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Photography by F. W. Humphreys

MELALEUCA CORDATA

HOW TO GROW WILDFLOWERS

GROWING WILDFLOWERS

As this is the first issue of a new volume, it is appropriate that we reflect on what has been accomplished and where we are going. Each volume of "Australian Plants" is also a comprehensive book on Australia's wildflowers and there will no doubt be new readers joining us at this point.

"Australian Plants" is a periodical produced on a non profit-making basis with honorary officers and published by The Society for Growing Australian Plants. The objective is to promote the appreciation and preservation of the Australian flora and its cultivation.

Preservation

Is the principal aim "preservation of the flora" or "cultivation of the flora"? Cultivation and development of suitable species with potential as horticultural subjects is the theme of this publication. This could become a major factor in the ultimate preservation of the flora. As the pressures of population and development by man on the limited resources of our planet build up, it is inevitable that wildlife reserves must be increasingly managed. Already the reserves adjacent to large populations need careful preservation; not just by leaving alone land, hoping they will not change, but by planting, breeding, control of dominant elements and love and care by competent conservationists. The plants, the animals, the birds, the whole environment are so inter-dependent.

Cultivation of plants in areas set aside for them, often alien to their natural habitat that has been swallowed up by "development", is the only hope for the preservation of a large proportion of our Australian flora. Those who have tried to grow a wide range of Australian wildflowers will know how difficult this can be in some cases and how much we have yet to learn. "Australian Plants" is playing a leading role in this developing crisis. In this sense a major objective is preservation.

Preservation by Cultivation

As individuals we can never hope to preserve the Australian flora in our gardens. However, by the very act of growing a few wildflowers in our gardens we are contributing. If you made an effort to grow more, reporting on your progress, successes and problems, then you could be making a very significant contribution to the ultimate preservation of the Australian flora and at the same time deriving a lot of pleasure from your garden.

Study Groups

These comprise people who are interested in the species concerned, enough to grow plants in their garden. No special skill is necessary. Free seed, competent advice and often plants are available. The groups are usually operated by mail, so anyone in Australia, no matter how remote, can join. See pages 12, 13, 14, and for ferns page 34.

In This Issue—Melaleuca

There are some very beautiful wildflowers that already have been proven to adapt readily to garden cultivation. It is appropriate that this issue, being the first of a new volume, should feature many of these; different species of *Melaleuca*. They grow in a wide range of conditions, plants are usually readily available (or at least some of the more generally known ones as the nurserymen will only stock plants that people know and buy), and they are easily grown from seed.

The Plant Family Myrtaceae

For those with some botanical knowledge—page 23.
For others—This magnificent plant family includes:
Eucalyptus. See page 33 and our previous issue 61.
Kunzea. See page 12—*Beaufortia* on page 13.
Xanthostemon. Tropical Myrtaceae—page 29.
PROPAGATION—page 10.

WILDFLOWERS
FOR HORTICULTURE

By THE EDITOR

Over the past eight volumes of Australian Plants there have been many articles by very experienced and skilled horticulturalists and home gardeners. All have written in their own style and readers are referred to these articles for competent advice on the cultivation of wildflowers. Will readers excuse me for taking this opportunity of saying it my way? This article is especially intended for the new reader, the beginner at growing wildflowers. Possibly the bug has not bitten you properly and you have not yet become a "wildflower nut". After reading my ramblings you will be warned. Actually I am hoping to warn you in time; to prevent you becoming a "wildflower nut"; to entice you to become a wildflower horticulturalist.

If you are not a beginner, or already know how to grow wildflowers, chew over the next few paragraphs, ship my suspect advice to the beginners and move on to the many valuable articles that follow.

What Is To Be Done?

Australian Plants is now published in 15,500 copies per issue.

Despite this wide interest, are we more successful in achieving our objectives than we were 20 years ago when we started, or even 10 years ago after publishing 30 issues? No doubt we have achieved a lot, but I feel sure it is far short of what we should have accomplished. We have built up a huge society and a publication of which we are all proud, but have we been using these resources as effectively as we could?

There is much more that could be done. There is much more that you, the reader, could be doing. The fault no doubt lies with the management of these resources? This has been badly expressed. There is no fault with individuals, who have done a magnificent job in building the Society and its publications to the present standards. However, we must go with the times—see how we can improve what we are doing and plan for a more effective effort in the future.

What Can We Do With This Publication?

As this is the beginning of a new volume, and we try to make each volume a self-contained book on all aspects of the cultivation of wildflowers, we have the opportunity to start afresh and present this information in a form that is easy to follow, will provide significant results and inspire all readers to join in the effort.

Let Us Only Grow the Best!

For this saga on growing wildflowers over the next few issues, I will commence with easily grown and hardy plants in the plant family *Myrtaceae*.

Even with these plants there is still much to be done. We should grow and develop the best forms for future plantings. Will those with good forms of plants write to the Editor and I will arrange exchanges. Fortunately most also propagate readily from cuttings. The garden exotics from other lands have been developed by careful selection and breeding and this is still to be done with our wildflowers. Even the newest beginner or the youngest amongst us can join in this work as will be shown later.



Photography by F. W. Humphreys

MELALEUCA CILIOSA

Grow as a small bushy shrub. Choose the best colour forms in yellow, orange or red. See page 18.

Do Not Let Scientific Names Baffle You

Do not be confused by the scientific names. Each family of plants with common characteristics is divided into genera comprising species that are very similar to each other, not in size or shape of bush, or even leaves, but because of similar flowers. The first part of the scientific name is the generic name given to all plants in the genus, and the second part applies only to the species or plant. Hence we have featured in this issue plants in the family *Myrtaceae,* principally those in the genus *Melaleuca.* Until you get more familiar with the plants, refer to them collectively as *Melaleuca.* Their common names are Paper Barks, Honey Myrtles, etc., but if you try to apply these common names it will certainly end in confusion.



Photography by F. W. Humphreys

MELALEUCA CUNEATA

An attractive small shrub. See page 19.

Let Us Be Scientific Amateurs

Let us go with the times, be scientific, and speak of *Melaleuca* (pronounced Mel-a-leu-ca).

One common name that will stick will be "bottle-brush". This is generally applied to the plants in the genus *Callistemon,* also in the plant family *Myrtaceae.* However, other plants in the family, especially about 40 species of *Melaleuca,* also have bottle-brush flowers, so let us get used to the scientific name *Callistemon* (pronounced Cal-lis-te-mon). See page 14.

If you are a beginner, do not be confused by all the names. Our flora is so vast that to cover even a small segment in an issue introduces very many names and descriptions. You will find this mass of information a valuable reference in the future. You will find in each issue a few species that are mentioned frequently, that have been tried and proven as good garden plants and for which adequate information on cultivation is given.

The next important advice for beginners is to choose plants that are easily grown in your garden conditions. The last part of this sentence confuses many people, as just what are your garden conditions? Let us discuss this later, but to make it easier choose plants that will grow in almost all garden conditions. For this reason I have chosen *Melaleuca* and *Callistemon* for the first issue of volume 9, possibly the most easily grown of our wildflowers. For those readers with good garden conditions, and those who want to try plants just a little harder, I have also included *Beaufortia* and *Eremaea* from the same plant family. See page 13.

Will *Melaleuca* and *Callistemon* grow in any garden conditions? They will grow in most conditions, but when you include the words "garden conditions" you imply that someone cares for them, admires them and may even talk to them. Yes, *Melaleuca* and *Callistemon* will grow in any garden conditions, despite the incompetence of the gardener.

Gardening is a "fun" job. You do it either to get enjoyment from nurturing nature and watching plants grow, or you do it to achieve a show, a setting for living. If you grow *Callistemon* and *Melaleuca* you will enjoy both these objectives.

Just how well they will grow will depend firstly on the "quality" of the plant you grow and how the garden conditions suit the plant. For "quality" I mean how nice the plant will look when not in flower, given its preferred conditions, and how well it flowers. It is time we were more selective in our choice of forms of wildflowers for horticulture. Everyone knows there are "bottle-brushes" and "bottle-brushes". Here again is an activity even a beginner can join in. See page 14, where plans for the study and development of the very best forms of *Callistemon* (bottle-brushes) are announced. You are invited to join in the fun.

Just what are your garden conditions, and what species of wildflowers are most suited? There are species of wildflowers ideally suited to all growing conditions, else how would they have survived all these generations in such a wide range of conditions on this continent of ours? For our first issue of volume 9 we will keep to the growing conditions that can readily be achieved in anyone's garden with very little effort. This means we will not consider plants in this issue for very dry conditions, or for very wet conditions. Actually, there are species of *Melaleuca* that revel in wet conditions, so if you are lazy in your garden preparation, or forget to turn the hose off, these plants in this issue will grow despite you.

Plants are living things, and there are few living things in this world that like growing in stagnant, smelly water. The first thing you must do in any garden, no matter what you grow, is to see that the water provided does not lie sour, but moves or is freshened. This applies particularly to under the soil, usually for one metre down, although even reasonable drainage to 10 cm is often sufficient.

"Hello," some will say, "he's got to that belaboured word drainage and will hide behind that excuse so often used, 'the drainage was not good enough'."

Well, for *Melaleuca* and *Callistemon*, drainage is not so important. In fact, with light soils, the plants do not usually get enough water and do not flower as well or grow as compact and healthy as in heavy soils. For light soils, if you water well, and for heavy soils if you provide just a little drainage and take care of the plants, you are assured of good results.

Hello, another let-off—and take care of the plants. What do I know about taking care of plants?"

Well, for *Melaleuca* and *Callistemon*, very little care is needed—just one thing. Prune the bush. Do not let this word "prune" deter you. All you need do is collect blooms on long stems for house decoration. For those left on the bush, cut off all "dead" flowers except for two or three. They are not dead, but have finished blooming and are going through another cycle of plant life, forming seed. Just one lot of seed capsules, from one flower head, will provide you with enough seed to grow 100 new plants. See the article on propagation on page 10.

Care of plants? Yes, *Melaleuca* and *Callistemon* and many wildflowers will get by with the care limited to watering them and pruning them, but we are not getting the fun out of gardening. All pets respond to a little extra attention, and plants will reward you handsomely for it.

Care of plants really starts with the preparation of their bed. Dig it deep, drain it by terracing a slope, raising it above normal ground, or providing drainage pipes or ditches. Is the soil good enough to eat? Well, not quite to eat, but have you thought that the plant will live there and seek its nourishment for its whole life span? If the soil is heavy, get some humus—decaying plant matter—into it. Kitchen compost is ideal. Any decaying matter will do, so that those earthworms can really feel at home. From then on nature will cultivate and nourish your plants for you below ground level.

Melaleuca and *Callistemon* are not so fussy and are ideal for lazy or inexperienced gardeners, so we start off the volume with them. Later issues will provide articles on the preparation and care of garden beds for growing plants—not just wildflowers, but any plants. Why should wildflowers be considered differently?

Some wildflowers need special consideration, and these will be described in future issues, but there is too much mystery about the garden bed. One "wildflower nut" who has spectacular results with a very wide range of wildflowers used to grow show dahlias. His beds were well constructed, with good rich soil, on a sloping site. His wildflowers did not just grow and flower, but did it in spectacular fashion. He would have graduated to a "wildflower horticulturalist" if he had specialised on growing on only the best forms, and, rather than trying to grow one plant of everything, concentrated on garden display with numerous plants of suitable species arranged for display and effect.

What Now?

We cannot present a sure-fire do-it-yourself garden guide in a few pages, but we hope to come near to this over the eight issues that comprise a volume. For this we need reports on:

1. Frost hardiness—what have you done to beat frost?
2. Garden care—what are your methods of fertilizing, watering, etc.?
3. Pest control—what are your methods?
4. Birds—what plants encourage birds?
5. Who has grown rainforest flora?
6. What are the answers to seaside planting?
7. What do you recommend for windbreaks?
8. What are your favourite specimen shrubs and trees?



Photography by F. W. Humphreys

MELALEUCA ELEUTHEROSTACHYA

Choose the best form of this attractive shrub—page 19.



Photography by F. W. Humphreys

MELALEUCA DEPAUPERATA

A hardy, attractive shrub for windbreaks—see page 19.

GROW FROM SEED.—I

PROPAGATION OF MYRTACEAE

A Summary by THE EDITOR

Species in the plant family *Myrtaceae* are so easy to propagate. They are ideal for the beginner to start with. Why go to a lot of expense and trouble purchasing plants when you can get all the plants you need from seed or cuttings?

This statement is not entirely true. Most species of *Myrtaceae* are easy to propagate and certainly all those described in this issue are very easy. Some genera have proved difficult, such as *Calytrix* and *Verticordia*—those genera where you do not frustrate nature's way of regulating germinating by getting it easily from the capsule or outer covering as described below. Propagation of these more difficult species will be dealt with in our next issue.

