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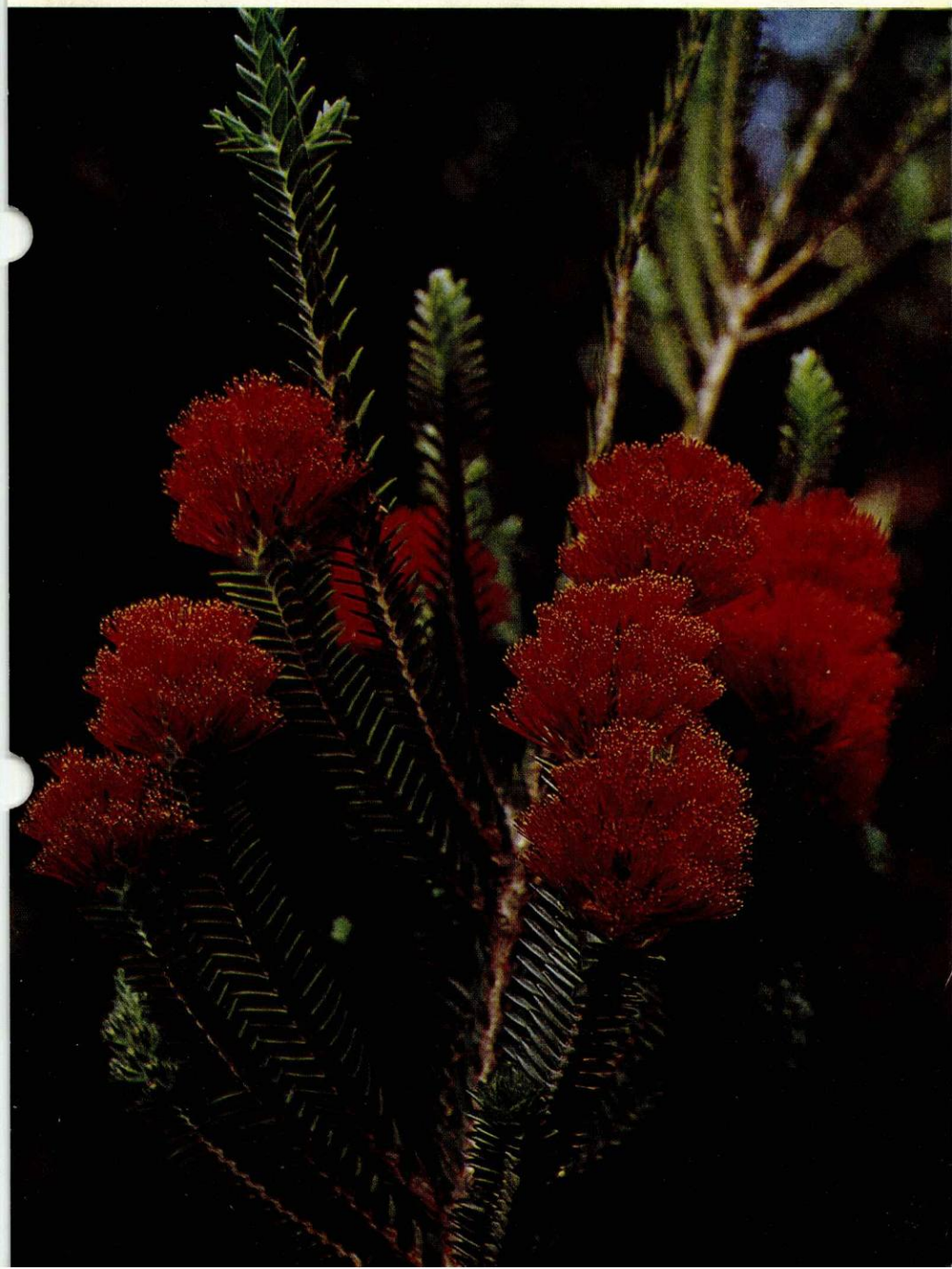
Australian Plants

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CONTENTS OF THIS ISSUE

This is the final issue of Volume No. 3. An index for Volumes 1 and 2 appears on pages 23-26 of this volume and an index for Vol. 3 is being prepared to supplement this.

The publication is produced to assist in the preservation and cultivation of our wildflowers. The previous issue, No. 27, introduced readers to the problems associated with the cultivation of wildflowers in clay and heavy soils. The principal theme of this issue is to expand further on this aspect. Contrary to popular belief, people with heavy soils do not realise how lucky they are if they wish to grow wildflowers.

GROWING WILDFLOWERS

PLANTS FOR CLAY OR HEAVY SOILS—page 339.

HEAVY SOIL GARDENING IN SYDNEY, by H. M. Hewett—page 341. A lesson for all areas, not just Sydney. The experiences of hundreds of S.G.A.P. members are summarised.

GARDENING ON THE CLAY SOILS OF THE WESTERN PLAINS, VICTORIA—page 343.

An excellent article by an experienced nurseryman.

HOW TO MAKE FRIENDS WITH CLAY SOIL by C. Loxley—page 344.

WILDFLOWER GARDENS

A new aspect of wildflower cultivation is introduced, their cultivation in light forest or timbered sections resembling a patch of natural bushland. For those who are fortunate enough to build a new home in a natural bush setting . . .

FOREST AS A GARDEN—1. Notes by the Editor, page 352.

FOREST TO A GARDEN—2. THE RETENTION OF INDIGENOUS FLORA IN DEVELOPING

SUBURBAN AREAS by D. D. Morris, page 359—Although this article gives the recommendations of an experienced wildflower gardener for a particular area, the method of treatment will apply to people who want to tame, not retain the natural bush near their home.

DESIGNING AUSTRALIAN BUSH GARDENS by Betty Maloney and Jean Walker. The book review on page 351 is of special value to people interested in this aspect.

NATIVES WITH WRENS by Don Hanna, page 355—A wildflower garden will cultivate birds.

A NATIVE GARDEN FOR BIRDS by H. S. Stevenson, page 356.

WILDFLOWERS

THESPEZIA IN AUSTRALIA by Paul A. Fryxell, page 366. The third article in a series on *Malvaceae*. Hibiscus like plants, this describes the two Australian *Thespesia* of the tropical north.

SEASIDE MAHOE by Julia F. Morton, page 367. This further describes one of the species of *Thespesia* that is widely known and grown in the world.

TETTRACARPEA by A. M. Gray, page 372. An article in a series on Tasmanian wildflowers.

BOTTLE BRUSH TYPE FLOWERING PLANTS—PLANTS FOR CLAY OR HEAVY SOILS—page 339.

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THE WHITE BOTTLE BRUSH AS A STREET TREE, page 348. A report by our Street Tree Section.

EUCALYPTUS, Breeding to Secure Early Flowering by L. D. Pryor, page 357.

SYNCARPIA, The Problem Of, by C. N. Debenham, page 352—A valuable review of the genus.

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ANODEPETALUM BIGLANDULOSUM by A. M. Gray, page 377.

NATIVE ORCHIDS

ACIANTHUS, The Genus in Australia by Leo Cadv. page 370—All Australian species described.

ACIANTHUS, No. 4 of a Series on Tasmanian Orchids by M. J. Firth, page 374. Delightful reading.

ACIANTHUS, Two Inland Species by B. Whitehead, page 378.

GROWING TERRESTRIAL ORCHIDS by Keith Bursill, page 383.

Editor's Note: The design of a garden or the landscaping of your home is such an individual project that any attempt to broach the subject would in itself fill a large volume. Rather it has been our policy to present our Australian flora to the reader under headings such as "Plants for Rock Gardens," "Ground Cover Plants," "Plants for Seaside Planting," "Plants for Heavy Soils" etc., and let the reader make his own selection. The above article is one in this series. Certain aspects of landscaping design such as contrast and form of plants must also be considered and our last issue introduced the "Smoke Bushes" for use as a foil in suitable situations. Can any reader nominate some more grey or grey-green foliage plants. One of exceptional value because of its unique foliage form and striking flowers is *Regelia grandiflora*. It is shown on the front cover although the lighting for the photography has concealed the true splendour of the foliage.

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AUSTRALIAN PLANTS—Volume 2 Price \$6.00 each plus 20c postage.

Volume 2 comprises issues 13-20. Bound in the same volume is the publication *Descriptive Catalogue of West Australian Plants*, see below, giving this volume its exceptional value.

These volumes are beautifully presented in gold lettered, hard covers and include AUSTRALIAN PLANTS Price 30c

The annual subscription of \$1.20 includes postage of the next 4 issues to your home. Past issues (excluding No. 2 and No. 12, that are now permanently out of print) are available as individual copies at 40c plus 4c postage. Some issues 9-17 are out of print and are available only in the bound volume.

OUR FRONT COVER . . .

Regelia velutina syn. R. grandiflora

A wildflower worthy of any garden. The bush, not shown here to advantage, is very spectacular even without flowers, grey green with fine stature in heavy and clay soils.

PLANTS FOR CLAY OR HEAVY SOILS

The bottle brush type of flowering plants and those with the brushes as heads resembling a pom-pom, at the end of the branches either open or fan-shaped as with the *Regelia* on the front cover or the *Melaleuca* on page 384, belong to the large plant family Myrtaceae. This family of plants in specially adaptable to heavy soils and in some cases, very wet situations.

Being such a large family, the botanists have divided it up into sub-families, tribes and genera. It is of such interest to the gardener that we will examine the family in a series of articles but with the plants grouped such that the layman can readily distinguish the groups. These will commence in issues next year. These preliminary notes are presented here as the plants are ideally suited for heavy soils, but particularly in the hope that readers will set to at once and grow them and report experiences so that our series later on will be more complete.

The family includes the large genus *Eucalyptus*, our Australian gum trees. The use of these, as large trees, as specimens for landscaping and the coloured mallee and dwarf forms will be the subject of future articles in this series. Many are especially suited to heavy soil conditions and some for wet or swamp situations.

The head of flower really comprises a cluster of true flowers where the stamens of the flower, those bristles of the bottle brush or pom-pom are prominent and the petals are insignificant.

For reasons of botanical classification based on the structure of the individual flowers, and not just to confuse the layman, the botanists have also included in these tribes plants with flowers that have stamens shorter than the petals and the petals are prominent. These include the "tea-trees" *Leptospermum*, *Baeckea*, *Thryptomene*, *Calytrix*, *Micromyrtus* and *Hypocalymma*, all excellent garden shrubs, many eminently suited to heavy soil conditions. For the layman these genera are also difficult to distinguish from one another but I have an excellent article in preparation to assist us. Please support me by sending comments and experiences in the cultivation of these plants.

SOME BOTTLE BRUSH TYPE FLOWERING PLANTS

CALLISTEMON

This is the genus of plants generally referred to as bottle brushes. Commencing with No. 3, various issues of "Australian Plants" have described these bushes (especially our No. 20 issue), that usually develop to large shrubs and in some cases small trees as mentioned on page 348, where the white bottle brush is recommended as a street tree. Most species are red flowered in various shades, an outstanding specimen being recorded as a cultivar on page 349.

KUNZEA

The majority are of the pom-pom type of flower. However possibly the brightest red species *Kunzea baxteri* (illustrated in colour in our No. 20 issue) does have flower heads similar to a bottle brush.

MELALEUCA

With well over 100 species this genus of plants offers infinite scope in shape, size and form of bush and colour of flower. 80 species have been described in our issues 10-20, this group including plants with bottle brush type flowers, the "claw" flowers, and the group that flowers along the stem such as *Melaleuca wilsonii* on the rear cover. Future issues will describe the pom-pom type flowered group such as *Melaleuca polycephala* on our rear cover.

CALOTHAMNUS

Commonly called the one-sided bottle brush as the flowers are often grouped on one side of the stem only. Two species are illustrated in No. 20 issue. The 24 species are listed in "West Australian Plants" and reports on all species are still awaited. However it is already obvious that they are extremely hardy, surviving long dry spells with some flowering, but being most rewarding after a wet winter. Those are ideal for the country dweller who cannot water artificially and their form of growth makes them excellent as a backdrop to conceal unwanted features in a garden such as a fence or shed.

Blocks donated by Mr. N. B. Thomson, being a record of his trip to Western Australia.



Eremaea beaufortioides



Beaufortia schauveri

A plant growing in the wild. By regular pruning it will do even better in heavy soil in your garden.

BEAUFORTIA

Beautiful shrubs with showy flowers. The 16 species were briefly described in our No. 21 issue and four species illustrated in colour. Further reports are needed.

EREMAEA

Small shrubs with showy flowers some of the bottle brush type. *E. beaufortioides* is illustrated on page 340. We need someone to purchase the seed of all the following species, glorify your garden by growing them and report results.

E. acutifolia—A shrub to 18 inches with orange flowers.

E. beaufortioides—A shrub to 4 feet with orange flowers.

E. ebracteata—A small shrub with orange to red flowers.

E. fimbriata—A slender hairy shrub to 2 feet with orange to red flowers.

E. pauciflora—A shrub to 4 feet with orange flowers.

Continued on page 347.

HEAVY SOIL GARDENING

by H. M. Hewett, Plant Recording Officer, N.S.W. Region

Until the emergence of S.G.A.P. the thought of growing Australian natives was associated in the minds of most home gardeners in this city with the commodity "bush sand." Doubtless this attitude has been encouraged by the dramatic beauty in springtime of our indigenous flora, now restricted, because of suburban development, to the more rugged Hawkesbury sandstone outskirts of Sydney, so frequently referred to in the off season by the derogatory term "scrub."

With the mounting public enthusiasm, for the growing of, not only local, but introduced species from all parts of the Commonwealth, it is not surprising to find an ever-increasing range of our plants satisfactorily established in the heavy soil areas. I have included hereafter a list of approximately 200 such species embracing many found growing naturally in the sandstone soils.

Sydney's heavy soils vary from comparatively rich, deep Villawood alluvial loams, to the heavy brown loams and clay loams overlaying the Wianamatta shales and to red and yellow ironstone clays.

It has been interesting to observe the contrasting growth form of some species in heavy soils compared with their habit in lighter mediums. Some which come immediately to mind are *Prostanthera incisa*, *P. rotundifolium rosea* and *P. latifolia*, and the W.A. *Boronia*s, *B. megastigma*, *B. heterophylla* and *B. denticulata*, all of which tend to grow in a more compact form under the heavy conditions. Early growth seems to be much more rapid, mature height of specimen is decreased and full heavy flowering is reached at an earlier age, although ultimate effective life is often shorter. Furthermore, these species seem to flourish under full sunlight exposure whereas, in the lighter soils broken shade seems more desirable. Many of the Mallee *Eucalypts* also have not only been established in heavy soils, but in refusing to make satisfactory growth in other locations, have surely indicated their preference insofar as our Sydney climate is concerned.

The denser form of growth characteristic of heavy soil gardens can be used advantageously to achieve a different and in many regards, more attractive garden appearance, than is possible with the lighter soil types where spacing of plants must generally be increased to provide adequate protection from root competition. In contrast the heavy soil gardener is able to grow shrubs and small plants closer to tree varieties and also closer to each other. Furthermore, some prostrate species, which are vigorous enough in the lighter soils to be classed as garden hazards, tend to grow denser and more contained.

My observations and records to date of heavy soil gardeners and their methods leads me to make the following suggestions for those wishing to grow Australian plants under similar conditions:—

Form built-up beds at least 6 inches high or preferably more, by excavating garden paths below natural surface level. Most species respond favourably to regular watering and frequent surface cultivation, say one inch deep to maintain the soil in an open condition and inhibit growth of surface roots. A satisfactory alternative to this latter suggestion is to use a mulch up to 2 or 3 inches thick of coarse river sand or similar material. This method has been used in the establishment of a group of species, which I have included in a supplementary list after the following main group of 200 or so species referred to above.

