Australian Plants

Registered for posting as a periodical —Category B

March, 1978—Vol. 9, No. 74 75c



CONTENTS OF THIS ISSUE

HERBACEOUS PLANTS:

This issue presents, principally, a wide range of herbaceous plants recommended for horticulture. Herbaceous plants are those which have a persistent root stock with annual aerial growths and includes the true herbaceous perennials and many of the bulbous plants.

The term is here extended to include plants with non-woody stems or those with persistent leaves, but lack obvious stems. Some of the plants described in this number are of this nature rather than typical "herbaceous perennials".

"Australian Herbaceous Plants," by T. R. N. Lothian, Director, Botanic Gardens, Adelaide, South Australia ..... Page 239
"Herbaceous Plants in Victoria," by Alf Salkin ..... " 256
"Herbaceous Plants in Sydney," by Charles Napier Thomson ..... " 257
"My Herbaceous Plants," by Peter Dunstan ..... " 257
"The Root Systems of Sedges," by Dr. Byron Lamont ..... " 259
"More Garden Herbaceous Plants," by Charles Napier-Thomson ..... " 264
"Some Herbaceous Plants of South Eastern Queensland," by B. A. Lebler .... " 268
"Cyperaceae in South Western Australia," by Ken Newby ..... " 262
"Violaceae in Australia," by L. Pedley ..... " 278
"Hybanthus—Native Violets," by Eleanor M. Bennett ..... " 271
"The Genus Bulbine in Australia," by H. Baijnath ..... " 266
"Notes on Australian Bulbine," by Charles Napier-Thomson ..... " 266
"Native Plant Pioneer—Bill Cane" ..... " 280

THE SMALL WILDFLOWER GARDEN

To many people a wildflower garden is not a collection of large shrubs but a wonderland of small plants that give pleasure by their variety of shapes and growth habits, often producing surprises that dainty flowers can seemingly pop-up from nowhere. For others with restricted space, a small garden with a wide range of plants is all they can have.

This issue is meant to encourage you to grow a special small wildflower garden. With the early issues of this volume I claimed "The Growing of Wildflowers In Good Garden Conditions Is Easy If You Select Suitable Species". Most of the plants of this issue are low growing plants of the understory or of open heathlands so that by providing suitable garden conditions, you should grow any of them.

Suitable garden conditions! What are they? Being understorey plants or heathland plants they are used to competing for moisture against considerable root competition. Hence, while they will withstand wet conditions for a short while, even thrive on them, if the water is not stagnant but moving down the soil to lower levels. Generally the soil on top dries out quickly. However all respond to watering so this needs good drainage — once again "good garden conditions" will give best results.

COVER PLATE *Thysanotus tuberosus* by Peter Althofer.

The Australian "Fringe Lilies" grouped into the genus *Thysanotus* are very beautiful wildflowers and excellent horticultural plants. They are iris-like plants with fringed petals, the flowers varying from blue, mauve to pink. Most species grow as a clumped herb, although one species, *T. arenarius*, tends to be prostrate, and *T. patersonii* is a twining weak climber. The flowers are often very numerous and vary usually from 3-5 cm in width.

AUSTRALIAN PLANTS—No. 74 Issue of Volume 9. Volume 9 will comprise issues 69-76. Publication Date: 1st March, 1978—published quarterly in 16,000 copies per issue. International Series Index ISSN 0005-0008.

Published by The Society for Growing Australian Plants. For details see last page. Available to members or by subscription of $3.00, including postage to your address.

Send to the Editor, 860 Henry Lawson Drive, Picnic Point, N.S.W. 2213



Australian Herbaceous Plants

by T. R. N. Lothian

Director, Botanic Gardens,
Adelaide, South Australia

Introduction

Because of the wealth of ornamental trees and shrubs native to Australia, it is only of recent years that attention has been given to herbaceous and bulbous plants. A recognition of their value as garden plants has come slowly but it has now been hastened because of the resurgence of interest in rock gardens, the planting of the terraces, rock walls and steeply sloping lands.

Plantings of the last mentioned usually result in the use of woody ground covers, but the grower of Australian plants who wishes to increase and improve his collection is now turning to the many beautiful, attractive and unusual herbaceous plants.

Cultural Requirements

Unlike the trees and shrubs which have been grown in the past, the requirements for herbaceous plants are often restricted, thus requiring greater care in selecting and preparation of the growing sites for these plants in the home gardens. Soil requirements are often more specialised and the positioning demands greater care. Because of the widely differing natural habitats of these plants, many will be grown in sites which previously it was not possible to use their woody counterparts.

Broadly, the herbaceous plants will thrive in the following positions:

1. Full sun — (a) in soil — (b) in water.
2. Under trees and in densely shaded areas.
3. Swampy and boggy grounds.

Herbaceous plants generally require more moisture or at least a constant supply of moisture during their growing period. Many are found along creeks or in river beds or in depressions with soil types varying from clay loams to sandy clays to almost pure sand. pH appears to be more important with these than trees and shrubs and the soil should generally be neutral or sub-acid in reaction. The advantage of well rotted organic matter is usually helpful and in soils which are somewhat heavy, the addition of coarse sand or small gravel as well as organic matter and agricultural sulphur will help growth considerably.

With these points in mind, many Australian Herbaceous plants can be successfully grown and flowered in deep containers or better still in prepared pockets of soil, either in the border or rock garden.

Most will benefit from light dressings of a complete fertiliser, especially if trace elements are present. These later often assist the growth by remedying deficiencies in the natural soil. Chlorosis is likely in excessively acid soils as it is in alkaline types and suitable foliage sprays will assist in correcting this problem.

Propagation

Seed is usually the best but not always the easiest method to raise new plants. Often, a lot of the seed collected is infertile and germination is delayed. Little is known about the germination requirements of many species, but fresh seed is usually more desirable and gives good results.

If seed is to be kept for any period of time before sowing, a small

(continued on page 242)





Photography by Erica Crane

DASYPOGON BROMELIAEFOLIUS



Photography R. Paynter

Loudonia roei "Golden Pennant"

This beautiful small plant comes from sandy areas and low-rainfall regions, frequently from limestone areas, and is thus ideal for rockeries. The plant is erect growing, glabrous, with narrow leaves topped with heads of bright yellow flowers producing conspicuous four-winged fruit.

Dasypogon bromeliaefolius (left flower and plant)—page 240

Plants have persistent foliage and flower heads are globular and creamy white in colour. They differ from *Xanthorrhoea,* which has flowers in spikes at the top of stout stems, and also most species ultimately produce a trunk —see page 243.

The Plant Family Haemodoraceae—Note by Editor

A family of herbaceous plants of very special horticultural value that includes the well-known *Anigozanthos*—Kangaroo Paws. An issue is in preparation on plants in the family, and notes on cultivation and colour slides are needed. Can you help with *Blancoa, Conostylis, Haemodorum, Macropidia, Phlebocarya* or *Tribonanthes?*

quantity of Naphthalene Flakes or Paradichlor Benzene should be mixed with the seed. There is some evidence that prolonged exposure of seed to these chemicals may temporarily inhibit germination (with woody plants this procedure should be carried out with all hard seeds, e.g. *Acacia, Cassia,* etc. because this seed is often infested with various grubs).

Most seed can be sown without any pre-sowing treatment but with most leguminous seeds, it is helpful if the seed is steeped in hot water — not boiling — for about half an hour. The results are germination is usually better and more even.

Stem cuttings of herbaceous plants are usually stout, short growths taken from the crown of the plants. They are often difficult to obtain, although if placed in moist newspaper after field collection and kept in plastic bags (which are opened daily), the cuttings will last up to a week before planting. A cutting medium of either coarse washed sand or peat and coarse washed sand (1 as to 2) will give good results. Should mist not be available, the pot can be put inside a plastic bag and the whole placed in a shady but warm position until striking has occurred.

Root cuttings are useful with some plants, e.g. *Wahlenbergia,* but little work has been done to test this method on a variety of species.

Division can be successfully employed for a number of genera — *Viola, Wahlenbergia, Helichrysum* (perennial forms), ground ferns, etc., but care will be needed to ensure that the crowns and attached roots are not unnecessarily damaged otherwise rotting can occur.

Species with Horticultural Potential

Whilst the species of most genera of woody Australian plants have been investigated and grown for many years, it is only fairly recently that close attention has been given to the herbaceous groups. As with the general run of garden herbaceous plants, some are found in plant families which have woody members also, whilst other families contain exclusively herbaceous or annual species.

Within Australia, there are several thousands of species and to date, very few have been tested and grown. Some families in which herbaceous members are found include: Compositae, Campanulaceae, Goodeniaceae, Stylidiaceae, Leguminosae, Umbelliferae, Amaranthaceae, Stackhousiaceae and Violaceae. In addition, a few of the monocotyledenous families also have herbaceous members and these are found in such families as *Liliaceae,* Haemodoraceae, Graminae and Iridaceae. In general terms, plants with bulbous root stocks (*Crinum, Calostemma* and Orchidaceae) are not included in these notes, but it is often difficult to exclude some of them under a general description.

The following notes are in no way exhaustive, but draw attention to some of the more important groups. It is hoped that these notes will stimulate growers of Australian plants to look more closely at the herbaceous plants and report on them.

Fern and Fern Allies

There are a number of ground or rock ferns which make attractive additions to our plant collections. Some genera, *Gymnogramma, Pleurosorus* and *Notholaena,* whilst naturally occurring in rock crevices will grow in selected sites in the open garden.

Gymnogramma reynoldsii is a small growing perennial fern with hairy roundish pinnae along a black shiny rhachis. *Pleurosorus rutifolius* is even smaller, the whole plant is covered with scaly hairs and the pinnae somewhat fan-shaped.

Because of nomenclatural changes the South Australian *Notholaena* are now referred to as *Cheilanthes. C. tenifolia* is Australia wide, the almost glabrous fronds are pinnatisect and often up to 25 cm high. The pale to dark green colour of this relates to the amount of direct sunlight the fronds receive. *C. distans (Notholaena distans)* is much smaller, the leaves are bipinnatisect and covered with woolly hairs. *C. brownii (N. brownii)* is slightly

smaller and the leaves are less hairy. *Cheilanthes* on the other hand is usually a woodland fern and is useful for growing under trees. Mention should also be made of *Marsilea* which can be grown in an open position or in a comparatively boggy or even aquatic position.

There are a number of *Marsilea* found in Australia. All have four leaflets, more or less covered with hairs, and the size of the leaves is usually dependent on the amount of water or soil moisture present. *M. drummondii* clearly show this diversity of leaf size, whilst *M. hirsuta* and *M. angustifolia* are both small leaved plants.

There are many other groups of ferns which can be included. *Gleichenia, Asplenium, Doodia, Blechnum, Hypolepis,* etc. are those which usually have persistant foliage and should not be overlooked although they are not truly herbaceous plants in the correct use of the term[1].

The Coral Ferns. *Gleichenia* has a number of attractive species. *G. microphylla (G. cincinata)* has tall and short dichotomously branched fronds with narrow pinnae, is usually found in moist peaty areas. *Asplenium* on the other hand has diverse frond shapes depending on the species. *A. flavelifolium (A. flabellifolium)* has small and long fronds with fan shaped pinnae whilst *A. bulbiferum* has long bipinnatisect fronds.

Blechnum is another large and diverse genus, usually with pinnate or pinnatisec fronds, having separate fertile and sterile fronds. *B. nudum (discolor)* is attractive and often with a short trunk.

