

Australian Plants

Registered at G.P.O., Sydney, for
transmission by post as a periodical

SEPTEMBER, 1961 Vol. 1, No. 8
PRICE: THREE SHILLINGS



Photo by R. F. Leaney

PHAIUS TANKERVILLIAE

Article Page 3

Growing Ground Orchids

L. CADY, Kiama

This statement covers a large number of species, for wherever we travel we are usually sure of finding some type of the "Groundies" present. The writer only intends to discuss the method he has found to be successful.

The compost, in which the orchids are to grow, being the all important question, will be discussed first. A mixture is made of black sandy leaf mould, that found under trees in sandstone country is ideal, and soil from the natural habitat of the plant. This soil or loam varies with the genus one is dealing with, and experience will show the grower how much to use. It is thought better to have the mixture a bit on the sandy side to start with, than have it too heavy. To this mixture is added a small part of very old cow manure (powdered). The manure can be left out if not available.

This mixture can be used with success for any of the following genera:

Pterostylis (Greenhoods), *Caladenia* (Spider or other type), *Corybas* (Helmet orchids), *Cryptostylis* (Tongue orchids), *Caleana* (Duck orchid), *Spiranthes* (Ladies' tresses), *Acianthus* (Gnat or Pixie caps). In fact, it can be used with confidence as a basis for any of our terrestrial orchids.

Where plants are found to like a heavier type of soil, the compost is to contain a much larger percentage of the original loam that the plant was collected in, together with a proportion of well-rotted leaf mould. Such plants belong to the genera *Thelymitra* (Sun orchids), *Glossodia* (Wax Lip orchid), *Prasophyllum* (leek leafed orchid) and *Diuris* (Double Tails).

Potting is of importance as one has to provide perfect drainage. Take your pot, usually a 3 or 4 inch is large enough. Place a large "crock" over the drainage hole and then add about one inch of granulated charcoal or small chips of old pots, the former being preferred. Add about two inches of compost. The tubers can now be spaced around the pot allowing plenty of room for the plants to multiply. Some of the *Pterostylis* may make up to four new tubers per year. Now the pot can be topped off with compost.

Watering is another important thing to attend to. Overwatering must be avoided at all costs, and it is much better to underwater a plant if in doubt of its dampness. The pot should be kept moist at all periods of the plant's growth however. When the dormant period arrives the compost should be gradually dried off. Dipping is the preferred method of watering.

Repotting should be carried out every year, after giving the plants seven or eight weeks from flowering to harden off their new tubers. This period of drying out varies with different genera. If the tuber is left three to four weeks after the green part of the plant has disappeared, it should be ready to repot.

Shading—this point is one to watch, and the best way to overcome the problem is to take notice of this feature in the plant's natural habitat. If it is found in the full sun as are *Thelymitra* and *Diuris* then they should be placed in the sunniest end of the bush house and the reverse for the shade lovers, the *Pterostylis*, *Corybas*, and such. For those people not possessing a bush house, a position of semi-shade would be right for the shade plant, and for the sun lovers, a position beside a shrub or under trees where the tree shelters the plants from the mid-day heat, for these plants like their tubers to be kept cool. If an outside position is used, more care will be required in watering as pots will dry out much faster than in the bush house. Draughts must also be avoided; the more sheltered the position is the better.

Manure is usually a controversial subject with all orchid growers and probably no two would agree to the same thing, but it has been noted that at least two of the above genera (*Pterostylis*, *Cryptostylis*) show marked benefit from an occasional dose of weak liquid fowl or cow manure. Both plants show a marked increase in root growth and in larger flowers.

It has also been found that *Pterostylis* will do equally well in the following two mixtures, tan bark *Cymbidium* compost, and a mixture of sandy loam, leaf mould and chopped tree fern fibre. The main thing to remember is that they must be provided with perfect drainage.

Terrestrial orchids can be removed at any period of their growth, but preferably just as the plant breaks ground. Tubers vary in depth. It appears to be governed by two things (a) climatic conditions and (b) soil condition. The harder the soil the shallower the tubers usually, but they rarely go deeper than three inches. A sturdy trowel or fork seem the best tools for the job and should be inserted a little away from the plant. It is most important to remove the tuber intact. The soil is then carefully broken away from the tuber and stem which should be kept moist and not allowed to dry out.

THE ORCHID PHAIUS

By REG F. LEANEY, F.R.H.S.

Phaius tankervilleae is Australia's largest and showiest species of orchid, with fine bright green leaves which persist throughout the year, and flower spikes up to six feet in height, quite upright, with a dense cluster of fine large flowers towards the top. I have flowered *P. tankervilleae* with up to forty one blooms and expect this figure could easily be exceeded in natural conditions.

Phaius tankervilleae is a "terrestrial", that is, it grows in the ground. It does exceptionally well in cultivation. Grown in a large pot or even in a large tin with plenty of drainage and in fairly loose mixture of rich humus, tan-bark and sandy leaf mould it is excellent. Give it plenty of water in the summer or growing season. This plant will take all the poultry manure you can give it. Flower spikes emerge in late winter or very early spring from the leafy shelters at the base of the mature bulb-like structures that form at the base of the leaves. When they first appear, and for the first six or eight inches of their growth the flower spikes are usually white, but as they progress the characteristic green takes over and by the time the buds appear from beneath small leafy bracts, the stem is quite green. *Phaius tankervilleae* flowers from the recently completed growth and these flower once only, relying on the new season's growth for the next flower spike. After the flowering is finished the leaves show signs of maturity and do in fact finally yellow and rot off. During this time the pseudobulbs are becoming more definite and end up quite large and bulbous and finally may be severed from the main plant. On potting separately they very quickly make strong growth and in no time at all you have another plant which should easily flower the following year or at worst the summer after.

Phaius tankervilleae is found in swampy, wet, boggy ground mostly in coastal swamps along the coast of Queensland, and has been found as far south as the Richmond River, N.S.W. It grows north right up through the islands and to India, Burma and China, no doubt right through the Malay Archipelago, where I understand it is quite a common garden plant. I have seen *Phaius tankervilleae* growing splendidly in rock gardens in Neutral Bay and at North Sydney, where about half shade is available and there is plenty of drainage and rich humus available. One was growing in an old five gallon drum under some trees and when I last saw it, it was in full flower having five tall spikes with over one hundred fully open flowers.

One of the very nice things about *Phaius*, is that all the flowers come out at the one time thus making the maximum showing, and a well-flowered *P. tankervilleae* really is an impressive sight. The flowers last about two weeks in perfection by which time they are starting to darken somewhat and then one day, they all fall off at once. As will be seen in the colour photo on the front page, the flowers are white or almost so at the back of the sepals and petals but the front of the flower has a different tale to tell. The sepals and petals have a fine bright amber brown shade, almost cinnamon. The long "Cattleya type" labellum is white with a very good section of rhubarb pink at the front which opens out somewhat and is nicely undulated at the front edge.

Phaius has the very happy habit of being able to propagate from cuttings of the spent flower spike. Under good conditions several plants can be quickly raised from each spike. Cut it to six inch lengths, place on a pot of sphagnum and keep moist. Before long the new plantlets will come from behind the tiny leaf bracts and quickly root into the pot below. They take about three years to bloom.

The Queensland Phaius . . . By D. Hocking, Springbrook

As well as *P. tankervilleae*, Queensland has two other species, *P. australis*, which has more reddish brown sepals and petals and the front of the labellum brownish, with its variety *P. australis* var. *bernaysii* with almost yellow flowers, and a rare species from the North Queensland mountains above 2000 feet, *P. pictus*. This latter species is not as easy to grow as the others from the coastal lowlands. It has an elongate aerial stem up to about 2ft. high on which the leaves and inflorescences are borne.

I have found the coastal and N.Q. species reasonably easy to grow in a *Cymbidium* type compost and even more satisfactory, grown direct in the ground—loamy soil plus old cow manure or leaf mould—in a sunny position.

Growing Terrestrials in Tasmania

FROM PAT PALMER—HOBART—TASMANIA

I have not been growing orchids in pots for very long but have grown successfully *Pterostylis* (four species) *Acianthus* (two species), *Caleana major*, *Glossodia major*, *Microtis unifolia*, *Diuris maculata*, *Caladenia* (four species), *Thelymitra* (various species), *Cryptostylis subulata*, *Eriochilus cucullatus* and *Chiloglottis*. I use a five (5) inch pot, potting the plants on the spot. I place a layer of small stones on the bottom, then pieces of charcoal, and a layer of sand or top soil. With a trowel, I dig up the plant as near to the shape of the pot as possible and then push the sod firmly into it. A layer of soil and leaves from the natural habitat of the plant (plus sandy soil from a "proven" orchid area added later if the natural soil is poor) is used to "top off", leaving about half an inch to top of the pot.

The plants are watered approximately as often as "mother nature" would but if the soil is getting dry, I add a little moisture attempting to keep to natural conditions of moisture in winter and dryer in summer. Repotting of several will be necessary as they are now very crowded. All pots are kept indoors in a basement with plenty of subdued light. Plants found in the open are placed to receive more sunlight.

I must say I started to grow orchids in the face of most discouraging remarks from several "naturalists" and gardeners. However, plants which still thrive despite being thrown aside in roadmaking, etc., must be made of stern stuff and the reason they have not grown well in gardens was that they were "overfed" in attempted cultivation.

FROM Mr. B. J. DUDMAN—BURNIE—TASMANIA

I have been growing native orchids in pots since about 1949, when at a monthly excursion of the Burnie Field Naturalist Club I excepted a senior club member's "challenge" that "native orchids could not be grown successfully in pots at home". Since that day I have successfully flowered 21 of 41 species in 16 genera. The most responsive species were *Pterostylis longifolium*, *P. pedunculata* and *P. vittata*, *Caleana major* (a number of plants up to 24 inches high carrying up to six flowers) *Corybas unguiculata*, *C. aconitiflorus* and *Acianthus exsertus*. I have had only limited success with *Thelymitra* and *Caladenia* but hope to improve on this during 1961-62, when my new 20' x 10' glass-house is completed.

All my plants are potted in four to six inch pots, using the same soil that they were collected in. Particular attention has been given to drainage, for, up to the present time, overwatering has caused most of my fatalities. *Cymbidium* "tan bark" mixture has been used for my *Pterostylis* resulting in good healthy, well-flowered plants.