First Get Your Seed

Seed is cheap to buy and readily available for most species of *Melaleuca, Callistemon, Eucalyptus,* etc. It is often free. If you look on the branch of a bottle-brush (*Callistemon*) or *Melaleuca,* where the flowers were last year, you will see capsules that contain the seed clinging to the branches. In fact, if the bush has not been pruned for years, there will be groups of capsules for each year of flowering down the branch. They can easily be twisted off, using thumb and finger. You can also easily collect "gum nuts", the seed capsules left on the eucalyptus trees after they have flowered.

Put the capsules in paper bags, with the plant names written on the outside, and place the closed bags on a sunny windowsill. In a few days the capsules will begin to open—shake the bag. The dust in the bag is the fine seed usual for *Myrtaceae.* You will have hundreds of seed in each bag.

So far the job of getting plants from seed is easy. Would you believe it gets easier? Anyone can do it.

Prepare Your Pots or Containers

Nurserymen use punnets (which are just shallow trays). I use 10 cm (diameter at the top) plastic pots. You can use any plastic container with holes punched in the bottom, such as empty margarine containers. The 500 gram size is ideal. Wash them out clean. I put some washed gravel in the bottom of my pots; most people do not bother with anything. These seed are so easy to grow you need not bother. Put in some coarse sand to 2/3rd the depth of the container. I use a coarse washed sand. You could use any sort of sand, or even a sandy soil—whatever is easiest to get. Some people use special materials, such as vermiculite (an expanded mica) or pearlite both of which are readily available from garden suppliers in handy packets.

The point is, seed of plants needs only light, warmth and water to germinate. Some seeds are fussy about the combination of these, but *Myrtaceae* will grow almost anyhow. It has sufficient food stored up in the seed to feed the seedling until it gets its first four leaves. Hence all we need is something that will hold the seed up near the surface, where it gets warmth, light and air, will keep the seed moist and will allow the root to grow straight down. Any number of materials will do this. If the material (propagating medium) is infested with microscopic "wogs", they might attack the seed: seeds being a food storehouse are often nice to eat, as we know full well. This is the reason that some people go to a lot of trouble to sterilise their medium or use a sterile material such as pearlite. I use pearlite for most of my seeds. Fortunately *Myrtaceae* (bottle brushes, eucalypts, etc.) are so easy to germinate that they spring into seedlings before most wogs have got around to the first suck.

Preparation of Seed

Many seeds have a coating or device provided by nature to protect the valuable plant embryo inside until conditions are right for growing; otherwise this often harsh climate of ours would have cooked out our flora ages ago. The method that nature uses with many *Myrtaceae* is to keep the seed snug in the capsules on the bush or tree until it needs spreading, say after a bushfire. We have already released the seed from the capsules as above and have it fresh in the paper-bags.

Planting the Seed

The seed is so fine it is difficult to sprinkle over the surface of the sand in the pots or trays evenly. Some people mix it with a little dry sand in the bag to help distribute it properiy. I am usually too lazy, so try it straight from the bag or seed packet and make a mess of it. But *Myrtaceae* seed will grow anyway. Sprinkle sand over the seed in the pot, to just cover it.

The Direct Planting Method

Here you plant one seed or a few seeds to each small container. You can get 3 cm plastic pots. Fill them with the same medium as above and treat the same way in all respects. When the seedlings grow there is not the problem of separating them and replanting in individual pots. This method is finding wide appeal, especially for large difficult to get seed, particularly if the seed is pretreated and with some methods (see next issue) partly germinated before planting. With *Myrtaceae* this method is quite successful, as they grow so easily. Getting only a few seed into each container is the trick, and then pricking out all the unwanted seedlings as they came up is fine work.

Watering the Seeds

Try sprinkling water on top of the pots and see what a mess you make. The seed is splashed out, floats to the top, and usually ends up in a blob on top. Actually they are so easy to grow they will germinate anyhow. There is an easier, better way. I like the easy part.

The Bog Method

In this method you place the pots or trays in a shallow tray of such a depth that when it is filled with water it is one-third to one-half as deep as your sand or medium in the pot. I use the plastic containers from ice-cream "bricks", the small size, to hold two 10 cm pots. By keeping the water tray full of fresh water, capillary action of the sand will draw water up to the seed and keep it moist. The whole thing is automatic. You can forget to top up the tray for days and the seed still gets some moisture. Tap or tank water is all it needs. *Myrtaceae* seed grow so quickly there is no need to change it, just top it up. Many people use this method very successfully for more difficult seed that often takes longer to germinate, and in this case they take care with cleanliness and keeping the water fresh.

The Dunk Method

There is little difference to the bog method. Instead of standing the pots in a tray of water permanently, you stand them in water just long enough to get the surface wet. You would need to do this every day, but it is more successful with some more difficult seed.

How deep to have the water? This depends on how moist you want the surface. *Myrtaceae* are so easy they do not care. Most will take it very wet. Hence the term "the bog method". However, it is best moist, but not sopping, so adjust the level accordingly. As the seeds germinate, and the roots start to grow down, lower the water level so that it becomes only just damp on the surface. With Eucalyptus it is best to get the surface dry as soon as possible or you may get what is known as damping off. A growth dependent

Continued on page 31

So What Do We Do?

There are many other fine hardy plants in the plant family *Myrtaceae* (see page 23 If you are botanically minded). On page 2 I mention "Study Groups", and If you have strong red blood in you (tinged with a spice of *Eucalyptus* oil), you will want to know how to contribute. *Callistemon,* the bottlebrushes, are a suitable challenge for the beginner—see page 14. Using this project as a model, others are available.

Melaleuca—This group is also ideal for beginners. You may join by writing to Ralph Campbell, 50 Lee-Steeve Street, Kambah, A.C.T. 2902. Get your supply of free seed and competent advice. One thing is certain, you will get many plants from seed and they will grow well in your garden.

Eremaea—Eight really beautiful shrubs. I failed to get a good colour slide for this page, so if you have one, send it to me. For *Eremaea* study group write to Lyn Parry, Kariong via Gosford, N.S.W.

Kunzea—Beautiful shrubs. Who would like to grow and study them?



Photography by F. W. Humphreys

KUNZEA PULCHELLA

Previously known as *Kunzea sericea,* this outstanding ornamental shrub has attractive foliage which contrasts with the brilliant red flowers.

Beaufortia Too

More shrubs In the plant family *Myrtaceae* with "pom-pom" style flower-heads. There are 15 species, all very beautiful, bright shrubs. Four are shown In colour In Volume No. 3, page 61, and the magnificent *Beaufortia sparsa* appears on the cover of our book "Western Australian Wildflowers for Horticulture—Part 1" (see page 43). To learn more about these plants, obtain seed, etc., write to the Beaufortia Study Group leader, Brian Walters, 19 Hurley Street, Toongabbie, N.S.W., 2146.



Photography by F. W. Humphreys

BEAUFORTIA SQUARROSA

An upright open shrub to 1 metre high and wide, this picture shows how striking these plants can be.

CALYTRIX FOR THE EXPERIENCED GROWER

Our next Issue features *Myrtaceae* that are not so easy to propagate and grow. If you are an experienced propagator you may like to join the Calytrix Study Group by writing to Joan Doney, 64 Cary Street, Wyoming, 2251.

BOTTLE BRUSHES

Everyone knows a "bottle brush" (species of *Callistemon*), and thousands have grown them. They are easily grown and flower well. Some plants flower better than others. You can help us untangle the confused situation with their names, develop and grow only the best forms, and beautify your property at the same time. Join the Callistemon Study Group.

The objectives of the Callistemon Study Group are:—

(a) To grow bottle brush *(Callistemon)* plants and find the conditions that give best results—flowering, bush shape, feeding requirements, pruning, etc.

(b) To initiate a programme for the correct naming of all the species. As they cross-pollinate so easily, the nomenclature of the genus is very confused. By growing and flowering all species and forms in arboreta, the botanists will be able to review the genus and publish the names to be recognised, with descriptions.

(c) Plants that have special horticultural value will be used to develop outstanding garden plants. These may not only be good forms of true species, but varieties or hybrids that will be named and registered as garden cultivars.

To achieve these objectives we have arranged:—

1. To form a Callistemon Study Group. All readers are invited to join by sending $1.00 to the group leader as below.
2. Mr Bill Tongue of University Farms, University of Sydney, Private Bag, Camden, N.S.W., 2570, has been appointed Group Leader. He will be assisted by Bill Cane, Maffra, Victoria, one of Australia's most competent propagators, who has considerable experience and an established arboretum of some 50 forms of *Callistemon*.
3. Plantations of all species and forms will be established at various places around Australia, starting with:—
   (a) University Farms, Camden, N.S.W.;
   (b) Research Area, Bankstown Municipal Council, Maxwell Avenue, Milperra, N.S.W.;
   (c) Maffra, Victoria, by Bill Cane (P.O. Box 19, Maffra, 3860).
   (d) Laguna, N.S.W., by B. Thomas, 45 Badgery Avenue, Homebush, 2140.
   (e) Burrendong Arboretum—C. Althofer, 60 Thornton Street, Wellington, 2820.

   Any person or organization with room to grow 60 bottle brush bushes is invited to establish an arboretum. We will supply plants.
4. Members will grow plants in their gardens, reporting results and forward plant material for propagation of only the best forms. Plants of these will be made available to Study Group members.
5. Seed of all species will be made available to Study Group members free on request. Seedling plants are being distributed to those in Sydney and this service will be extended to members in all areas.
6. Propagating material will be obtained from all the best forms of *Callistemon* from all parts of Australia to grow on. If you do not want to be a member and join in the fun, and know of an especially good form of *Callistemon,* will you write to the leader above, or send propagating plant material to each of the three arboretum above?
7. As plants flower, a systematic botanist will commence research on the genus with the objective of its complete revision.
8. As good horticultural forms are discovered or developed they will be submitted for registration by The Australian Cultivar Registration Authority, Canberra Botanic Gardens, A.C.T. If nurserymen or readers have a good form they consider should be registered, then do this by sending flowering specimens to the Authority during 1977.

WESTERN MELALEUCA

DIGEST OF WESTERN AUSTRALIAN SPECIES *by R. J. Hubbard*

Western Australia is endowed with a wealth of *Melaleuca species*, with at least 114 recognised species (14 of them tropical) out of an Australian total of upwards of 140 species. Over 90 species are endemic to this State. Various recognised varieties have also been recorded and there are a number of natural hybrids and several horticultural forms. In addition there are many as yet undescribed plants which may prove to be distinct species when they have been fully investigated.

The genus has long been in need of complete taxonomic revision. Certain of the presently recognised species have so many diverse forms that they appear to represent composite species, while others appear to be so close that they may well be conspecific.

Articles in previous issues of *Australian Plants* have treated many aspects concerning the propagation and cultivation of the genus. This article is intended as a brief guide to the presently recognised W.A. species. Limitations of space dictate presentation of a minimum of information concerning each species. Unless otherwise stated, the species occur in the southern half of the State. Flowering times and general locations of most are broadly indicated in the King's Park *Descriptive Catalogue of W.A. Plants*. Varieties, hybrids and cultivars have been omitted. A number of named plants of undetermined status have also been omitted.

One or two of the species listed are ones previously thought to occur only in E. Australia. A number of new listings for tropical species are due to investigations by S. T. Blake (1969). One species, *M. coccinea* has only comparatively recently been described (A. S. George, 1966). A further species *M. baxteri* (G. Bentham, 1867) has been omitted from recent lists possibly through oversight. It is not at present represented at the W.A. Herbarium though it is available commercially and appears to be a distinct species. *M. curvifolia* and *M. lehmanni* have been included in *M. lanceolata* and *M. viminea* respectiveiy for the purposes of this article, though the author is of the opinion that *M. lehmanni* may possibly be a distinct species. The name *M. polycephala* has been reinstated in place of *M. seryphyllifolia* which has been found to be illegitimate due to prior usage (as a synonym for *M. pulchella*).

Asterisked species are ones believed to be endemic to W.A.

M. acacioides: A large shrub or small erect tree 6-10.7 metres; bark papery; foliage pale green. Flowers white or cream, in dense *Acacia*-like globular heads. A northern species from tidal swamps and river floodplains.

**M. acerosa:* An erect shrub, 0.9-1.8 metres, bushy above; leaves grey-green, ± hairy, generally pointed. Flowers pale yellow to white or red, in small dense globular heads. Coastal sands, often with limestone subsoil. Suitable for seaside gardens. Colour plate on page 16.

M. acuminata: A bushy shrub, 1.8-3 metres; branches twiggy; leaves medium green, pointed, 5-10 mm. Flowers very small, usually creamy white, single or in clusters of 3-5, often forming long spikes to 15 cm or longer. Profuse flowering. Wide spreading in cultivation. Very hardy. Colour photograph in Issue, 53, page 12.