Monocotyledons

Graminae, the grasses, is the largest group and probably the least used. Many are most attractive when in flower and these include *Stipa* "Spear, Corkscrew Grass", *Chloris* "Umbrella Grass", *Panicum* "Panic Grass", *Eragrostis* "Love Grass" and *Themeda* "Kangaroo Grass". The flower spikes of the last named remain for months and give an attractive stand of russet brown colour to any garden.

The genus *Stipa* — Spear or Corkscrew Grass has many species which produce large heads of flowers and seeds. *S. elegantissima* will grow up to 100 cm high under good conditions and the heads are silvery to purplish in colour. In *Chloris* "Umbrella Grass" the flower seed heads are like the supports of an umbrella — hence the common name. *C. pectinata* grows up to 30 cms high with purplish coloured spikes and *C. truncata* "Windmill Grass" often growing to 1 metre with large horizontally spreading arms.

In *Panicum* the flower heads are tassel-like and both *P. decompositum* "Native Millet" and *P. whitei* "Pepper or Pigeon Grass" are tall growing and attractive. *Eragrostis* is usually smaller and neater in flower. *E. deilsii* "Mulka Grass" has short solitary panicles whilst *E. eriopoda* is an attractive species with densely woolly covering at the base of the shoots.

Although *Xanthorrhoea* usually have persistent foliage and stems, they should not be overlooked. In fact they have such value as landscaping plants they are worthy of a special article and will not be described further here.[3]. *Lomandra* belong to the same family and have many members which give attractive displays of flowers in spikes of various lengths. Members of this genus are dioecious and often it is the male plants which give the better floral displays[4].

An outstanding group is *Anigozanthos* of which there are 7 or 8 species. The colour range is from red and pink, orange, yellow and green, often with two or more colours in the one. The recent hybrid groups are interesting and extend the colour range. The related genus, *Macropidia,* is more difficult to grow. It has black and yellow flowers and spikes up to 1.25 m high.

The commonly cultivated *Anigozanthos* is *A. flavidus,* but today because of the ease with which they hybridize the colour range is from the greyish-green or yellow colour through deep yellows, pinks and reds. These plants are quite hardy and do not suffer with the "ink disease" which is a trial with other species[5]. *A viridis* has bright green flowers and whereas *A. flavidus*





Photography by Erica Crane

Orthrosanthus laxus



Photography by R. G. Cooke

Stypandra caespitosa



Arthropodium strictum

Arthropodium strictum, 'Chocolate Lily'

A herbaceous plant with soft tuberous rootstock. Leaves are long, radical, narrow and flat. The flower spike may reach 20-60 cm high—see page 246.

Orthrosanthus laxus (top left page)

Orthrosanthus are a group of attractive plants belonging to Iridaceae, with persistent long narrow foliage and usually blue open flowers—see page 246.

Stypandra caespitosa "Grass Lily" (bottom left page)

Very similar to *Stypandra glauca* described on page 246, except that this is a tufted plant with leafless stems and the blue flowers are erect. In *S. glauca* the flowers are held higher, although nodding, above the small flaccid leaf stems, often almost to 1 metre high.

can exceed 2 metres in height when in flower, *A. viridis* rarely exceeds 50 cms.

Moving now to the Iris type flowering plants we have in the *Iridaceae, Patersonia* and *Orthrosanthus* containing many attractive flowering species. A related group *Xyris,* is a semi-bog plant and is rarely cultivated. Other genera which should be mentioned include, *Dianella, Caesia, Arthropodium, Bulbine, Tricoryne, Burya, Sowerbaea, Stypandra, Burchardia, Conostylis, Blancoa.* Some of these have bulbous rootstocks but all are worthy of cultivation. I will briefly describe some of these very desirable plants and perhaps someone else will describe some of the more generally cultivated such as *Conostylis* and *Blancoa*[13].

Patersonia[6] "Native Iris" contains many attractively flowered species, usually purple in colour although in Western Australia a yellow flowered species occurs. *P. tragilis (P. glauca)* is a tufted plant with long narrow leaves, 40-50 cm long. The flowers are in a tight terminal spathe and the flower size is 3-4 cms wide.

Orthrosanthus (often called the "Morning Iris" as its blooms start to close at midday) on the other hand has tall stems up to 50 cms high, the flowers produced along erect scapes are usually blue in colour. *O. multiflorus* is an attractive species producing blue flowers over a long period of time[7].

Xyris[8] with its three-petalled flowers also looks like an iris but belongs to a separate family. *X. operculata* has long slender foliage and flower scape size to 50 cm long. The flowers are produced from globular heads usually yellow in colour. This semi-bog plant should be more widely cultivated.

Dianella[9] "Flax Lily" usually has persistent foliage and spikes of blue flowers. *D. revoluta* grows up to 1 metre high and following the flowers, bright blue fruits up to 1 cm are produced.

Tricoryne elatior[10] is a wiry branched perennial producing yellow star shaped flowers at their apices.

Bulbine[11] species are usually robust growing and erect plants and *B. bulbosa* has narrow leaves and spikes up to 50 cms high along which numerous yellow flowers are produced.

Arthropodium (has now absorbed the genus *Dichopogon*) usually have purplish and often sweetly scented flowers. *A. strictum* can be tall growing up to 1 metre high with a long slightly arching panicle with solitary flowers along it, whilst in *A. fimbriatus* the flowers occur in threes.

Burchardia umbellata "Milk Maid" is a beautiful plant with 2-3 stem clasping leaves and an open head of white flowers up to 30 cm tall.

Stypandra glauca is another attractive plant which has tall stems and distichously arranged foliage and terminal heads of drooping blue flowers.

It is surprising the species of *Borya*[12] are not more widely grown. They form small shrublets with short branches topped by stiffish acicular green leaves and a short capitate spike of white flowers is produced in season.

Dicotyledons

The few dozens of species already in cultivation have barely touched the potential of this major group of plants. Many of them are as useful and attractive as the traditional herbaceous plants and growers are urged to cultivate as many as possible and then report on them.

The family *Compositae* has very many examples, but because a great number of them come from the drier areas, little attention appears to have been given to them.

The genus *Helichrysum*[14] contains a varied collection of both woody perennial and annual species. In addition, some species occupy a very wide range of habitats and therefore, a single species can present a totally differing growth habitat.

H. apiculatum is a species which is probably best known as a plant from the savannah areas, but a dwarf ground-hugging form is to be seen in coastal regions. It is a most floriferous plant and the flowers are set off by the beautiful silvery-grey felt coloured leaves.

There are a number of other perennial members of this genus, and from time to time, reports are recorded that they have been introduced into cultivation. However, they never appear to persist for any length of time indicating that correct cultural details have not been established. Species that are worthwhile growing include:— *H. baxteri, H. leucopsidium, H. blandowskianum, H. scorpioides* and *H. podolepedium.* These should be tried because of their attractive flowers.

Senecio magnificus, a native to creek banks and flood out areas in arid regions, is a plant often growing up to 1.25 m high. It has grey foliage and at the tops of growths, heads of large golden flowers appear. It is a most striking plant. The related *S. megaglossus* perhaps is not as attractive, but is still worthy of cultivation.

There are a number of species of *Calotis* which are excellent but because most of the species come from the arid and low rainfall regions, well-drained sunny positions are essential. Perhaps many would regard these as sub-shrubs, but because of the abundance of flowers produced—usually yellow in colour—they make attractive items.

Vittadinia[15] is a small genus with several perennial members growing 25-30 cm high. They usually have purple, violet or white rayed flowers and are useful for rock garden work.

Although several exotic *Cotula* spp. have become weeds, *C. coronopifolia* is an attractive low growing plant useful for growing in wet situations and even water. It produces bright green foliage and large heads of yellow flowers.

It is doubtful if any species of *Pterigeron* has been cultivated, but because of the large flower heads — pink, purple and related colours, they would be worthwhile cultivating. *P. liatroides* and *P. cylindriceps* are attractive plants. The latter is often listed as an annual.

Pterigeron liatroides grows up to 40 cm high with hairy leaves and pink or purplish flowers. *P. cylindriceps* has large flowers rounded by dark purple bracts. They inhabit low rainfall regions.

Pterocaulon spp. are of interest because of the attractive scent which is present especially when the plants are in flower.

In *Pterocaulon sphacelatum* "Apple Bush", the terminal flower heads are somewhat globular and usually purplish or pink in colour. They are decidedly fragrant.

Although attempts have been made to cultivate species of *Ixiolaena,* these have not been successful. *I. leptolepis* is a small growing perennial up to 25-30 cm high with greyish or whitish tomentose leaves. *I. supina* is almost prostrate in nature. It is native to coastal regions and should be tried as a rock garden plant.

Amongst the species of *Leptorhynchos* are a number of attractive and generally wiry plants with flower heads on long thin stems. *L. squamatus* has green leaves with white tomentose beneath and the bracts surrounding the heads are woolly with lemon or orange tips. *L. elongatus* is more erect and has white or cream scented flowers.

Although there are annuals, *Rutidosis helichrysoides* is a perennial species up to 40-50 cm high with bright yellow flower heads on long stalks. It is often called "Yellow Top".

Both annual and perennial species are found in *Podolepis* — all of which are attractive. *P. jaceoides* is more or less a woolly perennial often over ½ m high with large yellow flower heads, while *P. rugata* is almost sub-shrubby.

Craspedia uniflora, although widespread, rarely appears in cultivation. It is often listed as an annual but some forms, especially those from the higher mountains are perennials and last for a few seasons. The mountain forms also frequently inhabit boggy areas.

In *Stylidiaceae* (the "trigger plants")[16], the ordinary *Stylidium graminifolium* is excellent with its dense rosette of linear leaves and tall, erect flowering spikes. Flower colour varies from very pale pink to almost white to deep



Photography supplied by N. Lothian

Calandrinia polyandra



Photography by B. Ballingal

Burchardia umbellata



Photography by M. Hodge

HELICHRYSUM BRACTEATUM FORM

Helichrysum bracteatum form

A very variable species, with both annual and perennial forms. *Helichrysum bracteatum* 'Dargan Hill Monarch' is a sub-shrub. Other similar species are *H. albicans, H. apiculatum, H. leucopsidium* and *H. scorpioides.* Another cultivar is a low-growing form, *Helichrysum bracteatum* 'Diamond Head', shown in colour on page 204 of our last issue.

Calandrinia polyandra (top left page)

The beautiful "Parakeelya" are excellent rockery plants and are described on page 253. Readers are particularly referred to an article by Jim Webb on his experiences in cultivation of these plants in Canberra.

Burchardia umbellata "Milk Maid" (bottom left page)

This white-flowered plant is quite attractive with its heads of white flowers and stem-clasping leaves. Every garden needs such unobtrusive plants providing contrast with clear white flowers.

luminous pink. Of course, there are very many species native to Western Australia but except for limited trials, no information has been recorded that these species are regularly cultivated.

It is always surprising that more members of *Goodeniaceae*[17] have not been brought into cultivation. There are very many species which are ideal rock garden plants or can be used for ground cover, both in full sun or dappled shade. The flower colour is usually yellow or cream and therefore, they make an excellent feature.

The "Native Primrose", *Goodenia primulacea* is a very variable species usually prostrate but sometimes with short, erect branches. The plants produce a continuing supply of pale yellow flowers during the late spring and early summer months. Many of the other species come from low rainfall regions and if attempts are made to cultivate these, a well-drained soil and sunny positions are desirable.

Another genus, *Velleia,* are most attractive with yellow flowers and the basal rosette of green leaves.

Velleia paradoxa is variable in size with flowers up to 3 cm across. They usually are white or yellow in colour.