The Genus *Chiloglottis*

By L. CADY—Kiama, N.S.W.

Chiloglottis is one of our lesser-known terrestrial orchid genera, consisting of eight species, being scattered mainly over the eastern coast of Australia from Queensland to Tasmania, and also in New Zealand.

The individual plants rarely exceed 18cm. in height, normally being much shorter.

The name *Chiloglottis* means "Lip-tongue", this portion of the flower being ornamented with various shaped calli.

KEY TO CHILOGLOTTIS SPECIES IN AUSTRALIA

- A Petals deflexed against the ovary, slender, dorsal sepal contracted in its lower half. Calli in clusters
 - B Labellum with one large reflexed callus, and many smaller ones; leaves stem claspings
 - C Labellum lamina obovate; callus reflexed, its stem smooth *C. reflexa*—1
 - C* Labellum lamina ovate or rhomboidal; main callus two headed, stem of callus tuberculate *C. formicifera*—2
 - B* Labellum lamina rhomboid or diamond shaped calli in small bunch in centre of lamina; leaves petiolate *C. trapeziformis*—3
 - D Labellum lamina rhomboid; calli crowded, two main deflexed calli *C. dockrillii*—4
 - A* Petals spreading; flowers larger than preceding, dorsal sepal not much contracted at its base. Calli scattered.
 - D* Flower segments all similar, petals and labellum with glands on lamina. Leaves stem claspings *C. trilabra*—5
 - E Labellum oblong, two large stalked calli, others scattered *C. pescottiana*—6
 - E* Labellum triangular-acute (trowel shape); three large calli at base, others scattered *C. cornuta*—7
 - F Labellum broad-ovate sometimes cordate; two large calli on mid-vein *C. gunni*—8

NOTES AND DESCRIPTIONS OF SPECIES:

1. *C. reflexa* (Labill.) Druce—RE-FLEX-A (refers to main gland)—Autumn bird orchid.

Plant to 16cm. tall (stems elongating after pollination) colour pale greenish to dull or reddish brown. Dorsal sepal narrow linear broadening at apex, incurved 12 to 15 mm. long. Lateral sepals narrow-linear, recurving. Petals approx. 10mm. long, sharply deflexed oblong-acute. Labellum with longish basal claw, the lamina obovate to rhomboid. Calli of various shapes, usually clustered towards the middle of the lamina and along the mid-vein, often extending to tip. One large callus reflexed towards column, its apex entire or variously shaped, the stem or stalk of this callus is always smooth. The leaves variable, elliptic or oblong-lanceolate-acute, petiolate.

Flowers—summer to autumn, rarely in the eighth month.

This species would be the commonest of the genus, being found in Queensland, N.S.W., Victoria and Tasmania. It is a most variable species, consisting of three fairly distinct forms (see plate). The plant responds well to culture, but is a shy flowerer. Pollination is caused by insects.

2. *C. formicifera* Fitzg.—FORM-ICI-FERA (callus resembles an ant) The Ant Orchid.

Plant resembles *C. reflexa* in habit and colour. The main differences lie in the labellum, which are: lamina rhomboid occasionally rounded in front, short pointed. Calli numerous extending the full length of lamina, mainly along the mid-vein. The large callus conspicuously double headed, its stem clothed with numerous warts or tubercles and often surrounded by numerous smaller insectivorous-type calli.

Flowers chiefly September.

EDITOR'S NOTE: Mr. L. Cady, "Milford", Saddlebank Rd., Kiama, N.S.W., has formed a study section for our terrestrial native orchids. Any reader in Australia is eligible to join so if you would like to grow these fascinating plants or can report of experiences, please write to Mr. Cady. Many of our native orchids are nearing extinction and we desperately need interested readers from all parts of Australia particularly in North Queensland and the west to assist Mr. Cady in some small way. No experience is needed just a desire to assist a worthy project.

This rare plant resembles No. 1 closely but differs in its main callus. The plant has a limited range in Australia, being found chiefly between the Hunter River and the Illawarra area. Surprisingly though, it is found at Kaitaia on the north island of New Zealand. Its pollination is carried out by the male *Ichneumen* Wasp.

3. *C. trapeziforme* Fitzg.—TRAPEZ-I-FORME refers to the shape of the labellum. Broad Lipped Bird Orchid.

Plant resembles No. 1 in colour and habit. Main differences are in the labellum structure, these being: labellum shortly clawed, lamina rhomboid or diamond shaped, with one small group of calli in the centre of the lamina, no large single callus present. Labellum usually assumes a perpendicular position with the column. Leaves as in No. 1 but not stem clasping.

Flowers September to October. Plant agrees with No. 1 in colour and habit. Little is known about the pollination of this species, but it is assumed that it would be in a similar way as the last two. Its range in N.S.W. is confined to the coast and eastern falls of the tablelands. It's also recorded from Victoria.

4. *C. dockrillii* Rupp.—DOCK-RILL-II—named after a noted present day taxonomist of orchids. Tall Bird Orchid.

Plant resembles No. 1 in form, its height is up to 18cm. and is robust for the "reflexa" group. Leaves almost sessile, ovate, and sharply pointed. The main differences are again found in the labellum. Labellum on a fairly long claw, lamina rhomboid, tip protruding, the lamina glands conspicuously covering the mid-vein of the lamina for its entire length, two large jointed calli protrude over claw, slightly deflexed.

It flowers in February. The plant's pollination is not known. It is the largest plant in the "reflexa" group, its range being confined to Barrington Tops in N.S.W.

5. *C. trilabra* Fitzg.—TRI-LAB-RA (refers to the three segments resembling one another). Three Tongued Bird Orchid.

Plant similar to No. 1 Dorsal sepal cuneate with a short point. Lateral sepals spreading or erect, sometimes recurving. Petals obovate, identical with labellum even to its glands. Calli composed of a large green one at the claw and other large brown ones in the centre of the lamina surrounded by smaller types. It flowers in March.

The author of this plant states that twenty plants were discovered at Mt. York on the Blue Mountains in N.S.W. This and the description is all that is known to science as to the writer's knowledge there are no known specimens.

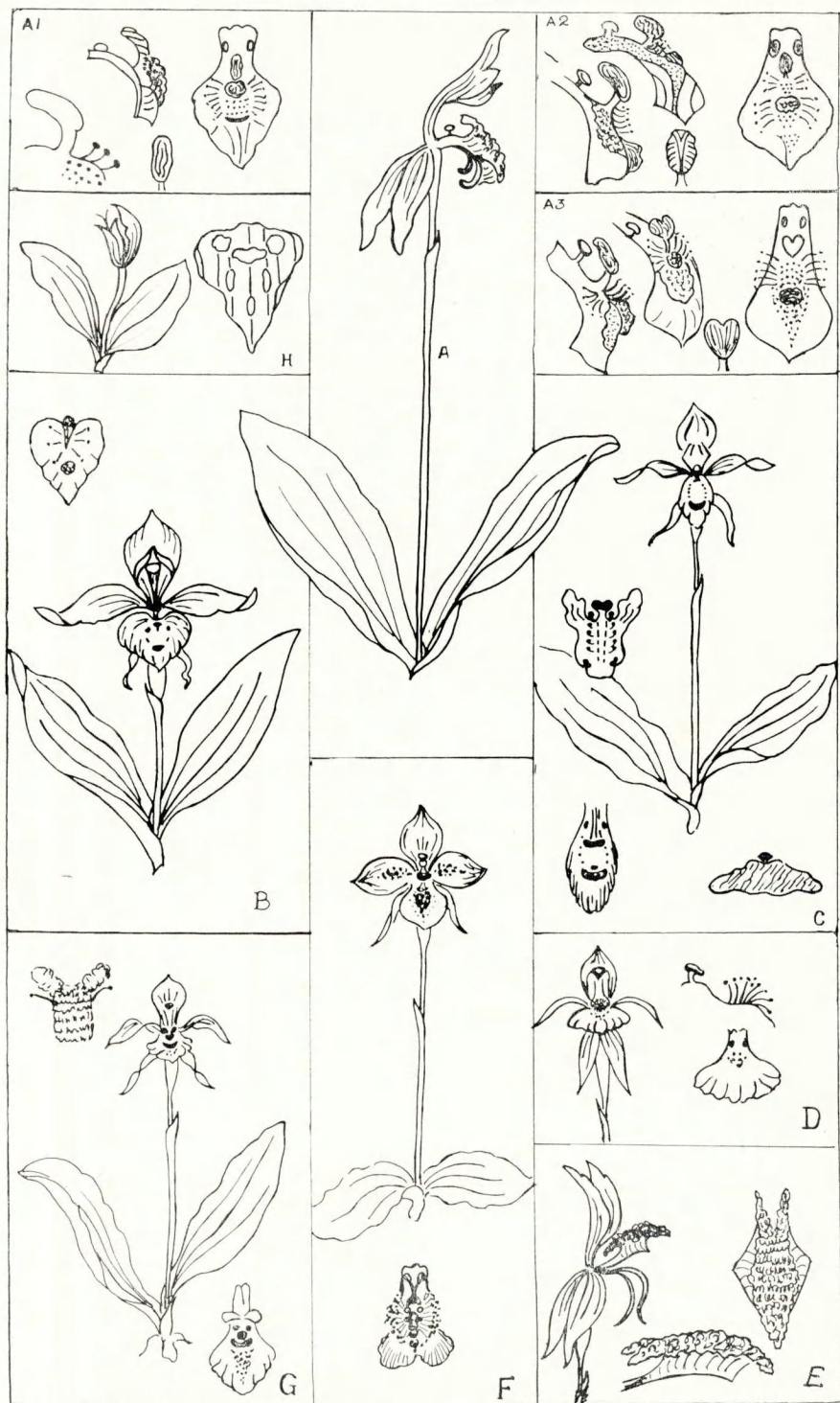
6. *C. pescottiana* Rogers—PESCOTT-I-ANA (refers to the late E. E. Pescott a botanist of note). Alpine Bird Orchid.

Plant slender up to 15cm. high, colour greenish-bronze or purplish-black. Dorsal sepal broader at apex. Lateral sepals linear spreading. Petals narrow-lanceolate-acute, spreading. Labellum oblong and canoe-shaped with two large glands and a number of smaller ones. It flowers in spring to early summer.

YOUR JOURNAL NEEDS PROTECTION . . .

