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GROW AUSTRALIAN ORCHIDS

CENTRAL AUSTRALIAN PLANTS

FOR THE GARDEN — PART 1

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Alice Springs, N.T.

INTRODUCTION

Alice Springs, being in a semi-arid zone, is a most suitable place for cultivation of native plants. The average annual rainfall is about ten inches, the summer being extremely hot, with severe frosts in winter. A number of homes are built in areas where the soil is fairly saline, and only plants tolerant of this soil type will succeed. Native plants are adapted to these conditions thus allowing the enjoyment of a garden even though exotic plants may fail. As well as our climatic conditions and soils the native plants do not use near the amount of water that our exotic introduced species do, and in country that needs to conserve its water, this is a most important feature.

This article deals with Central Australian plant species which are suitable for cultivation or are already incorporated into local gardens.

EUCALYPTUS SPECIES

Eucalyptus camaldulensis (River Red Gum), a tree regarded highly for its shade and the beauty of its trunk. It has been known to grow six feet in its first year of cultivation. Growing to 60 feet, having clusters of creamy flowers, and white trunk with markings of shades of brown, cream, blue, mauve, etc. make this a most attractive specimen.

Eucalyptus intertexta (Gum Coolibah), a tree to 40 feet high with a trunk which is rough around the base up to about 10 feet and then smooth white or grey with some coloured markings, making it also an attractive specimen tree.

Eucalyptus microtheca (Coolibah), a very attractive tree to 40 feet high, with rough grey bark on the lower part of the trunk and the upper limbs somewhat like Gum Coolibah. It would make a most attractive garden acquisition, especially for the garden with clayey soil.

Eucalyptus papuana (Ghost Gum), a much sought-after tree of 50 feet, with a very upright white trunk, bright green foliage, but is an erratic seeder, and is definitely a proud specimen tree.

Eucalyptus terminalis (Bloodwood), a cream flowering tree to 40 feet with grey tessellated bark, and after flowering has clusters of large gum-nuts and certainly is a good specimen tree.

Eucalyptus gamophylla (Blue Mallee), a many-stemmed eucalypt with blue-green foliage, growing up to 12 feet, and bearing creamy flowers. This is a most attractive small tree, and can be used in wind-breaks, divides or a backing for shrub areas.

(Continued on page 202)

EDITOR'S NOTE: This is portion of a series on wild flowers from Central Australia. We are making a special effort to assist readers from the inland areas of our continent to grow wildflowers under their rigorous waterless conditions. Will readers from country areas please send me seed from wildflowers in their area?

COVER PLATE: The beautiful *Diuris longifolia* a native terrestrial orchid. For further details refer to the next two articles. Blocks for this colour plate are by courtesy of the Dept. of Agriculture of Western Australia.

THIS ISSUE: Features of this issue are articles on native orchids, Boronia, Trees of Queensland, Melaleuca with a special full colour supplement on *Gompholobium*, one of the yellow pea family.

Growing Native Terrestrial Orchids

by R. C. Nash

Often I meet people who on finding out that I grow native terrestrial orchids say, "But don't you find them impossible to grow, I have tried and they would never grow." On further enquiry I find in most cases the poor plants have been subjected to ordinary garden culture or an attempt has been made to grow them in a glass house. In this article I hope to set out some of the basic requirements for the culture of native terrestrial orchids.

Two of the most important things to consider are, firstly give the plants good drainage, whether they are grown in a tin, pot, rockery etc., secondly they do like shade from heavy sun light, especially the direct overhead light.

Most people bring the plants home with a big clump of soil around the tuber and push this into the container (pot), the plant is hoped to grow in. In most cases this soil quickly becomes water logged with rain or when watered. Our native soils have never been disturbed by cultivation and have developed an established moisture ecology with the plants. As is commonly known cultivated soils saturate quicker than uncultivated soils. This pot of soil containing an orchid has lost its ability to rid itself of excessive water and saturates because of this transplantation. I have found it takes about three to four years for sandy soil in a pot to stabilize back to the more or less natural moisture ecology.

When potting native terrestrial orchids use plenty of good washed clean coarse sand, with broken pot or gravel in the base of the pot, if plants are from limestone soils, broken limestone. The easiest way to get humus into this pot, is to use sawdust, preferably from a native plant. Try to use the plant types the orchids were growing by. Mix sawdust with sand accordingly to the soils the orchids have been taken from, low sawdust content for sandy soils and more sawdust for heavier soils. Leave a layer of pure sawdust on top of pot, this assists water assimilation and helps to stop dry out. The sawdust used should have started to break down, to start this, mix a little sand with sawdust, keep damp and put a little urea with damping water occasionally. In preparing the orchid for planting, carefully remove as much of the native soil as is possible, taking care not to knock the tuber off. Make a drill hole in the compost in the pot deep enough to take the plant and fill lightly with compost, tap pot gently to settle and water.

In selecting the site for these potted plants in the garden take into account the location from where they collected. Good sites are well sheltered areas with direct morning or late afternoon sunlight or full indirect sunlight as would be found against a south facing wall or fence. Keep in mind when choosing a position in the garden the heat of summer. In summer when plants are dormant, do not water and allow pots to dry out again, then water again, it is best to move them to a cooler more shady position. Try to keep plants green as long as possible as summer comes on, even if they have to be hand watered. When watering them, mains water may be used providing it is not too brackish or hard, other wise use rain water.

For improved growth and health a little superphosphate once a year and a spray of urea once a month in the growing season are beneficial.

Watch must be kept for Aphids, Mites and Thrip, these deform the flowers and stems and cause the leaves to rot. Spray with weak solution of chloride of lime to kill leaf rot. Snails, slugs and grubs will cause severe damage to plants if let go unchecked. Birds may sometimes eat the buds or dig up the tubers when scratching for worms. Try to keep pots away from cats, dogs, and children.

When starting out to grow native terrestrial orchids select the forms that grow in colonies as these will respond quicker, leave most of the *Caladenia* (spiders), *Glossodia* and similar types to last as the tubers drop from these very easily.

Collect plants only from land being cleared or about to be cleared. Excessive collecting will denude an area of its native orchids quicker than excessive picking. It is better not to collect and have the beauty of future years than to collect and fail in the attempt to grow these exotic plants.

The Commoner *Diuris* in Australia

by Leo Cady

The genus *Diuris* or "Double-tails" is wholly a spring or summer flowering orchid, found in all states of Australia, with only one extra Australian species (*D. Fryana* Ridl. from Java).

The most prevalent colour in the genus is yellow of varying shades but white, mauve, browns and variegated types are to be found. N.S.W. appears to be the "Home" of this genus as upwards of 30 species have been recorded of the 40 odd named. The concentration of species in N.S.W. is on the western side of the dividing range, where a considerable amount of natural hybridizing has occurred, this has added much to the confusion of identifying the species with real certainty.

CULTURE GROWING THE ORCHIDS *DIURIS*

The culture of the *Diuris* is still in its infancy but the study group has found the normal compost for ground orchids (50% black sand, 40% peat moss with 10% leaf mould and crushed charcoal) appears to do the job. The compost should be kept moist during the growing season and allowed to dry out during dormancy (this appears to stop tuber rot) the drying out of the compost does not harm the tubers, except that they shrivel somewhat; but they plump out when the water is again given after the appearance of the new shoot above the ground.

DESCRIPTIONS OF THE COMMONER SPECIES

I D. punctata Sm. "Purple Double-tail"

This species, perhaps the choicest of all the genus, is an extremely varied plant in size, colour, and shape; a typical plant is described below. A robust or slender plant. Leaves usually 2 flowers to 10 fragrant at times, lilac-purple-reddish and rarely white or yellow. Lateral sepals to 6 cm. long, narrow. Dorsal sepals ovate to 16 mm. long. Petals as long or longer than the dorsal sepal clawed. Labellum 3 lobed midlobe broadly ovate with 2 calli ridges at the base, the lateral lobes to half as long as the midlobe, oblong falcate.

Distribution: Queensland, N.S.W., Victoria and South Australia. Flowers: August-December.

DIURIS Spp.

KEY TO PLATE

- | | |
|--|---|
| A. <i>D. punctata</i> , natural size to scale. | F. <i>D. sulphurea</i> , natural size to scale. |
| B. <i>D. longifolia</i> , natural size to scale. | G. <i>D. aurea</i> , natural size to scale. |
| C. <i>D. maculata</i> , natural size to scale. | H. <i>D. filifolia</i> , natural size to scale. |
| D. <i>D. palachila</i> , natural size to scale. | I. <i>D. pedunculata</i> , natural size to scale. |
| E. <i>D. palustris</i> , natural size to scale. | |

R. C. NASH reports from South Australia—

Diuris maculata, blooms in September. Habitat open shaded areas in the damper parts of the State being quite common in some areas. Keep pots well drained and in an open position and keep cool in summer. Break up into extra pots in preference to putting into a larger one.

2. *D. longifolia* R. Br. "Wallflower Double-tail" (Colour plate, front cover)

A cosmopolitan species, and as such it is most variable, a robust plant to 46 cm. tall. Leaves 2-3. Flowers to 6, brown and yellow or rarely wholly yellow, florets often extremely large. Dorsal sepal shorter than the petals semicircular. Lateral sepals longer than petals, sometimes crossed. Petals broadly ovate or oblong, prominently clawed. Labellum 3 lobed, all lobes often as long as one another, lamina keeled, but no calli ridges.

Distribution: All States except Queensland. Flowering: October-November. Variety *parviflora* Nich.

A smaller flowered form from Western Australia.

3. *D. maculata* Sm. "Leopard Diuris"

An extremely variable plant. In fact it, with the next species *D. palachila* Rog. could form the basis of most of the troublesome forms and disputable species in the western districts of N.S.W. for most of the plants either colour, form or both can be traced back to one of the two species mentioned.

A slender plant to 30 cm. high. Leaves to 3. Flowers to 8, pale yellow heavily blotched and spotted dark brown, especially on the exterior. Dorsal sepal shorter than the petals, margins usually reflexed. Lateral sepals to 16 mm. long crossed or uncrossed reflexed somewhat. Petals on prominent claws oblong or ovate. Labellum 3 lobed, lateral lobes upturned with crenulate margins oblong-falcate, the midlobe most variable, from almost rectangular to broadly cuneate or at times triangular, 2 prominently raised calli ridges at the base of lamina.

Distribution: All States except Western Australia. Flowering: July to September.

4. *D. palachila* Rogers "Spade lipped Diuris"

A slender plant to 40 cm. high. Leaves to 5. Flowers to 4, yellow, dotted and marked brown, especially dorsal sepal and petals. Dorsal sepal to 11 mm. Lateral sepals to 15 mm. long. Petals to 15 mm. long on short claw, oblong. Labellum brown spotted especially beneath. 3 lobed, lateral lobes not less than half as long as the midlobe, lanceolate with dentate margins, midlobe almost rectangular rounded at the apex and narrowing to the base (spade shaped), 2 calli ridges at base.

Distribution: N.S.W., Victoria, South Australia. Flowering: September-October.

5. *D. palustris* — Lindl. "Swamp Diuris"

A species that favours the swampy areas usually growing in small tufts. A slender plant rarely above 10 cm. high. Leaves to 8, spirally twisted. Flowers small to 4, dingy yellow with red-brown blotches. Dorsal sepals small ovate to 3.5 mm. long. Lateral sepals conspicuously long for flower to 1.6 cm. Petals on a short claw oblong or oval emarginate at apex. Labellum 3 lobed almost 6.5 mm. long. Lateral lobes oblong crenulate margins midlobe oblong, 2 raised calli ridges at base.

Distribution: Victoria, South Australia and Tasmania. Flowers: August-September.

6. *D. sulphurea* R. Br. "Sulphur Diuris"

An extremely variable species, at times occurring in hundreds in numerous types of soils from grey sand to heavy loam on dry ridges or on the edges of swamps or in heath land.

A robust species to 60 cm. high. Leaves to 3. Flowers to 8, sulphur yellow with brown markings. Dorsal sepal short and broad, 2 brown blotches at the base. Lateral sepals rarely longer than the petals, sometimes they have a tendency to be petaloid. Petals ovate on short claws. Labellum 3 lobed to 16 mm. long, lateral lobes broadly oblong, truncate, approximately half as long as the midlobe, margins entire, midlobe broadly ovate, sometimes apex emarginated, and almost truncate, a brown band replaces the basal calli ridges, midlobe keeled.

