

PUBLISHED BY THE SOCIETY FOR GROWING AUSTRALIAN PLANTS IN 15,000 COPIES

Australian Plants

Registered for posting as a periodical—

March, 1976 — VOL. 8, No. 66

Category B

Volume 8 will comprise Issues 61-68

75c



Photography by J. B. Fanning

BORONIA COERULESCENS

WILDFLOWERS OF SOUTH AUSTRALIA

This issue contains articles contributed principally by members in South Australia. There are many beautiful wildflowers to be found in that State, some being described here. They are recommended for cultivation in gardens in many parts of Australia. Similarly you will note that South Australian gardeners have been quite successful with wildflowers from other States.

Other issues compiled principally by S.A. readers are Vol. 5, No. 43 and Vol. 6, No. 51. Articles in other issues include:

In Vol. 1—Callistemons In Adelaide (Issue No. 2); Some Dwarf Acacias (6); Eucalypts for S.A. (8); Some S.A. Eremophila (10); Ground Covers For Coast (12).

In Vol 2—Melaleuca (20).

In Vol 3—Grevillea In Adelaide (21); Rock Gardens (23); Succulent Plants (23); Plants for Seaside (25); Wildflowers In Clay (27).

In Vol. 4—Myrtaceae For S.A. (30); Flax Lillies (36).

In Vol. 5—S.A. Plants With Fleshy or Bulbous Rootstock (38); Gardening In Low Rainfall Areas (38); Hakeas For S.A. (44); S.A. Upper Murray Area (44).

In Vol. 7—Ferns, Introduction, Reproduction, Tree Ferns (56), (59); Wildflowers of Central Australia (58); Hakea multilinea, H. bucculenta Group (59).

In Vol 8—Eucalypts, Small, Ornamental (61).

MY NATIVE PLANT GARDEN

By A. Nitschke

I live in the Murray Mallee area about 120 miles NE of Adelaide. It is in the drier part of the Mallee. The soil is mostly limestone; in some places there is an overlay of sand or light marl over limestone gravel — dry hungry soil. Our average rainfall is 250 mm per annum with heavy frosts in winter and long, very hot and mostly dry summers.

For about the last 12 to 15 years I have been experimenting and trying to get a native plant garden established. After the usual trials and errors I soon learnt more about the plants and their needs and was agreeably surprised to notice how soon the plants took root and grew given the correct treatment.

I found that watering was one of the worst hazards because the plants do need to be watered at least nine months of the year, but now I have the drip system established and it works wonderfully well. It was not hard to put down and was not costly. (I am an elderly widow living mainly on my own and therefore have to do what is to be done myself).

I find that after watering the plants for two or three years they are able to take care of themselves. They grow into hardier specimens and have brighter flowers than those getting a lot of water.

My plantation consists of *Acacia*, *Eucalyptus*, *Melaleuca*, *Grevillea*, *Casuarina*, *Eremophila*, *Callitris*, *Hakea*, *Correa*, *Banksia*, *Calothamnus*, *Cassia*, *Hardenbergia* and many others.

At present I have about 1000 plants established in various stages of growth. To me my plantation is an absorbing and fulfilling hobby. It attracts many varieties of birds, some not seen much in this district.

It also attracts many other folk and I have made many friends through it.

I can recommend this as a most interesting hobby for young and old and especially for lonely folk.

PRICE INCREASE FOR AUSTRALIAN PLANTS

You will note a big increase in the price from 50 cents to 75 cents. There have been unprecedented cost increases, especially in postage and dispatch, so the Society's Federal Conference decided the new retail price of 75 cents was necessary. All work in preparation of this periodical is done on an honorary basis and, as it is produced as a non-profit making venture, you are assured of full value in the future.

We hope you will continue to support us by renewing your subscriptions at the new rate of \$3 for subscribers only.—Editor.

BORONIAS

By Mr. Norm Alcock, 40 Nottingham Cres., Glandore, S.A. 5037

As much of the soil in South Australia is of an alkaline nature, with the reticulated water of the same nature, this has an adverse effect on the successful growing of most *Boronia*s. *Boronia caerulea* and *B. inornata* are two that will, under favourable conditions, flourish in alkaline areas.

Boronia caerulea, the blue flowering form, is a favourite of many people and will grow in the sand. *B. inornata* will require a heavier soil to be at its best. Soil of around 6.5 pH I find will suit them reasonably well; one cannot generalise on whether sand or loam is the required soil. Excluding the few swamp-lovers, drainage, very good drainage, is essential if a reasonable lifespan is to be attained. Colour plate on page 241 — the cover.

The root system appears to tolerate the confined spaces of containers; in this way I can grow many of the *Boronia* species. The foliage of these plants varies considerably and is pleasing to most people. The leaf range is such that a fine display of foliage is a very acceptable part of *Boronia*s in containers. There is, of course, an added bonus in the changing leaf colours, and in some of them this is very well defined. In *Boronia filifolia*, sometimes called the Bronze *Boronia*, these will change colour for the winter; *Boronia fraseri* is another with this pleasing feature. *Boronia serrulata* also has leaves that will change to a reddish brown.

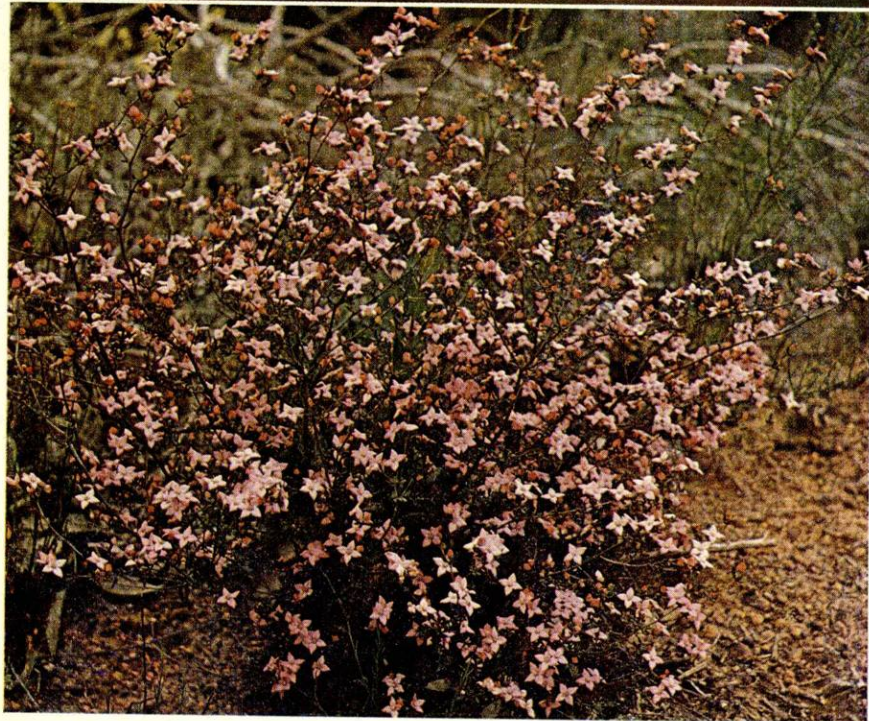
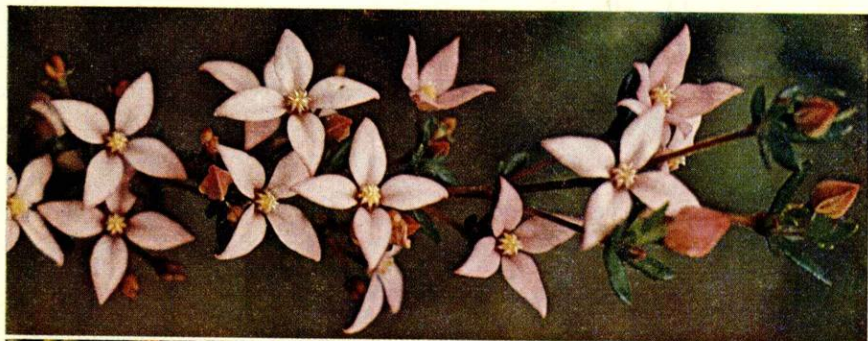
It is said that *Boronia*s have a short life span, and this is generally accepted, but it is sure that if given good conditions they will live for many years. *Boronia heterophylla* will survive and flower very well under very adverse conditions. There is a plant in a northern aspect taking the harshest of weather conditions, planted in a frownd on method, a hole dug out of the 9.5 pH soil filled in with sand of a 6.5 pH. The bush is now five years old, one metre high and a good bush. Added to these disadvantages is a *Hibiscus heterophyllus* planted 75 cm south, now five metres high. Maybe it affords a little shelter, but it must be a great rival for nutriment. Under better conditions a bush planted at the same time, of the same stock, is near two metres and is a very fine specimen of *Boronia heterophylla*.

Boronia edwardsii is endemic to South Australia and is little known to most growers. These fine bushes are found on Kangaroo Island and parts of the Mt. Lofty Range. This is a choice member of the family. A large flower judged by *Boronia* standards, a deep pink with a mauve tinge that does not match up with any other *Boronia* flower in my collection. The texture of the petals is such as to give *B. edwardsii* a *matt-like* surface. This gives it a feature of its own, a pleasing one too. The foliage is unique; if one takes a quick look the leaves appear to be in threes, but a closer scrutiny will show that these leaflets are connected to one leaf stalk close to the stem. It appears as if the majority of the plants have a sheen to their leaves. This sheen is governed in my opinion by whether the leaves have hairs on them or not. I find that the hairy leafed ones have the larger blooms, but whether this is general or only coincidental with my few plants of *Boronia edwardsii* is to be proved. See colour plate on next page.

Flowers are produced in June and will continue for many months. Others of course do likewise. *Boronia caerulea*, *B. filifolia* and *B. spathulata* are some. It is only in cultivation that this bush is not such a pleasing subject; not easy to strike and harder to grow. That has been my experience with them, although planted in soil from their locality has helped. I have now several bushes that are progressing well. Prior to this it was a nil result after promising starts.

TO GROW A BORONIA—continued on page 280

A SOUTH AUSTRALIAN BORONIA



Photography by C. J. Winn

BORONIA EDWARDSII

A beautiful *Boronia* and garden plant described on the previous page.

TO GROW BORONIA — See page 202 of our previous Issue

EREMOPHILA

A few of the best South Australian species by R. Schahinger



Photography by R. Schahinger

EREMOPHILA MACDONNELLII

Like most genera, *Eremophila* has some nondescript, uninteresting members, but there are some which can only be described as superb. The following are, in this writer's opinion, far removed from the nondescript and have been chosen because each has an entirely different type of excellence.

All of these should grow almost anywhere except in the tropics, the warm moist eastern coastal regions and cold wet areas, always providing the soil conditions are to their liking.

Eremophila macdonnellii

A rounded bush, 1 metre high by 2 metres across, varying greatly of course in different conditions. Its main attraction is the flower; a rich purple, flattened tube becoming five petalled at the open end where it is 30 mm wide, and about the same length.

I know of five different forms of this plant. In the form found near Innamincka, all the petals are pointed with rare grace. The leaves are mid green, pointed oval in shape, 10 mm x 3 mm. Under a 10X glass the leaves, particularly on the underside, have numerous tufts of white hairs, giving them a slightly furry appearance. The stems and large green calyces have the same tufts of hair. This form is lower left in the colour plate.

In the other form shown, the petals are not pointed, but the whole effect is almost equally good. Here the leaf form is very different, being long, narrow and smooth, 25 mm x 1.5 mm. The stems are sparsely covered with long hairs. This form is the bush and lower right in the colour plate.

These two, and a form from Curdimurka, are growing in my garden, 600 ft up in the Mt. Lofty Ranges. Our cold, wet winters set them back somewhat but they recover well in the warmer weather during which they flower freely.

Recently two more forms from the Simpson Desert came to hand; one of which was reportedly something really special.

Eremophila sturtii* and *Eremophila hillii

These are magnificent shrubs. They are described in Issue No. 51 of Volume 6 where both are well illustrated in colour plates. I shall always remember the bush of *E. sturtii* about 3 metres high just inside the Arkaroola compound in the northern Flinders Ranges, completely smothered with delicate pink flowers.

Eremophila subfloccosa

This is included as a foliage plant. I have three forms, one of which is the outstanding foliage shrub of the whole garden. Their flowers are inconspicuous greenish-yellow tubes about 15 mm in length.

From the Hambidge area on Eyre Peninsula comes a silvery form, a fairly low branched shrub with felty leaves, 20 mm x 55 mm.

Another which extends well into W.A. is similar, but is a green, dense bush with very numerous, close-set leaves, 15 mm x 7 mm, furry only towards the tips of the leaves. My bush is 2 metres wide and almost 1 metre high.

The third and outstanding form has felty stems and leaves, the leaves being broad oval, 40 mm x 15 mm, and very numerous along many branches, the whole effect being a bright silver, eye-catching splash in the garden.

Eremophila glabra

There is current research to define the plants at present all known as *Eremophila glabra*, some of which are:

1. The "W.A. Goldfields tetraploid". Slender, sparsely branched, erect shrub; leaves erect, grey, 3 cm x 4 mm, acute. Hairs short, branched, dense on young stems. Flowers red; sepals short and spreading.
2. The "Uranla diploid". Old stems decumbent; young stems erect, sparsely branched; leaves crowded, erect, green and shiny, 2.5 cm x 7 mm, blunt. Whole plant furry with glandular hairs. Flowers green; sepals acute, twice as long as the fruit.
3. The "Murchison R. diploid". Erect much-branched shrub; leaves spreading, oval, 1.5-2 cm x 5-10 mm, blunt. Whole plant woolly-silver with long branched hairs. Flowers red; sepals short.

A STUDY OF EREMOPHILA Susceptibility To Fungal Attack

By I. P. Bond and P. R. Dry, Loxton Horticultural Research Centre

In 1970, a few members of S.G.A.P. (Riverland Branch) became very interested in the genus *Eremophila*. In particular, Mr. Len Richardson who was responsible for introducing many species during the ensuing years. Most of them thrived under a wide range of soil types and water applications. However, a prolonged wet period from October 1973 to May 1974 provided conditions suitable for fungal infection. The following figures taken from the Research Centre records clearly illustrate the excessive amount of rain received at that time.

	1973				1974				
	Sep.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May
Total for month (mm)	22	105	44	8	134	41	28	80	52
Av. for previous 10 years	31	24	21	19	22	31	16	19	24

Plant symptoms:

Consist of either a generalised Blight of small plants, or a localised leaf and shoot Blight of larger plants. Affected parts shrivel and turn brown and, depending on the species, some defoliation may occur. Necrotic parts of the plant often become dark with time due to colonisation by dark-spored saprophytic fungi.

On affected shoots there is often a definite margin between healthy green tissue and necrotic tissue. Two different fungi, *Botrytis* sp. and *Alternaria* sp., are consistently isolated from such margins, and are suggested as the causal agents of the disease.

Susceptibility:

It is likely that several factors are involved. Application of fertilizer would produce more vigorous plants having denser shoot growth, and "softer" tissue, but less resistance to infection. Planting in sheltered sites would give longer wetting of plant parts and increase the likelihood of infection. Also, plants weakened by root knot nematode attack may be more susceptible to infection.

The following is a list of some of the species growing in the Riverland showing their susceptibility to these fungi:

- E. alternifolia*: Resistant.
- E. crassifolia*: Resistant.
- E. drummondii*: Resistant.
- E. glabra*: Grey-leaved prostrate form from Perth coastal area. Very susceptible.
Prostrate form from Price-Yorke Peninsula, S.A. Very susceptible.
From Canopus Stn., S.A. Fine-leaved green form. Very susceptible.
From Murchison River area of W.A. Very susceptible.
From Geraldton area of W.A. Susceptible.
- E. granitica*: Resistant.
- E. hillii*: Susceptible.
- E. ionantha*: Resistant.
One of our most adaptable. Grows in full sun, full shade, adjacent to lawn sprinklers, on natural rainfall (257 mm av.).
- E. macdonnellii*: Resistant.
- E. maculata*: From Calperum Stn., S.A. Yellow with red-spotted throat. Resistant.
From Calperum Stn., S.A. Cerise-red form. Resistant.
- E. scoparia*: Resistant.

Forms of *Eremophila glabra*—from page 246

4. The "arid zone form". Robust, spreading, much-branched shrub; leaves well-spaced, more or less spreading, variable up to 4 cm x 10 mm, with slender petiole, sometimes toothed. Hairs sparse except for short white branched ones on young parts. Flowers red or orange; sepals usually short.
5. The "Moorunde tetraploid". Stems and branches erect; leaves erect, to 4 cm x 10 mm, blunt. Whole plant furry-grey with v. long branched hairs. Flowers orange; sepals acute, as long as fruit.
6. The "Murray R. form A". Small shrubs with stems slender, erect, rising from decumbent old branches; leaves erect, v. long and narrow, glistening green, 5 cm x 2-5 mm, acute. Branched hairs, v. sparse; glandular hairs many, v. short. Sepals acute, twice as long as fruit.



Photography by F. W. Humphreys

EREMOPHILA GLABRA

Eremophila subfloccosa (as Fred Humphreys identified the plant above) cannot be distinguished from *E. glabra* on a single character, and probably has no more status than the above forms. The *E. subfloccosa* forms from W.A. and S.A. are different.

