearing from young fruit.

Shrubs, 2-3 m. in height, confined to the south-eastern coastal and near-coastal regions of the continent. Flowers decussate; leaves decussate, crowded, concave.

Leaves linear to oblanceolate, 4-18 mm. in length, 3-veined.

D. (coast and inland but not Tas.)

10. *d. decussata* R.Br. (1812)

Leaves ovate, 2-7 mm. in length, with inconspicuous venation.

D. (Kangaroo Is. east to Tas.)

11. *M. gibbosa* Labill. (1806)

Shrubs, 1 m. in height confined to the south-west province (central zone) of the west.

Leaves ovate to elliptical, 7-10 mm. in length, 3-veined.

Spikes short and few-flowered. E-K (inland restr.)

12. *M. platycalyx* Diels.

ii. Small heads, clusters or short spikes, at the base of new shoots.

In this group, fruit is found in clusters at the base of new growth. Both *M. leptoclada* and *M. basiccephala* are little known shrubs from the coast

of the south-west province. The eastern Thyme Honey-myrtle (*M. thymifolia*) seldom exceeds 3ft. in height and frequently flowers when but 1ft. high. Its habitat varies from sandy loams or dune sands to clay or gravel soils and is often associated with swampy conditions. Its range extends from the south coast (Jervis Bay) to the north coast into the south-east coast of Queensland and has penetrated the central tablelands to the central western slopes (Mudgee, Kandos, Gulgong). A cineole type of oil (of no commercial importance) has been extracted from the foliage of this summer-flowering erect shrub.

Flowers few or dense; receptacles round-based with sepals shorter and obtuse.

Fruit in short clusters with rounded base and prominent, persistent sepals.

Shrubs seldom exceeding 1 m. in height confined to the temperate to sub-tropical east coast. Filaments pink to purplish-red, 15-20 on a long and narrow claw. Leaves narrowly-lanceolate to lanceolate, acute, concave, obscurely 3-veined, 6-12 mm. in length.

C. B-C (mainly coast).

13. *M. thymifolia* Sm. (1797).

Small shrubs of limited occurrence in the coastal zone of the South West Province.

Leaves lanceolate to elliptical, acute or obtuse, flat or concave, 4-12 mm. in length, with inconspicuous venation.

Flowers few, at the base of lateral shoots. Filaments white, in groups of 2-4.

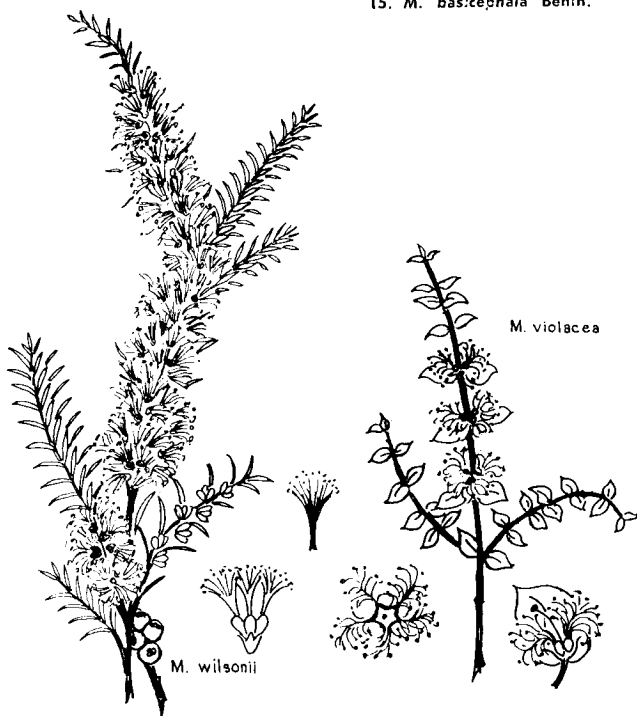
g. (south coast).

14. *M. leptoclada* Benth. (1866).

Flowers several in globular heads inserted on the old wood but forming the base of leafy branches grown out before the flowers expand.

Filaments red, in groups of 20-30. E. (south coast).

