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Colour Photography by Frank Hurley

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BORONIA MEGASTIGMA

GROW SWEET SCENTED BROWN BORONIA IN YOUR GARDEN

GROW THE NATIVE ROSE AND OTHER SYDNEY BORONIA — by P. J. PARRY
THE PROPAGATION OF BORONIA AND OTHER WILDFLOWERS BY CUTTINGS
GROWING THE RIVER ROSE — by A. M. BLOMBERY
GROWING THE COOKTOWN ORCHID — AUSTRALIA'S MOST BEAUTIFUL ORCHID

SYDNEY BORONIAS

by P. J. PARRY

There are more than thirty (30) species of Boronias and only popular Sydney species will be mentioned. Boronias do best in rockeries or built up beds, with a liberal quantity of leaf mould turned in before planting, and the bed top-dressed with leaf mould after planting. Keep the beds free from weeds, but further digging of soil should be avoided, as the less root disturbance the boronia plants have, the better chance they have of survival and successful growing. They do not require a lot of watering, but should not be allowed to dry out during hot or windy weather.

Most boronias are difficult to raise from seeds, and are usually propagated by cuttings using semi-hardened wood about three inches long. Cutting pots should be prepared with ample drainage in the bottom and filled with coarse sand. When rooted, the cuttings should be removed and grown on in pots or tubes and then planted out to their permanent positions when large enough.

I have plants of *Boronia serrulata*, *B. floribunda*, and *B. pinnata* that are over thirty years old.

Boronia serrulata, commonly called "native rose" is a beautiful species of Boronia which grows in isolated areas of eastern New South Wales generally on sand stone ridges, which are reasonably well drained, and sheltered by larger native shrubs. This variety is fast becoming a popular subject for home gardens.

Boronia floribunda is another particularly good variety, and grows to a height of five feet. The colour ranges from white to pink with a strong, delicate perfume.

Boronia ledifolia usually called the "Sydney boronia" is pink, grows to an average height of three feet and is one of the earliest boronias to come into bloom. It usually blooms from June to September. These three Boronias have a long life if grown under suitable conditions.

Boronia pinnata is pink and scented and requires a cooler temperature than most Boronias to be grown successfully — such as a gully area sheltered by trees to break the direct sunshine.

Boronia fraseri also requires similar conditions to *B. pinnata* and is a lovely deep pink late flowering variety.

AUSTRALIAN PLANTS AS A CHRISTMAS CARD

Why not use this issue as a novel Christmas card to your friends completing the following plaque with your Christmas greetings? Copies are available from the Editor, 250 Picnic Point Road, Picnic Point, N.S.W., with an envelope, at 3/- plus 5d. postage or for 4 copies or more, postage free. For other gift suggestions such as a bound volume comprising issues nos. 1-12, see page 162.

To

Wishing you a Merry Christmas and pleasant memories of our
friendship. While reading of these beautiful flowers it will be
another experience shared.

From

The Cultivation of Boronia

by W. N. B. Quick, Dargan Hill Nursery, Victoria

Probably the most logical approach to a talk of this nature is to start by defining quite briefly the conditions under which Boronias, with the odd exception, are NOT likely to succeed, and discuss each in turn. Like most other groups of plants, native or introduced, Boronias do have their likes and dislikes, if only we can spot them. The following would, I think, head any list of "dislikes":

1. Severe soil-temperature fluctuation, particularly to temperature over about 75 degrees F. at a depth of 1"-2".
2. Sudden seasonal change in the water table or moisture content of the soil.
3. Alkaline soils.

High temperatures in the soil are caused partly by direct heating from the sun, and partly by high air temperatures and hot winds. Local overhead shading alone, even with a fence as shelter from hot winds, may not be effective protection. Probably most of you have noticed from time to time in the garden or while out for a drive, that air from below trees or through foliage seems degrees cooler than generally prevailing temperatures. This is not imagination, but a direct result of natural evaporation from leaf surfaces. If then, shrubs are used as the windbreak, hot winds will be slightly but definitely cooled in passing amongst them, and within limits, the more foliage it circulates through, the cooler it will become. Further than this, if the shrubs themselves are shaded by trees, the cooling effect will be even more pronounced. I hope it will be seen from this that it is not really desirable to STOP a breeze from reaching the plants as a fence might do, but to diffuse it and at the same time cool it as far as possible. Hot sun should of course be prevented from reaching the soil surface adjacent to the plants. In very exposed areas, large stones and boulders will help greatly in avoiding sudden temperature changes in the soil below them. In a few words, from a soil-temperature point of view, small clearings amongst shrubs and trees should suit Boronias well.

Soil moisture content is perhaps easier to control. First and foremost, if drains are to be laid, get them in before planting is commenced. It's a bit tough on any plant to "educate" it to one water-level, and then suddenly remove this and expect a new root-system to form at a lower level in a week or so.

The actual moisture content of the soil seems not so important to Boronias as its consistency throughout the year. Under cultivation it is generally easier and more satisfactory to aim at a fairly low level. A plot protected by open or "field" drains about 6" deep will drain quite well in wet weather, yet require a minimum of watering in the drier part of the year. If, on the other hand, you are an incurable and regular waterer, it would probably be better to raise the plot a few inches, and allow it to stabilise for a few months. In the older established garden, competition from other shrubs and trees nearby will keep the level of soil moisture fairly constant and maintain the most natural balance. Here again we can sum up by saying that small clearings amongst shrubs and trees will be the most satisfactory from this second point of view. These conditions in actual practice have proved most satisfactory.

Alkaline soils are a much more difficult problem. Small areas may be

fairly satisfactorily treated with sulphur, or very acid bush litter in regular dressings. Aluminium sulphate is a bit risky to use once plants are in the ground, and the effects not sufficiently permanent to pre-treat the plot. For a bed featuring *Boronias* in alkaline-soil areas, it will almost certainly be easier and cheaper in the long run to "import" soil for a raised bed, or grow in containers. The problem however is not common in Victorian soils.

Soil Types for *Boronias* have so far not been mentioned, and indeed *Boronias* seem little concerned whether they are grown in the heaviest clay loams or in deep sands. Commercial plantings exist in the former near the Dandenong Ranges, and in the latter around Westernport Bay, while near Seymour they are grown on alluvial soils and lateritic gravels. Many of the plants in these plantations exceed eight years of age, and several I know of are over twelve years old.

It seems certain that these plants are better off in rather nitrogen-deficient soils, receiving what they need of this element from organic matter on the surface. During spring and autumn months this will be available to them, while over-rapid summer growth in a watered garden will be avoided since the surface dressings will dry out before decomposition can proceed to any extent. In very heavy loams it may be an advantage to work some well-decayed organic matter into the top inch or so, mainly to help young roots penetrate widely as fast as possible. Rotted sawdust is excellent for this purpose, particularly where natural topsoil may have been removed.

All these special conditions I have mentioned may tend to make a gardener wonder if it is worthwhile, but please bear in mind that these are aiming at the ideal, rather than the passable. Many species vary in their tolerance of unfavourable conditions, and will often give brilliant displays in apparently "impossible" situations. *Boronia heterophylla* and *B. megastigma* will withstand very wet winter conditions, and *B. pilosa* can withstand high temperatures. On the other hand, some of the central eastern species like *B. floribunda*, *B. serrulata*, *B. ledifolia* and particularly the lovely *B. barkeriana*, are very sensitive to hot winds and excessive sunlight. Gradual selection, particularly amongst self-sown seedlings, will eventually give us more adaptable plants.

MAINTENANCE & CARE IN THE GARDEN

Pruning:- Quite apart from the need to remove the excessive summer growth in over-fertile soils, or a desire to cut bloom, *Boronias* should be pruned and pruned hard from their first year, either during or just after their flowering season. Most species have a very small and compact root system, and if allowed to become lanky can be badly loosened by freak gusts of wind. Perhaps of more interest to the gardener though, a well-pruned and compact little plant may have twice or three times the life expectancy of the unpruned one. This is almost certainly the reason commercial plantings last as long as they do.

INSECT PESTS & DISEASES

Scale:- *Boronias* belong to the same family as the Orange and Lemon, and like these trees, are liable to attack by citrus scale, which I think most people know by sight. An unthrifty plant, or perhaps a single branch on a plant, will often be found to be harbouring these pests. If left unchecked, these can sometimes kill a plant, but the remedy is simple — a spraying with white oil at recommended strength while doing your

Continued on page 163

THE "BELL-FLOWERED" BORONIAS

by W. N. B. Quick

Amongst the ninety-odd species of *Boronia* occurring in the temperate and subtropical areas of Australia are a number of distinct plants which we can group — for convenience only — under the heading of "bell-flowered" species. More correctly perhaps these could be referred to as imbricate-petalled species, the petals overlapping noticeably in the opened flower. The bell-like shape formed by the concave petals of several commonly-grown species is so familiar that this floral form is often wrongly assumed to be typical of the whole genus. The great majority of species however have flowers resembling a four-pointed star, sometimes with the tips of the calyx lobes just showing between the bases of the petals. Most of these latter species also form a "bell" of sorts when the petals of a spent flower close over the developing seeds, but the petals in this case do not overlap.

It is hardly surprising that all except one of these unusual species have developed in the botanical wonderland of the south-west corner of Western Australia. The one exception, of a very distinct character, and reservedly included within this group, is *Boronia serrulata* of the central coast of New



Colour Photography by Frank Hurley

Blocks by courtesy of John Sands Pty. Ltd.

BORONIA SERRULATA — THE NATIVE ROSE

The only Eastern species of this group is shown pictured here with Flannel Flowers

South Wales. The limited areas of occurrence of all, and the rather specialised development of the anthers of the Westralian species suggests that they may have become dependent on some unusual agent for effective pollination. Seldom do they set seed in the eastern states, however favourable the environment might be for their growth. I have on occasions seen a small hole eaten through the base of a petal of *B. heterophylla*, presumably by one of our native bees, and this would seem the only ready approach to the pollen of several species.