7. The "Murray R. form B". Similar to above, but with long branched hairs, giving overall grey colour and soft texture.
8. The "Pingrup diploid". Absolutely prostrate, on edges of salt marshes. Leaves obovate, v. serrate, shining green, 1.5-2 cm x 5-8 mm. Hairs glandular, v. long, numerous. Flowers small, green; sepals short, spreading.

There are many other forms, some transitional. None of these is "typical" *E. glabra*, which grows around Perth. Some of these should be treated as distinct species.

TRIGGER PLANTS

Teppers Trigger Plant and Others of Kangaroo Is. by Ida Jackson

Teppers Trigger Plant is a beautiful little plant about 10 cm high. The narrow, silvery, slightly hairy leaves form a dense basal rosette 1-2 cm across. These rosettes are sometimes borne on slender crimson stems 1-4 cm high. The flowering stems are deep red, hairy, from 2-10 cm high with open racemes of 2-5 flowers near the summit. The flowers vary in colour from pure white to deep pink.



Photography by G. Jackson

STYLIDIUM TEPPERANUM

The plant was first collected from Mt. Taylor, Kangaroo Island, in 1886 by J. G. O. Tepper, a German migrant botanist and collector, a friend of Baron von Mueller. Mueller classified it as *Candollea tepperiana*, but it was transferred to the genus *Stylidium* in 1908.

Tepper found the plant growing in tiny pockets of sandy soil in the huge limestone slabs that make up a great part of Mt. Taylor. In 1965, Dr. H. J. Eichler found the plant growing on a limestone ridge on the track to the mouth of a river on the south coast of Kangaroo Island.

Another colony has been found on a rough track leading to the eastern part of D'Estrees Bay, also on the south coast. It was here that we found specimens with white flowers. The flowering stems of the latter were the same dark red as in the coloured variety. We have also found *Stylidium tepperanum* growing along a fence line running at right-angles to the coast of D'Estrees Bay several miles further east.

We have only found them growing in limestone, usually in association with *Olearia ciliata*, *Goodenia geniculata*, *G. primulacea* and *Logania ovata*

OTHER TRIGGER PLANTS OF KANGAROO ISLAND

Stylidium calcaratum is a small annual from 2-12 cm high. The leaves are small, ovate, in a radical rosette that often withers before the flowers open. There are 1-6 pale pink flowers in an irregular corymb. The sepals are free. The 2 lower petals are angled, making the flower easy to distinguish from *S. tepperanum* even without the leaves.

Stylidium perpusillum is a very small annual, 1-2 cm high, with minute white flowers. These 2 species are widespread on Kangaroo Island, growing in a variety of soils.

Stylidium graminifolium (see plate, Vol. 8, No. 64, Australian Plants) is a perennial with glabrous radical grasslike leaves 6-30 cm long. The pink or white flowers grow in a spike-like raceme 20-60 cm high. The sepals are united in 2 ovate oblong lips.

GROW PHEBALIUM

By F. A. Mason, of Rudall, near Cleve, S.A.

Phebalium bullatum

The natural home of *Phebalium bullatum* on Eyre Peninsula is in the 10in-16in rainfall sand area on both flats and sand ridges. It is a very attractive shrub varying from 2/3-1½ metres, usually of good shape and not dense, but occasionally straggly and woody, probably caused by too much competition from large old vegetation. See colour plate on rear cover.

In cultivation in sand it keeps a good shape and needs no attention whatever in our 14in-16in rainfall area. The leaf is an attractive green above and dull below, narrow and serrated. The brown buds appear in late autumn and are very attractive. The flowers, a lovely clear yellow, begin to open in winter, gradually coming into full bloom in early spring and lasting until October.

Although I have grown this species in a heavier soil, it did not do well and died after four years. I cannot prove, however, that it was the soil. Seeds germinate readily in sand in autumn and early winter and young plants are quite tolerant of transplantation from the seedboxes. Planted in sand or on a heap of sand, this Phebalium will make a lovely show for many years.

Phebalium pungens

Phebalium pungens is a very dense shrub sometimes almost cylindrical in shape. It is an early flowerer. Masses of white or pink buds appear in late autumn, to be followed by a dense flush of white and occasionally pale pink flowers. This is a really beautiful shrub growing up to 1 metre. It grows in a variety of soils; heavy gravelly loam, stony ridges, clay and swampy areas.

I have one plant only in cultivation, 10 years old and 1 metre high. It is growing in clay rubble and flowers well every June. The leaf of *P. pungens* closely resembles that of *Spyridium bifidum* and, as they grow in association with each other, are confusing as young plants.

This plant has proved adaptable in varied soils and will take water (mine is near an orange tree) and I think is worth a try by any plant lover.

DESERT LIME

by P. E. Conrick

Amongst the plant family Rutaceae is the genus *Eremocitrus*, which consists of one Australian species, namely *Eremocitrus glauca* (Lindl.) Swingle.

The botanical name derives from the Greek *eremos*—desert and *kitron*—citron, and the Latin *glauca*—seagreen, which refers to the colour of the leaves. This small tree or shrub, which may under ideal conditions grow to a maximum 5 metres in height, appropriately bears the common name of Desert Lime and is restricted to the arid inland having an average annual rainfall of from 200 mm to 300 mm. The species is extremely drought resistant, which is probably due to the fact that each tree originates as a sucker from an underground rhizomatous stem. In a good season an enormous amount of new sucker growth generally appears which, still being tender and succulent after the herbage dries off, is relished by livestock and other grass-eating animals. As a consequence it is rare for a new stem to survive to maturity.

The adult tree has a rather attractive appearance, having a clean bole for two thirds of its height, the remaining one third being a rounded crown, densely and intricately branched with numerous spines about 1 cm long. The leaves are sea-green in colour and roughly 3 cm to 4 cm long and 0.4 cm to 1.2 cm broad. The shape of the leaves is variable from oblong to wedge-shaped with a rounded end and a narrow tapered base. The flowers usually appear in the early spring, but, as with most other arid land species, flowering may occur at any time following extensive rains. When ripe, the fruit is a small, lemon-coloured berry from 1 cm to 1.5 cm in diameter and its shape varies from that of a lemon to a minute lime. The fruit, which formed part of the diet of the aborigines, normally ripens in December and consists of a thin outer rind enclosing an inner edible pulp having the taste of a lime and containing 2 to 4 yellowish-grey seeds. See colour plate next page.

Eremocitrus glauca was first recorded in 1848 when it was named *Triphasia glauca* by J. Lindley. In 1863 it was renamed *Atalantia glauca* by G. Benth and finally *Eremocitrus glauca* by Swingle in 1914, by which time it was known to occur in the arid inland areas of New South Wales, Queensland and the Northern Territory. It was always to be found localised in isolated communities.

There are three main communities of the Desert Lime in South Australia; the first being near Carrieton at a place known locally as the Horseshoe just south of the rather prominent Moockra Tower, the second at Glen Verne which is part of Corraberra Station, some 20 km northwest of Port Augusta, and the third on Wallerberdina Station, about 10 km northwest of Mt. Eyre.

Mt. Eyre was named by Governor Gawler to mark the northern limit of Edward J. Eyre's 1839 expedition of exploration. During August 1840, Eyre again climbed his mountain and then proceeded in a northwesterly direction to the shores of Lake Torrens. It is most likely that Eyre rode through the grove of Desert Lime on Wallerberdina, as it covers two or three hundred hectares in fairly open country on a red sandy loam to a depth of 30 cm overlying heavy clay. The average annual rainfall here is barely 200 mm so that these trees seldom reach a height greater than 3 metres.

At Wallerberdina, the mistletoe *Lysiana exocarpi* is to be found on a number of the Desert Lime trees. In the 40-odd years I have known this stand I have never seen a dead tree and I am of the opinion that this mistletoe does not have a deleterious effect on its host.

Whilst *Eremocitrus glauca* is not at this time an endangered species, because of the fact that it is localised in so few areas in the arid inland zone of eastern Australia, there is an urgent need for this most unusual and attractive tree to be declared a protected plant. I say this advisedly because I can recall the damage that was done in the late '40s when pastoralists in northern South Australia were urged to have their mulga (*Acacia aneura*) stands cut down to supply fence posts to the farming areas of the State.

Propagation is slow and with a growth rate of 1 cm per annum it is not easy to grow in the south.

However, I do believe that every effort should be made to propagate and grow this plant in warmer and, more particularly, in inland areas where a faster growth rate would make it more worthwhile.

DESERT LIME — *Eremocitrus glauca*

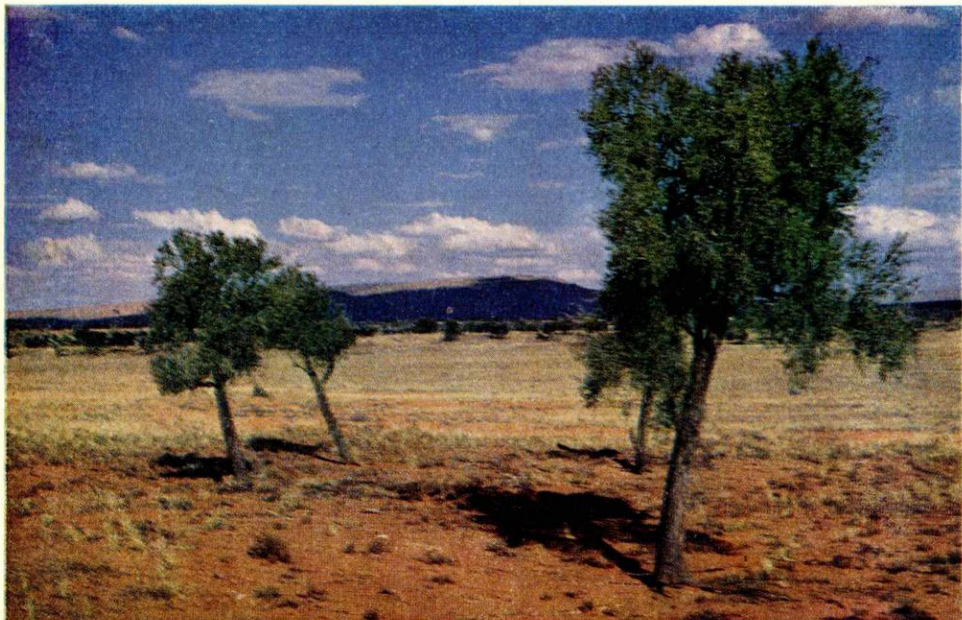
TOP: The Desert Lime at Wallerberdina Station.

Photography by P. Corrick.

BOTTOM: The leaves and fruit.

Photography by I. G. Hollday.

The leaves are usually grey like this, particularly underneath.



WATTLES OF THE FLINDERS RANGES

By I. G. Holliday



UPPER: *Acacia havilandii* in the Mount Lyndhurst area of the upper Flinders Ranges. Description next page.

Photography by Ron Hill.

LOWER: *Acacia burkittii*. Description next page.

Photography by Ivan Holliday.

Recognised as one of South Australia's finest tourist attractions, the scenic grandeur of the ruggedly beautiful Flinders Ranges has long since captivated photographer and artist alike.

The Ranges begin near Crystal Brook in South Australia's upper north wheatlands and extend some 360 kilometres in a slight arc northwards to Moolawatana. They dominate a flat and sparse landscape and it is this feature which adds to their scenic appeal and uniqueness. The annual rainfall is generally under 300 mm, although on the higher peaks of the southern Flinders it can be as high as 760 mm.

Although the Ranges have been extensively grazed for over 100 years and vegetation appears quite sparse over much of the terrain, they are botanically rich in species. Any plant enthusiast who is prepared to climb the peaks and hillsides, or explore the many creek-beds which occur throughout the Ranges, will be well rewarded.

Approximately 40 species of acacia alone have been recorded within the Flinders Ranges, of which several species are endemic only to that area.

Many of the acacias found in the Flinders are common small trees or shrubs of other parts of south and eastern Australia, particularly the drier regions. These include such tree species as *Acacia aneura* (Mulga), *A. brachystachya* (Umbrella Mulga), *A. carnei*, *A. pycnantha* (Golden Wattle), *A. rhetindoes* (Wirilda) and *A. salicina* (Native Willow). Even the higher-rainfall species, *A. melanoxylon* (Blackwood), occurs near Wirrabara in the south.

Shrub species include the common *Acacia paradoxa* (syn. *A. armata*), *A. brachybotrya* (Grey Mulga), *A. burkittii*, *A. continua*, *A. calamitolia* (Wallowa), *A. hakeoides* (Hakea-leaved Wattle), *A. havilandii*, *A. notabilis* (Notable Wattle), *A. rigens* (Nealie), *A. rotundifolia* (Round-leaved Wattle), *A. victoriae*, and many others. Two are described below and illustrated in colour plate on page 253.

A. havilandii Maiden—One of the needle acacias which is very similar to the more commonly known *A. rigens*. The phyllodes are generally much shorter, however, usually 3-4 cm long, terete, straight and pungent-pointed. Profuse, fluffy, yellow flower balls appear in August on axillary twin peduncles.

It is found in the Mount Lyndhurst area of the upper Flinders and is also native to north-west Victoria and N.S.W.

A. burkittii FvM. ex Benth—Usually a tall, bushy shrub, up to 4m high, but much smaller where it grows on rocky, infertile soils. The phyllodes are long and narrow, linear, with fine, soft hairs along the margins, particularly the upper half, the summit curved. Flowers appear in dense, twin, cylindrical spikes, deep yellow, about 1 cm long, flowering profusely, usually in late winter.

The shrub is also native to inland W.A., western N.S.W. and other parts of S.A.

WATTLES EXCLUSIVE TO THE FLINDERS RANGES

The following species are endemic only to the Flinders Ranges, with the exception of *Acacia iteaphylla* (Flinders Ranges Wattle) which has also been found on Eyre Peninsula.

Acacia gracilifolia Maiden et Blakely

A shrub found only in the wetter southern Flinders between Mambray Creek and Wilmington. It is fairly common in Alligator Gorge.

In cultivation, it is better suited to acid or neutral well-drained soils of assured rainfall, but adapts well to soils not excessively limey.

An erect, ornamental and graceful, medium to large-sized shrub, 2-3 m high. The rich green phyllodes are long, soft and wispy, 5-10 cm by under 1mm thick, somewhat sticky, usually curved, with a small mucro. It flowers in September when the deep yellow profuse flower balls on short peduncles make a bold display. Worth cultivating for its foliage alone.

Acacia iteaphylla FvM. ex Benth. (Flinders Ranges Wattle)

Despite its common name, this wattle also occurs in the Gawler Ranges on Eyre Pen. However, it is commonly associated with the Flinders Ranges.

The species is now a popular shrub in cultivation due to its general hardiness under almost all temperate conditions, rapidity of growth and ornamental, weeping foliage (in good forms). An added attraction is that the flowers appear in autumn, unusual in an acacia.

A dense, bulky shrub, 2-4 m high, with soft, handsome greyish drooping foliage. The new growth tips are pinkish which enhances the shrub's overall appearance.

Phyllodes are long and narrow, 5-10 cm long by about 2-3 mm broad (broader forms occur), glabrous, with an acute, curved mucro and grey-blue in colour. The pale yellow flowers occur in autumn in racemes of 8-12 flower-balls on short peduncles, each flower head first enclosed in a light brown bract.

***Acacia papyrocarpa* Benth.**

A small tree confined to the Mount Lyndhurst area of the northern Flinders.

I am not familiar with this tree either in cultivation or in the wild. It is described by J. M. Black as a small tree up to 7m high with rigid, linear-subulate and pungent-pointed phyllodes. The flowers occur in globular heads.

***Acacia pravifolia* FvM.**

A dwarf shrubby species often found in rocky situations in areas around Quorn in the southern Flinders.

Easily cultivated in an open, sunny location in most soils in moderately dry temperate situations (300-600 mm rainfall).

This small, rigid shrub, usually under 1m high by about the same breadth, has very prickly foliage and silky hairy (pubescent) branchlets. Its ornamental value lies in its profuse flowering habit.

The stiff phyllodes are small and flat, 5-15 mm long by 4-7 mm broad, triangular, and they taper to a pungent point. In early spring the shrub is covered in bright yellow, fluffy, globular flower-heads which appear profusely from every axil.

***Acacia quornensis* J. M. Black**

An upright shrubby species from the Quorn area. It bears some resemblance to *A. rhetinodes* but differs in its fewer flowers in each head, glabrous calyx and generally smaller phyllodes.

Easily cultivated under most South Australian conditions.

A bushy, erect shrub, 2 m or more high, with smooth slender branches. The phyllodes are lanceolate, tapering to a short petiole, one-veined, 2-3 cm long by 4-5 mm broad, the apex acuminate. The pale lemon flower-heads appear in axillary racemes in summer, each flower set in a glabrous, cup-shaped, lobed calyx.

***Acacia rivalis* J. M. Black**

This small tree commonly occurs as the dominant species on hillsides between Hawker and Mount Lyndhurst where its characteristic erect, umbrageous form is an unmistakable feature of parts of the landscape.

I have no knowledge of it in cultivation, but it should be adaptable to most soils in a moderately dry temperate climate.

A small tree up to 5 m high with numerous erect branches and an umbrella-like canopy of drooping foliage. Phyllodes are linear-lanceolate, 4-8 cm long by about 3 mm broad, smooth and shining, curved, with a small curved mucro.

The small yellow globular flower-heads occur in September-October, singly, on hoary peduncles arising from the axil of each phyllode.