15. *M. basicephala* Benth.



iii. Few (2-5) flowered clusters lateral or in the leaf-axils along the previous season's branches.

Receptacles rounded at the base, sepals various. Filaments in bundles of 10-20 on a claw longer than the petals. Fruit solitary or in short, often interrupted clusters along the old wood; sepals prominent at least on young fruit. Shrubs up to 2m. (6ft.) in height.

Here, fruit is found, either singly or in clusters, along the older stems, new growth proceeding from above these stems or along the stems but not from, as in the previous groups, the floral clusters. *M. violacea* shows some

variation in that clusters of flowers frequently terminate short lateral shoots. The leaves of this species are stem-clasping but a form with distinctly petiolate leaves occurs and has been designated var. *petiolata* Benth. The species forms an ornamental summer-flowering spreading shrub with slightly glaucous leaves, the young ones often deeply pigmented with a purplish tinge, borne on rather corky stems. It extends from the coast of the south-west province to the Eremaea. The inland species *M. websteri* has a particular centre within the Coolgardie District; found within the same district and known only from a single collection taken from north of Rovensthorpe is *M. agathosmoides*. Also from the Coolgardie District is *M. acuminata* where, and in the nearby district Eyre, it has been noted to reach small tree size, found sometimes in pure sands, occurring on loamy flats and frequently on soils rich in chlorides. It has a wide distribution in South Australia (Yorke and Eyre Peninsulas), Kangaroo Island, the eastern part of Mt. Lofty Range to Lake Alexandrina, and through the Murray scrub extends to north-west Victoria. *M. acuminata* is a summer-flowering shrub and a cineole type of oil (of no commercial value) has been extracted from its foliage. The summer-flowering Crimson Honey-myrtle (*M. wilsonii*) appears to have its centre in the Wimmera district of Victoria, and through Border Town, reaches the sand plain zone of the south-east (e.g., Coonalpyn).

Species confined to the southern temperate parts of the continent.

Filaments pink to purplish-red. Sepals as long as the receptacle, persistent and prominent on the fruit.

Leaves linear to narrowly-lanceolate, 8-15 mm. in length, concave obscurely 3-veined on the under-surface. Sepals lanceolate. D. (mainland only).

16. *M. wilsonii* F. Muell (1961).

Leaves ovate-cordate or ovate-lanceolate, 6-12 mm. in length, flat, 3-veined. Sepals ovate. Fruit often corky. Western species. E. (south coast).

17. *M. violacea* (Lindl. 1837).

Filaments white. Sepals shorter than to as long as the receptacle, obtuse, prominent and persistent on mature fruit only in the first. Primarily western species.

Leaves not exceeding 3 mm. in length oblong, obtuse, recurved rounded at base and sessile. Fruit somewhat immersed in a corky axis. Of highly restricted occurrence inland. E-K (restr.).

18. *M. agathosmoides* C. A. Gardn. (1939).

Leaves 5-10 mm. in length, lanceolate to elliptical acute or acuminate, often pungent, with inconspicuous venation, narrowed at base to a very short petiole, decussate. Sepals shorter than the receptacle. Fruit solitary or in small clusters along the old wood.

Leaves narrowly-lanceolate to lanceolate, concave, recurved. E. E-K (main).

19. *M. websteri* S. le Moore (1920).

Leaves lanceolate to elliptical, flat, 3-veined on the undersurface. Range continued eastwards. E-K, D, Kangaroo Island.

20. *M. acuminata* F. Muell (1960).

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Melaleuca violacea is a semi-prostrate little melaleuca with purple flowers clustered along the branches. There is little evidence of plants under garden conditions but so far has indicated general hardiness, particularly in withstanding drought.

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1. Study Sections—These comprise readers who, receiving the benefit of free advice, seed, and sometimes plants, agree to grow plants of known beauty and value, in their gardens and report results once a year. No experience is necessary to contribute to this national effort. Sections already exist for *Acacia*, *Dryandra*, *Eremophila*, *Orchids* (terrestrial), *Orchids* (epiphytal), *Telopea*, *Verticordia*, *Eucalyptus*, *Stylidium*, *Melaleuca*, *Leptospermum* and *Street Trees*.