Why not preserve your journal against damage with a special binder now available. This binder will accommodate three years' supply of journals. It is attractively bound in emerald green plastic fabrex with gold titling at the reasonable cost of 12/- each, including postage and packing. Send your remittance to The Editor, 250 Picnic Point Road, Picnic Point, N.S.W.

THOSE WHO HAVE RECEIVED FOLDERS ARE VERY PLEASED WITH ITS QUALITY AND VALUE

(A) typical *C. reflexa*(A1 to A3) form of *C. reflexa*(B) *C. gunnii* and labellum(C) *C. pescottiana* and views of labellum(D) *C. trapeziforme* and labellum(E) *C. dockrillii* and labellum(F) *C. trilabra* and labellum(G) *C. formicifera* labellum and callus(H) *C. cornuta* and labellum

This extremely rare plant is found at Cravensville in the north-east of Victoria and Tasmania and very few botanists have examined it in its fresh state. It is thought to be a natural hybrid between *C. gunnii* and *C. trapeziforme* and is found in scattered colonies at the roots of Eucalypt species, under *Bursaria spinosa* bushes.

7. *C. cornuta* Hook.f.—COR-NU-TA (Green Bird Orchid).

Plant up to 12cm. high, fairly robust. Flowers green sometimes spotted with purple. Dorsal sepal broad, ovate-lanceolate-acuminate, erect lateral sepals, linear-lanceolate, usually in front of the labellum. Petals similar to lateral sepals. Labellum triangular-cordate or trowel shaped, three large stalked rounded calli near its base, two linear ones each side of lamina towards apex, and three smaller ones between these large ones. The calli is very variable. It flowers from October to November.

This plant was for a long while known as *C. muelleri* Fitzg. but was later found to be identical with the New Zealand plant *C. cornuta* Hook.f. It is often found growing on the base of tree ferns. Nothing is known on its pollination. Plants are recorded from Victoria, Tasmania and New Zealand.

8. *C. gunnii* Lindl. GUNN-II (after collector R. Gunn). Large Bird Orchid.

Plant usually short, often stem and flower not exceeding leaves, but stem elongating after pollination up to 20cm. Flower green, at times tinted with purple. Dorsal sepal broad ovate, apex pointed, a slight constriction at the base. Lateral sepals linear, recurving. Petals erect or spreading, lanceolate-falcate. Labellum cordate-acute but variable, the calli are variable in size and shape and number usually two large ones on the mid-vein with a number of smaller types at each side. It flowers November to December.

This plant is the largest of the preceding three. Plants examined from Barrington Tops were up to 18cm. high and the flower was 4cm. wide. It is truly a highland plant preferring damp mossy soil under eucalypt cover. It takes to culture well, multiplies freely and flowers regularly. Occurs in N.S.W., Victoria and Tasmania.

NOTES ON CULTURE AND PROPAGATION:

This genus reproduces, mainly by adventitious growths, the "reflexa" group usually more than *C. gunnii* Lindl. and its allied types. The other method is by seed.

The compost used for these plants consists of 80% black sand (the sand found under trees in sandstone country is preferred) 20% loam in which the plant is found, and a small part of very old cow manure. This compost is kept moist NOT WET. A fairly warm area that gets broken shade is an ideal position.

It is as well to note the position and the conditions in which one collects the plants and I find it better to take only two or three tubers to practice on.

It must also be remembered that many of our orchids are protected flora and should always be regarded as such.

Correspondence from D. Hocking, Springbrook, Qld.

I have grown *Chiloglottis reflexa* and *C. trapeziformis* in a grey sandy loam with or without a little old cow manure. Fascinating tiny flowers to an orchid crank but only of passing interest to any but a real enthusiast. Beautiful under a lens but actually very inconspicuous plants with insufficient flowers to warrant cultivation so unless you are a real enthusiast leave them to grow in their natural habitat.

Orchid Seed Germination

By H. BOYD

Orchids have been imported into continental countries for more than 200 years. A lot of attention has been paid to their culture in England. In the past many huge collections of exotic orchids were housed in heated glasshouses and it became a fashion in the Victorian era among wealthy people. Scientific interest was taken in their culture, and then came the "hothouse", the "intermediate house" and the "cool house". A lot of attention was paid to composts and orchid culture began to get on to a sound basis. Attempts were made to germinate orchid seed on many types of media, corkfern roots and fibre sphagnum moss, and around the roots of the parent plants. The latter method gave the better results, but they were not very constant. Many hundreds of thousands of seeds were sown to obtain a few plants.

The first orchid hybrids were made by a Mr. Veitch of London, a plant propagator and nurseryman in the 1850's. These were *Calanthe* hybrids, the seeds were raised on the compost around the roots of the parents.

A. B. Franks in 1885 discovered that orchids lived in association with a fungi (Symbiosis) *Rhizoctonia repens*. This was an important step forward, and showed why seed developed on used orchid compost or around growing plants. Many practical applications of this idea were tried. Sphagnum moss and orchid compost were mixed in a terracotta pot, the pot being over-filled. A piece of towelling was tied over the surface to obtain a domed surface like a pin cushion, seed was then sown on the rough surface of the towelling and with the media of sphagnum and compost kept wet, germination was fair. Another method was to grow it on brick dust and orchid compost under a bell jar, on large pieces of cork, and bark, that had been buried in orchid compost, or on rotting wood to which an orchid had been attached. All of these methods gave some results, but they were inconstant, due to many factors.

Charles Darwin interested himself in the fertilisation of orchids and his book on the subject is as fresh as the day it was written. One of his comments might be worth repeating here. He estimated that if all the seed from one plant of a common British orchid attained 100% fertilisation and then 100% germination and conditions were 100% ideal, in the first generation it would cover an acre, in the second all the United Kingdom and in the third, the world.

Men who have played outstanding roles in orchid culture at the turn of the century are Bernard (French), Burgeff (German), Ramsbottom (English) and, of course, a man who is very seldom mentioned these days, the great German botanist, E. Pfitzer, the man who successfully placed orchid genera in their tribes and sub-tribes in the large family of *Orchidaceae*. His work has been included in that of Engler and Prantl's international system "Die Natürlichen Pflanzenfamilien".

The great break through in the germination of orchid seed came just after the First World War, when Dr. Lewis Knudsen of Cornell University demonstrated an aseptic method. It involved growing seed on a type of media used for the culture of Bacterium with complete asepsis and without the association of *Rhizoctonia repens*. This was achieved by using a substance that makes a very good gell (Agar), distilled water and nutrient salts. These substances are mixed by boiling together then, whilst hot, poured into flasks or bottles to the depth of half an inch, plugged with cotton wool that has

EDITOR'S NOTE: This article is dedicated to the preservation of our native orchids. If any one in Australia will accept the challenge to raise native orchids from seed to meet the growing commercial market, I will assist in obtaining the required seed and provide at least twelve months free advertising in the journal when the plants are ready for sale.

been sterilised with dry heat, then placed in an autoclave at thirty pounds to the square inch for half an hour. The flasks are then removed and the gell allowed to set.

Attention must be paid to pH values. This varies with different species. When in doubt use a pH value of about 5.

For the sterilisation of seed, calcium hypochlorite 10 grams, 140 c.c. of water are placed in a flask and stoppered. It should be well mixed, and allowed to stand till the solids settle, then the clear liquor can be poured into a one inch test tube and filled about half an inch from the top. The seed placed in this, will float, and should be allowed to remain in for ten minutes by the clock. A platinum loop is passed through the flame of a spirit lamp, the floating seed picked up by the loop, the bottle picked up in the left hand, held on its side, the cotton wool plug removed and the seed transposed from the calcium hypochlorite into the condensed water on the surface of the flask. A sterile rubber bung replaces the cotton bung. Most epiphyte seedlings do better if held at about 80 degrees Fahrenheit in the winter. This involves an incubator. These plants remain in the flask from six months to twelve months.

Some results have been had from Agar sugar and uncooked tomato juice, autoclaved together. Mr. Victor Clegg, of Manly Vale, has had very good results from the use of Agar sugar and digested fish protein. This can be bought as Atlas Fish Fertiliser. The protein is digested with papain. 7½ c.c. of this material, 20 gm. of sugar, 1000 c.c. of water. It is boiled and autoclaved the same as above. Comparative tests carried out by Mr. Clegg against Knudsen's formula, show that the fish materials give far better results. One of the advantages of germinating seed in a flask is that it requires no attention until it is taken out.

Mrs. J. Goldsmith of Lane Cove has, over the last ten years, demonstrated a new and novel technique for the septic germination of orchid seed. This method is quite novel and very useful to the person who can water twice or three times a day in the summer. Mrs. Goldsmith over the years has built up quite a large collection of early flowering orchids (*Cymbidiums*) by this method. The writer has observed this technique for more than five years and Mr. Reg Dallimore has made a successional photographic record of her work.

THE GOLDSMITH TECHNIQUE:

Sections of a palm trunk about three inches thick are taken from a palm that has been felled for about twelve months. If they are taken from freshly felled palms they must be kept for about twelve months in a damp situation—in the orchid house with a little used orchid compost sprinkled on the surface of each block. They can be stacked on top of one another. The test as to when they are ready to use is that if water is poured on these blocks it must pass through. Several species of palm have been used—*Butia yatay* syn, *Cocos yatay*, *Phoenix canariensis*, *P. lourieri* syn, *roebelinii* and *Livistonia australis*. (Mrs. Goldsmith obtains her palm trunks from a council tip).

Before use, the surface of each block is scrubbed down with a stiff brush till a clean rough surface is obtained. The block is then well-wetted and the seed sown sparsely over the surface. Care must be taken that the first few waterings will not wash the seed off.

Once the seed begins to germinate it is attached. The Goldsmith Technique is spectacular in so far as the tremendous growth rate. Some protocorms are as large as sweet pea seed five weeks after sowing. The protocorm size is many times that of plants grown on a sterile medium.