***Acacia wattiana* FvM. ex Benth.**

This large shrub occurs within a restricted habitat in the lower southern Flinders to the foothills near Gladstone in South Australia's upper northern wheat-belt.

It is easily cultivated in temperate climates and thrives on clay or loamy soils.

A large, dense and upright shrub up to 3 m or more in height. The phyllodes are fairly thick, glabrous, 3-8 cm long by 4.8 mm broad, oblanceolate in shape. The bright yellow globular flower-heads appear in racemes in late spring.



UPPER: From the top of Mt. Chambers looking east across the rugged gorge towards Lake Frome.

Photography by N. N. Donner.

LOWER: *Melaleuca glomerata* shown flowering above is a dominant tall shrub in the first of the five plant communities described here. The light green shrubby trees behind and to the right are *Acacia salicina*. The small white-flowered shrub at the extreme bottom left is *Minuria cunninghamii*.

Photography by Ron Hill.

THE PLANTS OF CHAMBERS GORGE AND MT. CHAMBERS

By D. J. E. Whibley and N. N. Donner (State Herbarium of South Australia, Botanic Garden, Adelaide)

Plant survey of the Chambers Gorge and Mountain

The plant survey of the area was carried out by the authors in September, 1973, and again in October, 1975. All the specimens collected are housed in the State Herbarium (AD.). Mr. G. Medlin also collected in the area in conjunction with a field survey carried out by the Mawson High School, Adelaide, during 1974-75, contributing a number of specimens to the checklist. Descriptive notes have been included in the checklist to help in the identification of the more easily recognised species. It must be remembered, however, that species may be found which have not so far been recorded for the area.

Situation

Mt. Chambers is 1,422m above sea level and is in the north-eastern Flinders Ranges, 30° 58' S, 139° 13' E, or ca. 70km by road east-north-east from Blinman via Wirrealpa Station. The gorge is rugged, colourful and spectacular with sheer rock faces and towards the eastern end a rock formation known as Windsor Pillar may be seen.

History

In 1843, Captain Frome, on an expedition to the interior, entered this area from the eastern side, and James Henderson, a member of Frome's party, climbed one of the highest points in the vicinity of Mt. Chambers, naming it the "Eagles Nest", which was placed on earlier maps. From Henderson's "Narrative of an Expedition to Lake Frome" (1926), it appears probable that the hill which he climbed and named "Eagles Nest" was not the present Mt. Chambers, but a high hill further to the east. The name Mt. Chambers, which is upheld on maps today, was probably first applied by John McDouall Stuart, who surveyed many pastoral leases, including that of John and James Chambers, who played an important role in the development of the area.

Climate

Mt. Chambers area is in an arid region, with a mean annual rainfall of approximately 150mm. In an arid region, the mean annual rainfall does not have much meaning, as rainfall can be very spasmodic. The area is subject to droughts and has pronounced seasonal fluctuations.

Geology

Grey-green shales, minor purple shales, with dolomites, occur mainly on the northern side of the creek, near the entrance to Chambers Gorge. It is a formation of the Wilpena group. On the lower northern slopes of Mt. Chambers, and continuing on the opposite side of the creek, along the hills in a north-easterly direction, is an area generally composed of purple and green shales, with feldspathic gritty quartzite, grading to purple gritty greywacke, of the Umberatana group. The area near the ridge of Mt. Chambers and following in a north-easterly direction on either side of Chambers Creek, and also extending along the fault-block, is generally composed of blue-grey silty shales, limestone, and siltstones (Copley, 1:250,000).

Soils

Hills and ranges of rock outcrops, with shallow calcareous loamy soils; valleys of sandy and rocky creek alluvium.

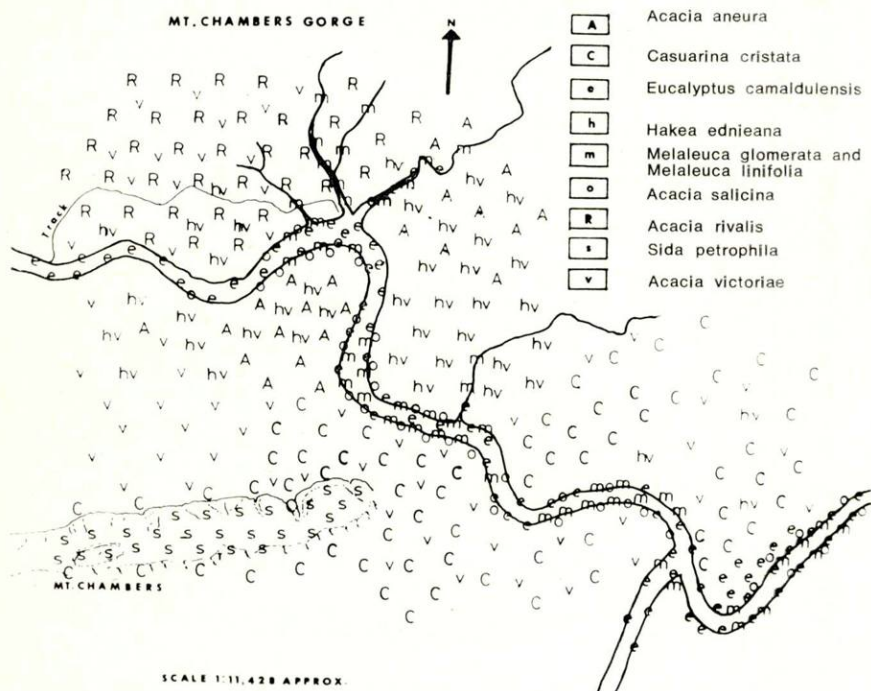
PLANT COMMUNITIES

The area for this survey has been divided into five communities, each one characterised by a species of shrub or tree. The ground layer of grasses, ephemerals and perennials varies in the number present according to seasonal fluctuations.

Eucalyptus camaldulensis community

Eucalyptus camaldulensis (River Red Gum) forms a ribbon-like woodland community and is restricted to growing in the watercourse and along the creek banks in those areas which are subject to periodical flooding. The smaller trees present are *Acacia salicina*, which is common along the creek banks with a few small trees of *Pittosporum phylliraeoides* interspersed. The dominant tall shrubs are *Melaleuca glomerata* and *Melaleuca linophylla*, which

line the watercourse. In the watercourse near the entrance to the gorge, a substantial patch of *Typha domingensis* (Bullrush) is formed. In the open sandy areas along the creek, *Nicotiana glauca* (Tobacco Bush) is common. The ground cover consists of a number of small undershrubs and a variety of ephemerals and perennial species found in the association are indicated (W) in the checklist.



Acacia rivalis community

This tall shrubland associated with the Wilpena group (see Geology), is distributed along the hills on the northern side of Chambers Creek near the entrance to the gorge. *Acacia rivalis* forms an attractive multi-stemmed, parachute-shaped shrub, 2-5m high with branchlets drooping towards the ends. Other *Acacia* species associated are *Acacia victoriae*, *Acacia tetragonophylla* and occasional plants of *Acacia oswaldii*. *Hakea ednieana* is sparsely interspersed, growing to a small tree, mainly 4-5m high in this area, and with a deeply furrowed rough bark and stiff needle-like leaves. Woody shrubs of *Eremophila alternifolia*, *Cassia nemophila* and *Cassia desolata* are sparsely represented, with the main undershrubs of *Senecio magnificus*, *Abutilon leucopetalum*, *Solanum ellipticum*, *Sida corrugata* and *Pterocaulon sphacelatum*. The ground layer is made up mainly of grasses but also with some ephemerals and perennial herbs.

Acacia aneura community

Acacia aneura (Mulga) shrubland occurs on the lower rocky northern slopes of Mt. Chambers, and also on the opposite side of the creek extending along the hills in an easterly direction, of the Umberatana group (see Geology). Many of the trees are dead and the remaining ones appear in a poor condition with no regeneration apparent. The main associated taller species are *Hakea ednieana*, *Acacia victoriae* and *Acacia tetragonophylla*, with a few scattered groups of *Heterodendrum oleaefolium*. The dominant smaller woody shrubs are *Eremophila freelingii*, *Dodonaea microzyga* and a number of

Cassia spp. The ground layer is mainly grasses, with a variety of ephemerals and perennials.

***Casuarina cristata* community**

Casuarina cristata (Black Oak) occurs in a scattered open distribution on the slopes of Mt. Chambers, generally in rocky, shaly areas with shallow calcareous soils. It also occurs on the opposite northern side of the creek, following along the fault-block, and extending in patches in an easterly direction on either side of the creek. *Casuarina cristata* is generally associated with *Acacia victoriae*, interspersed with *Hakea ednieana*. A ground layer of grasses, ephemerals and perennials is present.

***Sida petrophila* community**

A low shrubland is formed on the flattened ridgetop of Mt. Chambers with *Sida petrophila* often forming a number of dense patches. The larger woody shrubs, growing scattered amongst the rocky areas, are *Exocarpos aphyllus*, *Bursaria spinosa* and *Prostanthera striatiflora*. The dominant low shrubs are *Maireana sedifolia*, *Chenopodium ulicinum*, *Dodonaea lobulata*, *Olearia decurrens*, and occasionally bushes of *Glochidion rigens*. The ground layer is formed mainly of grasses and other ephemerals.

RARE OR INTERESTING PLANTS

***Gossypium sturtianum* Willis (Sturts Desert Rose)**

An attractive shrub about 1m high or more. The distinctive features are the smooth, stiff, oval-shaped, black-dotted leaves. The flowers are large and showy, pale purplish-pink with a darker blotch at the base, flowering in summer. This species is locally rare in the Chambers Gorge area, with a few plants growing along the creek and a small community of plants found growing on the hillsides on the north side of the creek near the entrance to the gorge. This plant may also be found scattered through the northern Flinders Ranges and the ranges in the far north-west of the State.

***Hibiscus sturtii* Hook**

An attractive, small, greyish tomentose undershrub about 30cm high. Appears to be common in the Chambers Gorge area, growing on the rocky hillsides. The leaves are ovate to oblong-lanceolate, crenate or somewhat toothed. Flowers are showy, purplish-pink, 3cm long. This species is not well represented in the State Herbarium. A few collections were made in the far north-west in the early 1930s and in recent years a few collections have been made in the northern Flinders Ranges.

***Melhaniea oblongifolia* F. Muell.**

This is a compact, low shrub 30-40cm high, a few plants of which grow on the lower northern slopes of Mt. Chambers. The distinctive features are the whitish stems covered with a soft stellate tomentum, leaves are oblong to oblong-lanceolate with a velvety tomentum. Flowers yellow with broad petals on long axillary peduncles. An interesting feature is the withering corolla which forms a brownish papery cap over the ovary. This species is rare in South Australia, as the only other localities for specimens held in the State Herbarium (AD.) are: Oodnadatta, June 1913, in fruit, collector Miss Staer; Birdsville Track, 28km north of Mitta Mitta Bore, dry plain, on red soil, collectors M. Crisp and I. Noble, No. 29, 4.iv.1969.

***Petalostylis labicheoides* R. Br.**

A handsome shrub with smooth branches, 1-2m high, growing in sandy soil along Mt. Chambers Creek. Flowers on a long petiole, orange-yellow, usually with a reddish marking at the base of one petal. The leaves are imparipinnate with 5-21 lanceolate mucronate leaflets. Very closely related to *Cassia*, but differing in the large, petal-like style. Rather rare in the Chambers Gorge area, but common in the Flinders Ranges and the far north. A genus endemic to Australia.

***Rhynchosia minima* (L.) DC**

A small trailing or twining perennial, pubescent or almost glabrous,

growing on a flat sandy area in the watercourse of Chambers Creek. Distinctive features are the three ovate-rhomboid leaflets about 1-3cm long, the terminal leaflet on a longer petiole. Flowers small, yellow, in racemes, generally longer than the leaf. This species is rare in South Australia, only collected from Aroona Creek, R. Tate, vi.1883; Plains between Welcome Pound and Paralana, R. Kuchel, No. 3150, 16.ix.1973.

ALIEN SPECIES

Nicotiana glauca (Tobacco Bush) is the largest of the alien species present and appears to be increasing in numbers and spreading along the watercourse. *Sisymbrium erysimoides*, an annual species, is abundant along the watercourse and creek banks and extending onto the hillsides. Some of the other species present to a lesser degree are *Chenopodium murale*, *Solanum nigrum*, *Centaurea melitensis* (Maltese Cockspur) and *Carrichtera annua* (Ward's Weed), a declared noxious weed over the whole State of South Australia. *Rumex vesicarius* (Rosy Dock), often referred to as Wild Hops, is common on the hillsides and along the creek.

CHECKLIST OF NON-FLOWERING AND FLOWERING PLANTS OF CHAMBERS GORGE

The following symbols and abbreviations are used:

- (*) — Introduced plants.
- (A) — Abundant; (C) — Common; (O) — Occasional.
- (R) — Rare, only one or two plants found or a few plants in a small group.
- (H) — Plants found growing on the hillsides or ridgetops.
- (W) — Plants found growing in the watercourses and on creek banks subject to flooding.

THALLOPHYTA

LICHENES

Acarospora schleicheri (Ach.) Mass. Minute yellow squamules, usually scattered, Apothecia immersed.

Aspicilia sp.

Buellia subalbula (Nyl.) Muell. Arg. Thallus white crust forming patches up to 6cm in diameter on calcareous rocks and pebbles. Apothecia numerous, black.

Caloplaca sp.

Colema coccophorum Tuck. Rosette shaped thallus of black crenate lobes growing on calcareous or sandy soil.

Dermatocarpon hepaticum (Lam.) Th. Fr. The thallus consists of small brown squamules, closely attached to the soil.

Diploschistes ocellatus (DC.) Norm. Thallus an extensive white crust of smooth chalky areoles, growing on calcareous soils in shaded sites.

Heppia sp.

Lenanora atra (Huds.) Ach. Thick and rough grey thallus. The apothecia have black discs with thalline margins, growing on rock surface.

Lecidea decipiens Ach. Thallus squamulose, reddish or pale flesh-coloured. Apothecia marginal, black.

Lecidea sp.

Lepraria membranacea (Dicks.) Lett. Thallus greenish-white, powdery-granular in appearance, growing between rocks on soil in shady places.

Parmelia metaclystoides Kurok. and Filson. Thallus yellowish-green, apothecia brownish black, growing on pieces of rock and also onto surrounding soil.

Parmelia sp.

Thyrea cf. *pulvinata* Mass. Black, fungus-like growth on rock surface, 5-15 mm in diameter.

BRYOPHYTA

MUSCI

Barbula australasiae (Hook. and Grev.) Brid.

HEPATICAEE

Riccia albida Soll. Growing on soil.

PTERIDOPHYTA

ADIANTACEAE

Cheilanthes lasiophylla Pichi-Sermolli. Small woolly rock fern, leaves bipinnatisect. (O)

Gymnogramma reynoldsii (F. Muell.) J. M. Black. Small hairy rock fern. leaves pinnate, growing in crevices on rock faces. (R)

SPERMATOPHYTA

AIZOACEAE

Tetragonia eremaea Ostenf. Prostrate herb, fruit greenish, becoming hardened, 4 winged. (W)

AMARANTHACEAE

Ptilotus exaltatus Nees var. *exaltatus*. Glabrous perennial, with single stems or often branched, flowers in long cylindrical purplish spikes. (OH)

Ptilotus obovatus (Gaudich.) F. Muell. Hairy undershrub with flowers in short oblong spikes. (AH)

APIACEAE

Daucus glochidiatus (Labill.) Fisch. Mey. and Ave-Lall. (Native Carrot). Annual, umbels, few flowered. (W)

Trachymene glaucifolia (F. Muell.) Benth. (Wild Carrot). Biennial, umbels many flowered, white or violet. (HW)

ASCLEPIADACEAE

Sarcostemma australe R. Br. (Milk Bush) or (Caustic Bush). Leafless shrub, 1-2m high, stems and branches cylindrical, succulent. Often trailing on the ground. (OH)

Cynanchum floribundum R. Br. Leafy shrub about 1m high, branches often twining. (OH)

ASTERACEAE

Actinobole uliginosum (A. Gray) Hj. Eichl. Prostrate compact rosetted, grey-woolly annual. (W)

Brachyscome ciliaris (Labill.) Less. var. *ciliaris*. Perennial somewhat glandular hairy, flowers white or violet. (WH)

Brachyscome ciliaris var. *lanuginosa* (Steetz) Benth. Stems and leaves woolly. (WH)

Brachyscome ciliaris var. *lyrifolia* (J. M. Black) Davis Leaves lyrate. (WH)

Brachyscome heterodonta DC. Branching perennial, flowers white. (WH)

Calotis latiuscula F. Muell. and Tate Scabrous hairy, probably perennial, flowers yellow. (H)

**Centaurea melitensis* L. (Maltese Cockspur). Erect scabrous annual, flowers yellow, all tubular. Involucral bracts with pinnately arranged spines. (W)

Glossogyne tenuifolia (Labill.) Cass. Glabrous perennial flower heads on long terminal peduncles, flowers yellow. (H)

Gnaphalium luteoalbum L. White cottony annual or biennial, bracts pale gold or yellow. Flowers all tubular. (W)

Gnephosis foliata (Sond.) Hj. Eichl. Erect branching annual, flower heads globular, yellow. Flowers all tubular. (HW)

Helichrysum ambiguum Turcz. Bushy perennial 20-40cm high, flowers yellow, on solitary woolly peduncles. (CHW)