M. adnata: A large shrub or small erect tree to at least 3-3.7 metres; leaves crowded, dark green, pungent. Flowers cream to white to pinkish white in dense oblong or cylindrical spikes 1-4 x 3 cm. Loamy soils. Suitable for quite dry sites.

**M. agathosmoides:* A diffuse shrub, ± 1 metre, spreading ± 2 metres; bark dark grey, corky; branchlets short, densely foliaged; leaves tiny. Flowers



Photography by F. W. Humphreys

MELALEUCA ACEROSA

white, single or clustered along old wood. From red loamy gravel, Coolgardie District. Unknown to date in cultivation.

M. alsophila: A bushy shrub to 2.4 metres, or a small straggling tree 4.6-7.6 metres; bark grey to white, papery; leaves ± 4-6 cm long. Flowers small, white to pale yellow or pinkish, in axillary or lateral clusters. A northern species, usually in woodland in sandy sub-saline soils.

**M. angulata:* A thick-stemmed, corky branched shrub, ± 30-90 cm; leaves overlapping. Flowers very small, lilac or deep pink, immersed at distinct angles in corky tissue of old wood, forming spikes. Fruits dense, covering stem. An attractive species from south coastal areas.

**M. apodocephala:* An erect shrub 1.2-2 metres, or rounded to 60-90 cm; branchlets short, slender, numerous; leaves crowded, pointed, ± 8 mm. Flowers small, yellowish or white, in closely clustered few-flowered heads. Sandy loam and white sands. Quite attractive.

**M. arenicola:* An erect, densely branched shrub, up to 2.7 metres; branchlets slender, leafy; leaves 8-12 mm. Flowers small, white, in small dense few-flowered sub-globular spikes. Sandy soils, Avon District, the exact location as yet unknown.

M. argentea: Usually a bushy crowned tree, 12-25 metres, occasionally a large shrub to 4.6 metres; bark whitish, papery; leaves large, ± silvery. Flowers pale greenish yellow becoming creamish, in large spikes sometimes to 15 cm long, often up to 4 spikes together. Very attractive northern species, often on banks or in beds of watercourses.

**M. aspalathoides:* A rigid, slender branched shrub, 60-90 cm; foliage and young branchlets densely silky hairy; leaves crowded, pointed, ± 1 cm. Flowers small, lilac, silky hairy, in few flowered clusters. Gravelly and sandy soils, Darling and Avon Districts. No herbarium specimen known.

**M. basicephala:* A bushy shrub, size unknown; branches twiggy; leaves 6-12 mm. Flowers pink or red, rather numerous, in small globular heads forming bases of leafy shoots. Location as yet unknown, though probably south coastal.

**M. baxteri:* An erect, very rigid tree, 9-10.7 metres; bark papery, light brown to cream; leaves light to medium green, 1.2-5 cm. Flowers small, white to greenish white, in globular heads. At junction of freshwater and saline estuaries, south coast. Good lawn tree. Very ornamental.

**M. blaeriaefolia:* An erect, dense, tall shrub or small tree, 4.6-6 metres; bark papery; leaves crowded, dark green, up to 6 mm long. Flowers quite large, red or white (also yellow-green?), in dense oblong-cylindrical spikes 5-6 x 2.5-3 cm. South coastal, often saline soils. Hardy.

M. bracteata: A dense, spreading shrub 1.8-4.6 metres in height and spread, or a tree to 9 metres or occasionally 15 metres; bark grey, fibrous; leaves ± 7-15 mm. Flowers rather insignificant, creamish, in short often leafy spikes. A northern species, rarely far from watercourses.

**M. bracteosa:* An erect to spreading shrub, 30-90 cm with a similar spread; leaves medium green, overlapping, ± 4 mm. Flowers small, cream to greenish white or pale violet tc mauve, in quite dense sub-globular to oblong spikes, sometimes few flowered, sometimes long and many-flowered. Close vegetation in sand overlying clay, often with winter waterlogging. Suitable for poorly drained sites. Attractive.

**M. brevifolia:* An erect shrub, 0.9-3 metres, slender branched, with numerous rigid branchlets; bark ashy, fissured; leaves overlapping, ± 4-6 mm. Flowers small, white, single or in tight few-flowered clusters often close together in apparent spikes. Sandy soils, saline flats, limestone, south coast. Should be a good seaside shrub.

M. caluputi: Sometimes shrubby (occasionally as low as 0.9-2 metres), more often a wide crowned tree to 21 metres, the trunk frequently stout and twisted; bark papery, white to greyish to grey-brown; leaves large, silky tc somewhat glaucous. Flowers white or greenish white to cream, in dense spikes 3.5-9 x 2-2.5 cm, singly or 2-3 together. A very ornamental northern species, adaptable for temperate areas as a garden or street tree. Optimum height (not in W.A.) 35-41 metres. Colour plate on page 44.

**M. calothamnoides:* An erect, bushy shrub, 1.2-1.3 metres; leaves light green, 1.2-1.9 cm long. Flowers large, red and green, in dense cylindrical spikes up to 5 x 3.8 cm. Rocky sandy soils in heath, Irwin District. Very attractive. Easily cultivated.

**M. calycina:* An erect, rigid, bushy shrub, 0.9-1.5 metres; leaves 8-10 mm, pointed, decussate. Flowers usually rather small, creamish with pink, 2-3 together in clusters or ± globular heads. Clay and sand, south coast. Attractive. Fruits star-like on top.

**M. canaliculata:* An erect shrub, size unknown but probably low; leaves 1.5-2 cm long, narrowly furrowed underneath. Flowers lilac, in dense many-flowered globular heads. Location not known, but most likely south coast.

**M. cardiophylla:* A slender or spreading, much branched shrub or under-shrub, 60-90 cm, up to 1.8 metres across in cultivation, with numerous drooping branchlets; leaves grey-green, 6-12 mm, of variable shape. Flowers in usual form yellow or white, in other forms green or greenish cream or pink, borne in small or large lateral clusters along old wood. Long flowering. Widespread from south coast to Ashburton District. An excellent border or rockery plant.

**M. carinata:* A shrub, ± 60 cm; leaves about 8 mm, acute, acutely keeled. Flowers purple, pedunculate, terminal, single or rarely in few-flowered clusters. Exact location unknown, but most likely south coast.

**M. ciliosa:* A straggling shrub, 0.75-1.8 metres; branches rigid, hairy; leaves grey-green, up to 6-7 mm, with deciduous hairs. Flowers usually yellow suffused purple, sometimes lemon yellow, orange or red, in globular heads 1.5-2 cm diam. Sand and gravel, north of Moore River. Bushy in cultivation. Attractive.

**M. citrina:* A slender branched shrub, 1.8-3.7 metres, up to 2.4 metres across in cultivation; leaves crowded, glossy, becoming deep green, 1.5-1.8 cm. Flowers lemon yellow, in very dense oblong-ovoid spikes 2.5-4 x 2-3 cm or larger. Granitic and quartzite soils. Very beautiful. The brightest yellow of any species. Easily cultivated. Colour plate on page 37.

**M. cliffortioides:* A spreading, rather prickly, bushy shrub, 1.2-1.8 metres; branchlets numerous, very short; leaves very pungent, overlapping, 8-10 mm, dark green. Flowers white, 1 x 1 cm, single and distant from each other. Damp sandy clay in mallee and woodland, south coast.

**M. coccinea:* An erect or spreading, *Beaufortia*-like shrub, 0.9-2 metres; leaves decussate, bright green, 4-10 mm, ovate-cordate. Flowers bright red to scarlet, in dense oblong-cylindrical spikes 5-7 x 2.5-4.5 cm. Sandy loam and granite outcrops, Coolgardie District. Very beautiful. Easily cultivated. Very suitable for landscaping. Fruits ornamental.

**M. concinna:* A rigid shrub, 60-90 cm or sometimes to 1.8 metres, spreading 1.8-2.4 metres in cultivation; branches thick, often twisted; leaves 6-12 mm, pointed, with wavy margins. Flowers creamy white, "claw-like", 1.2 cm diam., in clusters of 1-4 along old wood. Clay or sandy clay, in close vegetation. Attractive. Good border or rockery plant.

**M. concreta:* An erect, slender branched shrub, 0.6-1.2 metres; leaves 4.5-6 cm long. Flowers cerise, borne in ± globular heads 1.5 x 2 cm. A beautiful species, well worth trial in cultivation. From vicinity of Murchison and Hutt Rivers. Fruits very compact ± ovoid spikes. Colour, pp. 36.

**M. conferta:* An erect, few-stemmed shrub, 30-45 cm x 60 cm, quite dense, with numerous short slender branchlets; leaves crowded, greyish green, ± 4 mm. Flowers 5-6 mm diam., light mauve, single or in few-flowered clusters on old wood. Sandy, light gravelly and granitic soils (sometimes moist), south coast. Very good rockery or border plant.

**M. conothamnoides:* An erect, much branched shrub, 0.6-1.8 metres; leaves grey-green, rigid, 1.2-4 cm long. Flowers purple or red fading to near-white, in globular to ovoid heads 2-3 x 1.2-2.5 cm. Gravelly or sandy soils. Very attractive. Not fast growing. Possibly not separable from *M. oldfieldii.*

**M. cordata:* A rigid, quite open shrub, 0.6-1.5 metres, spreading 0.9-1.8 metres; branches slender, little forked; leaves ± heart-shaped to round, rather variable, from 6-8 mm long to 4 x 3.5 cm. Flowers scarlet-pink to purplish, in dense globular heads up to 3 x 4 cm. Sand, loam, gravelly and granitic soils. Very beautiful. Dry or moist conditions.

**M. cuculiata:* A dense erect shrub 1.2-2 metres or more, often a small tree 3.7-4.6 metres, up to 3.7 metres across; bark grey, papery; leaves 6-12 mm, ± decussate, ± peltately attached at base. Flowers rather small, white or cream, in globular or oblong spikes 1.2-2 cm long. Clay-loam soils, south coast. Attractive. Possibly a good windbreak.

**M. cuneata:* An erect, open or bushy shrub, 0.3-1.5 metres, spreading 60-90 cm, finely hairy throughout; leaves blue-green, wedge-shaped, 7-8 mm. Flowers lilac or purplish pink, in globular heads 1-1.5 cm diam. Sand, gravelly sand and sandy loams. Attractive.

**M. cuticularis:* A large shrub or small tree, crooked and 2.4-3 metres or straight and 4.6-9 metres; occasionally to 15 metres; much branched, very leafy; bark papery, glistening white; leaves dark green to greyish, 6-12 mm. Flowers white to creamish, single or in heads of 2-3 along the axils in ± globular heads to 2 cm diam. Clay, white sand, rocky loam, usually clear water (often saline). Very attractive. Hardy. Tolerates poor drainage.

**M. cymbifolia:* A dense shrub, 1.8-2.4 metres; branchlets numerous, very short; leaves boat-shaped on top, up to 6 mm long, rather crowded. Flowers small, white, in few-flowered globular heads ± 1 cm diam. Tea-Tree scrub, fringes of salt lakes. Attractive. Flowers plentiful.

**M. densa:* A dense bushy shrub, 0.9-1.8 metres, sometimes to 3 metres across; branches sometimes arching; leaves very variable in size and arrangement, often overlapping, grey-green to medium green. Flowers small, pale yellow or cream, in small dense heads. Sandy and clay soils. Excellent foliage shrub. Some forms possibly merit separation as distinct species.

**M. depauperata:* An erect, quite dense shrub, up to 2.7 metres, about 1.8 metres across. Leaves about 3 mm. Flowers pink or purple, in short, loose few-flowered globular heads. Sandy loam, south coast. Hardy. Attractive. Useful windbreak. Colour plate on page 9.

**M. depressa:* A compact shrub, 0.9-1.8 metres, much branched but not dense. Leaves whorled, dark green, 7-9 mm long. Flowers pale yellow or cream, in dense ± globular-ovoid heads. Gravelly and sandy soils, often damp. Attractive.

**M. diosmifolia:* A dense rigid shrub, 1.8-3.7 metres height and spread, very leafy; leaves dark green, 6-20 mm long. Flowers large, greenish yellow, in dense oblong or cylindrical spikes up to 7.5 x 3.8 cm. Moist peaty and stony soils and among granite rocks, south coast. Excellent foliage shrub. Good hedge. Tolerant of salt spray. Colour photograph Issue No. 53, page 5.

**M. dissitiflora:* An erect tree, 7.6-9 metres; bark greyish, papery; leaves narrowly pointed, 2.5-4 cm long. Flowers white or creamish, borne singly in the axils. Sandy loam along creeks in Kimberley District. Attractive.

**M. eleutherostachya:* A dense shrub, usually 1.8-2.4 metres, sometimes to 5.5 metres; leaves narrowly pointed, 6-12 mm long. Flowers white, in rather loose oblong-cylindrical spikes 2.5 cm long. Clay and sand (often yellow

with lateritic pebbles), northern and southern areas including inland. Several forms. Very attractive. Colour plate on page 8.