Distribution: All States except Western Australia. Flowers: September–November.

7. *D. filifolia* Lindl. "Cat's face Orchid"

A widespread species in Western Australia where it is endemic.

Plant robust or slender to 45 cm. high. Leaves to 10, spirally twisted. Flowers to 5, yellow with red-brown markings. Dorsal sepal ovate recurved. Lateral sepals as long or just longer than the labellum. Petals ovate to oblong, twisted on its claw. Labellum 3 lobed, lateral lobes to half as long as the midlobe, ovate the margins toothed, midlobe ovate-acute keeled, no raised calli ridges at the base.

Distribution: Western Australia, widespread. Flowering: October–November.

8. *D. pedunculata* R. Br. "Golden Moth Orchid"

A common and therefore variable plant. Slender or robust to 35 cm. high (Var. *gigantea* Nich.) usually only to 20 cm. high. Leaves to 7. Flowers to 5, golden yellow or sometimes rich orange or streaked with orange, florets usually nodding. Dorsal sepal very short, erect. Lateral sepals to 20 mm. long. Labellum 3 lobed, lateral lobes small, deeply dentate, midlobe almost orbicular or ovate often acute at apex, 2 ridges of calli at the base extending into pubescent calli at base of lamina. Petals broadly lanceolate on short claw to 18 mm. long.

Distribution: All States except Western Australia. Flowering: September into Summer.

Variety *gigantea* Nich.

Plant up to 35 cm. high. Flowers to 6.5 cm. in diameter. Distribution: N.S.W., Victoria, South Australia.

9. *D. aurea* Sm. "Golden Diuris"

Once again a most variable plant and it hybridizes freely in its inland N.S.W. habitats. A robust plant to 60 cm. high. Leaves 2. Flowers to 8, golden yellow marked with brown. Dorsal sepals to 16 mm. long recurved. Lateral sepals to 24 mm. long. Petals to 22 mm. long, broad lanceolate to orbicular. Labellum 3 lobed as long or nearly as long as the dorsal sepal lateral lobes not half as long as the midlobe, oblong or sometimes ovate margins sometimes crenulate, midlobe ranging from orbicular to almost diamond shape, keeled with 2 raised calli ridges.

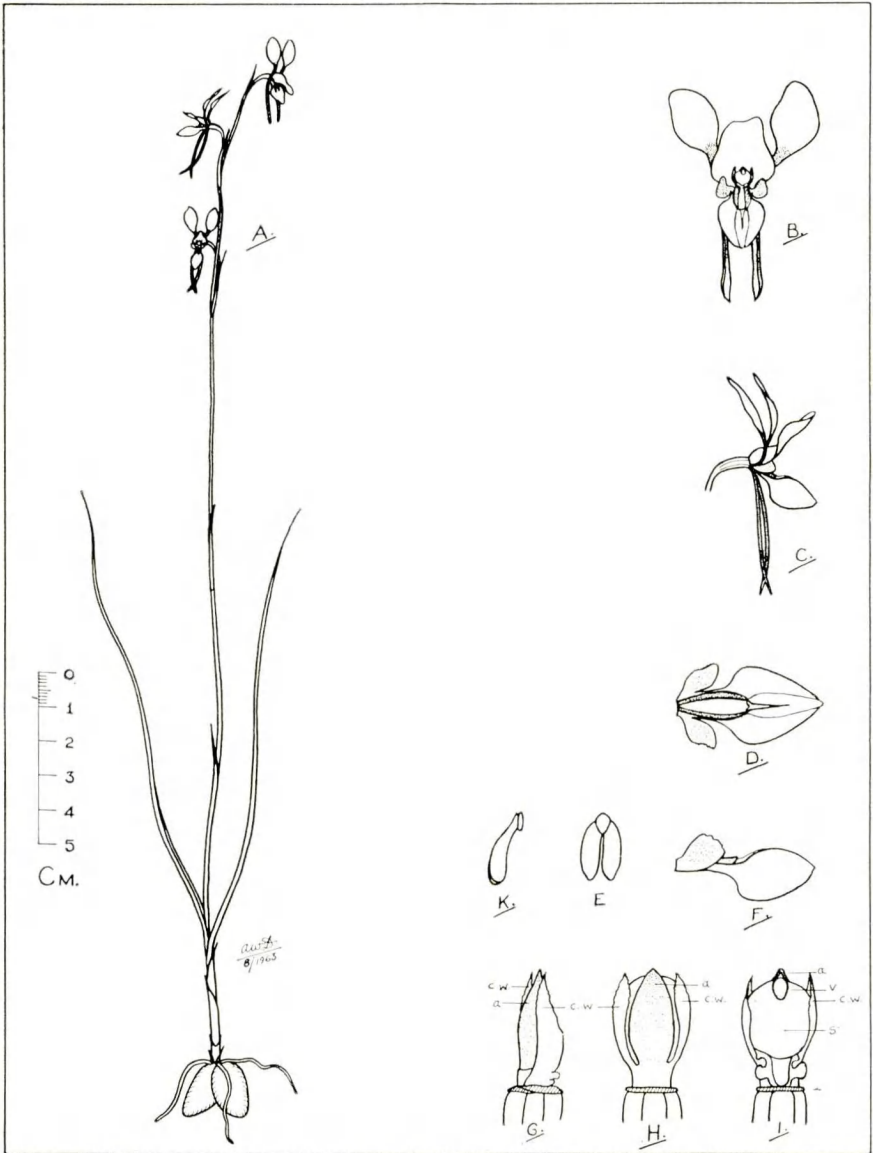
Distribution: N.S.W. and Queensland. Flowers: August–October.

DIURIS AUREA Sm. (Contributed by A. W. Dockrill)
EXOT. Bot. 1:15, t9 (1804).

SYN.: *D. SPATHULATA* SW., SCHRAD. NEU JOURN. 1:60 (1805), not of FITZG.
A rather robust species. Tubers 1–2.5 cm. dia., usually ovoid. Leaves usually 2, about 7–30 cm. long, narrow, thin keeled, grasslike. Stems about 15–60 cm. tall. Flowers 1 to about 8, from 2 to almost 6 cm. long, typically golden-yellow with a few brown markings but sometimes seen without markings and sometimes a more or less lemon or sulphur yellow. Dorsal sepal 6–25 x 4–18 mm., more or less ovate, cucullate at the base, thence recurved to varying degrees where its margins are often recurved to varying degrees, there are usually 2 large brown patches near the base outside. Lateral sepals 12–40 x 1–3 mm., linear,

often dilated towards the apex, usually green but sometimes brownish. Petals with laminae about 7.20 x 4.14 c.m. on claws 3.10 mm. long, laminae usually ovate but varying from lanceolate to circular or even obovate; claw usually brown. Labellum 8.22 x 3.14 mm.; lateral lobes erect, about 3.10 mm. long, obliquely oblong or ovate, often crenulate on the upper margin; mid-lobe 6.14 mm. long, quite variable in shape from almost circular to ovate, lanceolate or almost diamond-shaped, usually with 2 large brown patches or a transverse brown band but often without brown markings; disc with 2 brown-yellow or green ridges, the space between their apices keeled, the keel extending to the apex of the mid-lobe. Column 2.5-7.0 mm. long; wings variable in length, more or less lanceolate, acute, the upper margins crenulate or even dentate. Stigma more or less circular. Anther narrow-ovate. Pollinia and viscidium more or less typical of those of the genus.

DISTRIBUTION—From the Herbert River of Northern Queensland to Southern N.S.W.



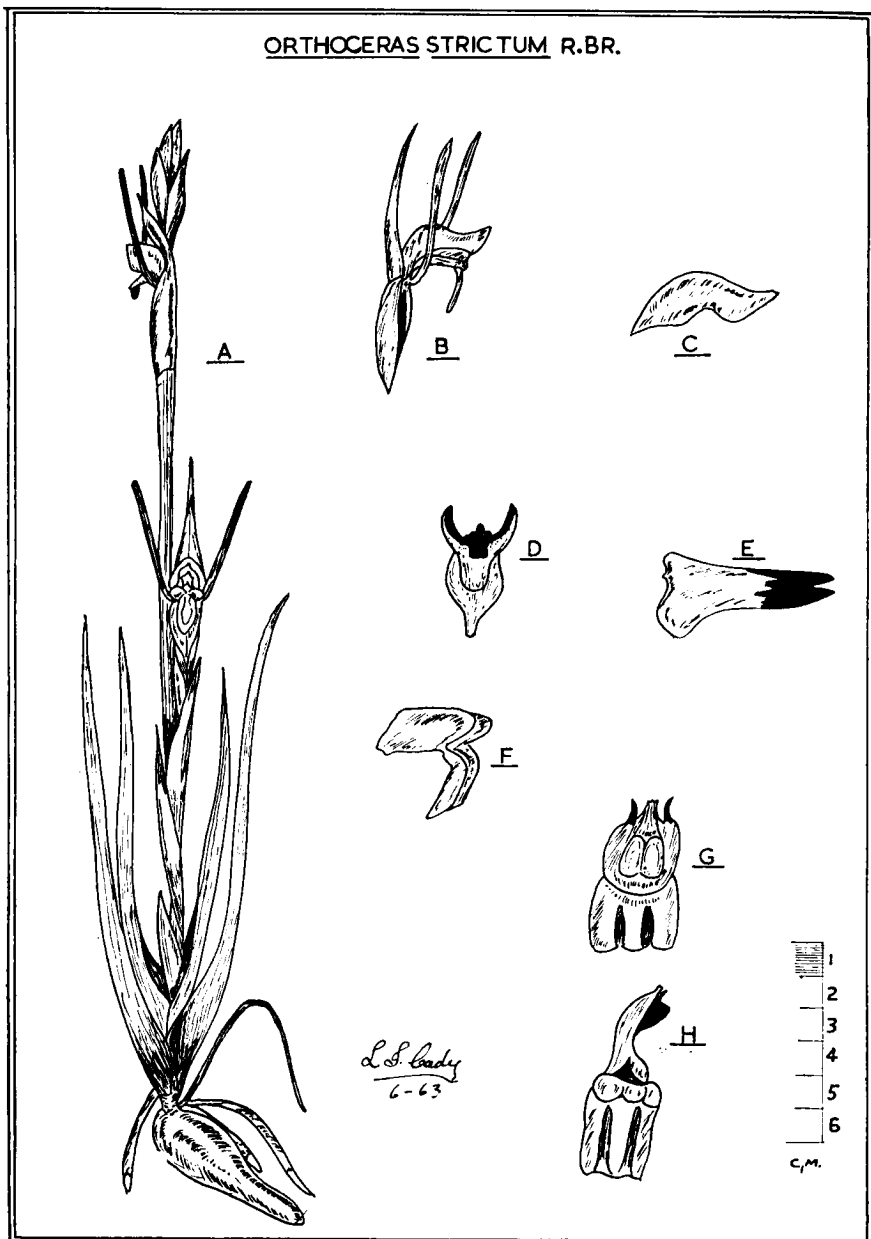
DIURIS AUREA

THE HORNED ORCHID

ORTHOCERAS STRICTUM R.Br.—A close relative of *Diuris*

By LEO CADY, Kiama, N.S.W.

ORTHOCERAS STRICTUM R.Br.



A—Plant natural size to scale provided.
 B—Flower side $1\frac{1}{2}x$ to scale.
 C—Dorsal sepal side $3x$.
 D—Labellum rear view $7x$.

KEY TO PLATE

E—Petal $10x$.
 F—Labellum side $7x$.
 G—Column top view $10x$.
 H—Column side $10x$.

The horned orchid is a common spring and summer flowering species which can, when it flowers, be seen in large colonies in all types of soils, but more commonly in our sandstone area. In its younger stages it can be mistaken for its close relation, the double tail or *Diuris* but once the flowers appear the conspicuous horn like lateral sepals leave no doubt as to the plants identity.

Very little is so far known about the adaption of this species into cultivation, but the writer has had a plant in culture for a number of years, and even though it has not multiplied, it appears to be quite happy in the following compost: 50% peat moss, 40% sharp sand, 10% rotten leaf mould and broken charcoal, and it requires constant dampness during growth period but to be left to the rain during the dormant period.

This plant being the only one in the genus, is found in all Australian States excepting Western Australia, and also New Zealand, where a form named *viride* is also known.

ORTHOCERAS STRICTUM R.Br.

