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THE QUEENSLAND LACEBARK, *Brachychiton discolor*

Flame and Kurrajong Trees

BRACHYCHITONS by ERNEST E. LORD

This remarkable group of trees includes some of Australia's most showy and adaptable species. Although essentially warm climate trees, which obviously should not be planted in extremely cold or alpine country, those tried have been found to succeed over most of our continent.

Illawarra Flame Tree, *Brachychiton acerifolium*, is always attractive if only for its glossy deep green leaves, long-stalked and usually 5- or 7-lobed. Older trees in brush forests with high rainfall may attain 100 feet, and the larger leaves may be smooth and egg shaped, or perhaps 3-lobed. The flowers are magnificent: perfect bells half an inch across, in many-branched clusters together with their stalks an intense fiery red. The trunk tapers conspicuously from the base up, a characteristic of the genus *Brachychiton*. Average height in southern gardens is nearer 20 to 40 feet.

Illawarra Flame Tree is grown and valued in many countries throughout temperate regions. Edwin Menninger, the "Tree Man" of Florida, tells us "it is prized in California as one of their finest flowering trees", and in Miami its seed pods are considered showy for months after flowering. The tree is grown outdoors in Scilly, off the tip of Cornwall; in Kenya it flowers at 10 years old "a crimson mass of bloom" ("Gardening in East Africa"); and in Ceylon "from low elevations to above 5,000 feet, with large masses of red blossom" (MacMillan).

Little wonder then that we find our Flame Tree, although indigenous to the warm coasts of New South Wales and Queensland, thriving all over Australia and in a wide range of soils. It blooms variously from November to February according to local conditions. Sometimes the whole tree will be aflame, every leaf having fallen for the occasion; other years only a portion of the tree will bloom, and that part only sheds its leaves—a curious phenomenon. Younger trees may indicate their approaching maturity by a defoliation of some branches at flowering time, without actually flowering.

Unfortunately the name of Flame Tree is freely applied to the lovely spring-flowering hybrid *Erythrina* so abundant around Sydney and many other places. This should of course be Coral Tree.

Kurrajong *Brachychiton populneum*, has an even greater range, withstanding more frost than Illawarra Flame. It is equally at home in city parks and streets, private gardens and on farms throughout the whole of the low-rainfall interior. It thrives in the California desert, and the writer has photographed in Monte Carlo a beautiful avenue of Kurrajongs alternating with Canary Date Palms.

The variation in shape of Kurrajong leaves is equally as striking as those of Illawarra Flame. Some trees have leaves all poplar-like, whilst those of other trees may be deeply cut into long finger-lobes. Always the trunk tapers vertically from a relatively broad base to the slender tip. This feature, together with the extreme delicacy of the leaves on their fine stalks, and the chocolate-spotted cream bell-flowers, has earned the Kurrajong a place in gardens, parks and streets everywhere.

The Kurrajong is indigenous to inland Queensland, New South Wales and the far east of Victoria. In common with all low-rainfall trees it is deep rooting and has little effect upon other plants or grass growing beneath or close to it. Its leaves afford moderate shade and, in emergency, excellent fodder for stock.

THE GENUS BRACHYCHITON

By C. N. DEBENHAM—Museum of Applied Arts and Sciences, Sydney

Brachychiton (pronounced brachy-kiton) is a genus of tall shrubs or trees endemic to Australia and includes the well-known Kurrajongs, Bottle Trees and the Flame Tree. Its family, *Sterculiaceae* (stir-culi-ace-ae) contains some 50 established genera (with about 750 species) predominating in the tropics and is represented in Australia by 211 genera, 10 of which are endemic. Besides the closely allied *Sterculia*, other members of the family which are of horticultural interest include the African Cola (*Cola acuminata* Schott & Endl.), the Chinese Parasol Tree (*Firmiana simplex* W. F. Wight), and the Western Australian confined group of small shrubs *Thomasia*, while the source of cacao or chocolate is the fermented seed of *Theobroma cacao* L. a small tropical American tree. Hickory or Crowsfoot Elm, *Heritiera trifoliata* (F. Muell.), Kosterm and Black Jack or Blush Tulip Oak, *Heritiera actinophylla* (F. M. Bailey) Kosterm, are notable timber trees from the scrubs of N.S.W. and Queensland, sometimes cultivated as ornamental or shade trees.

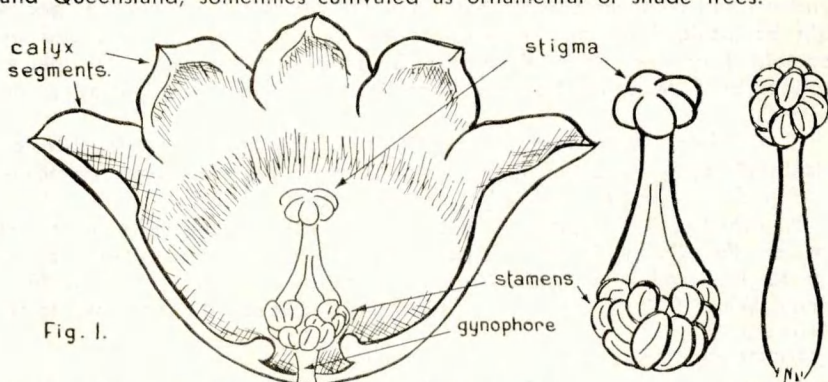


Fig. 1. Female flower of White Kurrajong with enlarged female structure. Fig. 2. Male

Due partly to the variable leaf-shape of the members and their readiness to hybridise, and partly to the early inclusion of the genus with *Sterculia*, the taxonomy of *Brachychiton* is in an incomplete state, and it is not possible within the compass of this article to make more than a passing reference to most of the species. Both *Sterculia* and *Brachychiton* produce the same complex floral structure, the flowers being either of one sex or of one sex in addition to some bisexual flowers on the one plant (the plants being either dioecious or polygamo-dioecious). Petals are absent, and a cup-shaped or tubular calyx is cut into 5, usually coloured, segments. The stamens of the male flowers are united in a column which bears at its summit a globular cluster of anthers while the ovary of the female flower is 5-lobed, tapered to a style which bears a 5-lobed stigma, and contracted at its base to form a short stalk (a structure known as a gynophore). From the ovary base arise a number of probably abortive anthers. The fruit aggregate comprises 1 to 5 large boat-shaped follicles, each opening by a slit along one side to shed several large seeds. A difference between the two genera is found in the seed. Whereas seed of *Sterculia*, is smooth, hairless, and is shed from the fruit with the two coats intact, the seed of *Brachychiton* is hairy or bristly and, when shed, leaves an outer coat attached to the fruit, so forming within the latter a honeycomb structure. Thus we have the derivation of the name: *brachy*—short, and *chiton*—a coat, in allusion to the loose outer covering of the seed.

Both *Sterculia* and *Brachychiton* are essentially tropical genera, the members forming soft-wooded tall shrubs or trees with leaves simple and alternate, often partially deciduous. While *Brachychiton* has several species confined to Australia, the much larger widespread genus *Sterculia* is represented in this country by two species only, one *S. quadrifida* R.Br. extending from the tropics south to the far north coast of N.S.W.

DISTRIBUTION OF SPECIES

A. SPECIES CONFINED TO THE TROPICS.

B. diversifolium R. Br. North Australian Kurrajong, has an extensive range from the north-west coast of Western Australia coastwards and inland to Cape York Peninsular. *Sterculia decipiens* W. V. Fitzg., described from the Kimberley Division, appears to show affinity with this species.

B. australe (Schott) Terrac. (in synon. *B. trichosiphon* Benth. Broad-leaved Bottle Tree, occurs from Rockhampton to the Gulf of Carpentaria.

B. incanum R.Br. occurs mainly around the Wyndham district of W. Australia.

B. paradoxum Schott (in synon. *B. ramiflora* Bent.) occurs south from Wyndham and coastwards to the east coast of Queensland. Within this species might be included *Sterculia tuberculata* and *S. viscidula* both described by Fitzgerald from the north Kimberley Division, perhaps also two species described by F. M. Bailey from the Cape York Peninsular, *S. garrawayae* and *S. vitifolia*.

S. viridiflora, again described by Fitzgerald from the Kimberley Division undoubtedly refers to a *Brachychiton* but its true identity is as yet unknown.

B. bidwillii Hook.f., confined to the north coast of Queensland.

B. carruthersii F. Muell., described from a collection taken near the base of the Owen Stanley Range and stated by the author to be close to *B. paradoxum* would extend the range of *Brachychiton* to New Guinea. When fruit of this species is matched however, it may prove to be a *Sterculia*.

B. SPECIES CONFINED TO THE ARID ZONE

B. gregorii F. Muell., Desert Kurrajong, occurs from the Murchison River district of Western Australia, south-eastwards to north of Kalbarrie, thence to the Victoria Desert and to the Musgrave Ranges—Finke River districts of Central Australia. The explorer, A. C. Gregory, is honoured in the species named by the author (von Mueller) who accompanied him (in 1855) as botanist on an expedition in search of Leichhardt.