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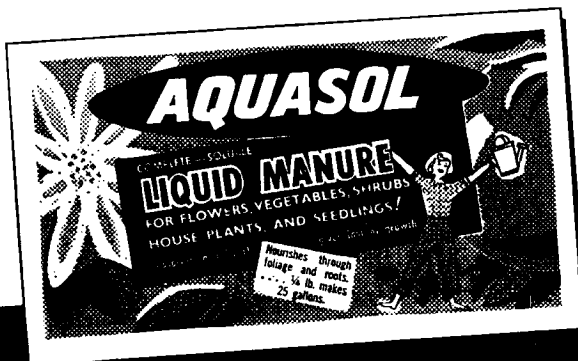
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Eremophila from Cuttings

By R. HARDIE

The following notes are on *Eremophila* propagation at Adelaide Botanic Garden since 1959. The technique has been to take soft, or soft medium tip cuttings, 2-3" long, and to insert them in small pots of coarse washed sand, or three parts of this sand to one part of peat. The pots have then been stood on the gravel bench of a cool glass-house (shaded in summer) or, better still, placed in a plastic frame on the bench—the additional protection of the plastic gives the calm, draught-free, humid atmosphere so helpful for striking soft tip cuttings especially. Cuttings have been tried for comparison under mist; also with and without hormones; and at various times of the year.

SPECIES WHICH HAVE ROOTED FROM CUTTINGS:

E. alternifolia and *E. polyclada* both rooted well in a plastic frame in a glass-house.

E. gibbifolia and *E. glabra* struck well in a cool glass-house under mist.

E. glabra and *E. latrobei* struck well on the open bench in the same glass-house while a small percentage were struck on the bench from *E. subfloccosa* (although usually difficult due to its woolly foliage), *E. delisseri*, *E. crassifolia*, *E. maculata* (being better on the open bench than under mist) and *E. dalyana* (a white flowered species obtained on a Birdsville Track expedition).

FAILURES FROM CUTTINGS: Some of the above species have not been successfully struck on other occasions. Other species which have been tried without any success at all, so far, include: *E. weldii*, *E. oppositifolia*, *E. parriifolium*, *E. scoparia*, *E. exostrachys*, *E. bignoniiflora* and *E. macgillavrayi*.

CONCLUSION:

It is well worth while trying *Eremophilas* from cuttings though some species are certainly easier than others to root. Neither hormones nor mist appear to help in striking, but more work needs to be done with these aids for they do assist the rooting of most species of plants. Nor does the time of the year seem very important—suitable soft or soft to medium tip cuttings are available most of the year—but remember the need of shading and humidity for soft cuttings taken in summer.

For home gardeners who do not have a glasshouse, place the frame in a part of the garden which receives ample light but is sheltered from wind and hot sun. In the frame the pots may be stood on a base of gravel or coke screenings, or plunged to the rims in sand, sawdust or some other clean medium which retains moisture in the pots and keeps them at a more uniform temperature. Cover the frame with plastic or glass, and on sunny days with hessian also. More ventilation and light is given as the cuttings strike.

We are working on seed germination techniques without much success to date but it is hoped to be able to report on the results in the future.

DID YOU LIKE THIS JOURNAL?

Your comments will be appreciated. An editor's task is not easy and constructive criticism is always valued. It is impossible to present all articles to please everyone, particularly with our wide range of readers. The journal has thus been expanded from 16 to 32 pages and if you are pleased with at least 16 pages then it is a success. If you do not like the semi-technical sections please be patient as many others do and one day you will find them invaluable. The reader participation in sending reports on their experiences is my chief disappointment and handicap. If you have tried to grow a *Melaleuca* or a Coral Gum, help me by reporting experiences. This is desired for species of *Eremophila* particularly from people in the inland.

Due to a flood, a defective block and a machine failure the last issue was not up to the usual standard. Any defective copies returned will be replaced free of charge—EDITOR.

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