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***Helichrysum acuminatum* ORANGE EVERLASTINGS**

WESTERN AUSTRALIAN EVERLASTING DAISIES

by P. J. Parry

In my opinion there are two species of Western Australian *Helipterums* worthy of cultivation, these being the *Acroclinium* (*Helipterum manglesii*) and *Rhodanthe* (*Helipterum roseum*). They are grown annually in large quantities at "Floralands" for the cut flower trade and are also useful and popular for use in dried flower arrangements. (*Acroclinium* and *Rhodanthe* are both obsolete generic names, sometimes used by nurserymen in a vernacular sense.)

Acroclinium seeds should be sown during February and the seedlings planted out into their permanent positions when large enough. Under cultivation this variety grows to a nice bushy plant and the flower stems grow up to three feet. They continue to bloom for a couple of months if the flowers are kept picked. The colour range is from white, through the various shades of pink to red, with either yellow or black centres. They flower during Springtime, but will not stand heavy frosts.

Rhodanthe seeds should also be sown during February, and seedlings planted out when about two inches high into their permanent positions. Like *Acroclinium*, they will not stand heavy frosts. The plant grows to about two feet, the colour range being two shades of pink and white, all with yellow centres.

Both of these everlasting species are best treated as annuals and planted freshly each year.

THIS ISSUE —

EVERLASTINGS

The value of everlasting flowers is only just being realised and the principal supplier to the trade has released his secrets in the above article. It is not generally realised the wide range of colours available and that these showy plants are easily grown in any garden. Compact plants can be obtained from various species with a mature height of only a few inches to plants of a few feet, with masses of blossom.

Predominant colours are yellow and white (two colour plates illustrate this) and when massed as shown in colour on page 229 they make a beautiful spectacle. Why not have a mass of this colour in your garden?

THE NATIVE DAISIES

The everlasting belongs to the large daisy family *Compositae*. To introduce this large family to the reader a special supplement by a leading Australian Botanist is included. He has gone to special trouble to present it as simply as possible and lay readers can skip those botanical sections that are included for the sake of completeness and for those who have been waiting for years for such original basic classification. Other articles mention various "daisies" for the garden. This issue is intended only to introduce the subject and future issues will deal more fully with the many valuable garden plants in the family. Such future issues will deal with the Alpine Daisies, *Olearias*, *Helipterum*, etc. and contributions and notes are invited.

WILDFLOWERS OF INLAND AUSTRALIA

Everlastings abound in inland areas. Wild flowers from inland Australia that will make good garden subjects are described by R. F. C. Swinbourne—Central Australia, Wittwer and Lullfittz—S.W. Australia, Dr. J. S. Beard—N.W. Australia and Western Queensland by L. Miller.

NATIVE ORCHIDS

Every issue contains articles on native orchids.

Some Showy Species of the Daisy Family in Western Australia

by E. Wittwer and F. Lullfitz, King's Park, Perth

Spring was a particularly good season in Western Australia for all free-flowering annuals such as the colourful Everlastings. These are seen to the best advantage in the outer wheatbelt and mulga country. This article mentions the most prolific and colourful species of the Daisy family (Compositae) which grow in the country between Kalgoorlie and Wiluna and up to Geraldton and Carnarvon.

The flowers in most cases consist of a cluster of bisexual florets arranged in a head or boss with a ring or ray of modified florets or of bracts acting as petals. In some species the petals are the most showy part of the flower but in others they are insignificant or absent; then the fertile florets form the colourful "flower."

These plants cover tremendous areas in the Salmon Gum and York Gum country and further out occur in even larger colonies amongst mulga. The different species merge into one another so that acres upon acres of pinks, changing to white or yellow, can be seen. The impression is of a vast, colourful carpet covering the countryside. (See page 229)

A noticeable feature of the Everlastings is their response to better conditions. When the country is dry or the soil poor the plants are small and carry only one or two flowers. In richer soils and where rain has been more generous the plants grow two or three times taller, the primary branches increase in number and the secondary branches carry many flowers instead of only one. The flower heads too grow considerably larger. On a large plant of *Waitzea acuminata* over one thousand flower heads have been counted. Prolific plants of *Schoenia cassiniana* can equal this.

In some localities *Cephalopterum drummondii* covers square miles with its yellow heads, completely hiding all other vegetation. Elsewhere the white form of the same species takes over.

But the Everlastings are not the only plants in this region presenting an unforgettable sight. There are many other annuals of equal beauty. The blue Billy Button (*Brunonia australis*) grows in abundance under the silvery-grey mulga trees, forming such a dense mass of countless cornflower-blue flower heads as to give the impression of a vast lake. In many places both sides of the road are covered with the pale pink, white-gold and gold of the Velleias (*Goodeniaceae*).

In the northern part of the mulga country the Mulla-Mullas (*Ptilotus*, or *Trichinium*) take over from the Everlastings. Square miles of country are so densely covered by these plants that the distribution of different species can be recognised from the air. Their colour ranges from silvery green to pink and purple. Species of this genus occur as far north as the Hamersley Range and the Port Hedland area.

Angianthus acrohyalinus — Upright annual 12" high, flowers yellow, oblong heads, 1" long, $\frac{3}{8}$ " diameter. In mulga country.

Bellida major — Annual 1-12" high with rosette of basal leaves. Flowers 2" diameter, bracts pink, centre golden. Up to 12 flower heads per plant. In red soil, Salmon and York Gum country.

Continued on page 241

CENTRAL AUSTRALIAN PLANTS FOR THE GARDEN

PART 2

by R. F. G. Swinbourne, Botany Section, Animal Industry Branch, Alice Springs, N.T.

INTRODUCTION reprinted from Part 1 in our No. 18 issue

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



Colour Photography by Frank Hurley

Block by courtesy of John Sands Pty. Ltd.

WILD FLOWERS FROM CENTRAL AUSTRALIA

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.

COMPOSITAE SPECIES (Daisies and Everlastings)

Brachycome ciliaris var. *lanuginosa*, a small herb with fine stems and leaves and dainty mauve-blue daisy flowers. This native is often encouraged in gardens and makes quite a show.

Calocephalus platycephalus (Billybutton), a small herb with bright yellow compact inflorescences, fine leaves and growing to 6 or 7 inches.

Helichrysum ambiguum, a very bright yellow flowering plant with bright green foliage, grows to 1 foot.

Helichrysum bracteatum (Everlasting), quick growing annual herb to 1 foot high with bright yellow papery flowers.

Helichrysum cassinianum, a very pretty bright pink "paper daisy" flower. Plant growing to 12 inches high, annual.

Helipterum semifertile, a small yellow-flowered herb growing to 12 inches high. Annual.

Helipterum fitzgibbonii, a most attractive annual "paper daisy", petals are white interior and the outer are brown-red, with a raised yellow centre. Growing up to 1 foot high this herb would make an excellent addition to the garden.

Helipterum floribundum "White Paperdaisy", this is an annual which makes a real show with white petals and bright yellow centres. Although the flowers are only small the plants seem to have a never ending supply of blooms. Growing to 10 inches high, this would make an ideal annual border plant.

Myriocephalus stuartii (Poached egg daisy), an annual herb to 1 foot and spreading, this is the most outstanding annual composite in Central Australia. The inflorescences are very large, white with yellow centres.

Pterocaulon sphacelatum, a perennial herb growing to 3 feet with mauve-purple inflorescences.



1. *Ptilotus macrocephalus*
2. *Ptilotus obovatus*
3. *Eremophila christopheri*
4. *Cassia artemisioides*
5. *Petalostylis labicheoides* var. *cassiioides*
6. *Prostanthera striatiflora*

Rutidosis helichrysoides, a grey-green perennial herb with yellow to orange-yellow inflorescences.

Senecio gregorii (Annual yellow top), a blue-green succulent herb with bright yellow daisy flowers and attractive seeding heads.

Senecio magnificus (Yellowtop), a perennial blue-grey succulent leaved herb with bright yellow daisy flowers, borne in huge clusters, making it a plant well worth consideration for cultivation.

Editor's Notes Who will help with notes, seed, or colour slides?

CASSIA SPECIES

Cassia eremophila, a fine-leaved light green bush up to 6 feet, with yellow flowers.

Cassia artemisioides, a grey leaved bush to 5 feet with yellow flowers.

Cassia notabilis, a large leaved, pubescent, herb to 3 feet high, has yellow flowers and very brightly coloured pods, these varying in colours, green, yellow, orange and red, according to age.

Cassia sturtii (Silver Cassia), a silvery-grey shrub to 6 feet with yellow flowers and yellow-green pods with reddish edges, making the bush very showy.

Cassia sophora, a large leaved shrub with yellow flowers growing to 3 feet and very easily cultivated.

Cassia venusta, a large leaved, slightly pubescent shrub to 5 feet with yellow flowers.

In a number of gardens and shrub areas these Cassias may be found giving a flash of brilliance with their bright yellow during blossom-time and colours of pods soon after.

Editor's Notes An issue is planned on *Cassia*. Who will assist with notes, colour slides and specimens?

LEGUMINOUS SPECIES (Pea Flowered Plants)

Indigofera leucotricha a pretty red flowering "Indigobush" makes a useful shrub for the odd spot, for with its grey foliage this shrub is attractive even when not in flower. It grows to 3 feet and forms an even shape.

Crotalaria cunninghamii (Bird Flower), an herbaceous shrub growing to 5 feet with very attractive spikes of lime-green pea-shaped flowers. In its natural habitat, it dies down during dry periods, yet when cultivated is slightly frost-tender in winter, but persists as a small shrub.

Clianthus formosus (Sturt's Desert Pea) an herbaceous, perennial legume, which has bright scarlet pea flowers, often with a dark centre, borne in clusters along the slender stems. This legume can be used in ordinary garden areas or in rockeries where it will cascade and lay among the rocks giving off its scarlet brilliance.

Glycine sericea an attractive climbing legume. Having pretty pink pea flowers this would make an attractive climbing addition to any native garden.

Erythrina vespertilio (Batwing Brantree), a semi-deciduous tree to 40 feet, with corky bark, tawny in colour, and batwing shaped leaves, the tree has a large spreading head and brilliant scarlet flowers appear when the leaves have just about fallen. The pods dry brown and split showing bright red seeds.

MALVACEOUS SPECIES (Hibiscus type flowers)

Clerodendron banyaioides, commonly known as "Sturt's Desert Rose" makes an extremely attractive shrub for grassed areas and its cultivation has increased since it was declared floral emblem for the Northern

Territory. It has large mauve-blue hibiscus-shaped flowers, takes well to reasonable pruning and generally makes a great display during the flowering periods.

Hibiscus farragei is an herbaceous shrub to 6 feet with large leaves and mauve-pink hibiscus flowers, with a dark centre. Growing fairly quickly and germinating fairly easily from seed are factors which make this a worthwhile specimen, as well as being extremely showy at blossom time. If dead wood is cut out frequently the shrub keeps a reasonably neat shape and doesn't get the straggly appearance of those in their natural habitat.

Notoxylon pedatum and *N. australe*, two members of the hibiscus family also worth consideration for cultivation. Both have mauve-pink flowers drying bluish and their foliage, whilst similar to *Cienfugosia gossypoides* has some fine hairs on the backs of the leaves. People often mistake the *Notoxylon* spp. for "Sturt's Desert Rose" but as well as the more hairy leaves, the stems of the "Desert Rose" have dark spots. The shrubs have a similar habit and can be used in similar positions.

Abutilon leucopetalum (Lantern Bush), an herbaceous shrub to 4 feet high with large soft leaves and bright lemon coloured lantern flowers.

Editor's Notes An issue on this *Hibiscus* family is planned. Who will assist with notes, slides or seed?

CHENOPODS

Atriplex nummularia (Old Man Saltbush), a very useful member of the "Saltbush" family. Grey herbaceous shrub to 6 feet high with dense foliage. When the flowering heads dry off they turn golden-brown giving a very attractive appearance. This shrub can be used as an individual specimen or as a very attractive and useful hedge. For farms and stations etc., this shrub also can be used as a feed.

Enchylaena tomentosa, a succulent herbaceous shrub growing to 3 feet high and spreading outwards with small green, orange and red tomato-like fruit. This is very easily cultivated. It is sometimes known as "Ruby Saltbush" or "Wild Tomato."

PTILOTUS SPECIES (Pussy Tails)

Ptilotus atriplicifolius, a perennial with grey-green foliage and mauve-purple inflorescences. This Pussytail grows in compact clumps approximately 2 feet high and 3 feet across, often found filling an otherwise barren spot.

Ptilotus obovatus. This Pussytail is very similar to *P. atriplicifolius* in growth habit and colouring except that the inflorescences are smaller and very compact and the foliage is considerably smaller.

Ptilotus exaltatus, a taller Pussytail with large fleshy leaves and large mauve-purple inflorescences to 6 inches long. The plant grows to 3 feet high or sometimes higher.

Ptilotus helipteroides, a smaller species with very pretty pink-purple inflorescences and greyish-green foliage. The species, growing to 10 inches high, is an annual but may act as a perennial in cultivation.

Ptilotus macrocephalus, a taller growing species, up to 3 feet high with narrow leaves and large green inflorescences to five or six inches long. This is an annual species but really worth cultivating.

Ptilotus nobilis, a larger Pussytail, similar in size and general growth to *P. exaltatus* excepting that it has large creamy-brown inflorescences to six inches long or even longer.

Ptilotus polystachyus is a larger Pussytail with fairly narrow leaves and

very long narrow inflorescences which are green in colour up to 10 inches long, appearing like candles.

Ptilotus polystachyus var. *rubriflorus* is a red, almost maroon form of *P. polystachyus*.

Ptilotus spp. generally are worthy of a position in any garden, as they are not just limited in colour range and certainly in mass make an outstanding display. Some of the annuals would most likely act as perennials in favourable conditions.

As well as using these in odd spots and garden beds, they would lend themselves well to plantings in rockeries.