C. SPECIES SUB-TROPICAL, OR EXTENDING FROM THE TROPICS TO TEMPERATE EASTERN AUSTRALIA

B. rupestre (Lindl.) K. Schum. Queensland Bottle Tree, Narrow-leaved Bottle Tree, confined to south-eastern Queensland.

B. discolor F. Muell. (incl. *B. luridum* F. Muell.) Scrub Bottle Tree, White Kurrajong, extends from the Maryborough district, Queensland south to the Hunter River district of N.S.W.

B. acerifolium F. Muell. Flame tree, extends from below Innisfail (North Queensland) to the Illawarra district of N.S.W.

B. populneum R. Br. Kurrajong ranging from southern Queensland, throughout N.S.W. and to the north-east and east of Victoria.

DESCRIPTION OF SUB-TROPICAL AND TEMPERATE SPECIES

B. rupestre (rock-site loving) Queensland Bottle Tree. A tree, often large, with a densely foliated large crown and a prominently bottle-shaped butt. Of wide distribution in south-eastern Queensland from the Warrego and Darling Downs districts to the coast, it appears to prefer dry scrub areas, avoiding the rainforest. Leaves heterophyllous; 3" narrow segments. Inflorescences small axillary panicles; follicles 1-1.5 inches in length.

The bottle-tree finds its chief use as a fodder plant. Not only the succulent roots and leaves, but also the mucilage-secreting stems, cut into billets, are reputed to have nutritive value in time of drought.

B. discolor (two-toned leaved) Scrub Bottle Tree, White Kurrajong, Lace Bark Tree. A tree attaining over 100 feet in height with butt often



LACE BARK TREE or SCRUB BOTTLE TREE. *Brachychiton discolor*. F. Muell.

slightly bottle-shaped, partially deciduous in the cooler districts. It is native to the coastal brushes from Maryborough (Q'land) to Dungog (N.S.W.) with inland extensions: in Queensland has been reported from the Bunya Mts. (about 100 miles from the coast). Adult leaves 4-8 inches in diameter, deeply divided into 3, 5 or 7 lobes, often pale or yellowish and downy on the undersurface. Flowers pink to pale-red, large and conspicuous, with a close hairy covering, abundantly produced in December and January. Follicles 3-5 inches in length, with a short down.

White Kurrajong (so named from the white colour of its soft, porous timber) produces an inner bark up to 1 inch or more thickness of layers of fibre (hence Lace Bark Tree).

The word "Kurrajong" is reputed to be a derivative from an aboriginal source signifying "bark-fibre". *Brachychitons* generally are useful fibre-plants and the name Kurrajong may be applied to most of them. Their stems all are mucilage-producing, and store considerable amounts of water.

As a shade tree or ornamental, White Kurrajong has claimed horticultural attention, not only for warm, moist areas but also for the drier regions of the western slopes. Hybrids of *B. discolor* with *B. bidwilli*, *B. acerifolium* and *B. populneum* have been cultivated.

B. acerifolium (maple-leaved) Flame Tree or Flame Kurrajong. A tree up to 120ft. in height with trunk not normally swollen at base, found in coastal brush of southern Queensland through to the Illawarra District of N.S.W. Leaves concolorous and heterophyllous: on older trees frequently entire, 4-9 inches in length and narrowly ovate, with some 3-lobed; on younger trees or flourishing growth deeply divided into 5 or 7 lobes, 4-10



THE FLAME TREE

Brachychiton acerifolium F. Muell.

inches broad. flowers brilliant scarlet, forming large axillary panicles, abundantly produced Nov. to Dec. Follicles about 4 inches in length.

From the striking appearance of the fiery red flowers when in full bloom usually contrasting with branches bare of the partly or fully deciduous leaves, the tree is named aptly Flame Tree. On fairly rich, moist soils in sheltered positions of the coast and tablelands or on sites of the western slopes down to 28-inch rainfall if protected in its early stages from frost and prolonged drought, it forms a beautiful ornamental. Its cross with *B. populneum* confers resistance to drought and heat to a pink-flowering, deciduous ornamental for street, park and estate planting.

B. populneum (poplar-leaved) Kurrajong. An average tree up to 60ft. in height with dense, heavy crown, widely distributed from southern Queensland, throughout N.S.W. (but not frequent on the coast) and the north-east and east of Victoria. A variety of soils is included in its range but it predominates on granitic hills of the dry interior or on limestone formations. Leaves concolorous, as variable as in Flame Tree, borne on long petioles and 2-5 inches in length. Flowers pale-coloured, yellowish or red inside, in small axillary panicles, much smaller than in Flame Tree. Follicles up to 3 inches in length.

A natural heritage to the white settler, often the sole source of food for his stock in time of drought and shade from cloudless skies for himself, it followed that the worth of this wonder tree became well-known after areas once flourishing were denuded of it. To the conservationist and inland town planner of today, the versatility and adaptability of Kurrajongs rate highly. Poor sandy loams, loams and stony soils of the Western Districts down to about 18 inches rainfall and with good drainage, it forms a fast-growing (providing the ground is regularly cultivated) deep-rooting fodder and shade tree with a reputation long-established.

BRACHYCHITONS IN SOUTH AUSTRALIA

By R. G. GRAY

Certainly the most commonly grown of the *Brachychitons* in South Australia would be *B. populneum*. This species has been widely used throughout the State for street trees, farm planting, and garden ornamentation. The author's observations indicate that the species requires an abundance



of water, but will withstand hot conditions. In the North of the State it is often used in the streets, but is unsuccessful for farm planting unless underground water is close to the surface.

B. acerifolium is also widely planted in S.A., but is more selective with top soil and rainfall than the former. In general this species requires a relatively higher rainfall and a non-calcareous soil.

and has been extensively used for park and garden ornamentation. Its soil A cross between the two former species known here as *hybrida* is highly ornamental and rainfall requirements seem to be similar to *B. acerifolium*. It is usually cleft grafted.

B. discolor is less commonly grown, but the author has seen plants as far north as Pt. Augusta and south to Mt. Lofty Ranges growing well.

B. gregorii has been grown at the Waite Agricultural Institute Arboretum with some success. One tree was planted in 1947, and while it has grown to only 9 or 10 feet it is quite healthy. *B. gregorii* should be tried further inland on sandy soil.

Brachychitons are among the easiest of Australian plants to propagate. Seeds can be sown in autumn or spring in seed flats. *B. populneum* is best grown in rows in the open ground and transplanted when two or three years old. Leaves should be stripped before transplanting in late spring or early summer. Other species can be grown in tubes or pots.

EDITOR'S NOTE: A call to N. Qld. We need reports on tropical species and specimens for sketches. All northern readers can help.

The Bottle, Lacebark and Hat Trees

BRACHYCHITONS by ERNEST E. LORD continued from Page 2

The Barrel or Bottle Tree (*Brachychiton rupestris*), is one of Australia's curiosities. Whilst still young the tree develops an enormous base, sharply tapering to a slender head branching with fine foliage. In later life the trunk may resemble a huge bottle six feet in diameter for perhaps 25 feet, then reducing to a normal head of branches.

Leaves vary in shape from three to many fingered lobes whilst young, to simple narrow leaves on adult trees. The mature height also differs according to where it is grown. Not only have the leaves a high fodder value but young roots and seeds were relished by the northern aborigines, together with a sweet thick sap which they extracted from trunks of living trees. Nets were made from the fibrous bark. If only as an object of interest, the Bottle Tree may be grown almost anywhere in Australia, excepting in the high country.

B. trichosiphon, semi-deciduous, has a more bottle-like trunk, broader leaves and smaller flowers of a rich deep red. In Florida they call it the Tree of Splendor (Menninger).

The Queensland Lace Bark *Brachychiton discolor*, is noted for the great beauty of its flowers. Large pink bells in clusters are covered outside with a thick brown felt. They fall eventually as a glorious carpet of pink. Leaves resemble those of Plane Trees, Sycamore or Maple, with 5 or 7 broad pointed lobes, usually coated with a lighter coloured down on the undersurface. Sometimes the lobes themselves carry smaller side-lobes.

This tree flowers freely in Melbourne and Geelong gardens. It attains its greatest size in eastern New South Wales and Queensland from whence it originally came.

Each of these species is comparatively slow growing in the initial stages, but the home gardener should not be deterred from planting them for this reason, provided there is room for ultimate expansion. Set between shrubs which take the eye while the tree is small it will always repay a few years of patient expectation. Where frosts are severe it is usually wise to provide some cover for the first winter or two. A few slender branches of tea-tree or melaleuca, say 3 feet long, pushed into the ground around a young tree and tied tentwise at the top, will permit free access of sun and air, and shield from frost.

Brachychiton luridum has been called the Hat Tree, from the appearance of the bunchy foliage which crowns the tree in early life. It much resembles *B. discolor* in leaves and flowers, but the flowers are usually paler and variegated, and fewer in the clusters. A tall tree in its native New South Wales and Queensland it matures to a small size in cooler gardens.

We have been growing a recognised hybrid in this genus for many years—it was named by Baron von Mueller in 1884 when first found in New South Wales. This tree, *Brachychiton populneo-acerifolium*, may be seen in many parts of the country.