Helipterum moschatum (A. Cunn. ex DC.) Benth. Erect densely cottony annual, flowers creamy white, often pink in bud. (W)

Helipterum strictum (Lindl.) Benth. Glabrous annual, leaves oblong-lanceolate, often stem clasping, flowers white. (W)

Minuria cunninghamii (DC.) Benth. Small glabrous undershrub, leaves narrow linear, flowers white. (OHW)

Olearia decurrens (DC.) Benth. Glutinous shrub, flowers white in a loose corymbose panicle. (CHW)

Podocoma cuneifolia R. Br. Scabrous hairy perennial, flowers purplish or violet. (OH)

Pterocaulon sphacelatum (Labill.) Benth. and Hook. f. (Apple Bush). Erect undershrub, flower heads in clusters forming ovoid oblong usually terminal heads, flowers all tubular. (AHW)

Senecio magnificus F. Muell. Branching, robust, glabrous, glaucous perennial, flowers showy yellow, 3-4cm diameter. (CHW)

Sigesbeckia orientalis L. (Indian Weed). Branching pubescent erect annual, flower yellow, in a loose leafy panicle. (W)

**Sonchus oleraceus* L. (Sow Thistle). Erect annual. (W)

Vittadinia triloba (Gaudich.) DC. Scabrous perennial, flowers pale blue. (CHW)

BORAGINACEAE

**Echium lycopsis* L. (Salvation Jane). Annual or biennial, purple flowers. (WH)

Heliotropium asperum R. Br. Herbaceous scabrous perennial. (CHW)

Heliotropium curassavicum L. Prostrate succulent glaucous perennial, flowers white. (CW)

Omphalolappula concava (F. Muell.) Brand. Small erect annual, flowers small, blue. (WH)

Trichodesma zeylanicum (Burm. f.) R. Br. (Cattle Bush, Water Bush). Stiff erect annual or short-lived perennial, flowers blue. (CHW)

BRASSICACEAE (CRUCIFERAE)

Arabidella glaucescens Shaw. Erect, woody, glab., glaucous undershrub. (OH)

Arabidella trisecta (F. Muell.) Schulz. Erect woody, papillose undershrub, flowers creamy yellow. (OHW)

**Carrichtera annua* (L.) DC. (Ward's Weed). Erect annual, petals yellow with purple nerves. (WH)

Lepidium papillosum F. Muell. Erect annual, pods small, ovate, usually purple when ripe. (W)

**Sisymbrium erysimoides* Desf. (Smooth Mustard). Glabrous erect annual, pods slender, flowers yellow. (HW)

CAESALPINIACEAE

Cassia artemisioides Gaudich. ex DC. Hoary-white shrub, leaflets terete, 3-10 pairs. (OH)

Cassia desolata F. Muell. var. *desolata*. Hoary shrub, leaflets elliptic, slightly tomentose. (OH)

Cassia helmsii Symon Woody greyish shrub, leaflets tomentose, obovate, densely white. (OH)

Cassia nemophila Cunn. ex Vogel var. *nemophila*. Woody, medium-sized shrub, leaflets terete, 1-2 pairs. (OH)

Cassia nemophila var. *zygophylla* (Benth.) Benth. A medium-sized shrub, leaflets linear elliptic. (OH)

Cassia oligophylla F. Muell. Woody shrub, leaflets obovate, 1-3 pairs. (OH)

Cassia sturtii R. Br. Woody shrub, leaflets linear, oblong, 4-6 pairs. (OH)

Petalostylis labicheoides R. Br. Glabrous, spreading shrub, flowers orange-yellow. (OW)

CAMPANULACEAE

Wahlenbergia sieberi A. DC. Simple or branching herbaceous perennial, flowers blue, bell shaped. (CWH)

CASUARINACEAE

Casuarina cristata Miq. (Black Oak). Tree, dark-coloured rough bark. (CH)

CHENOPODIACEAE

Atriplex lindleyi Moq. An annual, mealy-grey herb. (H)

Babbagia acroptera F. Muell. A small perennial herb, with alternate succulent sub-cylindrical leaves. (OH)

Bassia divaricata (R. Br.) F. Muell. Small spreading shrub, spines 4, 3 are long and 1 is short. (OH)

Bassia intricata Anderson Small shrub, branches and spines often reddish, spines 5, usually reflexed. (OH)

Bassia paradoxa (R. Br.) F. Muell. Small woolly shrub, spines 5, more or less hidden in a hardened white woolly ball. (OHW)

Bassia parallelicuspis Anderson Small shrub, spines 2, erect parallel. (OH)

Chenopodium cristatum (F. Muell.) F. Muell. (Crested Goosefoot). Prostrate annual. (W)

**Chenopodium murale* L. (Nettle-leaved Goosefoot). Erect annual with an unpleasant scent. (W)

Chenopodium ulicinum Gandoger. Small, rounded, grey, intricate shrub. (OH)
Enchylaena tomentosa R. Br. (Ruby Saltbush). A low spreading, tomentose shrub. (OHW)

Maireana brevifolia (R. Br.) P. G. Wilson Bushy shrub, leaves succulent plano-convex or almost cylindrical. (RH)

Maireana excavata (J. M. Black) P. G. Wilson Small perennial herb, leaves silky villous. (OH)

Maireana pyramidata (Benth.) P. G. Wilson Compact divaricately branched subshrub, leaves fleshy, almost obovoid. (OH)

Maireana sedifolia (F. Muell.) P. G. Wilson (Blue Bush). Divaricately branched shrub, leaves sessile, subclavate. (RH)

Rhagodia spinescens R. Br. Sprawling, spinescent shrub, flowers mainly in a short panicle. (OH)

Salsola kali L. (Rolly Poly). Sm., intricate, rounded shrub, fls. sessile. (OHW)

CONVOLVULACEAE

Convolvulus erubescens Sims Pubescent herb, annual or perennial, with procumbent or creeping stems. (CHW)

CRASSULACEAE

Crassula colorata (Nees) Ostenf. A small succulent annual, flower parts 5. (W)

Crassula sieberana (Schult. and Schult. f.) Druce. A small succulent annual, flower parts 4. (W)

CUCURBITACEAE

Melothria maderaspatana (L.) Cogn. Annual vine, twining on shrubs and trees, fruit small. (H)

**Citrullus lanatus* (Thunb.) Mansf. Annual, fruit large, green with mottled-white stripes. (H)

CYPERACEAE

Cyperus gymnocaulos Steud. Tufted perennial sedge. (CW)

EUPHORBIACEAE

Euphorbia australis Boiss. Prostrate villous herb. (CH)

Euphorbia drummondii Boiss. Prostrate glabrous herb. (CHW)

Euphorbia eremophila A. Cunn. ex Hook. An erect herb, annual. (OH)

Glochidion rigens (F. Muell.) Hj. Eichl. Small rigid shrub, branches ending in a spine. (RH)

FABACEAE

Clianthus formosus (G. Don) Ford and Vickery (Sturt Pea). Softly hairy herb, with villous prostrate or ascending stems. (OW)

Glycine clandestina Wendl. Twining herbaceous perennial, flowers purple. (OH)

Indigofera brevidens var. *uncinata* Benth. Small spreading greyish shrub, flowers reddish. (RH)

Lotus cruentus Court Pubescent perennial, procumbent or ascending stems, flowers red, pink or white. (CHW)

Psoralea patens Lindl. An erect herbaceous perennial, flowers pinkish or purple in a long raceme. (OW)

Rhynchosia minima (L.) DC. Small twining perennial, flowers small, yellow. (RW)

Swainsona oligophylla F. Muell. ex Benth. Prostrate hoary annual herb. Flowers purple.

Swainsona viridis J. M. Black. Prostrate, glabrous annual, fls. purple. (RW)

GERANIACEAE

Erodium cygnorum Nees ssp. *cygnorum* (Heron's Bill). Hairy annual, flowers dark blue. (HW)

GOODENIACEAE

Goodenia calcarata (F. Muell.) F. Muell. Erect glaucous annual, flowers white with purple streaks. (HW)

Goodenia subintegra F. Muell. Small perennial herb. Flowers yellow. (HW)

Scaevola ovalifolia R. Br. Small erect undershrub, flowers purple, pink or cream. (RW)

Scaevola spinescens R. Br. Erect rigid spreading spinescent shrub, flowers white. (OH)

LAMIACEAE (LABIATAE)

- Prostanthera striatiflora* F. Muell. Rounded shrub, strongly scented, flowers white with purple streaks inside. (OH)

LORANTHACEAE

- Amyema maidenii* (Blakely) Barlow Hoary grey plant, leaves flat, broadly oblanceolate, petals free to base greyish-green. (Parasitic on *Acacia aneura*, *Acacia tetragonophylla* and *Acacia victoriae*.) (C)
- Amyema miraculosa* (Miq.) Tiegh. Leaves narrow oblanceolate, flowers red, petals free. (Parasitic on *Eremophila freelingii*.) (O)
- Amyema preissii* (Miq.) Tiegh. Leaves terete, flowers red, petals free. (Parasitic on *Acacia rivalis*, *Acacia tetragonophylla*, *Acacia ligulata*, *Acacia victoriae*.) (C)
- Lysiana exocarpi* (Behr) Tiegh. United portion of flower red or yellow, upper dissected portion green. (Parasitic on *Acacia tetragonophylla*, *Acacia aneura*, *Acacia victoriae*, *Santalum lanceolatum*, *Heterodendrum oleae-folium*.) (C)

MALVACEAE

- Abutilon leucopetalum* (F. Muell.) F. Muell. ex Benth. An erect herbaceous perennial, petals large yellow or whitish, about twice as long as the calyx. (CHW)
- Gossypium sturtianum* Willis (Sturt's Desert Rose). Glabrous shrub, flowers large, pale purple with a reddish blotch at the base. (RW)
- Hibiscus sturtii* Hook. Small grey undershrub. Fls. pinkish to pale purple. (CH)
- Lavatera plebeia* Sims (Australian Hollyhock). Erect annual or perennial herb, woody towards base. Flower colour varies from white, pale lilac to blue. (OW)
- Lawrencina glomerata* Hook. Perennial herb, branching from the base. (RW)
- Malvastrum spicatum* (L.) A. Gray. Erect herb, flowers yellow in dense terminal spike. (OHW)
- Sida corrugata* Lindl. Prostrate or procumbent variable small undershrub, leaves orbicular ovate, cordate or obtuse at the base. (CHW)
- Sida intricata* F. Muell. Small intricate undershrub, leaves small, mostly orbicular. (OH)
- Sida petrophila* F. Muell. Small erect spindly shrub, leaves oblong linear, abundant on the ridgetop of Mt. Chambers. (H)

MIMOSACEAE

- Acacia aneura* F. Muell. ex Benth. (Mulga). A small upright tree, phyllodes variable from narrow, linear and flat, to terete with many fine nerves, flowers in cylindrical spikes. (OH)
- Acacia ligulata* A. Cunn. ex Benth. (Small Cooba). Shrub with spreading branches, phyllodes one-nerved thick linear-oblong. Flowers globular, bright yellow solitary or 2-5 in a raceme. (OH)
- Acacia oswaldii* F. Muell. (Umbrella Wattle). Shrub or small tree, phyllodes thick rigid linear, linear-lanceolate with a number of fine nerves, a short, fine point at the tip. Flower heads globular, sessile or on short pubescent peduncles. (OH)
- Acacia rivalis* J. M. Black Tall shrub with erect branches drooping toward the ends, phyllodes one-nerved, linear-lanceolate, with a curved mucro. Flowers globular, solitary or in a short raceme. (CH)
- Acacia salicina* Lindl. (Broughton Willow Wattle). Large shrub or tree with drooping branches, phyllodes one-nerved, broad linear-lanceolate, flowers globular pale yellow, solitary or 2-6 in a raceme. (CH)
- Acacia tetragonophylla* F. Muell. (Dead Finish). A large shrub or small tree, phyllodes clustered, slender needle-like, angular-subulate, flowers globular, solitary. (OH)
- Acacia victoriae* Benth. Tall intricate shrub, phyllodes one-nerved, flat, broad-linear, glaucous, generally with two stipular spines. Flowers globular in a raceme as long, or longer than, phyllodes. (AH)

MYOPORACEAE

Eremophila alternifolia R. Br. A slightly viscid shrub, flowers pink or red, dotted inside with darker red spots. (CH)

Eremophila duttonii F. Muell. Small rounded viscid shrub. Flowers usually pink, with yellow inside. (O)

Eremophila freelingii F. Muell. A viscid dark green shrub, flowers lilac, leaves pubescent. (CH)

Eremophila oppositifolia R. Br. Tall shrub, flowers white or shaded with pink. (OH)

Eremophila sturtii R. Br. A viscid shrub, flowers small, pale lilac. (RW)

MYRTACEAE

Eucalyptus camaldulensis Dehnh. (River Red Gum). (CW)

Melaleuca glomerata F. Muell. Tall shrub with white papery bark, fruits in a small dense whorl. (CW)

Melaleuca linophylla F. Muell. Tall glab. shrub, fruits in a loose spike. (OW)

NYCTAGINACEAE

Boerhavia repandra Willd. A low spreading perennial herb, flowers lilac. (OH)

OLEACEAE

Jasminum lineare R. Br. (Desert Jasmine). Small shrub, flowers fragrant white in axillary panicles. (RW)

OXALIDACEAE

**Oxalis corniculata* L. (Yellow Wood Sorrel). Small perennial, prostrate and rooting at the nodes. (OHW)

PAPAVERACEAE

**Glaucium corniculatum* (L.) Rudolph. Annual, flowers orange-red. Capsule hairy, linear cylindrical. (W)

PITTOSPORACEAE

Pittosporum phylliraeoides DC. (Weeping Pittosporum). A small tree with flexible pendulous branches, fruit a yellowish-orange capsule, ovoid in shape. (OW)

Bursaria spinosa Cav. (Sweet Bursaria). A shrub or small glabrous tree, with spinescent branches, flowers white in a terminal pyramidal panicle. (OH)

PLANTAGINACEAE

Plantago drummondii Decne. A small annual herb. (OW)

POACEAE (GRAMINEAE)

Aristida nitidula (Hem.) Blake ex J. M. Black. Annual or perennial, panicle long spike-like. (OH)

Cymbopogon ambiguus A. Camus (Scented Grass). Tufted perennial. (CWH)

Danthonia caespitosa Gaudich. Tufted perennial. (OH)

Dichanthium affine (R. Br.) A. Camus. Tufted annual. (W)

Digitaria brownii (Roem. and Schult.) Hughes (Cotton Grass). Perennial with silky white or purple spikelets. (OH)

Eragrostis cillianensis (All.) Link ex Vign.-Lut. Annual. (HW)

Eragrostis dielsii Pilger Prostrate annual with geniculate or erect stems. (W)

Enneapogon caeruleus (Gaud.) Burb. Tufted perennial. (OH)

Enneapogon oblongus Burb. Tufted perennial. (OH)

Enneapogon polyphyllus (Domin.) Burb. Tufted pubescent annual/peren. (AH)

**Lophochloa pumila* (Desf.) Bor. Small annual. (W)

Paspalidium constrictum (Domin) Hubb. Pubescent perennial. (OH)

**Polypogon semiverticillatus* (Forsk.) Hylander. Spreading perennial, growing near water. (CW)

**Schismus barbatus* (L.) Thell. Small tufted annual. (W)

Setaria dielsii Herm. Glabrous annual, panicle spike-like. (W)

Stipa variabilis Hughes (Spear Grass). Tufted perennial. (CH)

Stipa sp. (H)

Themeda australis (R. Br.) Stapf (Kangaroo Grass). Glabrous perennial. (OWH)

POLYCONACEAE

**Emex australis* Steinh. (Three-cornered Jack). Annual prostrate herb. (W)

Rumex brownii Campd. (Slender Dock). Erect annual. (W)

**Rumex vesicarius* L. (Rosy Dock or Wild Hops). Erect small annual, often quite robust with branching stems, fruits pink-red. (CH)

POLYGONACEAE

Hakea ednieana Tate Small tree with furrowed corky bark, leaves pungent, terete bifid or trifid, and then forked. (CH)

RUBIACEAE

Galium gaudichaudii DC. Small weak perennial, prostrate or ascending stems. (OH)

SANTALACEAE

Exocarpos aphyllus R. Br. Intricately branched leafless sh., root parasite. (OH)

Santalum acuminatum (R. Br.) A.D.C. (Native Peach, Quondong). Shrub or small tree, root parasite, fruit globular, edible, red when ripe, 2-3cm diameter. (RHW)

Santalum lanceolatum R. Br. (Plum Bush). Shrub with spreading branches, root parasite, fruit ovoid ca. 1cm diameter. (OH)

SAPINDACEAE

Dodonaea angustissima DC. Tall viscid shrub, leaves simple. (OH)

Dodonaea lobulata F. Muell. Medium glabrous, viscid shrub, leaves pinna-tifid. (CH)

Dodonaea microzyga F. Muell. Small rigid, glabrous, viscid shrub, leaves pinnate. (CH)

Heterodendrum oleaefolium Desf. (Bullock Bush). Small greyish tree with smooth stems. (OH)

SOLANACEAE

Datura leichhardtii F. Muell. Small annual, fruit globular, deflexed and densely spiny. (W)

**Nicotiana glauca* Grah. (Tobacco Bush). Tall spindly shrub, flowers funnel-shaped, yellow. (CW)

Nicotiana velutina Wheeler Erect annual velvety herb, flowers whitish. (OW)

Solanum ellipticum R. Br. A low sprawling prickly shrub, velvety grey, flowers blue, fruit globular, greenish. (CHW)

**Solanum nigrum* L. (Black Nightshade). Variable annual, flowers whitish, fruits drooping, becoming black and purplish-black. (CW)

Solanum sturtianum F. Muell. Erect shrub, greyish-green with prickly branches. Flowers purple, fruits erect, yellowish-brown, becoming black. (CHW)

STERCULIACEAE

Melhaniea oblongifolia F. Muell. A small, tomentose shrub, flowers yellow. (RH)

THYMELIACEAE

Pimelea microcephala R. Br. Glabrous shrub, flowers small, silky pubescent, yellowish. (CHW)

Pimelea aff. *trichostachya* Lindl. Small erect branching herb. (R)

TYPHACEAE

Typha domingensis Pers. (Bullrush). Aquatic herb, erect stems, reed-like flowers in dense cylindrical spikes. Abundant in patches along water-course. (W)

URTICACEAE

Parietaria debilis G. Forst. Annual, weak herb. Flowers small greenish. (W)

ZYGOPHYLLACEAE

Zygophyllum ammophilum F. Muell. Annual herb, flowers white. (OH)

Zygophyllum angulatum F. Muell. Small undershrub, flowers yellow, capsule 5-angled. (OHW)

Zygophyllum prismatothecum F. Muell. Small annual, capsule erect, narrow oblong, 4-angled, flowers yellow. (OH)

ACKNOWLEDGMENTS: The authors are grateful for assistance given by Mr. G. C. Medlin (Mawson High School), Mr. R. Coates (Geology Department), Mr. R. Filson (MEL.), Dr. J. P. Jessop, Mr. R. J. Chinnock and Miss T. Eadsforth, State Herbarium (AD.), in the preparation of this paper.