A terrestrial herb of rather rigid habit up to 60cm. high, leaves two to five long and narrow-linear. Flowers up to nine, almost sessile with large floral bracts, green and green. Dorsal sepal acute, hooded 10-12mm. long, lateral sepals narrow linear, long and straight, erect or spreading 2-3cm. long. Petals very small, hidden by the dorsal sepal, blunt, erect, usually notched at the apex. Labellum 9-12mm. long, sessile, three lobed, recurved, the lateral lobes much smaller than the midlobe which is elliptic or ovate and having a variable callus at the base of the lamina. Column short, with two wings. Another incurved tapering to an obtuse point, two-celled. Stigma erect in front of it. Pollinia two bilobed, mealy, without a caudicle.

EDITOR'S NOTE: We still need more growers of terrestrial orchids and a lot more seed.

ORCHID GROWERS IN QUEENSLAND

Will all competent photographers in Queensland make special project of photographing any native orchids in flower during this coming season. Please make special efforts to photograph *Dendrobium bigibbum* in all its forms and varieties, *D. superbiens*, *D. discipulum* and *D. undulatum*. Please help us to clean up the confusion over the various names and provide you with a comprehensive report complete with full colour illustrations.

NOTES ON PHAIUS TANKERVILLIAE

By DON SANDS

The plant I have at present in flower has been grown in a 12in. pot for about 40 years. The conditions have been varied from a cool, moist and shady position at Wahroonga (600ft. a.s.l.) to its present position at Newport (sea level) where it receives the full sun all day. The orchid is now flowering better than ever (November) and has up to two spikes on each pseudo bulb. The flowering has greatly improved after placing in full sun, although the leaves have yellowed somewhat. (Issue No. 8 has full colour plate).

This plant originally came from the Clarence River and is a form that will not produce young plants from the nodes of the old flower stalk as the northern forms will do.

However, the flowers are larger and darker than the northern forms, the flowers being up to 4½in. across and the interior colour of the petals is a deep chocolate brown, while the white labellum has a broad pink edging. The form is unlike the one described by Mr. Leaney (*Australian Plants*, Vol. 1, No. 8) in that the flowers only last about one week, the bright pink labellum then fading to a dull brown before the flowers open. Only four flowers remain open on each stalk at a time and they do not all drop together as in the form Mr. Leaney describes.

The flowers bruise easily in a similar manner to *Calanthe veratifolia*, and care has to be taken that other plants do not brush the flower stalk.

THE GENUS ERIOSTEMON

PART 5 — by Jean Galbraith

WEST AUSTRALIAN SPECIES

All W.A. species except *E. difformis* are endemic there, and knowing them only from herbarium material (except in the case of *E. spicatus*) I can only say that they appear very distinctive and easy to recognise.

E. coccineus C. A. Gardiner, has red, bell-shaped flowers on long stalks, but though bell-shaped the petals are not fused into a true bell. Narrow-leafed sometimes leafless. *E. brucei* F. Muell. has pink or white nearly stalkless flowers, and *E. fabianoides* Diels. has very short-stalked, four-petalled campanulate (bell-shaped) flowers.

E. nodiflorus Lindl., which has flowers in tight little round heads, has been described as "bright blue", but flowers on dried specimens appear to be lilac-pink. Probably the colour is variable.

The small pinkish-lilac flowers of *E. spicatus* A. Rich. grow in long, loose terminal racemes which are often compound (paniculate) forming loose pyramidal clusters, and the distinctive character of *E. tomentellus* Diels is its thick little oval velvet-textured leaves.

The thick oblinear leaves of *E. fitzgeraldii* C. Andrews are grooved and smooth above, convex and tuberculate below, and continue as a narrow tuberculate "ribbon" down the stem, which is smooth or almost so. As a result the stem appears to have smooth grooves between shallow tuberculate ridges. The flowers are small and terminal, with leafy shoots often growing out beyond the flowers so that they appear axillary.

E. thriptomenoides S. Moore, resembles *E. difformis* in many ways, but has smooth or downy stems while those of *E. difformis* are tuberculate, and it has leaves which are very thick and small, quite flat above and so convex as to be actually keeled below.

The species which has been described as *E. deserti* is not an eriostemon. It has the valvate, inflexed petal tips, and spreading stamens of *Phebalium*.

It is interesting to note that many specimens of *E. difformis* from W.A. have thick leaves, flat above, with a deep central groove. This is noticeable in some specimens from other States; especially from the drier areas, but is not nearly so pronounced as in the W.A. specimens.

VARIATION

In a series like this sketches of such details as leaf shape must illustrate typical leaves. There is always some variation; a few larger or smaller on any plant for instance, or occasional ones of not typical shape. Similarly, flowers of a four-petalled species may occasionally have five or even six petals, but it should be understood that both drawings and descriptions refer to the majority of flowers or leaves on the plant.

KEY TO ALL AUSTRALIAN SPECIES AND SOME NOTES

Expansion of the key published earlier (Vol. 1, No. 4) to include all known species has made it necessary to change the emphasis on key figures, as well as the sequence of species; and one, *E. brevifolius*, is here omitted.

Examination of material in Melbourne Herbarium seemed to support J. M. Black's description of *E. brevifolius* as a separate species, but later study of specimens from all mainland States, through the courtesy of Dr. Grieve of the University of Western Australia, and Government Botanists in five States, showed no consistent difference between *E. brevifolius* and *E. difformis*.

Flowers of otherwise typical *E. difformis*, may have hairs inside, or outside, or on both sides of the petals, and the leaf shape associated with *E. brevifolius* grades into that of *E. difformis*.

I hoped that someone familiar with endemic species of northern and western Australia, in their natural habitat, could prepare a key to those species, but as no one else had time to undertake the work I have done what I can after examining herbarium material of all species and living plants of five species which I knew only as dried specimens until last year.

A KEY TO ERIOSTEMON SPECIES IN AUSTRALIA

A Petals 4.

B Leaves oblong to ovate up to 1" long. Tasmania only. 1. *E. virgatus*B Leaves thick, appearing cylindrical. Flowers bell-shaped. W.A. 2. *E. fabianoides*

A Petals 5.

C Leafless. W.A. only. 3. *E. brucei* var. *aphylla*C Leaves incurved to midrib. Flowers nearly sessile. W.A. only. 4. *E. brucei*

C Leaves not incurved to midrib.

D Leaves with several distinct parallel veins. N Queensland. 5. *E. banksii*

D Leaves with no visible midrib or only one.

E Leaves narrow-lanceolate, about 1" long, consistently hooked, stems without hairs. 6. *E. affinis*

E Leaves not consistently hooked.

F Flowers bell-shaped, terminal, narrow leaves slightly decurrent. W.A. only. 7. *E. coccineus*

F Flowers not bell-shaped.

G Leaves decurrent as tuberculate ridges on a smooth stem.

G Leaves not decurrent. W.A. only.

H Flowers in small terminal clusters (apparent heads) Subulate leaves with pale hairs. Moruya only. 9. *E. carruthersii*H Flowers in dense terminal heads. Leaves without hairs. W.A. only. 10. *E. nodiflorus*

H Flowers terminal but not in heads or apparent heads.

H Flowers axillary with some terminal.

I Leaves small, oval, velvety on both sides. W.A. only. 11. *E. tomentellus*

I Leaves not velvety.

J Leaves needle-like, but broader at tip. Filaments with long hairs. 12. *E. ericifolius*

J Leaves not needle-like.

K Leaves narrow-linear, appearing cylindrical, not much revolute.

Flowers in terminal, usually compound racemes.

K Leaves flat, small, ovate, thin. Midrib prominent.

K Leaves flat, small, ovate, thin. Midrib inconspicuous.

K Leaves small and thick or cylindrical, usually no visible midrib.

L Leaves cylindrical. Filaments with long hairs.

L Leaves quite flat above, convex below. Short hairs on filament. Stems not tuberculate.

L Leaves often deeply grooved, never flat and plano-convex. Short hairs on filament. Stems tuberculate. 17. *E. thriptomenoides*M Flowers not pedunculate. 18. *E. difformis*

M Flowers pedunculate. P N

N Most peduncles bearing umbels of several flowers. Fruitlets beaked. 19. *E. myoporoides*

N Peduncles bearing one flower, sometimes two, never more. O

O Leaves linear to lanceolate, concave, narrowed to the point. Fruitlets not beaked. 20. *E. queenslandicus*O Leaves oblanceolate, cuneate or spatulate with a small mucro (abrupt point). Fruitlets hardly beaked. 21. *E. glasshousiensis*
 Stanthorpe.
  Wyberba.
  Mt. Beerwah.

- P Stems glabrous, usually tuberculate.
 P Stems downy or hairy, not tuberculate.
 Q Leaves conspicuously over 1" long.
 Q Leaves 1" long or less.

Q
T
R
S

- R At least 2 rings of overlapping bracts on pedicel (usually more).

Leaves lanceolate.

N.S.W. only.

- R Bracts minute and basal, or none, Leaves oblanceolate.

- S Leaves oval or ovate.

Edges revolute or recurved.

Midrib conspicuous.

- S Leaves obovate to obcordate.

Edges flat. Midrib not visible.

- T Leaves oblanceolate, turned downward.

Branchlets and leaves downy, without stiff hairs

- T Leaves linear; turned upward.

Branchlets with stiff hairs. Some short stiff hairs on leaves.

- T Leaves obovate to obcordate, glabrous. Branchlets downy.

N.S.W. only.

22. *E. lanceolatus*23. *E. trachyphyllus*24. *E. buxifolius*25. *E. verrucosus*26. *E. hispidulus*27. *E. scaber*28. *E. obovalis*

Drawing A. Spurway.

There are still ten species (*E. fabianoides*, *E. banksii*, *E. carruthersii*, *E. affinis*, *E. coccineus*, *E. fitzgeraldii*, *E. nodiflorus*, *E. tomentellus*, *E. brucei*, and *E. thriptomienoides*) which I know only as dried specimens. This is not wholly satisfactory, especially for those interested primarily in growing plants, but the key is based on characters easily seen in dried specimens, so even if some obvious field differences have been missed I hope it will be easy to use.

Since I described *E. obovalis* as "apparently rare" my friend Mr Althofer has kindly sent propagating material of it, with the comment that it is widespread in the Blue Mountains area, where it is protected.

ACKNOWLEDGMENTS

I should like to express appreciation of the work of Mrs. Spurway, whose illustrations have been invaluable, and also to thank Mr. Cane, who has provided innumerable fresh specimens and freely shared his knowledge of unusual forms.

I would also especially thank the Government Botanists of Victoria and Queensland for permission to examine dried specimens in the herbaria of those States, and Dr. Grieve, and the Government Botanists of Western Australia, South Australia and New South Wales for making available specimens for study.

SOIL FOR CONTAINERS

by P. Lindsay

Generally, in horticulture, it would appear that too little attention is being paid to the soil. Unless the soil structure is suitable and the acid level of the soil is at a level which will release the elements and the air has free movement throughout, some difficulty must be experienced in growing plant life in general.

To this end, the University of California developed a method of plant culture known as the U.C. method, which is simply a mixture of sterilised rice husks, peat moss and sand. This mixture has all the desired properties of a good soil and is used as a form of hydroponics by adding, at regular intervals, a complete plant food. At present quite a large number of nurseries are using the U.C. method which produces plants at a fast rate, under the correct conditions. This mixture, in itself, is not capable of sustaining plant life without regular feeding, and, therefore, for home use I do not believe that it should be generally used.

As a contrast to this method Mr. W. Hart (Horticultural Supervisor of the Sydney City Council) has been working on a medium which suspends all the elements needed to maintain plant life without this constant feeding, and still possesses the same properties. A similar method is used by many reliable nurserymen to a great advantage and plants grown by them are very hardy and survive very easily after planting out in the home garden.

With the U.C. method the correct acid level is also very vital. If the acid level is not correct the elements are not readily available to the plants; therefore, all feeding may be useless and wasted, with resultant effect on the plants. Bacterial action, which is essential in the soil is prevented by excessive acidity.

The second factor is the lack of silt content. Some soils around Sydney (particularly some of the Liverpool soils) are very high in silt content and when used they prevent a free flow of water and air throughout the soil, causing disastrous effects to plant life. Because carbon, hydrogen and oxygen are obtained by the plant from air and water in the soil as well as the atmosphere a good soil should allow free movement of both.