Leaves chiefly resemble the simple form of the Kurrajong, but here and there are seen leaves with one or two small pointed lobes. Flowers are nearer those of the Illawarra Flame but paler in colour. This hybrid is freer and faster growing than either parent species, usually reaching a given height in half the time.

Romance and the Rhododendron

By CROSBIE MORRISON, reprinted from the book "Along The Track",
by courtesy of Whitcombe & Tombs.

Some of our best wildflowers have been "tamed" and brought under cultivation as garden plants, among them being Australia's only native rhododendron. Its name is *Rhododendron lochae* which means "Lady Loch's Rhododendron," and I should like to tell you the romantic background story to this rare Australian wildflower.



RHODODENDRON LOCHAE

Reprinted from "Along the Track" with Crosbie Morrison by courtesy of Whitcombe and Tombs.

At first sight it doesn't look like a rhododendron at all. Instead of the erect head consisting of a large number of flowers, this one has only a few flowers in each head, and each flower hangs like a bell. The substance of the flower is more solid, it looks as though it has been skilfully fashioned out of bright-red wax. And instead of flaring out like a small trumpet from the very base, the flower has a basal part that is a cylindrical, not a conical, tube, with the five petal lobes opening widely at the mouth of it. Each flower is about two inches across the mouth, and rather more than that

in length from the base of the tube to the opening and there are about half a dozen to each flower head; but, since they all hang down, rather in the manner of a fuchsia, instead of standing erect on their stem, the whole thing looks, as I remarked before, quite unlike the conventional rhododendron.

Baron von Mueller was in his day the world's most famous botanist. He came to Australia as a young man, and he remained here, first in Adelaide and then as Government Botanist in Victoria from 1852 until his death, at the age of 71 years, in 1896. He had not only knowledge and an almost fanatical energy for botanical work, but there must have been some innate instinct there too, because not all the book learning and field collecting in the world would enable a man to do some of the things that von Mueller did. And one of the most outstanding of those things was that he made a prophecy.

Australia has many thousands of different native plants and von Mueller knew most of them. He also knew the geography of Australia better than most people of his time, because in addition to being a botanist, he was an explorer of some note. When he came to look over the resources of Australia and found there was no native rhododendron here, he began to ask himself why that should be. There were affinities between the flora of Australia and that of New Guinea, the Indonesian Islands, Malaya, and south-east Asia. In some of those other countries there dwelt native rhododendrons in amazing variety. They enjoyed a tropical climate at very high altitudes. Why had we no native rhododendron? We had large areas sufficiently within the tropics. Was it, perhaps, because none of our tropical mountains were high enough to provide the right habitat? He took stock of our tropical mountains. There was Bellenden Ker and its satellite peaks, not far from Cairns, well within the tropics, and towering to more than 5000ft. He was so confident of his own researches that he publicly announced his conviction that in time to come a native rhododendron would be discovered in Australia, and that, when it was discovered, it would be on the summit of Bellenden Ker or one of the peaks round about.

More than twenty years passed before Bellenden Ker was successfully scaled. I have seen it only from a distance. About 1886 Sayer and Davidson made the ascent and their large botanical collection sent to Baron von Mueller for identification and description of new species. Among the specimens was the rhododendron that he had prophesied twenty years before. One of his assistants described how the old Baron was "excited for days" when he received it. He named it in honour of Lady Loch, wife of Sir Henry Loch, who was then Governor of Victoria.

EDITOR'S NOTE—Will those who have grown this plant please write.

Desert Kurrajong

BRACHYCHITON² continued from Page 3

A species deserving of special mention is the Desert Kurrajong, *Brachychiton gregori*, found in the region of the Musgraves, Birksgate and Mann Ranges (the far inland of South and Western Australia) about the year 1856. Its handsome leaves have 3 or 5 narrow and pointed lobes; the flowers are pale yellow. Desert Kurrajong is rare in cultivation here, yet has been grown to maturity in California.

Two other Queensland species, *B. ramiflora* and *B. bidwilli*, both small trees or shrubs with red flowers are being grown in Florida. Why not in Australian gardens?

Acacias Growing in Poor Soils and Under Wet Conditions

By ALLAN C. KEANE—Montrose, Victoria

There is a saying that "the good old hardy natives will grow anywhere with little or no attention". This is partly factual inasmuch as Australian trees and shrubs are often surprisingly adaptable to sites and conditions sometimes far from their places of origin. It is particularly true of many wattles.

Experience has shown that wattles will not succeed under changed conditions without some attention as to mode of planting and general care during their first three years. Those listed below are the really successful ones among some 120 varieties growing on a 10 acre property just above Montrose, on the lower slopes of the Dandenong Ranges, 25 miles east of Melbourne and 800ft. above sea level. The average yearly rainfall over the past eight years has been 47 inches.

When purchased in 1949 the land was covered by a dense eucalyptus forest. After clearing, the soil was found to be of very poor quality; no top soil, a heavy clay badly drained. Many initial failures were recorded and the majority of the early planting, native and otherwise, either died or failed to thrive. Over the past 10 years about 170 varieties of acacia have been observed.

Since five years ago all acacias have been planted on top of the ground, carefully staked and tied, nourished with blood and bone and compost during their first three years, and weeds kept to a minimum. They are watered at weekends during dry periods and pruned moderately—sometimes hard—after flowering. This latter is important to avoid a tall unsightly tree which, as many wattles are surface rooters, may blow over with the first gale. In the case of the medium sized growers, which are many, at 8 to 10ft. high, old water piping is used for staking in place of the original wooden stakes, and these are left during the life of the specimen.

If treated in this way it has been found that quite a number can be persuaded to grow well, some in apparently unfavourable conditions. The undermentioned list includes only those where at least two specimens are doing well, where there have been no failures, where all are at least four years old and where reasonable approximation to their mature height has been achieved.

Indigenous to the area are:—

Acacia myrtifolia, *A. melanoxylon*, *A. stricta*, *A. verticillata*, *A. mollissima*, *A. baileyana*. These fulfil the conditions above stated.

A. acinacea, NSW, SA; *A. buxifolia*, Vic, Qld, NSW; *A. binervata*; *A. cyanophylla*, WA; *A. cultriformis*, Qld, NSW, WA; *A. calamifolia*, Vic, Qld, NSW; *A. dealbata*, Vic, SA, NSW, Qld; *A. decora*, Qld, NSW; *A. elata*, NSW; *A. floribunda*, Vic, NSW; *A. howittii*, Vic; *A. iteaphylla*, SA, WA; *A. longifolia*, All States except W.A.; *A. mucronata*; *A. maidenii*; *A. merrialli*, W.A.; *A. normalis*, NSW; *A. pubescens*, NSW; *A. prominens*, NSW, Qld; *A. podalyriifolia*, Qld, NSW; *A. pravissima*, Vic, NSW; *A. pycnantha*, Vic, SA, NSW; *A. pratervisa*, Vic; *A. pruinosa*, NSW; *A. rheticoides*, Vic, SA; *A. spectabilis*, NSW, Qld; *A. saligna*, WA; *A. subulata*, NSW; *A. spinescens*, Vic; *A. suaveolens*, Vic, Tas; *A. sophora*, Vic, A. subporosa, Vic, NSW.

Acacias are not long lived certainly, but with less attention than that given to the average exotic, a reasonable span of life can be assured. They have the advantage, most of them, of blooming in June, July and August, when colour is badly needed in our gardens, and I believe, with further investigation many more can be grown successfully in Southern Victoria.

EDITOR'S NOTE: Dr. A. C. Keane is leader of the Acacia Study Section formed to investigate the cultivation of our wattle trees and develop good forms for garden cultivation. You may join the group in this interesting work by writing to him, 544 Brunswick Street, North Fitzroy, Victoria.

WATTLE TREES—WHICH ONE IS THAT

The wattle tree is one of the most beautiful flowering trees in the world. There are hundreds of species, most of them being confined to Australia. What is the one growing in your area or your garden? Will you help a great scientific work.

Mr. R. D. Croll of the Acacia Section has undertaken the enormous task of compiling a census of the Acacias of the world with a description of each species and a key to their identification. Such a valuable work will eventually be published for your use and seeking your support, Mr. Croll writes:

"Now regarding an appeal for specimens from members I realize that I must approach this with care so that the good folk who respond will know from the start just what to expect. I attempt a summary thus:—

- (i) I should greatly appreciate receiving pressed specimens of as many Acacia species possible, no matter how common, from as many areas as possible.
- (ii) Specimens may consist of a small spray of leaves only, but if flowers and young or mature pods are available they would be welcome.
- (iii) Each pressed specimen should be labelled with: Place found (or grown), Date collected, Name of collector.
- (iv) Specimens should be parcelled and sent to R. D. Croll, 15 Maylands Avenue, North Balwyn, E.9, Victoria, Australia.
- (v) No acknowledgement of specimens will be made—the saving of 5d. per acknowledgement must be the excuse for this breach of manners.
- (vi) An identification will be posted to the sender if specially requested and if specimens are accompanied by a stamped, self-addressed envelope and a numbered list of specimens (the numbers on the list corresponding with the numbers on the specimens). It must be understood (I hope, generously) by senders that some time may elapse before identifications can be forwarded.
- (vii) It is hoped that the response to this request will be vigorous and that the recipient will be flooded with specimens from all over Australia. It is also hoped that the senders will be as generous in their patience and understanding of the size of the job being undertaken as they may be in obtaining and forwarding the material.