If the group does not include the most delicate colours and forms of the genus, it certainly does not lack interest in other respects, for within it we find one of the brightest and one of the darkest colours of the floral world, the most commercially-exploited of our native flora (excluding trees), and all the scented species of *Boronia*. It is quite possible that all species of the group possess a marked perfume, but who is to tell us, for the perfume of *Boronias* appears to be on the threshold of human detectability. Most noses can savour the sweetness of *B. megastigma* and *B. heterophylla*, but it is the fortunate few (I am told) who can enjoy the fragrance of *B. purdieana* in the winter garden, or the subtle suggestion of roses by *B. serrulata*. The writer feels hardly qualified to verify just which of the species are in fact already known to be scented, as all except the first-named are right off his wavelength! Perhaps compounds extracted from the blooms of these plants will one day provide a yard-stick to measure our least-calibrated sense.

Colours represented within the group include the deep bronzy-brown, often near black, of *B. megastigma*, bright golden-green, deep rich maroon red, to the brilliant glowing rose-cerise of *B. crassipes*. To anyone interested, there lies ahead a wonderful field for the development of truly beautiful and valuable hybrids from species of this group. There would seem however a need for some preliminary work to determine at what stage of flowering the rather elusive pollen is mature and shed, and whether the stigma is receptive at the same time, or later. It is possible, but unlikely that the flowers are protogynous, having the stigma receptive before the pollen is mature. Yet another remote possibility is that the petals are actually shed before the other parts of the flower are fully mature. It may be of some help in hybridisation experiments to bear in mind that the male factor, the pollen, will tend to have more influence on the flower colour of a hybrid than the female factor, while the latter may have the greater control over the form of both flower and shrub.

THE SPECIES

***Boronia heterophylla*.** "Kalgan *Boronia*."

Habitat: Almost limited to the Kalgan and King River districts near Albany, usually occurring a little further from the permanently wet areas than *Boronia megastigma*.

A compact, erect shrub of three to five feet. Leaves usually 3-foliate in young plants, the lateral pinnae of many specimens being deciduous, and these plants appear afterwards to produce only simple foliage. Young stems glabrous. Flowers bright rose, often paler towards the base of the petals, and becoming almost white as they age. Fragrant. Often confused with *B. elatior* and the following species in the trade.

Boronia "heterophylla"

For many years, a plant bearing this name has been extensively grown in and around Melbourne commercially as a cut flower, in private gardens, and the Botanical Gardens. This plant, with glabrous, usually 5-pinnate foliage and bright rose, fragrant flowers, has always been vegetatively propagated. Within the last few years however, seed of *B. heterophylla* has been available commercially, and has produced a variable and generally similar population of plants, yet visibly distinct from the plant formerly known under this name. The stigma of typical *B. heterophylla* is rod-like and the sepaline anthers almost round in longitudinal section. The stigma of the plant we have formerly known under the name is swollen, and four longitudinal lobes are obvious, while the anthers are acutely heart-shaped in longitudinal section. These differences may perhaps justify it being regarded eventually as a distinct species. Any information regarding this plant, or early records of it in cultivation would be welcomed by the writer.

Boronia elatior. "Tall Boronia."

Habitat: South-west Western Australia.

Under cultivation the name may seem misleading, the plants being of very much the same stature as the preceding two species, with which it is often confused in the trade. Foliage usually 7-11 pinnate, the young stems downy to some degree, sometimes markedly so. This character is sufficient to separate this species from *B. heterophylla* when the plants are not in flower. The bright rose flowers, not noticeably fragrant, are usually produced later than those of *B. heterophylla*, and age to a scarlet hue rather than white.

Boronia tetrandra.

Habitat: Esperance south-west Western Australia.

This species I have not yet seen either in its native habitat, or under cultivation. Foliage is represented by Blackall as 7-pinnate. Flowers are bronzy-green, pendant, and noticeably 4-sided. No noticeable scent.

Boronia tetrandra. Labill is not common. The flowers vary from yellow to green. It is common eastwards from King George's Sound to Cape Pasley in white sand. C. A. Gardner.

Boronia purdieana. "Winter Boronia."

Habitat: Dryish sandy soils near Perth, W.A.

A very early flowering species, beautifully scented, at least to the lucky ones who can detect the perfume. Seldom more than one foot in height under cultivation. Flowers are pendant, yellow often suffused with a reddish colour. Foliage usually 5 or 7-pinnate, small and often very downy. This little species will flower at a very early age, and produces a tremendous crop of blooms for its size.

Boronia sp. indet. "Bremer River Yellow Boronia"

Habitat: Near the mouth of the Bremer River, W.A. (A.J. Gray.)

Possibly a new species collected by Alf Gray in 1961, it resembles *B. megastigma* both in flower and foliage. The flower has little or no noticeable perfume, but to be of good ornamental value.

Boronia crassifolia.

Habitat: Cape Leeuwin, W.A. (Bentham).

The following details, lacking any knowledge of the species at first hand were drawn from Bentham's *Flora Australiensis*.

A dwarf, much-branched shrub or undershrub not exceeding 8" in any of our specimens . . . 3, 5 or 7-pinnate, rarely $\frac{1}{2}$ " long and often much smaller . . . Peduncles axillary, 1 or 2 flowered, short and often recurved . . . Petals attain 3 lines ($\frac{1}{4}$ "). The flower colour is not stated but is probably pink. The description suggests that this species could be a useful and delightful little species under cultivation if and when seed is collected.

Boronia crassipes.

Habitat: South-west Western Australia.

The inclusion of this species among the "Bell-flowered" species may seem extraordinary to those who have seen the open pink star-like flowers of the typical plant. However, we have for some time been growing a species with the most beautifully intense yet delicate rose-carmine bell-flowers. We feel that these will eventually be separated into two distinct species.

Boronia serrulata. "Native Rose".

Habitat: Central coast of New South Wales.

A very distinct species, with flowers strictly more cup-shaped than bell-shaped, held more or less erect, and produced in terminal clusters and upper axils. Foliage more or less rhomboid or almost oblanceolate, finely serrated particularly towards the apex. Leaves orientated into one plane along the stems. Seldom exceeds two feet under cultivation. Flowers reported by some to be strongly rose-scented, while others are barely able to detect a perfume. The large flowers are a rather lighter shade of rose than *B. heterophylla*, and are all the more conspicuous for this.

THE BROWN BORONIA AND ITS FORMS

Boronia megastigma. "Sweet-Scented Brown Boronia."

Habitat: South-west Western Australia, frequent in and around swampy areas near Albany and isolated patches to the west, and northwards towards Collie.

In the true swamps a wiry stagging plant often to six feet, growing amongst dense vegetation, and having relatively few flowers. In more open situations near the margins growth is much more compact, and the plants very much freer-flowering. Petals some shade of deep brown to almost black outside, golden-green inside.

Mutations of B. megastigma.

B. megastigma 'Lutea'. (Syn. *B. m. aurea*.)

A natural colour mutation in which the petals are of a bright golden-green both inside and out. Otherwise similar to the typical plant except for the perfume which is said by some to be slightly more "lemony" than the brown form.

B. megastigma 'Chandler's Red'.

A very beautiful mutation produced some years ago in a nursery near Melbourne from seed collected in Western Australia. Flowers are a beautiful shade of rich maroon red outside, golden-green suffused red inside. Otherwise similar to the brown form. Another mutation, rather resembling this form, but with a pale longitudinal stripe on each petal, has been produced by this same nursery.

Over the last 70 years the Chandler family have been growing and selling *Boronia Megastigma* commercially; there were several members of the family engaged in raising different forms of *Boronia* and these forms were known in the main part, by the Raiser's name, such as Arch's Early, Arch's Red, Jack's Red, etc. These are known collectively as various forms of "Chandler's Red."

We have catalogued for many years the following:

Early Brown — raised by A. C. C. Chandler of Kilsyth, known by the family as Arch's Early Brown, still grown commercially and is the earliest *Boronia* we know.

Burgundy — there are two forms, both of which are sold as Burgundy. One raised by A. C. C. Chandler, is known by the family as Arch's Red, the other raised by Jack Maguire (a Brother-in-law) of *Boronia* is known as Jack's Red. Both of these red forms are grown commercially in quantity and are extremely good *Boronia*s.

One commercial grower of *Boronia* — Mr. Fergus Chandler of The Basin, informs us that at present he is propagating vegetatively twenty different forms of *Boronia Megastigma*.

BERT CHANDLER & SON

B. megastigma 'Virtuoso'.

This mutation originated in a batch of seedling plants in our own nursery some years ago. Differing little from a typical plant to the eye, it possesses an extremely different root-system, both deeper and more vigorous than any other yet seen, enabling the plant to thrive under conditions of heat and dryness which would quickly bring death to most normal plants of this species. Flowers are a typical brown colour, but produced over the whole plant rather than just in the uppermost axila. Scent as in the normal form.

B. megastigma "Seedling 23"

Another slight mutation from our own nursery, the name of which is very doubtfully acceptable for registration. A good deep brown flower, this form has a scent very noticeably stronger than could be considered normal. It requires favourable conditions to do well, and can be regarded as "just average" from this aspect.

BORONIA FROM CUTTING

by J. M. CORKERY, Chairman, Stoney Range Native Flora Reserve

These notes outline methods used at Stoney Range, located on seaboard (no frosts) sandy soil. Remarkable success has been achieved with *Boronia* from the Sydney sandstone areas, including the "Native Rose" *B. serrulata*, *B. pinnata*, *B. ledifolia*, etc., with double forms.