<i>Abutilon auritum</i>	<i>E. sideroxylon</i>	<i>M. erubescens</i>
<i>Acacia acinacea</i>	<i>E. spathulata</i>	<i>M. fulgens</i>
<i>A. alata</i>	<i>Eugenia smithii</i> (syn. <i>Acmena smithii</i>)	<i>M. huegelii</i>
<i>A. cylindricarpa</i>	<i>Frankenia pauciflora</i>	<i>M. hypericifolia</i>
<i>A. cyanophylla</i>	<i>Grevillea asplenifolia</i>	<i>M. incana</i>
<i>A. drummondii</i>	<i>G. banksii</i>	<i>M. laterita</i>
<i>A. vestita</i>	<i>G. baueri</i>	<i>M. micromera</i>
<i>Actinotus helianthi</i>	<i>G. biternata</i>	<i>M. nesophila</i>
<i>Agonis flexuosa</i>	<i>G. buxifolia</i>	<i>M. polygaloides</i>
<i>Albizia lophantha</i>	<i>G. chrysophea</i>	<i>M. pulchella</i>
<i>Angophora cordifolia</i>	<i>G. dallachiana</i>	<i>M. radula</i>
<i>Anigozanthos flavida</i>	<i>G. glabrata</i>	<i>M. seedmani</i>
<i>A. manalisii</i>	<i>G. juniperina</i>	<i>M. thymifolia</i>
<i>A. viridis</i>	<i>G. lavandulacea</i>	<i>M. wilsoni</i>
<i>Baeckea linearifolia</i>	<i>G. paniculata</i>	<i>Micromirtus ciliata</i>
<i>B. virgatum</i>	<i>G. punicea</i>	<i>Myoporum debile</i>
<i>Banksia ericifolia</i>	<i>G. rosmarinifolia</i>	<i>M. floribunda</i>
<i>B. repens</i>	<i>G. sericea</i>	<i>M. humile</i>
<i>B. spinulosa</i>	<i>G. tridentifera</i>	<i>M. serratum</i>
<i>Bauera rubioides</i>	<i>G. wilsoni</i>	<i>Olearia microphylla</i>
<i>B. sessiliflora</i>	<i>Hakea cristata</i>	<i>O. teretifolia</i> correcta
<i>Boronia denticulata</i>	<i>H. erinacea</i>	<i>Orthrosanthus multiflorus</i>
<i>B. heterophylla</i>	<i>H. laurina</i>	<i>Pandorea jasminoides</i>
<i>B. megastigma</i>	<i>H. microcarpa</i>	<i>Panomic hastata</i>
<i>Brachychome multifida</i>	<i>H. multilineata</i>	<i>Parsonia pinitolus</i>
<i>Brachysema lanceolatus</i>	<i>H. petiolaris</i>	<i>Phebalium dentatum</i>
<i>Brassia actinophylla</i>	<i>H. purpurea</i>	<i>P. soummeulosum</i>
<i>Callistemon brachyandrus</i>	<i>H. salignus</i>	<i>Pimelea ferruginea</i>
<i>C. linearis</i>	<i>H. varia</i>	<i>P. limifolia</i>
<i>C. phoeniceus</i>	<i>H. victoria</i>	<i>P. roseus</i>
<i>Calostemma luteum</i>	<i>Hardenbergia monophylla</i>	<i>Pratia nuberula</i>
<i>C. purpurea</i>	<i>H. comptoniana</i>	<i>Prostanthera cuneata</i>
<i>Calothamnus sanguineus</i>	<i>Hardenbergia monophylla</i> var. <i>rosea</i>	<i>P. incana</i>
<i>C. validus</i>	<i>Hibiscus diversifolius</i>	<i>P. incisa</i>
<i>Calytrix sullivanii</i>	<i>Hovea lanceolata</i>	<i>P. lasianthus</i>
<i>Ceratopetalum gummiferum</i>	<i>Humenosporum flavum</i>	<i>P. niveni</i> <i>induta</i>
<i>Chamaelaucium uncinatum</i>	<i>Hypocalymma angustifolium</i>	<i>P. ovalifolia</i>
<i>Chorizema cordatum</i>	<i>H. cordifolium</i>	<i>P. latifolia</i>
<i>C. ilicifolium</i>	<i>H. robustum</i>	<i>P. rotundifolia</i> <i>rosea</i>
<i>Correa bauerlenii</i>	<i>Indofera australis</i>	<i>P. rulestone</i>
<i>C. decumbens</i>	<i>Isotoma axillaris</i>	<i>Pultenaea aristata</i>
<i>C. pulchella</i>	<i>Kennedia nigricans</i>	<i>P. flertilis</i>
<i>C. reflexa</i>	<i>K. rubicunda</i>	<i>P. mucronata</i>
<i>C. turnbullii</i>	<i>Kunzea barteri</i>	<i>P. peduncularis</i>
<i>Crimum flaccidum</i>	<i>K. capitata</i>	<i>P. pedunculata</i>
<i>Crowea exaltata</i>	<i>K. ericifolia</i>	<i>Reoelia ciliatum</i>
<i>Dampier hederacea</i>	<i>K. parvifolia</i>	<i>Rulingia pannosa</i>
<i>Darwinia citradora</i>	<i>Lambertia formosa</i>	<i>Scaevola crassifolia</i>
<i>Epacris longiflora</i>	<i>Leschenaultia biloba</i>	<i>S. striata</i>
<i>Fremophila maculata</i>	<i>L. formosa</i> (upright)	<i>Scleranthus biflorus</i>
<i>Eriostemon myoporoides</i>	<i>Leptospermum lanigerum</i> var. <i>macrocarpum</i>	<i>Scleranthus heterophyllus</i>
<i>Eucalyptus caesia</i>	<i>L. rotundifolium</i>	<i>Stenocarpus sinuatus</i>
<i>E. calophylla</i>	<i>L. sphaerocarpum</i>	<i>Swainsonia galegifolia</i>
<i>E. cinerea</i>	<i>Lomatia silaifolia</i>	<i>Telopea oreades</i>
<i>E. citradora</i>	<i>Macadamia integrifolia</i>	<i>T. speciosissima</i>
<i>E. crucis</i>	<i>Macropidia fuliginosa</i>	<i>Templetonia retusa</i>
<i>E. ficifolia</i>	<i>Marianthus erubescens</i>	<i>Thomasia petalocalyx</i>
<i>E. forrestiana</i>	<i>Melaleuca armillaris</i>	<i>Thymomene paynei</i>
<i>E. lehmannii</i>	<i>M. decussata</i>	<i>T. saxicola</i>
<i>E. leucorhylon rosea</i>	<i>M. densa</i>	<i>Thysanotus multiflorus</i>
<i>E. nicholi</i>	<i>M. diosmifolia</i>	<i>Veronica perfoliata</i>
<i>E. nutans</i>		<i>Verticordia plumosa</i>
<i>E. preissiana</i>		<i>Westringia frutescens</i>
<i>E. puriformis</i>		<i>W. alabra</i>
		<i>Xanthosia rotundifolia</i>

STUDY SECTIONS

We intend now to carefully record all plants that flourish in clay. Will readers please report on their experiences to the leader of this study section, Mr. M. Landuogt, 399 Waverley Road, Mount Waverley, Victoria.

These groups comprise home gardeners from all parts of Australia who correspond with a leader with a view to exchanging experience and information and the conducting of simple practical experiments under direction. Each group studies a family or genus of plants with a view to developing good easily grown garden forms of wildflowers. The cost is limited to stamp addressed envelopes for a reply and the entrance qualification is an enthusiasm to help.

Study groups exist for *Acacia*, *Anigozanthos*, *Banksia*, *Blandfordia*, *Boronia*, *Correa*, *Dryandra*, *Eriostemon*, *Eucalypts*, *Epacridaceae*, *Isopogon* and *Petrophile*, Insectivorous Plants, *Melaleuca*, *Nuytsia*, Orchids—Epiphytal, Orchids—Terrestrial, *Telopea*, *Pimelea* and *Verticordia* as well as groups that study certain aspects of cultivation such as Street Trees, Plants for Seaside Gardens, Frost Hardy Natives, Plants for Clay Areas, Miniature Gardens, Alpine Plants and Grasses.

GARDENING ON CLAY SOILS

by C. L. Wheller, Tullamarine Plant Farm, Victoria

It is now nearly 20 years since I planted my first fruit trees at my Housing Commission home at Newport in the heavy clay of the basalt plains west of Melbourne, and watched them slowly expire.

Recalling the ridges and furrows of the market gardens in the Dandenong area of my early youth, and with no money to spend on importing soils, I combed the Newport area in search of suitable materials to make raised beds. Amongst the materials readily available at the time were sheep manure from a nearby railway siding and black or brown coal ash from the local power station. Over the next few years many yards of these materials were laboriously hand carted and added to the garden and new trees planted. The satisfactory growth of these trees and the many successes with vegetables in the local shows in the ensuing 7 or 8 years tell their own story.

Moving to Tullamarine in 1960, conditions similar to Newport were encountered with the added problem of a particularly low-lying block with water up to a foot deep for several hours after heavy rain on some occasions. Remembering my experience at Newport, a number of loads of Newport ashes were spread over all garden beds to a depth of several inches and thoroughly incorporated with the top 6 inches of soil which was then built up with local red clay-loam of a more friable nature. A total of 120 yards of ash has been obtained and added to new beds and spread over the ground during the last 5 years. A mulch of old hay, manure or wood shavings has been spread over some areas each summer.

With the successful growth of many native plants on these raised beds, my faith in the effectiveness of this ash plus organic matter in improving the structure of the heavy clay soils on the western outskirts of Melbourne has been vindicated. The number of species established is too numerous to list in detail but includes the Qualup Bell (*Pimelea physodes*), *Scholtzia oligandra*, and various species of *Verticordia*, *Regelia*, *Chamaelaucium*, *Grevillea*, *Correa*, *Eriostemon*, *Boronia*, *Hypocalymma*, *Calytrix*, *Thryptomene*, *Kunzea*, *Eremophila*, *Eucalyptus*, *Leptospermum*, *Baeckea*, *Hovea*, *Melaleuca*, *Prostanthera* and many others. Unfortunately, owing to pressure of other work, most of these plantations have been poorly prepared and hastily planted and there is every reason to believe that much better results could be obtained by people able to devote more time and thought to this work.

Whilst clay soils are often potentially rich in plant food, some difficulty is usually encountered in achieving the physical conditions desirable for optimum plant growth, the clay particle size being too small to provide rapid drainage and adequate aeration, and the adhesion of the particles when wet making cultivation impossible. It is this adhesion however, and the subsequent cracking and crumbling as drying takes place that provides the key to the cultivation of these soils—the tendency of the fine particles to form crumbs or aggregates which approximate in size the larger particles of a sandy or gravelly soil. If advantage is taken of this crumb forming to break up the clods and incorporate ash or gravel and rotted organic matter in generous quantities to keep these crumbs apart, and further working of the soil is confined to periods when the soil is in this condition, and tramping of the

soil—especially when wet—is avoided, the tilth achieved by this method will withstand moderate rainfall and overhead watering or be readily re-established when excess water disappears, the ultimate fertility and structure of the soil being dependent largely on the quantity and kind of material used.

In the western suburbs of Melbourne the power station coal ash is by far the cheapest and best material for keeping the clay particles from bonding together into large clods incapable of allowing free drainage, but it should be remembered that owing to the large effect of the clay particle on the physical properties of a soil, several inches of ash will be necessary for satisfactory results. As this material contains little or no plant food or humus, the necessity to incorporate plenty of rotted organic material will be obvious. Where completely rotted organic material is used, very little chemical fertilisers will be necessary in the growing of ornamental plants under the above conditions, although intensive cultivation of vegetables and fruits may be more demanding. In the preparation of seedling beds for annual plants, the use of some form of calcium (lime) may further improve soil structure, however in the soils west of Melbourne which are only slightly acid or neutral, gypsum (Calcium sulphate) is to be preferred to other alkaline forms. The fine yellow ash obtained from burning briquettes in an ordinary grate or open fire has proved of no value whatever.

HOW TO MAKE FRIENDS WITH CLAY SOIL

by C. Loxley, Revesby, N.S.W.

The hero of this story is a chemical compound known as calcium sulphate or more popularly known as gypsum.

Before getting to the more interesting part of breaking up clay soil, it is necessary to understand more about gypsum, what it can do, what it is, and more importantly what it cannot do.

Gypsum is not a liming material even though it contains calcium, as it does not change the alkalinity of the soil. On the contrary, similarly to most of the sulphates used in the soil, it tends to render the soil gradually more acidic. Here, it might be convenient to point out, sulphate of ammonia and gypsum both, render the soil very gradually more acidic, whilst sulphate of aluminium does the same job much faster, and the beauty of this fact, is that gypsum may be placed in the soil without damaging azaleas or any other lime-haters, and several of Australia's natives are lime-haters, for example, the native heaths amongst others.

The big fact in the make-up of gypsum is that it is very insoluble, only two parts per thousand being soluble in saturated solution (I will refer back to this point later on). It is also a very hard mineral, the hardest being, (of course) diamond, then corundum, then topaz, then going down the scale to gypsum which is nine on the list, so for best results in the soil, it must be finely ground.

Gypsum, when heated strongly and then with water added becomes hardened, is known as plaster of Paris, and when it is again finely ground it is again gypsum, thus completing the cycle.

When added to water, gypsum makes the water permanently hard, thus preventing the water from dissolving very great amounts of soluble material.

This fact seems to be of great importance when adding gypsum to the soil, because the soil water passes out of the soil profile without taking with it too many of the soil's soluble constituents which are of value to plant life.

To digress here in order to discuss soil water, the only water which is of any value to plant life, is the water which is passing through the soil and not the water which is stagnating in the soil without passing down through the soil profile; lime also makes water either temporarily or permanently hard but the lime changes the pH of the soil, which is a disadvantage when thinking only of changes in the soil structure or the soil texture; both lime and gypsum benefit the soil tremendously, but one can overlime the soil to a dangerous degree for plant life, whereas it is almost impossible to add too much gypsum to the soil, if anything one can never really add enough gypsum especially if the soil is heavy clay with the consistency of plasticine.

Gypsum should be added to the soil in sufficient quantities to achieve the result required, and until that point is reached then not enough gypsum has been added, and this wonderful (for gardeners) material has not been allowed to do a job for which it can give really outstanding results.

Now, something must be said about soil texture and soil structure. Soil structure is that quality that one observes when one is digging and after the digging has been completed the soil forms clods about the size of footballs or even the size of cricket balls, then the soil structure may be said to be cloddy or of cloddy structure, but if the soil, after having been dug, breaks down into small crumbly particles the size and appearance of black bread-crumbs even up to the size of marbles then the soil has good structure or even, good crumb structure. After treatment with gypsum this is how the soil should appear and will appear if enough gypsum has been used and after two or so months have passed.

When the gypsum is added to the soil it must be incorporated into the soil by digging in, watering in, digging in again and so on, until final results are achieved.

It is now time to lay to rest that fine old furphy that sand will break up heavy clay. If ten per cent of clay is incorporated into the topsoil of a sandy soil then the clay will have a profound effect on the structure and texture of that soil BUT, if ten per cent of sand is incorporated into the body of a clay soil then the result is negligible. To effect a change in a clay by the addition of sand then something in the vicinity of 80% sand must be added. This fact may be verified either by observation or by studying a book written by Leeper "Introduction to Soil Science" which book by the way, should be in the library of every dedicated gardener.

I applied a load of eight tons of pure sand to an area about 8' x 6' and after about four years I defy anyone to tell me where that sand was placed. The first year I had a beautiful crop of parsnips from it, but now it has reverted back to good old clay.

When a gardener has decided to apply gypsum, then the economics of the situation must be studied. Gypsum costs about \$25 per ton which from my experience is the minimum amount to start with.

Blessed is the gardener who has twelve inches of good topsoil, and thrice-blessed is he, who has a greater depth of topsoil. When applying

gypsum, it is advisable to dig to a depth of at least twelve inches, as, if the gypsum has been applied properly, this depth will all become good friable topsoil.

If gypsum is not incorporated throughout the whole body of the soil to be treated, then, owing to its great insolubility, it will remain a nice soggy mass, just doing nothing.

I have been a great advocate of gypsum ever since I have come in contact with it, and am always singing its praises; so much so, that one of my acquaintances said to me "If this stuff is really that good why haven't I heard about it." Can anybody tell him?

REGELIAS

by F. LULLFITZ

There are five named members of this genus and they are all confined to the South West of West Australia.