The fixation of chlorophyll occurs at about seven weeks. At this stage most protocorms are about as large as a green pea and an occasional

How I Grow Waratahs

By H. BRACKPOOL

Plant the seeds as soon as pods ripen (about April) and begin opening on the plant. This minimises the danger of damping off. Use a five inch terracotta pot, not smaller. The larger the pot the better. (I find that tins when rusting have a toxic effect on many plants). Use grey bush sand or the like as a potting medium with about one third drainage material. Water daily or do not allow to dry out. Keep in a shady filtered sunlit position, one or two seeds to a pot. The seeds will keep on coming up at various intervals until November or December. You won't rear all your seedlings but you could rear most of them. In two or three months, if you wish, some can be transplanted with a bricklayer's trowel to other pots with the minimum of root disturbance. Actually one seed to each pot would be better, and if this has not come up by December another can be put in near the first one in the centre. If the seeds are planted late in the season or receive any root disturbance, the greater is the danger of losing your seedlings from damping off.

The plants should not be put out into the open ground before the May, preferably two years, after the seeds were planted. This gives all winter for the roots to get used to their new positions and the plants are large enough and able to stand the summer sun. If in full sun, they should be shaded for the first summer or two. Plants put out after one year or put out in September-October will usually die. Another equally important point is not to water the young plants in hot weather, but mulch with dead foliage or the like. If the weather is too hot and the plant is watered, the excess moisture goes to the leaves and the plant quickly wilts and dies, killed by the heat and mistaken kindness. It seems better to let nature look after them once they are planted out by not watering at all, and, of course, a well-drained position in full sun or facing the north is preferable. Where I do the foregoing the plants usually make good headway, and very rarely die. When the plant reaches eight to twelve feet, you can prune or shape it as you desire but do not cut out the new canes that come up from the base.

Propagation methods are so many and varied that it can be a mistake so often to say "this method is wrong" or "that is wrong". You can only state what you yourself have found to be successful. My method is as follows:

When preparing a pot for seeds I usually place a curved piece of broken terracotta pot over the drainage hole, fill to about one third with small pieces of coke or stones, then put some dead *Banksia ericifolia* needles or crushed dead gum leaves or others on top of these, and then almost fill the pot with bush sand or the like. Place seeds on top and for waratahs, cover with about one quarter of an inch of bright sand and finish with the level just low enough to take the watering.

Before planting out when ready, dig a hole about the size of the pot, fill with water, water pot thoroughly, then turn upside down over fingers and push soil and plant into hand with a pencil or stick pushed through the drainage hole to contact the piece of broken pot at the bottom and bring the watered plant away cleanly. Then, take away the broken piece of terracotta from the base of the potball and place plant in the now drained-away hole. It is better not to firm the soil around the plant very much; just work the soil around it and water to firm.

EDITOR'S NOTE: There is a study section on waratahs which interested readers may join and share in the activity of growing these spectacular plants with the benefit of expert advice, free seed, etc. Without any prior experience you can contribute to the development of better flowers and plants and add colour to your garden by writing to Mr. H. G. Bleakley, Ridge Rd., Kallista, Victoria.

THE EUCALYPTS by A. R. Penfold and J. L. Willis

Price: £5/15/6

It is my pleasure to strongly recommend this outstanding book. Australians have always been proud of the gum trees that dominate large areas of this continent. Their commercial value is well known but it is only recently that there has been an awakening of interest in their value as ornamental trees for garden and properties. For the first time a comprehensive book on the subject is available which is of exceptional value to the student but at the same time is so simply and clearly written for the interested beginner.

The book is well presented for easy reading and introduces us to this vast subject so well, that it is intended that all future material on Eucalypts in this journal will use the book as a reference and supplement it where possible with experiences and results of readers in their adaption of these trees for ornamental use. The ornamental flowering eucalypts are beautiful trees and receive special mention in this book in their propagation, cultivation and application.

THE BUDS AND FRUITS OF EUCALYPTUS SPECIES—Forrestry and Timber Bureau

The buds and fruits of 486 species and varieties of *Eucalyptus* are presented in drawings to assist the student in the identification of species. 5/- inclusive of package and postage from Director-General, Forrestry and Timber Bureau, Canberra, A.C.T.



Australian Native Plants for Home Gardens

By A. E. BROOKS, B.Sc.

Set in alphabetical form, quick and easy reference can be made to any plant or subject. 70 illustrations, 150 pages, 450 Index Entries.

PRICE 45/- (Post 1/-)

Available from YOUR BOOKSELLER NOW

LOTHIAN PUBLISHING CO. PTY. LTD.

1 FLEMING PLACE, MELBOURNE, C.1

Nourish Native Plants with *AQUASOL*!!

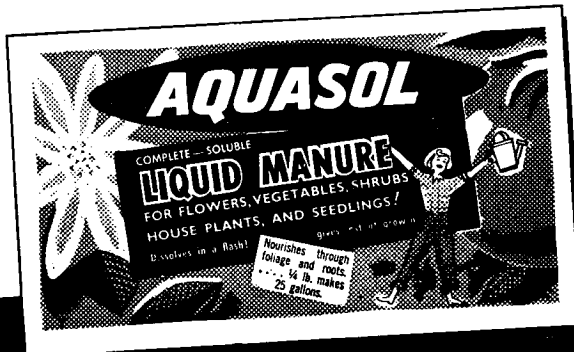
Your native plants need Aquasol NOW! Aquasol provides all the nourishment native plants need for strong, healthy lovelier growth—even in the poorest soils.

Easy to use: no digging-in needed. Just add water to get gallons of liquid manure in seconds.

Instant action: Growth is stimulated and sustained because roots absorb Aquasol immediately.

Get a handy 1/4lb. package of Aquasol from your garden supplier today. Also available in 2lb. jars, 4lb. packs and larger economy sizes.

Aquasol is another proven plant food from Hortico.



THE EUCALYPTS

By J. L. WILLIS—Director of Museum of Applied Arts and Sciences—N.S.W.

The eucalypts are the dominant feature of the vegetation in Australia, numbering about three-quarters of the total flora. The range in size from the dwarf shrubs or mallees, found mainly in the low rainfall regions, to the giant trees of the well-watered coast and mountain ranges. Their habitat varies from the sea coast to the arid interior and from the tropics up to the snow-line of the Australian Alps.

The story of the eucalypts began in 1770, when Banks and Solander collected the first specimen known to science—*Eucalyptus gummifera* on the shores of Botany Bay during Captain Cook's first voyage to the Pacific Ocean. However, it was not until 1789 that the first description of a *Eucalyptus* species was published (*E. obliqua*) and the name *Eucalyptus* proposed by the French botanist, L'Heritier. This author described a specimen collected in 1777 by Anderson and Nelson on Bruny Island off the east coast of Tasmania during Captain Cook's third expedition to the Pacific.

Since their original discovery, the usefulness of the eucalypts has caused them to be widely planted throughout the world, and they are becoming more and more extensively planted, particularly in the warmer regions, including arid areas where they often grow better than other tree genera. Some yield timbers of great beauty, others are suitable only for firewood; some provide honey, others, substances of therapeutic value, or oils varying in odour from peppermint to rose and lemon, whilst a few provide flowers of great beauty and colour. The eucalypts have proven a fertile field of research for many scientists and their investigations into the genus have exerted a considerable influence upon the Australian economy and contributed much to the economies of the other countries.

The literature on the eucalypts is enormous, but to date there has been no single book available which collected and collated the data available in all the various fields of *Eucalyptus* research. J. H. Maiden's monumental work "A Critical Revision of the Genus *Eucalyptus*" (1903-33) contains a wealth of information on the taxonomy of the genus and beautifully illustrated, but is out of date, although still of great value for reference purposes. W. F. Blakely's "A Key to the Eucalypts" (1st edn. 1934; 2nd edn. 1955) is a difficult book for the ordinary user, and in addition, deals only with the taxonomy of the genus. The book "Eucalypts for Planting" (1955) published by F.A.O., Rome, does contain a considerable amount of data on the methods of raising and planting seedlings of eucalypts, and also has a section dealing with taxonomy. However, many other important aspects are not treated in detail, particularly the basic botany and utilization of the genus.

The recent publication of the book "The Eucalypts" by A. R. Penfold and J. L. Willis provides a much needed source of information on the subject. This book which has the sub-title "Botany, Cultivation, Utilization" deals with these three aspects in detail and is the only volume available which does this.

Written primarily for the interested layman this book is also intended to be of value to the student, the specialist and the technical user. Its main objective is to present a simple and lucid survey of the genus, with an emphasis on practical information, in preference to theoretical aspects or exhaustive detail. The use of scientific terms has therefore been reduced to a minimum.

Some idea of the contents of the book can be gained from a list of chapter headings—The Stem; The Leaf; The Inflorescence; The Fruit and Seed;

Classification; Cultivation; Eucalypts as Exotics; Pests and Parasites I—Insects; Pests and Parasites II—Fungi, Marine Borers and Seed Bearing Parasites; Timber; Trees for Shade and Shelter and Ornament; Essential Oils; Honey Flora; Miscellaneous Uses; Digests and Descriptions of *Eucalyptus* species.

Although only the 150 most important species of eucalypts are fully described in the final chapter, all other species and varieties are listed, and details given of their appearance, habitat, location, etc. The Forestry and Timber Bureau's Leaflet No. 63 "The Buds and Fruits of *Eucalyptus* Species" would be a very valuable companion to "The Eucalypts" for those who are interested in identifying the various species.

The publication of this volume is opportune, as never before have the eucalypts excited such world-wide interest as at the present time. One hopes that this book and the others that will surely follow, will stimulate further research into this remarkable genus of trees and excite the enthusiasm of the lay reader for what is Australia's great gift to the peoples of the world.

Eucalypts for Inland Areas

By W. McREADIE—Western Wildlife Supply, Gilgandra, N.S.W.

A selection of taller growing Eucalypts suitable for the heavy red and black loams of the plains in areas down to 18 inches annual rainfall.

The selection is made from species which combine relative ease of handling with beauty of form and/or flowers.

Firstly, some hints on planting which will help to prevent losses. Nursery stock should be hardened-off. A simple and effective way to do this is to place the plants, in their containers, under an evergreen tree (a citrus is ideal) for a week or so before planting. Do not dig a massive hole (especially with a post-hole digger), as this only makes a sump in which free soil moisture accumulates and stagnates causing root rot. It is sufficient to dig a hole to a full spade depth (so as to hold the root system of the seedling comfortably) and work the soil up well. Drainage may be effected at the bottom of the hole by driving a garden fork down in a few places and working it back and forward. Plant in autumn, after the usual good February rains. It cannot be stressed too heavily that the most important factor in Western planting is that the plant should develop an extensive and deep root system before the onset of summer. Protection of species which are frost tender can be best effected by pushing branches of bushes—in which the leaves are persistent after drying—into the ground around the plant so as to form a small bush-house for each plant. Avoid the use of bags for this purpose as far as possible. You do just as much damage to the plant forgetting to take the bag off in the morning as you do forgetting to put it on on a frosty night. The branch method is job and finish. Once it is erected it is left in place all winter.