- (1) Take cutting from vigorous growing wood, which, preferably, hasn't flowered, in October-November (mid to late Spring). Length of cutting 2½" to 3". Cut cleanly with razor blade, preferably just below where the leaves join the stalk.
- (2) Remove leaves for about 1¼", taking care not to tear bark from stalk. Use a razor blade for preference.
- (3) Plant in good bushland sandy soil in an area which receives filtered sunshine, that is, well protected under trees or shrubs where evaporation is a minimum. (Will also afford protection from frost).
- (4) Cover each cutting with an inverted jam jar firmed into soil.
- (5) Keep the ground moist. A good watering once or twice per week, without removing jars, will suffice depending on weather conditions.
- (6) Remove jars when the cuttings are established, usually 6-8 months.
- (7) August-September pot into drained tins of generous size, 50% river sand, 50% bushland sandy soil being the best potting soil.
- (8) Plant out when vigorous usually 4-5 months later. A well drained position, protected preferably by other plants, but receiving an hour or two of sunshine a day is the location to find.
- (9) The bushes should flower in the 2nd or 3rd Spring after planting out.

SIMPLE MIST PROPAGATION OF CUTTING MATERIAL DURING SPRING AND SUMMER

H. Boyd

Much has been written about the electronic control of mist propagation. This method is expensive and complicated. What is not understood is that this method of propagation can be set up in a frame without the electronic control with very good results.

Misting sprays are manufactured in three types — A, B & C — to deliver 6, 18 and 42 gallons of water per hour over an area of 7, 12 and 18ft. respectively. (Available from Warner Bros.)

The writer has seen a frame made from polythelene, 4' square, three feet high, without a top, set up in a partial shade house. The "A" type misting spray is set in the centre of the frame on a water pipe about one foot above the bottom. It runs constantly in daylight keeping the frame full of a fog-like mist.

Cuttings are held in 4" terracotta pots containing large particle sand. Good drainage is vital. For large cuttings blue metal dust is very good. Special facilities are necessary to drain the spent water away as the pots must not stand in water. More leaf material can be left on the cutting (a greater production of carbohydrates) and rooting is much quicker. A higher percentage rooting is possible for species difficult to root. Most species of *Boronia* respond to this treatment.

This unit may be seen in operation at Mr. Kevin Ragan's Nursery at Brookvale, near The Mall.

The Effect of Dilute Acid (HCL) on Sand used in Cutting Propagation

by H. Boyd

The writer has been aware for many years of the value of an acid sand-peat moss medium for the propagation of plants belonging to the family *Rutaceae*. Tests were run using many other plant families and all tests in an acidified medium gave better results. The medium was kept at a pH value of 4.5 by using diluted hydrochloric acid. This inorganic acid remains in sand and organic material and does not tend to wash out very readily.

To acidify a mixture use "spirits of salts" (this is diluted hydrochloric acid)*, 5cc. or one level teaspoonful to 3 gallons of tap water, (in Sydney). A little more or less may be needed elsewhere. The propagating medium is well wetted with this mixture. If organic matter is present (peat moss, sphagnum or leaf material) it takes up the acidified water and retains it so it is important that it is broken into small pieces and well distributed. The propagating medium recommended is Nepean sand (a coarse sharp sand). It must be kept constantly damp if organic matter is not present or it will become more acid and allowance must be made for dilution of the acid as more water is washed through.

To check the acidity and help maintain its value a B.D.H. indicator paper is useful. Requiring no specialised techniques, the colour chart and instructions on the packet make this a simple task. Indicator papers are readily available for the range 4.5 to 7, for instance from Selby's, York Street, Sydney.

*See "The Treatment of Seed" in *Australian Plants*, March 1960.

NATIVE SHRUBS FROM CUTTINGS

By H. BRACKPOOL

To the keen gardener who wishes to strike our native plants, with their beautiful and so often dainty unique foliage, and their delightfully formed flowers, any suggestions as to their propagation are always welcome. Unlike some exotics that simply need pieces to be pushed into the soil in the right season to take root without further trouble, most of our Australian plants are harder or even impossible to strike until you discover the right method. Only then do you wonder how it was that you did not hit on this easy way before; though when you see your final results you realise that all your efforts were worthwhile. Here I will give my experience of the few with which I have been successful; although first I should detail some general principles that I have learnt from other people or discovered myself in the process.

Cuttings are best struck in pots of bush sand or something similar, with about a third drainage material at the bottom. These to be placed in a bush house on bricks or such to permit excess water to get away, or as with mine, they are put similarly in the shade of a large tree that permits a little overhead sunlight to come through in summer; yet are in a position where the early morning winter sun from the north is mostly unobstructed in its access.

Moist cuttings such as those from plants with fleshy leaves, or young tips of new growth, need plenty of shade. Covers such as glass jam jars only encourage rotting. However, sometimes jars can be put around each if the bottoms have first been removed. This seems best done by the old tried method of tying a piece of thick string or twisted cotton material around the end of the jar or bottle, taking it off again to saturate with methylated spirits, putting it around the end of the bottle again and setting it alight whilst holding it upwards. When the flame has about finished, plunge the end into a bucket of cold water.

Cuttings not quite so moist could have these bottomless jars placed around them, or necked bottles with the bottoms taken out similarly. As can be seen, the amount of cover varies with the moisture content of your cutting, and the hole in the spout of a bottle will naturally not allow as much moisture to escape as will a bigger opening. Cuttings of older growth, or not very moist ones, can usually be best struck with a complete inverted glass jam jar over each.

A few leaves should be cut from the stem at the base of all slips and about one-third of the cutting firmed into the soil in the centre of each pot. Pots should be watered daily, unless there is rain, in the mornings in winter and at dusk or midday in summer. During heat waves water twice daily.

Now for some examples of shrubs that I have successfully propagated from small slips:—

Crocea saligna: Take tips of new growth, about two inches long, from mid-May to June and strike without any glass cover or surround. These should root easily in almost full shade through the winter and can best be transplanted to a quite shady position the following May.

Eriostemon myoporoides: Take tips of older growth, about four inches long. Placed in your pots under jam jars is best for this species. Plant out the following May if you can see definite growth and know your slips have rooted. This shrub will stand full sun if necessary, but is liked by white wax scale a little.

Chamelaucium uncinatum (Geraldton wax bush) is best struck either from young fresh tips with a glass surround (bottomless jam jar), or pieces of older growth about four inches long with a bottomless bottle placed over the cutting. It is much more difficult if completely enclosed by a jam jar, and the slips seem to be best taken from about May to July. When planted out, the positions that I favour are against or near walls facing north-east to north-west. Put a large stake in first for each, but never dig around any natives as they resent root disturbance and they usually dislike lime.

Leschenaultia biloba: Four-inch tips, taken from November to January and struck under complete jam jars, give the easiest results for this shrub. When struck the plants can be put out at once, and in bush sand like to be in full sun or almost anywhere. They will do reasonably well in a fairly dry position in loose clay-based soil against a brick wall that faces north-west to north-east. They usually strike in about three months through the summer. When using inverted jam jars over slips of the shrubs that need this method, it is never necessary to remove the jars except to see how your cuttings are progressing. With at least a four-inch pot there is usually a space between the jar and the edge of the pot where the water can penetrate so that you simply water over the jar.

Boronia serrulata (native rose): Take tip cuttings about five inches long in December and use the jam jar method to cover completely. It is probably better not to plant out your successes (which should be nearly 100%) before May, 17 months later, but if you are only using a four-inch pot you could risk transplanting in July (i.e., after seven months).

When selecting the position in your garden to plant out your native roses, pick a well-drained spot with overhead shade for summer, but where the sunlight can easily get through from the north in winter, and they like to be grown amongst other shorter plants—though not too near—for company.

Acacia longifolia (Sydney wattle): This is the species with very long, thin leaves and long finger like flowers. Tips of these of about four inches can be struck under jam jars quite easily through the summer and could be planted out the following July. As this shrub can develop into a fairly large bush, to about 12ft. high, it needs plenty of room, but will grow in almost any position except a swampy area.

Thryptomene paynei: Take your four-inch cuttings any time when the shrub is in flower, and strike using the inverted jam jar method as described for *Leschenaultia*. The plants can be transplanted probably about six months after putting in your pieces; though it is better to transplant in early spring or through the autumn to winter.

Hypocalymma angustifolia (honey myrtle): Four-inch tips of older growth taken through the summer are best, and could be planted out to open ground into almost any sunny position a few months later. This plant is very hardy.

Hypocalymma robustum (W.A. pink myrtle): Easier to strike than to grow. Take four-inch tips of old growth in May and strike under a bottomless bottle. These will strike through the winter and you could probably safely take off your bottles about November, though it could be advisable not to transplant before the following May. When planting out select a spot with overhead shade in bush sand and where the sunlight from the north can come through in winter. Some of these should survive; but surprisingly you could also get success in loose clay-based soil in a fairly dry position against a brick wall that faces around north.

THE GENUS BAUERA

by A. M. Blombery

Amongst the plants particularly adaptable to the cool, moist and shady parts of the garden is the genus *Bauera*. The genus takes its name from the Bauer brothers, two early Austrian botanical painters of whom Ferdinand went with Flinders on his voyage in the "Investigator" in 1801. This small genus of three species and one variety has been placed in several families over the years and is now assigned to a family *Baueraceae*.

The genus has the following characteristics: shrubs with opposite sessile (without a stalk) leaves; each divided into three small leaflets with the appearance of a whorl (arranged in a circle) of six leaves. Flowers are axillary, solitary, up to one inch in diameter, with from four to ten calyx segments and petals and numerous stamens. The fruit is a two-celled capsule containing a number of roundish brown seeds.