The third factor is the presence of organic material, such as rotted leaves; in fact, almost any decomposed living matter will suffice. This property is essential to this method because the organic content is needed to suspend the fertilizer which is needed to feed the plant. Unlike the U.C. method, in this way the food is available over a long period and is only applied at potting time and possibly twice a year thereafter at the most. This applies to open beds as well as pots.

Finally a complete fertilizer containing nitrogen, phosphorous and potash is used. The proportions of each vary quite a lot, depending on the type of plant on which it is intended to be used, although there are some excellent balanced fertilizers on the market which will do quite well for most garden purposes. Remember the organic content of the soil suspends and distributes the fertilisers, so you need both.

The method is simply a mixture of 3 parts of silt free sandy loam, 1 part organic material (such as leaf mould, compost, cow or horse manure) and 1 part coarse sand. To this mixture add a complete fertilizer, as an organic fertiliser at the rate of 4 ounces per bushel of soil, which is 2 cubic feet, or a volume equal to 8 gallons. Hydrated lime is then added but the rate is determined by the acid level (pH), therefore, a reading should be taken before adding the lime. If the reading is, say, 4.5, then 2 ounces of lime should be added to each bushel of mix, because the most satisfactory pH is 6.5, and it takes 1 ounce of hydrated lime to reduce the acidity of 1 bushel of mix by 1.0.

Plants grown by this natural method may be a little slower at first, but seem much hardier and more able to fend for themselves when planted out.

This medium has been proven very satisfactory and depends on four factors. The first and foremost is the correct pH. level, i.e. the acidity of the soil should be reasonably correct. At pH 6.5 most elements are readily available to plant life. However, in the case of acid-loving plants such as azaleas, no lime should be added, and the pH should be approximately 5.0.

CUPANIOPSIS ANACARDIOIDES

by H. O. Oakman

Cupaniopsis anacardioides, or *Cupania* as it is more commonly called, has been used as a street tree in the East Coast Cities of Australia from Newcastle to Rockhampton. Probably the largest specimen is growing in Church grounds at Maclean, Northern New South Wales. This particular tree is approximately 40' high, with a spread of 60', but the average height is in the vicinity of 18' with a spread of 20'.



Block by courtesy of Jacaranda Press from *Some Trees of Australia*—Oakman

The genus name is derived from Francesci Cupani, an Italian botanist born in Sicily, 1657, and the specific name refers to its likeness to the cashew (*anasardium*). In parts of New South Wales it is called Tuckeroo.

The *Cupania* is a very hardy tree, and is particularly suitable for streets that have a considerable wind exposure together with poor soil conditions. It is indigenous to the East Coast of Australia, where it is found in isolated clumps or as single specimens. It flourishes on the sandy coastal strips where presumably its roots have reached down to the water table.

The *Cupania* is not affected by average winds and will take salt-laden "blows" with a minimum of burn. It cannot, however, take complete exposure to prevailing salt-laden winds. Under these conditions, it survives, but in a sawn-off form. Although so often found in sandy areas, it grows surprisingly well in heavy soil, providing always that there is adequate drainage at all times.

As a street tree, it is ideal for planting where there are service lines, as it seldom grows high enough to require constant cutting, nor does it spread laterally to become a nuisance to passing traffic. The *Cupania* is an evergreen, with dark green shiny foliage, and its dense branching provides excellent shade that requires a minimum of pruning.

It appears to be disease free and the only insect pest of any consequence is the Indian Wax Scale, which can make the tree quite unsightly;

infestations are usually associated with trees that are not in vigorous growth. Usually, defoliation acts as a fairly effective control, but less vigorous trees require spraying.

The Cupania is an evergreen shade tree, but it can be most attractive in appearance from early November to late December and January, when it carries a crop of seed capsules containing brightly coloured orange-red seeds. This tree is another of our natives that could be grown from selected specimens, as only about one tree in thirty has a fruiting habit. There is no doubt that an avenue of vegetatively propagated cupanias from a well chosen parent plant could easily compare in beauty with some of our flowering trees.

EDITOR'S REPORT ON STREET TREES: There are 96 local Government shires, Councils, etc., co-operating with us on the study of the street tree problem. Who will deny that provided we can find trees to meet the special requirements of a street tree, that add beauty to our dwelling areas. These Councils are being circulated with specially prepared notes on this subject for their comment with a view to the ultimate preparation of a handbook on this subject. Such notes are available to those especially interested on receipt of a stamp addressed envelope. On enquiry I can advise you if your Council is interested in this problem and if not you could make personal enquiries to try to spur them on in this special civic problem. How many of my readers care about street trees?

TREES OF QUEENSLAND

PART 2—TREES OF THE DARLING DOWNS

Submitted by Dept. of Forestry, Queensland

For the most part the Darling Downs is an area of tree-less plains with intrusions of open parkland following creek and river flats where the main species is River Red Gum (*Euc. camaldulensis*) and on slightly elevated land where Poplar Box (*Euc. populifolia*) is the principal tree.

Soils are typically the heavy black clays of great depth and fertility interspersed with red loams or clays. The black soils are alkaline and this coupled with the physical nature of the soil which causes it to swell or shrink markedly with changes of soil moisture largely explains the absence of tree growth in these areas. Climatic conditions are also adverse to tree growth — high summer temperatures, rainfall 25 ins., severe westerly winds, frost and prolonged droughts.

These difficulties together with the value of the soils for agriculture result in there being no demand for farm woodlots the principal and important call being for trees to provide shelter for homestead, crop or stock and for ornamental trees. Plantings by early settlers established the Pepperina (*Schinus molle*) as the best species to handle the conditions and provide shade around the homestead.

Recent work has shown that with careful attention to the following principles there are a number of species which can be successfully planted.

1. Use only vigorous tubed or potted planting stock.
2. Provide protection from grazing animals.
3. Cultivate before and after planting to eliminate weeds and conserve moisture.
4. Water plants immediately after planting.
5. Plant under favourable conditions in late summer or early autumn.

The following species listed in order of preference within size classes are suitable for windbreak planting and for shade or ornamental use.

(Continued on page 203)

EDITOR'S NOTE: The Queensland Dept. of Forestry is preparing notes in this series for the benefit of readers in the Country areas. The above notes should be a guide to all people living in wheat growing areas.

The Gompholobiums of New South Wales

by Colin Burgess and Loretto Williams

The genus **Gompholobium** is confined to Australia and consists of twenty-four species, eight of which have been described from New South Wales, in addition to one variety and one apparently undescribed variety or subspecies.

The word **Gompholobium** is from the Greek:— **gomphos** — a bolt or nail, and **lobos** — a capsule or pod. It was bestowed upon the genus by Sir John Smith in 1798 and refers to the inflated fruiting capsule which resembles the head of a nail or bolt.



Colour photography by Frank Hurley

Block by courtesy of John Sands Pty. Ltd.

GOMPHOLOBIUM LATIFOLIUM



Gompholobium latifolium

(a) Dissected corolla; (b) Calyx with corolla removed; (c) Other types of leaflets; (d) Fruiting capsule.

*Gompholobium*s are shrubs, varying from tall and erect to straggling or prostrate and, in New South Wales, have either digitate leaves of up to seven leaflets, or, as in *G. pinnatum*, true pinnate leaves. Seedlings and young plants usually have simple leaves, the divided leaves appearing as the plant emerges from its juvenile stage.

The notable features of *Gompholobium*, which distinguish it from other "pea bushes" are the **calyx**, which is deeply cleft into five lobes, dark-coloured outside and whitish-tomentose within, and the large, inflated, almost globular **fruiting capsule**, containing four or more seeds. Closely related is *Burtonia*, with twelve species and reddish, yellow or bluish-purple flowers. One species only is found in New South Wales. It has reddish-orange flowers. The fruiting capsule of *Burtonia* contains two seeds, and this, apart from any other feature, readily separates it from *Gompholobium*.

The following is a brief description of the New South Wales species:-

1. *G. latifolium* (Latin: broad-leaved), described and named by Sir John Smith in 1805.

A shrub, tall and erect, from 1 to 3 metres (3 to 10 feet) high. Near the coast and in sheltered places it reaches its maximum height, drooping with the weight of flowers in spring. At high altitudes (e.g. Blackheath, 3,500'), it is shorter and compact.

The **mature leaves** are digitate with three leaflets, very variable in size and shape, from rather broad to very narrow, flat or with recurved margins, the apex obtuse or acute, cuneate or emarginate, paler on the underside. They measure up to 5.7 cm. long and .8 cm. wide (2.2 x .3 inches).

The **flowers** are large and conspicuous, of a deep yellow colour, the standard on luxuriant specimens measuring at times 3 cm. x 2.8 cm. (1.2 x 1.1 inches) and usually with some dark, sooty-green markings on the outside. The keel measures 1.8 x 1 cm. (.7 x .4 inches) and is sooty-bronze, shading to almost white at the base with a conspicuous, white, ciliate margin. The calyx lobes at times measure as much as 1.7 cm. in length and .5 cm. in breadth at the base (.65 x .2 inches). They are black to bronze green on the outside, with whitish tomentum on the inside. The pedicels vary in colour from black to green and are up to 1.3 cm. (.5 inch) long — measured only to the pair of small bracts, the rest of the "stem" forming the peduncle.

The **fruiting capsule** is usually dark green, inflated, oblong, often 2 cm. (.8 inch) long, containing 12 or more pale seeds.

The **flowering season** varies from August near the coast, to November December in colder mountain localities.

The range of this species extends throughout the coast and nearby mountains, into Queensland and Victoria but it does not appear to descend the slopes westward and it has a distinct preference for sandstone country. A selection of localities from which specimens have been observed in the field, collected and, in some cases, grown, are as follows:- Hornsby-Hawkesbury River; Hornsby-Galston; Hawkesbury River-Gosford; Colo Heights-Howe's Valley; Morisset; Limeburner's Creek; Kulnura; Seal Rocks; Coopernook; Boundary Creek (36 miles ENE of Glen Innes); Kurrajong-Bell; Mt. Wilson; Lapstone Hill-Blackheath; Tahmoor-Mittagong; Thirlmere-Hill Top. Altitudes vary from near sea-level at Coopernook and Seal Rocks to 3,000'-3,500' at Boundary Creek and Blackheath.

2. *G. huegelii* — so named by Bentham, in honour of Baron Huegel, distinguished Viennese botanist, when the description of the species was published in 1837.

It is a small shrub, often virgate, inconspicuous except when flowering, rarely exceeding 1 metre (3 feet) in height.

The **mature leaves** are digitate, with three leaflets, usually grey-green in colour, rarely deep green, narrow, variable in size, minutely pointed and with recurved margins. The leaflets sometimes reach a length of 2.5 cm. (1 inch), but are commonly much shorter, and a breadth of .3 cm. (.1 inch) as a maximum would be rare.

The **flowers** are coloured bright yellow, the standard measuring up to 2.4 cm. (.95 inch) long and 3.4 cm. (1.3 inch) broad, marked with sooty or dark shadings on the outside. The keel measures up to 1.5 cm. (.6 inch) long and .8 cm. (.3 inch) at the broadest part. It is coloured greenish-yellow or even dark yellow to brown, with dark shadings and becoming paler at the base. The margin has a distinct, light, ciliate fringe. The calyx is black to very dark green, the lobes measuring up to 1.5 x 0.5 cm. (.6 x .2 inches), the inner side covered with a pale tomentum. The pedicel measures up to 1.7 cm. (.65 inch) long and, with the addition of the peduncle, the "stalk" may appear to be as long as 3 cm. (1.2 inch).

The **fruiting capsule** is dark green, inflated, measuring up to 1.5 x 1 cm. (.6 x .4 inches) and contains 12 or more seeds.

The **flowering season** is usually November-December.

This is an exceptionally attractive species, the large and showy flowers, on long "stems", with the background of grey-green leaves at once catch the eye. For the most part it is an inhabitant of the mountains and tablelands, from the Queensland border throughout New South Wales into Victoria and Tasmania. A selection of localities where it has been studied or collected by one, or both, of us is as follows:- Clarence (head of Dargan's Creek); Blackheath (Hat Hill); Megalong Valley; Kanimbla Valley; Kanangra Tops; Paddy's River (north-east of Marulan); Mt. Jerrabomberra; the Brindabella Range (A.C.T.) and near Nerriga (Pigeon House Range, N.S.W.)