Editor's Notes Some of these show exceptional promise as garden plants. Who will assist with notes, slides and seed?

EREMOPHILA SPECIES (Native Fuchsia of the Desert or Emu Bushes)

Eremophila christopheri (one of the Native Fuchsia family). A shrub to 6 feet, with small leaves and mauve inflorescences. A lovely addition to any garden.

Eremophila freelingii (Native Fuchsia), shrub to 5 feet, slightly pubescent, with viscid covering on leaves. Flowers lilac and when shrub is in bloom it really is a spectacle.

Eremophila gilesii, a fine viscid leaved Native Fuchsia growing to 4 feet with mauve-blue flowers. Easy to rear, and cultivate.

Eremophila latrobei, a glabrous shrub to 5 feet with flowers red exterior and yellow interior, and with narrow crowded leaves.

Eremophila longifolia, a taller growing Native Fuchsia with long pendulous leaves and brick red flowers. Growing up to 20 feet high, this is a graceful shrub or small tree.

Eremophila macdonnellii, a pretty Native Fuchsia bush, with bright green foliage and deep mauve flowers. 1-2 feet high and sprawling, this shrub is ideal for filling otherwise awkward spots.

Eremophila maculata, a shrub growing to 4 feet with lanceolate leaves and flowers varying from yellow orange to red with darker spots inside.

Editor's Notes These dry area shrubs were first introduced in our No. 10 issue. A further issue is planned. Who will assist with notes, slides or seed?

MISCELLANEOUS TREE AND SHRUB SPECIES

Brachychiton gregorii (Desert Kurrajong), a tree to 20 feet high with thick, tapered, fleshy trunk and emu-foot leaves forming a dense head. It has small cream flowers and large dark-grey pods. This is a most outstanding specimen tree and excellent for both garden and street plantings.

Pittosporum phylliraeoides (Native Willow or Apricot tree), growing to 20 feet high, with its attractive willowy habit, sweet-scented small cream flowers and a profusion of small apricot coloured fruits, this tree may be found in a number of gardens.

Casuarina decasneana (Desert Oak), normally a very tall tree to 60 or 70 feet and a huge dark grey to black trunk with weeping foliage. Recently a windbreak of young Desert Oak was planted and has done well, growing to 8 feet high in a few years, after being fairly closely planted.

Dodonaea viscosa var. *spathulata* (Hop bush), growing to 15 feet, this bush is extremely colourful with red fruit hanging in clusters all over and bright viscid leaves. In cultivation, the foliage becomes more dense and the bush generally becomes even more attractive. It is an eye-catcher in any garden.

Macrozamia macdonnellii (Cycad-palm) is a very attractive cycad, growing in the MacDonnell and other Central Australian Ranges, and is considered

a relic species. The main trunk doesn't grow very high, possibly 12 feet and the fronds extend 8-10 feet from the trunk. There are male and female plants, the female cones being very attractive when fresh, and are orange in colour with darker markings. In a number of gardens an occasional Cycad-palm may be found, especially being a feature in large gardens.

Marsdenia australis (Bush banana), a grey leaved twiner with small cream flowers and large greyish-green fruit. It is not unusual to see a plant of "Bush banana" or *Glycine sericea* twining themselves around the trunk of a "Corkwood."

Pandorea doratoxylon (Spearwood or Wonga Vine), a member of the *Bignoniaceae* family is also worthy of consideration for gardens, having masses of creamy bell flowers with brown-red markings inside, and attractive fine foliage. This is a weeping shrub sometimes twining. After flowering large clusters of green pods are hanging, still making the specimen attractive. It is fairly easily grown from seed and responds well to cultivation.

Prostanthera striatiflora (Mintbush), a shrub to 6 feet high with small leaves and masses of creamy-white flowers with dark markings in throat. It is highly scented, and has a shapely growth, and is easily cultivated.

Myoporum montanum (Boobyalla), a shrub to 7 feet with leathery lanceolate leaves and small cream-white flowers. This shrub is used as a hedge or wind-break, having a greater tolerance of some very saline soils as occur in small areas around Alice Springs.

Solanum quadriloculatum (Wild tomato or Tomato bush), despite its prickles makes an attractive splash of colour, the foliage being blue-grey, and the petals a brilliant purple with yellow anthers. The bush grows to 2½ feet high and 3 or more feet across, with dense foliage.

ROCKERY PLANTS

Sarcostemma australe, a succulent stemmed shrub with minute leaves, tiny cream flowers, and grows to 4 feet. This could well be used in rockeries and would be very much like "Skeleton Plant" which is used in rockeries and similar positions elsewhere.

Calandrinia balonensis (a Parakeelya), a succulent herb with thick fleshy leaves and very bright pink-purple flowers with yellow stamens. An ideal rockery plant proven for this purpose.

Calandrinia remota (a Parakeelya), a succulent herb with fleshy rounded leaves and stems, and very bright pink-purple flowers. This also is an ideal rockery plant.

Crinum flaccidum (the Sandover Lily), a very beautiful white spidery flowered lily. It is cultivated, and multiplies well, but often disappoints by failing to bloom regularly, but when it does flower, it is most rewarding. This could be used in rockeries.

Erodium crinitum and *E. cygnorum*, two members of the *Geranium* family are very interesting little additions to the rockeries, with their small bright blue flowers, pretty foliage (much like some cultivated geraniums) and their crow's foot seed pods.

Editor's Note: An issue on native succulents is planned. I urgently need notes, slides, etc., from readers for these excellent ground cover, very showy plants.

CONCLUSION

A number of the plants mentioned here have been or are being cultivated with very rewarding results. The others are mentioned because of their suitability and also they are reasonably easy to rear and cultivate.

NORTH-WESTERN AUSTRALIA

by J. S. Beard

Officially, the "NORTH-WEST" is that part of Western Australia north of the 26th parallel and bounded on the inland side by the unoccupied stretches of the Great Sandy Desert. Opened up by pastoralists and miners between 1880 and 1900, this vast region of 200,000 sq. miles has remained thinly settled and little known until quite recently when new mineral resources and tourism have begun to attract newcomers. Virtually all is semi-desert, with an erratic rainfall averaging only 8-12 inches a year, falling mainly in rare summer storms. The winter is dry, cool and delightful, but summer temperatures are the highest experienced in the whole continent.

From the north and west the land rises gently or in steps to a series of interior plateaux up to 2,500 feet above sea level from which rise, in the central Hamersley Range, further mountains that are the highest in the state and culminate in Mt. Bruce, 4,054 ft. This topography of barren tableland and mountain is drained by four great systems of intermittent rivers flowing to the north-west, the Gascoyne, Ashburton, Fortescue and de Grey. The plant cover is sparse and drought-resistant, the north half of the region very roughly north of the Tropic being covered with spinifex and the southern half with mulga. None the less the vegetation contains a number of outstanding floral elements which are well worth horticultural notice, and after a season of good rains the floral display often rivals that seen in the famous "SOUTH-WEST."

There is, however, a curious preponderance of the colours mauve and yellow, and absence of red, orange and blue, all of which are seen in profusion in the south-west.

In the more southerly part, that is, in the mulga, the most noteworthy element is the genus *Eremophila*, or "Poverty Bushes", shrubs which form a lower layer in mulga woodland and very often grow actually beneath mulga trees. (Mulga = *Acacia aneura* and allied species). There are over 100 species of *Eremophila* in the state with more still being found, so that they are too numerous to mention individually. All colours of the spectrum are represented in *Eremophila* flowers, some self, some spotted, mostly showy. In many cases the calyx is large and gaily coloured and persists on the bush after the corolla has fallen. Leaves vary from dark green and shiny to silver-tomentose, broad to narrow. Variation is infinite, and horticultural possibilities exciting.

Another genus in the mulga is *Ptilotus* or *Trichinium*, the "Mulla-mullas", annuals or soft perennial ground plants which in the northern mulga replace everlasting as the ground cover. Here again they are far too numerous to mention with over 50 species. The flower-spikes are either mauve or greenish-white.

These occur also in the spinifex country and rival the other main elements there, the *Cassias*, small shrubs of 3-4 feet, which grow among the spinifex and have all yellow flowers. Finest is *C. venusta* with great terminal spikes of large flowers. *C. desolata* is an attractive glaucous-leaved species. The widespread *C. pleurocarpa* is showy, and there are numerous others. A very good relative is *Petalostylis* with two species, *P. labicheoides* and *P. millefolium*, spreading shrubs, the flowers having a red mark in the

centre. Other legumes include Sturt's Desert Pea, *Clianthus formosus*; the vetches, numerous *Swainsona* spp. mostly trailing herbs of salty flats, though the finest, *S. maccullochiana* is an herbaceous shrub up to 8 feet with flowers white, blue or bronze; the bird flower, *Crotalaria cunninghamii*, another giant herb, and some smaller relatives, *Kennedya prorepens*, a trailing vine with small purple flowers; *Burtonia polyzyga*, a small bush with yellow flowers; and the genus *Tephrosia*, small woody plants with pea flowers in assorted colours — *T. remotiflora* (pink), *T. uniovulata* (yellow), *T. bidwillii*, *T. coriacea* (orange), *T. flammea* (orange-red), *T. purpurea* (purple).

The Hibiscus family has some interesting representatives. *H. panduriformis* is a soft shrub 6-8 ft., flowers yellow with crimson centre, found in sandy river beds. *H. goldsworthii* has beautiful lilac flowers with purple centre but the bush is fiendishly prickly. *Gossypium robinsonii* and *Notoxylum australe* are soft shrubs 6-8 ft. with mauve flowers and purple centre: the former has an indented and the latter an entire leaf.

Outstanding herbaceous plants include *Goodenia stapfiana*, bushy, spreading, to 3 ft. tall, with striking bright blue flowers marked with deeper blue. The foliage is sticky however, which is tiresome. *Trichodesma zeylanicum* is an erect herb 5-6 ft. tall with long blue and white flowers. *Didiscus glaucifolius* is a white-flowered relation of Rottneest Daisy.

Shrubs include some Dodoneas (Hop-Bushes) and several Grevilleas, Hakeas and numerous wattles. *Grevillea juncifolia* is a small tree, orange-flowered, in spinifex sandplain in mulga country. *G. wickhamii* is a tall shrub of upright pyramidal growth, flowers scarlet. The common Pilbara Grevillea, *G. pyramidalis*, has less interesting creamy flowers, and so has the Corkwood, *Hakea lorea*, with its thick fire-resistant bark.

NOTES ON PTILOTUS (TRICHINIUM)

Dr. J. S. Beard—Director Kings Park, Perth

57 species are recorded for Western Australia in our catalogue. Of these 18 were collected on our North-West run. Most of them are undistinguished but the best are:—

Pt. exaltatus. Large vigorous annual herb up to 3 ft. with broad, glossy, dark green leaves. Flower heads mauve and white.

Pt. rotundifolius. Perennial shrub, spreading, 2 ft., leaves silvery, flowers mauve and white.

Pt. obovatus. Woody shrub, 2½ ft., leaves glaucous, flowers mauve and white.

Pt. macrocephalus. Perennial herb, 2½ ft., flowers white in massive heads.

Pt. calostachyus. Perennial with a persistent woody rootstock and tall, delicate, grass-like stems up to 3 ft., bearing delicate heads of mauve and white flowers.

Pt. clementii. Annual herb, 3 ft., flowers greenish-white.

Pt. auriculifolius. Annual, 12-18", flowers white.

Pt. carinatus. Herb with persistent rootstock, 18", flowers mauve and white.

We are not well informed on the perennation of these plants and it may be that *P. exaltatus* is a true annual, the others resprouting each year from a persistent rootstock.

SOME QUEENSLAND EREMOPHILAS

By LEN MILLER

Because little is known of our *Eremophilas*, I think a small article is necessary to bring to the notice of interested persons, both within the State and outside, the beauty which is contained in this specie.

I know many people who have successfully grown a number of species and under cultivation they have done really well. They do not like moist, humid conditions but thrive in the western areas of the State.

Possibly the greatest handicap regarding the growing of some of them is the inability to germinate the seed. (Maybe someone has the answer now.) Again, with one particular specie, *Eremophila maculata*, it has been argued that it is poisonous to stock but I do not think this is so. I have seen them in paddocks where sheep are grazing and, if feed is good, they are untouched. At certain times of the year it may be so, but again, I have seen them eaten right back and no ill effects.

E. maculata is an ideal garden shrub, being very suitable for ground cover and useful as a low hedge. It has a spread of up to six feet and a height of approximately three feet. There is a wide variation of colour in the flowers, which are tubular, pinks, light and dark reds and some almost purple, the throats are spotted with darker colours.

One variety which has been on the market a number of years and one which I feel partly belongs to me is the one known as *E. maculata forma aurea*. This is a bright yellow variety with a clear throat. All the *maculatas* readily strike from cuttings.

Probably the most showy of all is *E. latrobei*. This, too, is a dry area shrub, of about five feet, very slender, and the flowers of this are fairly large and resemble the bloom of the foxglove. Colours here are cerise and red. Best grown on gravel country. Its native habitat is in the Charleville area. Can also be grown from cuttings.

One which has, over the years, been hard to establish is *E. bowmani*. There are two forms of this, one with small, round fleshy, greyish leaves, and one with narrow, grey foliage. Both are very attractive indeed and prefer gravelly country. The round-leaved variety is a small "flattish" shrub whilst and narrow-leaved one tends to stand erect. Both have flowers of blue or light purple and bloom profusely in a good season.

As a matter of fact they bloom quite frequently, many times a year, when rain falls. They can be found in the Quilpie area.

Also in the Charleville area grows *E. gilesi*. This is another blue flowered shrub and is similar in habit of growth to the round-leaved *E. bowmani*. Its leaves are narrow and grey-green, a light, open shrub growing to about two feet.