Regelia ciliata, Schau. is common in sandy silty soils between the Moore and Vasse Rivers. It is a shrub 3' to 8' with spreading branches and dense, variable foliage. Leaves in the typical form are ovate appressed to the stem in the lower half and in the upper half spreading.

Flowers are in globular heads about $\frac{5}{8}$ " diameter and purplish pink. They are terminal on the main and lateral branches of the plant. Fruits are small heads being less than half inch diameter and as in all the species has no persistent calyx lobes. Except for *R. inops* the fruits are in every case fused almost totally.

R. ciliata flowers from August to November. It is eminently suitable for hedge work as it responds well to clipping and the foliage is pleasing.

R. cymbifolia (Diels) C. A. Gardn. An attractive shrub 6' to 9' high densely branched with dark green leaves. The leaves are $\frac{1}{8}$ " to $\frac{1}{4}$ " long, are keeled on the back and more spreading than in *R. ciliata*. They are deep green in colour and are overlapping covering the small branchlets.

The flowers are a rich crimson appearing in November and December. It grows in sandy soil in low lying places in the upper reaches of the Gordon River. The plant was originally described by Diels as a *Beaufortia*.

R. inops Schau. This plant is found extensively in sandy soils in many parts of the South West from Kellerberrin to Cranbrook and from the Coastal Plain to Hyden district. It varies from 2' to 7' in height and has smallest leaves of any species. They are concave, more or less ovate, and closely appressed to the branches which they conceal.

The flowers are reddish pink and the heads are much smaller and are either terminal or lateral on the branchlets. They are profuse. The small globular fruits are not fused and are usually in clusters of 3 to 5.

It seems to prefer low lying places but is occasionally found on sandy rises and is very showy in full flower in November to December.

R. megacephala C. A. Gardn. This is a dense, coarse shrub somewhat resembling some titrees in habit, 6' to 12' in height, with very broad leaves, more spreading than in previous species. Flowers are purple rarely exceeding ½" diameter. Fruits are fused into globular or egg-shaped heads over 1" to 1½" dia. and are characterised by the very broad opening at the summit of the calyx tube which is broad.

This plant grows on stony hills near Coomberdale and flowers in December. It forms dense thickets on these hills.

R. velutina (Turcz.) C. A. Gardn. This plant has been known as *Regelia grandiflora*. It is a singularly attractive shrub, sometimes attaining the proportions of a small tree with rough bark and spreading branches. It is distinguished from the other species by its four ranked, closely crowded silvery silky white lanceolate leaves ½" long, and magnificent terminal spikes of scarlet orange and occasionally deep yellow flowers.

Flowering spikes of this species are not unlike those of *Kunzea baxteri*. The fruits are in heads of usually less than ten and are comparatively large and about half the size of *R. megacephala*.

This plant is known from East Mt. Barren and adjacent hills, usually growing at an altitude of 1000' to 1500' above sea level on quartzite rocks within view of the southern ocean.

It is an extremely attractive species but under conditions of cultivation around Perth, very rarely flowers. (This should be a challenge to the wildflower growers. Propagate only from profuse flowering forms). On the other hand its white silky densely crowded foliage makes it a very attractive plant.

In cultivation this plant should be trimmed to shape to produce a dense bush or allowed to grow tall with a loose branching habit. The silvery leaves against a blue sky forming a charming contrast. It should be grown in open conditions as a specimen so as to allow lateral development with ample sunshine.

A. L. Hargrave, Camberwell, Victoria, comments:

Success with *Regelia grandiflora* has so far eluded me. I have tried numerous plants in many positions one of which grew to 15 feet, but none have flowered for me. This is most disappointing as the large brilliant scarlet flowers are very striking. *Regelia ciliata* which has pink flowers, grows under all conditions and flowers freely. As far as I know it has no particular likes or dislikes. It grows to 8 feet. *Regelia inops* is a little more difficult. It is a straggling kind of shrub and the branches are rather weak, needing staking. The flowers are rather smallish and pink in colour. It grows to four feet.

PLANTS ON CLAY OR HEAVY SOILS—continued from page 340

E. purpurea—A tiny shrub to 1 foot with purple flowers.

E. rosea—A spreading shrub to 18 inches with pink flowers.

E. violarea—A small shrub to 2 ft. with violet flowers.

PHYMATOCARPUS

Small shrubs of which nothing is known.

P. maxwelli—A straggling shrub to 3 feet with purple flowers.

P. porphyrocephalus—A small shrub to 2 feet with yellow, white and violet flowers.

BOTTLEBRUSH AS STREET TREES

THE WHITE BOTTLEBRUSH *CALLISTEMON SALIGNA*

A report by H. Oakman and R. W. Boden, Street Tree Study Section

There is still some prejudice against the use of our native trees in park and street planting. This comes mainly from persons who are anxious to see flamboyant flowering trees used almost exclusively rather than the more subtly appealing flowering trees, whether they be native or exotic. Some sophistication is needed so that a more general appreciation of such attributes as bark, foliage, form and texture is reached rather than colour alone.

The White Bottlebrush has many advantages as a street tree; the chief one is its size, which makes it ideal for planting in streets that have overhead wires. It grows into a well shaped informal tree developing a strong stem and a good crown with fairly close foliage. Branching is dense and inclined to be twiggy, making regular pruning unnecessary.

This tree is native to the eastern coast of Australia but is adaptable to all except the hottest and coldest areas providing that a plentiful water supply is given it. It is adaptable to any soil and will grow in sand or clays equally well. It is fast growing but prefers moist situations similar to those in its native habitat where it grows along the borders of streams and in low lying areas. It will also do quite well in brackish soil. Although growth is rapid there is a tendency towards low branching in the early stages which must be controlled to induce an upright stem. Early branch growth is upright but older trees tend to droop, giving it a slightly willow-like look, as indicated by its specific name.

Average height is 25 ft. when open grown, but 40 ft. is the maximum that forest trees attain.

Propagation is invariably from seed, which is contained in the hard woody capsules that open up within a few days of being picked. The seed is very fine and care is needed to avoid damping-off in the early stages. Habit of growth and flowering is reasonably uniform, enabling formal avenues to be obtained without resorting to vegetative propagation. Maintenance is always light, the main requirement being watering. Pruning is only necessary to reduce the size or if a formal shape is required. Strong upright branching into overhead wires is rare.

Flowering is from October and November when most trees are completely covered with small creamy bottlebrush flowers that attract bees in great numbers as well as the honeybirds.

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AN OUTSTANDING BOTTLEBRUSH

Callistemon citrinus "Harkness", a distinctive new cultivar by H. L. Ellis, was first purchased by Mr. G. L. Harkness, Gawler Rail, South Australia, supposedly as a seedling of *Callistemon citrinus*. The supplier was also marketing *Callistemon coccineus* (more correctly referable to *C. macropunctatus*) at the time, and it is suspected that the plant could be a hybrid with these species as parents. This has not been established to date, but it is intended to have the plant registered as a garden cultivar under the above name pending confirmation of its hybrid ancestry.

The original tree, as displayed on the colour plate, is 25-years old; the height of 12 feet has been achieved by pruning and the trunk (or butt) at one foot from the ground is now approx. 10 inches diameter. The feature that has made the tree famous is the abundant and very large inflorescences (flowerheads) terminally clustered with up to 11 heads of flower in a cluster, each head of flower reaching up to 16½ cm. long and 6 cm. diameter. 74 buds in one spike is not uncommon opening to display the brilliant red-purple glabrous, shining filaments and the deep purple anthers that go to form the bottlebrush heads of flower.

The original tree has never set fruit but many successful strikes from cuttings have been made. Some new plants from cuttings have set seed, however (7 years from the seedling), but none of the plants raised from this seed have flowered as yet.



Colour photography by Ivan Holliday. Block by courtesy of Rigby Ltd.

CALLISTEMON CITRINUS "HARKNESS"



***Callistemon phoeniceus* growing in the wild.**

This could be one of the parents of the "Harkness" hybrid above.

A RARE HETAERIA

A NEW COMBINATION FOR A NORTH QUEENSLAND PHYSURINAE (ORCHIDACEAE)

by A. W. Dockrill

Hetaeria polygonoides (F. Muell.) Dockr. comb. nov.

Goodyera polygonoides F. Muell., *Fragm.* 8:29 (1873); Benth., *Flor. Austr.* 6:313 (1873); F. M. Bail., *Qld. Flor.* 5:1561 (1902).

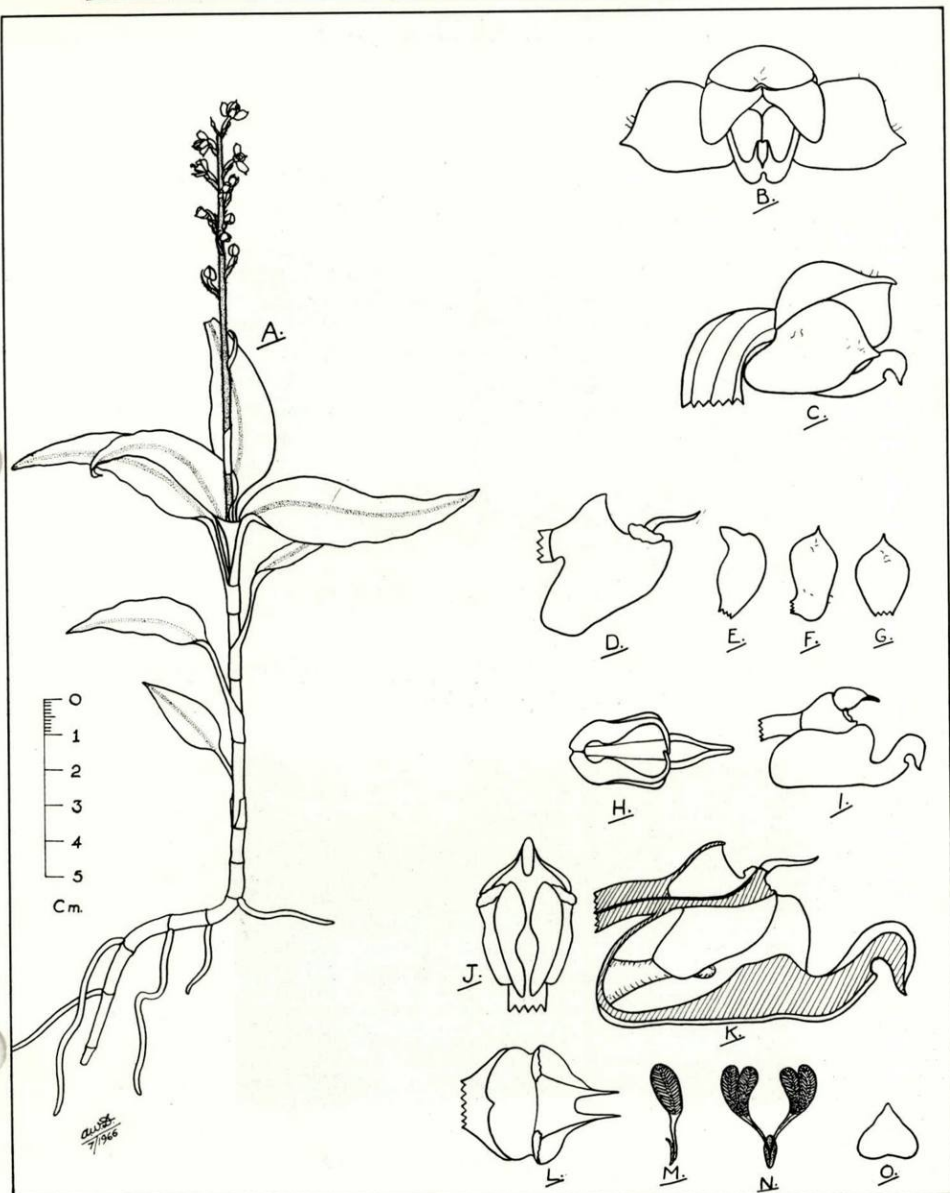
The holotype specimen of the plant under discussion is housed in the National Herbarium of Victoria and is not in very good condition, consisting of a single leaf and three flowers, two of which are incomplete. The third flower is in moderately good condition so that many of its details can be seen but too much liberty cannot be taken with it during examination, as it is the only flower of the holotype. During July, 1966 it was the good fortune of the present author to receive a fresh specimen from Paluma Range, collected by I. Walters of Townsville, and several fresh specimens from the Macalister Range, collected by J. Berry of Cairns, of a plant unquestionably belonging to this species. An examination of these specimens showed that the column has a stigma divided into two widely separated parts on the lateral extremities of the top of the column and are pouch-like with the openings within the clinandrium; the column also has two huge parallel wings; the inside of the saccate labellum has glands on either side near the base but no hairs. These features are consistent with HETAERIA but not with GOODYERA which has a single stigma of the $\pm$ usual orchid type, no column wings and a saccate labellum which is hairy within. Accordingly the above new combination is given.

A description of the species, prepared from the above-mentioned material follows:

Plant in flower 15-30 cm. tall. Stem 5-10 x 0.3-0.4 cm. with 3-5 leaves $\pm$ in a rosette at its apex and 2-4 smaller, almost bract-like ones scattered lower down. Laminae of the leaves of the rosette 3-8 x 1.2-2.2 cm., asymmetrically narrow-ovate, tapered to an acute apex, dark velvet-green or bronze-green with a broad white median longitudinal stripe. Inflorescence 8-15 cm. long of which the peduncle is about half and usually has 2 bracts, the lower one sheathing, the upper one slender, attached on a narrow base only; rachis containing 5-14 rather laxly arranged flowers on sessile, rather slender, glabrous ovaries 5-7 mm. long; bracts of the rachis about as long as or slightly longer than the ovaries, lanceolate, sparsely hirsute.

Flowers usually incompletely reversed, dorsal sepal and petals forming a $\pm$ porrect galea, lateral sepals rather widely spreading, sepals green and having a very few scattered hairs on the outside, petals translucent white, labellum white. Dorsal sepal 3.5 x 2.3 mm., obovate, constricting to an acute apex or apiculate. Lateral sepals 3.5-5.5 x 2.0-2.5 mm., $\pm$ oblong or narrow-obovate, apiculate, gibbous at the base where they are produced beyond the base of the column to form a backing for the pouch of the labellum. Petals 3.5-5.0 x 1.5-2.5 mm. $\pm$ oval with, at the front on top, an almost triangular or ovate lobe. Labellum 3.5-4.5 x 1.7-2.3 mm., densely saccate and rather broad in the proximal half to two thirds, thence sharply constricted and narrow for the remainder; saccate portion broadest near the front, the front wall deeply cleft down the middle but the margins of the cleft often overlapping, basal portion produced backwards well past the base of the column to form a short and broad pouch. Disc with a rather high keel inside and grooved below, within the basal pouch on either side is a rather large gland or group of glands which are $\pm$ finger-like in outline but not free; narrow distal portion of the labellum 1 mm. or less broad, narrowing somewhat towards the apex, thick, deeply grooved above, upcurved in its proximal half or more, then decurved or deflexed. Column about 1 mm. long, its wings very large, parallel, almost 1 mm. deep in the deepest part, attached along the full length of the column and extending, as a free portion, well past the base. Arms of the rostellum about 0.7 mm. long, tapered to fine points. Stigmas at the top lateral extremities of the column at the base of the rostellum and on the outside of the apices of the wings, pouch-like with the openings within the clinandrium, rather small, broader than long, rugose on the outside, upper lip-like margin somewhat crenulate, and white. Pollinia attached by long grooved caudicles to a rather small brown retinaculum without the intervention of a stipes; the retinaculum usually becomes detached from the caudicles when an attempt is made to remove the pollinarium from the column as the attachment of the retinaculum to the rostellum is firmer than the attachment of the caudicles to the retinaculum which would seem to suggest that the caudicles are indeed such rather than stipes of rostellum origin. FL.: 6-8.

Distribution: North-eastern Queensland and south-eastern Cape York Peninsula—the ranges, at an elevation of about 2,000 feet, from the Paluma Range probably as far north as the Big Tableland but the exact range is unknown. It is not a common plant, occurring in very widely separated colonies.

*HETAERIA POLYGONOIDES* (F. Muell.) Dockr.