Photo: Loretto Williams

GOMPHOLOBIUM GRANDIFLORUM

3. **G. grandiflorum** (Latin: with very large flowers) was so named by Sir John Smith in the description published in 1804.

A robust shrub, often exceeding 1 metre, (3 feet) in height, but shorter and more bushy at high altitudes.

The **mature leaves** are digitate with three leaflets, very narrow, measuring from .05 cm. to .2 cm. (up to .1 inch) in width and up to 3 cm. (1.2 inches) or more in length, the margins revolute, the apex ending in a sharp point.

The flowers are dark yellow, the standard measuring up to 1.5 cm. x 1.5 cm. (.6 inch) with some dark shading on the outer side. The keel may be 1.2 cm. long and .5 cm. wide (.5 x .2 inches), and is dark coloured shading to yellowish at the base, the margin almost glabrous. The calyx lobes are black or bronze, pale and somewhat tomentose within and may reach a length of 1 cm. and breadth of .5 cm. (.4 x .2 inches). The pedicel is up to .7 cm. (.25 inch) long.

The fruiting capsule is dark coloured and inflated, measuring up to 1.5 cm. (.6 inch) long and containing a variable number of seeds — from 6 to over 12.

The flowering season is September-October.

This brilliant *Gompholobium* has a limited area of distribution but is common within the area. So far as is known, it extends from the Gosford district to Jervis Bay and inland to the Blue Mountains and Southern Highlands.



Photo: P. Althofer

GOMPHOLOBIUM VIRGATUM var. ASPALATHOIDES

A selection of localities from which it has been studied in the field, collected and grown from is as follows:- Calga (about 10 miles south of Gosford); Hawkesbury River-Hornsby; Hornsby-Galston Gorge; Glenorie-Wiseman's Ferry; Annangrove; Wilberforce-Colo Heights; Kulnura; Blaxland; Silverdale; Thirlmere; Bargo; Burragorang; King's Tableland; Wentworth Falls; Mount Blackheath. Specimens from the higher altitudes were mostly, but not always, of the form with extremely narrow leaflets.

4. *G. virgatum* (Latin: twiggy). The name was bestowed by Sieber, whose description of the shrub was published in De Candolle's *Prodromus* ii, in 1825.

There are two varieties — one apparently confined to the coast whilst the other is found further inland.

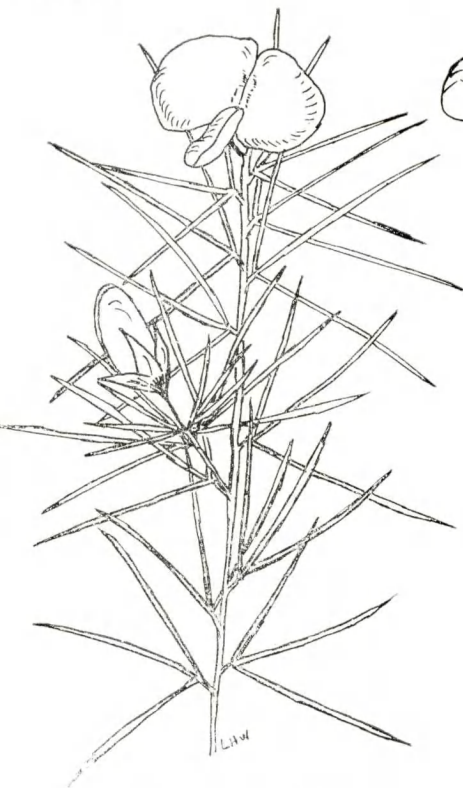
Variety *virgatum* is a small shrub, about 1 metre (3 feet) high, of a bushy and much branched habit.

The **mature leaves** are digitate, with three leaflets, averaging about 2 cm. (.8 inch) in length, but frequently shorter or longer — up to 3 cm. (1.2 inches) — and .2 cm. (.1 inch) wide at the widest part. They are broader towards the apex, with recurved margins, the apex obtuse, sometimes with a small, blunt, hooked point.

The **flowers** are yellow, the standard shaded with sooty markings on the outside, 1.3 cm. long and 1 cm. broad (.5 x .4 inches). The keel measures 1 cm. x .5 cm. (.4 x .2 inches) and is almost glabrous, dark coloured at the margin, shading to pale yellow at the base. The calyx lobes measure up to .8 cm. x .2 cm. (.3 x .1 inches) and are black or brownish green, with the inner side pale and somewhat tomentose. The pedicels measure about 1 cm. (.4 inch) in length.

The **fruiting capsule**, when mature, is dark brown, about .8 cm. (.3 inch) long and contains up to 8 seeds.

The range of this variety is limited to the coastal districts from Queensland to Sydney. Specimens have been studied in the field and collected from near Diamond Head; near Seal Rocks; and at Bungwahl, **flowering** in August and September.



Gompholobium grandiflorum



Gompholobium Luegelii

5. *G. virgatum* variety *aspalathoides* (*aspalathoides* — from the Greek, meaning "resembling the Aspalathus," a heath-like plant, with "pea flowers"). The name and description were published by Bentham, after Cunningham, in 1864.

This variety sometimes reaches a height of 2 to 2½ metres (say 6 to 8 feet)



Gompholobium virgatum
var. *virgatum*



Gompholobium virgatum
var. *aspalathoides*

e.g. at Owen's Gap, and is readily distinguished by the leaflets, which are very narrow, with revolute margins, appearing only .1 cm. broad. They are consistently shorter than those of var. *virgatum* — 1 cm. to 1.5 cm. (.4 to .6 inches) — and are of a darker green colour. var. *aspalathoides* appears to produce more flowers than var. *virgatum*.

The range extends along the Western Slopes, chiefly in the north and central parts, and the inland parts of the Central Coast. The variety has been observed in the field and collected from Sandy Hollow; Owen's Gap, 9 miles west of Scone; and on the rocky hillsides along the Windsor-Singleton Road from 60 miles south of Singleton to within 20 miles south of Singleton-Wallaby Swamp, Kangaroo Holes, Long Weeney Creek, Putty (2 miles east of the Post Office), Howe's Mountain, and Darkey Creek, **flowering** from August to October.

6. *G. minus* (Latin: less — in comparison to other species known at the time it was small). The name was published by Sir John Smith in 1805.

It is usually a small to very small shrub, decumbent or ascending, rarely erect, but occasionally reaching a height of one metre (about 3 feet). The stems are covered with short hairs and in some specimens (e.g. from Blackland's Ridge) the whole shrub may be noticeably hairy.

The leaves are digitate, with three leaflets, usually coloured bright green. The leaflets rarely exceed 1 cm. in length (.4 inch) except in young vigorous growth, and are very narrow, with recurved margins and a pointed, often recurved, but not pungent apex.

The flowers are brilliant yellow, those on some shrubs lacking the usual sooty markings, or almost so. They are arranged terminally on pedicels which may be as long as 2 cm. (.8 inch) or, on the other hand, be very short. The standard measures up to 1.5 cm. long by 1.3 cm. broad (.6 x .5 inches). Most specimens have a variable amount of sooty shading on the outer side, but in some (e.g. from Paddy's River, north-east of Marulan) it is almost entirely absent. The keel is almost glabrous and measures up to .9 x .5 cm. (.35 x .2

inches), darker coloured at the broadest part and shading to lighter at the base. The calyx lobes, dark green, may measure up to 1 cm. x .3 cm. (.4 x .1 inches). In the unopened buds the lobes make a ridge at their junction. This is a clear guide in determining the species and we have noticed it in no other with the exception of some specimens of *G. latifolium* collected at Manning River National Forest No. 1, but it was, even in that limited area, not a consistent feature of *G. latifolium*, occurring only in a small percentage of buds on individual shrubs.

The fruiting capsule, of a dark green colour, measures up to 1 cm. (.4 inch) long and bears about 12 or more seeds.

Late October to November is the usual flowering season.

The range of this species is along the Central Coast from about Maitland to a little south of Sydney, and inland to the Central and Southern Highlands and probably the Southern Alps. We have collected and studied it in many places, of which the following is a good "cross section":- Parramatta (North Rocks); Londonderry (6 miles due north of Penrith); Blaxland's Ridge (north of Windsor); Woodford (Blue Mountains); Thirlmere; Tahmoor to Mittagong; Mount Bullio; Paddy's River (Berrima-Marulan); Wingello; Sassafras (Pigeon House Range); Howe's Mountain.



Gompholobium minus



Gompholobium uncinatum

7. *G. uncinatum* (Latin: barbed or hooked, referring to the apex of the leaflets) received its name from Cunningham, whose description of the species was published by Bentham in 1838.

It is a small, low-growing shrub, diffuse or decumbent in habit, rarely bushy, often forming small "mats", but, so far as we know, having one root system and not rooting at the nodes. The stems are reddish-brown, becoming grey-brown as they age, and are slightly hairy.

The mature leaves are digitate, with three leaflets, measuring up to .8 cm.

long and .1 cm. broad (.3 x less than .1 inches), but appearing even narrower because of the recurved margins. The apex is usually a little wider than the rest of the leaflet and bears a small, dull, recurved or sometimes hooked point. The leaves are numerous and crowded and vary in colour from dark to light bluish or slaty green. On occasional shrubs they are slightly glaucescent in appearance.

The flowers also are numerous and bright, varying from scarlet to brick-red with a darker keel. The standard measures up to 1 cm. (.4 inch) long and 1.2 cm. (.5 inch) broad and has a clear, yellowish blotch .3 cm. x .2 cm. (.1 x less than .1 inches) at the base. The keel measures up to .6 cm. x .3 cm. (.2 x .1 inches), is dark red, shading to whitish-green at the base and is almost glabrous. The dark green calyx lobes measure .6 cm. x .3 cm. (.2 x .1 inches), and the pedicel may be .4 cm. (.15 inch) long.

The fruiting capsule is usually dark green, inflated, and up to 1 cm. (.4 inch) long.

The flowering season is November-December.

This *Gompholobium* is the only one in New South Wales which has red flowers when fresh. Many of the yellow coloured *Gompholobiums* dry to a reddish colour after being pressed and kept for some time in the herbarium, but this species is red in the field. With its background of dark, dull leaves it is a striking sight on wooded hillsides or in open forest. It seems to have a preference for sandstone soils or those of granitic origin and is found usually in open forest of the dry sclerophyll type.

The range of the species is from the North to Central Tablelands and North Western and Central Western Slopes, but there are two rather old coastal records — St. Marys (1887) and Bulahdelah (1914). Recently we saw specimens collected in Victoria which seemed identical with the New South Wales material. Localities from which one or both of us have collected the species, examined it in the field and at times obtained small plants which grew readily are: Granitic hillsides above Bowen's Creek (a tributary of the Cox River, in the vicinity of Wentworth's Sugarloaf); Clarence-Lithgow; Blackheath; Wallerawang; Munghorn and between Kandos and Rylstone.

8. *G. "Obscuratum"* (Latin: shaded, concealed, suppressed-literally: obscure, unknown, indistinct) — **provisional name only.**

Thus, we believe, is an undescribed *Gompholobium*, and the name is given,

<i>G. "obscuratum"</i>	<i>G. uncinatum</i>	<i>G. glabratum</i>
i. A very small prostrate or straggling shrub.	i. A small, low-growing shrub, diffuse, decumbent, rather dense, not straggling.	i. A small, low-growing shrub, decumbent, ascending, slender, rarely 30-50 cm. (12-16 inches) high.
ii. Leaflets 3.	ii. Leaflets 3.	ii. Leaflets usually 5, occasionally 7, very rarely 3.
iii. Leaflets pale green.	iii. Leaflets deep green or glaucescent.	iii. Leaflets pale green.
iv. Leaves not crowded. Leaflets similar in size and form to <i>G. uncinatum</i> .	iv. Leaves crowded, to .8 cm. long, margins recurved, apex hooked. numerous.	iv. Leaflets up to 1.7 cm. long, narrow, sometimes thread-like; or up to .1 cm. broad, margins recurved, apex blunt; leaves not crowded.
v. Flowers pale yellow, few, small, inconspicuous.	v. Flowers red, numerous, conspicuous.	v. Flowers yellow, terminal, not numerous, often larger than either of the foregoing.
vi. Flowering season — August-September.	vi. Flowering season — November-December	vi. Flowering season — July-September.
vii. Parts of corolla frequently adhering to maturing fruit.	vii. Parts of corolla not frequently adhering to maturing fruit.	vii. Parts of corolla not frequently adhering to maturing fruit.

provisionally, only because in an article of this kind the shrub must be called something. It may be a species, a variety, or, perhaps, a sub-species. Its affinities appear to be with *G. uncinatum* rather than with *G. glabratum*. Three of the four places in which it has been collected are disjunct and there appears to be no gradation between it and either of the two species named. It was first observed by one of us (Williams) at Blaxland's Ridge, above Robert's Creek, about 11 miles from Windsor on the road to Singleton.