From amongst the following you will find specimen trees and windbreak types to suit your needs.

Eucalyptus sideroxylon variety *rosea*—Pink Flowering Mugba Ironbark—extremely hardy and quick growing, of good dense form and a show piece in bloom. Indigenous.

E. melanophloia, Silver Leaf Ironbark—glaucous foliage against a black trunk and a wide spreading head, handsome, indigenous.

E. camaldulensis and variety *obtusa*, River Red Gum and an inland form of it. Stately, fast growers with wide spreading heads. Fast growing and very reliable.



EUCALYPTUS CAESIA

Blocks by courtesy of The Museum of Applied Arts and Sciences, Sydney

E. melliodora and variety *rosea*. Yellow Box and a pink flowering form of it. Monarchs these. Trees for the big scope. The pink flowering form is rarely deeply coloured but when in bloom the tree has a pink halo in the sunlight.

E. intertexta and *E. microtheca*. Coolibah Gum and Coolibah respectively. The former can grow into a very large tree with a smooth bark and grey-blue aspect. Coolibah more on the compact scale with similar aspect. Both clean attractive trees.

E. populnea (syn. *E. populifolia*). Bimble Box. Common and widespread but well grown trees true to type all very ornamental. Large silvery poplar like leaves and a dense head make it very desirable. Prune well to maintain dense head if necessary.

E. largiflorens (Syn. *E. bicolor*). Black or Flooded Box. Particularly suited for the heavy country. Its native habitat the flood plains of the Paroo, Warrego, arwon, Darling, etc. A shapely tree with a quiet character of its own. Much appreciated in the desert countries of the Middle East as is Bimble Box.

E. bicostata. Eurabbie. Has received much attention of recent years. Justifiably so. A native of the Mudgee district. A particularly fine tree with large drooping leaves. Very quick growing and will take both heavy and light soils. The juvenile leaves are particularly attractive and regular pruning will keep their showing to advantage. Select nursery stock with care, rejecting any showing curled or wrinkled leaves.

From the coast of N.S.W. and Queensland come two very closely related beauties, *E. maculata* and *E. citriodora*. Spotted Gum and Lemon Scented Gum. Both are frost tender in the young stages.

OVER 300 SPECIES

of indigenous and exotic trees and shrubs

AVAILABLE FROM NURSERIES

AT

**PENNANT HILLS
NARRANDERA**

**FORBES
DUBBO**

Complete descriptive price list free and post free from:

**SECRETARY, FORESTRY COMMISSION OF N.S.W.
BOX 2667, G.P.O., SYDNEY**



First and Foremost!

that's Surrey Beatty and Sons

First and foremost when it comes to printing. You can rely on them to produce the type of job you are seeking—trust them on delivery dates—and be assured they will render all the help and advice you may require.

They specialise in all classes of work associated with Plant Societies, Flower Shows and Nurserymen. Possibly you have been thinking about a small job, a journal or a catalogue. Why not phone or write and obtain a quotation.

RICKARD ROAD, CHIPPING NORTON, N.S.W. Telephone: 72-7404

Eucalypts for South Australia

By RON HILL

Among the many ornamental gums which can be grown successfully in Adelaide, the following are some of the most interesting species. *Eucalyptus ficifolia* the "Red Flowering Gum" reaches a height of 15-20' and varies in colour from cream through pink, orange, and red and flowers in December. *Eucalyptus gillii* the "Curly Mallee" with silver-frosted buds and creamy-yellow flowers is a very striking plant. The "Port Lincoln Mallee" *Eucalyptus lansdowneana* can be either a mallee or a small tree covering itself with mauve-pink flowers in profusion. Others which have been mentioned previously are *Eucalypts erythrocorys*, *E. caesia* and *E. torquata*. These are all useful garden plants in South Australia.

For the northern areas of the State, for example Port Pirie, Port Augusta, Whyalla and surrounding districts, ornamental gums can be had in many forms and colours, some of the more distinct being *Eucalyptus woodwardii*, the "Lemon Flowered Gum", which is a handsome tree 30-40' high with glaucous leaves and citron-yellow flowers in clusters. *Eucalyptus torquata* is very much at home in streets of Port Augusta where its bright pink flowers are very showy, some of the best colour forms can be found here. Other species for these areas are *Eucalyptus salmonophloia*, the "Salmon Gum" from Western Australia which grows 30-40' high with bright salmon-coloured bark. *Eucalyptus cornuta*, the "Yate" with greenish flowers, a tall tree to 60', while the mallees *Eucalypts gillii*, *E. erythronema*, *E. preissiana* are very ornamental.

Eucalypts in Other States

From National Arboretum Society (Dubbo), N.S.W.

Most eucalypt species seem to grow in this area, though some are frost tender in the early stages. Among species not local to this area, that are grown by members are eucalypt species *macrocarpa*, *leucoxydon macrocarpa** (quick grower), *ficifolia*, *bicostata*,* *torquata** (used for street planting), *citriodora*, *nutans viminialis*,* *lansdowneana* and *kruseana*.

*Grown in red gravelly soil close to a river where frosts are heavy. The ground was well ramped by stock and not prepared in any way. The trees were given very little water and growth is satisfactory although only about $\frac{1}{3}$ the rate of a local river gum planted at the same time.

From J. Twyford, Willunga Nursery, Sydney.

In suggesting ornamental varieties to suit the Sydney climate, *Euc. leucoxydon macrocarpa* form *rosea* is the first to come to mind as more and more reports of its success arrive from various districts and soils. Shrubby with various bark and usually cerise pink flowers, it grows to 25 feet. *E. spathulata* brown trunk with fine leaves 6-18 feet will thrive in wet positions. *E. megacornuta* with its green flowers to 20ft. is reliable on reasonably drained soils. Other small flowering gums are *E. caesia* 12-30ft. rosy pink, *E. torquata* coral pink 15ft., *E. tetraptera* 4ft. red, and *E. rodanthe*, broad shrub, silvery foliage with rosy flowers for a long period. *E. erythrocorys* 10-20ft. red buds, yellow flowers, has grown successfully in heavy loam and will tolerate lime.

From J. Hamersley, East Guildford, West Australia.

It appears that the agricultural area from Geraldton to Albany and inland to Southern Cross, at least, will grow much the same plants. It is all winter rainfall, summer drought and the provision of the necessary amount of soil moisture is the main problem though soil texture and stability cannot be ignored. The W.A. species mentioned by Mr. Twyford are native to areas from 8-20ins. rainfall, but all are established in gardens around Perth (35ins. in winter plus summer watering) in inappropriate soils. Other natives to similar dry conditions and apparently equally adaptable are eucalypt species *stricklandii*, *forrestiana*, *lehmanni*, *kruseana*, *orbifolia* and *crusis*. Three are notable for their buds, flowers or fruits and the last three chiefly for handsome foliage and profuse cream flowers.

From Forestry Commission of Tasmania.

Eucalypts have not been widely planted in Tasmania. The species most commonly planted for ornamental purposes, is *E. ficifolia*. It is being grown in gardens and as a street tree, but does not succeed far from the coast because of frost. Near Hobart, there are adult specimens of *E. cladocalyx*, *E. lehmanni*, *E. leucoxydon* and *E. sideroxydon*, but except for *ficifolia* the planting of mainland species of eucalypt has not been common in the last few decades until recent years when a fresh interest has arisen.

Of the eucalypts native to Tasmania, *E. perriniana* is the most favoured of the purely ornamental species, but the glaucous, perfoliate character can only be maintained by regular lopping. For tough growing conditions, such as in the Midlands, *E. ovata* is becoming more popular as its ability to succeed is recognized. *E. ovata* grows well in soils which are very wet in winter but dry in summer.

AUSTRALIA'S NATIONAL PRESERVATION JOURNAL

(A non-profit making venture dedicated to preservation by cultivation.)

This publication is receiving tremendous acclaim, not only from all parts of this unique continent, but from people throughout the world who are eagerly seeking information on our, as yet, little known flora. In response to my appeal the support received was so overwhelming that it was necessary, for this issue at least to increase to 28 pages. Every reader can help to glory our National Heritage, our beautiful flora by:

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

2. Assist in preparation of articles by forwarding small flowering specimens which grow in your district in a jam tin by parcel post (cost 5d.) as below:

All species of *Correa* to Mr. P. Wilson, Botanic Gardens, Adelaide, S.A.

All species of *Prostanthera* to Mr. G. W. Althofer, Nindethana Nursery, Dripstone, N.S.W.

All species of *Hovea* and *Qld.* or W.A. *Eriostemon* to Mrs. H. Spurway, 11 Stellmack Street, Everton Park, Qld.

All species of Orchids (terrestrial) to Mr. L. Cady, "Milford", Saddleback Rd., Kiama, N.S.W.

3. Sale of journal. A lovely gift. Copies of issues of No. 5 onwards are available at 3/- plus 5d. postage.

4. Collect seed for others to work with especially *Byblis* *Pileanthus* and *Dryandra*.

This journal is published by The Publishing Section on behalf of:—

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

President: Mr. C. M. Taylor.

Secretary: Mr. R. Doney, 190 Galston Rd., Hornsby Heights, N.S.W.

SOCIETY FOR GROWING AUSTRALIAN PLANTS—QLD. REGION:

President: Mr. H. W. Caulfield.

Secretary: Mr. R. J. Peach, Bushland Garden Nursery, Sunnybank, S.8, Q'land.

SOUTH AUSTRALIAN SOCIETY FOR GROWING AUSTRALIAN PLANTS:

President: Mr. V. W. Jahn.

Secretary: Mr. I. G. Holliday, 29 Tennyson Ave., Tranmere, S.A.

SOCIETY FOR GROWING AUSTRALIAN PLANTS—VICTORIA & TAS.:

President: Mr. G. Echberg.

Secretary: (Sister) E. R. Bowman, 4 Homebush Cres., Hawthorn, E.3, Vic.

WEST AUSTRALIAN WILDFLOWER GROWERS' SOC. INCORPORATED:

President: Mr. L. D. O'Grady.