Probably the most rewarding genus to cultivate are species of *Scaevola.* There are a number of species which are perennial, all with bluish or purplish coloured flowers and all make ideal rock garden plants. Successful cultivation has been achieved with a number of species and the following are most rewarding: *S. calendulacea, S. aemula,* and *S. albida.* The flowers of these are most attractive and the plants are usually totally prostrate and can be grown on the edges of terraces where they will hang over the sides of the terrace.

Perhaps because of their more-or-less persistent stems, species of *Dampiera* can be regarded as sub-shrubs. Because of magnificent displays of blue, purple or more rarely pink and white flowers, they should be widely grown. There are many species from Western Australia including *D. hederacea, D. cuneata, D. coronata* and *D. linearis* to name just a few. All of these make brilliant displays during the spring and early summer months, and attempts to grow them should be made where soils are light and sandy and well-drained. Despite the brilliance and often large flowers of the Western Australian species, *Dampiera rosmarinifolia* "Wild Rosemary", make a most attractive small growing plant up to 30 cms high, narrow greyish green foliage. The flowers can vary from white through shades of pink to blue or purple.

One of the outstanding perennials is *Brunonia,* an endemic family and genus to Australia. The heads of bright, clear blue flowers are borne on 20-30 cm stems and they are amongst the most brilliant of all the flowers. There is a small basal rosette of greyish leaves. It appears to require careful handling under cultivation and a crevice in a rock garden or light open soil appears to be more successful, than elsewhere. It will grow in full sun or in dappled shade.

Some of the best ground covers are to be found amongst *Hydrocotyle* (Umbelliferae) and unfortunately they are rarely cultivated. Some species prefer moist to wet sites but others are useful in shaded areas, particularly for carpeting in much the same way that *Dichondra* can be used.

H. verticillata (H. vulgaris) has attractive orbicular and peltate leaves 2-5 cms in diameter, usually prominently veined.

Centella cordifolia (H. asiatica) is a common widespread species with cordate or rexiform leaves 2-3 cm wide.

Two other genera of this family are worthy of note: *Didiscus* and *Eryngium. Didiscus (Trachymene)* has about 12-15 species scattered over Australia and many are excellent perennials. *D. glaucifolius,* "Wild Carrot", has a basal rosette of semi-glaucous divided leaves from the centre of which arises a stout flower head, bearing numerous clusters of whitish or cream coloured flowers. The plant under good conditions will frequently reach 50 cm in height although 30-40 cm is the usual height.

Eryngium spp. usually have spiny foliage and sepals. *E. rostratum*, "Blue Devil", is a medium sized plant up to 45 cm high with oval or globular heads of blue flowers. The whole plant has a violet or blueish tinge hence the common name.

The family *Leguminosae* is best known for the variety of species and brilliance of flowers in the genus, *Acacia*. There are, however, several genera which form perennating stems and include *Swainsona, Bossiaea, Crotalaria, Lotus, Psoralea* and *Kennedia*. Some have persistent stems but all are worthwhile cultivating.

Bossiaea are probably sub shrubs, but *B. prostrata* is quite attractive with small yellow and purplish flowers produced along the prostrate stems.

Kennedia prostrata is somewhat similar in growth habit, but the large trifoliate leaves and bright red flowers makes it a useful plant for rock gardens. These plants have been well described in other issues.

Although many *Crotalaria* are shrubs there are some perennial species. *C. mitchellii* is a silky pubescent perennial with dense racemes of yellow flowers. *C. dissitiflora* has yellow flowers in a scattered and long raceme. They require light well drained sandy soil and full sun to be successful.

There are several *Psoralea* which are excellent plants. *P. patens* can reach 50-80 cm high. It has green pinnate foliage and spikes of small lilac to purplish pea-shaped flowers. *P. eriantha* has white tomentose foliage and *P. adscendens*, glabrous foliage.

The genus *Swainsona* contains many perennials, but because they are native to the low rainfall or arid regions, seed has been difficult to obtain. The best known and most frequently cultivated is *S. galegifolia*, which is from the higher rainfall regions of Eastern Australia. This is a glabrous perennial up to 1.5 m high with light green pinnate foliage and long terminal spikes of pink, purplish or white flowers produced in profusion over a long period.

S. canescens is an erect and stout growing tomentose perennial with numerous leaflets, the purplish flowers are produced in dense racemes. It is often found near creeks or floodout areas. *S. flavicarinata* is totally prostrate and somewhat open in growth with short spikes of red and yellow flowers. *S. procumbens* is often found in coastal areas on sand dunes, but is also found inland. It is a prostrate, glabrous plant with several spikes of large purplish flowers.

One of the most spectacular species is the prostrate *S. stipularis*, a native from medium to low rainfall regions. The foliage is covered with silky hairs, leaflets are few and many of the plants except for the inflorescences are prostrate. The flowers vary in number from 15-30 cm vertical spikes and vary in colour from brick red to pure yellow.

All *Swainsona* should be attempted. They would be ideal for hot and sunny positions and also in rock gardens.

Whilst "The Sturt's Desert Pea" *Clianthus*[18] is often regarded as a shrubby perennial, it must be included in this survey. The silky grey foliage set along stout prostrate stems is attractive in itself. However, the large flowers, several in number are set at the top of a short, thick stalk and these are spectacular. The normal colour is blood red with a black boss, but colour forms from pure white through to deep pink with or without the boss, are known. It requires careful cultivation, needing a clay, sandy loam and is most susceptible to collar rot. It was originally collected on the Western Australian coast by William Dampier in 1699.

It is a pity that *Lotus australis* is not more widely grown. It varies in growth form, but is usually a semi-erect plant up to 45 cm high with trifoliate, greyish or green leaves. It is most attractive, especially when the heads of white, pink or red flowers are present. It makes an ideal rock garden plant.

Amongst the Labiates[19], *Ajuga australis* is probably the principal species which is worthy of attention. A most floriferous plant with deep blue to purple flowers (more rarely pale blue or white). These are produced in



Photography by J. Glass

Hybanthus calycinus

All the species of this delightful genus of plants are described and illustrated in colour on page 271. They belong to the family Violaceae, an excellent reference to the many plants in this family being given in the article "Violaceae In Australia", by L. Pedley, on page 276. Two species of *Viola*, the native violets, are illustrated in colour on page 277.

dense, erect, spokes, 30-40 cm high over a long period of time. The foliage is usually purplish green although pure green forms are known.

Teucrium racemosum is another attractive species up to 50 cm high with white flowers.

Within the family Scrophulariaceae there are several genera which warrant cultivation. *Mimulus repens* is a small growing, almost matted green leafed plant which has purplish and yellow flowers. It is found in marshes along creek banks and other moist places.

Morgania glabra, "Blue Top" is a vigorous growing herb up to 1 metre high with pale green coloured foliage and a leafy spike of pale to dark blue flowers. It requires a moist position and full sun.

There are many *Veronicas* which make good garden plants and it is surprising that they are not more frequently cultivated. *V. derwentiana* could perhaps be regarded as an under-shrub but it is best considered as a perennial. Tall growing, often over 1.5 metres high, with long, sessile, lanceolate leaves. It has terminal spikes of white or bluish-tinged flowers. *V. distans* is somewhat prostrate or procumbent, with a creeping rootstock. Leaves are small and a few lilac or pinkish coloured flowers are produced at the ends of erect growths.

V. perfoliata is distinctive with its perfoliate greyish, rounded leaves and short spikes of intense lilac or blue coloured flowers. This is a beautiful semi-woody plant.

Those who have particular interest in succulents[20] are aware of the potentiality of members of Portulacaceae. There are a number of species which give brilliant displays but most need a well-drained sandy soil in the full sun. *Portulaca intraterranea* is a robust, prostrate, succulent plant which produces large, bright yellow flowers in profusion during the summer months.

Claytonia australasica, on the other hand, is a small creeping plant usually found in or near swamps. The foliage is thin and long and a few small whitish flowers are produced in an open spike.

Although the genus *Anacampseros* is widespread in South Africa, only one species has so far been described from Australia — *A. australiana.* From a thick, tuberous rootstock, fleshy stems and a rosette of reddish-brown leaves are produced. Flower stems are short with a few long-stalked, pink coloured flowers. It requires a warm and sunny position in light rocky soils.

Amongst the genus, *Calandrinia*[21], there are many species which are attractive and have brilliant flowers. Some are regarded as annuals but appear to perennate when in cultivtation. *C. polyandra* and *C. remota* reach about 30 cm high with a large brilliant, bright pink flowers and cylindrical leaves. *C. balanensis,* "Broadleafed Parakeelyia" is vigorous and spectacular. Other species of the genus are often small to minute plants with insignificant flowers.

An anomalous member of Pittosporaceae is *Cheiranthera cyanea (C. linearis),* a perennial up to 45 cm high with erect stems, bearing numerous linear leaves. A head of large deep purple flowers with the prominent stamens ("Hand Flower") is produced at the tips of the growth. It grows in full sun but often appears to grow and flower better in partial shade.

A spectacular group, but one which is difficult to cultivate are members of the genus *Ptilotus*[22] (Amaranthaceae). This is a very large Australian genus with over 100 members and most of the species are excellent flowering plants. Many come from the low rainfall regions and often rocky sites. Seed is not easily obtained and because of the extended rootstock, they are difficult to transplant. Attempts however, should be made to cultivate them.

Among the more attractive species include: *P. exaltatus* and its variety *semilanatus* with dense, conical heads and pinkish flowers. *P. polystachyus (alopecurioideus)* is somewhat taller growing, with heads of greenish, yellow flowers. (There is also a red flowering form.) *P. nobilis* has yellowish or greenish-yellow flowers. *P. macrocephalus,* creamy to yellow flowers and *P. spathulatus* is a dwarf prostrate species with small heads of yellowish

flowers. There are also many other species in Western Australia, but few are in cultivation.

Very attractive plants are to be found in the family Stackhousiaceae. Within the genus *Stackhousia,* there are a number of species usually with whitish-cream or yellow coloured flowers. These are produced in terminal spikes or racemes on annual growths which vary in height from a few cms up to 30-40 cm. *S. monogyna* has a wide distribution and can be found in sunny as well as dappled shady positions. It prefers a lightish soil and is useful for rock garden purposes. *S. spathulata* has broad and thick foliage and is often found near or along coastal areas.

Within Violaceae, the type genus *Viola*[23] provides a number of attractive small growing plants. *V. hederacea* is probably one of the most delightful. It makes excellent ground cover for shady places and over a long period of time, small violet and white coloured flowers, sweetly scented, are produced. *V. sieberana* is almost minute, but useful for rock gardening purposes. *V. betonicifolia* is tufted and larger, with long lanceolate leaves and violet coloured flowers.

Another family, Campanulaceae has many species worthy of cultivation. One of the principal genera is *Wahlenbergia* which nomenclaturally is most puzzling. A number of species have medium to large sized flowers, usually blue or purple in colour (rarely white) and the plants are widely scattered. The most spectacular is *W. gloriosa* with deep royal purple flowers on their stems which arise from a basal rosette of leaves. A most attractive plant, which is limited to the higher mainland alps. *W. communis* (bicolor) is a twiggy plant up to 30-40 cm high with medium sized blue flowers, while *W. stricta* (consimilis) has slightly larger flowers. *W. vineiflora* was the first species to be cultivated in England. It is a very attractive plant with pale to deep blue flowers and is usually found in savannah country.

Pratia is another genus of this family which has a number of attractive prostrate species. They are useful for ground cover in moist and partially shaded areas. Flower colours vary from white-cream to bright blue.

Isotoma petraea is an ideal rock garden plant. It produces large, pale, lilac coloured flowers but needs a hot and sunny, well-drained site to grow.