A white, large flowered variety is *E. polyclada*. This is a most unusual shrub in that the leaves are narrow, short, shiny and very sparse. Most of the bush is made up of fleshy growth and soft spines. Have seen this growing in its natural habitat and the bush can be anything up to 10 feet high and six to eight feet across at ground level.

Can also be grown from cuttings or layers.

Propagation of *Eremophila Maculata*

By M. McALLISTER

Mature seed from South Australia proved very fertile. The hard, wooden, berry like fruits could have been lying under parent bushes for five or ten years and many showed effects of erosion. In September these were roughly covered with sand and kept damp in the open. Seedlings appeared after six weeks, and being large and succulent, were potted up immediately.

Most young plants were quite detached from the berries but by breaking the soil carefully apart I was able to see some with up to three shoots emerging from each. These usually fell away easily with the soil or if left undisturbed soon detached themselves and grew alongside the berries. Seedlings grew on very strongly and were ready for planting out in February. When six months old plants in the garden were one foot tall.

In a cold frame cuttings of *Eremophila maculata aurea* rooted well in creek sand after ten weeks. These also grew on strongly in the garden.

Propagating Native Plants from Cuttings in the Home Garden

by G. H. Mattingley, Blackburn Tree Preservation Society, Victoria

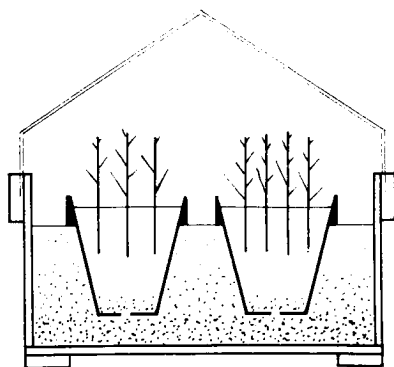
Native plants do not all deserve their reputation of being difficult to propagate from cuttings. With the aid of polythene film and a hormone treatment to stimulate rooting, the commoner species grown in gardens respond readily — provided a few simple rules are observed. The keen gardener will derive a great deal of satisfaction from raising his own plants in this way.

Timing is an important factor. For years, it has been accepted that, for best results, cuttings should be taken after a flush of growth, i.e. when the wood is partly matured, and February has been regarded as the best time. Cuttings taken then are fairly sure to strike, but they are slow and plants are not ready for planting out in the garden till Spring. Further, some, like Grevilleas, develop a large callus at the base of the cutting that appears to inhibit root formation.

Propagators discovered that species such as these gave satisfactory results if softer cuttings taken in November or December were used. Experience

has shown that this approach can be applied successfully to a number of other native plants. In fact, cuttings taken at this time strike more rapidly, if a little less surely, and are ready to plant out the following Autumn. The home gardener can afford to sacrifice a high percentage of strikes in favour of quicker results.

Materials. Clean, four-inch earthenware pots are satisfactory and have the advantage that they provide an easy means of separating different kinds of cuttings. Each pot will hold an



average of 8 to 12 cuttings but this depends on their habit e.g. 16 or more *Leschenaultias* can be packed in as against only 6 stiff-leaved *Grevilleas*.

A suitable medium is made of 3 parts clean, sharp, coarse sand and 1 part well broken-up peatmoss. It is an advantage to top the pot with about ¼ inch of sand to prevent the peatmoss floating off when watering.

A box 12" by 18" by 6" deep will easily hold six 4 inch pots, which should be plunged up to their rims in coarse sand to maintain more even temperature and moisture conditions. A wire support can be made, giving ample headroom for the cuttings, over which polythene film is spread and tied around the box.

Preparation and treatment of cuttings. It is advisable to take cuttings early in the day when the stock plant is turgid, and no time should be lost before they are set out in the frame. I find that the best cuttings are 3-4 inch side shoots of new season's growth. They may be taken with a heel, but as this is not considered necessary, trim them square across with a sharp blade just below a node. Trim off any leaves on the lower part of the cutting. With harder material, a couple of lengthwise cuts through the bark may be made at the base of the cutting.

Dip the base of the cuttings, say ¼ inch, in a solution of indole butyric acid*, a reliable cutting stimulant, for 5 seconds, shake off the surplus and allow to dry. Wet the medium and with a piece of dowel or pencil, make holes about 1½ inches deep, insert the cuttings and gently tamp the sand around each one. Finally, water the pot to settle them in and tie on the polythene cover.

The frame should be placed out of the wind and in a position where it receives broken shade. Water the cuttings each day with a fine spray, in the late afternoon for preference.

When the cuttings have rooted (3-6 weeks), provide a little ventilation to reduce the humidity and prepare the cuttings for the shock of transplanting. They are ready when the roots are 1-2 inches long.

Potting. To remove rooted cuttings from the pot, submerge the whole in a bucket of water and when thoroughly wet, gently slide out the contents. Some cuttings float to the surface, others may be found by gentle probing with the fingers. They are more easily seen in a black plastic bucket.

A suitable potting mixture is 3 parts free sandy loam, 1 part coarse sand and 1 part organic matter. This should be well mixed and dampened before use. Immediately after planting in the container (plastic pot or tin), water the young plants gently but thoroughly.

Hardening-off is a critical stage in the life of the young plant and must be taken slowly. A larger frame is required in a semi-shaded position. Cover newly potted plants with hessian for a few days. The covering is gradually removed, but it will be about 3 or 4 weeks before the young plants can be put out in the open to grow on.

Species that have been propagated successfully in the manner described include:-

Grevillea alpina, *juniperina*, *lavandulacea*, *oleoides*, *brevicuspis*, and several garden hybrids; *Leptospermum rotundifolium*; *Calythix tetragona*, *alpestris*; *Baeckia crenatifolia*, *gunni*; *Leschenaultia biloba*, *formosa*; *Mela-leuca Wilsoni*, *micromera*, *pulchella*; *Thryptomene paynei*.

Plants of the latter, six inches high and in flower, were planted out in the garden four months after cuttings were taken at the end of December.

* I.B.A. is obtainable at a strength of 4 grams in 1,000 c.c's of a 50% alcohol mixture. This is broken down with equal parts of water as it is too strong for most native species.

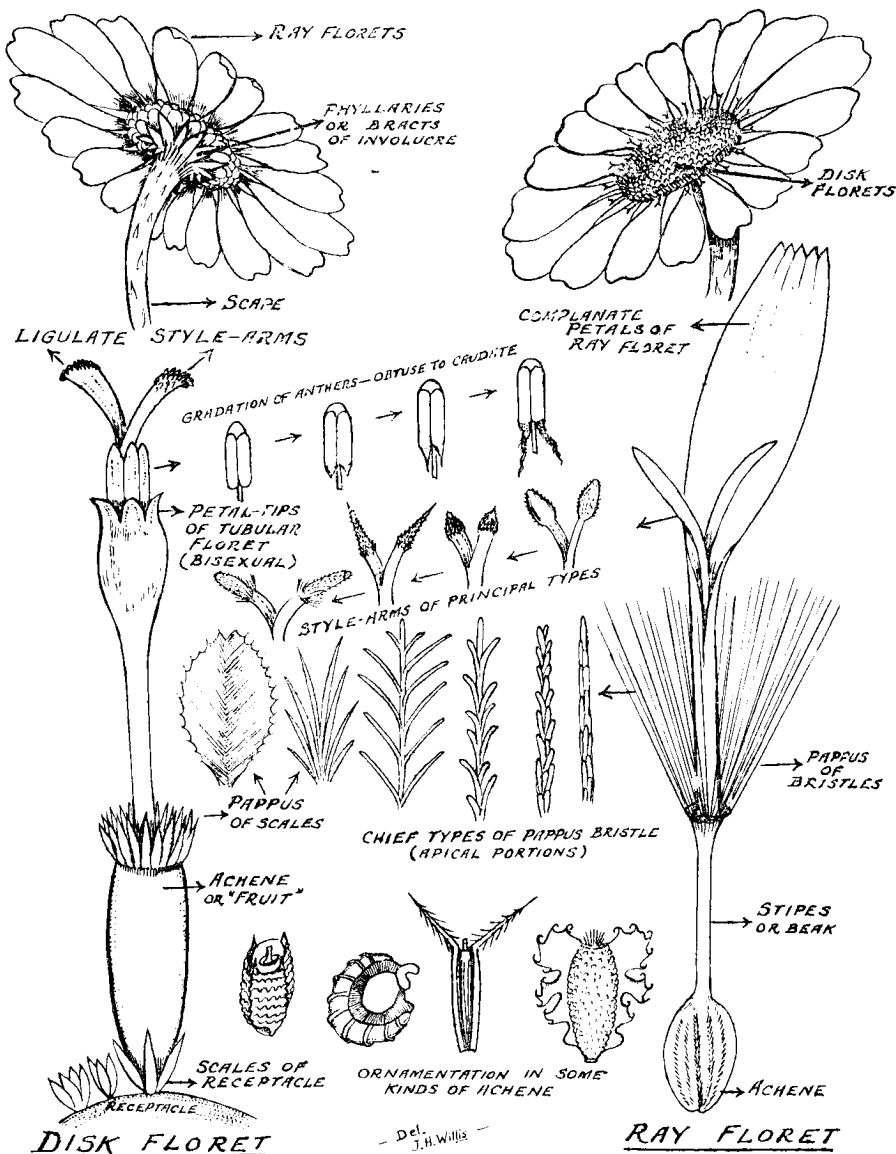
THE COMPOSITAE OR DAISY FAMILY

By J. H. Willis

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GENERAL CHARACTERISTICS

No great natural group of plants is more familiar or easier to recognize anywhere than the Daisy Family, including as it does such tamed and useful garden subjects as lettuce, artichoke, dahlia, chrysanthemum, marguerite, sunflower, zinnia and cornflower, also many troublesome weeds like dandelion, fatweed, stinkwort, fleabane, cape-weed, skeleton-weed and the innumerable



prickly thistles. The so-called "flowers" of these are actually heads containing numerous very small, one-seeded, stalkless flowers or **florets**, closely packed together for maximum fertility and often showing a remarkable division of labour — some are bisexual, others in the same head male or female, while those at the periphery may be neuter. The central florets are often regularly tubular, contrasting with an outer ring of much enlarged, very flattened florets that appear like the radiating petals of a single flower. Because of the "composite" nature of their individual flower-like heads, daisies are placed in the botanical family **Compositae**, sometimes also called **Asteraceae** after one of the larger boreal genera, **Aster**; but heads of small flowers can occur in members of many other families, notably the protea, mimosa, rue, spurge, daphne, myrtle, celery and pincushion groups.

Flower-heads (**capitula**) of **Compositae** are almost always surrounded by a protective cluster of modified leaves or bracts, sometimes green and sappy (or even fleshy), sometimes dry, papery and brightly coloured — as in the genera **Helichrysum**, **Helipterum**, **Schoenia**, **Ixodia**, **Waitzia** etc. which embrace the "everlastings" and "immortelles." The various florets are attached on a cushion-like circular swelling (or **receptacle**) at the apex of each flowering stem. When examined after the ripe fruits have all fallen, this receptacle is seen to have either a smooth naked surface or one that is uniformly sculptured into shallow pits or deep honeycomb-like cells; sometimes it is also beset with chaffy scales.

The typical bisexual flower in **Compositae** has 5 petals united into a cylindrical, bell-shaped or funnel-shaped tube surmounting the ovary. Sepals are absent, but their place is usually taken by a series of scales, awns, bristles or long silky hairs which constitute the **pappus** and aid in seed-dispersal by the wind. The 5 anthers, each on an individual filament, are fused at their vertical edges to form a short tube through which the forked style-tip protrudes when fully mature. The base of each anther-cell may be prolonged into a slender tail or brush-like appendage. Pollen is shed inwards from the ripe anthers and carried up on the elongating style whence it is distributed by insects to receptive stigmas on the styles of other heads. Thus, the number of seeds produced by a very large head, like sunflower, is truly prodigious.

Endless variety obtains in the sculpture and ornamentation of "seeds" (actually the 1-seeded fruits, called **achenes**) which may be intriguingly beautiful microscopic objects. In general, they are extremely light, having often an apical parachute of plummy hairs or a crown of winged scales (the **pappus**) and thus being admirably fitted for wide and rapid dispersal by air currents. So it is that mountains, deserts and even stretches of ocean are no barriers to migration by many members of the daisy clan, which now occupy every habitable situation in the world. Strangely enough, in Australia they seem to reach their greatest diversity and abundance in two completely contrasting regions — the Mallee and the Alps — but there are species peculiar to grassland, heath, sea-cliffs, dunes and fern-gullies.

With their amazing fecundity and adaptability, the **Compositae** are certainly the world's most successful plant colonists. They stand as a highly advanced, climax group in the vegetable kingdom. In number of species they also comprise the largest family of flowering plants. Anything approaching a precise estimate of species is impossible, for authorities differ in their concepts of speciation; many apomicts or "microspecies" are involved in such genera as **Hieracium** and **Taraxacum**, and undescribed members of the family are still coming to light each year. Dr. James Small, a leading informant on **Compositae**, estimated that by 1910 there were 22,749 accepted species in the **Index Kewensis** and its **Supplements**, without admitting the 6,000 microspecies of **Hieracium**. By now the total would probably lie somewhere between 25,000 and 30,000. In Australia **Compositae**, with about 800 indigenous species, is exceeded only by the **Leguminosae** and **Myrtaceae**.

Dr. Small, in his **Origin and Development of the Compositae** (1919), also expressed a firm conviction that the groundsel genus, **Senecio**, represents the basic stock from which the whole family evolved during Tertiary times. **Senecio** itself is presumed to have sprung from a lobelia-like ancestor somewhere in the Andean region of South America at the beginning of the Tertiary era — some 60 million years ago. Other authorities are inclined to regard **Heliantheae** (dahlia, sunflower, rudbeckia, etc.) as the most primitive section of the daisy

AN EVERLASTING OR PAPER DAISY. IN OTHER SPECIES A WIDE RANGE OF COLOURS IS POSSIBLE WITH FLOWERS UP TO 2.3 ins. ACROSS.