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I Grow Native Dendrobiums in Brisbane

By W. M. BRISTOW

Many growers of exotic orchids tell us our own Australians are not worth a place in a collection because of their insignificance, but we who read this journal love them for their daintiness and form, despite their smaller size. I do not have a bush or glass-house but have the plants tied to trees in my garden. I generally sprinkle them with the hose when watering the garden if conditions are dry. Care must be taken not to over-water. These notes stem from experience with my own plants.

My land is situated on a southern slope. The strength of winter westerlies is lessened by a high cypress hedge and some trees across the western end of the allotment, and partially protected from south-easterly winds by trees round the south-eastern corner. The winds are fairly severe and without these protective measures exposure would be considerable. The lowest part of the land only is subject to light frost several mornings during the winter. The orchids, in trees half-way up the slope, are not noticeably affected by nearness to the frost, which appears to be only at ground level.

DENDROBIUM SPECIOSUM, known as "King Orchid" (Rock Lily in N.S.W.), grows naturally on tree trunks mostly, but on rocks sometimes, in the rain forest. (Orchids are not parasites but epiphytes, using the host only for support). In my garden they grow in the forks of unpruned flowering peach trees, with a southerly aspect. It would appear that I have two varieties—one having longer racemes of bloom and deeper coloured flowers than the other. The larger ones flower better. The general colour of the flower ranges from almost white to quite a deep yellow, with smallish darker spots. The racemes vary from 9 to 18 inches in length. The flowers are massed together along the raceme and almost all open before the basal ones begin to fade. After a wet winter flowering is more prolific and very seldom do two good years follow consecutively. Experimental cultivation could improve this, and the following points are made as suggestions.

1. Systematic light watering from June or July onwards so that sufficient moisture is present to prevent the plant from becoming dried out.
2. A good soaking about June or July on three or four consecutive days to simulate a period of rainfall, then with-holding of same, with further spasmodic waterings from end of August into September (when buds should be developing fast), simulating early spring storms.
3. More packing, of leaf mould and fibre or sphagnum moss, behind the plant or at the base of the pseudo-bulbs to retain moisture for a longer period, thus lessening the need for applying it.
4. Experimental use of nitrogen in the form of sulphate of ammonia, by sprinkling crystals as you would salt meat, among the leaf mould or fibre, so that at each rain or watering a little be dissolved off for the use of the plant, care to be taken to keep it off the leaves.

(These suggestions leave out the use of a bush-house. Others who have grown them under these conditions would know their response to this type of culture.)

My plants were originally tied to tree forks. (Copper wire is said to be the best medium, but I used strips of rag). As the rag rotted the plants became firmly attached and now have no ties. An unusual feature is that the roots grow upwards. When young they have a greenish-white succulent appearance, but shrivel and become white as they get older or cease to grow.

Occasionally I add some decaying leaf substance to the centre of the clump. Sustenance is mainly from the air, aided by dust accumulation and decaying leaves from the tree.

Flowering is in the spring—September and October. New shoots develop from the base after flowers fade if weather conditions are reasonably good, but may be delayed or may remain dormant if weather is unsuitable. Development of aerial shoots appears to indicate poor condition of the plant and an effort to reproduce before death (in this species). These may be removed when large enough and tied in position, adding leaf mould or fern fibre, to form new plants. Main clumps may be split up to propagate new clumps. If picking the flowers on no account cut the pseudo-bulbs as buds develop on these from year to year for a long time. The flowers are not long-lasting as cut flowers so it is better to leave their beauty in the garden.

DENDROBIUM KINGIANUM, often called "Pink Rock Lily", grows in its natural state clustered in large numbers on rocks, mostly in the mountains. Tied to a tree in my garden it does not prosper, although a specimen on a citrus flowers better than one on a peach. This is a much smaller plant than *D. speciosum*. It flowers at the same time. The racemes are much shorter and individual flowers smaller but more waxy in texture. The colour range is from near-white to a deep fuchsia-pink. In its native haunts, after a wet winter, it flowers profusely but mine has flowered only sparsely or not at all. Increase is by aerial shoots. Indications are that my success would have been better had I fixed the plants to boulders instead of to trees. Large rocks were not available to me and this experiment was not made.

DENDROBIUM GRACILICAULE, known as the "Spotted Orchid", has long slender pseudo-bulbs with shortish racemes of pale yellow flowers spotted noticeably with brownish-red. Like *D. speciosum*, the depth of yellow varies. Habits and natural habitat are practically identical, and the same treatment has been meted out to it. When obtained it was a poor specimen, appearing to be in the last stages of death. Loving treatment, however, caused it to recover, and it is now a robust and healthy plant.

DENDROBIUM UNDULATUM, called the "Golden Orchid" which is something of a misnomer as its colour is really a greenish-yellow, has its natural habitat further north than the others mentioned but seems to do reasonably well in Brisbane. The pseudo-bulbs develop to some length. The petals and sepals of the flowers are curly and the whole effect of a raceme of flower is frilly and delightful. Mine is on a citrus giving it semi-shade. Having had it three years it has more than doubled its size but has flowered only once. Indications are that it is doing well. The roots attach themselves to the surface of the bark so it had to get settled when I first obtained it as an aerial from an old plant. Owing to its habit of growth it cannot be banked with rotted leaf material in the same way as *D. speciosum*.

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From . . .

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An Introduction to Triggerplants

By RICA ERICKSON

When I am asked, "What is a triggerplant?" I almost blurt out the answer in my haste to assure, "It's the easiest plant in the bush to recognise, because it has triggers." For from the throat of every trigger-flower rises a sensitive column or trigger that may instantly swing over when the throat of the flower is probed. It is from this column or style that their generic name of *Stylidium* is derived.

Then I tell my questioner that these flowers always have four petals. After a little more though I explain that the four petals are usually in pairs but in some species the pairs are very unequal in size and shape. Then I feel it is necessary to mention that some triggerplants are tiny, (only a couple of inches tall) while others are bushy (one can grow to six feet tall), that several grow in wiry creeping mats and others have dense tufts of rosetted leaves. By this time my questioner's face has assumed a puzzled and hopeless look. So I quickly fall back on the statement that all triggerplants have repeatedly sensitive triggers, and then we seek out a plant to demonstrate its powers.

Triggerplants flower mostly in the late spring, and in Western Australia in particular, they may be found in almost any part of the bushland.

A fine straw is plucked to simulate the proboscis of an insect and we carefully insert the grass stem into the throat of the flower. The poised trigger is resting in a spring-like curve between the petals but when probed it swiftly and amazingly sweeps in an arc over the flower. We try another flower and yet another. Again and again the sudden reaction seizes our attention. Sometimes the triggers refuse to work. It takes a couple of minutes for each to repose in a slow jerking movement, and after that it needs about ten minutes or so to rest in which to regain its sensitivity.

On hot days the response is very much swifter and the time required to rest is much reduced. This is neatly related to the fact that insects work much faster in warm weather.

What is the purpose of the trigger's swift movement? A magnifying lens shows that the apex of the trigger is exceedingly beautiful and often adorned with a glistening fringe. Some of the columns we view are crowned with anthers bearing four neat packets of pollen, others have the stigma, looking like a hairy pin-cushion. (See No. 10 and 11 of b/w illust.) The anthers appear first on each trigger but as they mature and the pollen is shed they are pushed aside by the development of the stigma. This successive development of anthers and stigma prevents self-pollination, while the trigger action is a neat and thrifty device to ensure cross-pollination. A young flower will deposit pollen on an insect in exactly the spot where the stigma of an older flower of the same species will gather it up.

If you stand patiently near a triggerplant you may be lucky enough to see a humming bee or a bee-fly sipping at the flowers. The nectar it seeks must be very attractive, for having once sipped it the insect is impelled to visit every flower of that species within reach. It alights gently on the outstretched platform of paired petals, it sips and is immediately branded by the trigger with a perceptible blow. It receives and gives pollen throughout the proceedings unaware of the vital part it plays as the marriage agent.

The various corolla shapes found among triggerplants are related to the need for the insect to adopt the same position on the corolla at every visit. It will be struck then in the same spot on each occasion.

The most common arrangement is that of laterally paired petals, as can be seen in the coloured illustration of the "Grass Triggerplant" and "Touch-

me-not". On these the insects may alight from either side. Another arrangement is of petals paired to the back and front, also to be seen in the illustrations. On these flowers insects land on the extended front petals and the trigger swings over between the two upright petals to hit the insects back as with the laterally paired petals. However, in a few species which have this front and back pairing the trigger swings up from between the extended front petals and strikes the underpart of the insect's abdomen instead. (See Nos. 5, 6 and 7 of b/w illust.) These flowers are more than usually specific in their pollination.