REFERENCES

- Geological Map. Copley, 1:250,000 Geological series sheet SH/54-9.
Henderson, James: Narrative of an Expedition to Lake Frome in 1843. Proc Roy. Geog. Soc. of South Australia, Vol. 26: 85-128, 1926.
Specht, R. L., 1972: The Vegetation of South Australia. Government Printer, Adelaide.

WILDFLOWERS FOR SEASIDE

Natives on and near the coast of South Australia—by P. M. Harrison

This is an account of shrubs and trees which I tried along the sea coast and inland on the Le Fevre Peninsula during my experience with the Port Adelaide City Council.

Coastal sand dunes occur along the beach areas, occupying a continuous strip extending from Outer Harbour to south of Semaphore. They consist of white siliceous sand for considerable depth, very alkaline and containing some salt. Back from the coast the soil improves slightly and, due to wind protection, some shrubs will grow a lot better although the soil is still alkaline.

Where streets run north and south, I have found that shrubs and trees grow far better than those in east and west running streets. More severe winds come from the west than any other direction.

Melaleuca nesophila; 6-10 feet, W.A. Splendid summer flowering shrub for all conditions. Mauve-pink globular heads at top of all shoots, oval leaves, attractive paper-bark trunk. Needs protection when young; cuts lightly with severe winds.

Melaleuca wilsonii; 3-5 ft, S.A.-Vic. Sometimes wide spreading. Red or purplish spidery flowers along the slender branches. Needle leaves, lime loving, stands wind very well and needs no protection.

Melaleuca megacephala; 6-8 ft, W.A. Rather large yellow flowers in brushes at ends of shoots, crowded oval leaves, stands salt air very well; needs protection when young.

Melaleuca halmaturorum; 6-12 ft., S.A., Vic. Small white flowers in leafy clusters, tiny narrow leaves, white papery bark. Useful for inland, coastal or saline soils. Stands salt air and winds very well.

Melaleuca decussata; 6-8 ft, S.A., Vic. Mauve flowers in short bottle-brushes on young shoots, leaves narrow, good shrub for warm, dry gardens. Cuts very slightly with severe winds, soon shoots again.

Melaleuca elliptica; 8-12 ft, W.A. Red bottlebrush flowers, 2-3 in long grey-green roundish leaves dotted beneath. Handsome shrub, easily grown, stands salt very well, cuts slightly with severe winds.

Melaleuca lanceolata; 10-15 ft, W.A., S.A., Vic., N.S.W. A small beach tree with dark bark. Narrow greyish leaves, loose cream bottlebrushes. A tough hedge shrub and sand binder. Stands wind very well.

Melaleuca armillaris; 12-18 ft, Vic., N.S.W. A graceful, easily grown small tree with needle leaves and cream bottlebrush flowers. Good quick hedge or windbreak for other plants, cuts slightly but soon shoots again.

Melaleuca leucodendron; 18-25 ft, N.S.W., N.T. Long, slender, white or pink bottlebrush flowers. Will tolerate salty, alkaline, hot or dry soils, but not frosts. Stands wind very well.

Eucalyptus ficifolia; 15-30 ft, W.A. Grown under suitable conditions — preferably coastal and not exposed to severe frosts — this is undoubtedly the most striking and brilliantly flowered of all Eucalypts. Grows very well near sea front.

Eucalyptus diversifolia; 10-15 ft, S.A., Vic. A small tree which has cream flowers when quite small. The leaves are lance-shaped and the flowers are in clusters. Grows well near sea front, burns slightly with severe winds.

Eucalyptus erythrocorys; 12-15 ft, W.A. The conspicuous red flower buds of very unusual shape contrasting with the large deep-yellow flowers and graceful leaves make this one of the most ornamental of the Eucalypts for warm areas. Called the "Red-Cap Gum", grows and flowers well back from esplanade.

Eucalyptus nutans; 8-10 ft, W.A. This crimson-flowered mallee is also called the "Nodding Gum". It has dark-green leaves and a shrubby habit of growth. Does not grow on esplanade, but grows well further back.

Eucalyptus incrassata; 12-15 ft, S.A., W.A., Vic. Grows very well just back from the coast and flowers when quite a young tree. Is lightly burnt by severe winds.

Eucalyptus botryoides; 40-60 ft, Vic., N.S.W. A very useful tree for all coastal districts. Quick-growing and thoroughly reliable for parks. A very good tree for shade and does very well just back from the esplanade.

Eucalyptus torquata; 10-20 ft, W.A. This is one of the best all-round small ornamental gums. It is fast-growing with ornamental buds and flowers. Flowers in showy bunches from red to a delicate combination of pink and white. Grows very well in streets just back from esplanade.

Eucalyptus lehmannii; 15-25 ft, W.A. A small, bushy, rapid-growing tree with a broad spread, very useful for low wind-break or shade purposes. Flowers are in yellowish caps the size and shape of fingers. Does extra well in streets.

Eucalyptus megacornuta; 20 ft, W.A. This remarkable gum has only recently been recognised for its worth. The striking bud-caps are warty and swollen. Flowers are much like *E. lehmannii*. Does very well just back from esplanade.

Eucalyptus cneorifolia; 15-20 ft, Kl. A bushy small tree with narrow leaves, it grows well near the sea. It was the main tree for making eucalyptus oil.

Eucalyptus spathulata; 10-15 ft, W.A. The attractive feature of this small, smooth-barked gum is its very narrow leaves. Small stalked buds in clusters have an unusual cylindrical cap half an inch long. Good garden tree. Burns slightly, but soon shoots again.

Acacia iteaphylla; 8-10 ft, W.A., S.A. A beautiful winter flowering shrub with drooping branches and narrow, often silver-grey phyllodes (not true leaves) 2-4 in long. Flowers in sprays from June to September. Growing very well among other shrubs on the esplanade.

Acacia longifolia var. *sophorae*; 6-12 ft, Vic., S.A., N.S.W., Tas. Grows into a small tree inland, but greatest use is a beach sand binder. As a shrub it withstands wind and salt spray.

Acacia rotundifolia; 3-4 ft, S.A., Vic., N.S.W. The foliage is attractive at all times. The long arching branches are so heavily loaded with flowers when in bloom that they appear from the distance to be long rods of gold. Growing very well on the esplanade at Semaphore.

Acacia calamifolia; 8-12 ft, S.A. Vic., N.S.W. When in bloom this is a particularly fine wattle. The branches are slender, and the straight, narrow, single-veined phyllodes 2-4 in long. Bright yellow flowers, mostly in pairs, cover the bush. Grows very well on the esplanade.

Hakea kippistiana; 3 ft, S.A., W.A. Small white flowers in dense clusters, fine needle leaves, golden, silky while young. Growing very well among other shrubs on the esplanade.

Hakea elliptica; 8-10 ft, W.A. White flowers in close rounded clusters, narrow oval leaves are richly brown felted while young. Attractive small tree growing very well in streets just back from the esplanade.

Hakea petiolaris; 10-12 ft, W.A. Purple-red cushion flowers studded with many yellow "pins", thick broad roundish leaves. Growing very well just back from esplanade.

Hakea suaveolens; 8-12 ft, W.A. A useful, tall, easily grown specimen shrub, small white fragrant flowers clustered towards ends of branches, stiff prickly branching needle leaves. Many planted in streets and trained as trees; grows very well and does not burn.

Hakea laurina; 10-18 ft, W.A. The best-known hakea in gardens. Winter flowering, the crimson flowers are studded with cream "pins". Fast growing, needs staking and well-drained soil. Grows very well just back from esplanade, does not stand severe winds.

Callistemon phoeniceus; 6-8 ft, W.A. Rich scarlet brushes, golden tipped; greyish leaves, thick, smooth and narrow, tapering to stalk. Grows very well among other shrubs on the esplanade.

Callistemon violaceus; 8-10 ft, N.S.W. Purplish violet brushes, a pleasing colour. Smooth thin leaves with thick margin and sharp pointed. Grown as street trees and doing very well.

Callistemon teretifolius; 6-8 ft, S.A. Crimson brushes (lower part of red stamens are bearded). Stiff sharp needle leaves. A hot desert shrub, grows very well and stands sea winds well.

Callistemon 'Harkness'; 10-15 ft, S.A. This bottlebrush was first grown at Gawler, S.A., in a local garden. All plants have been propagated by cuttings and are true to type. This plant in bloom is a treat for any garden-lover. The brushes are extremely long, up to 9 in, bright red in colour and prolific. It is this feature which makes the whole bush in flower look so striking. If this bottlebrush is correctly pruned it can be made into a good street tree. Two growing in our garden are at least 16 ft high. Five are growing well on esplanade but have a building for protection.

Cassia artemisioides; 4-5 ft, S.A., W.A., Vic., N.S.W. A bushy shrub completely covered with fine, silky, white down and useful for colour contrasts. The leaves are compound with short dense sprays of bright buttercup flowers during winter and spring. Grows very well among other shrubs.

Agonis flexuosa; 20-40 ft, W.A. A handsome tree with graceful, drooping, willow-like foliage on long slender stems with numerous small white flowers in late spring. It is highly recommended, especially for mild coastal districts. Often called "Peppermint Tree". Growing well just back from esplanade.

Leptospermum laevigatum; 6-8 ft, Vic. N.S.W., Qld. Small white flowers among the greyish round-oval thickish leaves. Well-known beach tree, often planted for large hedges, also for sand binding. Growing very well on the esplanade.

Eremophila maculata; 4-6 ft, S.A., Vic., N.S.W., W.A., Qld. Red flowers, spotted inside, lower lip deeply cut and curved back, slender curved stalks, narrow leaves 1 in long. Easily struck under glass. Growing very well on esplanade among other shrubs.

Eremophila glabra; 3-5 ft. Shrub with orange to red flowers, occasionally greenish. Leaves lanceolate, ½-2 in long, sticky or densely woolly, greyish. Growing among other shrubs, doing well.

Correa reflexa; 2-3 ft, S.A., Tas., Vic., N.S.W., Qld. The best-known, often called "Native Fuchsia", this red correa is remarkably variable. Rich red tubular flowers, usually green or yellow tipped. Growing very well on esplanade.

Correa pulchella; 1 ft, S.A. This form of *C. pulchella* was originally known as *C. minor*; a small shrub with numerous orange-red flowers and does well on esplanade.

Calocephalus brownii; 2-3 ft, W.A., S.A., Vic., N.S.W. The whole bush white-woolly; flowers in woolly ½ in balls at ends of stems, tiny narrow leaves lying along stems. A tough beach shrub, salt and drought resistant, outstanding for coastal planting.

For the benefit of those not acquainted with the area, the above references to the esplanade indicate an area on the sea front immediately above the beach. It has no protection whatever from winds bearing both salt and sand.

SEASIDE PLANTING

Previous articles dealing with plants suitable for growing in gardens near the sea are:

Ground Covers For Coastal Planting, Vol. 1, No. 12.

Plants For The Seaside, Vol. 3, No. 25.

SOUTH AUSTRALIAN CASUARINAS

by Rae Sexton

The S.A. Casuarinas are low trees and shrubs intermediate in character between the Eastern species, some of which grow as tall timber trees with exceptionally narrow, long and wiry branchlets and small cones (*C. torulosa*, Ait., *C. cunninghamiana*, Miq.) and the Western species, which show a reduction of branchlet size reaching a stout needle-like form. Some of the S.A. species occur elsewhere—*C. paludosa* Sieb. in Eastern states and Tasmania, *C. stricta* Ait. over most of Australia. *C. decaisneana* F.v.M. is a very distinctive species from the Northern Territory and Queensland with a low number of long sheathing teeth, oblong branchlets and large cones.

S.A. Casuarinas have always been difficult to distinguish, and this is found to be due mainly to an overlapping of features, particularly among members of what is known as the 'distyla complex' (treated as forms of the one species *C. distyla* by Bentham, but later described as four species).

Identification is mainly by vegetative features, and number and shape of sheathing teeth is found to be the most constant feature for any one population. However, even these features overlap between species in some cases and intermediate forms are found.

Reproductive features in the Casuarinaceae are not as useful for identification purposes as they are in most families of flowering plants. Male and female flowers often occur on separate trees and several species may grow together, so that one cannot be sure which specimens belong together. The shape of the fruit is extremely variable even on the one tree, sometimes stalked or not, beaked or blunt, regular or with aborted ovules; obviously the shape of the fruit (cone) will vary depending on whether the ovules develop and whether there is sufficient pollen of the right kind (analogous to a maize cob). The size of the anthers and colour of pollen (red, purple, yellow, golden brown) varies among populations from different localities; these may be slight genetic differences and not environmentally caused. Vegetative means of propagating (suckers and poly-embryony) are known to exist for the Casuarinas and very uniform small populations may be seen in the field with patches of trees of one height (this is seen in *C. stricta* on Eyre Peninsula, S.A.). Casuarinas which are taken from one locality or State and grown in another maintain the same general characteristics (e.g. unlike pink and blue *Hydrangea* on alkaline and acid soils) indicating that the differences are real and little influenced by environment. One might expect segment size (best measured in the central region of the green 'assimilatory' branchlets) to vary greatly in thickness and length under different conditions but this is not so. Readers who grow Casuarinas in their gardens may care to check that they still key out (a Bibliography of Floras is given at the end of this article).

The Casuarinas of S.A. should probably be regarded as a very plastic remnant flora (rather than a hybrid swarm) with many intermediate forms in the Mt. Lofty-Mt. Compass-Victor Harbour area. There is evidence to suggest that they may have an unstable chromosome complement, and that *C. striata* Macklin may be regarded as a central type, highly variable and occurring as a monoecious or dioecious shrub or tree, with a gradation in all features to *C. paludosa* Sieb. ex Spreng, *C. pusilla* Macklin, and *C. muellerana* Miq. (these 4 species = *C. distyla* Vent.). An overlap between the glaucous *C. cristata* Miq. and *C. luehmannii* R. T. Baker in number of sheathing teeth and segment size occurs in the north of the State. On Eyre Peninsula the normally distinctive *C. stricta* Ait. has characteristics of *C. striata* Macklin in some populations (erect habit, golden brown anthers, strongly ribbed segments but a sheathing teeth number of 9). *C. stricta* also has forms which appear glaucous due to a fine silvery covering of hairs (some coastal areas and the Flinders Ranges). The nodes are generally markedly swollen.

A new key is presented here based entirely on vegetative characteristics. It must be remembered that intermediate forms exist. Beadle et al. note that many intermediate forms of *Casuarina* exist in the Middle Harbour area, Sydney.

This study would never have been possible without access to the very large collections in the S.A. State Herbarium and I should like to thank both staff and collectors.