Bauera rubioides. (after the *Rubia* plant). A scrambling to upright-growing, somewhat hairy shrub with tough wiry stems from two to six feet long; the pink flowers, with numerous stamens, are carried on slender peduncles (stalks); the light green leaflets, about three-quarters of an inch in length, are lanceolate to oblong and usually serrated.

The species extends from Queensland to Tasmania, Victoria and South Australia.

Bauera rubioides var. *microphylla*. (small). This low-growing shrub is similar to the species but all parts are much smaller.

Bauera capitata. (having heads of flowers). This small diffuse shrub is very similar to *B. rubioides* var. *microphylla* in appearance, with numerous slender woody stems; the small, light, green, narrow leaflets are obtuse in shape with one lobe or tooth at each side. The flowers are almost sessile and solitary in axils, but several pairs together at the end of the branches form little flower heads. This species occurs in Queensland and New South Wales.

Bauera sessiliflora. (flowers without stalks). An erect shrub, soft and widely branched from four to six feet in height. The leaflets are dark green, entire, lanceolate and rather hairy. Flowers are sessile, axillary and crowded closely on the stems; the petals are pink or violet tinged to magenta in colour, with dark stamens. The species is confined to the Victorian Grampians, in moist sandy places.

The descriptions may be summarised by the following key:

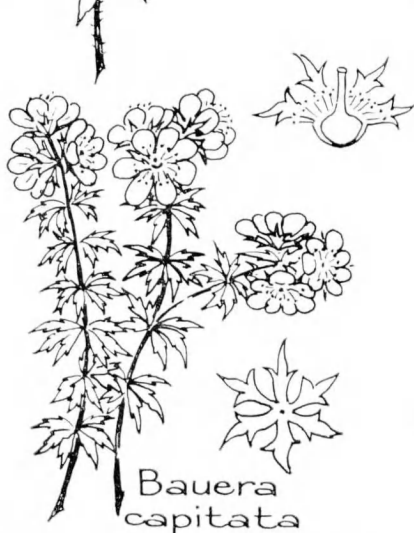
- (1) Flowers pedicellate
Ovary superior, leaves mostly lanceolate and serrate: *B. rubioides*.
Similar to above but smaller in all parts: *B. rubioides* var. *microphylla*.
- (2) Flowers sessile
Ovary superior, flowers terminal, leaves narrow and mostly three toothed: *B. capitata*.
Ovary half inferior, flowers axillary and crowded closely on stems, stamens dark, leaflets entire: *B. sessiliflora*.

In their natural habitat the species occur in close-growing masses, usually in a south to south-east aspect in moist, cool, shaded to semi-shaded positions, although in some moist situations plants may be found growing in full sunlight. Various common names are given to the species, such as "River Rose", "Dog Rose", "Wire Scrub", "Rose Heath" and "Showy *Bauera*". The flowers vary in colour from pale pink, through deeper shades to bright magenta.

PROPAGATION

These species are readily raised from seed or propagated by cuttings.

The small round seeds develop in small capsules and are best collected

Bauera
rubrioides*Bauera*
rubrioides
var: *microphylla**Bauera*
sessiliflora*Bauera*
capitata

D. Shumway

as the capsules turn brown and begin to open, usually from the end of November onwards, depending upon the flowering time. After drying for about a fortnight, the seeds are best sown when fresh into a box or other container, depending upon one's requirements, using a free sandy bush soil. Cover the seeds to their depth with a similar type of soil and then keep moist in a shady position. To assist in maintaining moisture, cover with a sheet of glass, polythene or hessian. Germination begins in from three to four weeks when the cover is best removed. Seedlings may be transplanted when the second or third pair of leaves has formed or, if so desired, the

Continued on page 167

GROWING THE COOKTOWN ORCHID

by P. Fetherston

Firstly, let me state quite definitely that I am no authority on the culture of the Cooktown orchid, but by trial and error over several years, have found one or two points which might save the newcomer some heart-aches and frustrations. Full credit though must go to Dr. Vote for any success I've enjoyed, as he was the true pioneer of the "hardwood" dendrobium culture in the Sydney area. Any would-be grower of these lovely plants can do no better than to consult his excellent article in the "Australian Orchid Review" of June 1956.

There are several varieties of the "Cookie" and any Sydneysiders seeking plants would be advised to try to obtain a variety sold as "compactum" which seems much less prone to "bud-drop" than the type. Good work is being done in this direction by at least one commercial grower, Mr. Jones of "Limberlost", Cairns, who has been hybridising from "compactum" with a view of thus assisting Southern growers.

This plant loves and must have light; shady "ferneries" are definitely "out". I have mine in an "open" glass house (i.e. glass on South, East and fence on the West, but open on the North, with approximately half the roof covered with fibreglass and the remainder with "Sarlon" shade cloth.) The plants hang high under the "Sarlon" during the growing season, and are moved under the fibreglass (with just a little less light) for the resting season. This resting period is absolutely essential. When the plants have completed flowering, watering is diminished, and then ceased completely until the new growths have developed to at least 1" in length (these new leads are particularly prone to damage from premature watering). Thus, from June to possibly September, the plants may receive absolutely no water. When new growth is well under way, it becomes important to bring the plant forth once more into full light, and to commence an adequate feeding programme (note "adequate" NOT "excessive" . . . overdoing fertilizers is a sure way to murder). "Aqasol" at the rate of one teaspoonful to the gallon applied fortnightly, with fish emulsion the alternating weeks is the diet of my plants, but feeding must be in direct proportion with both light available and growth rate of the plant.

As these plants are epiphytes and also have quite a "fine" root, rapid drainage will be seen to be essential, any stagnant water soon kills them.

The smaller the container the better, a 2" (or at very most a 3"), pot will be quite large enough. The bottom of the pot must be opened out completely, as so far as I know there is no flowerpot of this size on the market possessing a sufficiently large drainage hole (but just how to remove the entire base from a 2" terracotta pot without in the process shattering the entire pot is some problem — I would appreciate suggestion!) At least 1/3rd of the pot is now filled with crocks placed "on edge" — again to assist aeration and drainage. The plant is now placed (staked if necessary) above these, potting firmly in chopped thoroughly washed (to remove any soil and fine particles) medium to coarse fibre. (I have recently tried a few pots planted in medium grade fir-bark, which is popular in America and Hawaii, and results seem very promising). Whatever medium is used, it must be one which will not deny the roots instantaneous drainage (this cannot be overstressed) and as much access

to the atmosphere as possible. Stagnant air (as stagnant water) is fatal to these plants, hence my placing mine high under the "sarlou" roof towards the "open" end of the house. Another method worthy of trial is to tie the plant to a suitable support, one of mine seems to be quite happy on an 18" length of old weathered 3 x 2 fencing rail. This has the advantage of providing 100% drainage and aeration, and so seems a successful solution.

Now for that "bugbear" of all orchid lovers . . . Sydney's climate, especially our winter. I am quite satisfied the "cookie" can take it in its stride, provided it (the plant) is blessed with a sympathetic but wise owner; however, the problem of "bud drop" is one I've never seen completely overcome here. My plants will grow well and provide a wonderful array of sprays, but along will come a sudden cold "snap" and all I will have open will be but quite a small proportion of all the buds, the others having yellowed and dropped. Don't mistake me, the plants are very much well worth growing just for those flowers which do open, but it is a frustrating thought to envisage just what a show of flowers "might have been." In the winter months our night temperatures dive to the low 40's and even into the upper 30's. If the plants are kept in a light place, sheltered from undue gales, and kept dry, they will survive, nevertheless, when the nights pass below the 40's, I like to bring mine into the house to hang in a North facing window. This is not such a revolutionary idea, being quite common procedure in America and having been practiced last century in many English homes. With a little care in arrangement, the plants can be quite a decoration, and with an orchid-loving wife, but little persuasion is necessary. This procedure does assist the plants over the long bleak sodden periods Sydney seems to be getting as an annual event. So much for my experiences, what have other growers found?

DENDROBIUM SUPERBIENS REICHB. F.

by A. W. Dockrill

This species almost certainly originated as a natural hybrid *D. bigibbum* Lindl. x *D. undulatum* R. Br., in fact, garden hybrids of this cross have been raised which are almost indistinguishable from the naturally-occurring plant. *D. goldie* Reickle. f., Gard. chron. ser. ii, 9:652 (May 1878), *D. bigibbum* Lindl. var. *venosum* I. M. Bail., Dept. Agric. Bris. Bot. Bull. 2:18 (1891) and *D. bigibbum* Lindl. var. *georgei* C. T. White, Proc. Roy. Soc. Qld. 47:32 (1936), are based on an introgressive hybrid series.

DENDROBIUM SUPERBIENS REICHB. F.

Gard Chron. Ser. ii, 6: 516 (1876); ET 9:652 (1878). Syn.: *D. fitzgeraldii* F. Muell., "Leader", Melbourne, February, 1884; et Melbourne Chem. & Drug, June 1884.