There are a few other plants which could be mentioned. *Stellaria pungens* (Caryophyllaceae), is a small tufted plant with short pungent foliage and white star-shaped flowers. It is a good rock garden plant. There are other species of this genus which could also be used.

A number of the *Ranunculus* make excellent plants in moist situations but the species found in the alpine areas are excellent, although difficult to grow at lower levels.

Perhaps attention should be drawn also to the species of *Drosera* (Droseraceae), many of which, especially from Western Australia, are attractive and worth growing. *D. whittakeri* has a basal rosette of leaves from which large white flowers arise. *D. binnata* is a swamp plant and must be treated accordingly. It is interesting because of the forked foliage.

Pelargonium australe (Geraniaceae) is a tufted perennial often up to 40-60 cm high with grey reniform foliage and small pinkish flowers. *P. rodneyanum* has reddish flowers.

There are a few dwarf and prostrate species of *Hibiscus*[24] (Malvaceae) which are perennial but it is doubtful if any has been successfully cultivated although the shrubby forms are most useful in the garden.

For those interested in aquatics[25] there are several perennials worthwhile. *Myriophyllum* has whorled leaves, usually submerged, the flower spike appearing out of the water. *M. propinquum* is often stout growing with pinnatisect leaves, 4-5 whorl with conspicuous yellow-cream flowers. *M. verrucosum* is a slender plant with longish pinnatisect leaves, whilst *M. muelleri* has very fine almost pinate leaves. The male flowers are enclosed in a prominent hood shaped petaloid bract.

Another aquatic genus is Villarsia. *V. exaltata* is a handsome plant often 1 metre high in a rosette of stalked leaves 2-4 cm in diameter from which arises a tall stem with bright yellow flowers in a loose but erect panicle.

One should not forget either *Nelumbo* or *Nymphaea,* which although tropical[26] can be successfully grown in the warmer parts of Australia or under glass.

The above list makes no pretence to be exhaustive. There are plenty of very attractive and ornamental herbaceous plants native to Australia and it is hoped these notes will stimulate interest in this group and successful growers will report on their results.

EDITOR'S NOTES: I hope Noel Lothian will forgive me for liberally sprinkling his article with reference numbers and for the following comments but he has opened up a whole new world of fascinating Australian plants for us to comment on as follows:

1. Ferns have proved a fascinating interest for many readers and you are invited to join our Fern Study Group as listed elsewhere. What I would like is reports from members of ferns they have grown successfully in their gardens to give it interest, but which have not grown to pest proportions.
2. *Graminae,* the grasses. There is much we have to learn about the horticultural application of our native grasses. What grasses have you seen that would make a feature of a landscaping scheme? Who will lead us in the study and recording of useful native grasses?
3. *Xanthorrhoea.* These "grass trees" are really quite fascinating plants and look splendid in any landscaping scheme. Who will prepare notes for publication on this genus?
4. *Lomandra.* Perhaps the study could be extended to *Lomandra* or would someone like to describe them separately. They are interesting plants of special interest to those doing dried arrangements.
5. *Anigozanthos,* The Kangaroo Paws. Our Issue No. 16 of Volume 2 describing these plants is still of exceptional value. They will appear again in a coming issue together with descriptions of two new species. Who would like to be in a study group for these fascinating plants?
6. *Patersonia* — "Native Iris". See Vol. 5, page 57 for a colour plate of a typical plant.
7. *Orthrosanthus* — Allow me to recommend to you my favourite "Iris". I have had plants along the border of a garden for 15 years now. They flower well and can be multiplied by division quite easily. The large 6 cm pale blue flowers standing up proudly in a long row, are a feature of my spring garden display. Be sure you get a plant. Try some seed.
8. *Xyris* — Reports needed on the 14 species widely distributed in swamp areas.
9. *Dianella.* These have proved quite hardy plants for that difficult spot. I would like to hear from anyone with plants of special value.
10. *Tricoryne* — Reports are needed on the seven species recorded.
11. *Bulbine* — See other article in this issue.
12. *Borya.* This is a very widespread and hardy plant. At one time of the year they go a bright rusty red all over. I have seen plants on rocky ridges from Townsville to Western Australia and many people have been impressed with their horticultural potential. I have not yet been able to get a series of colour photographs to really show the growth habit to advantage.
13. *Conostylis* and *Blancoa.* Other articles in this issue feature these plants. Why not join the study group for them.
14. *Helichrysum,* Everlastings. We need good colour photographs of all species to illustrate a work on these beautiful plants. Many species have been described and illustrated in past issues.
15. *Vittadinia.* We shall be publishing a summary of a review of this genus in a future issue. Who has had experience in their cultivation? The plant generally grown as *Vittadinia australis* is not a *Vittadinia,* nor is it a native.
16. *Stylidium,* "Trigger Plant". Really fascinating plants, excellent for rock garden or pot culture. Past issues describe species and illustrate some in colour. Why not join the study group for these plants?
17. Goodeniaceae — A family of beautiful small shrubs and ground covers. Many species are described and illustrated in colour in our past issues.
18. *Clianthus* — The Sturt's Desert Pea. One of Australia's unique plants. Refer to past issues on its cultivation.
19. Labiates — Now referred to the family Lamiaceae. We are preparing an issue on this family and would welcome notes on the cultivation of all species in it.
20. Succulents. Will people who can help in a survey of Australian succulents please contact me.
21. *Calandrinia.* Beautiful little succulents well illustrated in previous issues.
22. *Ptilotus.* Beautiful dry area shrubs, well illustrated in past issues.
23. *Viola.* Reports are needed of other species of Australian *Viola.*
24. *Hibiscus.* We have already described and illustrated many specimens but need reports and slides of other species for an issue in preparation.
25. Aquatics? Please send reports for an issue in preparation.
26. For tropical aquatics, refer to our book "North Australian Plants".

Herbaceous Plants in Victoria

By A. SALKIN, Mt. Waverley

Xanthorrhoea minor

This is a local plant of the Waverley area and I have raised a number from seeds. They are very slow growing and do not flower until quite old (10 years). I have heard that they flower if burnt and so I have dutifully burnt one of mine. It recovered quickly but still no flowers so far. The plants take up little room in the garden, however if they flower they would add a great deal of interest.

Tricoryne elatior

Once again a local lily, it can be grown in the ground or pots and will multiply slowly. They seem hardy and if watered are perennial. It may be propagated by root divisions.

Stypandra glauca

Very vigorous and after 5 years it covers an area 2 by 3 metres. It propagates slowly from pieces taken with a piece of root.

Stypandra caespitosa

I have a number of forms, the white flowered form being rather slow growing. The blue form which is local, forms a neat compact clump but is not a prolific flowerer. The best form I have comes from Springvale, Vic. Its leaves are much broader and longer, up to 0.5 m, and it will produce flower stalks with numerous flowers up to 1 m high. It propagates readily by divisions taken in March.

Blancoa canescens

A slow growing plant but with attractive foliage. It flowers in mid winter but the flowers are not very obvious as the stalks are short.

Borya nitida

A most interesting plant. Dr. Gaff, Monash Univ., and a number of his research students have worked on its mechanisms of "resurrection". I discovered that it would resurrect by accident. On a very hot summer's day I noticed the foliage had turned brown and thought that that was the end of another of my rare ones. I was rather surprised therefore to see it in its former pristine state after one of Melbourne's cool showery changes. The mechanism appears to rest with the types of proteins that are known as enzymes. If these are destroyed during dehydration the plant can't function once it's re-hydrated. These types of enzymes are shared with a few other lilies, are more common in ferns and are almost universal in mosses and liverworts. That is, as plants become more advanced they lose this ability.

My plant is from W.A. where a number of races are recognised. The plant is recorded for the Grampians in Vic., from one place only. Dr. Churchill has thrown some doubt on this being a bona fide recording, although the niche it reputedly occupies there — in cracks on bare rock faces — is similar to those in W.A.

Leptorhynchus tenuifolius

Another of our local Waverley plants. It appears to be very hardy but is difficult to propagate. The only success I have had is from root cuttings.

Veronica perfoliata

Very hardy and tends to remain in one place even though it suckers. It is by no means vigorous but worth having for its foliage and small blue flowers.

Veronica gracilis

A very small delicate plant. This is also one of our local plants and so worthy of investigation. Very easy to strike from cuttings and may be useful for a hanging basket.

Herbaceous Plants in Sydney

By CHARLES NAPIER-THOMSON

In response to a request by the Editor I set out my experiences with these plants.

Lomandra glauca. Not a very interesting plant. It was growing here before the house was built (1954). Dug up and transplanted when the swimming pool was put in, it is still thriving.

Lomandra montana. Appeared from roots or seeds in soil brought from Moss Vale for the purpose of growing waratahs, 1972. Healthy and increasing.

Lomandra multiflora. A male plant from Beecroft Peninsula, Jervis Bay, it has many flower spikes each year.

Patersonia fragilis. I have tried them several times. I find they flower well and then die. I would like to know how to grow this more successfully.

Bulbine bulbosa. Two plants were grown from seed in 1969. One produced many spikes each year, and died suddenly last year. The other, in semi-shade, only has one or two spikes per year and is still healthy.

Bulbinopsis semibarbata. Many small spikes each year. So many seedlings that it achieves the status of a weed.

Stypandra caespitosa. Several clumps which flower magnificently each spring. They seem to need extra water. I have had others which died when they were allowed to get dry.

Stypandra glauca. I have tried it several times, but it does not seem to like the sandstone-overlain-with-clay conditions. I am now trying this and several other species in a bed of pure mountain-sandstone soil.

Podolepsis jaceoides. I have tried it several times. It always flowers one summer and dies.

Myriophyllum propinquum. I brought a piece from the side of a lake near Canberra in December, 1976, and it is in soil in a container immersed in water. It is probably too early to say how successful this will be.

Lotus australis. Some years ago I collected seed from a strongly pink form near Nundle. I grew a shrub a metre high and a metre broad, covered with flower, and it died after the flowering season.

Ajuga australis. I have had a patch of it for many years, originating from Narrabri district. I think the individual plants have a short life, and the patch is carried on by seedlings. I have given many seedlings away.

Mimulus repens. I have collected pieces from swamps a number of times and tried to grow them in soil in a container standing in water. It always flowers well and then dies out. Maybe the Sydney water is too alkaline. It would be interesting to try pieces in water with different pHs.

Stellaria flaccida. I am using it as a ground cover in a shady area. It is a bit too vigorous and tends to spread too far.

Stellaria pungens. I have been trying to use it as a cover for a hot slope. It forms a good cover, but large patches then die. Rhizomes then form other plants where not wanted, so that it is uncontrollable.

MY HERBACEOUS PLANTS

by Peter Duntstan

I live above Clontarf Reserve near the Spit Bridge, north of Sydney, N.S.W., and my garden has 8-25 cm of sandy loam over impermeable clay on a sandstone base. I have successfully grown the following genera:

(1) *Bulbine bulbosa,* this species seems to be very hardy and flowers very easily if grown in light shade and kept fairly moist. Seed germinates in 12 to 14 days and self-sown plants appear everywhere. It seems to like a cool root run and looks best when grown in clumps. The plants also transplant very easily if kept moist.

Bulbine bulbosa "Native Leek", a small onion-like herb with tufts of soft, fleshy, bright-green leaves to 15 cm. The flowers are borne on long terminal racemes to 30 cm, are clear yellow, 6 petalled, and about 1 cm across, they open gradually from the base of the stem.