Colour Photography by Frank Hurley

Block by courtesy of John Sands Pty. Ltd.

HELIPTERUM SAXATILE ("Rock Sunray")

A lovely scented plant of inland ranges including the Broken Hill area.

family. A tremendous impetus was given to the diversification and spread of Compositae during the great mountain uplifts of the Pliocene period.

CLASSIFICATION BY TRIBES

Classification of this vast assemblage has proved extraordinarily difficult. It is customary to arrange the genera in 13 different tribes, of which the most clear-cut is Cichorieae, containing lettuce, chickory, salsify, dandelion,

sow-thistle, cat's-ear, hawkweed etc.; these are at once recognizable by their milky latex and the absence of tubular florets in their flower-heads, all florets being flattened and strap-like (i.e. *ligulate*). For the remaining 12 tribes no such single features will serve to hallmark them, and the distinctiveness of each tribe is a combination of many characters drawn from the involucre bracts, receptacle, pappus, anther-bases, style-arms (of various shapes) and achenes.

INDIGENOUS GENERA (105) OF COMPOSITAE ARRANGED UNDER THEIR 12 TRIBES

(The number of species native to Australia is given within the brackets after each genus, and monotypic genera are prefixed by the sign †). For a key to these genera see page 232.

<i>Vernonieae</i>	<i>Inuleae</i> (contd.)	<i>Heliantheae</i>
Ethulia (1)	† Neotysonia (1)	Chrysogonum (3)
Centratherum (1)	† Gilruthia (1)	Zinnia (1)
† Pleurocarpaea (1)	Cassinia (18)	Sigesbeckia (1)
Vernonia (2)	Helipterum (±65)	Enhydra (1)
Elephantopus (1)	Ixiolaena (6)	Eclipta (3)
<i>Eupatorieae</i>	Helichrysum (±85)	Blainvillea (1)
Adenostemma (1)	† Argyroglottis (1)	Wedelia (6)
<i>Astereae</i>	† Acanthocladium (1)	Spilanthes (2)
Dichrocephala (1)	† Schoenia (1)	Glossogyne (4)
† Erodiophyllum (1)	Podosperma (4)	Bidens (3)
Lagenophora (2)	Leptorhynchus (9)	† Nablionium (1)
† Solenogyne (1)	Waitzia (6)	<i>Helenieae</i>
Brachycome (62)	Millotia (4)	Flaveria (1)
Minuria (7)	† Quinetia (1)	<i>Anthemideae</i>
Calotis (23)	Rutidosis (7)	† Dimorphocoma (1)
† Achnophora (1)	† Scyphocoronis (1)	† Ceratogyne (1)
Bellida (2)	Toxanthes (2)	Cotula (9)
Erigeron (4)	Humea (6)	Centipeda (4)
Vittadinia (7)	Ixodia (2)	Abrotanella (3)
Conyza (3)	Ammobium (2)	† Isoetopsis (1)
Podocoma (3)	† Eriochlamys (1)	† Elachanthus (1)
Celmisia (3)	† Pithocarpa (4)	<i>Senecioneae</i>
Olearia (±80)	† Thiseltonia (1)	Gynura (1)
<i>Inuleae</i>	Phacellothrix (1)	Emilia (1)
Blumea (12)	Acomis (2)	Arrhenechthites (1)
Pluchea (7)	Carpesium (1)	Senecio (40)
Pterigeron (8)	Podolepis (18)	Bedfordia (2)
† Thespidium (1)	Athrixia (7)	<i>Arctotideae</i>
† Coleocoma (1)	Myriocephalus (11)	Cymbonotus (2)
Cratystylis (3)	Angianthus (28)	<i>Cynareae</i>
Epaltes (4)	Gnephosis (16)	Saussurea (1)
Sphaeranthus (3)	Calocephalus (17)	Centaurea (1)
Pterocaulon (5)	Actinobole (2)	<i>Mutisieae</i>
Ewartia (4)	† Cephalopterum (1)	Trichocline (1)
† Parantennaria (1)	Craspedia (4)	<i>Cichorieae</i>
† Pterygopappus (1)	Chthonocephalus (4)	Microseris (1)
† Gnaphalium (11)	Decaszia (1)	Picris (1)
† Stuartina (1)	† Basedowia (1)	Crepis (1)
		Sonchus (1)

The following simplified key to tribes will demonstrate some of the major criteria used as a basis for classification:

SIMPLIFIED KEY TO THE 13 TRIBES OF COMPOSITAE

- A Florets *all ligulate and bisexual*; anther-bases acute; style arms slender, almost round in section (plants with milky latex) *Cichorieae*
- AA Florets of disk tubular, *never ligulate* but sometimes 2-lipped (plants devoid of milky latex)
- B Style-arms strap-shaped, each bearing a *collar of long hairs* below the conical stigma; anther-bases acuminate or variously tailed; receptacle bristly or scaly (herbs often with prickly foliage and/or involucre; flowers usually blue or purplish) *Cynareae*
- BB Style-arms *without any collar* of long hairs
- C Anther-bases tapering into *distinct slender tails*; receptacle chiefly naked
- D Leaves *entire*; involucre bracts usually *dry and firm* (scarious), often coloured *Inuleae*
- DD Leaves lobed; involucre bracts *herbaceous*, green and often woolly *Mutisieae*
- CC Anther-bases *without tails*
- E Pappus *absent* or a crown of short fused scales; style-arms strap shaped, with truncate, brush-like tips
- F Achenes *relatively large*, much curved, winged or very hard and globose; anther-bases *acute* to acuminate; receptacle naked *Calenduleae*
- FF Achenes small, neither curved, appendaged *nor* bases *obtus*; receptacle sometimes scaly *Anthemideae*
- EE Pappus *usually conspicuous*, consisting of hairs, bristles or scales (if absent, then style-arms very short and *not truncate*)
- G Florets in head *all tubular*, predominantly *purplish* (never or very rarely yellow); leaves often opposite
- H Anther-bases *acute to acuminate*; style-arms long and awl-shaped *Vernonieae*

- HH Anther-bases *obtuse*; style-arms club-shaped *Eupatorieae*
 GG Florets of 2 kinds (some regularly tubular, some 2-lipped),
 predominantly yellow.
 I Style-arms *awl-shaped* or with conical tips (leaves often
opposite)
 J Receptacle *chaffy* with scales *Heliantheae*
 JJ Receptacle naked or honey-comb-like, *never* scaly *Heleneae*
 II Style-arms *not awl-shaped* (leaves chiefly *alternate* or *radical*)
 K Receptacle *deeply pitted* like honeycomb; pappus of *scales*
 or absent (style often thickened under the short arms) *Arctotideae*
 KK Receptacle usually *naked*; pappus chiefly of *bristles*
 L Bracts of head narrow, cohering, in *one row* (except
 for a few minute bractlets at base of head); pappus
 always of silky hairs *Senecioneae*
 LL Bracts of head in *2 or more rows*; pappus sometimes
 of awns or scales, rarely absent *Astereae*

Apart from ornamental merit, hardly any Australian members have proved of economic value to man. Common cassinia or "dogwood" (*Cassinia aculeata*) may affect certain people with dermatitis, especially forest workers. The white flower-heads of this tall shrub are carried in dense flat-topped clusters at the ends of leafy branches, and the foliage is aromatic as in the 17 other *Cassinia* species native to the Commonwealth; they are virtually indistinguishable from the allied genus *Helichrysum* except for the presence of receptacle scales between their florets.

Another highly aromatic plant is Plumed Humea (*H. elegans*) which has also caused severe skin irritation. Few species are more remarkable or less daisy-like than this gigantic biennial of humid forest valleys between Port Jackson and Orbest, Vic., with an isolated western occurrence in the Victorian Grampians. Huge, wrinkled, stem-clasping leaves suggest those of a robust tobacco plant; but, at the end of the second season, it sends up a lofty inflorescence (to 10 ft. high or more) that carries elongated graceful festoons of innumerable very small and narrow flower-heads, ranging in colour from lustrous white through pink and bronzy tints to rich crimson. The weeping plummy character of the flowering branchlets is highly decorative, and this so-called "Incense Plant" deserves a place in gardens where it is easy to grow.

Helichrysum (literally "sun gold") is our main genus of everlasting flowers, so named from the dry, papery and often gaily coloured bracts which surround each flower-cluster. There are approximately 85 species native and confined to Australia, a further 9 in New Zealand, but more than 400 others chiefly in southern Asia and Africa; none occur in Europe or America. Australian kinds may be divided at once into herbs (usually with large isolated flower-heads) or shrubs with smaller, clustered heads and shorter bracts. Shrubby forms, of the section *Ozothamnus*, abound in the south-eastern highlands of the Continent, especially Tasmania, but are poorly developed in Western Australia.

Golden Everlasting (*H. bracteatum*), with large lustrous heads of yellow, red or white, came early into cultivation. Erbritsch, a plant-breeder near Erfurt in Germany, imported good forms of this plant, hybridized them, and by 1856 produced a giant annual strain in an astonishing series of colours; his very showy everlastings have persisted for a century and are still popular as garden displays here in their ancestral homeland. Much favoured for funeral wreaths are the gleaming silvery-white heads of Satin Everlasting (*H. leucopsidium*), which also ranges widely from Mallee scrub to subalpine forest. Preferring sandy lowland heaths, the Fringed Everlasting (*H. baxteri*) is an elegant herb; its narrow white floral bracts have softly fringed margins. In western Victoria and parts of South Australia cattle occasionally suffer impaction through browsing on the white-woolly foliage of *H. blandowskianum* (Woolly Everlasting), a persistent herb of marginal pastures and one bearing multiple snowy-white or rose-tinted heads. *H. acuminatum* is on the front cover.

Very close to *Helichrysum* is the genus *Helipterum* (sun-rays), differing solely in the feather-like, plummy bristles which crown each achene. About 65 kinds inhabit Australia, while 20 others are concentrated in South Africa. They are chiefly small annuals, adapted to the rolling inland plains where vast areas turn to yellow, pink or white by the myriads of these little immortelles in a good spring season. The rosy *Helipterum manglesii* (round-leaved and wiry-stemmed) and *H. roseum*, so conspicuous over much of Western Australia,

are sometimes cultivated, while *H. albicans* (Hoary Sunray) is a showy and highly variable perennial in the East — a golden-headed form abounds in rocky places on the Australian Alps. This and the preceding three genera belong to the great tribe **Inuleae**.

The daisy-bushes (**Olearia** species) number more than 80 kinds in Australia, with about half as many others indigenous to New Zealand. They are the shrubby "asters" in this section of the Globe, rivalling the true Asters of America and related Felicias of South Africa in the variety and beauty of their inflorescences. Some are to be found on almost every type of soil and at all altitudes throughout the temperate regions of the Commonwealth. Most have white-rayed heads, but there are several handsome azure or purple-flowered species in the Mallee. Foliage varies from narrow and heath-like, or quite minute, to large broad and silvered beneath as in Musk Daisy-bush (*O. argophylla*) — a fragrant tree of moist mountain gullies. Dusty Daisy-bush (*O. phlogopappa*, often called *O. gunniana*) is both variable and amenable to garden culture; billows of white blossom cover this slender upland shrub about Christmas-time, and there is a much less frequent blue form. Rice-flower Daisy-bush (*O. pimeleoides*), with broad white rays and golden centres, forms a trim rounded bush on Mallee sand hills; silvery-grey of leaf, it is a magnificent spectacle when smothered in bloom during early spring.

The little English Daisy (**Bellis**) has its counterpart in our herbaceous genus, **Brachycome**, of which the 64 known species are restricted to Australasia — New Zealand claims only three of them. The group shows an extraordinary diversity of fruiting achenes, often winged or appendaged and objects of surprising beauty when viewed under a microscope. Characteristics of the achenes are vitally important in discriminating species within this puzzling group. We have representatives in practically every situation, whether hot or cold, wet or dry; but only one kind seems to be on the seedsman's list of garden flowers, viz the dainty purplish or white Swan River Daisy (*B. ibericifolia*) which is a prolific annual ranging widely from near Busselton up into the West Australian tropics and across to inland parts of South Australia. Cut-leaf Daisy (*B. multifida*) prefers stony or cliffy terrain, and can be propagated vegetatively; its colour forms are becoming popular subjects in Australian rock gardens.