- A. Plant . . . to indicate scale
 B. Flower from the front . . . to scale x 10.
 C. Flower from the side . . . to scale x 10.
 D. Column from the side . . . to scale x 20 (anther and pollinia removed)
 E. Petal . . . to scale x 5.
 F. Lateral sepal . . . to scale x 5.
 G. Dorsal sepal . . . to scale x 5.
 H. Labellum from above . . . to scale x 10.
 I. Column and labellum from side . . . to scale x 10.
 J. Column from the front . . . to scale x 20.
 K. Median longitudinal section of column and labellum . . . to scale x 20.
 L. Column from above . . . to scale x 20. (anther and pollinia removed).
 M. Pollinium from the side . . . to scale x 15.
 N. Pollinarium from the front . . . to scale x 15.
 O. Anther from above . . . to scale x 10.

FOREST AS A GARDEN — 1

NOTES FROM THE EDITOR

Some people are fortunate enough to have a piece of land which is a natural light forest. That is it contains many trees that have grown there by chance. The forest floor has usually been invaded by grasses and weeds and only the hardiest of undershrub remains. What will grow there?



***Casuarina decussata* with *Clematis pubescens*, a white flowered scrambling plant in the background.**



CORAL PEA—*Kennedya coccinea*

I am fortunate enough to have such a piece of land, 200 ft. long and 40 ft. wide. It is on top of a ridge and most of the top soil has been washed off leaving only a few inches of light grey sand with no vitality and seemingly always dry. Careful drainage of water after heavy rain has stopped this erosion and the slow process of restoration of the humus in the soil by the leaf mould from the trees has commenced.

Although we are on the southern fringe of Sydney, it is in a belt of much lower rainfall. Light rain does not penetrate to the soil which is only dampened 3-4 times a year by heavy rain. In one section an attempt has

been made to water from fixed sprays but the competition from the trees is considerable.

So I have problems, and yet you often see such light forests ablaze with bush flowers. Why cannot I achieve this in my patch. Observation of natural bush settings reveal the best display occurs about two seasons after a bush fire. In unfired ground the shrubs are often too "leggy", small young plants are fewer and no doubt the tree cover is denser. I do not wish to burn off my plot but the same objective is achieved by thinning out the trees and pruning the shrubs. When the trees reach 10 ins. diameter at the ground I chop them down at ground level. Next year they sucker and shortly I have a couple of vigorous "saplings."

I have maintained my forest with trees already present naturally as I have fine range of Eucalypts and some *Casuarina*. Every wild garden needs *Casuarina* trees with their dark shaggy trunks, characteristic flowing foliage and of special value in this case, the carpet of bronze formed under them by leaf droppings. These fine trees are fully described in our No. 24 and 25 issues.

This leads us to ground cover. Remove weeds and native grass clumps and allow the leaves falling from the trees to accumulate and carpet the ground. Remove fallen twigs and branches but treasure the leaf cover. This will build up the soil and provide nutrition as described in our last issue on page 323. Supplement this ground cover with suitable plants. The Kennedias, described in our No. 12 issue and shown on the accompanying colour plate are of value. The N.S.W. species *K. rubicunda* must be kept from climbing and is of value only where conditions are hard as it gets too vigorous but the other species are rarely vigorous or troublesome. Who will advise us on other forest floor ground cover plants?

I have provided the setting for my wild forest garden taking advantage of the light forest that existed. It is possible to create a delightful natural bushland setting on even the dullest block of land as admirably described in the new publication reviewed in this issue "Designing Australian Bush Gardens."

To my mind it is undesirable to have large leafy bushes or bushes out of character with the setting. We are aiming at a light forest of small Eucalypts and Angophoras with a floor of small shrubs mostly under three feet high. Who has a similar setting and can report on their experiences?

What plants will grow in these conditions to create that colourful spring flowering effect of the wild? Readers reports are required. I feel they will be grouped into two groups, those that receive occasional water to sustain them particularly in dry spells (Group A), and those that survive without attention, Group B. In Group B, I find that Acacias (wattles), *Prostanthera* (Mint Bushes), *Correa*, *Hakea* and many pea flowered plants will survive without attention except for pruning. With a little attention in dry spells to maintain a little moisture in the ground the Group A plants will include the choicer species much prized as garden subjects and many that will not grow readily in the garden because of lack of overhead protection such as the Sydney *Boronia*s.

ALPINE FLORA — 1

The Alpine and Sub-Alpine Thymelaceae of the Snowy Mountains

by DANE WIMBUSH

Four species of *Pimelea* or rice-flower and one *Kelleria* occur above the winter snowline of the Snowy Mountains. The snowline is at about 5,000 feet and coincides with the transition from tall sclerophyll forests of alpine ash (*Eucalyptus delegatensis*) or mountain gum (*E. dalrympleana*) and white gum (*E. pauciflora*) to sub-alpine woodland consisting mainly of snowgum (*E. niphophila*) with a sward of snowgrass (*Poa caespitosa*) beneath.

The tall rice-flower, *Pimelea ligustrina* is the showiest of the four species, having cream flowers clustered in terminal heads 3-4 cms. across, these being surrounded by broad pink bracts. Its leaves average about 15 x 25 m.m. and though it may grow to 180 cms. in the forest, it is seldom found more than half this height above the snowline. Above the treeline it is restricted to rocky outcrops or other sheltered situations and usually grows in association with *Oxylobium ellipticum*, *Orites lancifolia* and *Prostanthera cuneata*.

A colour plate of *Pimelea ligustrina* appeared in our No. 24 issue.

Pimelea axiflora var. *alpina*, the "tough rice-flower", is also common above the snowline, growing in similar situations to *P. ligustrina*. Its cream flowers are situated, however, in the axils of the leaves along the stem. The leaves are smaller, and the plant is generally about 20 cms. tall.

The dwarf alpine rice-flower, *P. alpina*, a prostrate shrub with pink or white, delicately scented, terminal clusters of flowers, is found at all levels above the snowline, in low heath communities at the higher levels and within the grass sward of the sub-alpine tract.

The remaining species, *P. curviflora* var. *alpina* is a prostrate plant growing at all levels above 5,000 feet.

Often it forms a mat between adjoining tussocks of snowgrass, sometimes covering several square feet. Its leaves are a lighter green and its stems less woody than those of its relatives and its flowers are tiny, less than 3 mm. long and wine-red in colour.

Alpine *Kelleria*, *Kelleria tasmanica* is the smallest and most specialised member of the family. It occurs only in the extremely cold and wind tolerant "fjaeldmark" communities clinging to the cols along the main range. *Kelleria* grows in the form of cushions resembling a moss until the masses of tiny white flowers appear.

Editor's Note: This is the first of a series on our Alpine Flora. I am anxious to prepare an issue on "Alpine Gardening." This does not mean growing plants from our snow country alone but plants from elevated positions on mountains (usually small plants) in a specially constructed rock or alpine garden. Are there any readers interested to establishing such a garden and can others report on suitable plants for such a garden.

Another alpine plant appears in full colour on page 372.

AUSTRALFLORA NURSERY

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Natives with Wrens

by DON HANNA, Pest Control Series 3

I hope Mrs. Salter's article (*Australian Plants* No. 25) has set people thinking in this land of ours. I too have native birds, a family of blue wrens, that breed and live here and can support Mrs. Salter's remarks on how our native birds control the insect pests. My wrens are foraging through my garden from "piccaninny" dawn to late dusk. They raid the blooms of a *Hibiscus* here for nectar and a small dark beetle which used to ravage the flowers every year. These beetles are very hard to find now.

Slaters or "pigs" are becoming rare and are a favourite meal for the wrens. Young snails are snapped up and the snail population here is at an all time low.

"Loopers" and other soft green grubs and caterpillars just don't survive here, the wren looking on these pests very much as a child looks on an ice cream cone!

Grasshoppers, katydids and leaf hoppers, all have been plague pests in the past. All these are chased and eaten continually. Their numbers are kept small. Aphids, earwigs, every common beetle from clickbeetles to the small brown one once so common here, are all very scarce now.

Fruit fly is hunted and if fly-infested fruit is opened and left, the wrens clean the maggots out. Next door, infested fruit is allowed to rot on the ground. My wrens go in and turn over the fruit for the maggots. Of mealy bugs I'm not sure. There never were many here. They can't be found now so they too might be on my wren's menu.

Oddly, all the above pests are aliens. My wrens never evolved to eat these pests brought here from alien lands. I think this proves how adaptable our birdlife is.

Main thing here is water. Soil here is dry sandy loam with no surface water even after heavy rains. Permanent water must be kept out in the garden. A deep container out in the shade could probably go 10-12 days before retopping with a hose. In very hot weather, of course, every second day.

Again, my wren's nest is in very dense foliage. This is an 8 foot apple tree smothered over with 6 vines of *Thunbergia gibsoni* and one very rampant vine of the black-flowered, *Kennedya nigricans*.

This foliage is so dense that cats can't penetrate it so the wrens feel safe enough to nest here.

The only other place I have seen wrens nesting in Sydney is at a hospital out Parramatta way. Here, I saw wrens nesting in a 5 foot high shrub. This shrub was a densely twigged one, far too dense for anything bigger than a wren to enter. So it would seem the wren needs the right spot to make its nest.

My wrens had two different nestings in two different nests this year, raising 3 in the first and at least 2 in the second nesting. This nesting twice in the same year is natural for the wren.

Of course, cats must be kept out by all means.

Now just my observations on poison sprays which I never use here.

Firstly, sprays used indiscriminately only kill some of the pests but all of the pest controls. It works like this.

If the poison kills off say 90% of the pest; you are still left with 10% which will breed back within a year. Not so with your controls, the few which survived contact with the poison, are now reduced to living on highly-poisoned food.

Result? Within a year the pest will be about as numerous as before the spraying. Now though, all his enemies will be dead.

Within two years you'll have a plague on your hands and it will be a permanent plague. This has and is happening and will continue to happen, until sprays are thrown away.

"Ant-lions," small ant-eating grubs, fly-eating spiders and fly and moth-eating mantids are only a few of your friends that you kill every time you spray.

A NATIVE GARDEN FOR BIRDS

by H. S. Stevenson — Pest Control Series No. 3

Two years ago we met Mrs. Salter and began copying her methods. We have transformed our 78 ft. x 108 ft. building block into a native garden. We have planted many of the native plants she recommends. Our married daughter at Murrumbidgee also began to grow the native plants and trees and with the honey bottles described by Mrs. Salter, now feeds several families of "Wattle" birds and this year a family of "Greenies" were reared in her back garden, mainly on the bottle provided. The feeder in question is located about 3 feet from her kitchen window and the native birds have become so tame that they remain feeding even if my daughter and her husband go through the door to within 5 feet of them.

In our own garden we have many native birds. We endorse all Mrs. Salter's comments on poisons and like her, we use no sprays in our vegetables nor do we spray our several apple trees, yet neither my daughter's apple trees nor ours show any of the usual troubles with pests, etc.

We have only one regret in all this, that my self, wife and family have only just become aware of the vast and beautiful native flora and fauna of this our native land.

BOTTLEBRUSH FROM SEED

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

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

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

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

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

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

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

All the plants in the family *Myrtaceae* mentioned in the article. "Plants for Clay or Heavy Soils" are so easy to grow from seed. Seed is also readily available, see the advertisement for seedsmen. These plants also grow in all good soils. The most inexperienced amateur can grow them. Why not try?

ORNAMENTAL EUCALYPTS

BREEDING TO SECURE EARLY FLOWERING IN EUCALYPTUS

by L. D. Pryor, Australian National University

Many eucalypts, especially those from the colder areas of the country do not flower until they are some years old. *Eucalyptus bicostata* for example is usually 6 or 7 years from planting before the first flowers appear, and this is usually when the juvenile foliage has been replaced by the mature leaves which happens as the tree ages. Other species such as *E. macarthurii* and *E. grandis* flower often at three or four years of age whereas others flower still earlier, *E. maculosa* for example often being found with some flower buds present by the end of the second year. Also it is common nursery experience with *E. torquata* to have batches of one year old plants in pots almost all carrying flowerbuds. From these observations it is apparent that the age even in a single environment at which the onset of flowering is achieved differs between species. Observation also shows that the time at which the first buds appear differs within species too so that in some species in which flowering is normally late individuals produce buds some years before other individuals of the same population. In those species in which there is marked irregularity in this regard individuals which flower precociously so far as the whole species population is concerned often experience a pause after an initial flowering before producing blooms regularly.



PLATE 1—A one-year-old plant of *Eucalyptus maidenii* showing flower buds. A remarkable leap forward in the development of ornamental Eucalypts.

While in those species which have distinctly different juvenile and adult foliage it is usual for flower buds to develop only after the adult stage has been achieved although not always the case. Individuals are found often enough in most species, which, although in the juvenile stage nevertheless have normal flower buds which develop in the usual way to anthesis and set fruit containing normally viable seed. *E. dives* is an example in which this is seen from time to time. Of course those species such as *E. cinerea* or *E. pulverulenta* which retain the juvenile type foliage indefinitely and apparently never change over to the mature form of foliage commence flowering and always flower on branches on which the leaf form is juvenile in morphology. In short it seems that the juvenile leaf form is not associated with the incidence of flowering or at least the two are not mutually exclusive in most cases observed. It may well be that the change to adult from juvenile foliage and onset of flower bud development are simply separate expressions of a general maturing or aging of the plant which are not dependent on each other and which are not necessarily expressed at the same stage of development in all species or even in all individuals within the one species.

On one occasion a tree of *E. maidenii* was found in a two year old plantation of this species which was carrying a good crop of flower buds. The tree was the only one seen in some hundreds of individuals which were all in the stage with juvenile leaves and most of them were to remain so for another two or three years. General flowering did not take place until about the 5th or 6th year.

Pollen from a normal adult *E. maidenii* was placed on emasculated flowers of this early flowering individual and progeny secured from the cross. The plants thus raised also flowered early, in the second year, and one produced buds in the first year. Plate I.

From this experiment, carried out with care by Mr. R. R. Willing, it is apparent that precocious flowering is a character which in *E. maidenii* is passed on to many of its progeny as a strongly inherited trait. The fact that flowering normally occurs later in wild populations of the species implies that those individuals which do come into flower early in this species are at some disadvantage compared with the ordinary wild forms otherwise the normal behaviour as generally observed would have been likely to be early flowering.

There are at least two ways in which this trait, assuming it is similarly inherited in other species, can be employed in developing improved forms. Firstly, since early flowering is a desirable feature in cultivated plants, individuals which possess this trait will be sought usually in preference to those which take some additional time to come into flower. Secondly, if some goal in a tree improvement programme is sought, the more rapid turn over of generations which results from earlier flowering speeds up the work and might be the simplest way of speeding up a tree breeding programme which otherwise may be a long drawn out affair.

Cases of flowering at a young age in species normally somewhat delayed in this feature will always be worth noting and bringing to attention so that anyone interested in breeding from the material can subsequently use it.

FOREST TO A GARDEN — 2

THE RETENTION OF INDIGENEOUS FLORA IN DEVELOPING SUBURBAN AREAS

by D. D. MORRIS, Warner's Bay, N.S.W.

Many of our residential areas are rapidly encroaching into the surrounding bushland with almost universal clearing of the indigenous flora.

My own gardens is on a hillside near Lake Macquarie, N.S.W. The soil is poor with heavy clay about 6" below the surface. Fortunately most of the original trees still remained when I took up residence but the ground cover and lower storey had been lost. After a number of failures with Australian natives requiring lighter soils and less than our 42" rainfall, I decided to look for local species which might be equally interesting but more suited to our soil and climate.

I found many which were very desirable garden subjects and the fact that these are usually removed by unnecessary general clearing seems indefensible. Even when some existing trees are left, it is usually the large mature eucalyptus which are selected while the saplings, shrubs and many desirable brush remnants are bulldozed away. Retention of the younger trees and saplings would be more desirable as these are less likely to suffer wind damage in their newly exposed situation and ultimately form more attractive spreading trees than those which have grown tall and slender in a forest environment.