(2) *Patersonia longiscapa* I have raised from seed and the plants are thriving and should flower this season. The only problem is that it is prone to insect attack, but new growth appears quickly. It likes sun with cool roots and is tolerant of drought and wet conditions and doesn't appear to resent clay as long as drainage is reasonable. Seed germination is 48 days.

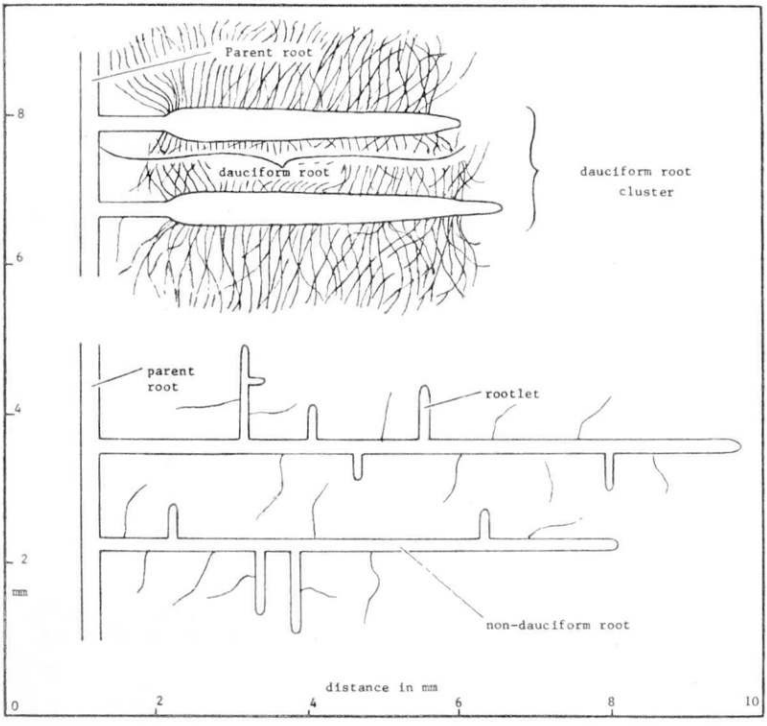
Patersonia longiscapa is a small clump-forming plant with tufts of flat, grey-green leaves to 15 cm, which are red at the base. Flowers are borne on tall racemes to 60 cm, several flowers emerge singly from each head and last only one day. The flowers are large, 3 petalled and purple. Each clump has many flower-spikes.

(3) *Podolepis jaceoides,* the yellow-frill daisy, has grown and flowered. This is another species which likes moist but well-drained soil, particularly round the base of the plant. Flowers came from a single stem with branches. Seed germinates without treatment in 14-18 days, but the plants are loved by snails at all stages.

Podolepis jaceoides is a small annual to biennial Daisy, with large soft, flat, green leaves which are basal. Flowers are carried on thin, wiry, branched stems to 60 cm, are yellow, circular, with a fringed edge and are about 3 cm across.

(4) *Tricoryne simplex* is growing quite happily in a pot in a bush house. It likes a sunny position and water. Growing in a well-drained clay soil, it suckers freely from the base. Seed germinates easily when fresh.

FIG. 1: Dauciform roots—the root system of sedges.



THE ROOT SYSTEMS OF SEDGES

By DR. BYRON LAMONT
(Biology Department, Western Australian Institute of Technology)

Introduction

While sedges have many features in common with grasses, grasses are more conspicuous in the semi-arid and semi-tropical parts of Australia, whereas sedges are more common in the maritime areas of southern Australia. They often form the dominant vegetation around the edges of rivers, lakes and swamps, but are prominent in dry dunes and sandplain country as well. Like perennial grasses, the long leaves arise from horizontal underground rhizomes which may be very short (to give a dense clump), or reach many metres (to give a sedge sward). New season's roots arise from the same nodes that produce the leaves and leaf-like aerial branches (that bear the flowers). These primary adventitious roots are usually 2 to 5 mm wide and radiate out from the rhizome. They have a well-developed root cap for protecting the growing tip as it pushes through the soil, and the roots of many species exude a thick mucigel which clings to soil particles and is thought to increase the absorptive qualities of the root.

The primary roots soon produce laterals at right angles, which in turn produce more roots, and these in turn usually bear the ultimate rootlets, rarely more than 0.2 mm wide. Root hairs, which increase the absorptive area of the root, are scattered over the various root types, but are most abundant on these rootlets. A special feature of the packing tissue (cortex) around the central conducting tissue of the larger roots are the very large air spaces between the fragile cells — this facilitates movement of oxygen from the shoots down the root to the growing tip. This oxygen may even leak from the root to aerate the surrounding soil, an important adaptation for growth under waterlogged conditions.

In addition to the above, many sedges have been shown over the last 5 years to produce bunches of specialized rootlets not unlike proteoid roots in the Proteaceae. Because of their carrot-like shape, these structures are called dauciform roots (carrot belongs to the genus *Daucus).* To date, they have been recorded from sedges in southern Australia, New Zealand, and Ireland through to northern Italy and the Caucasus Mountains in the USSR. They have been found so far on species in the following Australian genera: *Carex, Cladium, Cyathochaete, Gahnia, Lepidosperma* and *Schoenus,* but not *Scirpus* (Table 1). Of special interest is the report of dauciform roots in two species of the true rushes (Juncaceae) which generally grow in flooded soil, and their probable absence from the related Restionaceae, the wire-rushes, conspicuous among undershrubs of southern Australia and South Africa. The roots of many species in the latter family may however be densely covered with long, persistent root hairs.

TABLE 1

AUSTRALIAN SEDGES AND RUSHES WHICH PRODUCE DAUCIFORM ROOTS

GENUS	FAMILY	TRIBE	NUMBER OF SPECIES *Examined*	*Present*	REFERENCES
Calorophus	Restionaceae	—	1	0	D
Carex	Cyperaceae	Cariceae	23	11	A, B
Cladium	Cyperaceae	Rhynchosporeae	1	1	A
Cyathochaete	Cyperaceae	Rhynchosporeae	1	1	C
Gahnia	Cyperaceae	Rhynchosporeae	2	2	D, E
Hypolaena	Restionaceae	—	1	0	D
Juncus	Juncaceae	—	2	2	B
Lepidosperma	Cyperaceae	Rhynchosporeae	5	5	D, E
Restio	Restionaceae	—	1	0	D
Schoenus	Cyperaceae	Rhynchosporeae	5	5	A, B, D, E
Scirpus	Cyperaceae	Scirpeae	2	0	E

A—Davies, Briarty and Rieley, 1973; B—Powell, 1973; C—Lamont, 1974; D—Gullan, 1975; E—Lamont (unpub.)

Structure of Dauciform Roots

Dauciform roots are easily recognised by their carrot-like shape, even though, on average, they are only 5 mm long (Fig. 1). The swelling however may be obscured by an equally obvious feature — a dense mat of long (1-4 mm) root hairs. In addition most dauciform roots occur in small clusters which themselves may be scattered along the parent root. Equivalent 'normal' (non-dauciform) roots are longer, thinner, deficient in root hairs and often themselves bear minute rootlets. In contrast to proteoid rootlets, dauciform roots are not produced in longitudinal rows, are less crowded and in smaller clusters, are often shorter and of non-uniform diameter, and are longer-lived.

The dilated portion of dauciform roots is almost entirely due to extensive radial elongation of the epidermal cells around the root. The epidermal and cortical cells of 'normal' sedge roots are longitudinally, rather than radially, elongated. Unlike proteoid rootlets, dauciform roots are not necessarily of limited growth, and may occasionally resume normal growth at the apex or produce additional roots within the non-swollen portion.

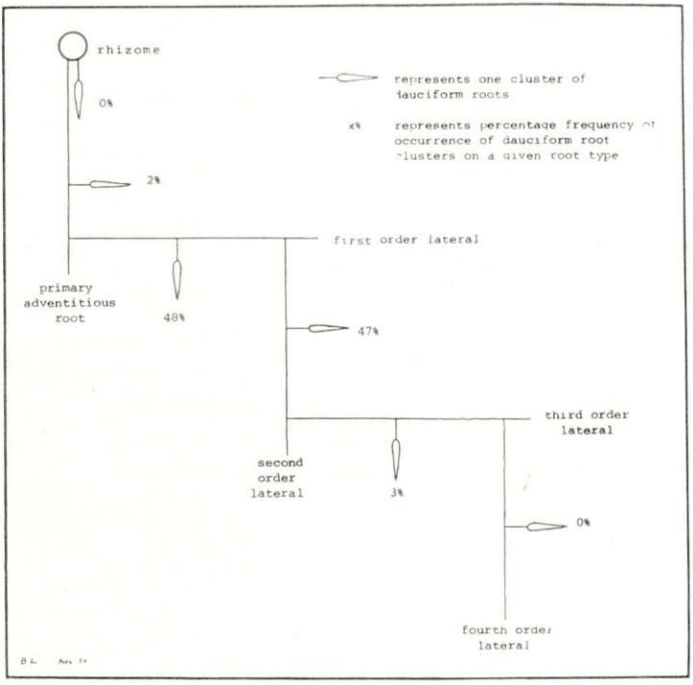


Fig. 2.

For root details see Fig. 1.

Contribution to the Root System

Dauciform roots have been observed on sedges growing in wetlands and drylands, uplands and lowlands, sand and peat. However, the contribution of dauciform roots to the root system is much reduced in very dry habitats, though not all species growing in wetlands produce them.

Seedlings as young as a month old may produce dauciform roots. These specialized roots sometimes grow from the primary adventitious roots, especially in young root branches, but more commonly from first and second order laterals in older root branches (Fig. 2). Young dauciform roots have only been observed by the writer during the winter-spring growing season in Western Australia, but they appear to be produced throughout the year in less severe climates.

For *Cyathochaete avenacea,* the present writer has shown that the number of dauciform roots per shoot in sand culture is much greater at low levels of nitrogen (N) than in the absence of N, or at moderate levels of N (the maximum for non-dauciform roots). With nearly 100 dauciform roots per shoot at the 'peak' level of N, these roots still only contributed 4% of the dry weight of the root system. Similar results on another sedge were obtained with phosphate by Dr. Conway Powell in New Zealand.

Distribution through the Soil

As with proteoid roots, there are far more dauciform roots in the surface soil horizons than would be expected from the profile distribution of the 'normal' roots. The reasons for this have not yet been explored, but it is not unlikely that dauciform roots form preferentially in localized regions of higher nutrient status in otherwise deficient soils.

Association with Micro-organisms

Their concentration at the soil surface, their tendency to occur in bunches, and their (superficial) similarity to proteoid roots, led to speculation that dauciform root initiation is controlled by a biological agent distributed as 'loci' through the soil. Pre-existing sedge tissue harbouring suitable micro-organisms seemed most likely to serve as such loci. However, more recently dauciform roots have been observed in pure sand and sterilized soil, and so we await the results of further research to see if a microbial stimulus is required or not.

Young to mature dauciform roots do not contain micro-organisms, but older roots may be invaded by threads of fungi and actinomycetes which tend to occupy the outer cell layers. Some of these have characteristics which suggest they may have a symbiotic rather than a pathogenic relationship with the root, but generally mycorrhizes are almost unknown in sedges.

Function

In view of their structure and profile distribution, dauciform roots would have little significance in terms of aeration of the rhizosphere or nutrient storage. Mineralization of insoluble nutrients and enhanced nutrient uptake from impoverished soils seem more likely. Dauciform roots may even be more efficient in this regard than proteoid rootlets, as they are wider spaced in the soil, are longer lived, cling to smaller soil particles, may be aided by microbial symbionts, usually occur in moister environments and have longer and a greater density of root hairs. With regard to the last point, studies by Dr. Paul Gullan in Victoria showed that *Lepidosperma concava* may have over 16,500 root hairs per cm length of dauciform root, giving it a 100 times greater surface area than in the absence of root hairs.