D. bigibbum Lindl. var. *ablo-marginatum* F. M. Bail., Dept. Agri. Brisbane, Bot. Bull. 2: 18 (1891), Non Linden

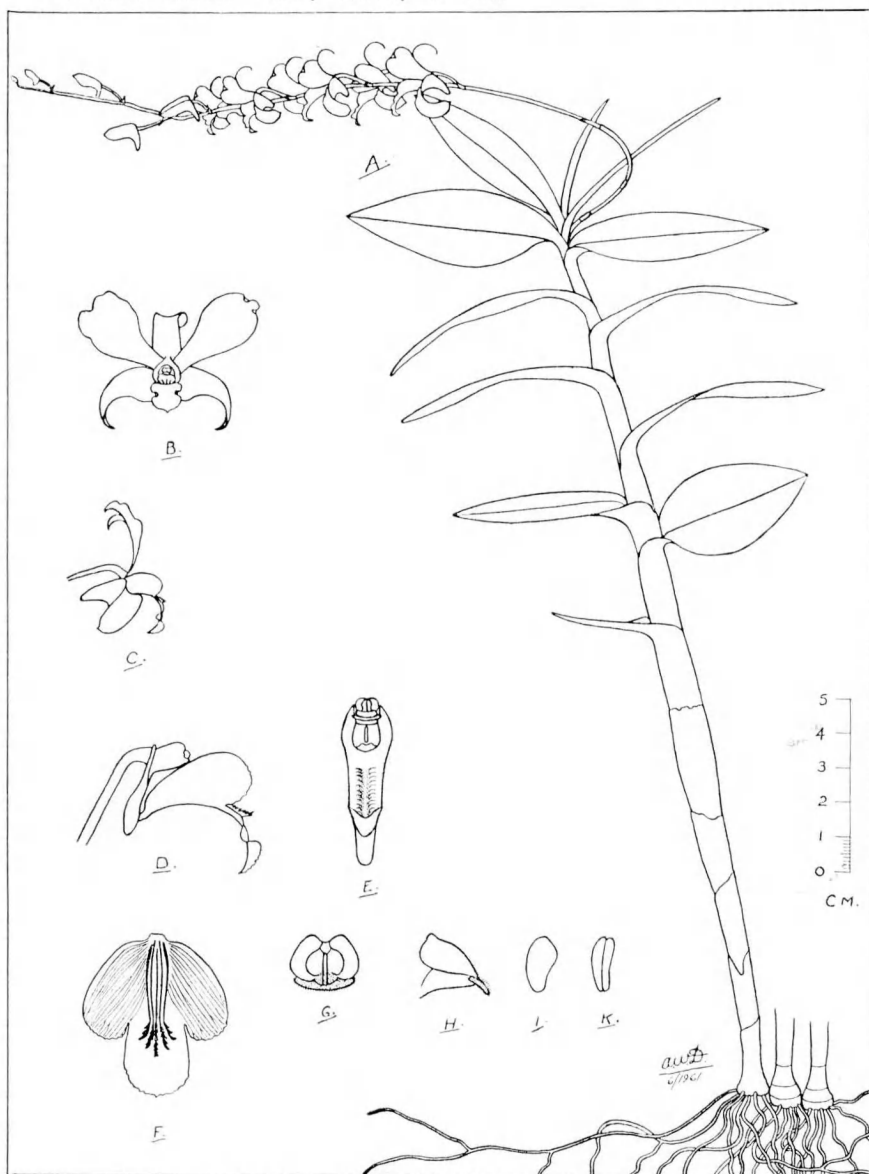
D. bigibbum Lindl. var. *superbiens* (Reichb. F.) F. M. Bail., Syn. Queensland: Flor: 567 (1863)

Pseudobulbs 30-60 x 1.6 — 2.2 cm, tapering towards the apex and to a less extent, towards the base, but swollen at the very base. Leaves 8-12, 5-14 x 3-6 cm, ovate, acute, sheathing. Racemes 25-40 cm. long, containing 8-15 flowers. Flowers about 4-5 cm. diameter, varying shades of pink, red and reddish-mauve, sometimes segments have white margins, segments twisted and margins undulate to varying degrees. Dorsal sepal 25-30 x 6-10 mm, narrow-oblong, usually reflexed. Lateral sepals somewhat similar to the dorsal one but joined at their bases, to form with the column foot, a spur 4-6 mm. long. Petals 25-35 x 10-20 mm., obovate, spatulate or oblanceolate: somewhat reflexed, usually partly twisted and margins somewhat undulate. Labellum 20-28 x 20-23 mm. (when flattened); lateral lobes erect and incurved, 6-8 mm. long, more or less rhomboidal, the apex being very blunt or rounded and its margins minutely incised, prominently veined; mid-lobe, when flattened, 8-12 x 6-10 mm, ovate, oblong or almost triangular, often apiculate, however, in the natural state decurved and

margins undulate so that the shape is not readily discernable; ridges of the disc 5, crested or toothed anteriorly where sometimes they (the ridges) are close together giving a massed effect. Column 14-18 x 4-6 mm. (including the foot), longitudinally grooved below the stigma; foot (spur) 4-6 mm. long, conical, cylindrical or even occasionally dilated at the apex. Stigma more or less scutiform. Another with a short, broad, somewhat decurved hirsute rostrum. Pollinia more or less typical of those of the genus.

DISTRIBUTION:—Some of the islands of Torres Strait, extending to the tip of Cape York Peninsular.

FLOWERING PERIOD:—Usually February to June.



A. Portion of plant . . . to one half indicated scale.

B. Flower from the front . . . to scale.

C. Flower from the side . . . to scale.

D. Column and Labellum from the side . . . to scale x 2.

E. Column from the front . . . to scale x 3.

F. Labellum flattened out . . . to scale x 2.

G. Anther from above . . . to scale x 10.

H. Anther from the side . . . to scale x 10.

I. Pollinium from the side . . . to scale x 10.

K. One pair of pollinia from the front . . . to scale x 10.

Native Orchids and You

Australian native orchid enthusiasts will be pleased to learn of the establishment of an Orchid Society devoted entirely to our native orchids. Known as the Australasian Native Orchid Society it has enthusiastic and competent officers and success of the venture is assured. Objectives of the Society cover every aspect of the culture, propagation, preservation, research, judging, publicity, etc. and are listed in the first issue of their newsletter entitled "The Orchadian".

The twelve page newsletter "The Orchadian" contains many interesting articles about native orchids and activities for the members and may be obtained for 1/3 plus 5 pence postage from the Secretary, W. T. Upton, 5 Woorarra Avenue, Narrabeen North, N.S.W. Why not become a member of that society for an annual membership fee of £1/5/0 and receive regular issues of "The Orchadian" and a copy of their journal which they plan to produce.

The Society for Growing Australian Plants was disappointed that the enthusiastic founders of this new Society did not form it as one of the autonomous societies grouped under our name. Although we offered all our facilities and resources to assist their formation, they decided to "go it alone", but our ties will always be close. We will give all the support and assistance possible for us to give. They have a huge task ahead of them so we urge all readers interested in the preservation and cultivation of our native orchids to give them every support.

S.G.A.P. EPIPHYTAL STUDY SECTION

The Society will still have its two active Native Orchid Study Sections, one for Terrestrial Orchids and the other for the Epiphytes. Leader of this latter section, Mr. G. A. Patterson, 50 Mildura Street, Coffs Harbour Jetty has plenty of news, advice and work for those readers who are interested to join the Section (only charge is a stamped addressed envelope for reply) but please do not write to him for plants. His last report describes some interesting experimental breeding by crossing species artificially (both generic and inter-generic) with a view to establishing varieties with best characteristics of colour. Another special study in hand is the wide variety of forms of *Dendrobium kingianum*.

Will all readers who have plants of *Dendrobium kingianum* growing report to Mr. Patterson as follows: Position of plant — On tree, raft, basket, pot — compost or other medium used — maximum and minimum temperatures — aspect — growth — open, bush-house, glass-house — size of inflorescence — pest control etc. For those who wish to start growing this hardy orchid it is fully described with a full colour plate in Australian Plants No. 4 (4/- plus 5 pence postage).

From the Editor:

Mr. Dockrill hoped to record the varieties and cultivars of the Cooktown Orchid to remove the present confusion. This has not been possible yet so the closely related *Dendrobium superbiens* is described as a start on this problem. I tried very hard to get a full colour plate for this species but could not obtain a suitable colour slide. Will growers please photograph all forms of *D. bigibbum* and the species *D. superbiens* and *D. dicuphum* during the next flowering season.

KANGAROO PAW DISEASE — Dr. L. R. Fraser, c/- Editor

A foliar nematode (*Aphelenchoides* sp.) seems to be capable of causing a very severe blackening under conditions of high humidity. It is not possible at this stage to say how important it is as a component of the disease syndrome, but during periods of prolonged wet weather it may be one of the more damaging of the organisms concerned.

Some growers may care to experiment with Lebayoid for its control and I suggest 2 or 3 sprays at fortnightly intervals using the strength recommended for the control of fruit fly in pome fruit. I should be glad to hear of any results either positive or negative.

REPORTS FROM READERS

From the Editor:

I have received many letters from readers in New Zealand. Most include reports of the adaptability of the "Brown Boronia", *Boronia megastigma*, which will grow under quite wet conditions. I grow quite a lot of *Boronia heterophylla* which strikes quite readily in a 4 inch pot of clean coarse sand placed in the open, under a Casuarina with filtered sun and protection from winds. With good garden loam, plenty of water and protection from wind, the plants grow vigorously both in shade and full sun. There is a Study Section on Boronia. Who will help this work?

From C. W. Yeo, Deagon, Brisbane, Queensland

N.S.W. XMAS BUSH: Planted 4½ years ago my bush grew like wildfire and flowered when 2 years old. The soil is generally poor with gravelly subsoil and excellent drainage. Once established, it has been watered when the weather is exceptionally dry. Now 14 feet high it was pruned after the last flowering, but grew more vigorously than ever.

N.S.W. WARATAH: Planted August, 1959, my bush flowered in its second year. It is now 7 feet high. Once established it is rarely watered except in drought conditions.

Apart from the occasional watering and pruning we leave our natives strictly alone. However, we apply a mulch of lawn clippings now and again.

YOUR GUIDE TO NATIVE PLANT SEEDSMEN

Nindethana Box 5, Dripstone, N.S.W. For all Native Seed. Packets, ounce or pound lots. Free list on application. Special supplies of West Australian Seed.

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

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

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

MELALEUCAS AS STREET TREES

In the City of Shepparton, Victoria, by the City Engineer, C. Johnson.