**M. elliptica:* A much branched shrub, 1.2-2.4 metres or sometimes exceeding 3 metres in cultivation, spreading 0.9-1.8 metres; leaves grey-green to blue-green or sometimes pale green, elliptic-ovate, 5-15 mm. Flowers usually dull red to brilliant scarlet, sometimes yellow, white, pale pink or coppery pink, sometimes two colours on one plant, in dense oblong-cylindrical spikes 5-8 cm long. Sandy soils amongst granite rocks. Very showy. Very hardy. Colour photograph Issue No. 53, page 4.

**M. erucaeformis:* A dense, erect shrub, 0.9-1.2 metres; branchlets short, numerous; leaves crowded, in overlapping whorls, dark green, 2-3 mm. Flowers small, yellow, in very small dense oblong spikes. Gravelly and granitic soils. Attractive.

**M. fulgens:* A quite bushy shrub, usually about 90 cm in wild, to 3 metres or even sometimes 4.6 metres in cultivation, 1.2-2.4 metres across; leaves narrow, light green to grey-green, ± 2-3 cm. Flowers rich scarlet or carmine, in showy dense oblong spikes 5-8.5 cm long. Profuse flowering. Very conspicuous. Amongst granite rocks and on gravel ridges. Many beautiful hybrids with *M. radula* and a garden hybrid with *M. steedmanii.* Colour photograph Issue No. 53, page 8 and No. 41, page 196, and Issue 64, page 181.

M. gibbosa: A recent recording for W.A. A dense or loose shrub, 1.5-3.7 metres, with very numerous slender branches and short branchlets; leaves crowded, ± decussate, grey-green, mostly 2-6 mm. Flowers pink or mauve to purplish or cobalt blue to reddish, fading to white, opposite and decussate, in short ovoid or almost globular heads or spikes 1-1.5 x 1 cm, mainly summer flowering. Sandy soils, coastal Eucla District. Beautiful. Colour photograph Issue No. 53, page 36.

**M. glaberrima:* A dense or open shrub, 0.9-1.2 metres, about 90 cm in spread; branchlets arch under weight of flowerheads; leaves crowded, 2-3 mm long. Flowers pale pink, in dense oblong or cylindrical spikes 1-3 x 1.5 cm. Peaty, sandy clay and sandy loam soils. Very beautiful. Very good rockery or border plant.

**M. globifera:* A tall bushy shrub or small tree 2.7-9 metres, spreading up to 4.6 metres; bark light brown, papery; leaves dull green, ± 4-6 cm. Flowers cream to yellow, in dense globular heads 2 cm or more diam. Granite rocks, south coast. Beautiful. Good windbreak or hedge. Very suitable for exposed conditions.

M. glomerata: A tall shrub or small tree, 2.7-5.5 metres, sometimes to 9 metres; bark whitish, papery; leaves blunt or pungent, hairy, 1.5-5 cm long. Flowers tiny, yellow to white, in small dense globular or rarely ovoid heads. Profuse flowering. Sandy soil near creeks, rocky gullies, northern areas. Very ornamental. Very suitable for dry conditions.

**M. graminea:* An intricately branched shrub, 2.4-4.6 metres; leaves sharp pointed, 4-6 cm long. Flowers white to cream, in dense globular to subglobular clusters about 8mm diam. Coastal sands and rocky soils in northern areas, exact location as yet unknown. Plants sold under this name have most likely been misidentified.

**M. hamulosa:* A rigid, many stemmed, much branched shrub, 1.8-2.4 metres, with similar spread, sometimes to 3.7 metres height; twiggy, with many short ± weeping branchlets; leaves 6-15 mm, with fine recurved tips. Flowers white to cream or pink to mauve, in many flowered spikes 4-6.5 x 1.6 cm. Various soils and conditions. Very attractive.

**M. holosericea:* A bushy shrub, 60-90 cm or up to 1.8 metres, spreading 1.2-1.8 metres, the whole shrub ± hairy; leaves crowded, dull green, 6-12 mm or longer. Flowers beautiful deep pink, in few-flowered globular heads ± 1.5 cm diam. Very showy. Sandy and stony clay soils. Hardy.

**M. huegelii:* A dense bushy shrub usually 1.5-2.4 metres, sometimes to 3.7 metres, rarely to 6 metres, generally spreading 1.8-2.4 metres; branches

corky; leaves stem-clasping, dark green, about 2 mm long. Flowers white to whitish cream or rarely pale pink, in spectacular slender, rather dense cylindrical spikes 5-10 cm long. Limestone and sand formations, often in close proximity to sea. Highly ornamental. Very hardy. Good beach shrub, windbreak or hedge. Cclour photograph Issue No. 20, page 273.

**M. incana:* A very dense, widely spreading shrub or small tree, 1.8-3 metres height and spread, with weeping branchlets; leaves grey or green in many shades, 6-15 mm long. Flowers small, pale to deep yellow or occasionally whitish, in profusion in small dense ovoid or oblong spikes 2.5 x 1 cm or occasionally 5 cm long. Swampy flats in peaty soils or sometimes in gravel. Highly ornamental. Very hardy. Good hedge. Colour photograph Issue No. 20, page 273 and No. 43, page 293.

M. lanceolata: A large shrub or small spreading tree, 4.6-9 metres, very densely crowned, widely spreading; bark dark grey-brown to blackish, persistent; leaves pointed, dark grey-green, 5-15 mm. Flowers white or creamy white, in loose sometimes leafy cylindrical spikes up to 5 x 2 cm. Sandy soils, coastal limestone, red loam overlying granite. Very attractive. Good seaside shrub. Very good shade, windbreak and hedge plant. N.B.: *M. curvifolia* with a tendency to recurved leaves is considered to be an inland form of this species.

M. lasiandra: A bushy shrub 1.3-2.4 metres or a small tree to 3.5 metres or sometimes to 10 metres; branches hairy; foliage silky when young; bark whitish, papery; leaves 2.5-5 cm long. Flowers crimson to red, in interrupted cylindrical spikes 2-4 x 1.2 cm, usually 2-3 together. Arid sandy soils, red loam, desert scrub or near streams, northern areas. Attractive. Flowers plentiful. Very suitable for dry inland areas of north.

**M. lateralis:* A rounded to spreading shrub 30-90 cm with a spread of 0.9-1.8 metres, or erect and 1.2-2.4 metres with a 0.9 metres spread; branchlets numerous, branches ± bare; leaves medium green, overlapping, 6-7 mm. Flowers lilac to deep pink, in small dense globular heads 6-10 mm diam. Profuse flowering. Very showy. Sand, gravel and graveily loam. south coast. Very suitable for borders or rockeries.

**M. lateriflora:* A dense shrub, 1.5-1.8 metres or up to 3-3.7 metres, spreading 3.7 metres; leaves 4-8 mm, crowded at ends of branches. Flowers creamy white, "claw-like", 1.2 cm diam., numerous, in globular clusters of 4-7. Swampy, sandy, light clay soils, in close vegetation. Very attractive. Very good windbreak. Suitable for saline soils. Of variable form.

**M. lateritia:* An open or fairly dense shrub, to 90 cm in wild, 1.3-2.4 metres or sometimes to 3 metres in cultivation, spreading to 1.3 metres; leaves grey-green to dull green, pointed, 1.2-2 cm. Flowers orange-red or brick red, in dense oblong or cylindrical spikes 5-10 x 3.3 cm. Swampy soils, often clay, often winter waterlogged. Highly ornamental. Tolerates quite dry conditions in garden, but best with moisture. Colour photograph Issue No. 20, page 273.

**M. laxiflora:* An erect to spreading, open shrub, 1.2-1.8 metres or sometimes 2-3 metres; leaves blue-green, 6-19 mm, mostly ± 12 mm. Flowers purple-pink to pale red, in masses in rather loose leafy cylindrical spikes 2-4 x 1.5-2 cm. Sand heath, amongst granite rocks, near watercourses, sometimes somewhat saline but generally fresh water. Tolerates quite dry garden conditions. Very ornamental. Colour photograph Issue 53, page 44.

M. lehmanni: See notes under *M. viminea.*

M. leiocarpa: A dense shrub, from 90 cm to 1.8-3 metres; leaves mostly 1.2-1.9 cm. Flowers tiny but plentiful, white to yellow, in loose few-flowered globular spikes 1.5-2 cm diam. Red sands or rocky soils, inland. Withstands quite dry conditions.

**M. leiopyxis:* A quite slender shrub or undershrub, usually 1.2-2.4 metres, sometimes up to 4.6 metres, with numerous short branchlets; leaves 6-12 mm. Flowers very tiny, white or yellow or pale mauve, in few-flowered globular

heads 5-6 mm diam. Limestone hills, Irwin and Austin Districts. Possibly a useful seaside shrub.

**M. leptoclada:* A slender branched, bushy shrub, 60-90 cm; leaves under 4 mm or 6-12 mm. Flowers very small, white, in few-flowered clusters at bases of leafy branchlets. Sand flats, coastal areas.

**M. leptospermoides:* A compact, fairly bushy shrub, 60-90 cm or sometimes to 1.8-2 metres; branches squarrose; leaves nearly overlapping, grey-green or bronze-green, usually ± 6 mm. Flowers purple, in small dense globular clusters about 1.5 cm diam. Sand heath, sandy gravel, often dry conditions. Attractive.

M. leucadendron: An erect tree, 15-40 metres, commonly below 25 metres, green crowned, with lower branches and branchlets often long and drooping bark papery, white to greyish; leaves pointed, mostly 10-19 x 1-2 cm. Flowers white or creamish or occasionally pink or red, in loose interrupted spikes usually 1-8 together. Riverain soils (sand and gravelly sand) in northern areas. Very ornamental. Grows well in temperate areas. Very good street and shade tree. Colour photograph Issue 64, page 148.

M. linophylla: A tall shrub, ultimate height unknown, slender branched; bark grey, papery; leaves pointed, 1.5-2 cm. Flowers very small, probably white, in loose or ± dense cylindrical spikes 2-4 cm long at bases of leafy branchlets. Fortescue and Ashburton Districts.

**M. loguei:* Possibly only a form of M. lasiandra. A much-branched shrub about 2.4 metres; leaves pointed, 1.2-2.5 cm long. Flowers small, white, in loose spikes about 2.5 cm long. Dry sandy soils near wells in desert south of Fitzroy River.

**M. macronychya:* An open, spreading shrub, 1.8-2.4 metres; leaves light green to grey-green, 3.5-5 cm. Flowers large, rich red, in dense oblong or cylindrical spikes 4.5-7 x ± 4 cm. Vicinity of granite rocks, often in watercourses. Beautiful. Summer watering essential for flowering. Colour photograph Issue 53, page 9.

**M. megacephala:* A rigid, very bushy shrub 2.4-3 metres, spreading 1.2-1 metres or more; leaves pubescent, green to grey-green, ±rounded and 8-12 mm or more oblong and up to 2.5 cm. Flowers pale to deep yellow, in dense globular heads 2-4 cm diam., often 3-4 clustered together. Sand heath and rocky soils, Irwin District. Many forms. Very ornamental. Hardy. Colour photograph Issue 47, page 108.

**M. micromera:* A dense pyramidical shrub, 0.9-1.3 metres or up to 2.4 metres, sometimes to 3.7-5 metres; branches often pendulous, branchlets short, numerous and intricate; leaves minute, scale-like, mostly whorled. Flowers small, purple, in profusion in small dense globular heads ± 4-6 mm diam. Rocky coastal sand, gravel, gravelly sand, gravelly loam, south coast. Very attractive. Colour photograph Issue No. 54, page 92.

**M. microphylla:* A dense spreading shrub, usually 0.9-1.2 metres, sometimes to 3 metres, mostly to 1.2 metres across; leaves dark green, 4-6 mm long, rather crowded. Flowers rather large, yellow or creamish, in dense cylindrical or ovoid heads up to 2.5-3 x 1 cm though often smaller. Sandy soils, often bordering salt lakes. Attractive. Excellent low hedge. Very slow to flower in Perth's sands. There is also a white flowered form.

M. minutifolia: A low straggling tree 3-4.6 metres or sometimes to 3 metres; branchlets numerous, extremely fine, quite dense; bark dark grey, fibrous; leaves scale-like, overlapping, appressed, mostly 1-2 mm, sometimes 3-6 mm. Flowers very small, white, in small dense ovoid heads or cylindrical spikes up to 5 mm long. Sandy, sandstone or granitic soils, northern area. May be grown in temperate areas.

Continued on page 35

THE PLANT FAMILY MYRTACEAE

Part 1 by C. N. DEBENHAM

MYRTACEAE: About 90 genera of trees and shrubs, the 50 in Australia with leaves rarely deciduous, always simple, entire, coriaceous or sclerophyllous and with oil-glands (sometimes obscure) apparent as black dots when dried and translucent by transmitted light when fresh. Pollination by insects.