Secretary: Miss M. Munro, 90 Basinghall St., East Victoria Park, West Australia.

Membership is open to any person who wishes to grow Australian native plants.

Contact the Secretary of the Society for your State.

PUBLISHING SECTION FOR SOCIETIES

Managing Editor: Mr. W. H. Payne.

Publishing Committee for this Issue: L. Cady, H. Boyd, P. D. Leak.

Sec.: K. Coxhead, Despatch: V. Hopkins, Illustrations: A. Spurway, Photography: R. N. Dallimore.

Advertising and Sales Representatives in each State: N.S.W., P. D. Leak; Qld., W. W. Kilgour;

S.A., J. S. Birch; Tas., G. van Munster; W.A., F. Lullfütz; Vict., F. R. Jeffs.

MAIL—Address mail to the Editor, 250 Picnic Point Road, Picnic Point, N.S.W.

SUBSCRIPTION—Members: Your 1961 subscription is now due.

NON-MEMBERS: Be sure of receiving your copies in future without inconvenience. Forward 12/- and the next four issues will be forwarded post free.

Continued from Page 10

hero is to be seen half an inch in diameter. Root development is dramatic and leaves begin to appear at eight weeks. Some plants are more vigorous than others. Due to crowding, the large ones are taken out as leaves and roots develop. To control this, these plants are placed in 'flats' containing fine, used orchid compost. Their rapid development is spectacular.

Whilst most of Mrs. Goldsmith's work has been done with the genus *Cymbidium*, the seed of *Dendrobium speciosum* has been raised by this technique and the writer is of the belief that most epiphytic orchid seed could be raised by this method. All of Mrs. Goldsmith's work has been done in the summer months as seed does not germinate freely in the autumn or winter. The block must be kept constantly damp from overhead watering, but must not stand in water, and be kept from wind and direct light. If pests appear use a water soluble solution of D.D.T.

For Effective Pest and Disease Control Use

Yates Garden-master

MULTI-PURPOSE SPRAY

The Genus *Dryandra*

By R. D. ROYCE—Government Botanist, Western Australia

The species of *Dryandra* are almost wholly confined to the South Western Flora Province and only occur outside its boundaries as isolated pockets. The main concentration of species lies in the belt of agricultural country from the Irwin River in the north to the south coast, and lying to the east of the commercial forest country. By far the greatest number are found in the lower Southern Area from Narrogin southwards and including the Stirling Range and the Albany district.

The lateritic soils are the true home of the *Dryandras*, and it is in this environment that the shrubs reach their greatest development. *D. polycephala*, perhaps the most striking of all the species, grows in masses covering many acres in extent, while *D. praemorsa* Meissn., which produces glorious pink and yellow flowers, in heads of 3-4 inches in diameter, the largest in the genus, occurs in isolated pockets on the edge of the forest country. *D. carduacea*, *D. cirsioides*, *D. patens* and the huge, shaggy *D. nobilis* are conspicuous and attractive members of the flora over large areas of the gravelly interior. Some species extend beyond the limits of the gravel and occur on the sandy soils of the coastal plain. Such plants are *D. sessilis* and *D. nivea*. These two are perhaps more widely distributed than any other species of *Dryandra* and appear to be as much at home along the coast in sandy soil as in the heavier soils of the interior. *D. fraseri* R.Br. too, is found in sandy gravel rather than the heavy gravelly soils, while some species, such as *D. tenuifolia* R.Br., for example, are frequently found in swampy soils.

The material on which the genus and the original 12 species were based was collected by Brown himself principally in the vicinity of King George's Sound in 1801 when he visited the south coast of Western Australia with Matthew Flinders in the "Investigator". Subsequently further botanical specimens and seeds including species of *Dryandra* were sent to England by William Baxter, a botanical collector sponsored by the Sydney Botanic Gardens, but who also collected for a Mr. Henschman of England. The seeds were distributed to various nurserymen, and the resulting plants became popular in gardens throughout the country. The best methods of propagation were well known by 1827 and it is interesting to read an extract taken from the "Botanical Cultivator", the third edition of which appeared in that year, regarding the propagation of *D. longifolia* R.Br. a typical species.

"They thrive best in an equal mixture of light turfy loam, peat and sand; the more sandy the soil is the better they will thrive. The pots must be well drained with potsherds, which should be broken very small, as the roots are very fond of running amongst them. Ripened cuttings taken off at a joint, and planted in pots of sand, without shortening any of the leaves, will root freely, if placed under hand glasses, but not plunged; as soon as rooted they should be potted off, as the sand will injure their roots if they stay too long in it; they should then be placed in a cold frame till they have taken fresh root, and must be hardened to the air by degrees. August and September is the best time for putting in their cuttings, many of which will be rooted by Spring."

The flower structure of *Dryandra* is remarkably similar to that of *Banksia*. The two can be distinguished however by the presence of an involucre and the capitate inflorescence of *Dryandra*.

EDITOR'S NOTE: A study section for *Dryandra* has been formed by Miss A. F. Harper, "Wyemand", Great Western Highway, E. Guildford W.A. Members are needed particularly from country areas of W.A. If you can do nothing else please collect seed.

DRYANDRAS IN SOUTH AUSTRALIA . . . By R. J. Stewart

In South Australia *Dryandra* species belong to a group of choice plants that are not generally cultivated in our gardens for fear of failure. The only species of *Dryandra* grown to any extent on the Adelaide plains and in the hills surrounding Adelaide is *Dryandra formosa*. One excellent plant grows in the Adelaide Botanic Garden on a sandy loam overlying a clay sub-soil with an alkaline soil reaction. This plant is approximately ten years old and is now about eight feet high and in very healthy condition, it flowers consistently every year, with its globe shaped bronzy metallic brushes born along the stems of the plant. It is quite attractive all the year round with its mid-green narrow serrated foliage set closely together to make a dense plant.

Dryandra formosa has proved itself as a hardy garden plant in all parts of Adelaide and other parts of South Australia and seems to give good account of itself. This species could easily be used both for its floral beauty and for its textural character which could lend itself for use as an informal hedge plant in our gardens in South Australia.

Of the other 50 described species little attempt has been made to cultivate them. The species *Dryandra polycephala* and *D. ashbyi* are being grown in the hills country surrounding Adelaide on sandy soil with an acid soil condition. As parts of the hills country with its sandstone ridges and acid soil reaction, resemble more closely its native habitat it appears that *Dryandra* has more chances of growing in this area than on the plains.

DRYANDRA IN QUEENSLAND . . . By D. Hocking

I have not had any difficulty in germinating seed of *Dryandra* in coarse sand, careful watering, but had losses after the fourth true leaf due to not shifting seedlings to follow the sun with change of seasons. *Dryandra formosa* and *D. praemora* have grown quite well but the flowers in this locality, Springbrook, with a pH of 5.6, have not been as attractive as in drier and hotter climates of Queensland.

DRYANDRA FROM SEED . . . By Alf Gray, West Australia

As a rule *Dryandras* may be raised readily from seed, provided due consideration is given to time of sowing and preparation of seed bed. The genus is obviously semi-arid in origin hence a light, well-drained soil free from strong manures and excess organic matter is the best medium and early autumn the best sowing time. Glass-house environments are foreign to *Dryandras* as is also heavy shade and excessive moisture. Often the seed is so delicate, almost paper thin in the case of *D. speciosa*. If you buy your *Dryandra* seed "in the shell" or collect it yourself, pop them in a frying pan over the stove and the winged seed can be easily removed. Do not use force.

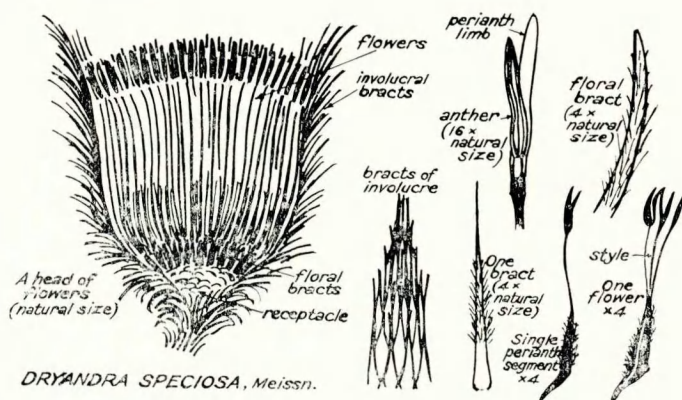
Covering of seed should be very light. I use a thin layer of sharp sand under another of vermiculite, the whole damped and firmed with full pressure on a plasterers float. Germination is usually free but establishment following transplanting of the seedlings is the problem with some species. *Dryandra speciosa* is probably the most tricky to handle at this stage and where convenient direct sowing into the container is advisable. I have seen many a good strike peter out in transplanting. A novice would do well to sow all *Dryandra* direct into a container. Once the seedlings are an inch or so high they are hardy if undisturbed. At three to six inches they will transplant and if the situation has been rightly chosen should mature and flower with the minimum of attention.

Dryandra speciosa Meissn.

By R. D. ROYCE—Government Botanist Western Australia

As a typical example of the flower structure of the group we can take *Dryandra speciosa* Meissn. The flower heads of this species are borne on small lateral branchlets arising at some distance from the apex of the branch. They all hang downwards due to the curved nature of the branchlet, and because of the leafy apex of the stems above them, they are largely hidden within the shrub. The bracts of the involucre are much longer in this species than in most others, and when fully developed the inner ones may reach a length of up to two inches. They are narrow, very numerous, and have densely hairy margins. The outer ones are fine, hair-like and range in length from one inch in the middle of the involucre to one quarter of an inch at the base, and continue as short rigid scales for some distance along the branchlet.

At the base inside the involucre is a woody flat or slightly convex receptacle or enlarged floral axis from which the individual flowers arise. These are yellowish in colour and consist of four perianth parts, all alike and not separable into petals and calyx. In the young flower they are fused together to form a single structure slightly swollen at the apex, the enlarged apical portion being the limb, and the narrow basal section being known as the tube. The stamens are four in number and are fused to the perianth, one to each segment, the filaments being free only from the apex of the tube, and the anthers lying free within the limb.



DRYANDRA SPECIOSA, Meissn.

DRYANDRA SPECIOSA MEISSN.