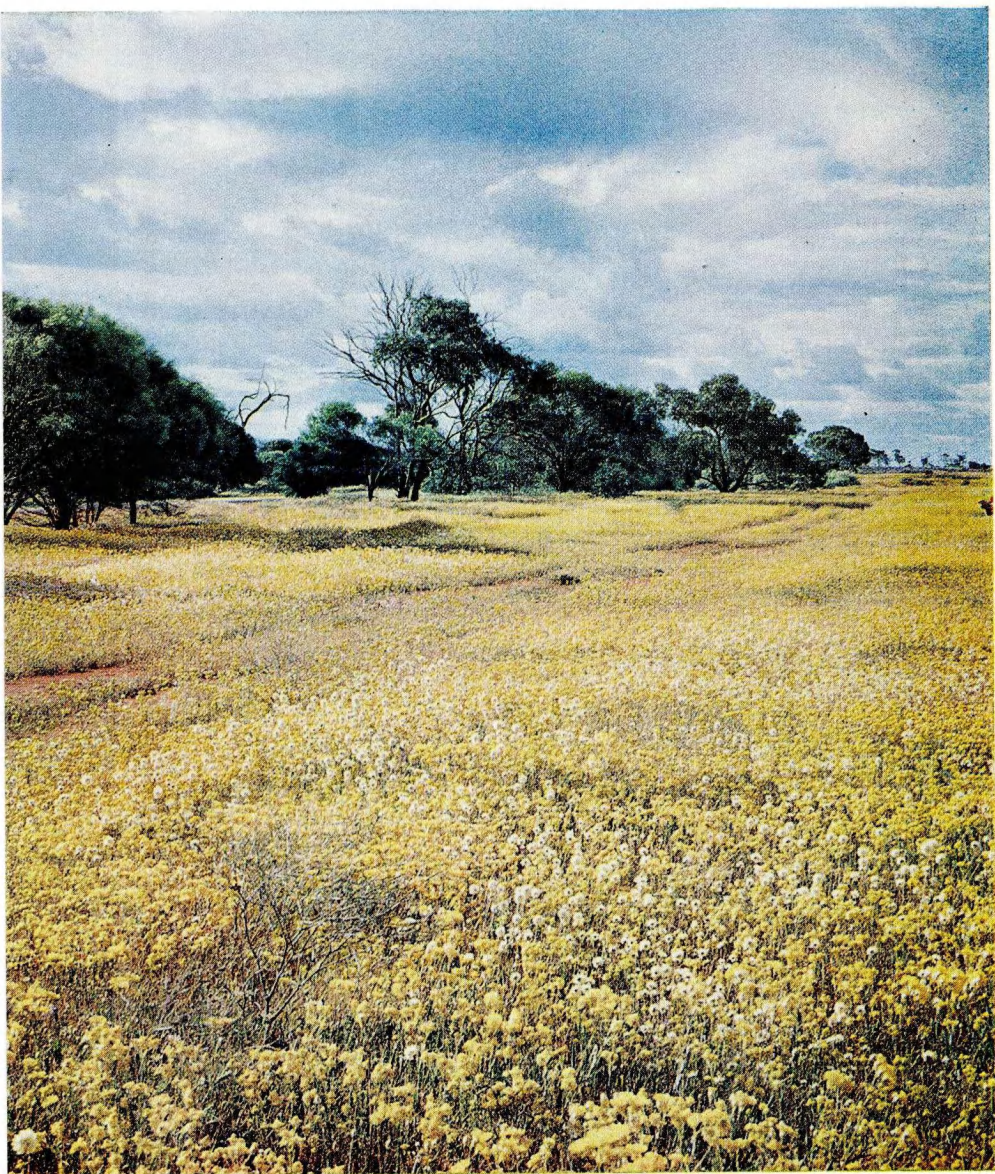
The related genus **Calotis** (Bur Daisies) is smaller, its pappus consisting of short spiny awns. For this reason several abundant species are a menace to sheep and their wool.

New Zealand's largest group of daisies is the genus **Celmisia**, 60 species of which add much to the beauty of her mountain scenery. Many are striking plants, with foot-high rosettes of stiff silvery leaves and flowering capitula as large as in a garden marguerite or shasta daisy. Only three species, all endemic, occur in Australia, viz: *Celmisia longifolia* (Silver Daisy) which extends from the Blue Mountains through the Australian Alps and higher Victorian ranges to Tasmania, *C. sericophylla* (Silky Daisy) which is endemic along water courses on the Bogong High Plains, Vic., and *C. saxifraga* of Tasmanian high plateaux. Thousands of these big white, mauve-backed flowers, all gleaming in the sun, is among the grandest spectacles confronting a mid-summer visitor to our alpine meadows. This and the three preceding genera are members of the tribe **Astereae**.

Cushion plants are quite a conspicuous feature on the loftier Tasmanian mountains, their life-form being a low dense mound of small and firmly congested shoots. Three genera of **Compositae** are involved (**Ewartia**, **Pterygopappus** and **Abrotanella**), but the "cushions" or "bolsters" themselves may often be composite structures, exhibiting several distinct families of plants — viz. daisy, heath (**Dracophyllum**), trigger-plant (**Phyllachne**) and donatia (**Donatia**) — all intimately mingled with **Ewartia meredithae** for mutual support and protection on the windswept alpine moors. The only mainland species of **Ewartia** (*E. rubigena*) forms extensive silvery-grey carpets above tree line on the higher Australian mountains; white papery flower-heads up to ½ in. wide nestle close into the mats of this little alpine which is sometimes called "Australian Edelweiss."

Coast Cushion-bush (**Calocephalus brownii**), although very much lighter and looser in context, bears a close resemblance to those extraordinary "Vegetable Sheep" (**Raoulia** species) of New Zealand hills; its whitish rounded masses, 1-3 ft. high, are to be seen on many sea cliffs, notably along Bass Strait,

A FIELD OF EVERLASTING DAISIES



Colour Photography by Frank Hurley

Block by courtesy of John Sands Pty. Ltd.

Quote from article page 211—Paper daisies (everlastings) "cover tremendous areas . . . The different species merge into one another so that acres upon acres of pinks, changing to white or yellow can be seen. The impression as of a vast, colourful carpet, covering the countryside." They are just as easy to grow in your garden.

Chthonocephalus, meaning "earth-head" is a small genus of diminutive annuals which appear as grey-green rosettes flat against the sand in dry inland and Mallee tracts; the related genus **Craspedia** embraces various herbs called "buttons", of which Drumstick Buttons (*C. globosa*) is the tallest — small yellow flower-heads are massed together in a perfectly spherical head.

of-heads about the size of a ping-pong ball, borne high above the silvery grass-like leaves on rigid stems from 1 to 3 ft. long.

CICHORIEAE

Microseris, represented by a single species (*M. lanceolata*) in Australia, is Yam Daisy which flourishes throughout our temperate zone and extends to New Zealand. Its nourishing tuberous roots formerly ranked high as a staple on the menu of aboriginal tribes — piccaninnies were taught how to dig up yams with a stick soon after they learned to walk. At flowering time several slender, naked, often bluish stalks spring from the loose basal rosette of narrow and hairless leaves. The yellow, funnel-shaped heads, at first nodding, bear only ligulate florets and are rather similar to those of the introduced dandelion. In fruit, however, there is considerable difference; instead of a delicate globe of pappus bristles like feathery parachutes, **Microseris** produces only a bundle of rod-shaped achenes each crowned with a ring of 10-12 thin white scales. Other indigenous genera are **Sonchus**, **Picris** and **Crepis**, with single native species but richly developed in the northern hemisphere; Australia is very deficient in **Cichorieae**.

CYNAREAE

Centaurea australis (Austral Cornflower) and **Saussurea affinis** are the only Australian members of their prickly tribe which includes heraldic thistles and many obnoxious weeds. The former endemic plant once extended from the Darling Downs in Queensland to eastern Victoria, but it is now presumed extinct in the latter State and is losing ground everywhere. It will be unfortunate if this noble purple-flowered herb of grasslands vanishes completely. The large, solitary, almost globular heads (to 2 ins. in diameter) are surrounded by numerous rigid bracts, the broadened tips of which become chaffy and soon torn; feathery bristles of the pappus are in several rows. The erect stems, 2-3 ft. high, bear alternate, cottony, deeply lobed leaves. **Saussurea**, which extends from northern New South Wales to India, China and Japan, resembles our rare Austral Cornflower, differing in its much smaller heads with only a single row of pappus bristles to each floret.

MUTISIEAE

Trichocline scapigera, widespread and endemic in south-west Australia, is among the largest-headed and most impressive daisies in the Commonwealth. Some 40 species of **Trichocline** inhabit South America, but **T. scapigera** is the only one located elsewhere and also the solitary member of its showy tribe in the Australian region — an astonishing example of disjunct distribution. Affinities with **Gerbera** species in South Africa are so close that the West Australian plant might well be regarded as our gerbera counterpart this side of the Indian Ocean. Its long-stalked, white-rayed heads, to 2 ins. in diameter, recall Silver Daisy of south-eastern mountains; and, indeed, the earliest collection was first published as a species of **Celmisia**! Leaves of this renascent perennial are all radical up to 9 ins. long, varying from almost entire to deeply and lyrate lobed, invested at the base with long silky hairs but cottony-white on the undersides of the blades. Narrowly pointed bracts of the funnel-shaped involucre are usually white-woolly, the disk florets are deeply cleft into linear coiling lobes and achenes silky-hairy. **Trichocline** certainly deserves to be more widely known, and it should have cultural possibilities.

ANTHEMIDEAE

Cotula is the principal genus of the few representing this tribe in Australia; chrysanthemums, tansy, wormwood, yarrow, chamomile and lavender-cotton — all aromatic plants — are familiar garden flowers. Of about 100 kinds dispersed throughout the world, only 9 **Cotula** species occur naturally in Australia; they are small, often trailing herbs with dissected leaves and stalked, button-like, yellow or greenish, rayless heads up to ½ in. wide. The commonest is **C. australis**, a flaccid, ferny-leaved annual that has become a weed in lawns and gardens. **C. coronopifolia** (Water-buttons) ranges widely in temperate swampland, extending to South Africa and South America; it is an almost succulent perennial, rooting in mud and one of the very few water plants among **Compositae**. Subalpine woodlands are sometimes carpeted by the hairy creeping **C. filicula**. Differing from **Cotula** in the virtually stalkless heads and four-angled (not flat) achenes, **Centipeda** is conspicuous on inundated flats; the three Australian species are known as sneeze-weeds, from a pungently aromatic and irritant principle carried in all green parts of these herbs.

VERONIEAE

Vernonia, with usually purple florets, is a large tropical genus represented in Australia by only two species, both having terminal panicles of rather small heads. The pappus bristles are fine and copious. **V. cinerea** is a nondescript, fleabane-like annual to 2 ft. high, inhabiting near-coastal parts of the tropics from the Kimberleys to Cape York, whence it comes southward as far as Twofold Bay in New South Wales. **V. scandens** climbs extensively and also has broader, quite entire leaves; it is much more restricted in Australia (e.g. at Rockingham Bay), but occurs also in India.

EUPATORIEAE

Adenostemma viscosum is a frequent annual or biennial weed in warmer parts of the Old World. It was collected at the Endeavour River, North Queensland, by Banks and Solander in 1770, so would appear to be truly indigenous in the Australian tropics. Occurrences in New South Wales and farther south, however, are more likely to be introductions. Weak-stemmed, with opposite nettle-like leaves, **Adenostemma** has terminal panicles of small, hemispherical, yellow-flowered heads, and it rarely exceeds a height of 2 ft. No other member of this tribe is native here, but several species of **Eupatorium** have become vigorous weeds.

HELIANTHEAE

Sigesbeckia orientalis (Indian Weed) occurs throughout the eastern States of Australia, usually in shady places (forests and gorges), extending into most warm countries of the world. It is a lanky, branching annual 1-3 ft. high, with irregularly toothed opposite leaves and small numerous flower-heads on slender stalks. Bracts of the outer row spread widely, like wheel-spokes; the more erect inner series individually embrace a female floret, and are covered with sticky glandular hairs on their curved exterior face, so that they readily adhere to clothing or the coats of passing animals. The achenes are black, sausage-shaped and somewhat angular.

A complete contrast in the tribe is provided by **Nablonium calyceroides**, peculiar to the western coast of Tasmania and a few Bass Strait islands. This creeping perennial, with narrow leaves in radical tufts, has solitary stalked heads only 1-2 ins. high but from $\frac{1}{2}$ to $\frac{3}{4}$ in. wide; the curious achenes bear two sharp, rigid and wide-spreading awns. Sunflowers and dahlias also belong to this group.

HELENIEAE

Flaveria australasica is the sole member of its tribe growing naturally in the Australian region. It thrives on heavy soils of dried-out creeks and water holes in the interior (all mainland States except Victoria), as an erect hairless annual 1-2 ft. high. The widely divergent branches fork regularly, and at each upper forking sits a stalkless lemon-yellow head embraced by a tuft of longish, narrow, leafy bracts. A ring of very short ray florets girdles each squat head, the long black achenes being finely ribbed.

ARCTOTIDEAE

Cymbonotus also is the sole native representative of its predominantly African tribe, being our analogue of the introduced Capeweed (**Arctotheca calendula**). There appear to be two species, distinguished only on fruiting characters; **C. lawsonianus** is confined to the east (southern Queensland to eastern Victoria), while **C. preissianus** ranges more widely from Tasmania and Victoria to southern parts of Western Australia — usually on damp but well-drained soils and often in shaded grassy places. Both are perennial herbs with rosettes of coarsely toothed leaves (2-4 ins. long), green and roughened above but cottony-white on the underside. Wholly yellow flower-heads (about $\frac{1}{2}$ in. wide) are carried on stalks much shorter than the leaves, and the oblong ribbed achenes have no pappus.

SENECIONEAE

Senecio, the groundsel genus, is the largest group among daisies, and perhaps in the whole vegetable kingdom. Opinions vary on the status of many that have been described as distinct species, but there must be more than 2000 "good" and undisputed species in this great assemblage. The name (from Latin **senex**, an old man) refers to the copious beard-like floss — actually pappus hair — that extrudes from myriads of heads at seed-time. Habits vary from small herbs, to rank climbers, shrubs and even trees, while ray florets may be

large and conspicuous or absent from the heads. Yellow is the prevailing colour; but the vivid blues and purples of garden cineraria have been derived from *Senecio cruentus*, a native of the Canary Islands. *S. elegans*, a South African weed on some of our southern coastal dunes, is also purple-headed.

No more than a small percentage of the world total can be found in the south-west Pacific, Australia and New Zealand having each about 40 native species. Some of these are unattractive weedy plants that grow rampantly wherever a recent bushfire has occurred; they serve a useful purpose as quick soil coverage where exposed mountain slopes may be prone to erosion, and are often called "fireweeds."

By far the most widespread Australian member is *S. laetus*, its vernacular name of Variable Groundsel reminding one of the great variability in foliage — leaves can be succulent and undivided or thinly membranous and very deeply dissected. The medium-sized flower-heads have conspicuous yellow rays, and forms of this branching groundsel occur in every State, from sea level to the alps and far into the dry interior. The most handsome, also largest-headed of our species, are all inland herbs of rather arid places, viz. *S. gregorii*, *S. magnificus*, *S. macranthus* and *S. megaglossus*; the last has exceptionally big heads, with ray florets to 1 in. long, and is endemic in the Flinders Range, S. Aust. A few alien kinds are now troublesome as crop or pasture weeds, notably *S. jacobaea* (Ragwort).