Australian genera.

Inflorescence: mostly axillary, cymose, racemose, or solitary-flowered.

Flowers: bisexual (a degree of incompletion sometimes occurs within inflorescences), regular.

Calyx: of 4 or 5, rarely more or less, sepals on the rim of a floral tube or receptacle, imbricate — except in *Eucalyptus*, rarely fused in an operculum or calyptra and deciduous as a unit.

Corolla: when free and distinct, of petals the same number as the sepals arising from a disc lining the summit of the receptacle, imbricate, white or of shades of pink.

Stamens: often numerous, but sometimes as few as 5, in one or more whorls on the margin of the disc, free or connate at least basally in a tube, cluster or bundle usually opposite the petals, perigynous or epigynous.

Gynoecium: a multi-or uni-carpellate, inferior ovary adnate to the wall (at least partially) of the receptacle, with a single style and simple, usually capitate, stigma.

Fruit: dry (indehiscent or a multi-locular capsule) or succulent (then a berry) included by the receptacle: seeds with little or no development of endosperm.

In the fields of timber, fuel, pulp for paper, fibre for building boards, essential oils, honey production and pollen sources, tree establishment for shade and shelter, farm and estate, avenue and street, park and garden, no family so characteristically Australian has provided so much. Much is contributed directly by the bloodwoods, gums, ashes, boxes, ironbarks, peppermints, stringybarks, mallees, etc., of *Eucalyptus*, source of the world's largest hardwood trees and the only true dominant of our forests. Turpentine from *Syncarpia glomulifera* and Brush Box of *Tristania conferta* are timbers with world-wide reputation. The Lilly Pilly of *Acmena smithii*, the "Apples" of *Angophora*, the tea trees of *Leptospermum* and *Kunzea*, paperbarks of *Melaleuca*, bottlebrushes of *Callistemon*, the Geraldton Wax of *Chamaelaucium uncinatum* and the various western heath myrtles are a familiar part of our landscape and gardens.

Of the exotics, the New Zealand Christmas Tree *Metrosideros excelsa*, a well-known street tree of the eastern coast and the South American *Feijoa sellowiana* of gardens, are worthy of mention. Cultivated also here for its fruit is the *guava* of *Psidium guajava* of Central America. Familiar drugs used in this country include the oils and spices of cloves (from the buds of *Eugenia aromatica* native to the Mollucas, but chiefly grown in Africa), and allspice (from fruit of *Pimenta officinalis* chiefly of Jamaica).

KEY TO THE GROUPS

SUB/GROUP NUMBER

1. Fruit succulent. Trees or shrubs essentially of the rainforest. Leaves coriaceous, broad and flat, pinnately-veined, opposite. Inflorescences mainly determinate (cymose). Greatest distribution extra-Australian, particularly within both tropical and temperate regions of North and South America. (Sub-family *Myrtoideae*). 1-8

II. Fruit dry. Trees or shrubs essentially of the sclerophyll forest. Greatest distribution within Australia.
(Sub-family *Leptospermoideae*).

A. Fruit indehiscent or not capsular, 2-locular. Leaves as in I. 9-12

B. Fruit dehiscent, a 3 or more locular capsule.

(a) Predominantly trees with leaves opposite or alternate, otherwise as in I. Inflorescences primarily determinate (cymose). 13-19

(b) Predominantly shrubs with narrow or small sclerophyllous, longitudinally-veined leaves. Inflorescences primarily indeterminate (solitary and axillary, or racemose). 20-

(i) Stamens free.
Leaves alternate. 20-24
Leaves opposite. 25-29

(ii) Stamens united. 30-37

III. Fruit dry, indehiscent, 1-locular. Leaves and inflorescences primarily as in II.B.(b). Essentially shrubs of heath communities, particularly developed in the west, confined to Australia.
(Sub-family *Chamaelaucioideae*).

(a) Stamens in a single whorl, definite in number. 38-43

(b) Stamens in more than one whorl, in number above 20. 44-50

I. Fruit an included berry, i.e. with a wall (hard or self-textured) formed by the fusion of receptacle and ovary enclosing a succulent or pulpy interior embedding one or more seeds, usually ovoid or globular and surmounted by a rim formed by the persistent part of the sepals, sometimes coloured. Stamens free, numerous, often longer than the 4 or 5 petals. Leaves opposite, mostly broad and pinnately-veined. Flowers from 1 to several on axillary peduncles (variable within the genus), rarely sessile. pink or white.

Trees and shrubs especially of the tropical and sub-tropical rainforest of the eastern coast.

Of the 40 or more genera bearing succulent fruit (i.e. sub-family *Myrtoideae*), *Myrtus* and *Eugenia* are most prolific in number of species. *Myrtus* is confined to temperate regions. especially of South America (the classical myrtle, *M. communis* is of southern Europe and western Asia): *Eugenia* essentially is of tropical America. The links of these two genera with Australia are obscure. *Austromyrtus* and *Pilidiostigma* have been segregated from *Myrtus, Acmena* and *Syzygium* from *Eugenia*, to leave a small residue of tropical species yet to be treated.

1. Ovary 1-locular. Leaves with a curved prominent vein on each side and in line with the mid-rib, silky-haired on the undersurface.
Floral receptacle not produced above the ovary. Petals and sepals 4. 1. *Rhodamnia*.

1. Ovary 2 or more locular. Leaves longitudinally 3-veined only in one or two species of *Rhodomyrtus* (when the sepals and petals are 5).

2. Floral receptacle narrowed rather abruptly and not produced above the ovary. 3

2. Floral receptacle tapered gradually below and usually produced above the ovary. 6

3. Stigma disc-like and prominent, attached to its style on the undersurface (i.e. peltate). Sepals and petals 5. Fruit usually black. 4

Stigma terminating the style as a small cap. Sepals 4 or 5. 5

4. Ovary 2 or 3 locular, the ovules within each locule in a single row. Anthers with scattered, immersed glands. Seeds 1 to 8, relatively large, with a membranous coat marked by wart-like glands. 2. *Pilidiostigma*.

4. Ovary 1 to 3 locular, but divided by septa to appear multi-locular, the ovules within each locule in 2 or more rows separated by the longitudinal and transverse septa sometimes apparent in the fruit. Seeds from several to numerous, with a horny coat. 3. *Rhodomyrtus*.

5. Ovary 2 locular. Seeds few to several, with a hard but smooth coat. Leaves sometimes (e.g. *A. tenuifolia*) narrow and with recurved margins. 4. *Austromyrtus*.

5. Ovary 3 to 5 locular. Seeds few, with a horny, glandular-warted coat. 5. *Decaspermum*.

6. Ovary 2-locular. Sepals and petals usually 4, free or calyptrate and deciduous, fruit often large, usually 1-seeded, the seed with membranous coat.

7. Sepals in bud calyptrate, falling away irregularly and transversely from the receptacle. 6. *Cleistocalyx*.

7. Sepals free (sometimes, especially in *Acmena*, much reduced).

Anther-lobes parallel, opening longitudinally. 7. *Syzygium*.

Anther-lobes globular but distinct, opening by terminal pores or slits. 8. *Acmena*.

II. A. Fruit dry and indehiscent (included by the receptacle), 2-locular (or sometimes 1 in *Fenzlia*), in some *Backhousia* dividing to 2 dehiscent mericarps, in *Fenzlia* with a hardened endocarp enclosing 1 or 2 seeds. Stamens free, numerous; anthers versatile, the lobes parallel and opening longitudinally. Leaves opposite, pinnately-veined, usually broad and flat. Sepals and petals 4 or 5 (except in *Osbornia*).

1. Ovules 1 per loculus. Stamens in a single whorl, several times the length of the petals. Flowers free, sessile in globular heads on long peduncles. Sepals and petals distinct, the former persistent. Small trees. 9. *Choricarpia*.

1. Ovules from two to several per loculus. Stamens in 2 or more whorls, only slightly longer, or shorter than the petals.

2. Flowers pedicellate in pedunculate clusters. Receptacle produced above the ovary, the sepals petaloid. Shrubs or small trees. 10. *Backhousia*.

2. Flowers solitary. Receptacle not produced above the ovary. Shrubs, usually low, confined largely to the northern tropical coast, *Osbornia* to littoral or mangrove communities.

Flowers sessile. Sepals 8, short and obtuse; petals none. 11. *Osbornia*.

Flowers pedicellate. Sepals 5, acute; petals 5. 12. *Fenzlia*.

II. B. Fruit an included capsule loculicidally dehiscent into valves the same number as the locules.

(a) Flowers mainly in clusters on terminal or axillary peduncles. Trees with leaves broad and flat, coriaceous, pinnately-veined, often with a continuous vein (intramarginal vein) parallel or concurrent with the margins. Stamens numerous, longer than the petals, free (except in *Tristania*); anthers mainly versatile, the lobes distinct, parallel, dehiscing longitudinally.

1. Sepals distinct as teeth (*Angophora*, some *Eucalyptus*) or fused as a single layer alone or with petals in an operculum (most *Eucalyptus*). Flowers in umbellate clusters or the clusters compound and appearing as a corymb or panicle, rarely (as in *E. globulus*) the cluster reduced to a single flower. Capsule never prominent from the receptacle, at most the top level with the rim, 3-6 locular.

Petals free. Leaves mainly opposite. Flowers corymbose. Wall of receptacle in fruit usually thin-textured, ribbed, surmounted by the hardened sepals. Species all eastern, sometimes (e.g. *A. cordifolia)* shrub-like and scrub-forming. 13. *Angophora.*

Petals when present usually fused with the sepals. Leaves mainly alternate when adult, in very few species the frequent opposite nature of the earlier-formed (juvenile) leaves retained in the adult stage. Flowers mostly umbellate, sometimes paniculate (corymbose in one section). Receptacle in fruit rarely prominently ribbed, usually the wall smooth and hardened or woody. Anthers sometimes adnate to the filament and not versatile, or opening in pores. Sometimes reduced to shrub-like mallees or marlocks. 14. *Eucalyptus.*

1. Sepals and petals distinct, 4 or 5. Flowers mainly in cymes. In other than *Syncarpia,* and some species of *Tristania,* the capsule raised above the rim of the receptacle, the locules mainly 3.

2. Stamens united in bundles opposite the petals, sometimes (e.g. *T. neriifolia*) irregularly or very briefly so. Leaves mostly alternate (opposite in the species quoted). Trees and shrubs of the tropical and temperate eastern coastal scrub. 15. *Tristania.*

2. Stamens free. Species confined to the tropics except a single *Syncarpia.*

3. Flowers sessile, united by their receptacles to form a globular head which, in fruit, appears as a woody, fused cluster. Leaves opposite. 16. *Syncarpia.*

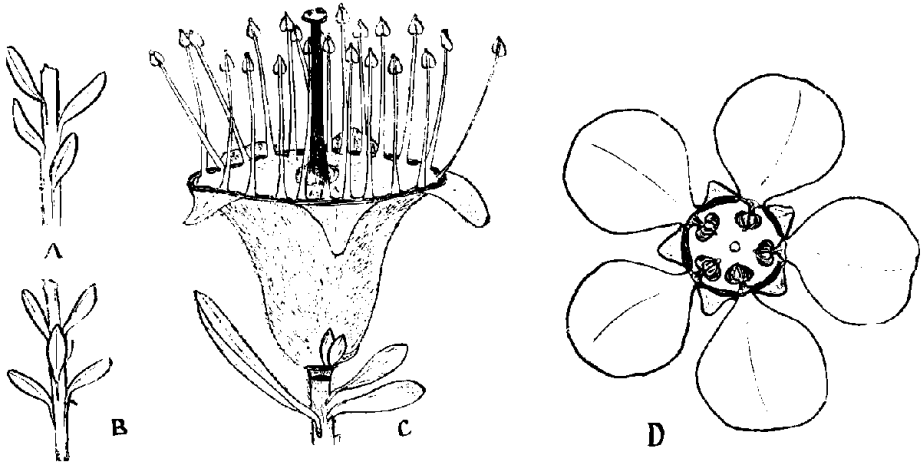
3. Flowers free from one another, not in globular heads when several together. Capsule globular, dehiscent almost to the base, the receptacle saucer-like.

4. Leaves narrowly linear, with revolute margins, opposite. Stamens in 2 or more whorls, the inner shorter than the outer. Capsule 3-locular. 17. *Lysicarpus.*

4. Leaves broad and flat, opposite in *Metrosideros,* rarely opposite in *Xanthostemon.* Stamens in 1 or more whorls and of equal length.

Ovules numerous in a single row on the margin of the placenta. Ovary sometimes 2-locular, or up to 6-locular. 18. *Xanthostemon.*

Ovules numerous in several rows on the placenta. Ovary 3-locular. 19. *Metrosideros*.
(The 2 species do not share the features of other *Metrosideros*, e.g. of New Zealand, and may require segregation.)