KEY TO S.A. CASUARINAS

1. Trees with robust branchlets, sometimes hoary (segments more than 1 cm long, or greater than 1 mm wide, or both) 2
1. Shrubs with wiry branchlets, never hoary (segments 1 cm and under long, and 1 mm and under wide) 7
- [If rarely longer, then angular] *C. muellerana* 7
2. Sheathing teeth long (2-5 mm) lanceolate 3
2. Sheathing teeth short (1 mm or less) cuneate or with breaking tips 4
- (*) 3. Teeth 9-12 *C. stricta* 4
3. Teeth 4 *C. decaisneana* 4
4. Branchlets hoary, smooth; teeth 9 or more 5
4. Branchlets green, smooth or ribbed; teeth 6-8 6
5. Segments 1-1½ mm wide, separating easily, teeth 9-11 (usually 10) *C. cristata* 5
5. Segments 1½-2 mm wide, teeth 10-13 (usually 13) *C. luehmmanii* 5
6. Rounded ribs, teeth appressed, cuneate (usually 8) *C. striata* 6
6. Flattened ribs, sometimes indistinct, teeth spreading, lanceolate (usually 6-7) *C. paludosa* 6
7. Sheathing teeth small (0.5 mm) white, appressed, cuneate (usually 5) 8
7. Sheathing teeth small (0.6-1 mm), brown, spreading, lanceolate (usually 6-7) 9
8. Branchlets angular with sharp, narrow ribs *C. muellerana* 8
8. Branchlets smooth, terete *C. helmsii* 8
9. Branchlets smooth, teeth overlapping at base (usually 6) *C. pusilla* 9
9. Branchlets with flattened ribs, sometimes indistinct, teeth not overlapping 10
10. Ribs prominent (on young branchlets only), grooves with spreading hairs (teeth usually 7) *C. paludosa* 10
10. Ribs indistinct, glabrous (teeth usually 6) *C. paludosa* var. *robusta* 10
- (*) linear (usually 12-16), branchlets waxy *C. glauca* 10

N.B. *C. glauca* appears to be growing wild now on the Moonta mine fields (garden escape).

NOTES ON THE IDENTIFICATION OF S.A. CASUARINAS

The Casuarinas show considerable variation in vegetative and reproductive features (such as shape of cone); shape and number of sheathing teeth are relatively constant. Additional prominent features are as follows:

- C. cristata* Miq.—glaucous, smooth, segments fall apart readily.
C. decaisneana F.v.M.—branchlets oblong in section, teeth large.
C. helmsii Ewart & Gordon (*C. humilis*)—smooth, shiny branchlets, slender; cones distinctive, smooth, openings in regular vertical rows.
C. luehmmanii R. T. Baker—glaucous, usually stout, teeth breaking easily.
G. muellerana Miq.—angular branchlets, dark green, ribs triangular.
C. paludosa Sieb. ex Spreng.—variable, ribbed (similar to *C. striata*) to smooth; tufts of hairs in grooves.
C. paludosa var. *robusta* Macklin.—smooth generally without hairs; teeth generally shorter than the above, which may slightly exceed 1 mm.
C. pusilla Macklin.—very similar to the above, but careful examination shows teeth overlap laterally at the base; segs. ½-1 mm wide, smooth, glaucous-cent when dry, not at all swollen at nodes.
C. striata Macklin.—variable, monoecious or dioecious shrub or tree; rounded green ribs on branchlets prominent; teeth much more blunt and appressed than *C. stricta*.
C. stricta Ait.—green striate branchlets, generally drooping, sometimes almost as striate as *C. striata*, sometimes greyish with small hairs (probably including '*C. bicuspidata*'), swollen at nodes (goblet shaped).

When Macklin split up *Casuarina distyla* (Macklin, E.D., Trans. Roy. Soc. S.A. 51:271, 1927) she created two new South Australian species, *C. striata* and *C. pusilla* and what she considered to be a variety of an Eastern species, *C. paludosa* var. *robusta*, which existed only in South Australia and was usually less than a metre in height. In view of the greater number of specimens we now have available for study, and the overlaps found between many, and the lack of custom in making varieties for the Casuarinas, I think it is not desirable to retain this variety. Just as much variation is likely to

exist within *C. paludosa* in the Eastern states as in S.A. The distinguishing features are not even extremely convincing in her type specimens, even comparing Type with Co-type; as she says, it is a matter of degree: there are no absolute lines of demarcation.

Personally, I see *C. paludosa* var. *robusta* as being an intermediate between *C. pusilla* (with which it is often confused) and *C. paludosa* (from which it is not, to my mind, sufficiently distinct).

Casuarina pusilla is the smallest of the S.A. Casuarinas: a low cushion shrub 25 cm to 1 m high with very wiry branchlets, usually only 0.5 mm wide and not apparently ever more than 1 mm wide, often clustered and curving; male spikes red and terminal; sheathing teeth overlapping, 6, ovate, white fringed; dries glaucescent.

Casuarina paludosa is a low Eastern species also entering into the South East of S.A. It attains 2-4 metres, with more sparse, longer and stouter branchlets 1-1.5 mm wide, with flattened ridges and generally hairy grooves, "sometimes glabrous"; male spikes whorled and sessile, red. Teeth 7, not overlapping. The older segments are often entirely smooth, the edges of the grooves becoming more raised. The author has observed a completely glabrous N.S.W. specimen, and others where some of the young branchlets were hairy, others were not, on the one branch; some specimens had long hairs, some bristles.

Macklin's distinguishing features for var. *robusta* include the fact that it is generally less than 1m high, with ridges rounded, internodes glabrous or almost so, teeth always ciliate on older branches (this feature is not convincing. Male spikes whorled, sessile or terminal, red. Teeth 6, not overlapping. My observations are that these features overlap with those of *C. paludosa*; also the branchlets may be almost as wiry as *C. pusilla* and much smaller than 1-1.5 mm wide given by Macklin.

It would seem that these are remnants of a once extensive population in which genetic material was freely exchanged and distinctive forms (such as the Northern *C. decasneana*) were not evolved until barriers formed. Minor differences between small populations are now exaggerated by vegetative propagation. A differing gene frequency from the general population results. A loss of fertility is further obvious in the high frequency of aborted ovules and loss of monoecious habit in many individuals. The fact that many forms grow adjacent means that there is much stray pollen should seasons overlap.

Casuarinas Under Cultivation

Casuarinas, so named because their jointed branchlets resemble the drooping feathers of the Cassowary (Casuarinas), are leafless trees and shrubs that are mainly Australian but extend into Asia, and are cultivated in other lands. They are ornamental and unusual besides being extremely tolerant of drought and brackish conditions. Several are grown as street trees, two of the Eastern species are milled as timber, and probably more of the shrubby species could be grown as ornamentals (*C. pusilla* Macklin usually attains less than a metre). The male trees are particularly colourful with their spikes of stamens and flowering of different species is spread throughout the year.

Casuarinas stocked by nurserymen:

- C. cristata* Miq. (silver grey branchlets, street tree, 4-15 metres: Belah or Black Oak).
- C. cunninghamiana* Miq. (fine branchlets, tall timber tree, street tree).
- C. decasneana* FvM (yellow-green branchlets, 10-15 metres: Desert Oak).
- C. equisetifolia* Forst. (tropical weeping tree 25 metres; Shingle Oak).
(i.e. var *incana* Benth. is a softly hairy grey form found in coastal Qld.).
- C. glauca* Sieb, ex Spreng. (weeping form, street tree, windbreak).
- C. littoralis* Salisb. (*C. suberosa*) (ornamental, shelter tree).
- C. stricta* Ait. (ornamental, street tree, 5-7 metres: Drooping Sheoak).
- C. torulosa* Ait. (shelter, timber tree).



Photography by Louis Sourry

THELYMITRA RUBRA

Terrestrial orchids are found in all but the arid regions of Australia. *Thelymitra rubra* grows in many areas and may be seen to perfection on Kangaroo Island. We have published reports of some people who have grown our "Sun Orchids", but none appear to have outstanding success. Who will make a special effort to help us solve this problem?

GROWING OF AUSTRALIAN TERRESTRIAL ORCHIDS IN SAND-PEAT MIXES

by H. B. Wilson

Many species of native Australian ground (terrestrial) orchids have not been grown successfully in cultivation. Some species have been cultivated, but growers have had varying success with different species and with different soils and potting mixtures or composts. There are differences of opinion about the merits of various soils and potting mixtures for the cultivation of native ground orchids, and about the merits of different types of fertilisers, or whether fertiliser should be used at all. Some growers believe that for best results ground orchids should be grown in the natural soil and leaf mould of the area from which the orchids were taken to maintain the association between the plants and the fungi which form mycorrhizal tissues in the roots.

Because of these differences of opinion a number of native species of terrestrial orchids were grown in sand-peat mixtures using only chemical fertilisers following the U.C. system, to see whether the orchids would grow satisfactorily under these conditions.

The U.C. system is described in the publication—"The U.C. System for Producing Healthy Container-grown Plants", edited by Kenneth F. Baker (University of California, Division of Agricultural Sciences, Agricultural Experiment Station—Extension Services, Manual No. 23, September, 1957).

The objective in mixing sand and peat is to produce a crumbly potting material of uniform consistency which drains easily. Sand washed free from clay, either naturally or artificially, and horticultural peat form mixtures which do not become sticky when wet, do not set hard or form lumps or clods when dried, and allow water to drain freely. Because the sand and horticultural peat contain practically no mineral plant food at all fertilisers are added to the mixtures according to the U.C. formulae, depending upon the proportions of sand and peat.

The sand and peat were mixed by rubbing together by hand; standard grade industrial inorganic chemical nutrients were added to the mixes according to the U.C. formulae, as follows:

50 p.c. Coarse Sand/50 p.c. Peat:

Chemical	Amount per cubic yard
Potassium nitrate	4 ozs
Potassium sulphate	4 ozs
Superphosphate	2½ lbs
Calcium carbonate	6½ lbs
Magnesium carbonate	3½ lbs

The fine sand mixes were prepared by making up two basic mixes, 100 p.c. sand and 100 p.c. peat, to which inorganic nutrients were added by the U.C. formulae, as follows:

Chemical added to Sand	Amount per cubic yard
Potassium nitrate	8 ozs
Potassium sulphate	4 ozs
Superphosphate	2½ lbs
Calcium carbonate	12 ozs
Magnesium carbonate	12 ozs
Calcium sulphate (Gypsum)	2½ lbs

Chemical added to Peat	Amount per cubic yard
Potassium nitrate	6 ozs
Superphosphate	1 lb
Calcium carbonate	6¼ lbs
Magnesium carbonate	1¼ lbs

Note: Where the U.C. fertiliser formulae require Dolomite (Calcium magnesium carbonate) calcium carbonate and magnesium carbonate were used in place of Dolomite and in addition to the separate amount of calcium carbonate required in the formulae.

The sands used in preparing the sand-peat mixes were—(a) a commercial coarse potting sand (actually a fine gravel), free from clay, soil, or organic matter; and (b) fine sand free from clay, soil and organic matter, obtained by sieving and hand-washing in a bucket—a Victorian coastal sandy loam. The peat was a brown crumbly material sold commercially for horticultural purposes.

The sand and peat were mixed in different proportions. With the coarse sand a 50 p.c. coarse sand/50 p.c. peat mix was used. With the fine sand the following mixes were used: 50 p.c. sand/50 p.c. peat; 75 p.c./25 p.c.; 88 p.c./12 p.c.; 94 p.c./6 p.c.; and 100 p.c. sand.

Orchids were grown in the 50 p.c. coarse sand/50 p.c. peat mix during 1972, and in the fine sand-peat mixes during 1973.

The mixes were steamed in a soil sieve covered with black polythene for about 20 minutes over a copper of boiling water. The temperature of each batch was raised above 140°F., but kept below 180°F. The object of this steam treatment (according to the U.C. Manual) is to destroy certain harmful fungi without destroying the other micro-organisms in the soil. The treatment may not be as effective for this purpose when tubers are planted instead of sterilised seed, because tubers cannot be sterilised like seed. The steaming was carried out, however, to adhere as closely as possible to the U.C. method for the purpose of the experiment. The steam treatment also seemed to be highly effective in destroying weeds which were noticeably absent from the mixtures after treatment.

Trial batches of mixtures were tested for acidity by measuring the pH, or acidity, with a Hellige liquid-dye indicator. The pH of the mixtures was adjusted to between 6-7.5 (slightly acid to slightly alkaline) by adjusting the amount of calcium carbonate (lime) added to each mix.

The orchid tubers were planted in mid-summer, about half-inch deep in the mixes in plastic pots with side openings. The pots were stood in the open about 3 feet above the ground on water-pipe legs to exclude snails, slugs, earwigs, garden weevils, and other crawling pests.

The pots were watered about once a fortnight with a nutrient solution having the following composition, according to the U.C. formula: Ammonium nitrate 8 ozs—Mono-ammonium phosphate 8 ozs—Potassium chloride 8 ozs—Water 100 gals.

No organic fertiliser, such as animal or poultry manure, blood-and-bone, leaf mould or compost was used. No fertiliser was used containing trace elements such as boron, copper, iron, manganese, molybdenum or zinc, because the U.C. Manual stated that in California these had not been found necessary.

Results:

The growth of the orchid plants varied between species and between different pots containing the same species. There appeared to be no connection between the health and vigour of the plants and the proportions of the sand and peat, or the use of coarse or fine sand.

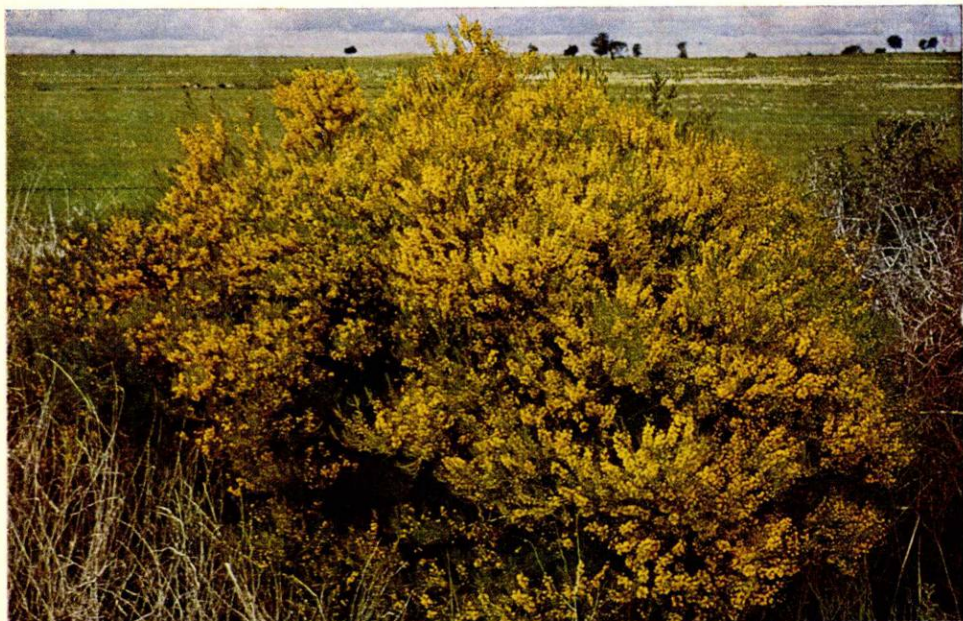
Species of which some plants grew well, and flowered, in 50 p.c. coarse sand/50 p.c. peat were: *Acianthus exsertus*, *A. reniformis*, *Chiloglottis gunnii*, *C. trapeziformis*, *Corybas diemenicus*, *Microtis parviflora*, *Pterostylis baptistii*, *P. concinna*, *P. curta*, *P. parviflora*, *P. pedunculata*, *Thelymitra aristata*, *T. flexuosa* and *T. pauciflora*. *Glossodia major* plants flowered but the leaves became very yellow and the plants failed to shoot during the next season.

Species in which all plants grew poorly, or showed unhealthy symptoms such as stunted growth or yellowing or development of purplish-brown spots, or combinations of these symptoms, or died, were:—*Diuris sulphurea*, *Prasophyllum* sp., *Pterostylis decurva*, *P. laxa*, *P. nana*, *P. ophioglossa*, *P. revoluta*, and *Spiranthes sinensis*.

Species of which some plants grew well and flowered in the various fine sand-peat mixes were:—*Pterostylis baptistii*, *P. concinna*, *P. curta*, *P. longifolia*, *P. nutans*, *P. parviflora*, *P. pedunculata*, *Acianthus fornicatus* and

MONARTO WATTLES

The Rare Wattles of Monarto by Margaret Kenny



Photography by M. L. Kenny

ACACIA MENZELII

This shrub is growing north of the old Presbyterian Church at Monarto. The characteristic shape of the bush is shown indicating a good garden shrub.

South Australia's new town, Monarto, is at present in the planning stages. The land has been bought, the farms vacated and 15,200 hectares, stretching from the eastern foothills of the Mount Lofty Ranges to within a few kilometres of the River Murray, are being eagerly investigated by botanists and naturalists.

It was farming land, so obviously much of it had been cleared and cultivated or grazed. But about a quarter of the total area is still uncleared and much interesting woodland and mallee scrub remains, some of it even untouched bushland which has never been grazed.

ACACIA MONTANA

Another beautiful garden shrub with potential, as shown above. The characteristic shape of the "leaves" (phyllodes) is shown in the lower picture

Photography by M. L. Kenny



The locality is a good one for wattles and so far 18 have been recorded. Among these are four which are listed as species considered rare in South Australia, with a fifth just a few kilometres south of the Monarto southern boundary.

1. *Acacia argyrophylla*. A stout shrub, $\frac{1}{2}$ -2 m high, has foliage (phyllodes) silky with silvery hairs, the young growth being bright gold. The phyllodes are obovate, 2-4 cm long, the large flowerheads appearing in spring. The pods are big — 10-12 mm broad and about 10 cm long — dark brown, raised and hardened above each seed. *A. argyrophylla* is found also in Western Australia.

2. *A. menzelii* is a very sticky spreading shrub 1-2 m tall, with slender terete phyllodes 1 mm thick and up to 3 cm long. It flowers in early spring and the pods which follow are narrow, almost straight, about 3 cm long, and viscid. This wattle is endemic in South Australia and is restricted to this locality.