Bedfordia (Blanket-leaf) is a small south-eastern genus of tall gully shrubs or trees, differing from *Senecio* only in the axillary panicles of flower-heads (much shorter than the foliage) and in having obtuse, but not truncate, style-arms; the relatively large leaves are bald above but blanketed underneath by a thick mat of white-woolly hairs.

KEY TO INDIGENOUS GENERA OF AUSTRALIAN COMPOSITAE

(Note—The key characters are arranged artificially, and may not express the natural affinities of genera within each tribe. The four tribes having only one genus in Australia are excluded).

Tribe VERNONIEAE

1. Flower-heads small (of 1 or few florets), crowded into dense compound heads, the whole surrounded by a very few broad leafy bracts; florets 4-lobed, deeply cleft along one side; pappus of several stiff bristles (small perennial—tropical Q.): **Elephantopus**
- Flower-heads distinct, simple; florets 5-lobed, equally cleft 2
2. Pappus none; achenes 4- to 5-angled, truncate at apex (branching herb—tropical Q.): **Ethulia**
- Pappus of bristles; achenes 8- to 10-ribbed (florets purplish) 3
3. Pappus persistent, of numerous long capillary bristles (flower-heads in terminal cymes or panicles; anthers obtuse at base): **Vernonia**
- Pappus very deciduous, of few short bristles: 4
4. Involucre hemispherical, the outer bracts long and leaf-like; anthers obtuse at base; pappus of several flattened, scale-like bristles: **Centratherum**
- Involucre ovoid, with few herbaceous bracts; anthers pointed at base; pappus of 2-5 short bristles (tropical northern coasts): **Pleurocarpaea**

Tribe ASTEREAE

1. Pappus well-developed, almost or quite as long as achene 5
- Pappus reduced, much shorter than achene, sometimes absent 2
2. Bracts in 1 row; receptacle with rigid scales between female florets; pappus a minute rim (S.A.): **Erodiophyllum**
- Bracts in 2-4 rows; receptacle naked; pappus short or lacking 3
3. Disk florets yellow, mainly fertile; ray florets ligulate; achenes not contracted or beaked at summit: **Brachycome**
- As for the last, but florets all tubular and those of disk purple (tall herb with small heads in terminal panicles — northern Q.): **Dichrocephala**
- Disk florets barren; achenes beaked or contracted at summit; pappus none 4
4. Outer florets ligulate, exceeding the involucre; achenes beaked: **Lagenophora**
- Outer florets neither ligulate nor exceeding the involucre;

- achenes not beaked (scape often stout and shorter than leaves): **Solenogyne**
5. Pappus consisting entirely of bristles; disk florets fertile 8
 Pappus of 2 cup-like scales, each bearing a row of stiff bristles; florets all similar, bisexual and fertile; achenes distinctly stalked (leaves radical, narrow-linear — W.A.): **Bellida**
 Pappus of some or all flowers consisting of scales or rigid awns; disk florets barren 6
6. Receptacle bearing chaffy scales; disk florets without a pappus (small, glabrous, coastal perennial with radical leaves—S.A.): **Achnophora**
 Receptacle naked; all florets bearing a pappus 7
7. Ray florets in 1 row; pappus consisting of barbed awn-like bristles or spines (very rarely reduced to a single short awn): **Calotis**
 Ray florets in 2 or more rows, their pappus of capillary bristles: **Minuria**
8. Achenes contracted into narrow beaks (inland herbs with solitary heads on long naked stalks): **Podocoma**
 Achenes not beaked 9
9. Shrubs or semi-shrubs; ray florets in 1 row; achenes terete: **Olearia**
 Alpine perennials, with linear, radical, silvery leaves and large, white, solitary heads on tall scapes; ray florets in 1 row; achenes terete: **Celmisia**
 Herbs; ray florets in 2 or more rows; achenes $\pm$ flattened (if alpine perennials, then leaves neither linear nor silvery): 10
10. Female ray florets filiform and very numerous: **Conyza**
 Female ray florets ligulate (but ligules occasionally minute) 11
11. Leaves disposed along branches of perennial herbs or under-shrubs; tips of style-arms awl-shaped: **Vittadinia**
 Leaves mostly radical or rosetted; tips of style-arms lanceolate: **Erigeron**
- Tribe INULEAE**
1. Pappus present (of bristles or distinct scales) 19
 Pappus absent (or reduced to a small crown-like cup) 2
2. Heads without individual stalks, densely crowded into globular or ovoid, compound heads 13
 Heads distinct, but sometimes in dense corymbs and only shortly stalked 3
3. Receptacle with scales between the florets 11
 Receptacle naked (no scales subtending the florets) 4
4. Heads on long slender stalks, manifestly radiate, the inner bracts with white petaloid blades (annual herb with filiform leaves — W.A.): **Thiseltonia**
 Heads not or scarcely radiate, the bracts not petaloid 5
5. Dwarf annuals to 2 ins. high; bracts few, herbaceous (florets 3-12 per head, all bisexual, at length conspicuously recurved) 10
 Taller annuals or perennials; bracts $\pm$ scarious 6
6. Achenes beaked; heads with large leafy bracts at base, inner bracts dry and obtuse (Q.): **Carpesium**
 Achenes beakless; heads without any leaf-like bracts 7
7. Outer florets female and numerous (small, often annual herbs, the bracts never petaloid): **Epaltes**
 All the florets bisexual 8
8. Heads broadly hemispherical, isolated on long stalks; bracts not coloured (slender herbs to 2 ft. — N.S.W. & Q.): **Acomis**
 Heads narrow or top-shaped; bracts $\pm$ petaloid (white, yellow, red or purplish) 9
9. Bracts few; heads numerous in panicles or corymbs; florets less than 10 per head (shrubs or tall biennial herbs): **Humea**
 Bracts 30-90; heads up to 10 in a small corymb; florets more than 15 per head (annual herbs to 2 ft. — W.A.): **Pithocarpa**
10. Florets 3- to 4-toothed, persistent, at length turning reddish; pappus completely lacking: **Toxanthes**
 Florets 5-toothed, deciduous, remaining yellow; pappus a short greenish cup (W.A.): **Scyphocoronis**
11. Weak annual herb to 1 ft.; heads isolated on long terminal stalks, yellow; bracts very broad and greenish, never radiate (W.A.): **Neotysonia**

- Erect herbs or shrubs 2-9 ft. high, the stems often with decurrent wings; heads in panicles or corymbs; inner bracts with white radiating tips 12
12. Receptacle scales narrow, $\pm$ enveloping the florets; pappus completely lacking: **Ixodia**
- Receptacle scales broad, dark, persistent; pappus a minutely toothed cup: **Ammobium**
13. Leaves forming decurrent wings on stem; partial heads with outer 6-9 florets filiform and female only (stiffly erect, coarse herbs 1-2 ft. high): **Sphaeranthus**
- Leaves not decurrent on stem; if outer florets ever female, then less than 6 14
14. Partial heads with 2-3 bisexual flowers and 2-3 outer, filiform female ones (small, rather woolly annual with spoon-shaped leaves and naked receptacles): **Stuartina**
- Partial heads unisexual, consisting of 1 male central head (with 4-6 flowers) surrounded by 2-3 single-flowered female heads (sparsely downy annual with oblong stem-clasping leaves and chaffy scales between florets — S.A.): **Basedowia**
- Partial heads entirely bisexual 15
15. Florets of partial head each subtended by a chaffy receptacle-scale (dwarf, mostly prostrate annuals): **Chthonocephalus**
- Florets of partial heads without any receptacle-scales 16
16. Compound heads with a general involucre of numerous narrow bracts (often with white radiating tips); general receptacle broad and flat: **Myriocephalus**
- Compound heads without a general involucre (or with only a few scarious to leafy bracts): 17
17. Partial heads many-flowered, woolly; bracts broad, herbaceous or with scarious margins: **Eriochlamys**
- Partial heads usually 1- to 3-flowered; bracts chiefly hyaline 18
18. Involucres of partial heads compressed, consisting of 2-6 bracts: **Angianthus**
- Involucres of partial heads hardly flattened, with 7 to numerous bracts: **Gnephosis**
19. Heads $\pm$ stalked and distinct (but sometimes crowded in corymbs) 28
- Heads without stalks, densely clustered to form an ovoid to globular compound head or heads 20
20. Outer florets of partial heads female, filiform and numerous, the inner disk florets few and bisexual 27
- All the florets bisexual 21
21. Plant glabrous (except for a few long hairs near base of leaves), $\frac{1}{2}$ -2 ins. high; pappus of 7-11 large obovate, notched scales: **Rutidosis**
- Plants downy to woolly; pappus not as above 22
22. Compound heads without any conspicuous general involucre 25
- Compound heads with a general involucre; pappus of 1 to several bristles 23
23. Bracts of general involucre broad and leafy; pappus bristles 5, recurved (white-woolly annual to 3 ins. high): **Actinobole**
- Bracts of general involucre not leafy; pappus bristles straight 24
24. General involucre of few small, inconspicuous bracts; receptacle of partial heads with a hyaline scale subtending each floret; pappus of 9-20 slender plumose bristles; achenes silky-hairy: **Craspedia**
- General involucre of numerous conspicuous, hyaline or white-tipped bracts; receptacles without scales; pappus of barbellate or simple bristles; achenes downy: **Myriocephalus**
- As for the last, but receptacle bearing broad hyaline scales between florets, and the achenes glabrous (W.A.): **Decazesia**
25. Pappus of broad lacerated scales or short, coarsely barbed bristles; partial involucres $\pm$ flattened, 1- to 3-flowered: **Angianthus**
- Pappus of long bristles; partial involucres not flattened 26
26. Inner bracts of partial heads no longer than florets; pappus-bristles usually 6 or more; achenes glabrous: **Calocephalus**
- Inner bracts of partial heads with radiating petaloid tips far

- exceeding the florets; pappus-bristles 3-6; achenes densely hairy (W.A. & S.A.): **Cephalipterum**
27. Compound heads axillary (and sometimes basal); pappus of 6-12 bristles, flat and scale-like at base; anthers shortly tailed; achenes cylindrical; leaves not decurrent (Q.): **Thespidium**
- Compound heads terminal (or in axils of upper leafy bracts); pappus of fine, simple, capillary bristles; anthers shortly tailed; achenes $\pm$ cylindrical; leaves with decurrent wings along stem (tall, often scented perennial herbs or undershrubs, 1-3 ft. high or more): **Pterocaulon**
- As for the last, but anthers finely tailed, achenes $\pm$ oblong, and stems without decurrent wings (smaller, odourless herbs): **Gnaphalium**
28. Pappus of capillary bristles (simple to plumose, sometimes with dilated or fused bases) 31
- Pappus of scales, or a jagged tube 29
29. Heads axillary, with only 1-2 red florets; pappus scales 3-6, lanceolate (woolly annual to 4 ins. high): **Quinetia**
- Heads terminal, with several to many flowers 30
30. Pappus in all flowers (bisexual) of 4 to several distinct scales; heads on long stalks, rather showy: **Rutidosia**
- Pappus-scales in outer, slender, female florets united in a long tube; heads stalkless within the last leaves (tropical herb with toothed leaves and very broad involucre bracts): **Coleocoma**
31. Heads cylindrical, 4- to 6-flowered, solitary at ends of short, leafy rigid branchlets, some entirely female, some bisexual or male ($\pm$ hoary spreading shrubs of arid interior): **Cratystylis**
- Heads ovoid, with numerous florets, almost stalkless and solitary among upper leaves, strictly dioecious and either male or female (low, densely tufted perennial of Australian Alps): **Parantennaria**
- Heads never semi-dioecious or entirely female 32
32. Style-branches $\pm$ truncate at tips; florets often all bisexual, never purple; leaves always entire 35
- Style-branches filiform, pointed; outer florets of head always female, often pink or purple; leaves often $\pm$ toothed (plants of far inland areas or tropical coasts) 33
33. Bracts narrow, acuminate, all herbaceous or soft; style always forked (annual herbs): **Blumea**
- Bracts often broadish, at least the inner ones rigid and dry 34
34. Heads small (to 7 mm. wide); florets never ligulate; style never bulbous, simple in the disk florets (shrubs and undershrubs): **Pluchea**
- Heads larger (more than 7 mm. wide), the inner bracts often conspicuously coloured at tips; outer female florets often with short narrow ligules; style bulbous at base, always $\pm$ forked (annual or perennial herbs): **Pterigeron**
35. Female filiform florets fewer than bisexual inner flowers or all flowers bisexual 37
- Female filiform florets more numerous than bisexual inner flowers 36
36. Pappus of more than 6 capillary barbellate bristles (plants never cushion-forming): **Gnaphalium**
- Pappus of up to 6 flattened, almost plumose bristles; heads solitary but densely packed together, with 6-12 florets (grey-green alpine cushion-plant — Tas.): **Pterygopappus**
37. Dwarf cushion-or carpet-forming perennials or high alps (leaves crowded-imbricate, silvery or hoary, obovate, often recurved at tips; heads ovoid to hemispherical, 6-8 mm. long): **Ewartia**
- Habit not as above (never alpine cushion-plants) 38
38. Involucre bracts wholly dry, scarious or with radiating petaloid points 42
- Involucre bracts linear, all $\pm$ herbaceous and green or with scarious margins and tips 39
39. Bracts nearly equal; achenes with slender beaks (small annuals, the outer florets $\pm$ deflexed over involucre): **Millotia**
- Bracts imbricate in several series; achenes never beaked 43