A. Leaves alternate. B.—Leaves opposite. C.—*Leptospermum myrsinoides* flower showing numerous stamens arising separately in a single row within the ring of persistent sepals. The petals have dropped off. D.—Flower showing the disposition of five stamens opposite five petals alternating with the tiny sepals.

(b) Flowers axillary, solitary, when several close together forming heads, clusters, or spikes, less commonly corymbs or racemes. Mostly shrubs with narrow or small, sclerophyllous leaves, the mid-rib alone conspicuous or with 1 or 2 sets of veins parallel with the mid-rib. Sepals and petals 5, distinct and free.

(i) Stamens free or, if partially united (e.g. *Astartea*), not in bundles or clusters opposite the petals.

1. Leaves alternate. Fruit usually becoming woody (except in *Kunzea*). Anthers versatile, dehiscing longitudinally, the lobes parallel.

2. Stamens not longer than the petals.

3. Flowers usually solitary or few in clusters, axillary or at the ends of short branches, rarely pedicellate or several in a head. Ovary 3-10 locular (often 5), the ovules descending and recurved from the placenta in the upper part of the locule. Stamens usually 25 or more in a single whorl. 20. *Leptospermum*.

3. Flowers several, sessile in a dense globular head. Ovary 3-locular, the ovules erect on a small basal placenta. Stamens with a tendency to grouping opposite the petals.

4. Stamens either 10 grouped opposite the petals, or 20 or more regularly in a single whorl. Ovules few in each loculus. Petals long-persistent. Species all western. 21. *Agonis*.

4. Stamens 40 to 50 united in an undulate ring with a tendency to grouping opposite the petals. Ovules 10 to 15 in each loculus. Petals not persistent. One eastern tropical species. 22. *Sinoga*.

2. Stamens longer than the petals, either in 2 or 3 whorls (*Kunzea*), or in several whorls (*Callistemon*). Flowers sessile (or almost so in some *Kunzea*), when in heads or spikes the floral shoot usually (all *Callistemon*) continued as a vegetative shoot.

   Flowers in terminal heads, dense clusters, or short spikes. Capsules not woody, usually retaining the sepals, 2 to 5 locular. 23. *Kunzea*.

   Flowers regularly in spikes, usually showy from the very long red or white filaments. Capsule woody, without sepals, 3 or 4 locular. Stamens rarely (e.g. *C. viminalis*, *C. speciosus*) in clusters or united basally in a single ring. 24. *Callistemon*.

1. Leaves opposite. Fruit hardened or not, rarely noticeably enlarged. Stamens shorter than, or only slightly longer than the petals, in a single whorl (except some *Astartea*). Ovary sometimes 2-locular in *Scholtzia*, *Baeckea* and *Hypocalymma*.

5. Stamens free (or in *Hypocalymma* very shortly united basally in a ring). Flowers axillary, solitary or few to several together, sessile or pedicellate. Stamens rarely (a few *Baeckea*) with dilated filaments.

6. Stamens numerous; anther-lobes distinct, parallel, opening longitudinally.

   7. Flowers usually in pairs, sessile or on a short common peduncle. Receptacle broadly conical or almost flat; petals white, pink, or yellow. Ovules few, lateral or pendulous in each of the 2 or 3 locules. 25. *Hypocalymma*.

   7. Flowers solitary, on short stalks. Receptacle urceolate; petals bright red. Anthers versatile. Ovules several in 2 rows in each of the 3 locules. 26. *Balaustion*.

6. Stamens 5 to 10, or rarely more than 20; anther-lobes distinct or united, opening in pores or longitudinal slits.

   8. Ovules 2 in each of the 2 or 3 locules, separate or one above the other. Flowers frequently umbellate or in small, sometimes dense cymes, the peduncles often longer than the leaves. 27. *Scholtzia*.

   8. Ovules several in each of the 2 or 3 locules or, if 2, then side by side. Flowers sometimes forming leafy racemes or corymbs. 28. *Baeckea*.

5. Stamens either in clusters, each cluster opposite each of the 5 sepals, the filaments then terete but ± united basally, or the filaments dilated, of unequal length, and united in an almost complete ring. Ovary 3 (rarely 2) locular, each locule with several to numerous ovules in either 2 rows or in a ring around the placenta. Anther-lobes distinct, parallel, opening in longitudinal or transverse slits, the connective terminated by a gland. Flowers solitary and axillary, sessile or shortly stalked. 29. *Astartea*.

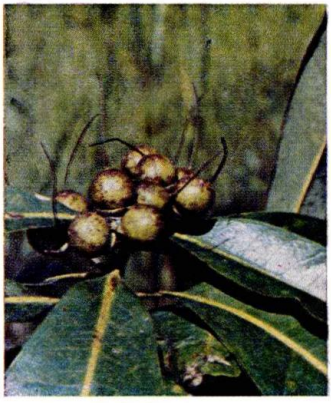
Continued on page 30

TROPICAL MYRTACEAE

Genera 1 to 12 in "The Plant Family Myrtaceae" are principally found in tropical and sub-tropical areas, mainly rainforests. We are preparing an issue on these plants but desperately need reports on what they look like, who has grown them and good colour slides. Will you help us?

Meanwhile refer to our issues 62 and 63 of Volume 8 and "North Australian Plants" by Jenny Harmer, see page 43.







XANTHOSTEMON PARADOXUS

TOP: A flowering tree in Arnhem Land. Photo by N. Byrnes.

BOTTOM: The fruit (left) and the flower. Photo by Jenny Harmer. A small tree to 7 metres that would be a treasure in anyone's garden in areas north of Brisbane.

(ii) Stamens united in bundles or clusters (at least basally) opposite, and longer than the petals. Fruit enlarged and woody, 3-locular.

1. Anthers versatile, the lobes parallel, opening longitudinally.

2. Stamens joined by at least half their length in a continuous tube. Flowers solitary and sessile. Ovules per loculus numerous. Leaves alternate.
30. *Lamarchea*.

2. Stamens (when in bundles) united to form a distinct, usually flattened claw, one claw opposite each petal.

3. Ovules per loculus one. Flowers sessile in terminal globular heads. Stamens (in 2 of the 3 species) free the greater part of their length in 5 clusters of 3. Leaves opposite. 31. *Conothamnus*.

3. Ovules per loculus numerous. Flowers sessile in heads or spikes, the floral shoot usually becoming vegetative during or after flowering, or sometimes few in clusters or solitary. Leaves opposite or alternate. 32. *Melaleuca*.

1. Anthers erect, attached at the base to the filament. Species all western, largely of heath communities.

4. Ovules per loculus 1. Anthers opening at the top in transverse slits. Flowers in dense terminal heads or short spikes, usually bright red. Leaves opposite, less than 20 mm. long, linear to orbicular. 33. *Beaufortia*.

4. Ovules per loculus 2 or more. Anthers opening in longitudinal slits or (*Phymatocarpus*) transverse slits, or some (*Regelia*) terminal pores.

5. Flowers in dense globular heads. Ovules per loculus 2 to 4. Leaves opposite, about or less than 10 mm. long, ovate to orbicular.
Stamens in clusters of either 3, or 10-15.
34. *Phymatocarpus*.

Stamens united in 5 distinct bundles.
35. *Regelia*.

5. Flowers solitary or 2 to 5 in a head (*Eremaea*) or in lateral clusters or spikes (*Calothamnus*). Ovules per loculus numerous. Leaves alternate.

6. Stamens united in 5 or 4 bundles (corresponding in number to the petals); when 4 the united parts often in pairs of unequal breadth. Anther-lobes linear or oblong, side by side, opening inwardly in longitudinal slits. Flowers frequently unilateral. Leaves usually from 50 to 300 mm. long, mostly terete. 36. *Calothamnus*.

Stamens regularly in 5 distinct bundles, the claw sometimes very short. Anther-lobes obovoid, somewhat divergent, opening outwardly in longitudinal slits. Leaves less than 15 mm. long, linear to ovate. 37. *Eremaea*.

Continued in the next issue are those genera with dry fruit in the plant family *Myrtaceae*. They are *Thryptomene, Micromyrtus, Pileanthus, Verticordia, Chamaelaucium, Actinodium, Homaranthus, Darwinia, Calythropsis, Wehlia, Homalocalyx, Calytrix* and *Lhotzkya*.

GROW FROM SEED—Continued from page 11

on water attacks the plants as they enter the sand. Many propagators spray with a fungicide such as Captan at the seedling stage. This is rarely necessary with *Myrtaceae.*

The Propagating House

People use all sorts of contraptions. The nurseryman has a glasshouse that keeps the air moist and warm, the wind away, and filters the sunlight. You can provide your own glasshouse by simply placing a small piece of glass flat on the top of the pot or tray. Now we have a tray full of water in which is standing a number of pots carefully labelled as to the type of seed they contain with a piece of glass over the lot. Where do we put it?

Seed and seedlings need warmth and light, but we do not want them to dry out, scorch or be cooked. During summer place the tray in a position that gets filtered sunlight, or in shade just missing direct sun rays. In the winter you could place it on a windowsill inside, where it gets direct sunlight for part of the day. The sun will not get through to the delicate seedlings, as a film of water will build up on the underside of the glass.

Keep off the ground, away from wogs and ants.

Watch the wind. It needs free air circulation but little wind. I use plastic pots, instead of clay pots that would dry out quickly.

The Seedlings

After five to 10 days the sand surface will be dotted with green spots—the plants. Oh, so many! Now we will see how well the seed was distributed. As the seedlings grow, so you slowly raise the glass to allow more fresh air. Each seedling will have two leaves, often broad and round, not like the parent plant at all. When they are about ½ to 1 cm high a second pair of leaves, often of a different shape, will grow.

When the seedlings are 1 to 1½ om high (2 cm in case of *Eucalyptus)* it is time to move them. The glass will be off and they will start to run out of food in their old seed home. The roots will be at least as long as the plant is high. To get them out without too much damage to the fine root system is the next problem.

To get strong, vigorous seedlings many nurserymen and experienced propagators give them a feed a week or so before planting out. A spraying with Aquasol, or other foliage fertilizer, is quite easy with anything that will give a fine spray on the leaves. A garden spray, a cheap pest spray, or a fine-hole watering can will do. This deposits a balanced diet of chemicals on the leaves that the plant sucks in and thrives on. Adding a fungicide to the mixture prevents damp-off or root of the seedling stems where they enter the medium. In this way many grow on their seedlings to five or even 10 cm high before planting out.

Being the lazy type I do not do this. Vigour of the seedlings is very important for growing healthy plants, and for harder to grow species I recommend you concentrate on this aspect, but with *Myrtaceae* they are so easy to grow, and there are so many more seedlings that you can use, a few losses are unimportant.

Potting On

The seedlings will need to be planted into individual pots, tubes, bags, or whatever containers you can get. For years I have used beer cans with the bottom taken out, the side pierced at the bottom in three places, such that the metal forced inwards will prevent the bottom falling out when placed inside again. The deeper the container the better, especially for Eucalypts, as these rely on a strong, straight tap root. The current craze is to use plastic bags, readily available for the purpose, with holes in the bottom.

I still crock the bottom of my containers, i.e. I place stones or gravel in the bottom. The current trend, you will notice, is even not to do this, but the

containers are always stood on a gravel or porous bed to ensure good drainage away from them.

The soil in the containers should be a loose, open soil—say a sandy soil—sand with peat moss in it, or a light loam with sand in it. Once again, if you check on what the nurserymen do, those who have the healthiest, most vigorous plants have a very coarse potting mix and obviously foliar feed the young plants with Aquasol or other foliar fertilizer. This stage of plant growth is very important and I request experienced propagators to advise me what method they use. A number use nitro-phoska pellets placed sparingly near the edge of the container away from the plant.

Fortunately *Myrtaceae* do not need any of this—and, you have guessed it, I do not bother.

Now to get the seedlings out of the pots. Some people use two sticks, pointed at the end, such as icecream sticks, to gently prise out the seedlings they want, leaving the rest to grow on. My way is, as you would now expect, the easy way. I tip the whole lot out on a tray—the sand medium and all—such that it lays sideways, with the seedlings horizontal pointing to the left and the sand crumbling away on the right. If you use a sterile medium, such as perlite, it will all fall away as you lift out the seedling. If you used sand, wash it away with a spray of water, leaving the mound of seedlings and roots without the sand. You will be able to pick out the seedlings one at a time and plant them in the containers. Be sure the hole in the soil in the containers, to receive the seedling, is deep so that the roots will slide straight in and point to the bottom without bending. This is important for Eucalypts, as if you bend the tap root, even at this stage, it will grow with a bend in it and possibly suffer wind damage later.

The Plants

The size of plant when planted out depends on the trouble you take to grow on in containers and the protection you give it after planting out. If you repot the small plants from the beer cans, or whatever, into larger containers with a good but well-drained soil, and feed and water the plants, you will get a vigorous plant that should prosper when planted out.