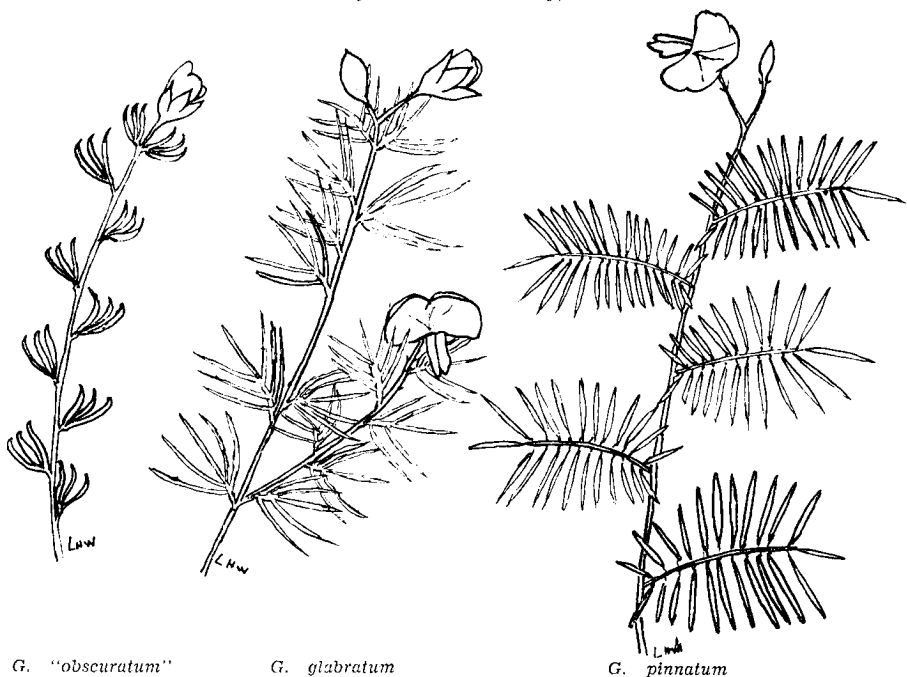
The table on preceding page compares its main characters to those of *G. uncinatum* and *G. glabratum*:-

The points may be summarised thus:—

G. "obscuratum" differs from *G. glabratum* in its consistently three-fold, digitate leaves. In the same locality it begins to flower later than *G. glabratum*. It approaches *G. glabratum* in the flower colour, although, in all specimens seen, the colour was extremely pale.

It differs from *G. uncinatum* in the colour and relative sparseness of the leaves, and in the colour and paucity of its flowers. In contiguous areas it begins to flower two to three months earlier than *G. uncinatum*. It approaches *G. uncinatum* in having leaves which are digitately three-fold — both seem quite consistent in this respect.

This *Gompholobium* needs further investigation and the writers would welcome any information about it. The following list includes all localities in which one or both of us have observed and collected it:— Blaxland's Ridge, Colo Heights, Tinda Creek (near Putty), Kanimbla Valley, Governor's Hill (north of Goulburn) and more recently at Howe's Valley, Lower Portland and Marulan.



G. "obscuratum"

G. glabratum

G. pinnatum

9. *G. glabratum* (Latin: smooth, bald; perhaps so named because of its almost hairless branchlets and stems as compared to the sometimes very "hairy" small species *G. minus*). The name was given by Sieber and published, with the description, in De Candolle's *Prodromus* in 1825.

It is a low, virgate shrub, usually with slender stems, decumbent or ascending, occasionally to 50 cm. (20 inches) with support, rarely erect.

The leaves are digitate when mature, with 3 to 7 leaflets (i.e. 1 to 3 pairs, with a terminal leaflet), the usual number being 5. The leaflets are pale green and dull, up to 1.7 cm. (.65 inch) long and very narrow — almost thread-like —

to .1 cm. wide, with recurved margins and a blunt apex. Some specimens (e.g. in the Bargo-Tahmoor district) have very narrow leaflets which tend to a pinnate arrangement, with a common petiole a little longer than the short petiole usually found in the species. The leaves are more distantly arranged than those of *G. uncinatum* and have a tendency to fall off, giving a sparse-leaved impression.

The **flowers** are borne in terminal heads, few-flowered, and are bright yellow or greenish-yellow when fresh, with conspicuous sooty markings. The standard measures up to 1.2 cm. long by 1.5 cm. broad (.5 x .6 inches), and is yellow with dark markings on the outside. The keel is black, shading to yellow at the base, and measures up to .9 cm. x .5 cm. (.35 x .2 inches). It is almost glabrous. The calyx lobes and pedicel are dark, sooty-green, the lobes measuring up to .4 x .8 cm. (.15 x .3 inches) and the pedicel up to 1 cm. (.4 inch) long.

The dark-coloured **fruiting capsule**, inflated, may reach a length of 1 cm. (.4 inch) and bears 8 to 12 seeds.

The **flowering season** is early spring — commencing sometimes in July near the coast, to September-October in higher, colder country.

The range of the species is from about Port Stephens to Nowra on the coast, and inland to the Central and Southern Highlands. It is common on sandstone. A selection of areas from which it has been collected and in which it has been studied is: Wyee; Calga; Hornsby; Terrey Hills; Beecroft; Gladsville; Loftus; Engadine; Waterfall; Bundanoon; Mittagong; Hill Top; Bargo; Blaxland's Ridge (north of Windsor); Woodford; Wentworth Falls; Mount Hay Road (6 miles east of Leura); Blackheath; Clarence-Lithgow.

10. *G. pinnatum* (Latin: *pinna* — a feather — referring to the pinnate leaves). Sir John Smith's description of the shrub was published in 1805.

This *Gompholobium* is small and straggling, occasionally ascending or erect, and is often found in damp or grassy situations.

The **mature leaves** are green and pinnate, with leaflets numbering up to thirty or more. The leaflets are about 1 cm. (.4 inch) long, usually narrow, with recurved margins and terminating in a short point.

The **flowers** are yellow, frequently with a reddish spot at the base of the standard, which has darker, sooty markings on the outside. The standard measures up to 1 cm. x 1 cm. (.4 x .4 inches). The keel is dark coloured, shading to pale at the base and measures up to .6 cm. x .3 cm. (.2 x .1 inches). It is almost glabrous. The calyx lobes, of the usual bronze colour, may reach .6 cm. in length and .2 cm. in breadth at the base (.2 x .1 inches), and are pale and somewhat tomentose on the inner side. Pedicels up to 1 cm. (.4 inches) long have been measured but they are often shorter.

The typical dark green **fruiting capsule** may at times be as long as 1 cm. (.4 inches) and contains about eight seeds.

The **flowering season** is October-December.

This shy little shrub is not well known and is sometimes hard to find, except when in flower. Its range is from Queensland, down the coast of New South Wales to near Sydney, with an isolated occurrence around Nowra. It is not regarded as a highland species, but one of us (Burgess) collected it in bloom in November, 1962, at Woodford, on the Blue Mountains, at an altitude of about 1,900'. The following is a selection of localities in which the species has been studied, collected or grown from: Woolgoolga; Kendall; John's River; Nabiac; Stroud; Limeburner's Creek (north of Raymond Terrace); Colo Heights; Blaxland's Ridge (above Roberts' Creek, about 11 miles from Windsor); Londonderry (6 miles in a direct line north of Penrith); and Woodford.

GOMPHOLOBIUMS IN OTHER EASTERN STATES

In order to complete the list of *Gompholobium*s in the Eastern States, the following notes are appended:—

In Victoria, South Australia and Tasmania there are, apparently, no species or varieties described other than those recorded from New South Wales and stated to extend to these states. Some New South Wales species are mentioned as extending to Queensland, and, in addition, one species and one variety occur in Queensland and are confined to that state. They are:—

1. *G. nitidum* (Latin: Bright, shining—a reference to the leaves) which received its name from Solander in the earliest days of Australia's discovery, and specimens of which are found in the herbarium of Sir Joseph Banks. It is a smooth, much-branched shrub.

The leaves are pinnate, with seven to eleven leaflets. The leaflets are oblong to cuneate or obovate in shape, with the apex emarginate, and measure up to 1.3 cm. in length. The upper surface is dark green and shining and the lower surface glaucescent.

The flowers are terminal and solitary on very short pedicels and are coloured yellow. The keel is not ciliate and the rather thick calyx lobes are about 1 cm. long.

The fruiting capsule is less than 1 cm. long and bears four ovules.

The species is recorded from the Endeavour River, but no doubt occurs in other districts.

2. *G. virgatum* Sieb. ex DC. var. *emarginatum* Bailey. (The varietal epithet "emarginatum" is a reference to the emarginate—notched—leaflets).

This variety is described by Bailey as similar in other respects to *G. virgatum* var. *virgatum* except that the leaflets are somewhat larger and broader and have an emarginate apex.

References: The Queensland Flora, Bailey, 1900. Comprehensive Catalogue of Queensland Plants, Bailey, 1909.

GOMPHOLOBIUM FROM SEED

Loretto Williams

Seed of four species of *Gompholobium* were included in a germination test with the following result: *Gompholobium grandiflorum*—100% success; *G. latifolium*—50% success; *G. obscuratum*—100% success; *G. pinnatum*—50% success. These figures are approximate.

All seeds were covered with boiling water and left overnight. They were planted in sandy bush soil and left in a place where they get full sun from early morning to about 3.00 p.m. Although they were watered frequently drying out did occur without any ill effects.

Germination took approximately six weeks in all cases and growth was rapid after this.

NATIVE PLANTS FROM SEED—A note from B. D. Blomfield, Woy Woy, N.S.W.

I have found "Root-o-Pots" (compressed peat moss) a splendid help in raising seeds using the bush soil here, which is very sandy. I place a couple of seeds in each pot and stand the pots in groups on terracotta drip trays used normally with clay pots. These trays are filled with water and the whole lot carefully slid into large plastic bags. After about 10 days out on the tank stand where they receive full sun for 4 hours each day, the seedlings are usually through.

When the seedlings are high, the peat moss pots are planted direct into the garden and a plastic bag and bracken fern kept overhead until well established.

I have used this method successfully with seed of *Eucalyptus ficifolia*, *E. macrocarpa*, *E. erythrocorys*, *E. kruseana*, *Leschenaultia biloba* and *Sturt Pea*.

BOOK REVIEW

BLUE MOUNTAIN GUMS—by Colin Burgess

This small booklet of 68 pages gives the layman and bush walker a simple guide to the 45 species of Eucalypts and Angophoras of the Blue Mountains area of N.S.W. Line drawings of the buds and fruits of all the species give positive identification. This booklet will be of special value to all bush walkers in the Sydney-Blue Mountains area. Price 10/-.

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THE GENUS MELALEUCA

The series continued by C. N. Debenham

THE BLACK TEA TREE GROUP

In this group we have brought together species sharing some of the features of *Melaleuca bracteata* and *M. pubescens*, both popularly known by the group name. The name refers to the somewhat sombre colour of the bark — dark grey or brown, accentuated perhaps by a rough texture — which contrasts with the smooth-textured, white or light-grey bark of the paperbark group. A paperbark (*M. linophylla*) is included because of its more probable affinity, a dwarf shrub (*M. corrugata*) also, more because of a related habitat, but otherwise the key members are rough-barked large shrubs or small trees with foliage dull or ashy-green and forming a bushy, spreading crown. Their predominant inflorescence is a somewhat loose spike of white-coloured flowers which are formed towards the ends of the branches. Their leaves are very closely-spaced and spirally-arranged, narrow and pointed and rarely above 25 mm. in length.

With Darwin in the north, and Stroud (N.S.W.) in the south-east as extreme foci, that tract of the continent east of a connecting arc provides a fairly close approximation to the range of *M. bracteata*. Within this tract, the bushy small tree is found on a variety of soils (perhaps favouring the heavy loams) but is rarely far from the banks of water-courses or water-fed sites. It reaches an occasional 50 ft. in height but more often is found now at 15-20 ft., and flowers mainly from October to December. It is possible that the tropical range of the species may be extended westward to include the Kimberleys of Western Australia — some specimens collected by Fitzgerald from this area require alignment with the species or a very close ally.