3. *A. montana*, a viscid spreading shrub, is usually from 1-2 m tall. The phyllodes, which are rather variable, may be from $1\frac{1}{2}$ -3 cm long and 3-6 mm broad. The narrow pod, from 3-5 cm long, is sticky and densely hairy. This shrub, which flowers in spring, is found also in eastern States, but in South Australia is known only in this locality.

4. *A. rheticarpa*. Endemic in South Australia and very localised, grows at Monarto South. Once it was known only by a very few individual plants. Through the efforts of the Field Naturalists' Society of South Australia the area containing these plants was fenced in 1967 and has since regenerated well. Very localised occurrences of this rare wattle on Eyre and Yorke Peninsulas are reported. It is a small, intricate shrub, 50 cm-1 m high, the phyllodes are rigid and obliquely obovate, 2-4 mm long and about 2 mm broad. The flowerheads, which appear in early spring, are small, rather pale, but quite prolific.

5. *A. rhigiophylla*. Known as the Dagger-leaved Wattle, this is a very spreading, rigid shrub with dark green, dagger-like phyllodes 1-2 cm long and about 2 mm broad at the sessile base.

It has had an interesting history. Recorded as having been found by Baron von Mueller in 1848 "in scrub between Mt. Barker and R. Murray", it was not collected in South Australia again until 1926. It was recorded in 1902 from West Wyalong, in N.S.W., and in the last decade several collections have been made in South Australia from the area between Kimba, Cowell and Whyalla on Eyre Peninsula.

Within the boundaries of Monarto, it is found in places where outcrops of granite occur, in association with the broombush *Melaleuca uncinata*. Hunting in a remnant of broombush scrub among granite boulders will very often reveal the presence of these wattles.

A. rhigiophylla, although rather formidable on account of its dagger-like foliage, is a handsome spreading, dark green shrub, 1-1½ m high, its masses of brilliant gold flowers lasting for up to six weeks during September and October.

A mass of these shrubs all in flower at the same time is an unforgettable sight and the present vernacular name must surely in time be changed to "Monarto Wattle".

ACACIA SPECIES RECORDED FROM MONARTO:

Acacia argyrophylla, *A. armata*, *A. brachybotrya*, *A. calamifolia*, *A. dode-naeifolia*, *A. euthycarpa*, *A. ligulata*, *A. menzelii*, *A. microcarpa*, *A. montana*, *A. pycnantha*, *A. rheticodes*, *A. rheticodes* var. *uncifolia*, *A. rheticarpa*, *A. rhigiophylla*, *A. rigens*, *A. rotundifolia*, *A. sclerophylla*, *A. spinescens*, *A. wilhelmiana*.

THE AIMS OF OUR FOUNDERS

Lance Howland — Co-Editor of this issue from South Australia

One of the principle reasons for forming our Society was to introduce into home gardens Australian plants which are rare or are likely to face extinction, including those endemic to particular local areas.

A good deal of our efforts appear to be directed towards the spectacular and easily available species and not enough to looking for the less well-known and more difficult plants, better forms, and those closer to home.

Let us not forget the original aims of our founders and let us do as much as we can to introduce untried plants and to select better forms of ones already introduced whenever this is possible.

The experience could prove very rewarding.

BIBLIOGRAPHY ON AUSTRALIAN PLANTS

It is proposed to produce a general bibliography on Australian Plants. It would include:

- (a) Monographs dealing with (i) propagation; (ii) identification; (iii) uses, e.g. landscaping; (iv) distribution.
- (b) Local "check lists" or descriptions of district flora.
- (c) Sources of individual papers of essentially a "scientific" nature covering, for example, taxonomy, plant breeding, nutrition, plant physiology, etc. These would be indicated by journal title only, rather than by listing individual papers.

We seek the assistance of readers with knowledge of, or access to, information published or unpublished, which already exists in Society records, individual collections, and holdings of public institutions.

We are also interested in collecting "good condition" copies of local "check lists" and descriptions of district flora. It may well be that the authors of such material may have reservations about this aspect of the project, but we see great advantage in finding a method of making this type of material more widely available.

If you can assist, please write to: "Bibliographer" S.G.A.P., P.O. Box 207, Civic Square, A.C.T. 2608.

AN UNUSUAL FORM OF EUCALYPTUS GRACILIS

by I. P. Bond

On a trip to Ivanhoe (N.S.W.) in 1967, I found a tree of *Eucalyptus gracilis* which stood out in sharp contrast to the surrounding mallees. Its very beautiful white trunk was due to a mealy covering which rubbed off onto the hands. A small amount of seed was collected from which several plants were raised and given to enthusiastic collectors. Of two planted in Loxton in 1968, one has come very true to type and is already showing whiteness on the lower trunk. Fortunately this tree is isolated from any other *E. gracilis* and has a heavy bud formation this year so that a good seed source seems assured for further propagation of this magnificent form.

NEW BOOKS — Not available from The Editor.

Grampians Flora, An Introduction To, by Rodger Elliot. Price: \$3 plus 60c post.

An excellent guide to the wildflowers of The Grampians in Victoria. Following the introduction, which describes the various plant communities, there is a 15-page plant identification guide based on such easily recognised features as flower shape, colour, flowering period and natural occurrence, which can be used by anyone. The remainder of this small, 98-page (18 cm x 12 cm) book is devoted to simple plant descriptions. The only unfortunate feature is that the illustrations are not in colour.

Students' Flora of North Eastern N.S.W.

Available only from the Dept. of Botany, University of New England, Armidale, N.S.W. 2351, and University Co-operative Bookshops, the first two parts of this proposed six-part series comprises: Part 1. Pteridophytes (which contains also the glossary for the whole work), price \$2.50 plus 80c postage, and Part 2. Gymnosperms — Key to the families of the angiosperms and 46 families of angiosperms with keys to the genera and species, price \$3.50 plus 80c postage. Excellent publications for students and those who wish to know more of our flora.

TO GROW A BORONIA

Norm Alcock continues his article from page 243

To grow many of the *Boronias* on soil that is alkaline is but a simple matter. I recommend sand carted from where the Bracken Fern grows, spread to a depth of 30-35 cm and retained by sleeper or logs. Make sure you have a sheltered position or you could end up with a small desert. Shelter from deciduous plants is an advantage, as full winter and spring sunshine is available when most of the *Boronias* are in flower. It is just a matter of planting up, and if you do not forget the summer waterings your plants will grow well and thrive.

Containers can be used with success and the addition of about five per cent peat moss can be beneficial. The use of loam, of course, can be detrimental unless very well drained. Ample drainage will ensure a long life. You can pot on *Boronias* any time of the year. They do not object to being transferred. This soon gives one confidence, and as many fine containers are on the market, fill them with *Boronias*. Using these simple methods I have the beginning of a collection of *Boronias*. They include *Boronia megastigma*, the browns, reds, yellows and the striped one; *B. heterophylla*, *B. molloyae*, *B. crenulata*, *B. spatulata*, *B. fastigiata*, *B. inconspicua*, *B. juncea*, *B. tetrandra*, *B. denticulata* (several forms) are from Western Australia. The Eastern States have supplied *B. diversifolia*, *B. muelleri*, *B. fraseri*, *B. anemonifolia*, *B. pilosa*, *B. pinnata*, *B. mollis*, *B. latipinna*, *B. floribunda* and *B. filifolia*. The notable omission is *B. serrulata*, which I have not successfully grown. I will make further efforts to overcome my inability to master this fine *Boronia*. It is most unlikely I will ever see all the *Boronias*, but from what I know it can be said some are better than others, but all are worthwhile plants. The perfume from *Boronia megastigma* undoubtedly places it high in the estimation of most people.

The safe way to apply fertiliser to these plants is the use of Red Nitrophoska; a few granules will keep the plants in a good condition. I have had disaster from the use of mulches and find that my plants grow well without.

What of the bug-bear that is often referred to as Collar Rot? I do lose plants to this villain of the piece, but as yet not in the raised beds. Good, very good, drainage is a must, coupled with drenchings of Dexon.

Many fine bushes of *Boronia* are to be found in gardens of the Mt. Lofty Range, where most of the soil is suitable for them. There are records of plants in excess of 10 years old, and it is in this region that *Boronias* will become well known as garden plants.

BORONIA—A Change In Name

Boronia molloyae, Drummond in Hooker, London Journal of Botany, 2:169 (1843). syn. *B. elatior*, Bartling (1845).

James Drummond, who was one of the first European settlers in Western Australia, corresponded with William Hooker, the Director from 1841-1865 of the Royal Botanic Gardens, Kew. Some of Drummond's letters were published by Hooker in one or other of the journals he edited, and it was in Hooker's London Journal of Botany that the description of *Boronia molloyae* appeared. The description forms part of a letter dated June 13, 1842, in which Drummond describes some interesting native plants. His comments on the *Boronia* were as follows: "By far the finest species of *Boronia* I have ever observed in Western Australia grows on the bank of swampy brooks between Vasse and Augusta. Captain Molloy informs me he has seen it as high as his head, when riding on horseback. . . . I have given it the name of *Boronia molloyi*, after the lady of Captain Molloy."

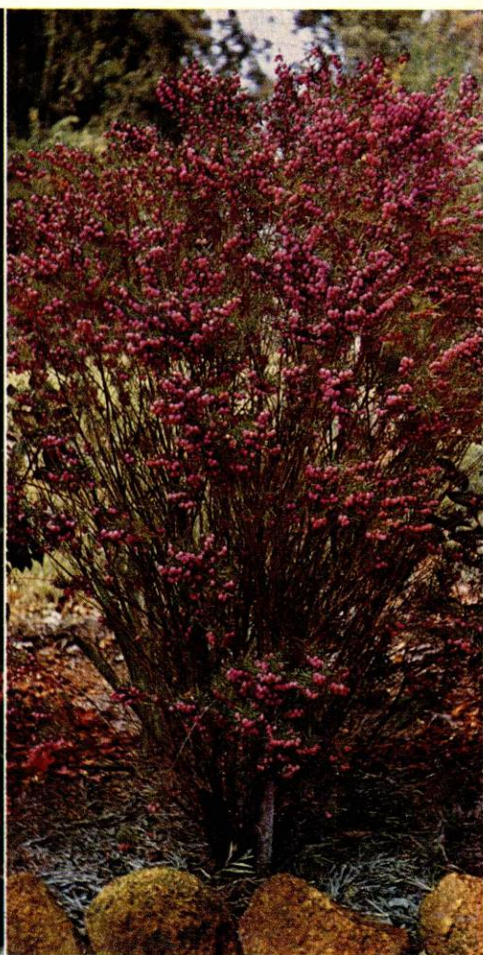
The change in the termination of the specific epithet from "*molloyi*" to "*molloyae*" is necessary, since the plant was named after a woman, not a man.—Paul Wilson.

RED BELL-FLOWERED BORONIA



LEFT: *Boronia molloyae*.

This hirsute (hairy) spreading shrub, up to 4 metres tall, has pinnate leaves 2-4 cm long and bell-like flowers 5-6 mm long. It grows along wet banks in swamps near the Albany coast to Margaret River.



RIGHT: *Boronia heterophylla*.

Photography by Erica Crane.

This plant, growing in the garden of Mr. Frank Wilson, of Bridgetown, W.A., shows the typical growth of these plants that are so similar. *B. heterophylla* is a glabrous (hairless) shrub of about 2 metres with simple or pinnate leaves 3-5 cm long. The flowers are 6-8 mm long. It occurs on sandy flats in the Albany-Denmark area, and at Busselton.

The Oranges-and-Lemons Family

A Series for the Young in Spirit by Nuri Mass

Probably you've never thought of wishing that you could have an orange or a lemon for a cousin. But if you did, you'd naturally have to start off by belonging to the right family—a flower family by the name of Rutaceae. And once you did belong to it, you would doubtless be delighted to find that you were also related to Boronias, Eriostemons, and a host of other beautiful Australian wildflowers.

Family likenesses are not always as easy to see among flowers as they are among people, but most of the members of family Rutaceae do have an orange-blossomy look about them, even though their colours may be pink, red or heliotrope, and even though some of them (like the Phebaliums) are so tiny that if they didn't crowd together into large clusters, you wouldn't notice them at all.

Now, suppose you were out bush-walking and you came upon a flower that you thought just might belong to the Rutaceae family, how would you go about making sure of whether it did or not? Like a good detective you would, of course, look carefully and patiently for clues.

The first of these clues would be the number of petals and sepals—either four (as in Boronias) or five (as in Eriostemons). And while the petals would be free and separate in most cases, the sepals would be joined together into little cups with either four or five lobes as the case may be.

Next, the stamens would be either the same or double in number—four, five, eight, or ten—with freely-swinging anthers. And finally, right at the centre of the flower and set a little above all of the other parts, the ovary (or seed-box to come) would be made up of four or five cells.

If by chance some of the flowers had already gone to seed, you could carry your detection work a stage farther, for family Rutaceae has either soft fruity-looking seed-holders or dry ones that split open in either four or five places.

So much, then, for what the flowers and fruits can tell you. But there are other important clues besides. For instance:—

Rutaceae plants have a beautiful “herby” fragrance, and if you look closely at their leaves, you'll understand why, for these are covered with tiny oil-dots. Another more general clue is that the plants of family Rutaceae take the form of shrubs, small shrubs or trees. And yet another, is the fact that Rutaceae like growing in warm climates, mostly in South Africa and Australia, whilst many of them live in Australia and nowhere else.

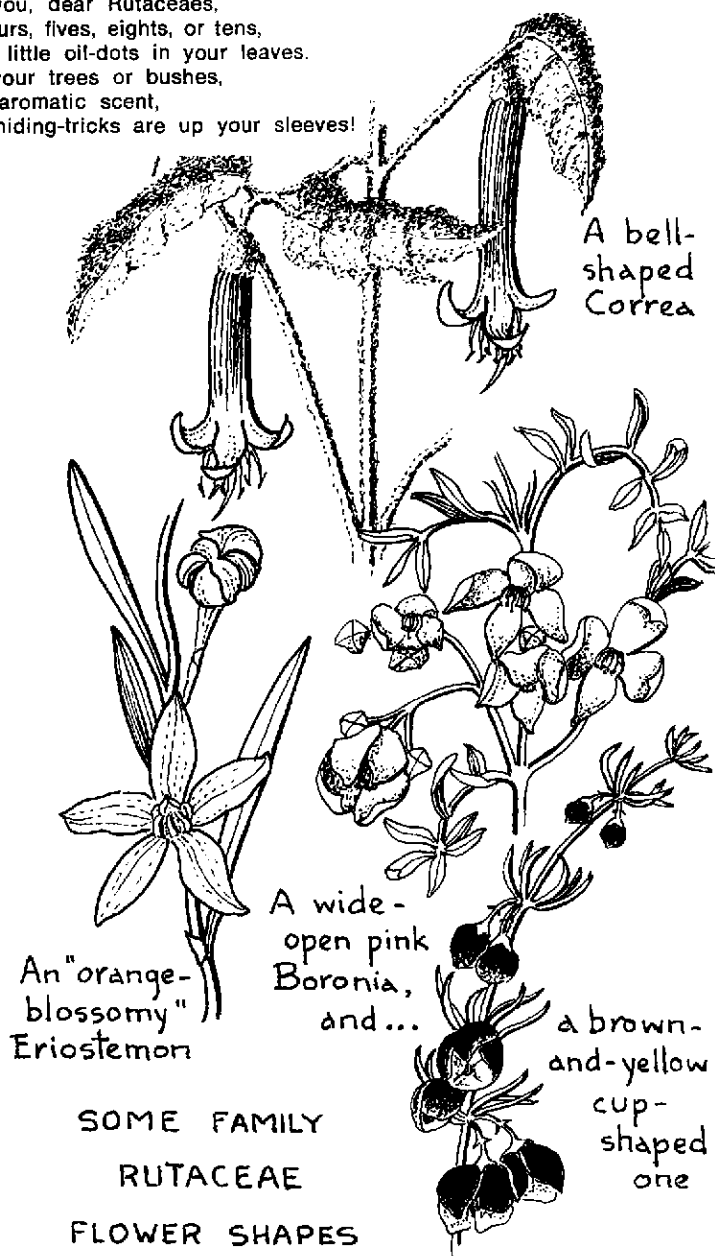
The Boronias are one of these all-Australian Rutaceae, and there are about 80 different kinds of them, mostly with pink flowers, although there's also a pretty little cup-shaped brown-and-yellow one.

The beautiful pink and white Eriostemons also—all of them except one are wholly Australian. So are the Philothecas with their heath-like plants and heliotrope or bluish flowers, so much like those of the Eriostemons in shape.

Phebaliums are another large group that belong almost entirely in Australia, their bushes coming alive in springtime with showering masses of dainty white or yellow flowers. And so the list goes on. But the only other group that we'll pause to speak of here is that of the pretty little Correas.

Most of these are quite different from the usual “open” type of Rutaceae flower, their petals joined together into the shapes of bells, and their colours varying from red to greenish-yellow and white. Even their leaves are different, for as well as all the typical Rutaceae oil-dots, they are covered with quaint little star-shaped hairs. So that altogether, if you were not thoroughly experienced as a flower-detective, you might quite easily pass Correas over as belonging to some other family. And for all we know, they might get lots of fun out of tricking people in this way.

I'll know you, dear Rutaceae,
 By your fours, fives, eights, or tens,
 By all the little oil-dots in your leaves.
 I'll know your trees or bushes,
 And your aromatic scent,
 Whatever hiding-tricks are up your sleeves!