The throats of many of the flowers are adorned with appendages which are best seen with the aid of a lens. Their purpose may be to direct the proboscis of the insect more accurately. Possibly the most unusual corollas are to be found in the tropical triggerplants (No. 8 b/w) and one can only guess at the purpose of the various divisions and fusions of their petals.

There is no space in this short introduction to detail the other devices evolved by some of the plants, except possibly to mention the hinged locket trigger which folds the anthers into a protective pouch. (No. 9 b/w) and also the peculiar action of the strap-like stigma of "Book Trigger" (No. 4, 5 and 6) a plant common to both Eastern and Western Australia.

No one has yet determined just what makes the trigger work, although scientists have studied the problem spasmodically ever since triggerplants were grown in the hothouses of Europe since the beginning of the last century. They have been cultivated in the Old World as botanical wonders almost ever since their discovery. So they should not be difficult to grow in the gardens of their homeland, indeed they have responded happily in those few where I have seen them. "Grass Trigger" (whose range is from near Cairns in Queensland to Tasmania and South Australia) is one of these and the "Matted Trigger" is another. The latter is a creeping plant of Western Australia and has been introduced into a garden by training the new trailing stems of bush plants to root in small prepared pots which later in the season were transferred to the desired place. The small bulb-like triggerplants are easily lifted in sods. Their natural habitat of a drying swamp is easy to simulate but they are too small and short-lived to be worth the trouble. The biggest and loveliest trigger flowers, some of which are to be seen in the colour plate, are worthy subjects for any gardener. The "Queen Trigger" is very lovely and "Cowkicks", the largest flowered of them all has a powerful trigger action that quite justifies the amusing folksy title that children have bestowed on it. These plants do not transplant readily except as seedlings. They are more or less dormant during the summer months, shedding most of their leaves and apparently dying. Soon after the first rains fall the old stock regenerates, putting forth new leaves and roots and in time multiplying into a dense tuft. I know some that are at least twenty years old and see no reason why they should die out. A bushfire is usually beneficial, although the ground may be swept bare and the old-established plants may disappear, after the rains their places are taken by a new generation of seedlings. This suggests that the seed may be viable for long periods and that either heat or ashes may be needed for successful germination.

All except four of the known 136 species are found in Australia. Every state in the Commonwealth is represented and south-western Australia is



- 1: "Grass Triggerplant", *Stylidium graminifolium*, showing habit of growth.
2. Flower of "Touch-me-not", *S. diversifolium*.
3. Flower of "Fan-leaved Triggerplant", *S. striatum*.
4. "Book Triggerplant", *S. calcaratum*, showing habit of growth.
9. A locket type of trigger with the anthers folded against the pouched column.
6. Released trigger of "Book Trigger" showing the strap stigma lying along the column.
7. 'Topsy-turvy Triggerplant', *S. spinulosum* with trigger poised below the flower.
8. *S. fissilobium* a tropical triggerplant with divided petals.
9. A locket type of trigger with the anthers folded against the pouched column.
10. Anthers at the apex of a typical trigger column.
11. Hairy stigma cushion developing between the empty anthers.

SHRUBS AND TREES FOR AUSTRALIAN GARDENS . . . By ERNEST E. LORD

This is not a new book on the market. I have sought this occasion to recommend it to you as it is undoubted, the very best book on this subject that is, or ever has been, on the market. It has been reprinted a few times to meet the popular demand and with each reprint improvements have been made. The front cover of this journal is a portion only of one of a number of large colour plates. The competence and easy style of the author may be readily judged from his article on page 2.

In the introduction it states: "It is claimed with confidence that virtually every garden grown variety of shrub and tree likely to be met is here referred to and can be quickly traced through the comprehensive index system . . . containing 5000 names." This statement is correct for all the usual exotic trees and shrubs likely to be met and even for Australian natives, a rare tribute to a general gardening book.

The coverage of this large 450-page book may be judged from its sections comprising Section 1—Trees, a wide coverage with recommendations of plants suitable for conditions in the different zones of Australia. Section 2—Municipal tree planting. Section 3—Australian shrubs. Section 4—Shrubs, their application and cultivation under all the various conditions in Australia. Section 5—The hot, dry, inland. Section 6—Climbing plants. Section 7—Garden Planning—A very valuable book, and well worth the price.

FLOWERS OF AUSTRALIA CALENDAR

If you like the colour plates that have been appearing in this journal then you will love the whole colourful pictures from which they are reprinted. More than half of the colour plates we use are by the courtesy of John Sands Pty. Ltd., and are only a portion, about two thirds of the whole picture that appears on their wildflower calendars. Each year a wildflower calendar is produced with twelve such beautiful colour plates, a different one for each month and these are available from N. H. Seward Pty. Ltd., 457 Bourke Street, Melbourne, for 4/6 plus sixpence postage. If you are in business John Sands can supply your calendars with beautiful wildflower displays.

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One of Australia's most dedicated naturalists has written this book of exceptional merit. Being principally about the wild life of Australia, it is written in such a simple enjoyable style that it will make interesting reading for all Australians. Portion of the chapter on flowering plants, "Romance and the Rhododendron", has been reprinted in this book together with the full colour frontispiece of the flower *Rhododendron lochae*. You will observe the easy interesting style of the author. It would make an ideal present for young people who would be interested to learn about kangaroos, koalas, birds, reptiles and the inhabitants of the sea. Price £1/10/-, postage 1/6.

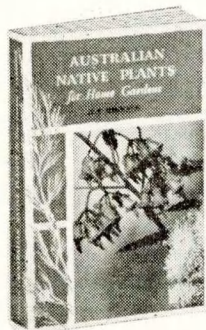
TRIGGERPLANTS by Rica Erickson

This 230-page book is the finest treatment of a native plant group I have ever seen. The work that went into its attention-to-detail and to thoroughness of presentation was enormous. It is confined to that portion of the genus *Stylidium* that is indigenous to Australia, with the exception of the final chapter on "Styleworts", the genus *Lavenhookia*, a closely related group of plants. An introduction to those fascinating plants commonly known as "Trigger Plants" is contained in this journal and from it you will be able to appreciate the pleasant style of the author. A reader of the book can follow the author through her fascinating rambles in search of these unique little plants. Inevitably such a reader will want to know more about them and this is presented in such a simple manner. An exceptional part of the book is also the method presented in identification of species. The keys may be very easily followed and compared with maps of Australia showing the localities in which each species may be found. The 62 illustrations of which eight are in full colour (one appears in this journal) are exceptional for accuracy, detail, and presentation. An invaluable book for anyone interested in these fascinating plants.

Available from Brokensha Pty. Ltd., 65 Murray Street, Perth, West Australia. Price 45/- plus 2/- postage. Also available from N. H. Seward.

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The Genus *Prostanthera*

By G. W. ALTHOFER

West of the Dividing Range in N.S.W. and Queensland is the home of a great number of really beautiful Mint Bushes, as well as some quaint and bizarre ones. The vast inland areas of this region have spawned some of the loveliest species of the genus and here it is that change and development are still taking place. This has eventuated in all probability by the very unstableness of the inland in past geological times. The sudden uprising of much of this country by the huge volcanic obtrusions of Canobolas, Warrumbungles, Kapitul. The Glass House Mountains and part of the Carnarvons served to isolate portions of the country wherein, due to changing climatic and soil conditions many strange and wonderful plant forms have evolved. The sudden blocking of stream outlets forming great inland seas isolated many plant forms for centuries. It seems feasible that in this way many of our mint bush species have evolved.

It has been rightly considered that the mint bush is a lover of good drainage and even though it is quick to feel the effects of dry weather in the unaccustomed garden soils, in its natural habitat it is extremely hardy. The fact remains that even where the top soil is extremely friable the tap root is always able to tap hidden reserves of moisture. Rarely are species found on deep friable soil, even with *P. stricta* which is recorded only from the basaltic uplands of central west N.S.W. This species is found at the edge of the basalt with its feet deep in the sandstone underlay. After a fruitless search across the basalt cap of Mt. Vincent we came at noon on a breathtaking vista. The basalt cap ended suddenly in a flurry of scrub life and dwarf trees and below—far below—a toy train wended its way across a broad treeless valley from Vulcan siding towards Mudgee. Poised on the lip of this thousand foot drop was the plant we had sought in vain across the whole width of Mt. Vincent and its western approaches. A dense sprawling shrub, *P. stricta* with flowers of deep violet is much like *P. parvifolia* which we had seen in plenty at Glenmorgan, Queensland.

During this walkout through the haunts of the genus *Prostanthera* we have been particularly fortunate in locating many of the rarer species and our luck still holds in that paradise of flowering shrubs on the granite uplands of New England. Here at Torrington at an altitude of 4,000 feet grows *P. teretifolia* with flowers of an intense shade of violet—a shade not previously seen in this genus. An upright, sticky-leaved shrub of several feet, bowered in *Boronia granitica* and a host of other flowering shrubs. What a delight to the eye is this rare species. The leaves when touched give off the exact odour of turpentine. It would be interesting to know the economics of this plant and indeed the whole genus would amply repay an investigation into the essential oils of the leaves and stems.