An erect bushy shrub of three to four feet in height the branchlets rigid, hoary-tomentose. Leaves crowded towards the apices of the branches narrow-linear, entire two to four inches long, erect, shortly petiolate and broadly attached, rigid, acute, the margins closely revolute. Flower-heads solitary on short lateral branchlets on short scaly recurved peduncles, or sessile, usually without floral leaves except sometimes when terminal. Involucre hemispherical-campanulate, up to two inches long, the bracts very numerous in many series, the outermost aristate, the intermediate linear, flat towards the base with long aristate ciliate points, the innermost flat with acuminate points, all ciliate, glabrous outside except towards the base and entirely glabrous and red inside, erect but ultimately spreading or recurved above the middle. Perianth orange-yellow, one inch long turgid and woolly-villous below the middle and above the glabrous base, the tube glabrous in the upper part, the limb glabrous one quarter inch long, slender and obtuse; style as long as the perianth, straight, glabrous rigid, with a narrow smooth stigmatic end about one eighth inch long. Fruit obliquely obovoid up to three quarter inch long, densely rufous-villous except for the glabrous swollen base and a ring of long silky hairs at the base itself.

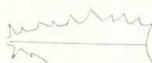
Key to the Species of *Dryandra*

(Concluded from Vol. 1, No. 7 — Australian Plants, June, 1961)

DRYANDRA, SECT 4 COMIT'D

D Leaves white underneath

D Leaves green on both sides



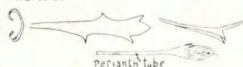
38 *D. praemorsa*

Cul-Leaf *Dryandra*
39 *D. cuneata*

A Leaves linear lanceolate to oblong, prickly toothed or lobed

TS leaf

B Perianth tube glabrous: leaves revolute,
entire or 2-4 prickly teeth.



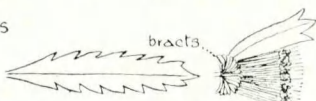
40 *D. carlinoides*

B Perianth tube silky villous



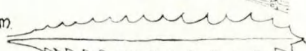
C Leaves with oblique lobes

D Bracts glabrous, recurved



41 *D. carduacea*

D Bracts villous, perianth $\pm$ 4 cm

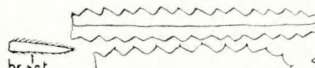


42 *D. stipulosa*

C Lobes triangular

D Lobes contiguous

E Bracts acute, ciliate



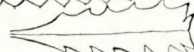
43 *D. serra*
Serrate-leaved *Dryandra*

E Bracts obtuse, tomentose



44 *D. concinna*

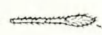
E Bracts villous becoming glabrous:
leaves very variable



26 *D. armata*
Prickly *Dryandra*

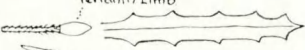
D Lobes distant

E Perianth limb villous



45 *D. squarrosa*

E Perianth limb glabrous



46 *D. vestita*

A Leaves entire or 3-toothed at end



B Leaves narrow-linear, entire,

closely revolute, flowers nodding

TS leaf



47 *D. speciosa*

B Leaves linear cuneate, mostly 3-toothed, flat.



48 *D. tridentata*

KEY TO THE SPECIES OF *DRYANDRA*

perianth tube—floral envelope

glabrous—a surface destitute of hairs

villous—covered with long weak hairs

tomentose—covered with closely matted short hairs

ciliate—bordered by hairs

involucre—whorl or a circle of, in this case, bracts

axillary—in axil formed by leaf and branch.

revolute—rolled back at edges; acute—pointed; obtuse—blunt

cuneate—broadest about middle and tapering to base

lanceolate—lance shaped; linear—long and narrow

lobes—projection on edges in this case on the leaves

HOW TO KNOW . . .

WESTERN AUSTRALIAN WILDFLOWERS

This key to the species of *Dryandra* and the colour plate on the rear page is reprinted from the books "How to Know Western Australian Wildflowers" by W. E. Blackall and B. J. Grieve. The two volume work became the life's work of a very competent and dedicated man, Mr. W. E. Blackall, and following his death Professor B. J. Grieve completed the work for publication. Professor Grieve was one of the first professional botanists to offer his services to our journal. There are 3000 species of Western Australian flora in keys such as these with many colour plates.

2 Volumes—30/- each plus 2/6 postage in Australia.

Available from the—

UNIVERSITY BOOKSHOP—NEDLANDS, WESTERN AUSTRALIA

DRYANDRA, SECT. 3 CONT'D

G Style not above 2 cm leaves up to 20 cm



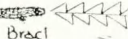
27 *D. mucronulata*
Sword-fish *Dryandra*

B Lobes revolute



Lobes flat in *D. nivea*

C Fl-heads terminal only
(Dwarf shrub)



Bract



28 *D. nivea*

Fl-heads terminal axillary

D Bracts broad mostly obtuse ciliate

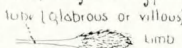


29 *D. tenuifolia*

D Bracts (at least inner ones) tapering into long points usually plumose



E Perianth limb villous



tube (glabrous or villous)

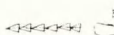
limb

F Leaves mostly 3-4 cm fl-leaves few spreading



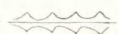
30 *D. Kippistiana*

F Leaves 8-16 cm fl-leaves enclosing head



31 *D. pulchella*

F Leaves 16-50 cm fl-leaves few small



32 *D. plumosa*

E Perianth limb glabrous



Perianth tube villous



F Involute under 1 cm fl-leaves few spreading 4-10 cm



19 *D. polycephala*

F Involute 1-5 cm fl-leaves closely surrounding head



33 *D. sclerophylla*

F Involute 4 cm heads sessile without fl-leaves



34 *D. Shuttleworthiana*

SECT. 4.

A Leaves obovate to cuneate prickly toothed or lobed.

B Involucral bracts as long as fls (5 cm)



35 *D. quercifolia*
Oak-leaved *Dryandra*

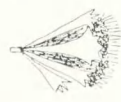
B Involucral bracts not above 1/4 as long as fls

C Perianth limb glabrous



limb

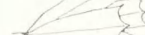
D Fl-leaves not longer than head



56 *D. floribunda*

Holly-leaf *Dryandra*

D Fl-leaves longer than head



C Perianth limb hirsute or villous



limb

57 *D. falcata*

YOUR GUIDE TO NATIVE PLANT SEEDSMEN

Nindethana, Box 5, Dripstone, N.S.W. For all Native Seed. Packs ounce or pound lots. Free list on application. Special supplies of West Australian Seed.
 Australian Seed Co. Robertson, N.S.W. Bulk or packet lots. Stamped envelope brings lists.
 Western Wildlife Supply, Gilgandra, N.S.W.—Bulk supplies of natives and exotic tree and shrub seed to the trade—Special collections to order.
 Yates, Arthur & Co. Pty. Ltd., 90-100 Sussex Street, Sydney.

YOUR GUIDE TO NATIVE PLANT NURSERYMEN

Abel, J. L.—P.O. Box 26, Nowra. Native plants from 2/6. Freight and pack. extra.
 Althofer, G. W.—Nindethana Nursery, Box 5, Dripstone, N.S.W. Very wide range.
 Boddy's Eastern Park Nursery—32 Denman St., Geelong, Victoria. 3 000 varieties.
 Denovan's Nursery—188 Marco Ave., Panania, Sydney, N.S.W. Specialist in Melaleuca.
 Echberg's Drive-in Nursery—Centre Road, East Brighton, Victoria.
 McLeod, F. C. J. McLeod—Warrien Rd., Croydon Victoria—Quality Plants.
 Narrabeen Nursery, 1444 Pittwater Rd., Narrabeen Nth., N.S.W. Plants for coast.
 Willunga Nursery—21 Nelson Street, Thornleigh, N.S.W. From 2/6. Specialist in trees.
 Parry, P. J.—'Floralands', Kariong via Gosford, N.S.W. A wide range. Postal orders taken.
 Wyatt P.—33 Plummer Road, Mentone, S.11, Victoria—Hardy plants.

ECHBERG'S**DRIVE-IN NURSERY**

Cnr. Nepean H'way &
 Centre Rd., East Brighton, Vic.
 XB 3267

*Native and South African
 Plants*

Indoor Plants, Liliiums,
 Perennials, Geraniums,
 Fuchsias, etc.

FLOWER POTS

Colourful Plastic Flower Pots
 and Bulb Bowls will Increase
 Your Sales of Plants. Write for
 List from Manufacturer or Ring
 LA 4089.

Alba Engineering

20 ROWLEY ST., CAMPERDOWN, N.S.W.
 BOX 32 P.O. LA 4089

NATIVE PLANTS

101 HARDY VARIETIES

P. WYATT, "KANANOOK"

33 Plummer Rd., Mentone, S.11
 Victoria

AUSTRALIAN NATIVE PLANTS
 3,000 varieties

Grown in the Open — Plants dispatched
 to all States

Catalogue and Planting Guide 4/-

Boddy's Eastern Park Nursery

32 Denman St., Geelong, Victoria
 Tel.: 2598

"WILLUNGA" NURSERY

NATIVE TREES & SHRUBS
 From 2/6

21 Nelson St., Thornleigh, N.S.W.
 Closed Saturday only — WJ 3709

DENOVAN'S NURSERY

Good Range of Native Plants
 available at Nursery

188 MARCO AVENUE, PANANIA, N.S.W.
 Specialist in plants for clay areas.

PRESERVATION BY CULTIVATION

FLORALANDS

KARIONG, via GOSFORD, N.S.W.

A large variety of the most popular native plants available at nursery

PHONE: Gosford 21142

P. J. PARRY

NARRABEEN NURSERY

74 AUSTRALIAN NATIVES

1444 Pittwater Rd., Narrabeen
 Nth., N.S.W. — XX 2604

OPEN EVERY DAY

Specialist in plants for sea coast.

NATIVE PLANTS —

USUAL & UNUSUAL

F. C. J. McLEOD

Wildflower Nursery

WARRIEN ROAD, CROYDON, VIC.

Keep Cut Flowers Alive Longer

By H. BOYD

Most cuttings that rot out in the cutting bed do so because they become infected with micro-organisms capable of ingesting plant tissue. It might be referred to as a retting effect.

Flowers that are stood for days in water are submitted to a true retting process. The soft cellular tissue is broken down usually at the incisal stalk end, so that upward movement of water is inhibited and drooping becomes obvious. Portions of the stalk above the water level that have been wetted by receding water, are also attacked by fungi. This is more obvious in plants belonging to the *Liliaceae* and allied families.