The selection of trees suitable for street planting is always a problem for the Municipal Engineer and in Shepparton we thought we had solved that difficulty some years ago by the selection of Desert, Claret and Golden Ash. In a number of streets these were alternated but owing to the slow growth of the Claret Ash, Desert Ash finally were adopted. It was thought that our low annual rainfall of 20 inches and clayey soil would permit this type of tree to develop as the most suitable species. However, rate of growth exceeded our anticipations and within ten to twelve years, these trees were causing trouble with overhead wires and roots were pushing up kerbs and gutters.



Melaleuca styphelioides
Regent St., Shepparton, Victoria



Melaleuca linariifolia
Princes Crescent, Shepparton, Vic.

Some six or eight years ago, I was shown some specimens of *Melaleuca Styphelioides* at the Natural Resources Conservation League of Victoria's nursery at Springvale and was informed by the Superintendent that this species had proved most successful for street planting at Camberwell — no trouble had been experienced from roots.

After inspecting these trees, Council adopted my recommendation that they be tried at Shepparton. In the last years many hundreds of *Melaleuca* have been planted and have proved successful in wet or dry conditions. Our preference is for *Melaleuca linariifolia* as the species will not grow to the same height as *M. styphelioides*.

We obtain the young trees in 6 inch tubes and in some cases planting is made direct from the tubes, in other cases the tubes are transferred to tins where, after twelve months, they attain a height of 18 to 24 inches and then are planted out.

Our soil consists generally of 3 inches to 6 inches of top soil and then a light clay to about 4 feet. Preparation for planting consists of digging a single hole, 3 feet deep, with a 10 inch diameter post hole digger and filling with sandy loam. The tree is planted and one 2 inch square stake provided. Watering is done once per week during the hot weather for the

first two or three years and after that regular watering is discontinued. The only attention is minor pruning.

To date we are very happy with the *Melaleuca* and only for the purpose of avoiding monotony do we plant other species.

REPORT FROM STREET TREE INVESTIGATION SECTION

MELALEUCA STYPHELOIDES

City of Melbourne, 25". Should only be planted to develop naturally. Not extensively planted in City.

Shire of Glenelg, Casterton, Vic. 27". Heavy black. Two years old. Good progress.

City of Shepparton, Vic. 20". Light medium clay. Good.

City of Chelsea, Vic. 24". Sand-clay away from beach. Satisfactory.

Shire of Whittlesea, Vic. Heavy clay. Very good.

South Melbourne, Vic. Sand/Limestone. Very good.

Shire of Rodney, Tatura, Vic. Medium clay-shallow surface loam. Good.

City of Geelong, Vic. 20". Yellow clay to black loam. 2-4 years, growing well.

Shire of Warracknabeal, Vic. 12-16" sandy clay. Good.

Municipality of Rockdale, N.S.W. 45". Sandy loam and clay. Used in dry or damp positions.

MELALEUCA ARMILLARIS

Toowoomba City Council, Old. 43". Very good.

City of Chelsea, Vic. 24". Sand-clay away from beach. Satisfactory.

MELALEUCA LEUCADENRON

Strathfield Municipality, N.S.W. Sydney Clay rainfall. Growing well.

City of Greater Wollongong, N.S.W. 48" + Generally clay. Grows 25', does well in sandy soil, and near sea side.

MELALEUCA LINARIIFOLIA

City of Shepparton, 20". Light medium clay. Good.

City of Chelsea, Vic. 24". Sand clay away from beach. Good.

South Melbourne, Vic. Sand/Limestone. Very good.

City of Geelong, Vic. 20". Yellow clay to black loam, 2 years, not conclusive.

MELALEUCA HYPERICIFOLIA

City of Chelsea, Vic. 24". Sand clay away from beach. Good.

City of Greater Wollongong, N.S.W. 45" + Generally clay. Grows to 15', does well in sandy soil and exposed to salt air.

MELALEUCA PUBESCENS

City of Chelsea, Vic. 24". Sandy clay away from beach. Good.

MELALEUCA SQUARROSA

City of Chelsea, Vic. 24". Sandy clay away from beach. Good.

MELALEUCA DECUSSATA

Willoughby Municipality, N.S.W. 5' to 6' as street shrubs.

THE GENUS MELALEUCA

PAPERBARK TREES FOR WET CONDITIONS

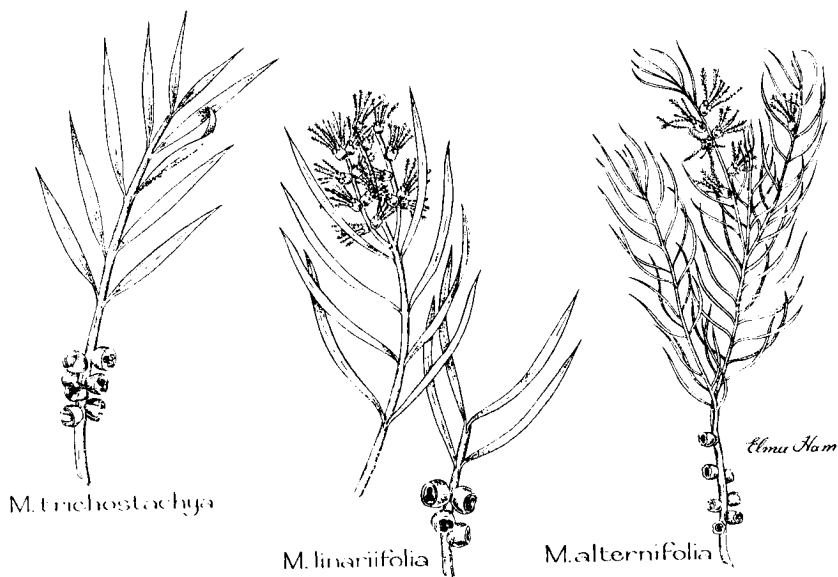
Series III. SPICIFLORAE (continued by C. N. Debenham)

A frequent feature of the swamp-dwelling members, particularly when exposed to alternating periods of extreme high and low moisture conditions, is well marked in *M. linariifolia*. This is the production of adventitious roots which appear usually several in number, arise from the trunk at varying heights and traverse the trunk surface to the ground, so attaining diameters of ½ inch or more. The function of these roots seems to be an auxiliary to normal root function whenever a physiological adjustment to water-logging is required. Perhaps, also, the papery-textured, white or grey, readily separated layers of suberised phellum making up the thick bark of the members (again well shown by *M. linariifolia*) act as a barrier to extreme environmental stresses, besides protecting the phloem which, in these members, generally is thin (Bamber, 1962).

The earliest collection for science of *M. linariifolia* was from the Sydney district and here, although now well cut out by settlement, the species has been found on edges of swamps, along brackish water-courses, and in creek beds both in the shale and sandstone areas. Southwards it has been noted from such districts as Jervis Bay and Milton of the South Coast, and Moss Vale, Mt. Tomah and Hill Top of the Southern Tablelands. It is fairly frequent along the coast to at least Gladstone in northern Queensland, where it merges with the coastal populations of *M. trichostachya*. Typically it is a bushy-crowned, dull and fine foliaged tree to 40ft., profusely blooming from October to December. To the apiarist, who perhaps knows the tree

as "Flax-leaved Paperbark", the bloom is of some value for the nectar and pollen utilised by the bees in making up their colony numbers. Stamens and petals of this member, and others of the group, are white or cream-coloured.

Features accepted as separating *M. linariifolia* and *M. trichostachya* as distinct taxa may lose their value somewhat over a wide range of distribution and these taxa really may be clinal forms of a super-species. Accepting, at least for the present, both as segregates at species level, it may be said that *M. trichostachya* occupies a range more extensive than its companion. Its distribution includes a large part of the North-east Interzone (see Regional Map. Aust. Plants. Vol.1. No. II.) both in Queensland and New South Wales, with an additional occurrence along Queensland's north-east coast. Although often associated with low rainfall conditions, it prefers to follow the rivers and creeks within these regions. The locality of the type specimen is the Belyando River of Central Queensland, the material being gathered from a sandy bed of the river (in August, 1846) by Surveyor-General Thomas Mitchell during his journey into the interior of tropical Australia.



M. alternifolia is rather similar to *M. linariifolia* in habit, although a smaller tree (up to 20ft. high) and blooms mainly from October to February. It is found lining swamps and creeks principally in the Coff's — Copmanhurst — Casino — Stanthorpe — Maryborough coastal sector and is recorded as far south as Stroud. Close attention has been given to the tree from the aspect of essential oil exploitation. The oil secreted by its foliage is a terpenic type, of value for its germicidal properties. These properties seem to be influenced by the cineol content which, for medical and pharmaceutical uses, is normally less than 10-12%. At least two chemical variants of *M. alternifolia* are known with cineol fractions in excess of 30% but a morphologically-indistinguishable form (designated as

'Type') yields an oil with the necessary lower cineol content to meet the requirements of the medical profession. Local production of 'Type' oil has been dependent on the cutting of foliage from naturally-occurring stands, but in the former Dutch East Indies some cultivation was maintained. The 'Ti-trol' and 'Melasol' types of antiseptics, soaps and germicides incorporate the oil as the active ingredient. Steam-distilled oil is pale lemon-coloured, has a nutmeg aroma, and from fresh foliage yield is in the vicinity of 1.5%. It may be noted that oil from *M. linariifolia* is not unlike that of *M. alternifolia* but varies considerably in cineol content, never reaching a lower limit for its use as a pharmaceutical item.