At the upper end of the Bylong Valley, hemmed in by stupendous cliffs of sandstone grow two beautiful species of *Prostanthera*. Both are denizens of the half-shaded gullies. *P. discolor*, misty with pale violet flowers and loose habit of growth, and the upright, gross-leaved *P. prunelloides* with flowers of similar colour. Both are lovers of moisture and the half light of the gully deeps. The latter species occurs at many places between Cox's Gap and the Blue Mountains. Another species revealing in similar conditions is the dainty *P. violacea*. I once saw a narrow gorge near Springwood with a veil of the pale violet flowers of this species, lovely in the half light of the chasm bottom. This central Blue Mountain area has many another rarity

for here also is the glory of *P. incana*. The soft downy foliage of ashen hue is a perfect foil for the rather large lavender flowers. This is one of the few species from the cool forested gorges which has adapted itself to garden culture in a variety of soils and climates. Growing under similar conditions is *P. rhombea*, a compact small-flowered species which, to date, has not given good results in gardens.

Over 130 years ago A. Cunningham found *P. rotundifolia* on "Barren, Rocky Hills west of Wellington Valley". For the past 25 years I have searched these hills without finding a trace of this widely disseminated species. It was not until recently (1959) that I had an inkling of where Cunningham had found this species. A friend sent me some material for examination and amongst this was *P. rotundifolia* with the typical small leaves of the inland forms. Investigation proved that here on the southern prolongation of Cunningham's "Barren Rocky Hills" at Neurea in the Bell Valley was the home of this fine species. Here it grew in profusion with *Zieria aspalathoides* and *Actinotus helianthi* and many other shrub species. A tall gangling plant with a profusion of violet flowers in September and October. This small leaved form occurs also at Obley 25 miles north-west, the Hervey Ranges, Goonoo Forest and near Dunedoo amongst other stations. A large leaved form in keeping with the typical southern adaptation grows in rock pockets at Cooyal near Mudgee.

In the blistering heat of the inland areas of this continent one would hardly expect to find a *Prostanthera* of the calibre of *P. striatiflora*, but on the gravel ridges out Byrock way growing cheek by jowl with *Eremophila bowmani* and *E. latrobei* and in many other rocky declivities of the far inland this distinctive species grows. Very large cream flowers with violet striations and sweetly aromatic leaves are features of this, the mint bush with a greater geographical range than any other species. Extending from inland N.S.W. across the continent to W.A. *P. striatiflora* adds colour and fragrance to the brittle beauty of the Hinterland. A very close relative *P. magnifica* from areas around Pindar in W.A. has huge purple or brick-red flowers.

Denizen also of the lower rainfall areas but further to the south is that gleaming jewel of the lower growing species—*P. aspalathoides*, seen at its best in the Wyalong, N.S.W., area intermingled with the dwarf mallee, its living crimson, jewel-like flowers are the most striking feature of this land of flowers. Growing here also was another dwarf species *P. microphylla* var. *aeruginosa* with small greenish flowers and compact habit. *P. microphylla* proper with red or even purplish flowers is found only in South Australia and Western Australia. *P. arenicola* found at Gnowangerup, Western Aus-

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CUT LEAF MINT BUSH—*Prostanthera incisa*

At many places on the central coast is found that extremely variable and ill-defined species *P. incisa*. The extremely aromatic foliage of this, the cut-leaved mint, is its most prominent feature. In common with its near relative *P. sieberi* it graces the shaded ways on N.S.W. coast and mountains. The lilac flowers of both these species are borne in profusion.

tralia, has been recently reduced by Gardner to varietal rank. It is very similar to *P. microphylla*. Other close relatives with attractive red, orange-red or crimson blooms are *P. calycina* from South Australia and *P. grylloana* from Western Australia.

Western Australia has a number of magnificent species and these include *P. eckersleyana* with fine violet-blue flowers and *P. magnifica*. I have twice seen fresh specimens of this latter species. Recently through the courtesy of Mr. and Mrs. D. M. Gordon, I received an airmail parcel of flowering specimens of this fine species. I can truly say that it has been aptly named.

STREET TREES

How much is known about the use of Australian trees for street planting? A lot by a few, very little by most. Many courageous local government officers have tried experimental plantings but who has recorded and co-ordinated their work? The following extract provides food for thought.

Extracted from July-August, 1961, Vol. 21, No. 5 issue of Trees Magazine, The Journal of American Arboriculture—A report by Edward H. Scanlon on his attendance at the Australian Shade Tree Conference held under the auspices of the Royal Horticultural Society of Victoria.

After a tour of Melbourne streets, parks and Botanical Garden he reports:

"One amazing observation—suddenly it dawned on me that I had seen few Eucalypts, either on the streets, in the parks and not too many in the Botanical Garden. I was surprised that certain of the Eucalypts like *E. cornuta-lehmami* at least that is what it has been called in California, were not used. Regardless it forms a nice umbrella-like head and while it has not been used there nearly to the extent it should have—which is true of most good species all over the world, thanks to the overall delinquency of the nursery industry—it is a splendid tree. I suppose maybe it is a matter of familiarity breeding contempt but there did not seem to be too high a regard for their own."

Mr. E. J. Thompson, 115 Wattle Street, Fullarton, South Australia, has agreed to accept the enormous task of organising the Australian Street Tree Study Section. Undertaken on an Australian-wide basis this will present innumerable difficulties one of which will naturally be the diverse conditions say between, Cairns, Hobart, Alice Springs, Sydney, Adelaide and Fremantle, and just one co-ordinating authority does appear desirable. Mr. Thompson is enthusiastically engaged on the work but does not claim to be an authority.

1. Gathering and collating data from reports by Local Government Officers who have been actively engaged on this work.

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This is a national effort to benefit our Australian flora and we call on every local government officer, gardener, or society who has any experience in this matter to contact Mr. Thompson.

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The Rainbow Plant

BYBLIS GIGANTEA Lindl. by PROFESSOR B. J. GRIEVE

Byblis, like *Cephalotus* is an insectivorous plant, but the method of trapping insects is very different. In the case of *Byblis* small flies, mosquitoes, moths and ants are caught by mucilage exuding from glandular hairs occurring on the stems and on the thread-like leaves. The plants grow from fifteen to twenty-four inches in height and have a strong and well-branched stem. The leaves, which are of a yellow-green colour, sometimes with crimson tips when young, are very numerous. They may be up to eight to nine inches in length and are three-sided. The flowers are large, being up to two inches in diameter and are violet or purple-red in colour with contrasting yellow stamens. The stems, leaves and flower stalks are densely covered with glandular hairs and it is usual to find many insects trapped amongst them. The common name for the plant is believed to be derived from the fact that on looking through the plant towards the setting sun, one can see a spectrum of colours where the edges of the leaves are bordered by the shining drops of liquid on the glands. The glands are of two types—stalked and sessile. Usually insects are first caught by the stalked gland and these tend to collapse or bend as they pour out secretion. The insect is thus also brought in contact with the sessile glands and becomes enveloped in additional secreted fluid. The process of secretion and absorption continues until all of the soft parts of the insect are dissolved and only the hard, indigestible parts remain. The glandular hairs then stop secreting and the stalked ones commence to recover to their normal position. In due course the hard parts of insect which are left dry out and fall off. The insectivorous nature of the *Byblis* plant may be in the nature of an adaptation to soil conditions of low nitrogen. The plant grows in areas which become swampy or water-logged in winter. The soil is generally sand or sandy clay with a hard pan at one to two feet below the surface and is infertile and low in nitrogen. Probably the most common area of occurrence of *Byblis* is at Cannington a few miles from Perth and even here in recent years it has become somewhat rare. In an attempt to preserve it, the University of Western Australia a few years ago acquired for the Botany Department an area of about one hundred acres of swampy land at Cannington on which *Byblis* (as well as other fascinating insectivorous plants such as *Polypompholyx* and *Utricularia*) was growing. Some time after the area had been fenced to prevent grazing damage there were more stands of *Byblis* recorded. *Byblis* has been successfully grown in glass-houses in Britain and on the Continent as well as in Western Australia.

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Native Epiphytic Orchid Ecology

By H. J. BEAR—Blackalls Park, N.S.W.

Presenting the unusual angle to orchid growing. Whereas rainforests are searched for species for bush-house cultivation, in this case we seek a suitable environment within a rainforest to introduce species. Many species have not previously been known to cross the wide Hunter River Valley that has also proved to be a barrier to Avian Fauna, who, in conjunction with air currents provide a medium for seed distribution.