The writer reasoned that if a non-toxic germicide was used, the germ count might be kept down, or considerably reduced, and the putrifying process stopped or slowed down. Several substances were used, the best results by far being obtained by chlorhexidine diacetate. This is a white crystalline substance manufactured by I.C.I. and sold under the trade name of "HIBITANE DIACETATE". It has been derived from the antimalarial drug *Paludrine* and is non-toxic to man. A stock solution of one gramme to 8 ounces of water is made. Then 1 teaspoonful (5c.c.) of this solution is added per pint of water in the vase. The stock solution should be shaken before use.

The experiments with this solution were begun in January, 1960, in Sydney when the temperature was, for many days around 100 deg. F. The trials were carried out by people with access to fresh flowers, Mr. F. Aubrey, Mr. V. Clegg, Mr. and Mrs. C. Daley, Mrs. Harvey and Miss Hammond. Rose, hydrangea, carnation, daffodil, saxafraga, marigolds, hyacinth, camellias, epidendron, cymbidium, snowdrops, several species of native pea flowers, and many species of *Compositae* were used. Treated flowers all did better than controls. Treated flowers of saxafraga did not lose colour from petals when dead. Treated roses opened fully and petals remained much longer than controls. Treated spring blossom did not fall. Miss Howard of the Geranium Society kept treated geranium flowers for a week, the controls lasted two days.

This solution can be used at greater strength as there has been no sign of any toxic effects. In none of the treated plants was stench present and retting was considerably reduced, or not present. Mr. V. Clegg, an orchid grower and exporter, considers this a good method for holding orchid bloom during a glut period.

NINDETHANA NURSERY

BOX 5, DRIPSTONE, N.S.W.

OVER 1000 SPECIES STOCKED

*All Australian natives with special supplies of plants and seed of
West Australian species.*

THE PIONEER NATIVE PLANT NURSERY

Catalogue — 4/- Posted

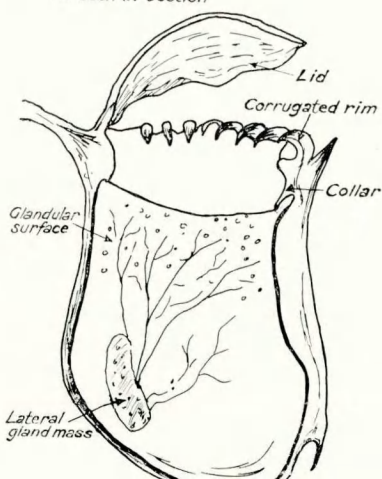
The Genus *Cephalotus*

By Professor B. J. GRIEVE, University of Western Australia

The Western Australian Pitcher Plant was discovered in the Albany area by La Billardiere, naturalist on board French ships visiting the south coast of Western Australia in 1792. It was described and named by him some few years later, and it is a plant which has continued to excite scientific and popular interest, not only because of its ability to trap and digest insects but also because of its uniqueness as a character plant of south Western Australia.

The plant is confined to a relatively small, almost crescent-shaped area extending from a western tip near Busselton to an eastern tip somewhere near the Pallinup River. The area of its commonest occurrence has been near Albany, but there is evidence that with development and changing conditions it is tending to die out there. It grows in swampy, peaty areas or near the edges of small streams. Sometimes the plants can be easily seen, but more often they have to be searched for among taller grasses. *Cephalotus* has two kinds of leaves which are closely crowded in a rosette. From the centre of this, in late summer, an erect flower stalk bearing small white flowers develops. The inner normal leaves are flat, ovate, green and somewhat fleshy. The outer lower leaves only are modified to form the pitchers illustrated in the colour plate. The young pitchers are bright green in colour, but as they grow older they tend, at least when exposed, to develop bright red and purple colours. In appearance they are somewhat like slippers, but have a lid in addition. Actually the lid does not terminate the modified leaf, but is an outgrowth, from the petiole. The pitchers are attached by a stalk at the back and tend to rest obliquely on the moist earth. Full grown specimens may be as large as one inch in diameter and up to one and a half inches deep. Three strong ridges are visible on the outside and the central one can be seen to extend from the base of the pitcher almost up to the mouth of the trap. Long stiffish hairs develop on these ridges and particularly when the pitcher is young it appears to bristle with hairs, giving it, as Hamilton so aptly notes, the appearance of a "vegetable hedgehog". The pitchers are ideally adapted for catching insects and the presence of the above-mentioned hairs is believed to assist the progress of crawling insects into the trap. Flying insects may also be attracted to the trap since the half-open lid has whitish patches on it and on the pitcher itself purplish-red veins are present. These could at a distance be mistaken for a flower.

DIAGRAM OF PITCHER
as seen in Section



Once the insects in the course of their search for nectar get upon the smooth slippery inner surface of the mouth of the pitcher, they easily fall into the interior cavity. This is generally part full of liquid so that the majority of the unfortunate insects drown within a short time. Those that are active enough to struggle out of the water are then confronted by other barriers to escape. Firstly, the inner concave surface is very smooth and slippery, secondly, a circular downwardly pointing ridge projects inside the pitcher, and thirdly,

a fringe of close set stiff downwardly pointing bayonet-like spikes is present.

The efficiency of the pitchers for trapping insects is shown by the fact that when they are opened they are generally found to be full of insect remains. Ants, flies and beetles are the commonest insects represented.

It has been shown that glands are present inside the pitchers and a considerable amount of study has been devoted to determine whether the trapped insects are digested by some secretion. Certainly the pitchers do contain a digestive ferment which may be responsible, together with the action of bacteria, in breaking down the insect proteins and making these available to the plant.

BOTANICAL DESCRIPTION: The plant family *Cephalotaceae* comprises a single genus with a single species endemic to the lower south-west region of Western Australia. The genus *Cephalotus* (from *kephalotos*, headed, referring to the filaments of the stamens) was named by La Billardiere in 1806. The specific name *follicularis* is in reference to the little bag-like arrangement of the outer modified leaves. In life form, *Cephalotus* is a perennial herb with a well-developed system of underground rhizomes from which the rosettes of leaves arise. The radical leaves are of two types; the inner flat, elliptic to ovate, entire and somewhat fleshy, the outer converted into lidded pitchers. Flowers which develop in late summer are white in a narrow spike-like head at the end of a leafless stalk. The calyx tube is greenish, with white lobes, but petals are lacking. Stamens, six long and six shorter ones are inserted on a glandular disk. All are considerably shorter than the calyx lobes. The anthers possess a thick, swollen, glandular connective. There are six carpels which are free and usually contain one ovule in each.

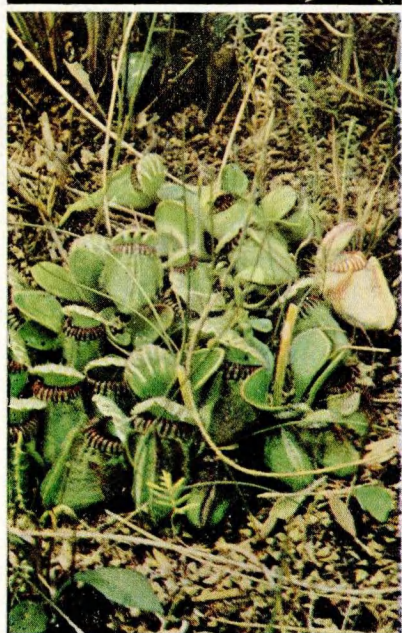
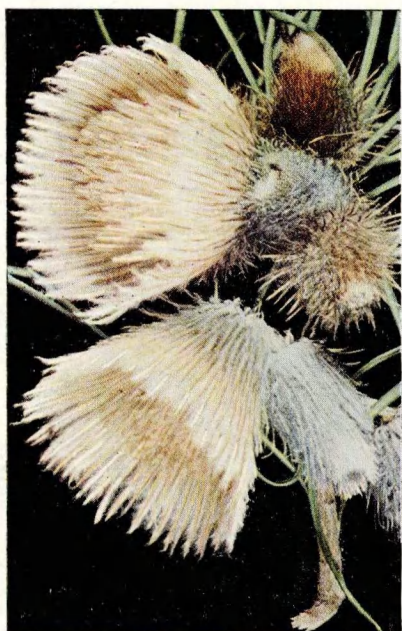
The plant may be seen growing best in the area between Albany and the Frankland River, although it may be collected further west almost to Busselton and east to at least the Pallinup River. There is some reason to believe that La Billardiere originally collected specimens further east of this point. With increasing cultivation and grazing, *Cephalotus* is tending to disappear, at least in areas close to Albany. Efforts are being made to preserve it in its native habitats. The plant can be successfully transplanted provided adequate peaty soil is taken, and it has been grown at the University at Perth under glasshouse conditions for some years. The pitchers do not, however, develop the same bright red and purple colours so often observed in the field.

EDITOR'S NOTE: Who will heed this warning of extinction and cultivate this plant.

Marianthus erubescens Putterl. (See Colour Plate on rear cover)

This plant is one of the most colourful members of the family *Pittosporaceae*. It is a twining plant rising from a woody base and with somewhat narrow, leathery, deep-green leaves. The clusters of flowers which are brilliant red in colour may be up to one inch in length. Botanically *Marianthus erubescens* may be separated from other species of the genus and from the closely related *Billardiera* by its twining habit, its short and broad sepals and by the way in which the staminal filaments show a broadening at the base. The specimen photographed shows it climbing on a Mallee. These trees together with wattles are the commonest plants with which it is associated as a climber.

Marianthus erubescens is a plant which has a fairly wide distribution. From near Perth it extends down into the Albany area and eastwards collections have been made at areas such as Wongan Hills, Kellerberrin and Merredin. There are records of its occurrence as far east as Coolgardie. It could prove to be an attractive climbing plant in a garden.



Colour plates reprinted from "How to Know Western Australian Wildflowers" by W. E. Blackall and B. J. Grieve—by courtesy of The University of Western Australian Press

DRYANDRA SPECIOSA Meissn.
(See article on page 21)

MARIANTHUS ERUBESCENS—Purterl.
(See comments on page 27)

CEPHALOTUS FOLLICULARIS
"Albany or Western Australian Pitcher Plant"
(See article on page 26)

BYBLIS GIGANTEA Lindl.
"Rainbow Plant"
A beautiful garden plant from 15-24 inches high.