It is interesting to note the incidental evidence that sedges known to bear dauciform roots do not respond markedly to increased supply of nitrogen or phosphorus (dauciform root production perhaps adjusting to the supply of nutrients), whereas those presumably lacking dauciform roots respond very markedly. However, this could equally be due to a lower growth rate and hence a lower demand for nutrients in the first group. In a water culture experiment conducted by Dr. David Jeffrey in Victoria, plants of *Lepidosperma concava* absorbed considerably more phosphate than four other major heath species studied at the same time. As already noted, this species produces dauciform roots in abundance in the field, so these structures no doubt made a large contribution to this enhanced rate of uptake.

Finally, it should be emphasised that sedges are native to very poor soils. While they are easily propagated from rhizomes (*like* Juncaceae, but *unlike* Restionaceae), which also serve as a nutrient store, they are slow growing (*like* Restionaceae, but *unlike* Juncaceae). This means that they do not require rich soils or fertilizing. The role of dauciform roots in maintaining this slow, steady growth in impoverished soils is still uncertain, but it should be noted these roots only form a small part of the total root system and indeed many species manage quite satisfactorily without them.



Cyperaceae in Southwestern Australia

by Ken Newby,
School of Environmental and Life Sciences
Murdoch University, W.A.

Known collectively as sedges, the family has about 21 genera present in southwestern Australia; most prominent are *Cladium, Gahnia, Lepidosperma, Schoenus* and *Scirpus*. About 160 species have been named. Species are usually difficult to identify, often at generic level. Few botanists have worked on this family over the last 70 years. So far, my own studies indicate at least 50 additional unnamed species.

Cyperacea is often hard to distinguish from the family Restionaceae (cord sedges), and some of the coarse tufted perennial grasses, e.g. *Spartochloa scirpoidea.*

Sedges have more perennial than annual species. All species have the same basic life form: rhizomes just below ground level connecting upright to spreading simple leaf-life branches called culms, usually with basal leaves similar to the culms, alternate and spreading in a single vertical plane. The life form varies from dense and tufted where the rhizomes are very short between the culms, e.g. *Scirpus nodosus,* to colonial with longer rhizomes, e.g. *Cladium junceum.* (Over recent years some *Cladium* species have been disputedly transferred to *Baumea* and *Machaerina.* For this article the name *Cladium* is retained for all species.)

Annual species are generally much smaller than perennials. Height and width varies from a few cms, e.g. *Scirpus antarticus,* to about 2.5 m *(Lepidosperma effusum).* The culm cross-section is variable: almost square with small wings *(L tetrequetrum),* almost flat *(L. brunonianum),* or terete *(L. striatum).* Culm width varies from under 1 mm *(L. leptophyllum)* to about 2.5 cm *(L. gladiatum).* Apart from a few species, e.g. *Cladium articulatum,* the culms are simple and without jounts. The leaves are generally similar to the culms, more flattened, usually shorter, and sometimes greatly reduced.

Apart from *Carex,* the flowers are bisexual with the anthers maturing before the branched style. The reduced flowers are largely concealed within closely fitting small bracts of the spikelets. Spikelets are generally less than 1 cm long with from 1 to 20 flowers, maturing from the base outwards. The only visible flower parts are the anthers, up to half of the filaments, and the style branches (2 or 3). Individual plants flower 10-14 days. Most perennials flower shortly after the winter opening rains; annuals the middle to late spring.

The flower heads are terminal but sometimes appear one-sided when the bract at the base of the flower head is culm-like, e.g. *Lepidosperma tuberculosum;* sometimes at an angle to the culm, e.g. *Mesomeleana tetragona.* Flower heads usually have more than one spikelet, and may contain several hundred *(Cladium articulatum).* Spikelets may be sessile and crowded, e.g. *Scirpus nodosus,* but are usually on compound branching structures from 1 cm to 1 m long, upright to pendant, rigid to lax.

Cyperaceae is present in almost all vegetation types in Southwestern Australia. A few species will tolerate some salinity, e.g. *Lepidosperma brunonianum* (low), *Scirpus nodosus* (sea water level). I have not seen Cyperaceae on highly saline flats or salt lake margins dominated by *Arthroonemum* and *Salicornia.* Tufted species tend to be associated with drier soils, colonial species with damp and waterlogged soils. The majority of annuals grow on winter-damp or winter-waterlogged soils, often around small seasonal pools.

Some Cyperaceae species have horticultural value. A number of tufted species add contrast to informal gardens. Colonial species must be used with care as they may spread further than desired and become a pest. The flowers of some perennials are moderately attractive but unfortunately short-lived. Many perennial species are suited to dried arrangement. They have long, straight and rigid culms (acting as stalks); flower heads remain intact 2-3 years in the field, and 5-10 years indoors. At flowering the flower heads are varying dull shades of yellowish to medium brown, ageing to blackish within a year.

Practically nothing is known about cultivating sedges. Perennial species retain their seed up to two years. It is easy to collect but not all seed is viable. In the field regeneration after fire or earth disturbance is almost entirely by suckering. Seedlings are uncommon. Smaller plants transplant easily. Propagation by division seems highly possible.

The species briefly described below are recommended for informal gardens and dried flower arrangement. All will tolerate diffuse shade but prefer more open situations. Unless stated otherwise, they require well-drained sand to loam. Dimensions are from mature flowering plants in the field; in sheltered situations they can be expected to grow larger. Apart from *Cladium articulatum* all species listed are tufted.

Caustis dioica R. Br.

Upright-spreading, mid-open, 40-60 cm x 40-60 cm. Culms terete, 2.5 mm diameter, dull light green. Flowering heads with numerous curved branches, 8-12 cm long.

Cladium articulatum R. Br.

Upright-spreading, mid-dense, 1.5-2.5 m high, forming large colonies. Culms terete, 6-8 mm diameter, jointed, dull medium green. Flower heads dense, lax, 30-70 cm long. Grows in waterlogged areas.

Evandra aristata R. Br.

Spreading, mid-dense, 1.5-2.5 x 2.0-2.5 m. Culms terete, 5-6 mm diameter, leafy, dull darkish green. Flower heads open, lax, up to 1 m long.

Gahnia deusta Benth.

Upright-spreading, mid-dense, 50-70 x 60-80 cm. Culms terete, 2 mm diameter, dull lightish green. Flower heads dense, 8-12 cm long.

Lepidosperma drummondii Benth.

Spreading, mid-dense, 70-90 x 100-160 cm. Culms flattened, 6-9 mm wide, bright darkish green with fine red margin. Flower heads mid-dense, 10-25 cm long.

Lepidosperma gladiatum Labill.

Spreading, mid-dense, 1.5-2.5 x 2-3 m. Culms winged, 2-3 cm wide, bright darkish green. Flower heads crowded, 10-20 cm long. Grows close to the sea helping stabilize sand dunes.

Lepidosperma tetraquetrum Nees

Spreading, moderately open, 2.0-2.6 x 2.3-3.0 m. Culms almost square, 4-winged, 8 mm across, bright medium green. Flower heads mid-dense, 30-50 cm long. Grows along seasonal creeks in 750-1000 mm rainfall.

Lepidosperma tuberculosum Nees

Spreading, moderately-open, 40-55 cm high, slightly colonial, 40-90 cm across. Culms bright darkish green, 5-7 mm across, flattened, margins resinous, sometimes red. Flower heads dense, 13-20 cm long.

Lepidosperma viscidum R. Br.

Spreading, mid-dense, 50-70 x 60-100 cm. Culms flattened, 3-4 mm across, glossy darkish green. Flower heads moderately open, 20-30 cm long.

Mesomelaena stygia Nees

Upright-spreading, mid-dense, 20-40 x 15-35 cm. Culms almost terete, under 2 mm diameter, dull medium green. Flower heads appearing axillary, mid-dense, within 2 flower head bracts, 10-12 mm across.

Mesomelaena tetragona F. Muell.

Spreading, open, 60-100 x 80-130 cm. Culms almost terete, 2 mm diameter, dull medium green. Flower heads dense, globular, about 20 mm across, within 2 culm-like bracts with spreading bases.

Schoenus curvifolius Benth.

Upright-spreading, open, 18-25 x 15-25 cm. Culms terete, 1 mm diameter, dull medium green. Flower heads dense, upright, 12-15 mm across, surrounded by 4 or 5 almost divaricate, narrow basal bracts 4-8 cm long.

Schoenus grandiflorus F. Muell.

Upright-spreading to spreading, 30-100 x 30-70 cm. Culms terete, 3 mm diameter, bright light greenish yellow, leafy. Flowers in moderately open leafy spikes 15-35 cm long. Mainly grows on stabilized coastal sand dunes with low lime content in 625-1200 mm rainfall.

Scirpus nodosus Rottb.

Upright-spreading to spreading, mid-dense 60-85 x 70-120 cm. Culms terete, 2.5-3.0 mm diameter, dull darkish green. Flower heads globular, dense, 12-16 mm across. Grows on coastal dunes (mainly in the troughs), margins of swamps, rivers and creeks. Will tolerate salinity slightly higher than sea water.

Tricostularia neesii Lelm.

Upright-spreading, mid-dense, 40-70 x 40-70 cm. Culms terete, 1.5 mm diameter, dull lightish green. Flower heads spike-like, 8-11 cm long.

EDITOR'S NOTE: There are some very interesting sedges. Will readers who know of plants that may have horticultural potential please advise me. I would especially like to hear from anyone who has any experience in the germination of seed of sedges, or who can supply seed for an investigation we have in hand.

More Garden Herbaceous Plants

By CHARLES NAPIER-THOMSON

***Brunoniella australis* (Acanthaceae)**

This is a tiny plant with shilling-sized flowers of brightest blue. The plant itself is small enough to get lost among shrubs or to be mistaken for a weed, and is therefore probably best grown in a pot.

I have not been able to collect the seed. It falls around where the plants have been growing, so that many natural seedlings appear.

The species is widespread in eastern Australia, both on the coast and inland.

***Calotis cuneifolia* (Compositae)**

In the wheat belt and other inland districts this is considered a weed, the objection being the prickly burrs that comprise the seed-heads. Each seed bears a spine, and these lodge in the socks of the passerby and create an itch, so that the plant has earned the name "Bogan Flea". My plant in the garden has produced thousands of such seeds but I have not been able to obtain any germinations.

My specimen was a tiny seedling on the road verge near West Wyalong. I transplanted it to Sydney in December, 1976. From about July to December, 1977 it formed a clump about a metre in diameter covered with blue daisies that would put any *Brachycome* to shame. By January, 1978 the prostrate stems were looking very old and I cut them all back to fresh young shoots of which a number were arising from the lower part of the stems.

Evolvulus alsinodes (Convolvulaceae)

An accidental discovery. An annual with prostrate stems, small, sparse dull-coloured leaves and small pale blue flowers does not sound a promising horticultural subject. In the spring of 1970 I had some soil from inland N.S.W. and I put it in an old tub for storage. *Evolvulus* germinated. I find that if you train the prostrate stems back into the tub there is a concentrated show of blue flowers all the summer, and the seeds fall back into the tub so that new plants are produced there the following spring.

Hybanthus enneaspermus (Violaceae)

It came as a surprise to find that there is a *Hybanthus* with flowers of a colour other than blue. This species from northern N.S.W. has bright orange flowers of the same structure as the more common species, i.e. all petals but one are minute. The anterior petal of *H. enneaspermus* is usually broader than in others of the genus.