In this area many remnants of the original brush species remain scattered through the present sclerophyll forest. These usually go unnoticed as they seldom grow more than a few feet high before being reduced to ground level again by recurrent bushfires. Many of these are highly desirable species capable of growing in a suburban environment and often of a size and form more suited to this than many of the larger eucalypts.

In this article emphasis is placed on the treatment of existing specimens suitable for retention in developing residential neighbourhoods. In some cases, lopping may be the only alternative to complete removal and reference is made to the likely response to such treatment.

Not all the existing species will be suitable for retention and in most cases new trees and shrubs will have to be introduced. The following list of some species occurring in the area east of Lake Macquarie (N.S.W.) may also be of interest to those with similar heavy soils and ample rainfall.

LARGE TREES

Angophora costata varies considerably in its form depending on the soil and exposure and mature trees often contain considerable dead wood which could cause damage if too close to buildings. However, healthy young trees are well worthy of retention and under suburban conditions usually form attractive trees which on better soils may reach considerable size. It does not appear to respond well to lopping and it is best controlled by tip pruning when young to produce a more spreading form with consequent reduction in height. It flowers rather irregularly but when it does the masses of white blossom are held beyond the foliage making a spectacular display.

Eucalyptus haemastoma is to be found locally on poor grey clays associated with such species as *E. intermedia*, *E. umbra* and *Angophora costata*. It grows as a rather crooked tree to a height of about 50 ft. with a light crown of grey-green leaves. While a rather brittle timber, healthy trees don't seem to suffer undue wind damage, but only healthy young trees or saplings should be retained. The smooth white trunk characteristically marked by zig-zag lines is very attractive, and the tree's tendency to produce a number of trunks is visually pleasing and should be encouraged. This tree does not like severe lopping and this should not be resorted to.

Eucalyptus intermedia appears to be more common in this area than *E. gummifera*. It is widely distributed but occurs more frequently on the poorer valley soils in association with *E. haemastoma*. It tends to be a slender upright tree when young but in maturity may become a large

spreading tree 50 to 80 ft. high. When in flower it is usually covered with beautiful white blossom completely obscuring the bright green foliage. It appears to coppice fairly easily but general lopping is seldom satisfactory.

Eucalyptus maculata generally occurs on the ridge tops in this area growing on gravelly clays derived from eroding conglomerate. It is a beautiful fast growing species with a smooth mottled trunk and dense bright green foliage. Under forest conditions spotted gum will produce an upright little-branched form and can reach considerable size. In open conditions it will branch much lower but may still grow to 50 ft. or more. Saplings can be readily encouraged to produce a spreading form by tip pruning the lead growth until the laterals are big enough to sustain themselves. A number of examples showing a good response following heavy lopping have been observed and would indicate that this degree of control is possible should it prove necessary.

Syncarpia leptopetala is a beautiful tree with a very individual character. It occurs on a variety of soils but reaches its best development in the brushy valleys. Almost conical when young, it maintains its grey green foliage well down the trunk even in maturity, and if necessary will stand severe lopping. Naturally it is a large forest tree, but when grown in an open environment it produces a spreading form and seldom becomes a problem because of size.

Callistemon salignus is widely distributed but occurs most commonly in damp swamp areas. Its ability to grow on more elevated sites makes it useful for garden planting where it will produce an attractive paper-barked tree up to 20 ft. high with beautiful pink new foliage and creamy brushes in spring. It appears to stand lopping and even coppicing fairly well, while light pruning stimulates the production of new foliage, thus accentuating its colour.

Casuarina torulosa is a very graceful oak with pendulous lead shoots and rough corky bark. When young it has a neat rather conical shape and the foliage colour varies from green to purple depending on the season, while the male trees turn russet when laden with spore. It appears to coppice easily, quickly regenerating from the base after bushfires, and old or disfigured trees might well be retained and be treated in this way. *C. torulosa* grows naturally as the under storey of the better eucalypt forests in this area while *C. suberosa* occurs more commonly with *E. haemastoma*.

Glochidion ferdinandi is one of our most neglected trees, but a mature specimen in full leaf is a sight to be remembered. Commonly called

cheese tree, it grows rapidly when ample moisture is available, to form a spreading tree about 40 ft. high. It is semi-deciduous in late winter, at which stage its foliage is usually sprinkled with deep red leaves. It is naturally a tree of the brush margins but will grow equally well in open situations. Being surface rooted it may be a potential source of trouble if growing adjacent to drainage lines.

SMALL TREES

Melaleuca linariifolia has narrow leaves about 1" long and when in flower is often covered in masses of white feathery blossom. It flowers when a small shrub and may grow into a 20 ft. tree. This tree grows in damp

situations, but I have seen no examples of it, growing in local gardens. When in flower it is more striking than *M. styphelioides* but mature natural specimens are seldom as shapely. It has been used successfully as a street tree in a number of other localities (*Australian Plants* Vol. 2, p. 155).

Melaleuca styphelioides grows into a tree about 20 ft. high with prickly, sometimes pendulous foliage and carries small white brushes in late spring. Its white paperbark is attractive and it forms a rounded tree even under very difficult conditions. Although naturally a swamp dweller, it is supposedly deep rooting and a number of local specimens have been observed growing satisfactorily in dry, difficult conditions surrounded by paving.

Pittosporum undulatum is a very common marginal brush species which is so well known it hardly needs comment. However, it forms a very beautiful small tree with dark green glossy leaves and carries numerous yellow berries in late summer. It will retain its foliage right to the ground and can be clipped to form a tall dense hedge. However, it is perhaps most attractive as an upright spreading tree about 20 ft. high, and though prone to attack by white scale this can be controlled by suitable sprays. *P. undulatum* is one of two local trees listed by the Californian Department of Highways for roadside planting, the other being *Eucalyptus robusta*.

SHRUBS

Banksia collina grows into a shrub about 5 ft. high with attractive finely serrated foliage and large yellow or bronze coloured brushes up to 8" long. The colour of the styles varies from yellow to dark red and the latter produces the bronze hue when viewed from a distance. (*Australian Plants* Vol. 1, No. 12. p. 30).

Callistemon linearis grows here on the poorly drained valley clays as a loose open shrub 6 to 8 ft. high with dark red brushes. With regular pruning it will form a dense attractive bush with somewhat pendulous brushes carried in profusion on graceful arching branches.

Callistemon pinifolius occurs occasionally in this area and while it is usually found on damp sites it has also been observed growing naturally well away from water. Under cultivation it needs heavy pruning to control its normal spindly habit. One garden specimen treated in this way has formed a dense bush about 6 ft. in diameter, 4 ft. high and produced more than 200 beautiful green brushes at one time.

Jacksonia scoparia is a fast growing broom-like shrub or small tree which is covered with masses of small golden yellow pea flowers in early spring. I have kept my specimen shapely by hard cutting immediately after flowering and it responds with a striking display each year. It grows locally on dry rocky sites and may form dense thickets after repeated burning. Under garden conditions it grows vigorously and may reach 8 to 10 ft. high.

Lambertia formosa is worth growing although mine has been rather slow and has not formed a very dense bush. The clusters of red flowers are attractive and the well known mountain devil fruits are always interesting. It is a very prickly shrub and with suitable pruning could be used to form a protective hedge.

Leptospermum flavescens grows here as a shrub about 6 ft high. It has small leaves and a rather horizontal branching habit and is covered with small white flowers in early spring. Light pruning after flowering keeps it from becoming too open.

Melaleuca thymifolia is a lovely little upright shrub about 3 ft. high with fine leaves and mauve flowers. (*Australian Plants* Vol. 1, No. 10, front cover). It grows here on the poorly drained valley clays.

Pittosporum revolutum grows only to shrub size here and appears to be rather slow but its large yellow fruit, retained for months before opening to reveal the blood red seeds, make it a striking sight. (*Australian Plants* Vol. 3, No. 21, p. 33).

Doryanthes excelsa is a beautiful plant well worthy of a place in any garden. The stiff sword-like leaves are up to 5 ft. long and even when not in flower, few exotics can rival its dramatic form. Its dark red flowers are carried in a dense head 10 to 12 ft. above the ground.

Xanthorrhoea. I have three different local species growing, but have not been able to satisfactorily identify them. I find they can be transplanted easily even when quite large and like *Doryanthes excelsa*, are worth growing for their form alone. That these two characteristically Australian plants should be lost to our suburban gardens by thoughtless clearing is most unfortunate.

THE PROBLEM OF SYNCARPIA

by C. N. Debenham, Museum of Applied Arts and Sciences, Sydney, N.S.W.

The complex conveniently named *Syncarpia* forms part of the capsular-fruited division of Myrtaceae where *Metrosideros* is the key member of its sub-tribe in company with such genera as *Tristania* and *Xanthostemon*. A primarily tropical sub-tribe (*Metrosiderinae*) with members spread throughout south-east Asia, Papua and New Guinea, Australia, New Caledonia and New Zealand, it has outliers in South Africa and in Chile. Certain of its features bridge the gap between the capsular and soft-fruited (e.g. *Acmena*, *Syzygium*) broad divisions of the family.

Field details of two outstanding *Syncarpia*s have been in these pages (see G. H. Hewitt, *Australian Plants* 3:23 (June, 1965) p. 131). It remains now to discuss the genus as a whole—a not easy matter within limited space. It is hoped that the following brief sketch from an historic approach, while not giving full perspective to the genus, will at least emphasize the problem of its status and circumscription.

First publication of the name *Syncarpia* dates from 1840 when Michele Tenore of Italy described *S. laurifolia*. Subsequent to F. Mueller's publishing (1859) of *S. leptopetala* based on a plant from the Brisbane River, Benthām was able to remark: "The genus consists of two species exclusively Australian, and differing perhaps as much from each other as either one does from *Metrosideros*". The key he gave is:—

Calyx	connate.	Petals	broad.	Ovary	3-celled with several ovules	
in each	cell					1. <i>S. laurifolia</i> ..
Calyx	free.	Petals	narrow.	Ovary	2-celled, with 1 ovule in each	
cell						2. <i>S. leptopetala</i>

Actually, Bentham may have overlooked a reference to *Syncarpia* by the Dutch J. E. Teysmann and S. Bennendijk (in 1855). These authors set up a *S. vertholenii* for a plant found in Ambon (Amboina). No further reference to the name appears in later work on the genus and its status is in some doubt—no definite record appears of a mainland link with the almost complete exclusion of the genus to the eastern coast.

Neidenzu (1893) adds little to the picture except for a displacement of *laurifolia* for *glomulifera*, a reinstatement of John Smith's *Metrosideros glomulifera* under the later genus. Bailey (1884) described a new *Syncarpia* from Fraser Island—*S. hillii*. Maiden (1904) briefly reviewed the genus in his account of *laurifolia* and suggested that *Syncarpia* should be restricted to *S. laurifolia* and *S. hillii* while *S. leptopetala* was best placed with *Metrosideros*.

The next significant contribution is from C. T. White (1919) who placed a specimen from Imbil (near Gympie) as *S. subargentea*. This plant, while bearing a superficial resemblance to *leptopetala*, showed a connation of receptacles (calyxes) and a 2-locular ovary. The features led him to believe a connecting-link between *laurifolia* and *leptopetala* was found and, for convenience, suggested that *Syncarpia* be retained for members with receptacles connate or otherwise, i.e. acceptable to *Syncarpia* were *laurifolia*, *hillii*, *subargentea* and *leptopetala*.

Domin (1928) is the most recent worker to give attention to generic limits. He related, firstly, the *Metrosideros procera* of Salisbury (1796) to the *glomulifera* of Smith (1797) so that, on grounds of priority, both *glomulifera* and *laurifolia* should be replaced by the new combination. The second aspect of his contribution was the setting up of a new genus *Choricarpia* based on *S. leptopetala*. No mention of White's *subargentea* was given and the new genus to Domin was monospecific.

A difficulty with *leptopetala* is that its mature fruit is elusive. Although scanning abundant material no fruit approaching that of *procera* has been seen by me, although sighting apparently fully-formed seed when the well-advanced flower was not yet distinguishable as a fruit. The wall of the receptacle above the ovary, unlike that of *procera* where it remains to leave the valves of the capsule free, in *leptopetala* appears to contract so that dehiscence, if occurring, must be very restricted. The style and stamens of *leptopetala* are long persistent, just at what stage of fruit development they completely wither is a matter of conjecture. The inference may be that the fruit-head falls with little or no enlargement of the flower head and without the development of woody tissue. The flowers in bud are clearly free from one another but during development noticeable compaction without connation occurs.

To a reader who has access to fresh fruit of *leptopetala* may I request his help in either describing or (better still) forwarding them to me. There is a disturbing absence of its mention in literature. Domin in fact dismissing it with "capsulas maturas et semina haud examinar!"

A KEY TO SYNCARPIA (*sensu lato*)

In the absence of a critical revision, the view taken here is that *Syncarpia* should remain in the broad sense of Bentham. A change which seems desirable is the acceptance of *procera* for *laurifolia*.

Trees, frequently tall-growing, of forest or scrub along the eastern tropical to temperate coast and sub-coast. Leaves opposite, petiolate, usually appearing in whorl-like groups.

broadly lanceolate to elliptical or ovate, entire, bicolorous (at least when young) with the upper surface glossy-green and the lower light-coloured or silvery from a dense mat of very short hairs, coriaceous, pinnately-veined. *Inflorescence* a dense-flowered globular head, either solitary on axillary peduncles or in terminal panicles, the flowers compacted with their receptacles either connate or free; petals and sepals 4 or 5, the former sometimes obsolete, the latter persistent; stamens free, numerous; style filiform, long-exserted and with a small stigma. Ovary inferior, adnate to the receptacle at the base, 2 or 3-locular with 1 or more ovules per loculus. *Fruit* (where known) a capsule included by the receptacle; seeds linear to wedge-shaped.

Flowers 6-10 in each head; receptacles connate at bases. Petals orbicular. Fruit enlarged and woody, dehiscent by valves. Ovary 3-locular with numerous ovules in each loculus. Shaft-like trees up to 120 ft. or more high with bark persistent, deeply furrowed, thick, fibrous and stringy.

Leaves 6-10 cm. long, ovate-lanceolate to ovate. Flower-heads terminal, 2 or 3 together on peduncles 20-30 mm. long. Receptacles glabrous. Fruiting-heads 2.5-4.0 cm. diam. 1. *S. hillii* Bailey

Confined to Fraser Island. Known locally as Peebeen.

Leaves 5-10 cm. long, ovate to broadly elliptical. Flower-heads in terminal groups or solitary on axillary peduncles towards the ends of the branches, the peduncles 25-50 mm. long. Receptacles pubescent. Fruit-heads 1.2-2.5 cm. diam. 2. *S. procera* (Salisb.) Domin.

Flowers numerous in each head, much smaller than preceding. Fruit? Ovary 2-locular, with 1 ovule per loculus in *leptopetala* but not given in the first. Leaves 5-10 cm. long, broadly-lanceolate to elliptical.

Receptacles connate at bases. Flower-heads about 1¹/₂ mm. diam., on peduncles 6-12 mm. long, mainly solitary and axillary, towards the ends of the branches. Petals absent? 3. *S. suberargentea* C. T. White

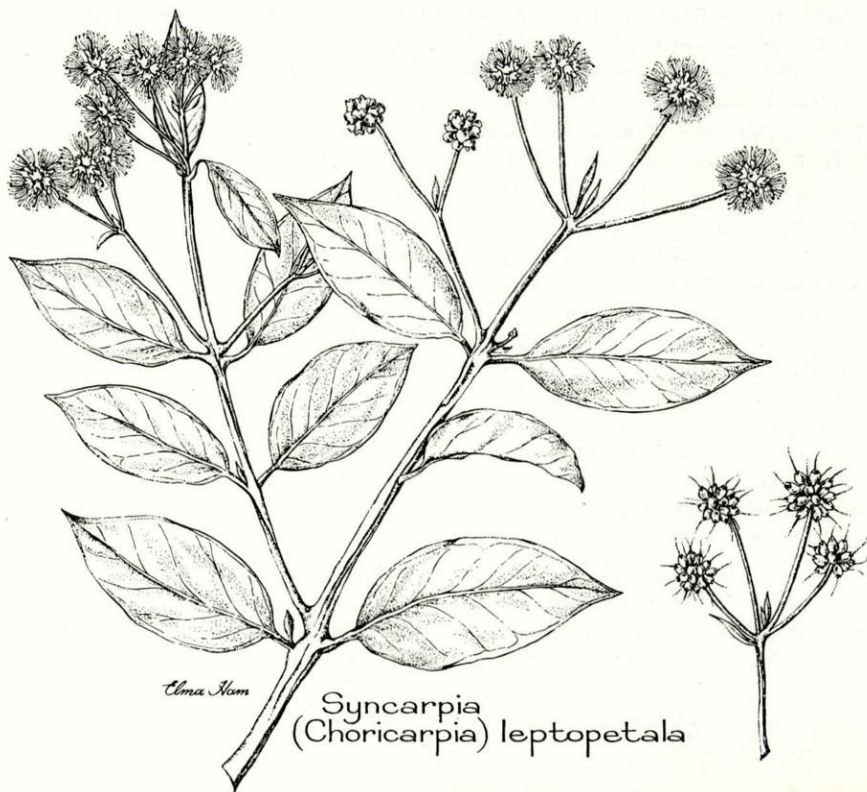
Tree up to 120 ft. high with smooth bark shed in thin flakes confined to scrub centred around Imbil, southern Queensland. Known locally as Giant Ironwood.