The extent of this Black Tea Tree (throughout the coast, inland and interior of the tropics and sub-tropics) is considerable enough, in fact about one-third of the total continent, yet its botanic history as a distinct taxon is relatively short. Mueller's type plant came from the Moreton Bay district of Queensland's south-east coast as early as 1858 but Benthham could see no difference in it from *M. decora* and *M. lanceolata* and included them all under *M. genistifolia*. When Baker and Smith (1910) drew attention to a unique feature of the plant, the combination persisted but, with the uncovering of the nature of its essential oil, the need to distinguish it from its allies was emphasized. Fortunately, by the time post-war overseas interest was directed to the possibility of its establishment as a commercial crop (e.g. by Kenya) it was much better known.

The interesting component of the heavier-than-water oil of *M. bracteata* is methyl eugenol. This phenolic ether is of some significance in rather diverse fields, e.g., perfumery (it has a carnation-like fragrance), the compounding of pesticides and germicides, and during World War II its high refractive index was put to use in the manufacture of optical glass. A valuable oil, certainly, but until the post-war period *M. bracteata* as a commercial source had not been seriously considered. Its yield (from below, to 1% with methyl eugenol content 60-90%) scarcely compares with that from a former major source, Huon Pine. The steam-distilled sawdust and wood-chips from this Tasmanian-confined *Dacrydium* (*D. franklinii*) yield

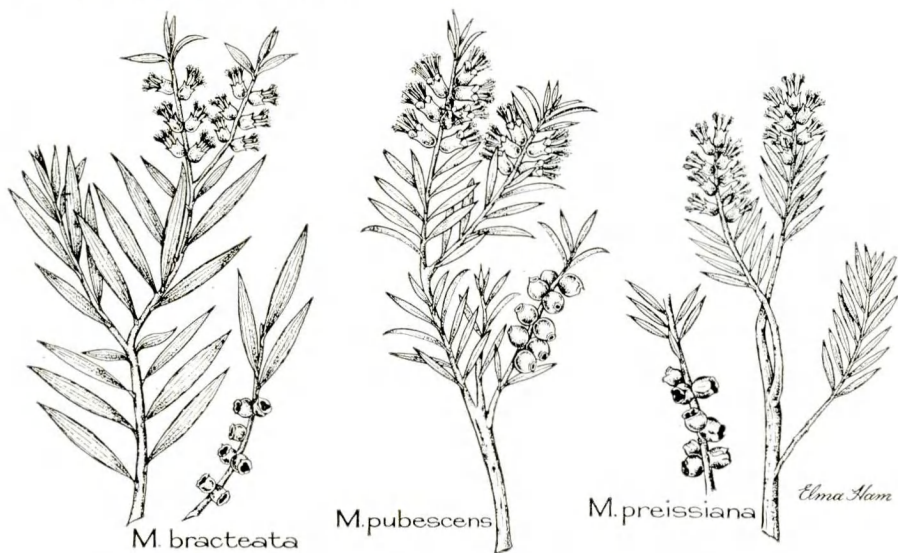
from 4-6 per cent oil with a methyl eugenol content averaging 95 per cent. However, Huon Pine no longer exists in commercial quantities.

In this age of chemo-synthesis, it remains to be seen whether the Black Tea Tree will be exploited to an extent comparable with that provided by Huon Pine. In common with other essential oil-bearing plants, chemical variants are known. Two, have the methyl eugenol content of the oil completely replaced by other phenolic-ethers. One yields methyl iso-eugenol, the other elemicin, hence great care must be taken in the settling of seed provenance when methyl eugenol is the desired end-product. Observance over a number of years of an experimental plot of the three chemical forms (seed parents from the Warialda district of N.S.W.) at the Museum's plantation (Castle Hill, on shale) impresses a point of horticultural interest. The general hardiness and thrift of the plant to occasional long spells of dry conditions and periods of frost indicate some potential as a hedge or low wind-break for regions further south than the species' natural distribution. At the plantation the trees are at 6 ft. spacings and form an unbroken, ground-reaching canopy. They were planted in 1952 and progressed slowly for the first year, then reached quickly 8-10 ft. heights at which they have been stabilized for some years. As a measure of the adaptability of these plants, a river-side planting was made also at National Park, Sydney, and flooding of the river brought silt to cover completely the young seedlings — there was almost no loss. An additional feature is their profuse and reliable blooming, of some consequence to the bee-farmer concerned with sources of pollen.

The second Black Tea Tree has a very different range to that of *M. bracteata*, for it is at home on the mallee sandhills, shallow soils over limestone, and desert loams of southern temperate regions. An excellent account of the species, *M. pubescens*, is given by J. H. Willis (Vic. Nat. 35(4): 76-84, 1948) under its alternative local name "Moonah". The complexities of its nomenclature (e.g. its displacement of *M. parviflora*), distribution and ecology are discussed in his article so that, here, it will suffice to say that Moonah has an almost unbroken transcontinental range from at least the Eucla district (W.A.) to the Wimmera and Mallee districts of Victoria, with a disjunct appearance around Port Phillip Bay to Western Port. A sporadic occurrence is apparent also along the south and west coast of the south-west province (W.A.) and at Rottnest Is. (Hence "Rottnest Tea Tree"). Its particular prevalence is in the districts of Eyre and Flinders (including Kangaroo Island) with a northern limit at Mt. Lyndhurst. South-eastwardly, the West Victorian Highlands (e.g. the Grampians) provide an ecologic barrier. Within this range, Willis notes that it "avoids mountainous areas and evinces a preference for limestone formations at or derived from the sea". At least in the south, its predominant soil-type in N.S.W. is the sandy-textured red brown earth, its main occurrence in this state being centred around the Wyalong district, thence westward to the border south of Broken Hill (e.g. the Lake Papilta area) and south to the Murray (e.g. at Moama). Allan Cunningham is credited as the collector of the type material from an undisclosed point of the Lachlan district in May, 1817 (vide White, C. T., 1949). North of the Wyalong district there is a rapid recession in the species' present occurrence so that, from known records, a hypothetical path must be followed from the Dubbo district to connect

its prevalence in the brigalow scrubs of the Darling Downs in south-east Queensland.

Locally, Moonah is not always favourably regarded. Its spreading, freely-suckering habit renders it at times a pest to the land clearer (e.g. in the Darling Downs), but its ability to thrive under low rainfall conditions suggests a use in soil reclamation for the inland. The main flowering time is from November to March.



Close by the north-eastern extremity of the limestone-derived plateau known as the Nullabor, and marking the southern limit of the Great Desert formed by the Western Shield, lies Ooldea. Here, amid the sandhills, *M. pubescens* is noted, finding sufficient moisture for its maintenance from an annual 8-10 in. rainfall. About 300 miles further north, the granitic bosses of the Musgrave Ranges arise from the Western Shield. From the Ernabella Creek area Cleland (1933) gathered material of a dark and rough-barked shrub with several features of *M. pubescens*, growing in association with the paperbark *M. glomerata*. To this material Black gave the name *M. monticola* and drew attention to an earlier collection made by S. A. White (1914) from nearby Glen Ferdinand. Further material from the Musgraves, on which is based Black's *M. corrugata*, came from a small shrub flowering at 3 ft. high. This was found on the summit of Mt. Woodroffe, at an elevation of almost 5,000 ft. Both species appear as relics from a bygone age when perhaps prevalent populations of the ancestors of *M. pubescens* abounded, before the northward uplifting and tilting of the land around the Bight and the consequent formation of decimating desert.

Beyond the Musgraves in a north north-east direction (about 200 miles in direct line) lies Alice Springs. Some 60 miles further north is Connor's Wells and here a large shrub resembling *M. pubescens* was discovered by Mrs. B. A. Dale, honoured in the species name. Blakely cited an additional specimen from Cloncurry (Q'land) which subsequently proved to be *M.*

bracteata. There is reason supporting an affinity with this species — the location of *M. daleana* lies close to the southern limit of *M. bracteata*.

From scattered localities north-east of Alice (e.g. Pine Hill), north-east towards the Gulf (e.g. near the source of the McArthur River) and (according to Black, 1934) within the Musgraves, the paperbark *M. linophylla* is noted. A close ally, *M. dissitiflora*, again has an incomplete recording. Its type locality is the Bonney Creek area south from Tennant's Creek but Fitzgerald noted its presence near the Hann River of the Kimberleys. His tree was found on sandy loam, reached 30 ft. high, and had a bark "rough, greyish, flaky". As time progresses, it is likely that currently-active surveys of the interior and the tropical north will provide some perspective to these species. Their association with our early history of exploration is intimate. Mueller states the source of the type specimen for *M. linophylla* is north-west Australia, from the 1861 expedition of Frank Gregory. The expedition of the younger brother led through the arid north-west of W.A. just north of the tropic and culminated in the discovery and naming of the rivers Ashburton, Fortescue, De Grey and Oakover. An earlier expedition (1855-57) of the Gregory brothers, led by Augustus, was accompanied by Mueller as botanist. Following sea transport from Moreton Bay to the Victoria River south of Darwin, the main course of the journey by land across the continent brought them to the rivers Roper, McArthur, Nicholson, Gilbert, Burdekin, and Dawson. From the expedition, botany was enriched with detailed descriptions of almost 2,000 species, 800 of them previously unknown. Bonney Creek was reached by J. McDouall Stuart on April 12th, 1861 during his second attempt to traverse the land between Sturt's most northern point and the Gulf. It was to be the following year, and on a fresh expedition (again through Bonney Creek), before Stuart's glimpse of the



sea at Chamber's Bay marked the first south to north crossing of the continent. Mueller quotes "between the Bonny and Mt. Morphet" on the 1862 expedition of Stuart, and the presumption is made it was on this epic journey that the collection of *M. dissitiflora* was made. It is by extreme good fortune that Stuart and Waterhouse (naturalist in charge of collections) survived an arduous return to Adelaide.

Note of appreciation: the writer is indebted to his friends of Western Australia and Tasmania, to Dr. R. D. Royce (Perth) and Dr. B. Briggs (Sydney) for making available material necessary for a work of this nature.

Fruit of *M. preissiana* was not available for the sketch appearing in the previous part, but an abundance of fruiting material recently received has prompted the inclusion of a further sketch showing this feature.

The sketch of *M. dissitiflora* is taken directly from a photograph of a type specimen made available through the courtesy of the N.S.W. National Herbarium.

KEY TO THE SPECIES.

A.2.i.ii. Rough-barked small trees or large shrubs (excluding *M. linophylla* and *M. corrugata*) of the dry or arid inland and interior with higher rainfall coastal occurrences by *M. bracteata* and *M. pubescens*. Flowers near the ends of the branches, white or cream-coloured, except in *M. dissitiflora* forming spikes. Fruit (where known) not retaining the hardened sepals. Leaves spirally-arranged, close together and in some almost decussate, linear or narrowly lanceolate, above 25 mm. long only in *M. linophylla* and *M. dissitiflora*, acuminate and often sharply so, narrowed at the base.

Leaf-length in range 15-35 mm., the leaves flat and usually erect. Stamens in bundles of 15-20 or more, the free filament-parts about the length of the claw. *

Leaf-length in range 5-15mm., the leaves frequently curved when flat, or concave when erect. Stamens either in bundles of 8-15 and then the free filament-parts much longer than the claw, or 20 or more and then the free filament-parts as long as the claw. **

* Leaves 15-25 x 2-3 mm., narrowly lanceolate to linear, and 3-5 veined, sessile. Floral shoots usually extended after formation of the spike. Receptacles rounded at the base. Staminal claws relatively broad. Fruit ovoid to barrel-shaped, 2-3 dia.; valves at rim-level, the orifice scarcely contracted.

A, G-A, B, B-H, B-C, C-I, C.

61. *M. bracteata* F. Muell. (1858)

Leaves 15-35 x 1-2 mm., linear to narrowly lanceolate, 3-veined or only the mid-vein prominent, petiolate. Floral shoots usually extended during the early development of the flowers. Receptacles truncate at base. Staminal claws relatively narrow.

Flowers forming definite spikes. Fruit globular-urceolate, 3-4 mm. dia.; valves sunk within the contracted neck-like orifice. Paperbark.