Situated between Sydney and Newcastle, 15 to 20 miles from the coast and 6 miles from the Western Shores of Lake Macquarie, are the ramparts of the Northern extremities of the Hawkesbury Sandstone group of rocks which present a 25 mile long elevated 1600ft. plateau, culminating in the 2090ft. basalt capped Mt. Warrawolong the highest point east of the Blue Mountains. Deeply indented into its eastern face are long 1000ft. deep gorges that support the remains of tropical rainforests that one time covered the eastern Australian coastal strip. These plant communities can only maintain their biotic state with an assured rainfall of 60 to 100 inches per year. As the surrounding district's average rainfall ranges from 30 to 50 inches an attempt has been made to study the climatic conditions essential for epiphytic plants and at the same time catalogue the orchids indigenous to the area, the more important types being:

Sarcochilus olivaceus, *S. falcatus*, *Cymbidium sauei*, *C. canaliculatum*, *Dendrobium speciosum* var. *curvicauli*, both white and cream forms, *Dendrobium gracilicaule*, *D. aemulum*, long and short stemmed varieties. *D. beckeri*, *D. teretifolium*, *D. tetragonum*, the type form and a giant variant with pseudo-bulbs 28in. long, flower sepals 62 m.m. long, this being only 1m.m. shorter than *D. tetragonum* var. *giganteum* from tropical Queensland. It may be noted when dendrobs grown in conjunction with *Bulbophyllum exiguum*, *B. crassulifolium* (syn. *B. shepherdii*) mosses and lichens, their growth is particularly robust and it could be assumed the association is beneficial to the whole group. Observations at this stage showed many natural hybrids and other varieties indigenous to northern N.S.W. and southern Queensland were absent although the rainforest plant range is practically identical. Wet and dry bulb thermometer readings taken at lat. 33° south, long. 151° 25' east, provide the following interesting data:

Wet Bulb	Dry Bulb	Relative Humidity %	Dew Point	Time	Remarks
60° Far.	61° Far.	94%	59° Far.	6.00 a.m.	Midsummer
78° Far.	84° Far.	76%	75° Far.	12.00 noon	Clear sunny day
74° Far.	78° Far.	82%	72° Far.	6.00 p.m.	N.E. to S.E. wind, moderate
68° Far.	69° Far.	95%	68° Far.	12.00 Midnight	Clear night, calm
50.5° Far.	51° Far.	96%	49° Far.	6.00 a.m.	Late autumn
65° Far.	71° Far.	76%	63° Far.	12.00 noon	Clear sunny day
61° Far.	62° Far.	94%	60° Far.	6.00 p.m.	N.E. to E. wind, light
53° Far.	54° Far.	93%	52° Far.	12.00 Midnight	Clear night, calm

Sunny days with clear nights were selected for the above example as they represent average conditions during midsummer to late autumn when the relative humidity remains reasonably constant even though temperature shows a considerable variation. Many of our orchids are adaptable to considerable temperature range providing the humidity range remains in the above bracket during the main growing period.

Attempting to prove that climate can be as much a product of environment as of latitude plants of *Dendrobium kestevenii*, *D. gracillimum* and *D. kingianum* were introduced at altitudes ranging from 10ft. to 1800ft. in remote rainforest gorges. After several years their size and rate of growth, (in some cases multi leads occurring both in spring and autumn), were greater than in their natural habitat. These results were so pleasing that *Dendrobium falcorostrum* and *Sarcochilus fitzgeraldii* are now showing similar progress after two years in their new location. As time and plants permit the experiment will be continued

I GROW NATIVE DENDROBIUMS IN BRISBANE *continued from Page 14*

DENDROBÆUM AEMULUM, called "Ironbark Orchid", also grows on "Brush Box"—*Tristania conferta*—in nature. Its roots penetrate the surface bark and if getting specimens from mill logs (they grow on the main trunks) a portion of the bark must be taken with the plant to avoid root injury and thereby considerable set-back. Tie this area of bark, which would be about the size of your hand with widely extended fingers, on to branch or trunk of a citrus and tuck a little fibre and leaf mould behind it. Mine are happy with this treatment and flowered particularly well this year past. Plants tied to a frangipanni out of reach of the hose did not do nearly so well. The white spidery flowers with reddish spots on the labellum come on six-inch long stalks from the tip of the pseudo-bulb in spring.

DENDROBIUM LINGUIFORME, or "Tongue Orchid", is so called because its leaves are in shape fashioned like a tongue. Under moist conditions the leaves are plump, under dry conditions they apparently give stored moisture to the plant, as they become somewhat wrinkled, but fill out again when rain falls.

This orchid spreads out over the surface of the bark to which it is attached in a rhizome-like growth, keeping a somewhat flat appearance over-all. From this flatness the flower spikes stand out and up at right angles. They are white dainty and spidery, and so numerous they give an altogether pleasing effect. Mine is attached to a citrus on a southerly slope.

DENDROBIUM BECKLERI is one of the "Pencil Orchids". It has solitary flowers at intervals sometimes growing in groups of three or four with the very shortest of stalks, of a creamy green colour with purplish mark on the labellum. The flower is small and has daintiness of form to recommend it. For this, it is a little gem. Other species of Pencil Orchid are much more floriferous, particularly a northern one, but I have had no experience of growing it. The leaves of *beckleri* are cylindrical with perpendicular lines. They grow outwards and slightly downwards in a curve, and develop long semi-pendulous successions joined by noded thin stems.

DENDROBIUM TERETIFOLIUM, another "Pencil Orchid" which I have had only a short time, flowered this year early in September. Its white spidery flowers grow in a downward arching raceme of four to eight florettes. Waving gently in the breeze they make one think of diminutive dancing fairies. The terete leaves are smooth and more slender than *Den. beckleri*.

DENDROBIUM BIGIBBUM VAR. *PHALÆNOPSIS*, is the "Cooktown Orchid", Queensland's State Flower. Its natural habitat is the north of the State and I am told that there the flowers are up to three inches across. Grown here the flowers are only half that size but their colour is still the rich orchid pink so well known. In my experience of three years with a plant attached to a frangipanni tree on a southern slope I have had little success. It may be the wrong aspect. It may be that a bad drought has been experienced here during that period, and coming from a high summer rainfall area, the weather has affected it more than the other species. So it would be unwise to pass judgment without a longer period and more normal weather conditions. Mine is out of the range of ordinary garden hosing so gets little water other than rainfall. More artificial watering may improve it. Three bud spikes that formed this year were eaten off indicating the need for D.D.T. dust protection next year.

DENDROBIUM PUGIONIFORME, or "Dagger Orchid" has characteristic sharp-pointed leaves, which grow in downward-hanging trails. Mine did not like its transplantation and gradually faded away. Host was a citrus—aspect southerly. In nature it is generally high in the trees. Perhaps nearness to the ground had something to do with its death.

FRUITS

• • • By Helen Purnell

In Botany, the term "fruit" is used in a wider sense than it is in every day speech. Apples, plums, tomatoes, beans, peas, cucumbers, melons, wheat grains, etc., are all fruits in the botanical sense.

The wall of the fruit, the pericarp, is developed from the ovary wall. Three layers can frequently be seen in the pericarp. The outermost is called the exocarp and mesocarp and the hard shell is composed of endocarp. The edible portion is the seed. The fruits of all pea-type flowers, such as garden peas or beans and the native peas, are called legumes or pods. The pod is the pericarp and the seeds have developed from the ovules.

Fruits may be classified into two main types:

A. SIMPLE—which are the roduct of a single carpel or a gynoeium of fused carpels, e.g., the pea pod, apples.

B. COMPOSITE—which are derived from many carpels or an inflorescence, e.g., blackberry, pineapple.

A. SIMPLE FRUITS

These may be either succulent or dry.

1. SUCCULENT FRUITS

(a) **DRUPE**: The pericarp is differentiated into skin (exocarp), a fleshy mesocarp and a stony endocarp surrounding the seed. E.g., cherry, plum, peach, almond (the husk eventually peels off or rots away).

(b) **BERRY**: Similar to the drupe but lacking the stony endocarp, e.g., tomato, date. N.B., in the botanical sense the so-called "berry" fruits are not berries!

The fruit of citrus, e.g., orange, lemon, etc., is a type of berry called a hesperidium. The thick peel containing oil-glands is the exocarp and mesocarp, and the segments are endocarp. The juice is in sacs or vesicles which are outgrowth from the walls of the endocarp.

(c) **POME**: The carpels of the flower fuse with the receptacle which becomes fleshy and the core is derived from the pericarp, e.g., apple, pear.

2. DRY FRUITS

2.1 **Achenial**: these are usually one-seeded and indehiscent (i.e., they do not split open).

(a) **ACHENE**: The pericarp is membranous or leathery and is free from the seed-coat (testa), e.g., fruit of *Ranunculus* (butter-cup).

(b) **CARYOPSIS**: Also known as a grain. Similar to the achene except that the pericarp and testa are firmly fused together, e.g., wheat, oats, corn, etc.

(c) **SAMARA**: These are typically winged one or two-seeded fruits. The wing is an outgrowth of the pericarp, e.g., elm (one-seeded), maple (two-seeded).

(d) **NUT**: In Botany "nut" is used in a restricted sense for a one-seeded, indehiscent fruit with a stony endocarp, e.g., acorn which is partially enclosed, before it is ripe, in a hard green cup or involucre. Walnuts are true nuts and the green husk which falls at maturity is composed of fused bracts and the perianth. The almond, as mentioned earlier is a drupe, a peanut is a legume and a brazil nut and macadamia nut are seeds.