If you give the small plant some shelter at first, and a little attention early on, actually all *Myrtaceae* need is water—then you can plant direct into the garden when the small plant is only 15 cm high.

With Eucalypts, the sooner they are planted out the better—a 15 cm-high young tree could have a tap root 20 cm long. Advanced trees are a trap. The tap root curls up and goes around and around the bottom of the container and when planted out will probably produce a weak tree that will blow over. Planted early, the tap root will grow downwards and other roots will radiate out in all directions to support the tree firmly.

Do we want healthy plants, and do we want vigorous plants? Will readers please comment. More about this in the next issue.

OUR NEXT ISSUE

Many of our usual features have been omitted from this issue, as I fear I got a little carried away with the effort to encourage more readers to become more active, especially the beginners. Our next issue will feature a wider range of subjects, a very good article on ferns and continue the series on native orchids.

The series on propagation will be continued on seed, then on cuttings, an excellent and easy way to propagate *Melaleuca*. Please send comments on your methods of propagation.

EUCALYPTUS ARE MYRTACEAE



Photography by F. W. Humphreys

EUCALYPTUS KINGSMILLII

What garden is complete without a Eucalypt—a gum tree?

For those with some botanical knowledge, the characters that define *Eucalyptus* in the family *Myrtaceae* are given on page 26. For the beginner, the above shows many of the more obvious features:—

Leaves: Alternate along stem (i.e. not opposite each other).

Flowers: The wreath of flower stamens (male) around the stigma (female).

Buds: At bottom of picture. These pointed caps lift off to reveal flowers.

Fruits: To the left of the picture. The flower has been fertilized, probably by bees, the seed has begun to grow in these capsules, and the flower stamens have dropped off. They have performed their task in nature's plan—attracted the bees to brush the pollen off the yellow stamens and deposit it on the central stigma. This has fertilized the ovaries at the base of the stigma, causing seed to form and grow in the fruits.

Seed: When the fruits are dry and beginning to open collect a number, place them in a paper-bag as described on page 10.

Which Eucalyptus to Plant?

Any that grow in your State. You may not be really successful with *Eucalyptus kingsmillii*, shown in the colour plate. It prefers the tough, dry, semi-arid areas. The Forestry Commission in your State will be pleased to advise you on the species of *Eucalypts* most suited for your area and also help with plants at a reasonable cost. Our No. 61 issue is devoted largely to species of *Eucalyptus*, so send for a copy.

EUCALYPTS FROM SEED

A report by N. K. McCARTHY, Toowoomba, Qld.

Quick and satisfying results were achieved in a recent germination experiment of Eucalypt seed as shown below.

Variety	*Days to germinate*	*Quantity*
E. globulus s.sp. *bicostatae* (syn E. st'johnii)	5	Profuse*
E. cinerea	7	,,
E. lindleyana-numerosa	6	,,
E. nicholii	6	,,
E. peeneri (prostrate)	7	,,
E. scoparia	6	,,
E. tessellaris	5	,,

* Profuse — 50 or more plants per 10 cm pot.

METHOD USED:

The very effective bog process of placing a 10 cm pot in a tray with 25 mm of water as a continuous water medium by capillary attraction was utilised in this experiment. The medium used was 1 part peat and 4 parts coarse sand. Each filled pot was pre-moistened to establish a satisfactory capillary before placing in the tray. After a light sowing of seed on the surface of the medium, an extremely light covering of coarse sand is sprinkled on the surface of the pot, more to anchor the seed from air disturbance than to actually cover the seed to any depth.

The experiment was carried out in glasshouse conditions with automatic temperature control at a constant 21°C and under light shade with little or no air disturbance.

The above varieties are excellent specimens for cultivation in Toowoomba's variable climate. The seedlings grew rapidly and were ready for potting-up in three weeks.

Eucalypt seed can be variable according to species and seasonal conditions which greatly affects the setting of seed. Some retain viability for long periods, in fact years: others must be sown fresh as their viability is only short-term.

A SELECTION OF AUSTRALIAN FERNS

By D. L. JONES & S. C. CLEMESHA—Price $12.95, pl. 85c

At last a really good book on ferns. The authors are well known already in Australian Plants for their botanical knowledge of the ferns and their experience in their cultivation. 307 species are described and illustrated with line drawings, but it is the interesting notes that can only be provided by botanist/horticulturalists as competent as these authors that will be of special interest. Rounded off by excellent colour photography by E. Rotherham, this book must certainly be in huge demand. Order quickly.

FERN STUDY GROUP

The report on the King Fern of North Queensland was taken from the latest newsletter of the Fern Study Group. Another article of interest in this newsletter is "Ferns That Can Become Pests". If you would like to join this active group send $2.00 to Stephen Clemesha, c/- Post Office, Moonee Beach, N.S.W., 2450. For those who cannot attend meetings in N.S.W. there is available a service to identify your ferns, provide advice on cultivation, fern spore from a well-stocked "bank" and regular issues of their newsletter.

W.A. MELALEUCA SPECIES—Continued from page 22

**M. nematophylla:* A bushy or ± open shrub, 0.9-2.4 metres, spreading 0.9-1.8 metres; leaves needle-like, light to dark green or blue-green, 1.9-10 cm. Flowers mauve or purple to bright pink, in dense globular to ovoid-oblong heads ± 3 cm diam. Gravelly, loamy, granitic or sandy soils. Highly ornamental. Hardy. Colour photograph Issue 54, page 81.

M. nervosa: A tree, usually crooked and 3-7.6 metres, sometimes to 10 metres, crown ± glaucous, young growth hairy; bark white to grey to dark brown, papery; leaves 4-9 x 1-3.7 cm. Flowers usually green to greenish yellow, sometimes red (*M. crosslandiana* form), in rather dense spikes 4.5-9 x 3-5 cm. Sandy flats, northern coastal areas. Attractive. Colour No. 63, pp. 120.

**M. nesophila:* A dense, often very spreading tall shrub or small tree, 3-4.6 metres or sometimes to 6 metres, spreading 2-4.6 metres; bark white to light brown, becoming grey, papery; leaves grey-green, 1.2-2.5 cm. Flowers pink or purple-pink fading to white, in dense globular heads up to 2.5 cm diam. Sandy or rocky soils. A very ornamental shrub. Excellent hedge or windbreak. Excellent seaside shrub.

**M. oldfieldii:* A fairly bushy shrub, 0.9-1.5 metres, occasionally to 2.4 metres in cultivation, spreading 0.9-2 metres; leaf length in type specimen 1.2-2.5 cm, but other specimens at W.A. Herbarium up to 6 cm long. Flowers purple-pink, in dense globular, ovoid or cylindrical-oblong heads 1-2 cm diam. or sometimes up to 5 x 2 cm. Sandy and gravelly soils. Very attractive.

M. pauperiflora: A spreading, bushy, obpyramidical shrub, 1.2-3 metres, or a small tree to 7.6 metres; bark grey, papery; leaves grey-green, 4-6 mm. Flowers small, white or cream, in clusters of 4-6 or sometimes up to 15, in ± globular heads up to 1 x 2 cm. Profuse flowering. Sand, sandy clay, red loam overlying granite, granitic alluvial soils. Very attractive. Good hedge. Very suitable for dry areas.

**M. pentagona:* A very variable shrub, dense or (in taller forms) rather open, erect or spreading, 60-90 cm or 1.2-2.4 metres or sometimes to 3 metres, with spread varying from 0.9-2.4 metres; branches arching, sometimes pendulous; leaves extremely variable according to form. Flowers small, pink-cerise to bright pink or rarely red, in dense globular heads ± 1-1.6 cm diam. Soils very variable, including saline types. A beautiful species. Hardy. Quick growing. Fruits fused in honeycomb-like arrangement.

**M. platycalyx:* A compact ± flat-topped shrub, 0.6-1.2 metres with similar spread; leaves blue-green, 6-10 mm. Flowers rose-pink to mauve or pale mauve, 6-8 x 8 mm, borne mostly in stalkless decussate pairs or forming short spikes below ends of branches. Sandy gravel and sandy clay often overlying granite. Attractive. A good garden shrub.

**M. polycephala* (syn. *M. serpyllifolia*): A compact, quite bushy, flat-topped shrub, 0.3-1.2 metres in the wild, up to 1.8 metres in cultivation; branchlets numerous, very short; leaves medium to dark green, 6-12 mm. Flowers pink to purple, in dense globular heads 6-12 mm diam. Profuse flowering. Dry sandy soils and clay, in close vegetation, south coast. Beautiful. Colour photograph Issue 21, page 45 and No. 28, page 384.

**M. polygaloides:* A dense or loose and spreading shrub, sometimes as low as 45 cm, usually 1.2-1.8 metres, sometimes to 3 metres, in all cases spreading 1.8-3 metres; leaves whorled, light green, 6-12 mm. Flowers deep sulphur yellow, in dense ovoid or cylindrical spikes mostly 2.5 cm long, sometimes to 5 x 1.9 cm. Profuse flowering. Swampy soils, coastal sand dunes and rocky areas, Swan River to south coast. Good seaside shrub.

**M. preissiana:* An erect tree, 6-9 metres, often to 15 metres in the wild, usually several storeyed in wild; with a single large crown in cultivation; bark whitish, papery; leaves deep green, rather crowded, 8-12 mm. Flowers white or yellowish, in numerous leafy oblong or cylindrical spikes 5-7.6 cm long,



Photography by F. W. Humphreys

MELALEUCA CONCRETA

Melaleuca concreta. A beautiful small shrub to 1.2 metres. See page 18.



TOP: *Melaleuca trichopylla*.—A beautiful shrub to 1 metre high. See page 40.
BOTTOM: *Melaleuca citrina*.—A slender-branched shrub to 3 metres. The brightest yellow of all. See page 18.
Photography by Ivan Holliday

erect and usually 3-5 together. Profuse flowering. Swampy soils, dry in summer. Very ornamental. Hardy. Withstands poor drainage and also dry conditions.

**M. propinqua:* An erect shrub, at least 60 cm, with pendulous branches and short branchlets; leaves whorled, overlapping, about 3 mm. Flowers small, yellow, in dense oblong spikes, late spring and probably longer. Stirling District. Said to be very much like a miniature *M. densa*.

**M. psammophila:* An erect to spreading shrub, 30-75 cm; branches erect, branchlets numerous; leaves crowded, dull green, 4-6 mm. Flowers deep rose pink, in numerous globular heads ± 1 cm. Dry sand heath and mallee heath. Irwin District. Beautiful. Should be highly suitable for rockeries.

**M. pulchella:* A spreading, dense or sometimes ± open shrub, 60-90 cm in usual form, sometimes to 1.2-1.5 metres in cultivation, usually 1.2-1.8 metres across; leaves crowded, light green to blue-green, 3-6 mm. Flowers pink or mauve, "claw-like", 1.2-1.5 cm diam., single or 2-3 together. Sand heath, often peaty, sometimes winter waterlogged, also gravel, south coast. Beautiful. Very good border or rockery plant. Hardy. Colour photograph Issue 20, page 293.

**M. pungens:* A dense or loose shrub, 0.9-1.2 metres or sometimes to 1.8 metres; spread similar; branchlets short, numerous; leaves pungent, dull green, 6-25 mm. Flowers bright yellow to yellow-white, in small dense ovoid to oblong or rarely globular heads up to about 1.5 cm. Rocky, sandy or gravelly soils. Beautiful.

M. quadrifaria: A dense erect shrub or small straggling tree, 3.7-4.6 metres or sometimes to 6 metres; branchlets short, slender, pubescent; leaves decussate, deep green, crowded, ± 4-6 mm. Flowers white or yellow, in globular heads about 1 cm diam. Sandy and probably stony soils. Eyre, Coolgardie and Eucla Districts. Attractive.

**M. radula:* A bushy shrub, usually 1.8-2.4 metres, sometimes to 3 metres, 0.6-1.5 metres across; leaves grey-green, 1.9-5 cm, linear. Flowers large pinkish mauve, very variable in intensity, rarely almost blue, fading to whitish, in quite loose cylindrical to oblong spikes 4-4.5 x 2.5 cm. Gravel and sandy soils, also granitic soils. Beautiful. Hardy. Best colour forms in wild growing in ironstone. Colour photograph Issue No. 20, page 269 and No. 53, page 1.

M. rhaphiophylla: A large bushy shrub or a very shapely tree, 3-6 metres or sometimes to 15 metres; bark whitish and greyish, papery; leaves acute to pungent, yellow green to dark green, 1.9-3.8 cm. Flowers white or creamish, strongly scented, in interrupted oblong or cylindrical spikes ± 3-3.3 x 1-1.5 cm. Sandy soils, low-lying areas on margins of swamps and watercourses. Beautiful. Tolerates both poor drainage and fairly dry conditions in cultivation.