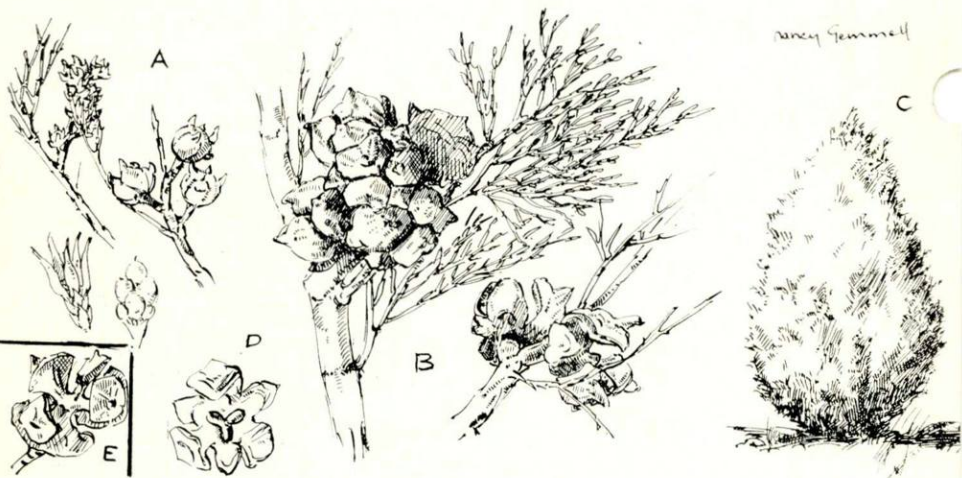
THE PLANT FAMILY *RUTACEAE*. . . Editor

Our last issue introduced the Australian wildflowers in the plant family *Rutaceae*. For those who found the manuscript a little technical, the article opposite may be of special interest.

AN AUSTRALIAN CYPRESS

A common tree in Tasmania, *Callitris rhomboidea* is not often seen in South Australia, being confined to the moist gullies of the Mt. Lofty Ranges (Warren Reserve, Hale National Park, Clarendon, Bradbury and Hackham) and Kangaroo Island. As a bush it is also found on laterite soils 40 km north of Wolseley (D. Kraehenbulch).

I was surprised, therefore, to find a strong growing plantation of shapely trees in the populous Aldgate Valley where it is probably mistaken for the European Cypress until a closer look shows the unusual spurred fruits opening from the base like a woody flower with a distinctly three-lobed columella.



A. male and female flowers and juvenile fruits; B. Fruits unopened and open; C. Tree; D. Fruit showing columella; E. Fruit of European cypress.

GROWING TERRESTRIAL ORCHIDS—continued from page 275

Diuris aurea, *D. pedunculata* and *D. sulphurea* grew fairly well but did not flower.

Species which in the fine sand-peat mixes grew poorly, or showed the unhealthy symptoms seen in plants grown in the coarse sand mixes (stunted growth, yellowing, development of purplish-brown spots, or combinations of these symptoms), or died, were *Acianthus reniformis*, *Chiloglottis trapeziformis*, *Corybas diemenicus*, *Pterostylis alata*, *P. decurva*, *P. laxa*, *P. ophioglossa*, *P. revoluta*, *P. truncata*, and *Thelymitra* sp.

The stunted growth, yellowing, and development of purplish-brown spots in some plants appeared to have been symptoms of starvation due to a deficiency in the mixtures of one, or more than one, of the mineral elements essential to healthy plant growth rather than to differences in the proportions of sand and peat, or between the use of coarse and fine sand. This received some confirmation during 1974 when a commercial brand of "complete" fertiliser containing trace elements, in addition to nitrogen, phosphorus and potassium, was added to the pots. Although species of *Acianthus*, *Chiloglottis*, *Corybas*, *Diuris*, and *Microtis* did not show much response to the complete fertiliser, species of *Pterostylis* and *Thelymitra* grew and flowered more vigorously than in the preceding years, and the unhealthy symptoms previously observed were absent. Comments from other pot-plant growers who have used the U.C. system to grow a variety of plants indicate that they have also encountered mineral nutrient deficiency problems.

BUSHFLORA

46 SWAN STREET, ELTHAM, VICTORIA, 3095

WIDE RANGE OF WELL-GROWN PLANTS

INSPECTION INVITED.

Hours: 9-5 p.m., Thurs., Fri., Sat.; Sunday 1-5 p.m.

ERICIFOLIA NATIVE PLANT NURSERY

6 Game St., Blackburn, Vic. 3130

Telephone 878-3889

Open 9-5.30 Daily. Closed Wed. only.

NATIVE PLANT NURSERY

Extensive range of native plants, including many rare or difficult to obtain species. Native bird feeders also available.

Mt. Martha Shopping Centre,
Mornington Peninsula, Victoria.
Phone Mt. Martha (STD 059) 74-1792
weekdays. (Open weekends only.)**Austraflores Nursery**W. & J. MOLYNEUX NURSERIES
PTY. LTD.

BELFAST RD., MONTROSE, VIC. 3765

The largest range in Australia from which to select. Mail orders catered for within Australia and Overseas. Retail only.

Open 9-5.30 Mon.-Sat.; 12-5.30 Sun.
during Spring and Autumn.
Agency in Canberra, A.C.T.1975 catalogue — 60c at Nursery,
\$1.00 posted**ALEXANDER PLANT FARM**
(Doug Twaits, Prop.)2 Winfred Street, ESSENDON, VIC.
3040

Phone: 379-5163

EVERYTHING FOR THE GARDEN
Specialising in Australian Native Plants**Nindethana Native Plant Seeds**

By Packet, Ounce or Pound

Large selection. Send for free list.

NINDETHANA

Box 129, Wellington, N.S.W. 2820

BELBRA NURSERYIn the heart of the Gramplains
LARGE RANGE OF AUSTRALIAN
NATIVES

Closed Wednesday only

BOX 12, HALL'S GAP, VIC. 3381

Greenbriar Drive-in Nursery

AUSTRALIAN NATIVE PLANTS

Large and Varied Selection

195-7 MOUNTAIN VIEW RD.,

BRIAR HILL, VIC. 3088

Phone: 43-1468 — Open Weekends

MICHIE'S KENTLYN NATIVE PLANT NURSERY

Specialising in Australian Plants

Beth & Bob Michie invite you to call
96c George's River Rd., Kentlyn, 2560

Phone: Campbelltown 25 1583

Closed Tuesday & Wednesday only

NAROOMA NATIVE NURSERY

(H. & N. RYAN, Proprietors)

15 TILBA STREET, NAROOMA, N.S.W.
2546 — Phone 132

Good variety of native plants.

Catalogue Available 10 cents.

WIRIMBIRRAHume Highway between Tahmoor and
Bargo, N.S.W.**AUSTRALIAN PLANTS**

Wide Range — Phone: 841112 Bargo

OPEN SEVEN DAYS A WEEK

"CHIVERS' NATIVE PLANT NURSERY"26 Cowper Road, Black Forest, S.A.
5035 — Phone: 93-7808

Open April-May — Catalogue Available

From March 1st—Send 10 cent stamp

No Interstate Orders



COLLECTORS NURSERIES NATIVE PLANT SPECIALIST KEVIN REED

Cnr. BELLEVUE CRES. and SEAFORD RD. SEAFORD Vic. 3198

Huge Selection from ground
cover to trees, rare and the
common, sizes large or small

Open Saturday and Sunday

(Closed Mon. & Tues.)

PRESERVATION BY CULTIVATION

Closed Tuesdays

FLORALANDS

KARIONG, via GOSFORD, N.S.W. 2250 — Prop. Brian & Lyn Parry

A large variety of the most popular native plants at nursery

PHONE: Gosford 25-1142

Send self addressed envelope for plant list.

Clearview Nursery—W. Cane, Box 19 Maffra, Victoria, 3860. Specialist in developed plants.

FOR A DIFFERENT SELECTION OF NATIVE PLANTS
ALBION PARK NURSERY

150 PRINCES HIGHWAY, ALBION PARK RAIL, N.S.W. 2527 - PHONE: (042) 562865

No Mail Orders — Closed Tuesday and Thursday

Lakkari Native Plant Nursery

Russell & Sharon Costlin
 Wide range of all common varieties,
 many interesting and hard to get plants,
 new introductions from North Queens-
 land and other tropical areas.

477 REDLAND BAY ROAD,
 CAPALBA, QLD. 4157 — 206-4119
 (closed Thursdays)

PARSONS NATIVE PLANT

NURSERY

Trees, Shrubs, Ground Cover, Climbers
 Specialising in Grevilleas

Open Thur., Fri., Sat. 9-5; Sunday 9-1
 Research—Warrandyte Rd., Research,
 Vic. 3095

SUPPORT YOUR
 SPECIALIST
 WILDFLOWER
 NURSERYMEN

AUSTRALIAN PLANTS CENTRE

(John & Joan Barton)
 Large variety of natives.
 Specialising in rockery plants.
 Retail only—No Mail Orders
 Pine Ridge Rd., Coombabah, Qld. 4215.
 Phone Gold Coast 37-1227
 Closed Mondays (except Pub. Hols.)

DEANES ORCHID NURSERY

Specialising in Australian Native Orchids

Please send for descriptive list. Plants sent anywhere.

Nursery open every weekend—weekdays, phone 86-3446

157 BEECROFT ROAD, BEECROFT, N.S.W. 2119



**FOREST
 NATIVE
 NURSERY**

(02) 450 1785

NO MAIL ORDERS

9 Namba Road, Duffy's Forest, N.S.W.
 (beside Waratah Park, via Terrey Hills)

**MAGAZINES, BOOKS, BROCHURES, PRICE LISTS,
 CATALOGUES, OFFICE STATIONERY, LETTERHEADS,
 INVOICES, STATEMENTS, ENVELOPES, BUSINESS CARDS**

Consistent quality and unbeatable service together with reasonable
 costs remove most of the problems confronting people purchasing
 printing at . . .

SURREY BEATTY & SONS

43 RICKARD ROAD, CHIPPING NORTON, N.S.W. 2170

Telephone: 602-7404, 602-3126 S.T.D. 02

PAST ISSUES OF "AUSTRALIAN PLANTS" AVAILABLE

Because of the vast wealth of our flora there is very little repetition.

VOLUME No. 1 Issues 1-12 — to be reprinted in 1977. Watch for announcements.

VOLUME No. 2. Issues 13-20, all available only fully bound at \$9.00 plus \$1.00 postage, including "A Descriptive Catalogue of Western Australian Plants".

VOLUME No. 3. Issues 21-28, all available only fully bound at \$9.00 plus \$1.00 postage, including also "Catalogue of Cultivated Australian Native Plants" valued at \$6.00.

VOLUME No. 4. Issues 29-36, all available only fully bound at \$9.00 plus \$1.00 postage, including "Western Australian Plants for Horticulture—Part I" valued at \$6.00.

VOLUME No. 5. Issues 37-44, all available only fully bound at \$9.00 plus \$1.00 postage, including "The Language of Botany", a valuable reference to words and terms.

VOLUME No. 6. Issues 45-52, all available only fully bound at \$9.00 plus \$1.00 postage, including "Western Australian Plants for Horticulture—Part II" valued at \$6.00.

VOLUME No. 7. Issues 53-60, all available only fully bound at \$9.00 plus \$1.00 postage, including "North Australian Plants" valued at \$6.00.

"Australian Plants" is produced as a continuing series each issue adding to the information recorded over the past issues. The most valuable and complete reference.

OTHER BOOKS OF THE SOCIETY

West Australian Plants for Horticulture. Parts 1 & 2 each available at \$6.00 plus 80c postage from the Editor. On the right-hand pages of these books there is a full colour plate of a W.A. wildflower and on the page opposite is a description of this plant together with another plant or plants from the same genus. The descriptions are clear and in simple terms with a special section on propagation and horticulture treatment and potential. Part 2 most recently published carries 42 new colour plates.

WEST AUSTRALIAN PLANTS—A Descriptive Catalogue. Price \$6.00 plus 80c postage.

The only complete reference to the flora of Western Australia.

AUSTRALIAN INDIGENOUS ORCHIDS, by A. W. Dockrill. Price \$24.00 plus \$2.00 postage.

A magnificent large book. The only complete reference to all Australia's epiphytic orchids. Each plant is fully described botanically followed by a description for the layman and each has a large detailed line drawing.

BINDERS FOR ISSUES OF "AUSTRALIAN PLANTS". Price \$3.00 plus 60c postage.

Good quality D-ring binders with gold lettering on the spine. At the moment available only with Vol. 9 or without a number on the spine.

President: Mr. W. H. Payne, 860 Henry Lawson Drive, Picnic Point, N.S.W. 2213.

NORTH AUSTRALIAN PLANTS — 1, by Jenny Harmer. Price \$6.00 plus 80c postage.

This is the first book giving a reasonable coverage to the flora in the North of Australia and will be an authoritative reference to it. There is a reference to 380 species. While this is a lot of flowering plants it is still a long way short of the Northern Australian Flora. As such it is Part 1 of a series and describes those plants of horticultural interest that are to be found in the Darwin area and Arnhem Land, known locally as the "top-end" of the territory.

This book will be of interest to all. On each right hand page is a large full colour plate of a wildflower usually showing the tree or shrub, and a detail of the flower. Opposite is a reference to the plant family in which it belongs together with other genera in the same family that occur in the area, a description of the genus together with all other species of the same genus occurring in the area followed by a clear description of the plant pictured, its distribution and economic value. Of special interest, on each page there is a separate paragraph on Cultivation.

THE SOCIETY FOR GROWING AUSTRALIAN PLANTS

"AUSTRALIAN PLANTS" IS AUSTRALIA'S NATIONAL PRESERVATION JOURNAL

(A non-profit making venture, produced quarterly, dedicated to preservation by cultivation)

This Journal is published by The Publishing Section on behalf of:

SOCIETY FOR GROWING AUSTRALIAN PLANTS—N.S.W. REGION:

President: Mr. W. H. Payne, 860 Henry Lawson Drive, Picnic Point, N.S.W. 2213.

Secretary: Mr. Ray Page, 21 Robb Street, Revesby, N.S.W. 2212.

SOCIETY FOR GROWING AUSTRALIAN PLANTS—QLD. REGION:

President: Mr. J. Smith, Roger Street, Birkdale, Qld. 4152.

Secretary: Mrs. D. Brown, 79 Birley Street, off Wickham Terrace, Brisbane, Qld. 4000.

SOCIETY FOR GROWING AUSTRALIAN PLANTS—SOUTH AUSTRALIAN REGION: INC.:

President: Mr. J. Scarvelis, 13 Wakelin Terrace, O'Sullivan Beach, S.A. 5166.

Secretary: A. Peart, Box 1592, G.P.O., Adelaide, S.A. 5001.

SOCIETY FOR GROWING AUSTRALIAN PLANTS—TASMANIAN REGION:

President: Mr. R. Wyatt, 7 Cedar Street, Lindisfarne, Tasmania 7015.

Secretary: Mrs. D. H. Gill, Box 1353P, G.P.O., Hobart, Tasmania, 7001.

SOCIETY FOR GROWING AUSTRALIAN PLANTS—VICTORIAN REGION:

President: Mr. D. B. Fletcher, 247 Waverley Road, East Malvern, Victoria 3145

Secretary: (Sister) E. R. Bowman, 4 Homebush Crescent, Hawthorn East, Victoria 3123

Please do not phone or call at private home—enquiries by mail only.

SOCIETY FOR GROWING AUSTRALIAN PLANTS—CANTBERRA REGION:

President: Mrs. Christine Tynan, 42 Bindaga Street, Aranda, A.C.T. 2614.

Secretary: Mrs. J. Benyon, P.O. Box 207, Civic Square, A.C.T. 2608.

WEST AUSTRALIAN WILDFLOWER SOC. (Inc.):

President Mrs. M. Wittwer, P.O. Box 64, Nedlands, W.A. 6009.

Secretary: Mrs. K. Edmonds, P.O. Box 64, Nedlands, W.A. 6009.

Seed is in very short supply—try the commercial seedsmen, not W.A. Society

Membership is open to any person who wishes to grow Australian native plants. Contact the Secretary of the Society for your State for information without obligation.

PUBLISHING SECTION FOR SOCIETIES—Produced as a non-profit venture.

Managing Editor: W. H. Payne, assisted by P. D. Leak; Despatch by E. Hubner, H. Jones with families. Stencils Miss R. Mashford. No telephone enquiries please.

MAIL—Address mail to the Editor, 860 Henry Lawson Drive, Picnic Point, N.S.W. 2213.

Please do not telephone or call at private home—enquiries by mail only.

SUBSCRIPTION—Members: Apply to State Secretary above.

NON-MEMBERS: You may receive the next 4 issues direct to your home by forwarding an annual subscription of \$3.00. Overseas subscription \$4.20 Aust., £2.50 in English currency or \$5.50 U.S.

WILDFLOWERS OF SOUTH AUSTRALIA



Photography by M. L. Kenny

PHEBALIUM BULLATUM

This attractive shrub, 2½ to 3 metres high, may be found on Eyre Peninsula. The brown buds, shown above, appear in late autumn giving a contrast in colour to the bright green of the leaves. The lovely, clear yellow flowers begin to open in winter, coming into full bloom in spring and lasting until October. See article on page 250.