2.2 **Capsular**: these are usually many-seeded and dehiscent.

(a) **LEGUME**: (pod). Derived from a single carpel and when mature, opens along both edges (sutures), e.g., nearly all members of the Leguminosae (pea family).

(b) **FOLLICLE**: Derived from one carpel and differing from the pod in pening along one suture only, e.g., *Grevillea*.

(c) **CAPSULE**: Derived from an ovary with two or more united carpels and may be unilocular, e.g., *Hybanthus*, or multilocular, e.g., *Eucalyptus*, *Papaver* (poppy). The capsule may dehisce (split) lengthwise, e.g., *Iris*; or by means of apical pores, e.g., *Papaver*; or by means of apical teeth, e.g., *Eucalyptus*, or in various ways.

(d) **Silique and silicula**: Typical of the family Cruciferae and derived from two fused carpels. The silique is long and narrow as in the stock, wallflower and *Brassica* and the *silicula* is short and heart-shaped as in shepherd's purse.

B. COMPOSITE FRUITS.

These may be aggregate or multiple.

1. AGGREGATE FRUITS.

Such a fruit is formed of numerous carpels of one flower. The flowers of raspberry, blackberry, etc., have many small carpels on the receptacle. Each carpel develops into a tiny drupe and the receptacle remains fleshy. The flower of strawberry also has many carpels attached to the receptacle but in this case the carpels develop into achenes which are embedded in the very fleshy receptacle.

2. MULTIPLE FRUITS

These are formed from the ovaries of a cluster of flowers. A pineapple, e.g., consists of a thickened fleshy stem in which a large number of berries are embedded. The edible part is mostly stem. The edible fig consists of a fleshy receptacle in which the small flowers are enclosed. The mulberry, which appears to resemble a blackberry, is a multiple fruit developed from a spike of many flowers.



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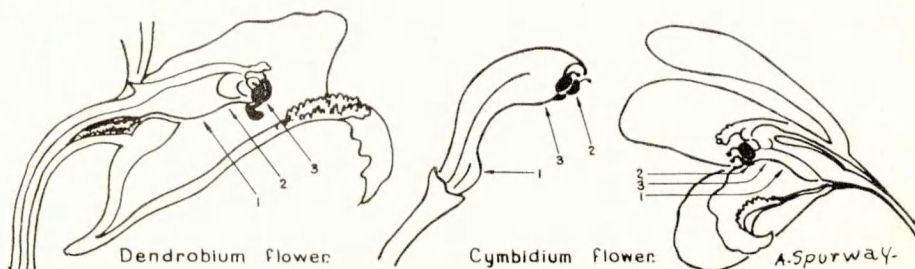
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AUSTRALIAN ORCHIDS

THEIR POLLINATION AND SEED COLLECTION—By H. BOYD

Orchid flowers may be easily pollinated to produce seed by even the most inexperienced grower. The process of "Pollination" was described by Helen Purnell in Vol. 1, No. 6, *Australian Plants*, and involves the transfer of pollen from an anther to a stigma. In orchids, the pollen on the anther is covered with a cap which must be removed. The pollen mass is picked up with the blunt end of the needle and thrust onto the stigmatic surface. If receptive this surface will be sticky and will hold the pollen. (In some orchids the stigma is dry and the pollen sticky, *Diandrae*).



1. Column 2. Pollen mass 3. Stigma. Stigmatic surface always faces labellum or lip.

Following fertilisation as described in Vol. 1, No. 7, *Australian Plants*, the seeds will form in a carpel that looks like a small cucumber. When seed is about to be cast, the colour of the carpel changes to yellow and at this stage it should be taken from the plant and placed in a paper bag. Dehydration of the carpel is continued. The paper bag is placed in a warm dry position such as on the inside of a window ledge, until it begins to open with a three-sided longitudinal suture. The seed is raked out and placed in a clean paper bag for further drying. When dry the seed may be stored in an envelope, in a dry screwtop jar that is to be kept in the bottom of a refrigerator.

Precautions! Do not allow carpels to become infected with small animals or fungi and if does, do not attempt to propagate the seed in a plastic bag.

NATIVE ORCHID (Epiphytal) STUDY SECTION

If you are interested in our native epiphytic orchids you may exchange notes and join in development work with other enthusiasts who have been organised on an Australia-wide basis, by Mr. L. W. Archer and Mr. G. A. Patterson, 50 Mildura Street, Coffs Harbour Jetty, N.S.W.

Messrs. Archer and Patterson offer the following comments on the Article on page 13.

1. For fixing orchids to trees where permanent support is needed we strongly recommend copper wire or nails, but binder twine is generally quite satisfactory. By the time it has rotted the plant has either attached itself or it is beyond help.

2. We feel that the location is not particularly good, adverse factors being the southern slope and the west-ries. These orchids need plenty of warmth and sunlight.

3. *D. speciosum*. The Queensland popular name is much more appropriate than the now firmly established N.S.W. title of "Rock Lily", since it is neither a lily nor is it confined to rock growth. We find that almost all the dendrobium family are improved by a winter rest followed by generous watering in the spring. If the water is applied too early it will stimulate new growth rather than flowers, and excessive water promotes aerial growths. We, too, regard these as an indication of ill-health generally associated with too much water. The upward-thrusting roots, while not uncommon with speciosum, usually occurs when its growing medium becomes sodden.

4. *D. kingianum*. This does not depend on aerial roots. If placed in a tree it needs something in which to bury its roots. Increase is not only by aerial growths. If conditions suit it it will make as many basal as aerial growths.

5. *D. undulatum*. This does well in full sunlight as far south as Brisbane, but it is a difficult subject farther south where it needs artificial help.

6. *D. aemulum*. This definitely depends on aerial roots, never penetrating farther than the thin outer layer of decaying bark.

7. *Dendrobium bialibum* var. *phalaenopsis*. This orchid definitely appears to need a winter rest to flower. Pour the water on when the racemes begin to appear and keep it so till it flowers. It needs heat, though we grow it behind glass but without artificial heat and with the aid of aqualox we find no difficulty in getting 2½ to 3 inch blooms. This is particularly true of var. *Schroederianum*.

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Triggerplants for Gardens

By K. J. WIDDOWSON

Triggerplants can claim a place in any Australian garden both from the point of view of their dainty beauty and their curious trigger action.

Early this year a study group was formed by the South-Eastern Region (now an Australian wide Study Section) to experiment with the adaption of this plant to garden conditions. It was found that very few of the one-hundred-and-thirty-six species were being grown in Melbourne gardens, the most common ones being:—

1. *Stylidium graminifolium*—"Grass Triggerplant"—a vigorous plant with a pink scape growing to about three feet.
2. *S. soboliferum*—"Bristly or Grampians Triggerplant".
3. *S. lineare*—"Narrow-leaved Triggerplant"—a dainty species from the Sydney area.

There may be others which members can add to this list. The general experience has been that in the garden triggerplants rarely live beyond one or two flowerings. Some efforts have been made to grow Western Australian species from seed, but very little success has been obtained. All this indicates that there is wide scope here for experiment and the pooling of knowledge.

The group has already obtained three species from Western Australia which were taken as seedlings from the bush, packed in silver paper and polythene and airmailed to Melbourne, and after six weeks are growing well in pots. They are *S. brunonianum*, a dainty mauve flower which has bloomed in the pot since being transplanted, *S. piliferum* a matt type of plant, and *S. schoenoides*, the well-known "Cowkicks".

EDITOR'S NOTE: For miniature gardens, rockeries and pot plants these colourful little plants are ideal. The group appeals for any assistance in the way of advice, information seedlings or seeds, and interested members from all States, which will enable it to carry on its investigations into the possibilities of this fascinating Australian plant. The Study Section Leader is K. J. Widdowson, 6 Lind Street, Strathmore W.6, Victoria.

AN INTRODUCTION TO TRIGGERPLANTS continued from Page 17

particularly gifted with almost a hundred triggerplants. They are found on grassy plains and open heaths, on rocky slopes and the poorest sandplain, in forests and along the margins of drying waterholes and creeks. One even grows in the shadow of Ayers Rock.

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EDITOR'S CRY FOR HELP

The next issue will feature *Melaleuca* so I want to receive reports from experienced growers throughout Australia. I desperately need specimens, a couple of small branches in flower if possible although not essential of *M. macronycha*, *M. calothamnoides*, *M. blaueriaefolia*, *M. diosmaefolia*, *M. cardiophylla*, *M. agathosmoides*, *M. acuminata*, *M. websteri*, *M. leptoclada*, *M. basicephala*, *M. platycalyx*. Will you help me to serve you?

TRIGGERPLANTS FOR SMALL GARDENS

(Article on page 15)



1

2

3

4

SCALE-LEAVED TRIGGERPLANTS

1. Hairy Triggerplant, *S. hirsutum*. 2. Cowkicks, *S. schoenoides*.
3. Queen Triggerplant, *S. affine*. 4. Moth Triggerplant, *S. scabridum*.

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