The plant is quite small. The leaves are sparse and small, and if planted in the garden the plant would be in danger of being lost, so that it would seem best to keep it in a pot.

Isotoma anethifolia (Lobeliaceae)

The appearance of the plant is very similar to the well-known *Isotoma axillaris,* but the flowers are white, not blue, with broader petals, and generally a little larger. The flowers are more zygomorphic than *I. axillaris,* the two upper corolla lobes and the three lower being closer together with wider spaces at the sides. It is a more floriferous plant than *I. axillaris.*

The life of the plant is short, averaging about two years. Seeds are easy to collect and germinate readily. Cuttings strike easily, so that there is no difficulty in maintaining continuity.

The home of *I. anethifolia* is in the forests of the far northern highlands of N.S.W. and southern Queensland.

Polymeria calycina (Convolvulaceae)

This is a ground-cover for a sunny but rather wet position. It is vigorous but reasonably controllable. It bears shilling-sized flowers of a pale but bright pink.

Propagation is easy because roots form at the nodes of the creeping stems, which can then be separated to form new plants.

The species is widespread on the east coast of Australia. It is probably quite common but is usually lost among heavy grass. Sometimes you may see a pink flower among a tangle of grasses, particularly in high-moisture positions such as on the south side of the headlands.

Velleia spathulata (Goodeniaceae)

When not in flower the plant consists of a rosette of dark green leaves similar in appearance to various common weeds such as *Plantago.* For a long period over the summer months flowers are produced in decumbent panicles much longer than the leaves. The peduncles are filiform and consequently not easily visible. The effect is of a scatter of yellow flowers on the ground around the central rosette, but at first glance, not connected with it. It would probably display the flowers well to cover the ground around the plant with black plastic.

The flowers are not the largest in the genus, being much smaller, for instance, than the striking *V. paradoxa,* but many more flowers are produced. *V. spathulata* comes from the coast of N.S.W., mainly north of Sydney.

I have not yet tried to collect the seeds, but I should think a successful method will be to cover spent panicles with plastic bags while they are still attached to the plant.

THE GENUS *BULBINE* IN AUSTRALIA

Sketch, key and some notes taken from pages 118-9 in "Brunonia", Vol. 1, No. 1, dated 24th February, 1978, from a research report by H. Baijnath. "Brunonia" is a new journal published for Herbarium Australiense by the C.S.I.R.O. Annual subscription for this journal of taxonomic botany and related fields is $10.00 per annum.

A detailed account of the Australian members of the genus *Bulbine* will be the subject of a future paper. This report is to record the naming of a new species, *B. alata,* defined in the sketch and the key herewith.

Some writers have placed Australian species in a separate genus, *Bulbinopsis,* but investigations of this author do not warrant the maintenance of the genus *Bulbinopsis.* Pending further research the species are referred to as *Bulbine* in this issue.

KEY TO THE SPECIES OF *BULBINE* IN AUSTRALIA

Usually large perennials; tepals 9-20 mm long; styles 4-6 mm long; seeds 3-5 per loculus ..... *B. bulbosa*

Usually small annuals; tepals 3-8 mm long; styles 1-2 mm long; seeds 1-2 per loculus.

Capsules 6-8 mm long; seeds winged; all filaments hairy; bracts broadly ovate ..... *B. alata*

Capsules 2-4 mm long; seeds not winged; only 3 inner filaments hairy; bracts narrowly ovate ..... *B. semibarbata*

Notes on Australian Bulbine

By CHARLES NAPIER-THOMSON

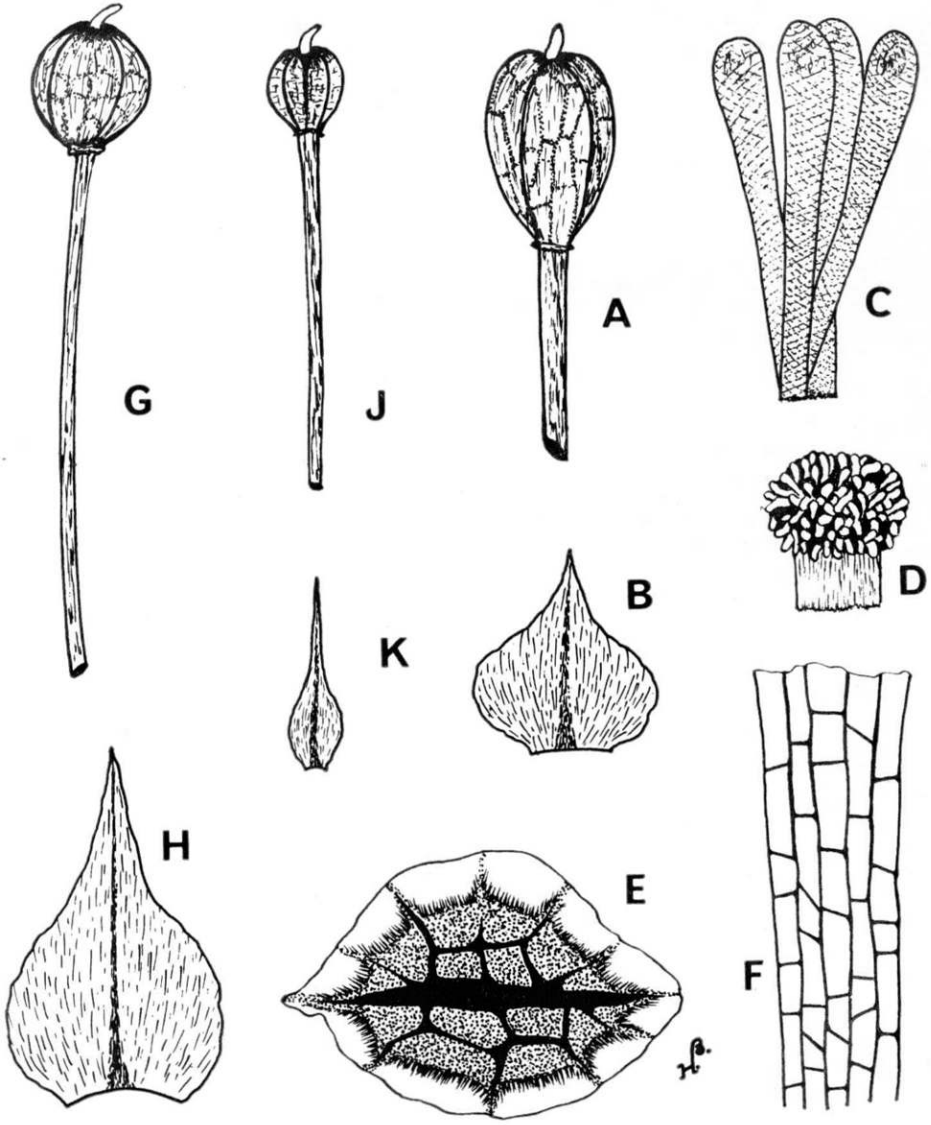
Bulbine is an African liliaceous genus with a few outlying species in Australia. Several years ago taxonomists split some or all of the Australian species into a separate genus, Bulbinopsis, but recent literature seems to have reverted to referring to them as *Bulbine.*

Bulbine bulbosa is found in the moister parts of southeast Australia. The plant consists of a tuft of soft deep green leaves from which arises a tall stem producing a few bright yellow starry flowers. As the stem continues to grow these flowers die and more flowers are produced on the new growth. If the plant is kept well watered the stem will elongate to several metres, producing new flowers as it lengthens. This is curious, but of course not pretty.

Bulbine semibarbata is similar but smaller. Its range is wider, extending to Western Australia. I have not found it a good garden plant because its seeds germinate too freely, and it becomes a weed.

AUSTRALIAN PLANTS IN COLD CLIMATES

The Canberra region is preparing a full issue of "Australian Plants" describing plants for cultivation in cold climates both in Australia and overseas. The special problems associated with gardening in these conditions will be examined. Readers are invited to forward articles, small notes, or just a few lines about their experiences that could be of value to others. Good colour slides or colour prints are also needed of plants that have indicated suitability. Replies should be sent direct to D. H. Mackenzie, 46 Cockle Street, O'Connor, A.C.T., 2601.



Bulbine alata: A, capsule with style remains and pedicel, X3; *B*, bract, X6; *C*, filament hairs, X150; *D*, stigma papillae with porticn of style, X75; *E*, outer face of winged seed, X8; *F*, cells of seed wing, X80. *B. bulbosa: G*, capsule with style remains and pedicel, X3; *H*, bract, X6. *B. semibarbata: J*, capsule with style remains and pedicel, X3; *K*, bract, X6. *A-D* from *Symon 5679*; *E.F.* from *Basedow 279*; *G.H.* from *Morrison 1514*; *J.K.* from *Schodde 596*.

Some Herbaceous Plants of South Eastern Queensland

Notes from the work of BERYL A. LEBLER

A very well-written small book by Beryl A. Lebler entitled "Wildflowers of South-eastern Queensland—Vol. 1" has been produced by the Department of Primary Industries, William Street, Brisbane, Qld. You can obtain a copy by forwarding to the department $2.50, which includes postage.

The chapter headed "Herbs" gives a very good description of the plants in the family Violaceae in the area, these being *Viola hederacea* and *Viola betonicifolia,* together with *Hybanthus monopetalus* and *Hybanthus enneaspermas.* You must buy a copy to obtain a full but very simple description of these lovely little herbs. As a guide to the style of the book the following report on three other herbs will be of interest.

ANEILEMA AND MURDANNIA

Three native herbaceous plants, closely related to Wandering Jew, known by most gardeners, begin to bloom in early summer.

Two have white flowers and are species of *Aneilema.* They grow in rainforests, along road edges, on shady banks beneath shrubs and ferns, or along creek banks.

The third is *Murdannia graminea,* which has lavender to violet flowers. It grows in grasslands and in open eucalyptus forests among grass. This plant frequently appears in lawns of houses in outer Brisbane suburbs bordering on the mountain ranges.

The name *Aneilema* is derived from the Greek prefix *an,* meaning without, and the Greek word *eilema,* meaning a veil or covering. It refers to the fact that the inflorescence is not included in a spathe; that is, it is not sheathed by an oblique leafy bract.

Aneilema species are always weak herbs with ascending or erect flowering stems. Their leaves are alternate, with bases which sheath the stems. The flowers are small and, in most species, are arranged in terminal panicles with a small concave bract beneath each pedicel.

Each flower consists of three sepals, three spreading petals, usually six stamens, and an ovary containing three cells. Sometimes both the number of stamens and the cells in the ovary are reduced by abortion. The sepals are green and the petals white and very delicate in texture.

In most species three of the stamens are perfect and produce pollen, and the remainder are staminodes. The filaments are glabrous. The ovary in most species consists of three cells, but one cell can be much smaller than the others and contains imperfect ovules, or the ovary can be two-celled.

The fruit is a capsule which is nearly globular or oblong-ovoid in shape and opens in valves. The seeds are mostly cubical and are usually covered with wrinkles.

Two species are found in south-eastern Queensland, *Aneilema acuminatum* and *A. biflorum.*

Aneilema acuminatum

Description: This is a herb with stems which are wiry in texture. The leaves are ovate-lanceolate in shape, 3.5 to 7.5 cm long, 1 to 2 cm wide, and end in a blunt point. They are dark green on the upper surface, pale grey-green beneath. The upper surface is rough to the touch when it is rubbed from the tip towards the base. This is caused by minute raised dots.