M. decora (Ironwood or Ridge Myrtle) is well-represented in both shale and sandstone areas of Sydney. Its northern and southern limits approximate the Brisbane district and Nowra, respectively, and within this coastal range is found chiefly on the margins of swamps or on poorly-drained soils. Flowering time is from October to January. *M. lanceolata*, from south-east Queensland south to Broken Bay, and *M. pauciflora*, from south of Newcastle to Jervis Bay, are similar to *M. decora* in their habitat preference and frequent appearance as bushy shrubs — both flower mainly between September and October.



The two western members reach heights of 40ft. with trunk diameters of 3ft. Lining the coastal swamps south from the Murchison River, the two frequently associate but *M. preissiana* occurs also along the south coast (e.g. the Stirling Range) and has inland extensions. *M. preissiana* is a close ally of Moonah (*M. pubescens*) and, in addition to the very different bark type, the preference for coastal swamps, and its gnarled and twisted stout branches, other differences are in its almost flat and erect leaves, its broader, squatter and wider-orificed fruit, and its slender and long staminal claws. Main flowering periods are: *M. preissiana* — January-March; *M. raphiophylla* (Swamp Paperbark) — September-November.

A.2. Leaves alternate or opposite, not above 20mm long unless linear or very narrowly lanceolate.

A.2.i. Spikes at first at the ends of terminal shoots, the shoot produced

during or after flowering or (in two of the alternate-leaved members) with the shoot well-advanced above the developed spike.

A.2.i.i. Paperbarked trees reaching heights of 10m (30ft) or more, or shrubs usually at least 3m (9ft) high, commonly associated with swamps or water-courses, sometimes with water-logged conditions. Primarily coastal members.

A.2.i.i.a. Leaves linear, narrowly lanceolate, or lanceolate and not pungent, no more than 3mm. in width.

Eastern members.

Spikes long, the flowers scattered or close together along the floral shoot. Staminal claws long and narrow, the filaments usually more than 20 from each claw. *

Spikes short, compact or few-flowered. Staminal claws short and broad, the filaments no more than 15 from each claw. Leaf-length to 12mm. ***

*Leaf-breadth more than 1mm (but no more than 3mm)

Leaf-breadth no more than 1mm, length 20-35mm. Leaves alternate, usually recurved and not rigid. **

C, B-C.

45. *M. alternifolia* (Maiden & Betche) Cheel (1924)

Leaves 20-30mm long, 2-3mm broad, rigid, opposite; mid-vein prominent and forming a keel on the undersurface. *

Leaves 10-20mm long, 1.5-2mm broad, stiff and spreading, alternate; lower surface channelled by the inset mid-vein.

C, B-C.

46. *M. decora* (Salisb.) Britten (1916)

**Mainly coastal and sub-coastal. Valves of fruit enclosed.

B, B-C, C.

47. *M. linariifolia* Sm. (1797)

Mainly inland and interior, tropical. Valves of fruit at rim-level. Leaf-length range overlapping lower limits of *M. linariifolia*.

A, B-H, B.

48. *M. trichostachya* Lindl. (1848)

***Leaves alternate, 3-veined (usually conspicuously). Floral shoots densely silky-haired and produced after flowering.

C, B-C.

49. *M. lanceolata* Otto ex Link (1827)

Leaves opposite, on upper surface inconspicuously veined and channelled by the mid-vein prominent on the undersurface.

C (coast)

50. *M. pauciflora* Turcz. (1847)

Western (south-west W.A.) members. Leaves alternate.

Leaves 15-35 x 1mm, pungent and recurved, almost terete.

E (west, mainly coast)

51. *M. raphiophylla* Schau. (1845)

Leaves 5-15 x 2-3mm, not pungent, almost flat and erect.

E (coast and inland)

52. *M. preissiana* Schau. (1845)

BROAD LEAVED PAPERBARKS:

A.2.i.i.b. Leaves broadly lanceolate or ovate-lanceolate. (Ovate or elliptical in one member).

Eastern and south-eastern members.

Leaves alternate. Floral shoot extended beyond the developed spike. *

Leaves opposite, (acute, up to 12mm. long). Floral shoot extended during or after the flowering period. **

*Leaf-length up to 20mm and breadth to 6mm. Leaf-apices acuminate and pungent. Venation finely striate. Floral shoots densely silky. Sepals rigid, pointed, and prominent on fruit.

C (coastal), B-C.

53. *M. styphelioides* Sm. (1797)

Leaf-length not above 3mm and breadth 1mm. Leaf-apices acute or obtuse. Venation striate but of 6 veins. Floral shoots without hairs. Sepals not pointed, rarely persistent on fruit.

B-C.

54. *M. irbyiana* R. T. Baker (1913)

**Leaves ovate-lanceolate, 5-7 veined. Spikes dense, cylindrical.

D, C (coastal). Taas.

55. *M. squarrosa* Donn (1800)

Leaves ovate or elliptical, 3-5 veined. Spikes 5-8 flowered.

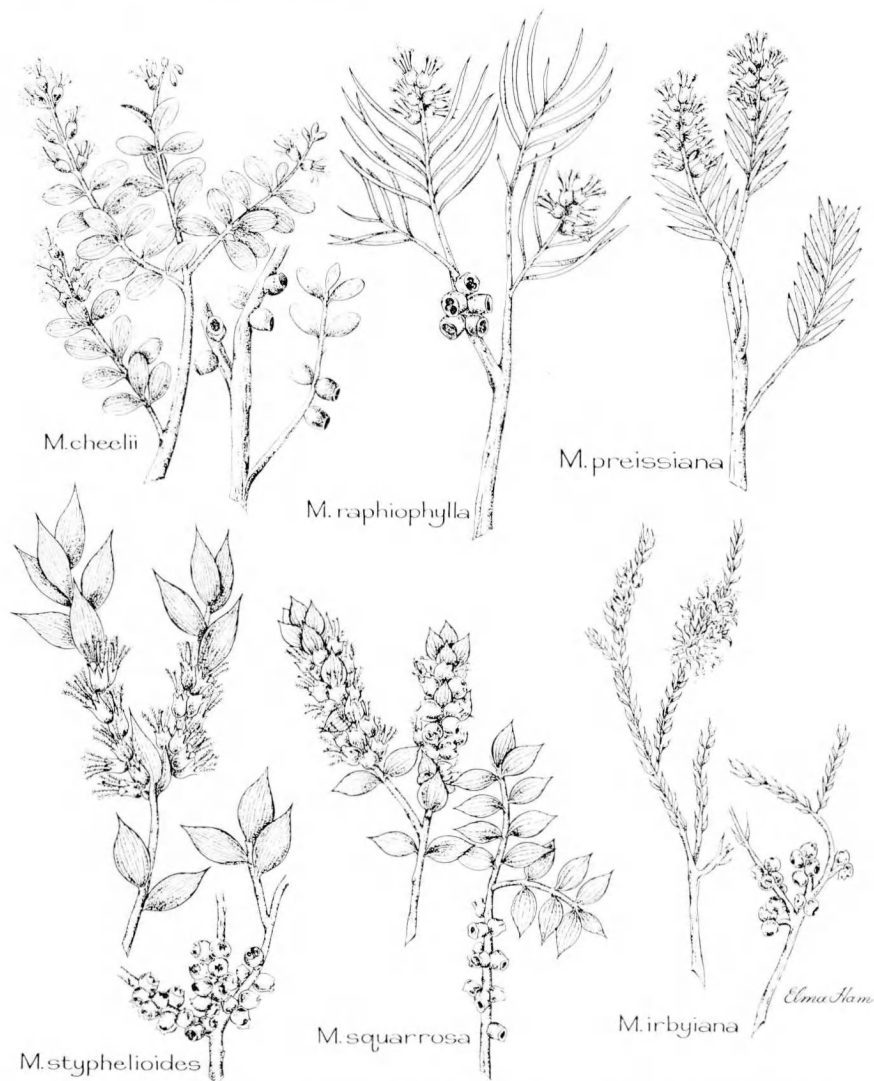
B (coast, south)

56. *M. cheelii* C. T. White (1931)

The most northern of this sub-group is *M. cheelii* with a very limited occurrence in the Burrum River district of North Queensland (e.g. Traverson, the type locality). It has been found as a spreading-branched tree reaching 30ft. high, flowering in October, and common in wet places in the sandy wallum country. Closest allies occur about 200 miles further south. These are *M. styphelioides* at its most northern limit (i.e. the Richmond River district, N.S.W.), and *M. irbyiana* which reaches westward from the Richmond River district to about Inglewood in south-east Queensland. *M. irbyiana* may well be a direct segregate from the former species.

M. styphelioides (or Cream Prickly Paperbark) follows the estuaries and coastal rivers south to the Shoalhaven River. In the Sydney district, it

occurs both on sandstone and shale and, close to Sydney, is scattered throughout the sandstone plateaux. e.g. Blackheath (3,500ft.), Yerranderie, near Mittagong. Frequently it forms an ornamental, spreading-branched tree (to 60ft. high) and is sometimes planted in parks and avenues for its adaptability to poorly-drained or harsh conditions. Flowering time is summer. The bark at present finds use (in favour of *M. quinquenervia* bark) as filling for nursery mattresses and pillows.



The most northern range of *M. squarrosa* overlaps the most southern range of *M. styphelioides*. This range for *M. squarrosa* is limited by the Georges River on the coast and the Nepean Ramp (e.g. at Robertson and Mittagong) at higher elevations. Southwards it becomes increasingly abundant along the coast of New South Wales and in Victoria (except the north-west)

TREES FOR QUEENSLAND

Part I—Introduction by Department of Forestry, Queensland

There are many ways in which trees can be of service to the man on the land. They lend charm to the landscape and provide a becoming setting for his home; they afford welcome shelter where his stock may rest, protected from the heat of the summer; as windbreaks they place a barrier to the cold and boisterous westerlies and to the dry winds of summer; in times of drought they give of themselves to sustain the starving sheep; they halt the forces of erosion and finally in wood-lots they assist in the efficient integration of land use on the farm and make a contribution to the financial well-being of both farm and State alike.