40. Outer florets female, often ligulate or irregular; pappus-bristles strongly barbed or plumose, bracts narrow-linear, with almost filiform points (chiefly annual): **Athrixia**
 Florets all bisexual and equal; bracts never awl-shaped at tips 41
41. Pappus-bristles strongly barbed or plumose; achenes shortly stalked, densely hairy (small annuals): **Podosperma**
 Pappus-bristles entire or shortly barbellate; achenes never stalked, bald or shortly hairy (taller branched annuals or perennials): **Ixiolaena**
42. Outer row of florets female, often ligulate and longer than hyaline involucre (herbs with solitary terminal heads on long stalks): **Podolepis**
 Outer florets female and filiform (rigid woolly-white shrub with spiny branchlets and lateral stalkless heads—N.S.W. & S.A.): **Acanthocladium**
 Florets all bisexual and equal, or sometimes a few outer ones female (habit never spiny) 43
43. Achenes neither contracted above nor beaked 45
 Achenes contracted at summit or tapering into a beak 44
44. Involucral bracts petaloid and coloured, sometimes radiating; florets shorter than involucre: **Waitzia**
 Involucral bracts neither petaloid nor radiating, thin and scarious; florets longer than and often overhanging involucre (heads solitary on long wiry stems): **Leptorhynchus**
45. Receptacle with narrow, deciduous, chaffy scales between florets; heads few-flowered, with petaloid but non-radiating bracts (aromatic shrubs): **Cassinia**
 Receptacle naked 46
46. Pappus-bristles plumose almost from base, where sometimes fused (chiefly small annuals) 49
 Pappus-bristles simple or barbed, but never plumose for greater part 47
47. Bristles of pappus falling singly or fused only at extreme base; achenes nearly all fertile, scarcely flattened, less than 4 mm. long (herbs, shrubs or small trees, the inner bracts with petaloid radiating tips): **Helichrysum**
 As for the last, but only outer 4-6 flowers developing achenes which are very flattened, silky and $\pm$ 4 mm. long pink-headed annual (W.A., C.A. & S.A.): **Schoenia**
 Bristles of pappus variously fused near base; heads terminal and solitary 48
48. Slender semishrub; heads 20 mm. long; pappus-bristles more than 5 mm. long, fused into basal ring that falls intact (W.A.): **Argyroglossis**
 Annual herb, loosely cottony; heads $\pm$ 6 mm. long; pappus-bristles $\pm$ 2 mm. long, connate in 2's, 3's or 4's (tropical Q.): **Phacellothrix**
49. Inner bracts not woolly-tufted below tips; pappus-bristles not dilated beyond the common basal cup: **Helipterum**
 Inner bracts bearing a double tuft of woolly hairs below tip; pappus-bristles terminating dilated teeth around a basal membranous ring (or crown) on glabrous achenes (W.A.): **Gilruthia**
- Tribe HELIANTHEAE**
1. Involucre sessile, axillary, consisting of only 4 broadly ovate bracts that exceed the florets; receptacle conical; achenes flat, without pappus; style-arms flattened (marsh plant, creeping and rooting in mud — N.S.W. & Q.): **Enhydra**
 Involucre stalked, almost globose, having 3 to several rows of closely overlapping, very broad, obtuse bracts; receptacle conical; achenes flat, usually 1- or 2-awned; style-arms filiform (Q.): **Zinnia**
 Involucre of about 2 rows of $\pm$ equal bracts 2
2. Pappus of 2-4 conspicuous rigid awns (leaves sometimes compound) 8
 Pappus either none or of very short bristles or a minute cup (leaves entire) 3

3. Inner bracts embracing the achenes, the outer widely spreading and all glandular-hispid; achenes sausage-shaped, without a pappus: **Sigesbeckia**
 Inner bracts not embracing achenes, never glandular 4
4. Receptacle very conical; style-arms flat and truncate; ray achenes triangular, ciliate, with pappus of 2-3 short bristles: **Spilanthes**
 Receptacle flat or slightly convex; style-arms not truncate 5
5. Ray achenes flat; style-arms acute or absent 7
 Ray achenes triangular; style-arms obtuse (ligules of ray florets extremely short) 6
6. Inner bracts chaffy; receptacle-scales concave, embracing achenes (coarse, hairy, erect annual 2-3 ft. high—tropical Q.): **Blainvillea**
 All bracts herbaceous and $\pm$ equal; receptacle-scales flat and narrow-linear (habit usually prostrate): **Eclipta**
7. Bracts more than 6; style in every floret divided, the arms acutely tipped; disk achenes fertile, $\pm$ flattened: **Wedelia**
 Bracts 4-6; style in disk florets undivided; disk achenes abortive (tropical W.A. & N.T.): **Chrysogonum**
8. Leaves wholly radical, entire, linear to lanceolate; scape 1-headed, exceeding the foliage; style-arms truncate (small coastal perennial with creeping stolons — Tas.): **Nablonium**
 Leaves not all radical or deeply lobed; stems branching, with several heads; style-arms acute or awl-shaped 9
9. Annuals with sterile ray florets and short appendages on style-arms (leaf-segments broad): **Bidens**
 Perennials with fertile ray florets and long appendages on style-arms (leaf-segments linear or absent): **Glossogyne**

Tribe ANTHEMIDEAE

1. Pappus present, of flattened scales, sometimes with bristles also (small annuals) 5
 Pappus absent 2
2. Outer female florets slender 4
 Outer female florets shortly tubular, or their corollas absent 3
3. Heads conspicuously stalked; disk florets numerous; achenes flattened: **Cotula**
 Heads sessile or almost so; disk florets few; achenes 4-angled (pungently aromatic herbs of damp places): **Centipeda**
4. Achenes 4-angled or flattened but not winged (dwarf tufted perennial of S.E. alps): **Abrotanella**
 Achenes large and flat, with 2 incurved wings that are produced at summit into divergent ciliate lobes or horns (small annual of arid inland areas): **Ceratogyne**
5. Leaves oblanceolate; ray florets 7-8, with short white ligules; pappus of bristles and scales (S.A.): **Dimorphocoma**
 Leaves narrow-linear; ray florets tubular; pappus of scales only 6
6. Heads stalkless, densely clustered at base of the much longer radical leaves; disk achenes without a pappus: **Isoetopsis**
 Heads stalked and terminating the few erect branches; disk achenes with pappus of a few bristles: **Elachanthus**

Tribe SENECEONEAE

1. Style-branches terminating in awl-shaped points or an acute appendage 4
 Style-branches truncate or very obtuse 2
2. Heads in axillary inflorescences that are white-floccose and much shorter than leaves (S.E. shrubs or small trees): **Bedfordia**
 Heads terminal, solitary to corymbose 3
3. Disk florets perfect and fertile, with $\pm$ glabrous style-arms (some non-ligulate species with filiform female florets were previously but erroneously referred to the American genus **Erechtithes**): **Senecio**
 Disk florets structurally perfect but sterile, their style-arms papillose-hairy on the outer surfaces (purplish perennial herb of eastern mountains): **Arrhenechthites**

4. Florets yellow; style bulbous at base, the arms tapering into long hairy points (perennial with stalked leaves—northern Q.): **Gynura**
 Florets orange to reddish-purple; style not bulbous, the arms ending in an acute appendage (annual with stem-clasping leaves — northern Q.): **Emilia**

Tribe CYNAREAE

- Involucral bracts with lacerate appendages or prickles; pappus-bristles numerous, free, unequal, in several rows: **Centaurea**
 Involucral bracts without appendages, never prickly; pappus-bristles in a single row, fused at base (N.S.W. & Q.): **Saussurea**

Tribe CICHORIEAE

1. Flower-heads solitary (at first often nodding), on long leafless scapes; pappus of narrow flat scales that taper into bristles (roots fleshy, tuberiform, tapering): **Microseris**
 Flower-heads in leafy corymbs or panicles; pappus (at least of central florets) consisting of capillary bristles 2
 2. Pappus-bristles plumose; achene transversely striate (or ribbed), tapering at apex or distinctly beaked: **Picris**
 Pappus-bristles simple; achene smooth or vertically ribbed 3
 3. Involucre a single row of nearly equal bracts; achenes cylindrical, tapered at apex: **Crepis**
 4. Involucre conical after flowering, with several rows of closely imbricate bracts; achenes flattened, truncate at apex: **Sonchus**

Cooktown Orchid in Western Australia

H. E. Foote, Western Australia

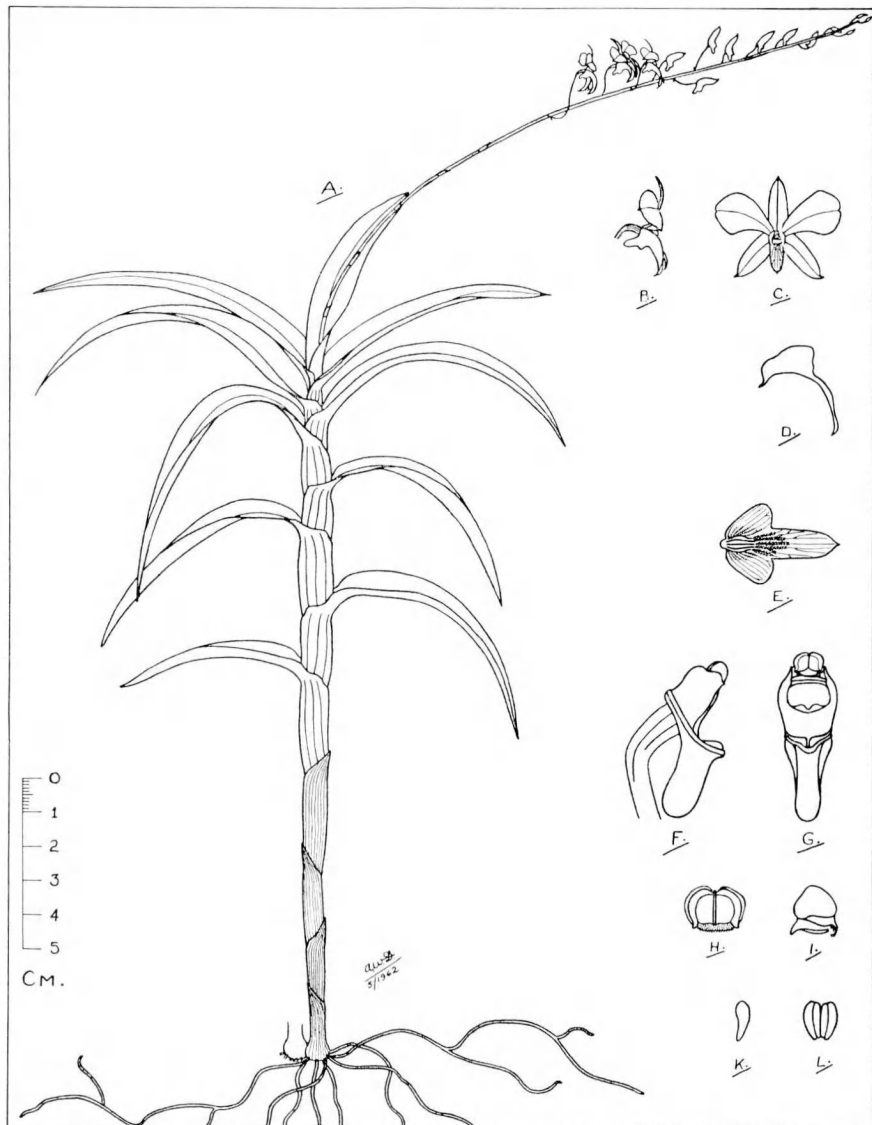
I have grown and flowered two plants for 4 years using osmunda fibre in small pots. Kept in a cool glasshouse, the flowers came in April but did not last long with our first cold snap. Last year I placed them outside, sheltered from the rain but in a position where they would get full morning sun. This year they flowered earlier and lasted longer. As the buds began to develop I brought them into the glasshouse in case there was a cold spell.

A plant fastened to a tree has not flowered yet. All plants were watered well in the morning of every day in which they could be expected to dry out by nightfall. They were sprayed monthly with aquasol.

DENDROBIUM DICUPHUM F. Muell

Fragm. 8:28 (1872).

A species with obvious affinities with *D. bigibbum* Lindl. Pseudobulbs stouter than those of the latter species, 80-450 x 1.2-2.5 cm, often deciduous, usually covered with scarious sheaths (leaf bases), furrowed and ridged when aged. Leaves 6-10, 8-18 x 0.8-3.0 cm, narrow-triangular or narrow-ovate, sheathing, acute. Racemes usually terminal but sometimes also 1 or 2 from the upper nodes, 20-50 cm. long, containing from a few to about 20 flowers. Flowers widely expanding, 2.5-5.0 cm. diameter, white or very pale green outside and cream inside with deep maroon markings on the base and lateral lobes of the labellum. Dorsal sepal 12-20 x 4-7 mm., oblong or



- A. Portion of plant . . . to one half indicated scale.
 B. Flower from the side . . . to scale.
 C. Flower from the front . . . to scale.
 D. Labellum from the side . . . to scale x 2.
 E. Labellum flattened out . . . to scale x 2.
 F. Column from the side . . . to scale x 5.
 G. Column from the front . . . to scale x 5.
 H. Anther from above . . . to scale x 10.
 I. Anther from the side . . . to scale x 10.
 K. Pollinium from the side . . . to scale x 10.
 L. Pollinia from the front . . . to scale x 10.

narrow ovate, shortly acute. Lateral sepals subsimilar to the dorsal one but joined at their bases to form, with the column foot, a double spur. Petals about 12-20 x 10-15 mm., obovate. Labellum, when artificially flattened out, about 12-20 x 9-13 mm; lateral lobes erect and incurved, about 3-5

x 5.8 mm, obliquely triangular, very obtuse (rounded), basal sections of veins somewhat crested, when flattened, these lobes are divaricate, their front margins making a line of about 180 degrees, one with the other, so that the labellum is more or less hastate when viewed towards the base; mid-lobe decurved, 7.11 x 3.5-5.0 mm., oblong, acute or becoming acute; ridges of the disc g, fringed or crested in their apical halves. Column 3.4 x 3.4 mm. with a robust foot (spur) 4.5mm. long, not longitudinally grooved below the stigma. Stigma = broad scutiform. Anther with a short, broad, deflexed, hirsute rostrum. Pollinia more or less typical of those of the genus.