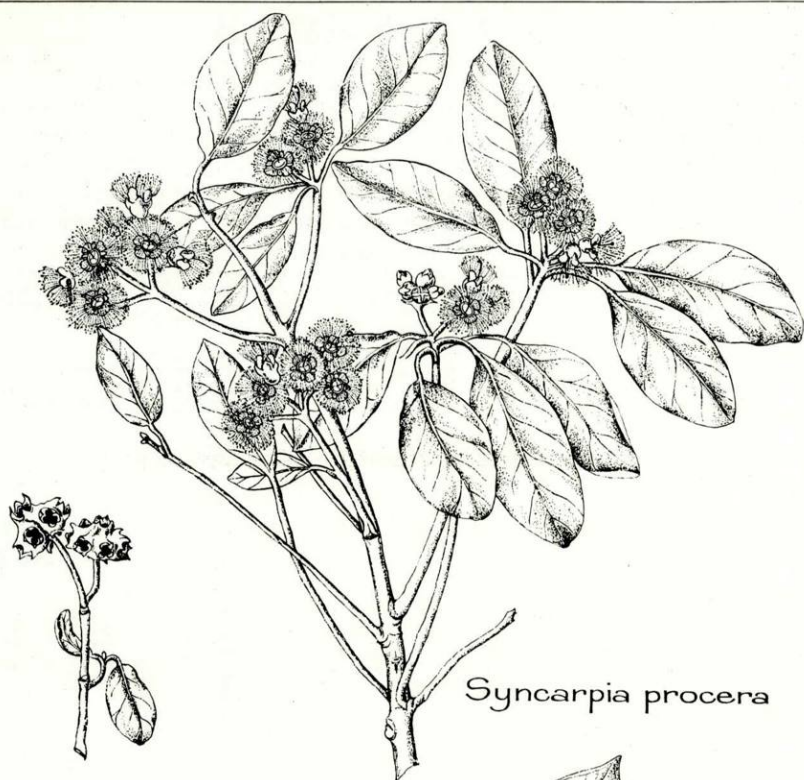
Receptacles becoming closely compacted but free from one another. Flower-heads 15-20 mm. diam. on peduncles 25-50 mm. long, either forming panicles or in terminal clusters. Petals almost obsolete.

4. *S. leptopetala* F. Muell.

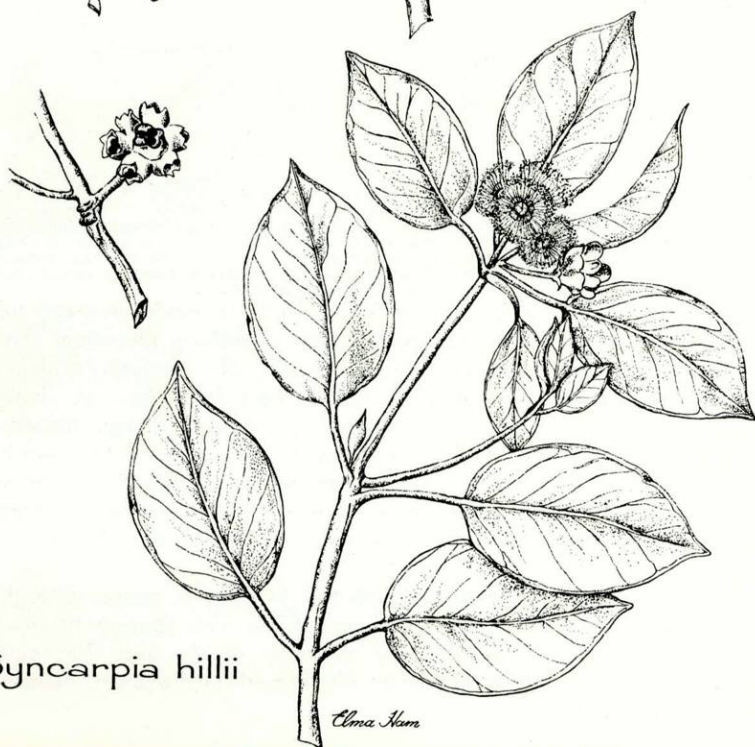
Tree up to 50 ft. high or shrub-like, confined to scrub or brush from the South Coast of N.S.W. (e.g. Stanwell Park) to a few miles north of Brisbane. Known locally as Brush Turpentine.

To the staff of the National Herbarium, Sydney, may I extend once again my thanks for their courtesy and help, in particular Dr. B. Briggs for a most enlightening discussion.





Syncarpia procera



Syncarpia hillii

Clara Ham

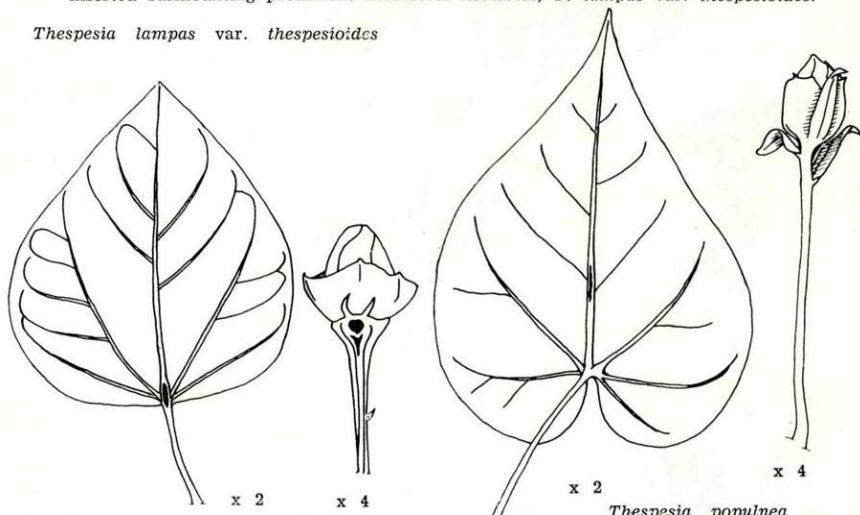
THESPESIA IN AUSTRALIA

by Paul A. Fryxell, Research Geneticist, Crops Research Service U.S. Dept. of Agriculture
The fourth article in a series on Malvaceae, Hibiscus-like plants.

Two representatives of this genus occur in Australia, both of them along the northern coast. These plants are large shrubs or small trees. Their flowers are rather similar to those of *Gossypium*, though they are somewhat larger and more fleshy, with yellow petals and (usually) a maroon throat. The petals are sometimes crinkled. The fruits are typically woody. The two Australian species may be distinguished as follows:

- A. Fruits 5-celled, oblate, woody, appearing leathery, usually indehiscent; seeds large (10 mm. long), woolly; leaves poplar-like (cordate, acuminate, simple), glabrous or minutely scurfy when young becoming dark waxy green when mature; involucre bracts 3, linear, irregularly inserted, early deciduous (leaving scars); involucre nectaries lacking; *T. populnea*.
- A. Fruits 3-4 celled, ovoid, woody, dehiscent; seeds small (5 mm. long) glabrous; leaves ovate, sometimes lobed, truncate, acute to obtuse, finely and densely puberulent below; involucre bracts 6 to 9 in 3 groups, minute, subulate, persistent, regularly inserted surmounting prominent involucre nectaries; *T. lampas* var. *thespesioides*.

Thespesia lampas var. *thespesioides*



LEAVES (under-surface shown): *T. lampas* var. *thespesioides*—foliar nectary is located at base of leaf blade and is a prominent, elaborate structure sunken into midrib. *T. populnea*—foliar nectary is in centre of leaf and is a secretory area on surface of midrib; scarcely evident except for nectar it secretes. *T. populnea* is characterised by "domatia" on underside of leaf at principal vein juncture. Buds: *T. lampas* var. *thespesioides*—3 involucre nectaries are prominent (shown), but bracteoles above are inconspicuous because of tomentum covering entire fruiting structure. *T. populnea*—peduncle is often long, but may be shorter.

1. *Thespesia populnea* (L). Sol. ex Corr. Small to moderate-sized trees, foliage glabrous or more or less covered with a stellate tomentum that is reduced to minute, peltate scales. Leaves profoundly cordate, acuminate, simple, waxy, punctate, long-petioled (more than $\frac{1}{2}$ length of lamina). Involucre bracts 3, 8-10 mm. long, irregularly inserted, linear, deciduous. Involucre nectaries lacking. Calyx truncate, becoming revolute, undulate, and ligneous at maturity. Petals yellow, sometimes crinkled, usually with maroon spot at base. Stigma clavate, sometimes twisted. Anthers numerous, yellow. Fruit oblate, glabrous, 5-celled, indehiscent. Seeds about 10 mm. long with short red-brown wool.

Thespesia populnea is widely distributed in coastal areas throughout the tropics. The indehiscent fruits, which are filled with spongy tissue, are quite buoyant and may float for long distances in the sea. The mature plants are apparently well adapted to the littoral environment, tolerating salt spray and brackish water.

In Australia, these trees grow along the tropical shores of the north, generally from the vicinity of the 20th parallel northward.

T. populnea is known by a variety of vernacular names, including the English names "Portia tree," "Seaside Mahoe," and "Tulip Tree." This species is used as a street tree in southern India. The wood is valued in some parts of the world for handicrafts because of its resistance to splitting. The wood is hard and heavy and has been employed in the manufacture of gunstocks and in carriage constructions to some extent.

2. *Thespesia lampas* (Cav.) Dalz. ex Dalz. & Gibs. var. *thespesioides* (R.Br. ex Benth.) Fryx. (Synonyms: *Gossypium thespesioides*, *Notoxylinon thespesioides*. These plants have sometimes been incorrectly given the name *Thespesia macrophylla*, which is in fact a synonym of *T. populnea*).

Moderate-sized to large shrubs, more or less densely rusty-puberulent; leaves ovate to slightly 3-lobes, truncate or slightly cordate, acute to obtuse, densely puberulent below, short-petioled (less than $\frac{1}{2}$ length of lamina), glabrate above. Peduncles surmounted by 3 prominent nectaries. Involucral bracts inconspicuous, 1-2 mm. long, subulate, 2 or 3 above each nectary, regularly inserted, persistent. Calyx densely puberulent, with 5 short teeth. Petals yellow with maroon spot at base. Stigma clavate. Anther numerous, yellow. Fruit ovoid, puberulent, 3-4 celled, dehiscent, woody. Seeds about 5 mm. long, glabrous, shiny purplish-black.

SEASIDE MAHOE (*Thespesia populnea* Soland.)

Also called Portia Tree, Majagua, False Rosewood, and "Cork Tree."

by JULIA F. MORTON, Director Morton Collectanea, University of Miami, U.S.A.

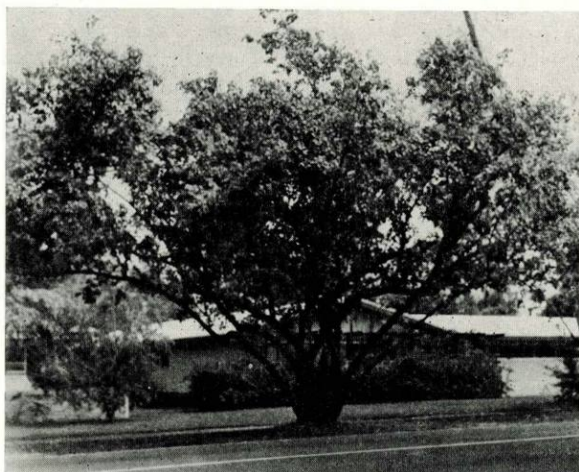
The seaside mahoe is a shrub or tree to 50 ft. with spreading branches and evergreen leaves, smooth, heart-shaped, pointed, and 2 to 5 inches long. The flowers are hibiscus-like but cupped, to 3 inches wide, crinkled; pale-yellow in the morning with purple-red throat; dark-red in the afternoon; and remain on the tree for several days. Blooming is continuous throughout spring and summer. The abundant seed capsules are oblate, to $1\frac{1}{2}$ inches wide, with persistent calyx, soft-woody and near-black when mature; 5-parted, with 10, 3-sided, brown seeds, $\frac{3}{8}$ inch long and $\frac{1}{4}$ inch wide. They do not split open but remain intact on the tree a long time before they fall. Seeds will germinate after the capsules have floated a year in salt water.

The tree is common in the Old World but has been distributed since prehistoric times in the islands of the Pacific, in North Australia, Malaya, Africa and the West Indies. In Florida, it is naturalised on the southernmost mainland and the Keys and is often cultivated as a street or shade tree here and from southern Mexico through Central America and northern South America. In cotton-growing regions, the tree is being eliminated because it is a host of the cotton stainer insect.

The wood, said to smell of roses when fresh, is almost indestructible under water. It is very heavy when wet; very light when dry. The sapwood is light brown; heartwood dark reddish-brown, often with dark-purple veins.

It polishes and stains well and is used for boat-building, cabinetwork and gunstocks. Inner bark of the young branches yields a tough fibre used for cordage and for making coffee bags and cigar wrappers.

As emergency fare, the leaves, buds and flowers may be eaten, raw or cooked. The unripe fruits and the flower buds yield a yellow juice which is used as a dye and also applied to skin afflictions. The seeds are cathartic. A tonic is prepared from the roots of the tree.



*Thespesia
populnea*
growing in a
street in
Florida, U.S.A.

The true MAHOE (*Hibiscus tiliaceus* L.) is native to the tropics of both hemispheres and South Florida and the Florida Keys. As an Australian native it is fully described with a large colour plate in No. 25 issue of *Australian Plants*. It is often found with the mangroves in coastal swamps and, in such wet ground, it is a "walking tree" for its low-hanging branches take root and create extensive thickets. Planted on drier land, it is a shapely ornamental with dense, rounded head. Being top-heavy, it is blown out of the ground by hurricane winds in Florida, but resets without difficulty and recovers rapidly. The flowers are universally described as yellow with a maroon eye when first open, turning red before they fall at the end of the day. However, in Florida the maroon eye is usually absent, the fresh flowers being entirely yellow. This tree rivals the seaside mahoe in the usefulness of its wood, bark and edible and medicinal parts. Its velvety seed capsules split open on the tree, releasing the seeds, and are highly decorative when sprayed with "gold" paint.

The closely related BLUE MAHOE (*Hibiscus elatus* Swartz) from the uplands of the West Indies, has larger leaves, and flowers with recurved petals, orange when first open and later dark-red. It becomes a large tree, sometimes to 80 ft., and its excellent wood is valued for furniture, bowls and other objects enhanced by its light-olive hue, streaked with greyish-blue. In Cuba, it is the only native wood used for ladders because of its strong, straight grain. The supply is steadily diminishing. The inner bark called "Cuba bast" was formerly much used for tying bundles of cigars.



Photography by Julia F. Morton

THESPSIA POPULNEA

Because of the importance of the seaside mahoe to coast-dwellers and sea-farers, the tree is revered as sacred in the Old World Tropics and is often planted around temples. The generic name "*Thespesia*" is derived from a Greek word meaning "divine."