In each of these fields there is a wide range of suitable trees, both native and exotic, and since Queensland is a vast State with many different soils and climates, each case requires consideration. To assist in the choice of the right tree for each particular use it is proposed to publish a series of six articles each dealing with a restricted section of the State.

The first two of these will deal with the Downs and Western Plains where the chief concern is for shade, windbreak and fodder trees, and where soil and climate present problems which restrict the choice of species. Then will be dealt with in order the Granite Belt, South-east Queensland, Central Coastal Queensland, North Queensland both Coastal and Tableland.

Whilst most farmers have a sound appreciation of the value of trees as ornamentals and for shade and shelter, there is not much evidence that they are fully aware of the potentialities of the farm woodlot. In older countries where time and experience have developed a stable design for land use the farm woodlot and private forests make a major contribution to the timber economy of the country. In the United States of America approximately one-fifth of the farm land carries forest and these farm-forests represent almost one-third of the productive forests of the nation. In nearly all European countries private owned forests comprise the bulk of the forest estate and much of this is in small farm holdings. In the very cold Scandanavian countries the farm-forest permits all the year working since the forest can be tended or logged when other work on the farm is impossible.

This series of articles aims at providing assistance in the selection of the species best suited for the various uses to which trees may be put and at the same time will deal in some detail with important native species in each division of the State.

and in Tasmania it is widespread, mainly in moist heaths or along rivers, at higher elevations a frequent component of shrub swamp. The species also has some representation in the south-east of South Australia and on Kangaroo Island. The usual habit of the summer-flowering member is that of an erect and bushy shrub about 10ft. high but it is known to reach tree size. To many horticulturists (who know the species as Scented Paperbark) it finds favour as an attractive shrub for moist conditions.

Editor's Note: The tree *Melaleuca linariifolia* is appreciated as a valuable street tree overseas. E. H. Scanlon, Editor of the U.S.A. publication "Trees" reported after a visit to Australia, "If I had anything to do with street planting anywhere in Australia wherever this gorgeous tree (*M. linariifolia*) would be happy, you can be sure that street scape would be much the brighter for having this beautiful tree move in."

HANDBOOK OF THE VASCULAR PLANTS OF THE SYDNEY DISTRICT AND BLUE MOUNTAINS
by N. C. W. Beadle, O. D. Evans, R. C. Carolin

This book has been prepared for those interested in the identification of the native and naturalised flora of the Sydney district, an area defined by Gosford in the north, Kiama in the south and Mt. Victoria in the west. The number of species occurring in the area is 2,200 (pteridophytes, gymnosperms and angiosperms) and keys are supplied for identification of the families, genera and species.

Those who have no knowledge of botany can learn to use the keys and thereby identify any plant as far as the species, since the book includes sections on floral structure, the basic principles of classification and a glossary.

In order to produce a book at a price within the reach of the student, publication has been financed privately on a non-profit basis.

597 pages with 64 Figures. Page-size 8" x 6½". Cloth bound. Price £3/10/0 (postage paid). Available from Professor N. C. W. Beadle, Box 259, P.O. Armidale, N.S.W.

ORCHIDS OF AUSTRALIA (by W. H. NICHOLLS)

At the time of his death in 1951 the author and artist was recognised as the leading Australian authority on this subject. He had devoted 27 years to the collection, propagation and study of Australian orchids, travelling throughout Australia on many occasions. The manuscript and 600 water colour drawings, together with 5,000 dried specimens were bequeathed to the National Herbarium, Melbourne, and Mr. J. H. Willis has edited the text since.

It was planned to complete the work in 26 parts, each containing 24 colour plates with text. With a page size of 13½ins. x 9-3/4ins. it has been possible to reproduce the blooms full size and in full colour. Four parts have already been published—Parts 1-2 being bound together in quarter leather to form Volume 1. The price of the first four parts is £35. Herein lies the tragedy. Acting on well-meaning advice and high principle, the publishers, Georgian House Pty. Ltd., undertook the project with a reasonable assurance of a market. The high standard of production priced the books outside the pocket of the interested layman and unless more copies are sold, the publishers, who have already incurred a loss of £5,000, will not be able to continue publication of the series.

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HOW I GROW N.S.W. NATIVE ROSE

by J. Twyford (Thornleigh, N.S.W.)

Boronia serrulata (Native Rose) has responded well to cultivation in our garden, natural conditions being simulated as far as possible.

Rockeries were built up with poor grey sandy soil to a depth of a foot or so above the natural black soil. The plants were placed between pieces of sandstone or over flat stones. The soil has been kept moist at all times and shade from the winter sun provided. Blood and bone as a fertiliser and a mulch of *Casuarina* needles has proved effective. Growth has been slow but sure, while the plants have flowered each year.

We have found that young *B. serrulata* plants exposed to full winter sun developed symptoms of yellowing. This paleness of colour is possibly due to lack of chlorophyll or iron while temperatures are low. Some of these plants died. It may be worth noting that our property is at an elevation of over 500 feet, with comparatively low temperatures and high rainfall.

As *B. serrulata* may live for more than 20 years under natural conditions, care in preparing a planting site may well be worth the effort.

THE CULTIVATION OF BORONIA — continued from page 140

daphne or lemon.

Tip-curl or wilt is not strictly a disease, but a condition resulting from attack by juvenile scale-insects. Unlike the adult insects, which are covered by a dark waxy dome, these are tiny, active yellowish insects, which congregate on the younger stems. At this stage they can be killed quickly by nicotine sulphate or Rulene or a combination of the two. Either of these, but not both, can be added to the white oil spray for mature scale.

Virus disease once decimated commercial plantations near the Dandenong Ranges, but all the better cutting-grown varieties seem quite immune to this, and in any case it would be rare in small-scale plantings, largely isolated from each other.

Slugs and snails will occasionally cause trouble in the spring months by climbing the plants and ring-barking younger stems. Every gardener has his or her own preference of a remedy for these pests.

Cats. Without going into details, let us just say that cats are capable of killing *Boronias* faster than anything else I know of.

Fertilizers: As a general rule, if leaf mould is used as a top dressing on occasions, these are seldom necessary. On the poorer soils however, a little extra food may be desirable. Blood and bone is satisfactory on very acid soils, but as the end-product is slightly alkaline, it should be avoided on the near-neutral grey sands and on converted alkaline soils. The use of dried fowl manure or well-rotted cow or sheep manure is preferable, and is safe on all soils. It is most important though, that whatever is used should be applied in moderation, and to the surface only — never dug in.

Flowering seasons: Typically, *Boronias* are spring flowering, but some species do flower at other times of the year. *B. purdiana* produces its yellow bells in mid-winter, and sometimes keeps flowering into summer. This is followed in late July by *B. megastigma* and its varieties, then by *B. pulchella*, *B. gracilipes*, the brilliant *B. crassipes*, *B. heterophylla* and its apparent hybrid with *B. elatior*, *B. muelleri*, *B. pinnata* and *B. thujona*, *B. serrulata*, *B. elatior*, *B. denticulata*. By this time, usually around Christmas *B. pulchella* and *B. gracilipes* have commenced their summer flowering. *B. filifolia* and *B. viminea* are in flower most of the year.

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THE GENUS BAUERA — continued from page 150

plants may be left and transplanted in the late autumn. After transplanting, the seedlings should be held for approximately three months or until well established, when they are ready for planting out into the garden. An example of the effectiveness of raising seedlings by this simple method might be mentioned, for at the time of writing, seedlings are being transplanted from a box of advanced seedlings raised by an enthusiast in which they are so thick there is barely space for a pencil between plants.

Propagation by cutting is readily carried out by using side and leading shoots in October and November or February and March. The cuttings should be from two to three in length with the lower leaves removed. The cutting medium may be, of coarse river sand, vermiculite, or separate cuttings may be placed in well-drained, sandy soil. The river sand or vermiculite should be placed in a pot or tin with a layer of coke or other drainage medium at the bottom. The cuttings should be placed from half to two-thirds their length in the cutting medium, which should be kept moist in a shady protected position or in a cutting-frame. Covering the container with a sheet of glass or standing in a polythene bag with drainage holes at the bottom helps to conserve moisture when no cutting frame is available. Cuttings should not be allowed to dry out at anytime. Individual cuttings in a shaded position in sandy soil covered with a glass jar give good results, but over-watering must be avoided. Cuttings take from two to four months to form roots when they are ready for potting. After potting they should be kept in a shaded position for about three months when they are ready for planting out.

CULTIVATION

Bearing in mind the habits of the genus, the best position for cultivation is a cool, shaded or early morning sun position, although, provided an ample supply of moisture is always maintained, any situation in the garden is satisfactory. Several plants grouped together give a pleasant effect, particularly with the lower-growing species, *B. capitata* and *B. rubioides* var. *microphylla*. The larger growing species, *B. rubioides* and *B. sessiliflora*, make good specimen plants or a pleasant soft hedge for shaded position.

In establishing new plants, it is essential that watering should be carried out regularly. This is most essential, particularly in the drier parts of the garden, and, even with old established plants, watering must not be neglected in dry exposed situations.

The plants tend to keep a compact form but, if desired, light pruning may be carried out immediately after flowering, avoiding cutting old wood during the process.

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BAUERA RUBIOIDES

The flowers of the common "River Rose" of N.S.W. are usually pinker than shown above.

Given correct conditions, *Bauera* species will grow for years with little attention. As an example, plants of the species *B. rubioides* var. *microphylla*, raised from cuttings, and grown in a half-shaded moist position, have been in cultivation in my own garden for twelve years and have received little attention after their initial establishment. This article by A. M. Blombery commences on page 149.