**M. rigidifolia:* Described by N. Turczaninow in 1852, it has only recently been accorded recognition. No specimens are yet available. An erect shrub probably 60-90 cm, with numerous short branchlets; leaves mostly 1.5 cm x 1 mm, recurved, with very short flexible white pointed tips. Flowers lilac, in dense moderately hairy globular heads. Probably from Eyre District. Close to *M. scabra* and *M. subtrigona*.

**M. scabra:* A much branched, often quite open shrub, 0.2-1.2 metres, to about 60 cm across; very variable in form; leaves usually quite rough, grey-green, 6-12 mm. Flowers deep pink to reddish purple, in dense globular heads ± 1.6 cm diam. Profuse flowering. Stony or sandy soils. The type specimen occurs in Eyre District. Many varying forms elsewhere, some of which will probably be separated following future taxonomic revision. Very ornamental. Hardy. Colour photograph Issue 20, page 269.

**M. scierophylla:* A diffuse, often fairly bushy shrub, 0.6-1.2 metres, spreading to 1.2 metres or sometimes wider; branches and branchlets short, rigid and spreading; leaves 1-1.8 cm, becoming warty. Flowers purple, in globular heads 2.5 cm diam. Sandy gravel. Very attractive. Hardy.

**M. seorsiflora:* A shrub of unknown height and stature; leaves blunt, 6-12 mm. Flowers small, white, single in axils below ends of branchlets. From near Mt. Ragged in Eyre Range.

**M. seriata:* A quite bushy shrub, usually 60-90 cm, rarely to 1.8 metres, spreading 0.9-1.2 metres; branches slender; branchlets short, numerous; leaves 6-8 mm long. Flowers small, deep pink to vivid lilac to rich rose or sometimes white, in dense globular heads to 1.9 cm diam. Sandy, peaty, clay soils. Very attractive. Hardy. Of varied form.

**M. sheathiana:* A very bushy shrub or a small tree, 3-4.6 metres, with short twiggy ± corky branches; branchlets numerous; leaves ± 2-3 mm, pointed. Flowers white or yellowish white, in globular heads 5-6 mm diam. Profuse flowering. Moist saline places in woodland, red loam overlying granite, granitic alluvial soils, Coolgardie and Austin Districts.

**M. sparsiflora:* An erect bushy shrub, 1.5-1.8 metres; leaves decussate on smaller branchlets, very blunt, 3-8 mm. Flowers white, hoary pubescent, in globular to subglobular heads of 1-3 during spring. From southern part of Coolgardie District.

**M. spathulata:* A bushy, compact or spreading shrub, 0.9-1.2 metres with similar spread; branchlets very leafy, older branches leafless; leaves medium green, mostly blunt, 4-6 mm or sometimes to 8-12 mm. Flowers red or purple-pink, in dense globular to ovoid heads 6-8 mm diam. Gravelly hillsides and sandplains, sometimes winter waterlogged, south coast. Attractive. Profuse flowering. Colour photograph Issue 54, page 85.

**M. spicigera:* A bushy to ± open shrub, 1.2-1.5 metres, spreading 1-1.8 metres; branchlets slender, sometimes arching at tips; leaves overlapping, at first glaucous, 7-10 mm. Flowers white or pinkish, in somewhat loose cylindrical spikes 1-1.9 cm long. Sandy or granitic soils. Attractive.

**M. steedmanii:* An erect, quite open shrub, 0.6-2 metres, becoming quite dense in cultivation; leaves greyish green to light or medium green, 1.2-1.8-3 cm. Flowers large, intense red to orange-red, in dense oblong spikes up to 4-5 x 3-4 cm. Profuse flowering. Granitic and gravelly soils, sometimes moist. Beautiful. Deep purple-mauve hybrids (*M. steedmanii x radula*) are found naturally. A garden hybrid (*M. steedmanii x fulgens*) with spikes up to 7-8 x 4-5 cm of bright crimson flowers is available commercialy under the horticultural name *M. 'Paynei'*. Colour photograph Issue 20, page 249.

**M. striata:* A quite dense shrub, usually 60-90 cm in the wild, 1.2-1.8 metres in cultivation (or sometimes to 2.4 metres if closely planted), usually to 0.9-1.8 metres across; branchlets very numerous, very short; leaves crowded, light to deep green, pointed, 6-20 mm. Flowers pink or rarely white, in dense oblong to cylindrical spikes 2.5-7.6 cm x 2.5 cm. Sandy soils, occasionally grey clay. South coast. Highly ornamental.

**M. suberosa:* A quite open shrub, 30-90 cm with similar spread, corky barked; branches ± angular; branchlets short, very slender; leaves crowded, light green to blue green or ageing to reddish, 3 mm or sometimes 6-7 mm long. Flowers pink or mauve to purplish red, 5 x 3 mm, in fine loose clusters around branches and partly immersed in corky fissures. Profuse flowering. Peaty sands in swamps, south coast. Very beautiful. Best with some protection.

**M. subfalcata:* A bushy or quite open shrub, 0.6-1.2 metres in wild, sometimes to 1.8 metres in cultivation, 1.2-1.8 metres across; leaves usually subfalcate, spirally arranged, becoming dull green, mostly 1.5-2 cm. Flowers small, pale to deep pink, in dense or interrupted oblong or cylindrical spikes 2.5-5 x 1.5-2 cm. Clay, sand (often peaty), gravel, loam, south coast. Very attractive.

**M. subtrigona:* A dense, bushy, erect or diffuse shrub, 0.2-1.2 metres, up to 90 cm across; leaves usually crowded, thick, mostly blunt, about 3 mm. Flowers deep pink, in small dense globular heads 1-1.5 x 1-2 cm. Profuse flowering. Sand and mallee heath, often damp depressions. Beautiful. A rough leaved form (*M. tuberculata*) has lilac to purplish flowers.

**M. tenella:* An erect or spreading Tamarix-like tree or shrub, 1.2-4.6

metres; branches arching; branchlets short, fine, numerous; leaves sometimes whorled, mostly 4-8 mm. Flowers usually small, pure white, in dense globular, oblong or cylindrical spikes about 1.2 cm long. Karri forest and moist riverain soils, south coast. Attractive.

**M. teretifolia:* An erect or spreading shrub, 1.5-1.8 metres, or sometimes a small open tree to ± metres; leaves dark green, narrow, 3-8.5 cm. Flowers rather small, white or pink to scarlet, in small dense globular clusters up to 1-2 cm diam. on branchlets or along old wood, sometimes in a continuous mass to 18 cm long. Clay or sandy swampy soils, Darling District. Showy.

**M. thymoides:* A much-branched, rather loose shrub, 60-90 cm or straggling to 1.8 metres; spread sometimes 1.8-2.4 metres; branches often spinescent; leaves usually pointed, 6-12 mm. Flowers pale to bright yellow or white, in numerous dense globular heads about 1.2 cm diam. Sand often overlying laterite, gravelly and granitic soils. Very attractive.

**M. thyoides:* A dense, many-stemmed shrub, 2.4-3 metres or sometimes to 6 metres, spreading at least 2.4 metres in optimum conditions; leaves spirally arranged, scale-like, overlapping, becoming dark green, 1-2 mm. Flowers small, white, in dense ovoid or globular or shortly oblong spikes 1.2-2 cm diam. Sandy, clay or loamy soils, often near salt lakes. Very ornamental.

**M. trichophylla:* A much branched, hairy shrub, 60-90 cm, spreading up to 1.8 metres; leaves crowded, grey-green, usually covered with white hairs, mostly 1.2-2.5 cm. Flowers purple-pink to red, in numerous dense globular heads up to 2 cm or more diam., subtended by foliage leaves. Sandy gravel and ironstone. Particularly beautiful. Colour plate on page 37.

M. uncinata: A bushy shrub, usually 0.9-1.8 metres, but often to 5.5 metres, spreading to 2.4 metres; reported to 9 metres height in N.S.W.; bark grey, papery; leaves slender, dark green, 1.5-4 cm or sometimes to 6 cm. Flowers small, bright to pale yellow, in numerous very dense ovoid to oblong or ± globular heads 1.2-1.9 x 1.6 cm. Profuse flowering. Dry sand, clay and sandy clay soils, sometimes swampy soils. Very attractive. Good hedge or windbreak. Colour photograph Issue 54, page 80.

**M. urceolaris:* A dense shrub 60-90 cm or often much taller, ± hoary; leaves rough, hoary, often crowded, 6-12 mm. Flowers yellow or white with red, in dense globular heads 1-1.5 cm diam. Sandy soils. Beautiful.

**M. viminea:* A dense shrub, 0.9-1.8 metres or often to 3.7 metres, sometimes to 4.6 metres; spread 0.9-2 metres; bark white, papery; leaves dark green, narrow, 6-12 mm. Flowers small, white to creamish, in dense globular or oblong-cylindrical spikes up to 4 cm or longer. Sandy swampy soils and clay, in close vegetation. Attractive. *M. lehmanni* appears to be considered a part of this species, but differs in its dark grey, fibrous, persistent bark. The latter occurs in vicinity of Perth, growing in the Swan River. A good hedge.

**M. violacea:* A shrub 30-45 cm or sometimes 0.9-1.2 metres, usually bushy and flat-topped, sometimes straggling; branches intricate, sometimes corky; leaves grey-green to blue-green, 6-12 mm. Flowers purple-red to violet to blue, in small globular heads or clustered along old wood, sometimes solitary. Sandy swampy soils, south coast. Very variable. Very attractive. Excellent border or rockery subject.

M. viridiflora: Occasionally a shrub 1-2 metres, usually a small, often crooked tree 3-3.7 metres or sometimes to 18-24 metres; crown dull green to silvery; bark fibrous, persistent; leaves mostly 6-15 x 2.5-6 cm, sometimes to 22 cm long. Flowers largest in genus, greenish white to white or pale greenish yellow or frequently pink or red to deep crimson, in spikes 7-10 x 4-6 cm, often up to 3 together. Mainly riverain soils, sandy scrub and swampy highlands, Kimberley District. Flowering January-September. Very beautiful. Colour, No. 49, page 200, No. 62, page 61, and page 44 this issue.

**M. websteri:* A slender-branched shrub, 3-5.5 metres; branchlets fine, densely foliaged; leaves finely pointed to pungent, 6-10 mm. Flowers white,

rather insignificant, in small few-flowered ± globular heads. Granitic loamy soils, Avon and Coolgardie Districts.

Acknowledgement

The above information has been greatly condensed from a work soon to be submitted for publication, covering the whole of the family *Myrtaceae* in Western Australia. A complete list of references and acknowledgements will be contained therein. My warmest thanks to Mr. R. Royce for allowing me full access to the collections at the Perth Herbarium and to Messrs. P. Wilson and R. Aitken for considerable help with identifications.

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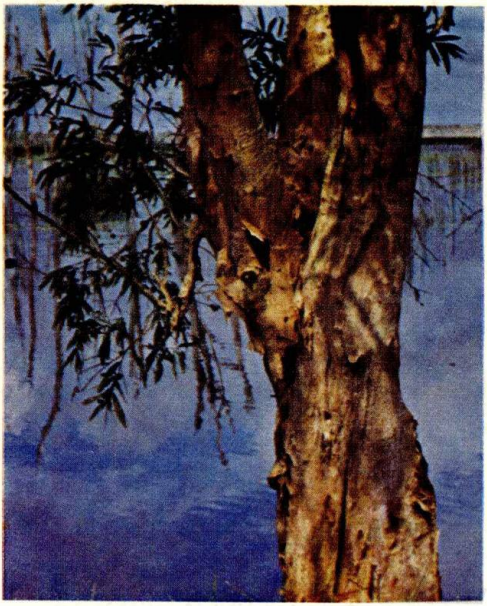

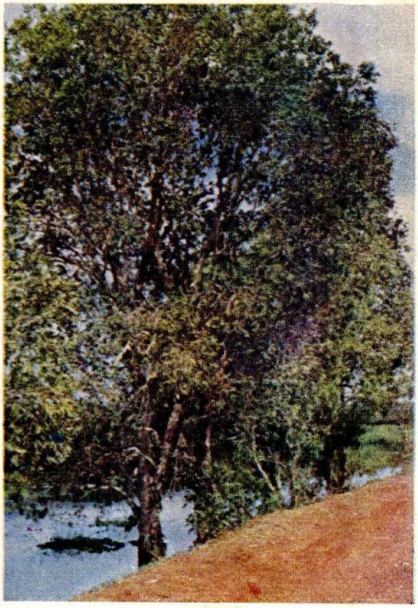

Photography by Jenny Harmer

TOP: The flowering spike and leathery leaves of *Melaleuca viridiflora* growing in a swampy area of Darwin. See page 40.

BOTTOM: *Melaleuca cajuputi* growing along the bank of Fogg Dam, Darwin, featuring its papery bark found on many *Melaleucas*.

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