A, G (scattered and isolated)

62. *M. linophylla* F. Muell. (1862)

Flowers axillary and solitary, distantly placed, larger than those of *M. linophylla*. Fruit not described. Roughbark?

F, G (restricted and isolated)

63. *M. dissitiflora* F. Muell. (1862)

** Filaments 20 or more, the free parts about the length of the broad claw. ***

Filaments 8-15, the free parts much longer than the claw. ****

*** Leaves 5-8 x 1-2 mm., lanceolate, concave, sessile, with soft, spreading hairs, 1-veined. Flowers forming loose, almost leafless spikes 10-20 mm. long before elongation of the shoot. Fruit not described.

G (restricted, south)

64. *M. daleana* Blakely (1941)

Leaves 5-15 x 1-2 mm., linear, concave, shortly petiolate, without hairs, 1-veined. Flowers forming spikes 20-40 mm. long, the shoot produced concurrently. Fruit flattened-globular, black, wrinkled, pitted, 7-10 mm. broad, the 5-angled orifice much contracted.

J (restricted, north)

65. *M. corrugata* J. M. Black (1952)

**** Leaves 5-15 x 1.5-3 mm., flat and often recurved, obscurely 3-veined or venation inconspicuous, with a close ash down when young. Spikes loose, 30-70 mm. long. Fruit 3-6 mm. dia., ovoid or globular, the orifice much contracted over the deeply inserted valves.

E-K, K (south coast)

66. *M. pubescens* Schau. (1843)

D, C-I, E-H (south), E (restricted).

Leaves 4-10 x 1.5 mm., concave and erect, obscurely 3-5 veined. Spikes very short, few-flowered. Fruit 2-3 mm. dia., cup-shaped, the orifice not contracted.

J (restricted, north)

67. *M. monticola* J. M. Black (1934)

Eucalyptus pachyphylla (Redbud Mallee). This is the most attractive mallee in Central Australia, having red buds about one inch across and these burst into large creamy blossoms, the many-stemmed tree being absolutely covered with flowers. Growing to 12 feet, and having dark green foliage, this tree is worthy of a position in any garden. It could be used in similar positions to the Blue Mallee, and planted alternatively with it, it would make a most attractive divide or wind-break.

Eucalyptus gongylocarpa (Marble Gum). Whilst this tree usually is found in "desert country" it is considered one worthwhile trying in cultivation. It earns its common name through the appearance of the trunk markings and colouring. Growing to 50 feet, it would make an attractive specimen tree. The trunk is white with small strips of brown bark shedding from it giving it the marble appearance, the foliage is blue-grey in colour and is most attractive. For those who admire the unusual, this is a tree well worth trying.

Eucalyptus thozetiana is a most attractive eucalypt with its principal beauty being the unusually marked and coloured trunk. It grows to 40 feet and the bark colouring range is brown, red, pink and grey to purplish, and appears in strips giving a very attractive appearance. The leaves are narrow and dark green, and the flowers small white.

ACACIA SPECIES

Acacia estrophiolata (Ironwood) is a large tree with pendulous foliage, growing to 50 feet on the sandy loam areas. The bark is very thick and rough towards the base of the trunk, and is grey in colour. The head of the tree is usually a very wide spreading one, making it a most graceful shade tree.

Acacia murrayana is the most brilliant golden wattle in Central Australia, having fairly long phyllodes and large sprays of bright golden blossoms in spring time. It grows to 15 feet and in the garden can be pruned after flowering.

Acacia victoriae varies in colour from creamy to light yellow and is one of the most attractive available. At early springtime this wattle is a profusion of attractive blossom, which almost hides all foliage. This wattle grows to 20 feet and is frequently used in gardens.

Entering Alice Springs from the south, the traveller passes through a natural stand of *A. murrayana* and *A. victoriae*, and in early springtime this is a most impressive sight with both acacias in full blossom.

Acacia aneura (Mulga), under cultivation is a most attractive wattle, blooming frequently after rains, but not necessarily each spring. It usually has quite a profusion of blossom. Growing to 20 feet, it would make a very attractive specimen tree.

Acacia strongylophylla is a wattle growing to 10 feet high with pungent tipped leaves and stipular thorns, and large golden blossom. This is a very attractive species and would be most rewarding when it is in blossom.

Acacia kempeana (Witchetty Bush) usually forms a neat bush to 10 feet high having fairly thick foliage, and spikes of golden blossom. The foliage appears fresh green when this wattle gets regular waterings. It is a very attractive wattle and could be well used in wind breaks or similar positions. It is also lime-tolerant.

PROTEACEOUS SPECIES

Grevillea juncifolia grows to 12 feet high, and is a most outstanding member of the *Proteaceae*. The foliage is very narrow, the inflorescences are yellow to orange and are borne in profusion making it a really spectacular sight.

Grevillea wickhamii (Hollyleaf Grevillea), a shrub to 10 feet high with leaves very similar to "Holly", and lovely red spidery flowers. Both this species and *G. juncifolia* are worth consideration for the garden, as they are extremely showy.

Hakea divaricata (Spiny Leaf Corkwood), growing to 15 feet, bark dark grey, corky, trunk twisted and gnarled. The inflorescences are creamy yellow, and hang in clusters, and the foliage strikingly unusual, being terete and divaricate. It makes a very attractive small specimen tree.

Hakea suberea (Longleaf Corkwood), very much like *H. divaricata* in trunk, inflorescences and growth habits etc., but the foliage differs in that the leaves are long, rigid, pungent, hoary, and finally glabrous. This makes an attractive small specimen tree.

Hakea leucoptera (Needleleaf Hakea) grows to 12 feet high, has pungent terete leaves with a mass of white flowers in springtime.

TREES FOR QUEENSLAND (Continued from page 170)

- A. LOW TREES OR SHRUBS TO 20ft.
Ligustrum lucidum — Tree Privet.
Callistemon viminalis — Red Bottle Brush.
Eucalyptus landowneana — Crimson Mallee Box.
- B. MEDIUM-SIZED TREES — 20ft. to 50ft.
 (i) Evergreen
Acacia pendula — Weeping Myall.
Acacia homalophylla — Yarran.
Eucalyptus orgadophila — Mountain Coolibah.
Eucalyptus pilligaensis — Molly Box.
Eucalyptus melliodora — Yellow Box.
Lagunaria patersoni — Norfolk Island Hibiscus.
Acacia harpophylla — Brigalow.
Acacia stenophylla — Fragrant Myall.
 (ii) Deciduous (not natives)
Celtis sinensis — Chinese Celtis.
Fraxinus oxycarpa — Desert Ash.
- C. LARGE TREES — OVER 50ft.
Casuarina cunninghamiana — River Oak.
Eucalyptus sideroxylon — Mugga Ironbark (W)
Eucalyptus hemiphloia — Grey Box (W)
Eucalyptus camaldulensis — River Red Gum (W)
Eucalyptus microcarpa — Green-leaved Box (W)
Eucalyptus ochrophloia — Napunyah (W)
Casuarina cristata — Belah.
Brachychiton populifolia — Kurrajong.
Eucalyptus populifolia — Poplar Box.
Eucalyptus nubilis — Blue-leaf Ironbark.

In addition to the larger shade and windbreak plantings, ornamental and garden plantings are of value in enhancing the beauty of property or homestead. With this in mind the following highly ornamental species are recommended as supplementary to those listed above. Generally they are only satisfactory for garden plantings where some measure of added protection and care can be given.

- A. FROST SUSCEPTIBLE SPECIES — NEED EARLY PROTECTION
 (i) Producing abundant, and attractive flowers.
Bauhinia hookeri — Pegunny. *Eucalyptus grossa* — Coarse-flowered Mallee.
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Eucalyptus torquata — Coral Gum. *Eucalyptus woodwardii* — Woodward's Blackbutt.
 (ii) Others
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Boronias Suitable for the Garden

by DON SANDS

Until careful selection of *Boronias* under garden conditions has been carried out for some time the plants in this genus will maintain their reputation of being difficult to grow. Most of them are very sensitive to poor drainage, wind burn, extremes of temperatures and other climatic factors, but some of the species are definitely easier to grow than others. Continual cultivation of Western Australian species such as the Scented Brown *Boronia* (*B. megastigma*), The Red *Boronia* (*B. heterophylla*) and the dwarf pink species with blue behind the petals (*B. tennis*), has produced some garden subjects.

The Victorian *Boronia muelleri*, the eastern coastal *B. thujona* and *B. mollis* all show very little resistance to taming. The first two mentioned sometimes attain the dimensions of small trees while *B. mollis* will grow to 5ft. in a shady spot. These three like a rich sandy loam in a spot sheltered from the wind and grow better when large shrubs offer them shade. These have the typical masses of pink flowers somewhat similar to *B. pinnata* (see Australian Plants No. 10, P. 21) and except *B. mollis*, have highly scented flowers. Their leaves have an unusual scent, *B. thujona* having the peppermint-like odour of the thujone in the leaves. *B. mollis* is very rich in Thioglycollic acid and due to its objectionable odour is not suitable for picking.

Many years ago in a gully in the National Park near Sydney were some hundreds of plants of *B. thujona* flowering in profusion and some reaching the height of 15ft. with smooth trunks up to 6" in diameter.

Very little is known about the germination of seeds of *Boronias*, and efforts by members of the *Boronia* Study Group have failed to find a method for germination seeds of the Eastern Australian species. One exception is *Boronia polygalifolia* whose seeds will germinate readily if sown while very fresh. This little plant of sometimes 1ft. high makes a beautiful rockery or pot plant and responds well to pruning. The small rounded pale pink to deep red flowers may be seen at almost any time of the year and although not seen in great profusion they occur in pairs all over a well trimmed plant.

A *boronia* that will withstand much less shelter from wind and sun is *Boronia ledifolia*. Forms of this species are extremely varied and the flowers

(Concluded on rear cover)

EDITOR'S NOTE: Don Sands has years of patient research and dedication to *Boronia* behind him. He leads the *Boronia* Study Section and will be pleased to hear from all keen *Boronia* growers who are prepared to assist him in growing these plants and reporting results. D. Sands, 39 Herbert Avenue, Newport.

PHOTOGRAPHIC COMPETITION

Issue No. 12 announced a small photographic competition for readers. Results of this competition are: Hovea—P. Althofer (colour plate to appear in a future issue). *Prostanthera lasianthos* and *Verticordia*—no suitable slides submitted. North Queensland Native Orchid—R. F. Leaney (his excellent colour slide of *Dendrobium rigidum* appears on the rear cover of Issue No. 13).

Although the quality of many of the slides was good, the general response was disappointing. This is only a small competition between friends without any prizes. However it provides an interest for some and certainly is a great help to me in getting good slides. The winning slides will appear in full colour in an issue of Australian Plants. Let us try another competition to finish in March 1965, a separate competition being conducted for each of the following subjects: 1. A North Queensland epiphytic orchid; 2. Any epiphytic orchid; 3. Any terrestrial orchid; 4. A pea flowered plant; 5. A mint bush *Prostanthera* or a *Westringia*; 6. A wildflower of Tasmania; 7. A *Tetratheca* (Black-eyed Susan); 8. *Verticordia*; 9. A species of the family *Epacridaceae* which includes the heaths *Epacris*, *Styphelia* etc.; 10. A flower from a native tree; 11. A *Grevillea*; 12. A *Banksia*; 13. A *Hakea*; 14. An everlasting flower of any species; 15. A Liliaceous plant of any genus.

Conditions of entry are that the Editor's choice is final. The slides shall be based on the features shown in plates already reproduced in the journal with emphasis on it illustrating a group of flowers in a natural-like arrangement, close up, showing flower, buds and leaf if possible. Slides may be sent to the Editor at any time up to 1st March 1965. These will be recorded and judged immediately and returned promptly to the owner within 4 weeks of receipt.

We also have Photographic Groups for keen photographers. Enquiries c/- The Editor.



Colour photography by Frank Hurley

Block by courtesy of John Sands Pty. Ltd.

BORONIA LEDIFOLIA

Continued from page 207

have been seen to vary from single white varieties through all shades of pink and one plant has been seen that had 15 perfectly formed flat petals in each flower. This species does not seem to have a very long life in gardens, but no doubt some forms will be found to take more kindly to cultivation. This species as with most of the other boronias is not easy to grow from cuttings, and cuttings taken from a plant that has been grown from cutting will strike much more easily than cuttings taken from seed-grown plants.