Thespesia lampas var. *thespesioides* also occurs along the northern coast of Australia, but apparently it is not a shore-line plant like *T. populnea*. It occurs around Darwin and to the east along the northern edge of Arnhemland as far as Buckingham Bay. To the west it occurs as far as the vicinity of King Sound in Western Australia. It extends inland at least as far as Bridge Creek, nearly 100 miles south of Darwin.

Var. *thespesioides* is found only in Australia. Var. *thespesioides* is very similar to var. *lampas*; the latter occurs in south-west Asia from the hills of Burma, Siam, and southern China to Hainan, the Philippines, and the Celebes islands, and has been distributed elsewhere in cultivation as a specimen shrub. Presumably the Australian variety is also worthy of cultivation.

A number of species of *Thespesia* occur in New Guinea but apparently none of these extends to Australia, except the ubiquitous *T. populnea*.

The Genus *Acianthus* in Australia

by Leo Cady, Kiama.

Mother nature has done some wonderful things with plants, one being the ability of plants to mimic other objects; we find plants that mime stones and rocks (South African *Lithops* and *Pleiospilos* Spp.) moths (mainly Orchids, *Phaleonopsis* Spp.), Birds (*Caleana* Spp.), Lizards, (European orchid *Himantoglossum hircinum*), Monkeys (*Orchis simia*), Frogs (*Coeloglossum viride*), and even Man (*Aceras anthropophorum*).

The genus that mimics insects in general is the one that interests us this time and this is the genus *Acianthus*. In this we find "Gnat Orchid" *A. reniformis*, "Mayfly," *A. caudatus*, "Mosquitos" *A. exsertus*, just to mention a few, it shows that even though the plants may be small in stature it is no less interesting if one likes to seek out its points of interest.

Acianthus is not a large genus, about 20 species confined to the Australian area, 7 species in Australia, 2 varieties of Australian species in New Zealand and approximately 12 species in the New Caledonia and adjacent Island areas. It is a variable genus in size and shape the species being found mainly in sheltered *Eucalyptus* forest or under Bracken Fern (*Pteridium esculentum*) or *Leptospermum* trees behind the beaches where they can get shelter and a moist, ground covered area. The writer has seen them in vast numbers in the latter habitat with luxurious growth up to 25 cm. high.

CULTIVATION OF ACIANTHUS

The culture of the commoner species is fairly easy, they are seen to the best advantage if grown in a 6" pot with say 12 to 20 tubers per pot thus giving a mass effect, this feature is by far the best method to show most of the Australian ground orchids to their best advantage as most are small in stature, but what they lack in stature they gain in floescenceness.

A suitable soil is 50% fine sand (black or grey sandy leaf mould), 40% peat moss, 10% crushed charcoal and powdered cow manure. This mixture should be kept moist in the growing season and rather on the dry side during the dormant period. The writer keeps most of his pots where they receive only natural rain in the "off" period, thus complying with what the plants would receive in nature, the plants are in a fairly sheltered corner of a bush house as this genus resents wind and draughts and quickly withers if either are encountered.

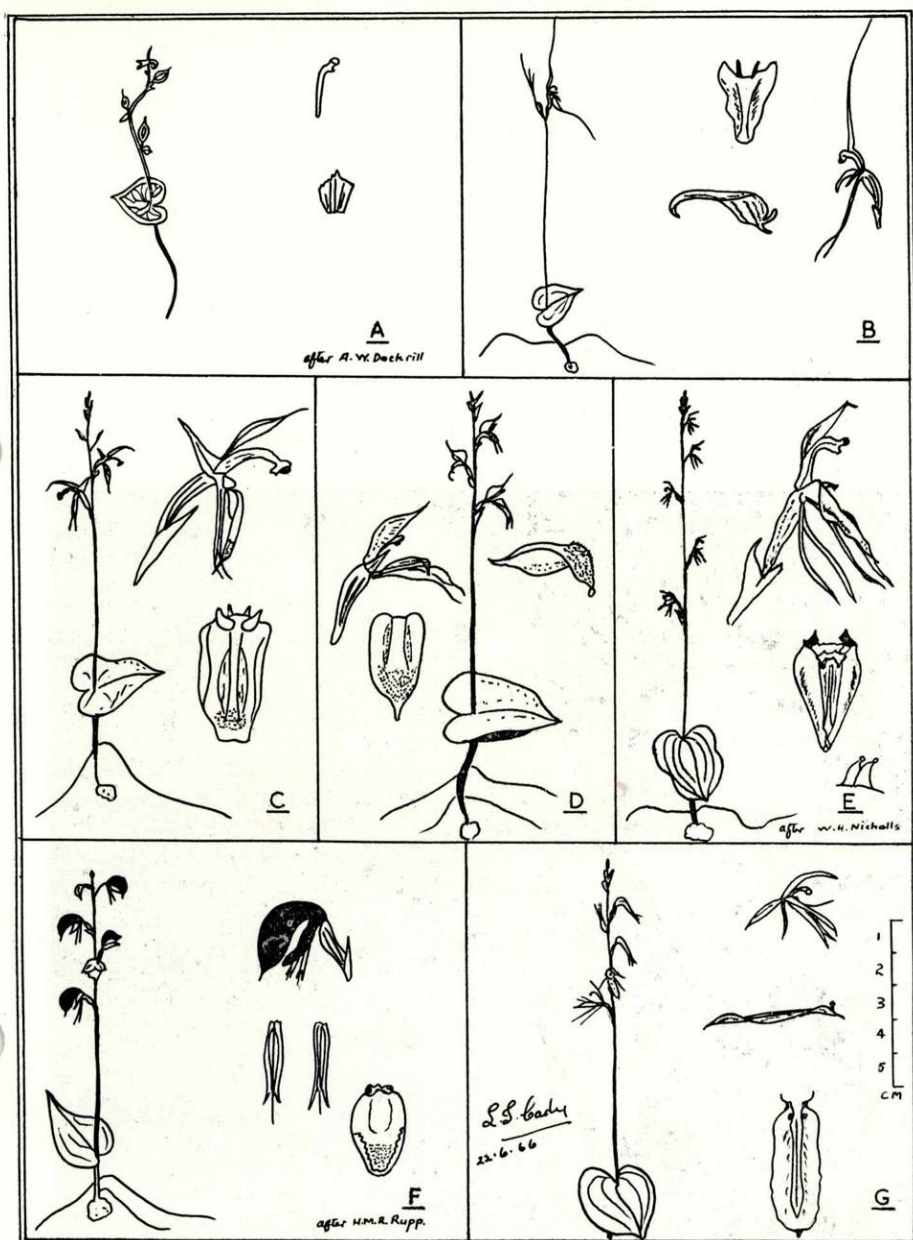
DESCRIPTION OF AUSTRALIAN SPECIES

1. *A. amplexicaulis* (Bailey) Rolfe.

A slender plant up to 12 cm. high. Leaf cordate, apiculate, prominently veined. Flowers to 7, smallish on short pedicels, raceme rather loose subtending flower bracts ovate-acuminate. Sepals and petals about equal in length, the dorsal sepal slightly longer linear-lanceolate, spreading. Labellum sessile trapesiform about 3mm. long by 3 mm. broad, decurving almost at right angles in middle, the anterior margins denticulate, its apex mucronate.

Remarks: This rare North Queensland species resembles *A. exsertus* somewhat but differs in labellum shape and the sessile labellum.

Distribution: Queensland. Flowers April.



KEY TO PLATE

- A. *Ac. amplexicaulis*. Typical plant, labellum top view, column side.
 B. *Ac. caudatus*. Typical plant, labellum side and top view, flower side.
 C. *Ac. exsertus*. Typical plant, labellum top, flower side.
 D. *Ac. fornicatus*. Typical plant, labellum top and side flower side.
 E. *Ac. huegelii*. Typical plant, labellum top, flower side, basal calli.
 F. *Ac. ledwardii*. Typical plant, labellum top flower side, lateral sepals.
 G. *Ac. reniformis*. Typical plant, labellum side and top flower side.
 Plant shown natural size to scale, other segments variously enlarged.

(Continued on page 373)

TETRARCAPAEA TASMANICA Hook. f.

Part 4 of a series on Tasmanian Wildflowers by A. M. Gray

Tetracarpaea is a genus with one species found only in Tasmania, occurring in alpine and sub-alpine habitats. A somewhat unobtrusive small shrub, 2-3 ft. high, when scattered amongst other alpine shrubs, it becomes quite attractive when in flower in April-May. The flowers are rather small, the attractiveness mainly being due to their mass display on a bush. They are similar (to the non discerning glance) to flowers of some of the *Spiraea* species. It is easily propagated.

A small shrub, 2-3 ft. high, much branched, leaves evergreen, ovate-obovate in outline with a rounded apex, margins serrated, glandular tipped, $\frac{1}{2}$ -1" long and $\frac{1}{4}$ - $\frac{1}{2}$ " wide, shining green and with veins impressed on the upper surface. Flowers borne on terminal racemes, receptacle hypogynous, petals 4, obovate, creamy-white, falling early. Sepals 4, spreading. Stamens 8. Carpels 4, narrow-oblong, narrowing at the apex into a fine style. Fruit is a group of 4 follicles opening along the inner margins. Seeds many, obscurely winged.



Photography by A. M. Gray.

TETRARCAPAEA TASMANICA x 2

A low growing shrub of the Tasmanian highlands. The plant has masses of white flowers in spring and summer.

Continued from page 371—

2. *A. caudatus* R.Br. "Mayfly Orchid"

A slender species up to 16 cm. high. Leaf cordiform near base, stem clasping reddish purple below. Flowers to 6 very dark, reddish purple rarely green. Dorsal sepal dilated about to the level of the anthers then produced into a long filiform point to 5 cm. Lateral sepal filiform divergent about 2/3rds length of the dorsal sepal. Petals shorter than sepals, lanceolate falcate. Labellum erect at base recurved anteriorly, lanceolate with two nipple like calli at the base.

Remarks: An unmistakable species having no parallel in the rest of the Australian species owing to its much extended sepals. It also produces a rather unpleasant odour.

Distribution: N.S.W., Victoria, Tasmania and South Australia. Flowers September to October.

3. *A. exsertus* R.Br. "Mosquito Orchid"

Generally similar to *A. fornicatus*, but usually smaller in all respects and more slender. Leaf green both sides, cordate. Flowers to 15, greenish with translucent patches, inflorescence to 22 cm. high. Dorsal linear lanceolate with a fine tip, contracted at its base, broadening towards the upper part of segment, concave at its widest part. Lateral sepals as long as dorsal sepal, narrow-linear, all sepals at times can be gland tipped. Petals about half as long as sepals lanceolate often sharply reflexed. Labellum distinctly clawed, prominently oblong-lanceolate with an acute deflexed point. Basal calli very prominent, lamina papillae very few. Column conspicuously bent forwards; exserted.

Remarks: A very common Eastern plant, very abundant in some areas usually in open forest areas or grasslands in sheltered positions.

Dist.: Queensland to Victoria. Flowers April to June.

4. *A. fornicatus* R.Br. "Pixie Caps"

A slender plant up to 30 cm. high. Stems reddish, leaf cordiform near the base of the stem but not on the ground, reddish beneath. Flowers to 10 pale green rarely, pale reddish brown or green with reddish tints. Dorsal sepal ovate-lanceolate cucullate over the column, tip, acuminate or ending in an extended filiform. Lateral sepals linear nearly as long as the dorsal sepal slightly deflexed below the labellum at times even partly connate. Petals half as long as sepals narrow lanceolate. Labellum just longer than the petals, sessile usually darker than the other segments erect and concave at base with 2 calli, spreading to its broadest part, 2 longitudinal ridges of papillae along the middle. Column very short for genus.

Remarks: A fairly common plant, abundant at times, particularly behind the beaches in tea tree scrub.

Dist.: From Clyde River north to Queensland. Flowers May to September.

5. *A. huegelii* (Endl.) Nicholls et Goadby.

An extremely slender plant up to 18 cm. high. Leaf at or near the base fleshy, orbicular-cordate, very similar to *A. reniformis*. Flowers in loose spike, flowers to 12 greenish purple or green, ovary elongated. Dorsal sepal narrow linear erect or projecting forward, abruptly acuminate, lateral sepals and petals linear, petals shorter than the lateral sepals, spreading or reflexed. Labellum sessile, cuneate lanceolate, broadest at base where it embraces the column. Lamina flat margins reflexed terminating in a short

point, basal calli prominent, 2 conical with black tips extending from the base are 2 glistening lines or ridges almost to apex of lamina.

Remarks: An extremely rare species found only in the Bayswater area near Perth, W.A. very similar to the commoner *A. reniformis* but separated by its smaller size and differently shaped labellum.

Flowers: September to October.

6. *A. ledwardii* Rupp.

Plant closely resembling *A. fornicatus* about 5 cm. high. Leaf pale green above. Flowers to 6 somewhat depressed. Dorsal sepal deeply hooded mucronate at the apex, with a short depressed point. Lateral sepals linear parallel, near the apex shortly and prominently trifid the outer division shorter than the middle one. Petals broadly lanceolate short, labellum ovate, convex below with incurved serrulate margins. Disc smooth towards base papillose towards the blunt apex. Column bent.

Remarks: Very close to *A. fornicatus*, it could even be a variety of this species, it differs in general appearance the flowers being more depressed, the dorsal sepal being much more cucullate, the labellum is differently shaped and lacks the papillose ridges of *A. fornicatus*. A very rare plant.

Dist.: Burleigh Heads, South Queensland. Flowers June.

7. *A. reniformis* (R.Br.) Schlechter. "Gnat Orchid"

A very slender plant up to 27 cm. high. Leaf basal sessile, reniform, orbicular or cordiform, hoary below, prominently veined. Flowers almost sessile to 8, light reddish brown or darker, rarely yellowish green. Dorsal sepal linear-lanceolate, erect, incurving, concave. Lateral sepal shorter linear, spreading. Petals as lateral sepals. Labellum sessile approximately as long as petals, broadly oblong, flat, with 2 raised ridges are often found on the lamina, these act as guides for the honey like nectar which is often found on the lamina, 2 conspicuous basal calli are present.

Remarks: A fairly cosmopolitan species widely spread and fairly abundant in some areas. With its kidney shaped bright green leaf it is one of the easiest of the genus to identify.

Dist.: All Australian states. Flowers May to October.

ACIANTHUS

No. 4 OF A SERIES ON TASMANIAN ORCHIDS

by M. J. Firth

What a temptation it is to count orchids. Here is a group of *Pterostylis alata*, five, eight, ten in a few square yards. Quite a sight, but hardly as spectacular as the twenty two *P. grandiflora* we found growing together in 1962. Then there were the ninety five *Cryptostylis* we found in one small swamp, and the *Spiranthes* we found after years of searching.

But some orchids you do not count. We, in Tasmania, seldom number the *Acianthus*. There are far too many of them.

Statistics do have a place in the field book. In late autumn and early winter usually only half a dozen species are to be found, two or three *Corybas* perhaps a couple of *Pterostylis*, and, of course, *Acianthus exsertus*. In recording your finds for the day, you hardly would be likely to overlook noting an

Acianthus at this time, but later, when the wealth of orchid species appear, it is easy to overlook this genus.

Acianthus reniformis blooms later than *Acianthus exsertus*. Perhaps, when these plants first appear, you may remark on the few seen in flower; but when the full flush of dull brown blooms lift their heads from the patterned carpet of green that their leaves spread over the soil, even the most persistent counter is jolted from his groove by the sheer impossibility of numbering the flowers.

The most amenable of the *Acianthus* to the cataloging finger yearning to record the occurrence of a species is *A. caudatus*. In some areas only a few blooms appear raising their spidery tentacles towards the sky. Count them if you like, but, sooner or late, you will find a hillside where their crowding forms defy enumeration.

These are our three *Acianthus*. They take their vernacular names from the insect world. *A. exsertus* is the "Mosquito Orchid;" *A. reniformis*, the "Gnat Orchid;" and *A. caudatus*, the "Mayfly." The resemblance of these three plants to their insect counterparts is most striking, and one feels that their common names have been well chosen.