DISTRIBUTION:- The northern part of Northern Territory, extending to Groote Eylandt. There are unconfirmed reports of its occurrence around the Gulf of Carpentaria into Cape York Peninsula.

FLOWERING PERIOD:- Usually April to August.

In Proc. Linn. Soc. N.S.W. 72:241 (1948), Rupp and Hunt described var. *Grandiflorum* as being pure white and having flowers as large again as the type form. However, they quoted the type form as having flowers only 2.5 cm. across, whereas, in fact, flowers are frequently encountered much larger than this.

THE FLORAL EMBLEM OF QUEENSLAND—THE COOKTOWN ORCHID

Our No. 15 issue described this beautiful Australian orchid *Dendrobium bigibbum*, at some length and featured a front page full colour plate of a typical flower. This issue features another flower form in full colour on the rear cover. Our No. 17 issue described *D. superbiens* a very closely related species and this issue describes *D. dicuphum*. The forms of *D. bigibbum* appear very numerous and mingle with these two species. It is intended to classify these various forms in the No. 21 issue if possible and for this any information or colour slides that will assist would be appreciated.

Dendrobium dicuphum differs from *D. bigibbum* in having shorter, stouter (forma *compactum* excepted) and more fusiform stems, smaller flowers which have narrower segments, and a column which is not longitudinally grooved below the stigma.

Dendrobium superbiens is readily distinguished from *D. bigibbum* Lindl. by having stems which are more robust, leaves which are thicker in texture, segments of the flower also thicker in texture, petals which are narrower and usually twisted, only a single instead of a double spur. It differs from *D. dicuphum* in having longer and less fusiform stems, larger and deeper-coloured flowers, petals which are usually twisted and a single instead of double spur, and having a longitudinal groove below the stigma.

MIST PROPAGATION

No. 17 issue contained an article giving the advantages of cutting propagation under a fine mist. A number of readers have requested further details. The sprays I have seen are marketed as type A, B and C Fog Mist Nozzles by George Warner (associated with Lanes). They deliver 6, 18 and 42 gallons of water per hour over an area of 7', 12' and 18' in diameter respect. Type A screws onto a 1/2" gas B.S.P. thread and retails at 23/6. Because of the area and amount of water used they appear to be of value only to commercial nurserymen. If a reader knows of a spray using much less water and will serve only a small propagating box, I shall be pleased to hear further details.

There is available for £7 an automatic control unit to automatically adjust the frequency of misting to achieve certain conditions. These may be of value to a commercial installation but have not proved necessary in the propagating box as described in the article. There has been a lot of work done and reports published, all dealing with elaborate usually experimental glasshouses but our interest here is the application of the system in a very small box with a minimum of equipment—Editor.

STURT'S DESERT PEA

The R.H.S. Dictionary of Gardening states that in Europe the Sturt Desert Pea — *Chilanthus Formosus* (Syn. *C. Dampieri* *C. Speciosus*) is very difficult to cultivate successfully or even keep alive for any length of time on its own roots, but it has been found that if grafted as a seedling in the cotyledonary state on a similar seedling of *Colutea arborescens*, it grows and blossoms much more freely and lives longer. It is admirable for hanging baskets.

The Victorian president, Geoff Echberg, 22 Middleton Street, Highett, is importing seed of *Colutea arborescens* and would be pleased to supply seed to any members wishing to experiment with grafts.

SHOWY SPECIES OF THE DAISY FAMILY—Continued from page 211.

Bellida graminea — Spreading annual up to 6". Flowers 1½" diameter, pink. 2 bunches of pink hairs (pappus) standing up on top of the seed for the composite head. Bracts or ray are lacking. Up to 12 flower heads per plant.

Brachycome latisquamea — Scandent shrub growing in low Acacias up to 4', supporting itself on branches of the wattle. Flowers 2" to 2½" in diameter. Mauve ray and golden centre. In saltbush country south of Carnarvon.

Calocephalus multiflorus — Herb 12"-18" high. Flowers in yellow balls ¾" diameter with small green bracts showing. Rich red ironstone loam, Port Hedland, Wittenoom.

Calocephalus francisii — Spreading annual 6" high and up to 8" in diameter. The 20-30 yellow globular flower heads completely cover the foliage. In sand on Murchison River.

Helichrysum roseum — Slender, upright annual 10-12" high. Flowers 1½" diameter, bracts rich pink. In salmon and York Gum country.

Helipterum cirratum — Trailing herb 18" diameter and to 6" high. Flowers white bracts, golden centre. Up to 100 flowers per plant.

Helipterum roseum — Upright branching annual to 18" high. Flowers to 2". Bracts pink or white. Grows in huge colonies.

Helipterum manglesii — Erect annual to 2' growing in dense colonies. Flowers 1½" diameter. Silvery outer bracts merge into rich pink ones. Flower buds are hanging; when opening rise and face the sun. Leaves heart-shaped, stem clasping. In wheatbelt and mulga.

Helipterum splendidum — Erect annual branching from ground; up to 2' high. Flowers to 3" diameter. The white, yellowish or creamy tinged bracts have a black spot at the base. Up to 12 heads per plant. In mulga country.

Myrocephalus gueriniae — Erect herb to 18" high. Flower heads round, 1½" diameter, Rich yellow. No ray florets. Mulga country south of Carnarvon.

Olearia muelleri — Shrub to 3', branching, crowded with white ray flowers 1½" diameter. Leaves dark green and glaucous underneath. Salmoi. Gum-York Gum country.

Podolepis aristata — Herb 18" high branching from base; also secondary branching. Flower heads 1" diameter; bright yellow, surrounded by silvery, papery bracts. Occurring in huge colonies. York Gum country.

Podolepis auriculata — Erect herb 18" high. Flower heads golden yellow, 1½" diameter, surrounded by creamy, hairy bracts. On red sand dunes, Carnarvon.

Podolepis lessonii — Herb 9-12" high much branching from the base. Flower stems wiry, brown, up to 30 flowers per plant. Flowers 1½" diameter, yellow buttons surrounded by white woolly bracts. York Gum country.

Schoenia cassiniana — Branching annual 12-24" high. Branching from base and secondary branching. Flowers 1" diameter with up to 10 rich pink "ray flowers" per head; a multitude of flowers per plant. Growing in huge colonies. In wheatbelt and mulga country.

Waitzia acuminata — Much branching annual up to 18" high. Flower heads conical ½" diameter and up to 1" long. The bracts are pointed; rich orange on the outside merging to rich gold inwards. The number of flower heads per plant varies from 20 to well over 100.

Waitzia podolepis — Erect herb to 12". Flower heads yellow, 1" diameter surrounded by pink or white bracts. Murchison River.

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BUCKINGHAMIA CELSISSIMA

by R. J. Peach

In some parts of Australia referred to as "Ivory Curl Flower" but in its home State of Queensland is generally called by its botanical name "Buckinghamia." The genus is limited to this one species whose natural habitat is the tropical rain-forest of North Queensland where it can attain a height of sixty feet or more. Like many another Queensland rain forest tree, Buckinghamia appears adaptable to a wide range of conditions. It has been planted as a street tree in Brisbane and grown in gardens as far south as Melbourne, doing well on different soil types under varying climatic conditions. In gardens it seldom reaches its rain forest height and twenty-five to thirty feet would be a probable average. In the initial stages growth from seedling stage can be fairly rapid and for several years the plant can have the appearance of a dense tall shrub with flowers and foliage reaching to ground level. The natural growth habit is such that little, if any pruning need be done to obtain a well shaped specimen. Pruning of course can be done after flowering to reduce height and keep the plant from becoming too large. Flowering generally begins in the fifth or sixth year and for a four to six weeks period in January and February well grown specimens can be a creamy white mass of flowers carried in dense cylindrical sprays eight to nine inches long. The sprays are frequently so densely crowded over the tree that the attractive evergreen foliage is almost hidden. It is without doubt one of the showiest of our native trees. Propagation by seed often results in plants that show considerable variation particularly with regard to the foliage. One of the forms produced has leaves which hang on the plant like long twisted green ribbons and this form has distinct possibilities as an indoor plant or as a bonsai subject. Propagation by seed is quite simple. Provided that the seed is sown shortly after collection a high percentage germination can be expected.

BOOK REVIEW

QUEENSLAND GARDEN — Price 2/- at newsagents.

The monthly publication of this new general gardening magazine is of tremendous importance to all home gardeners in Australia, north of Grafton in N.S.W. Produced on very good quality paper in 34 large pages with full colour production on the front page (the colour plate on the rear cover of this journal is reproduced from the February issue of Queensland Garden) and with fully illustrated and clear text, the magazine is a commercial product of the highest standard. What is more important is that the many articles included are well written by obviously competent writers as well as gardeners.

For years there has been a demand for a magazine catering for tropical and sub-tropical conditions—one that will help amateur and experienced garden lovers alike. With this recent articles on the exotic flowering plants, the vegetable garden, indoor plants, orchids, native plants and general gardening procedures will appeal to all northern gardeners who have for so long, been neglected.

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BUCKINGHAMIA

by H. O. Oakman

Buckinghamia celsissima is fast becoming one of the most popular of sub-tropical street trees. It has many excellent characteristics which help to make it an ideal choice for planting under the almost invariably harsh growing conditions associated with streets.

The *Buckinghamia* has no common name, although it is occasionally referred to as the "Ivory Curl Flower" — a name that no-one seems to use. The tree is an evergreen, fast-growing while young, slowing down when mature but without loss of vigour. At maturity, growth appears to go into leaf and flower production rather than into branching or extension upwards. Under forest conditions *Buckinghamias* attain a height of 70-80



Photo by R. J. Peach

ft. but when planted in the open the average height of a matured tree is from 18-24 ft., with dense, fairly low branching and a symmetrical globular outline.

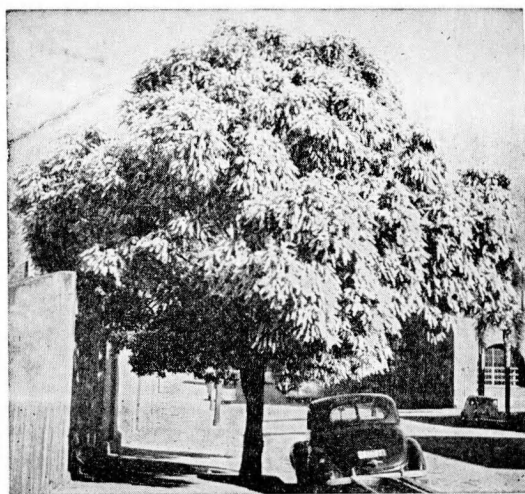
The leaves can lead to difficulties in identification. They are most variable, deep green, sometimes silvery underneath, prominently veined, entire or deeply incised with from 3 to 5 lobes.

Flowers are often produced in abundance on trees only 3 years old. These flowers are of typical proteaceous structure, are perfumed and honey-laden and resemble the Queensland Nut inflorescence. They could be described as cream coloured Buddlea flowers and are produced in dense masses that almost completely cover the trees for up to 4 weeks from January to February. The flower racemes are from 4-8" long and are followed by numerous follicles which are slightly flattened, about $\frac{1}{2}$ " in size and contain from 1-4 flat papery seeds with narrow winged margins.

As a rule seed is plentiful and remains viable for a long time. It is almost certain that all street trees have been raised from seeds.

Variation is not significant in the trees themselves in spite of the great difference in leaves. Growth is fairly uniform and so is the quantity of blooms and the flowering period, so that asexual propagation is not as important as it is with such variable trees as the *Erythrin*as when raised from seed.

The *Buckinghamia* prefers good soil but grows surprisingly well in places where there is only shale, heavy clay or coarse sand. It prefers a sunny location but is shade-tolerant and it can also stand exposure to wind providing that this is not too severe or salt-laden.



Lopping is seldom necessary, pruning being generally limited to shaping the trees about once a year. As a rule it is pest free but at times scale insects can be troublesome, more particularly when trees are in poor health.

Buckinghamia celsissima is endemic to Queensland and there is only one species. Occasionally it is mistaken for *Grevillea hilliana*, which it somewhat resembles in habit, foliage and flowers.

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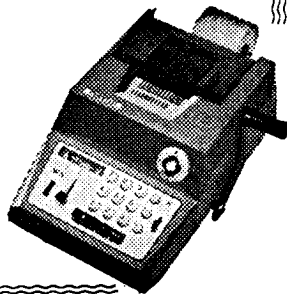
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THE COOKTOWN ORCHID

by Stephen Clemesha

I have grown a form of the "Cooktown Orchid" known to me as *Dendrobium bigibbum* var *phalenopsis* in an unheated glasshouse open to the east, since 1957. The plants, hanging 3' from the glass, are tied to the shaded side of a blade bone to protect the base of the bulbs from the sun. Almost all of the roots are on the shaded side of the bone.



Reproduced from "Queensland Garden"

Blocks by courtesy of Jacaranda Press Pty. Ltd.

The plants get watered with other plants in the glasshouse in both winter and summer. The only special treatment is an attempt to keep the buds dry. Some years I have fed heavily and others hardly at all but the growth has been the same each year. The plants have never lost all or even most of their leaves and no new growths have ever rotted. The mature stems are consistently ten inches high. "Second" growths sometimes appear and not having time to mature, stay at about half normal size.

I started with one 8 stemmed plant in 1957 which has increased through back-cutting. These are now six plants, two of which are flowering size. Eight new growths are coming this year compared with one in the 1957-58 growing season. Every year the plant produces sprays of buds which drop with the cold weather.

Unless some satisfactory way of overcoming the bud drop problem is found, I think Sydney people will find cultivating cold tolerant species from the North Queensland highlands and Southern areas far more satisfying.