Most of the scents which we are able to perceive are named from flowers. There are piney scents and attar of roses, mint, and eucalyptus, and lavender. Most of our orchids are devoid of scent, or only faintly perfumed. Exceptions are *Sarcochilus*, most of the *Prasophyllum*, and *Microtis*. The only *Acianthus* with pretensions to aroma is *A. caudatus*, and what a scent it carries! Neither mint nor lavender but quite a different kettle of (stale) fish. It has a penetrating "doggy" smell.

To the enthusiast such matters as lack of colour in the *Acianthus* and the unpleasant smell of one of its species are but minor details. These little orchids have features which are worthy of study. In these plants nature has provided a well of nectar overflowing onto the labellum, providing a royal treat for pollinating insects. In all probability even the unpleasant smell of *A. caudatus* is merely a puckish device designed to trick carrion flies into pollinating the species.

In general, the *Acianthus* could be confused with two others of our genera. All three have a single, short, broad leaf, lying flat on the ground. The Helmet Orchids, *Corybas*, always carry but one flower which is never raised more than an inch or so above ground level. Red Beaks, *Lyperanthus nigricans*, have a much bigger, fleshier leaf than those of *Acianthus* or *Corybas*, and the flowers are large and striped with red. The three *Acianthus* can be distinguished from each other partly by their leaves and partly by their flowers. *A. reniformis* has a leaf which is frosty beneath, whereas the other two are tinted with red under the leaf. *A. caudatus* can readily be distinguished because of its spidery flowers, with segments one to two inches long, not forgetting, of course, its "doggy" scent.

If you wish to initiate a complete novice into the mysteries of orchid study, please avoid the *Acianthus*. As like as not he will compare them with weeds, and even suspect you of trying to fool him. He already has a mental picture of showy, exotic flowers, noted for their brilliant colours and odd shapes. To him these native orchids would seem but poor cousins to the magnificent blooms his mind already encompasses. And please do not suggest he sample the odour of *A. caudatus*.

ACIANTHUS IN SOUTH AUSTRALIA

by R. C. NASH

There is to be found in South Australia 3 species of *Acianthus*. One species has three well defined forms.

***Acianthus exsertus* R. Brown**, mosquito orchid, is the first to be found in bloom each year. It starts to bloom late in April and continues through to July. This plant is one of the most common orchids to be found in South Australia and is easily grown under cultivation.

Habitat: Throughout the damper parts of the State, amongst low bushes, rocks and at the base of trees. This plant forms quite large colonies.

Compost: Must be loose and is made up of 50% each of coarse clean sand and sawdust or leaf mould for the top $\frac{1}{3}$ pot depth. The middle $\frac{1}{3}$ pot is filled with a mixture of 75% coarse clean sand and 25% sawdust or leaf mould. Broken pot and clean sand make up the lower $\frac{1}{3}$ pot depth. Plant tubers approximately one inch down from the top of the compost. Place pots in a location where the plants get full benefit of the early morning sun with indirect light during the day. Pots must be sheltered from wind. Keep pots cool and shaded in the summer. Allow the plant population to build up to the overcrowded point, then repot. This species may be grown very successfully with *Pterostylis robusta*.

Watering: Keep compost nicely damp—do not overwater.

***Acianthus reniformis* (R.Br.) Schltr.**, gnat orchid. This species has two main forms and a colour type. One blooms in July and August and has a light green leaf with the appearance of the veins being depressed.

The second form blooms in August and September and has a dark bluish green leaf with outstanding veinings. Generally this form is a little less robust than the early form, also the flowers are not quite so numerous on the stems and are redder. This form has a pure yellow flowered colour type. This type has only been found at Cherry Gardens and the area is now cleared.

Habitat: Shady position in the higher and damper parts of the State, common in some areas. Found in colonies.

There does not appear to be any hybridisation between the early and late flowering forms as I have found them in bloom at the same time in the same area.

Compost for the early flowering form should contain about 20% more coarse sand than that used for *Acianthus exsertus*. They will multiply freely when established. These like heavier shade also. When repotting, use a larger pot. Overcrowding does no apparent harm. Keep cool in summer.

Compost for the late flowering form: Use the same mixture as that for *Acianthus exsertus* also place pots in a similar position as that recommended for this species. The yellow type may be grown with *Pterostylis robusta* and it also multiplies faster than the red coloured forms.

***Acianthus caudatus* R.Br.**, may-fly orchid, is the third and last member of this genus found in South Australia, a supposedly rare plant. It is quite common within its range, being found mostly in lighter sandier soils. This

plant likes very bushy and shady areas in the Mt. Lofty Ranges. In some areas the flowers emit a very strong offending odour. Blooms late August to early October.

So far this species has been disappointing under cultivation. I have had some plants grow for several years but they never multiplied or flowered. These plants always liked to be well hidden and forgotten, under leaves or in a very isolated spot in the collection. A very shy plant.

For those people attempting to grow this species I would suggest the use of a very sandy compost well drained with a heavy topping of sawdust or leaf mould. Keep the plants in a very shady spot.

Acianthus fornicatus from the Eastern States, would I think, respond to the same culture that I have used for *Acianthus exsertus*.

Urea used in a spray is very beneficial to these plants, plus a little superphosphate once a year.

ANODOPETALUM BIGLANDULOSUM

Part 4 of a series on Tasmanian Wildflowers by A. M. Gray

The only species of the genus *Anodopetalum* is endemic in Tasmania. Together with the genus *Bauera* it represents the family *Cunoniaceae* in Tasmania. Most bushwalkers will have had some dealing with *Anodopetalum*, probably better recognised by its common name—"Horizontal Scrub." The "Bete noir" of any visitor to Tasmania's south-west. Found in the high rainfall areas of the south and west, it occurs abundantly in gullies and rainforests, often making pure stands in some places. As its common name implies, its typical habit of growth is horizontal. As it grows, the trunk gradually bends over into a horizontal position, from this trunk branches sprout upwards and then these in turn bend over and so on until the successive layers of branches become so entangled and compact that they may form platforms at two or three levels some distance above the ground, the whole arrangement making a virtually impenetrable scrub. Its description is as follows—a tree 6-30 ft. high, slender, evergreen; in open situations often reduced to a bushy shrub. Leaves opposite, shining, shortly stalked, narrow elliptical-lanceolate, apex blunt, the margin serrated with blunt, gland-tipped teeth. Stipules small, lanceolate, deciduous. The flowers occur singly or in two's or three's usually in the axils of the upper leaves. Petals 4-5 small, greenish-white smaller than the sepals. Sepals 4-5 triangular, joined at the base, inner surface often with downy hairs. Stamens 8 inserted on the outer rim of the thick, glandular disc. Ovaries two, joined, bi-locular. Styles free, spreading. Fruit fleshy about ¼" long and containing one seed.

A very easy plant to propagate either by cuttings or seeds.

TWO INLAND N.S.W. ACIANTHUS

by B. Whitehead, Forbes, N.S.W.

Both *Acianthus fornicatus* (Pixie Caps) and *Acianthus reniformis* (Mosquito Orchid) occur in suitable habitats in areas of Central Western N.S.W. and are common in some localities. *A. fornicatus* has been found by the writer in bushland near Forbes, Parkes, Grenfell, Cowra and Bathurst, and in the immediate vicinity does not appear to extend more than 15 miles west of Forbes. Cypress pines provide suitable shade and growing conditions for the species on hillsides and the orchid is sometimes to be found in profusion growing among smaller embedded stones on the banks of the upper reaches of creeks which are dry for much of the year.

A damper situation is favoured by *A. reniformis*, which I have recorded from representative localities near Parkes, Eugowra, Cowra and Manildra. The plant appears to favour the shelter of native grasses and grows often with moss on the banks of creeks and hillsides in undisturbed areas. Large boulders sometimes shelter colonies of this orchid at their bases.

Acianthus have a charm in cultivation which arises from the small but well-defined flowers and the little carpet of leaves. Both species mentioned grow without much difficulty in cultivation here and are given no special treatment other than that required by many native orchids—moderate shade and a well-drained potting mixture, in this case consisting of roughly 60% clean river sand and 40% leaf-mould.

A. fornicatus

Cultivated plants push their furled heart shaped leaves through the surface in this climate during April. After a few days the number of flowering plants can be predicted from the appearance of a bud at the bottom of the still unfurled leaf. Not all plants flower, and the percentage of flowering plants varies each season.

Frosts of 27°F. and lower should be avoided.

The dainty pale purplish flowers may appear from July to August and have good lasting qualities, retaining their freshness, if unfertilised, for 2-3 weeks, sometimes longer. I have known a cultivated plant to remain in full flower for 10 weeks, but this appears to be an extreme case.

A. reniformis

This plant also appears here during April and the kidney-shaped leaves hug the surface of the soil after development. The remarks on frost damage to *A. fornicatus* flower buds also apply to this species and similar steps can be taken to avoid this.

The larger flowers of this species appear about September and are reddish purple in colour. A yellow flowering form also exists in cultivation.

A. reniformis appears to benefit if a thin layer of leaf-mould is scattered on the soil surface.

Both species multiply rather well in cultivation. Pots should be kept just damp and may occasionally be allowed to dry out almost fully before re-watering. During dormancy, complete absence of water does no harm. Overcrowding should be avoided, and I find 30-40 tubers in a 7" pot provides a comfortable existence.

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HAKEA ARE ADAPTABLE

Plants that are adaptable to a wide range of garden conditions are the *Hakeas*. A particularly fine plant is the *Hakea purpurea* shown below, that will grow to 4 feet in heavy soils. A previous request for reports from readers on *Hakea* they would recommend, failed to yield results. Who will assist me? Editor.



Photography by Ron Hill

Reproduced from "Growing Australian Plants"

HAKEA PURPUREA

One reason for reproducing this colour plate is to correct the unfortunate printing accident on page 36 of our No. 21 issue.

GROWING WILDFLOWERS IN ADELAIDE

As in Sydney there are large areas of the suburbs with clay soils. A full report on the cultivation of wildflowers under these conditions is given in the book "Growing Australian Plants" by Noel Lothian, Director of the Botanic Gardens, Adelaide, and Ivan Holliday, a very keen home gardener of wildflowers. Excellent value at 37/6 at your bookseller.

BOOK REVIEW (These are not available from Editor)

Designing Australian Bush Gardens by Betty Maloney and Jean Walker . . . Price \$1.00

This economically priced book is meant for those who wish to create a natural bush effect about their suburban home or weekend retreat. The work, although in black and white, is artistically presented and illustrated by sketches and photographs. After dealing with the general aspects of ground cover and treatment, the use of wood, trees, stone and water, the practical problem of how to create a bush setting on a block only 50 feet wide, in a suburban area, is squarely faced with an actual example detailing the treatment and plants recommended. The book reflects the competence and experience of the authors and their feeling of intimacy with the subject.

A Check List of the Orchidaceous Plants of North Queensland

Revised by A. Dockrill in May 1966, and produced by and only available from the North Queensland Naturalists' Club, P.O. Box 991, Cairns, North Queensland for 75 cents + 5 cents postage.

For the orchid enthusiast this 22 page booklet will be of vital interest. The 190 odd orchids found naturally in North Queensland are listed with their full and correct names and under each is listed various other names by which each orchid has been called in the past but must now be discarded. Other than their known distribution and flowering periods, no other information is given, but the work is an invaluable reference.

Australian Native Shrubs and Windbreak Trees

This is Boddy's Eastern Park Nursery 1966 Planting Guide Catalogue available only from Boddy's Nursery, 32 Denman Street, East Geelong, Victoria, for 50 cents + 5 cents postage. It is very far from being a nurseryman's catalogue. It is a 100 page book listing thousands of wildflowers with a brief description, all grouped under various headings such as "Tall Shrubs", "Medium Shrubs", "Ground Cover Plants" etc. A valuable guide to every home gardener.

The Endemic Flora of Tasmania

Published under the sponsorship of Lord Talbot de Malahide, beautifully illustrated by Margaret Stones with botanical and ecological text by Winifred M. Curtis, the complete work of 5 volumes is a classic reference. Each volume, really a monograph, comprises 40 large (18" x 13") pages, each illustrating a species with a further 36 pages accommodating a botanical and ecological description of each species. Volume No. 1 will soon be available, each volume costing 15 guineas sterling plus 4/- postage. A magnificent production bound in full linen board, gold blocked on face and spine. Enquiries and orders direct to the publishers, The Ariel Press Ltd., 14 King St., Covent Garden, London, W.C.2, England.

THE SOCIETY FOR GROWING AUSTRALIAN PLANTS

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Contact the Secretary of the Society for your State for information without obligation.

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We wish to advise Editors and Publishers that we are printing specialists in this field and would be glad to discuss the printing of these journals at your convenience.



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GROWING TERRESTRIAL ORCHIDS

From Keith Bursill, Campbelltown, N.S.W.

Firstly, I would like to applaud the professional approach of our terrestrial orchid study group leader, Mr. R. Nash, in respect to the detailed methods of culture which he is recommending obviously after many years experience of varying climatic conditions and of trial and error. In the No. 26 issue of *Australian Plants* two cultural methods were detailed by Mr. Nash for just three of our species of the genus *Corybas*, which tends to illustrate the thoroughness of his research.

I would stress the importance of drainage even more, not only for *Corybas*, but for all of our terrestrial orchids for even our well-known "Swamp Lily Orchid," *Plaius tankervilleae*, must have that infallible drainage before success is a possibility. The drainage should vary only from excellent to perfect. It is only above the drainage material and preferably not mixing through it, that the compost (also well drained) can vary from pure sand for some dry country species, to varying degrees of soil or humus laden composts according to the requirements of the species.

However, reliable treatment under differing conditions varies so greatly that it is impossible to generalise on any specific method even for a whole genus.

This issue is *Acianthus* and I will confine my specific recommendations to those that I am familiar with. Three species of *Acianthus* occur in the Georges River region near Campbelltown, N.S.W. *Acianthus fornicatus* occurs mainly on sheltered mossy rock shelves in shallow soil where a degree of seepage is mostly present. *A. reniformis* mostly occurs in the shelter of bracken fern or other low cover in the creek gorges. *A. exsertus* is found in the vicinity of large shrubs also in the creek and river gorges.

Acianthus fornicatus and *A. exsertus* respond well to a very well drained potting mixture of 50% leaf mould or rotting shavings or sawdust with granulated charcoal, topped off with a ½ inch layer of old wood shavings. Keep in a shady, sheltered position and water carefully. *A. reniformis* requires the potting mixture to be 75% sand and 25% humus content.

Liquid fowl manure in a very weak solution, administered once a week proves very beneficial to the plants in the growing season.

EXPERIMENT 5—A series of experiments by R. Nash from our No. 26 issue.

For those people living handy to a bushland area who do not wish to grow terrestrials, but are still keen on these plants, the following study may appeal to them.

In this exercise on area of bushland is to be marked out and from one to as many species as the participants may like to study, be studied.

The information required is:—

- a.—Time the plants show up each year.
- b.—Total number of plants in one season, large or small.
- c.—The number of plants that bloom.
- d.—The number of plants setting seed and the approximate number of seed carpels.
- e.—The quality of the plants and blooms.
- f.—Insects observed visiting which flowers. Try to capture some of the insects and send to your State Museum, asking them to identify them and tell the Museum people why.
- g.—Any unusual happenings.

This study will take many years to complete and with the drought in parts of Australia, will help in the study of the recovery of our native plants after a bad drought.

Please do not expect solid results for at least 3 years. I may not be able to interpret the results, but others may. Getting this information for the present is the important thing.

Native Plants for Clay and Heavy Soils



Melaleuca polycephala



Melaleuca wilsonii

Photographs by Ron Hill reproduced from "Growing Australian Plants" by courtesy of Rigby Ltd., Adelaide. See book review on page 387.

This issue is meant chiefly for those home gardeners in very heavy soil or clay areas. Our previous issue introduced the problem and showed that these people were in fact very fortunate and could grow a wider range of wildflowers than people with sandy soil. The plants described in this issue are very hardy and recommended for all beginners of growing wildflowers regardless of soil type. More important they are easily propagated from seed as described within.