On the upper surface the midrib is the most prominent vein. Two secondary veins can be seen on the lower surface, curving outwards from

the midrib and in towards the tip. A short petiole connects the leaf to a rusty cylindrical sheath 1.5 cm long surrounding the stem. Short spreading hairs on the surface of the sheath give it this rusty appearance.

The ends of the stems are erect and reach a height of 30 cm or more. In this part of the plant the leaves are sometimes crowded together. The stem ends in a delicate-looking panicle with many fine branches and flowers on thread-like pedicels. Only a few fragile flowers are open at a time, and never more than one on any branch of the panicle.

The three sepals are green, edged and tipped with purple. When the flower opens, the sepals fold back along the pedicel. The petals are twice as long and are white. In outline the flower shape is triangular, each petal also being triangular, with a very short, narrow claw at the base and a rounded apex.

Each flower is more than 1 cm in diameter. In the centre is a short, white, flattened, cylindrical ovary which ends in a long, slender style curved abruptly out to one side. Surrounding the ovary is a ring of stamens, three with long white filaments and large, white, perfect anthers. These are opposite the sepals. The staminodes are opposite the petals and have shorter, white filaments and kidney-shaped yellow staminodes.

The long white style and the stamens, the filament of one often being shorter than the others, give the flower a delicate lacy appearance. The fruit is a flattened capsule and contains seeds whose outer surface is covered with warty wrinkles.

Flowering time: Summer and autumn.

Habitat: In or near rainforests, along road edges, on shady banks, or along creek banks.

Distribution: This plant is found only in New South Wales and Queensland, in the coast and adjacent plateaux, from as far south as the Shoalhaven River to as far north as the Mulgrave River.

General remarks: This plant grows only in Australia.

Aneilema biflorum

This plant is a rather insignificant, weak herb with slender branches that creep over the ground, rooting at the nodes and sending up short, erect, flowering branches. In luxuriant growth these can be as high as 15 to 20 cm, but more often are only half that height.

The book continues with a similar description to that above, with species being illustrated by sketches. *A. biflorum* has a more restricted distribution and is a weak herb with slender branches, the terminal head of flower being on two short branches rarely exceeding the terminal leaf.

Murdannia graminea

Description: This is a herb with a white, fleshy, thickened, tuberous root from which a tuft of grassy leaves develops. At the time of flowering, an erect stem emerges from the centre of the tuft, with the basal leaves sheathing the stem. The sheath can be up to 2.5 cm long. The leaves are glaucous and are concave.

A sparse covering of short white hairs covers the lower surface, and a scattering of hairs can also be found on the upper surface. The basal leaves can be as long as 23 cm and 1 cm wide, and end in a blunt point. The erect stem can be 60 cm long, but is usually much shorter. It is firm in texture, but not wiry.

The terminal-branched panicle is subtended by a shorter reduced leaf with bracts of a similar form beneath each branch of the inflorescence and very tiny bracts beneath each flower. Between the base of the stem and the panicle there are usually several leaves with sheathing leaf bases tinged with purple.

The flowers are between 1.5 and 1.75 cm wide. The sepals are green, tinged with lavender, 0.6 cm long, pointed and keeled. The widely spreading petals are 0.8 cm long and approximately the same width, with a very short claw at the base and a rounded tip.

All of the stamens have bearded filaments of a deeper tone than the lavender-to-violet petals. Long, thread-like, purple hairs stand out at right-angles to the filaments to form the beard. The stamens are more densely bearded than the staminodes. The fertile stamens are opposite the sepals and are twice as long as the staminodes, which are opposite the petals.

The sterile anthers on the staminodes are hastate and bright yellow. Fertile anthers are white and have begun to shed the pollen before the flower opens. The pale green, three-lobed ovary is almost as long as the staminodes, and the pale lavender or white style bends out abruptly to one side.

Flowering time: Summer to autumn.

Habitat: In sandy soil among grass in open eucalyptus forest.

Distribution: It is found in New South Wales as far south as the Hunter River to as far north as Babinda in Queensland and also in the Northern Territory.

General remarks: Although the flowers are lavender on the coastal plains, on the Darling Downs they are blue.

FROGSMOUTH

Frogsmouth and the shrub blue-tongue are two of the commonest and most widely-spread wildflowers in the coastal belt.

Both have distinctive and brightly-coloured flowers with rather unusual features in their appearance.

Often they can be found growing in the same area, sometimes almost side by side, since both flourish in very moist conditions. Each is also unusual in being the only representative of its genus in Queensland and, in fact, in Australia.

Frogsmouth

Frogsmouth or Woolly Waterlily (*Philydrum lanuginosum*). The Greek word *philydros* means water-loving and is an ideal choice of name for this plant, which grows so abundantly in waterways, ditches and swamps.

The second half of the name is derived from the Latin word *lanuginosus*, meaning woolly or downy. It refers to the loose, white coating of long hairs which cover the leaves, the flowering stalks and especially the inflorescence.

This is a perennial herb, somewhat grass-like in appearance, with rather fleshy roots and a tuft of sword-shaped, light green leaves spreading in the one plane like an opened fan. Frogsmouth usually forms large clumps, sometimes in damp or waterlogged soil, at other times with the base of the plant completely covered by several inches of water.

At first sight the gaping yellow flowers appear to consist of two yellow "petals" (tepals), which are parts of an undifferentiated perianth. The common name, Frogsmouth, is very descriptive of the appearance of one of these unique flowers.

They are arranged on a simple or branched spike, individual flowers being sessile and solitary in the axes of leafy green bracts.

The flower has only one stamen, with a broad thick filament standing erect between the inner tepals. The ovary is covered with white woolly hairs and the short style curves downwards, ending in a globular stigma. The fruit is an oblong capsule about ½ in. (1.25 cm) long, which finally splits into three.

This plant has been brought into cultivation for use in bog gardens. Its only disadvantage is that it is such a vigorous grower and seeds so freely that frequent thinning out is needed to keep it within reasonable bounds. Although the flowers usually last for only one day, a fresh flower opens each day on the stem above the spent bloom.

WILDFLOWERS OF SOUTH-EASTERN QUEENSLAND—Volume 1 — by Beryl A. Lebler. Available from the Department of Primary Industries, William Street, Brisbane, 4000. for $2.50 including postage.

A delightfully written small book of 102 pages (24 x 18 cm), well illustrated with sketches and some colour plates of the wildflowers of S.E. Qld. As an indication of the style of the author, extracts from the book have been reprinted in the article "Some Herbaceous Plants of South-Eastern Queensland" in this issue. Please note that the sections reprinted are only parts of the very competent simple descriptions by an author who is a botanist with a feeling for plants.



Hybanthus 'Native Violets'

By

ELEANOR M. BENNETT

The genus *Hybanthus* is a member of the family Violaceae. There are about 150 *Hybanthus* species known from Africa, India, Malaysia, America and Australia, the main development being in Central and South America. Eleven species are found in Australia.

MORPHOLOGY

They are perennial herbs, undershrubs or semi-creepers with alternate or clustered leaves. Like all members of the Violaceae there are two stipules at the base of the leaves. The flowers are irregular with a large and distinctly spurred anterior petal; the 4 lateral petals are asymmetric, the 2 outer ones being linear and the 2 inner ones are broader. There are 5 anthers which cohere together by an apical connective appendage and connecting tissue at the side of the anthers. Some species have orange or white narrow triangular loculi appendages less than 0.5 mm long. In all species the 2 lower (anterior) stamens have nectaries at the base.

1. H. enneaspermus

A perennial spindly herb or compact shrub to 60 cm high, usually glabrous but with occasional scattered pubescence on the linear entire leaves. The stipules are scarious, linear 1-7 mm long. The flowers are solitary; the two anterior anthers have elongated nectaries tipped with a dense tuft of hairs. The seeds are yellowish-white with longitudinal ribs.

ssp. enneaspermus

This subspecies with blue flowers, is found in the north-west of Western Australia, Northern Territory, Queensland and northern New South Wales.

ssp. stellarioides

This subspecies has yellow flowers, and is found in coastal areas of eastern Queensland and eastern New South Wales.

2. H. aurantiacus

A compact, typically scabrous shrub to 60 cm high. The leaves are alternate or clustered, linear to lanceolate, with serrate dentate, occasionally entire margins; the stipules are linear, 1-30 mm long, pubescent, occasionally glabrous, green and leaf-like or yellow-white and pithy. The flowers are solitary, yellow to orange; the two anterior anthers have sessile, glabrous to densely pubescent nectaries. The seeds are yellowish-white, smooth and pitted.

The species is found in the north-west and northern Western Australia, Northern Territory, northern South Australia and Queensland.

3. H. cymulosus

A perennial herb to 70 cm high with linear, alternate leaves and small tripartite or laciniate stipules. The inflorescence is a 3 to many flowered dichasia reaching 2-5 cm long with blue flowers; the nectaries on the anterior anthers are sessile and glabrous. The seeds are dark brown, pusticulate.

This species is found only on Mount Singleton at Ningham Station, Western Australia.

4. H. floribundus

A shrub 1.5 m with alternate linear, lanceolate or oblong leaves; the stipules are 0.5-1.5 mm long, glabrous or with a few hairs at the base. The inflorescence is axillary, dichasial or racemose, reaching up to 40 cm in length, occasionally with solitary flowers. The flowers are white or blue.

ssp. floribundus

This subspecies shows a lot of variation in habit and morphology. Typically the leaves are broad and flat. Variation in the sepals is from pale blue and petaloid, to dark blue or green and not petaloid.

This subspecies is widely distributed in the south west of Western Australia, South Australia, Victoria and southern New South Wales.

ssp. adpressus

This subspecies has narrow conduplicate leaves which are appressed upwards against the stem, and pale blue petaloid sepals.

It is found near Ravensthorpe in Western Australia.

ssp. curvifolius

This subspecies has distinctly curved, conduplicate leaves with an uncinate apex and dark blue to green sepals.

It is found around the Kalgoorlie-Norseman area of Western Australia. This plant has been found to have a high nickel content and has been suggested as a possible nickel indicator plant.

KEY TO SUBSPECIES OF *HYBANTHUS FLORIBUNDUS*

1. Sepals petaloid, pale blue, apices recurved. Leaves ± appressed upwards against stem.
   2. Leaves narrow, conduplicate (Ravensthorpe area) — subsp. *adpressus*
   2. Leaves broad, flat, distinct pustules on surface — subsp. *floribundus*
1. Sepals dark blue to green, apices appressed to petals. Leaves variously spreading.
   3. Leaves conduplicate, curved (Norseman area) — subsp. *curvifolius*
   3. Leaves flat, not curved — subsp. *floribundus*



Photography by H. A. Morrison

Hybanthus floribundus

The tallest-growing species of this genus of plants that are usually quite small. This is a shrub to 1.5 m found right across southern Australia.



Photography by E. M. Bennett

Hybanthus calycinus **(flower and bush)**

5. H. monopetalus

Perennial herbs to 60 cm high with alternate leaves, although the upper ones are often opposite. The stipules are linear-lanceolate to triangular-deltoid 0.25-1.5 mm long. The racemes are axillary up to 20 cm long with blue flowers. The seeds are black.

This species is found in South Australia, south-eastern Victoria, New South Wales and Eastern Queensland.

6. H. debilissimus

A perennial, procumbent or low growing herb with alternate lanceolate leaves and no stipules. The racemes are 1-3 flowered, axillary, 2-3 cm long with blue flowers. The seeds are dark-brown.

This species is found in the south-west corner of Western Australia. It flowers prolifically after the area has been burnt, as all recent collections have been made after a fire.

7. H. calycinus

A perennial herb to 60 cm tall with alternate linear leaves and linear-lanceolate stipules 0.2-1 mm long. The racemes are 5 to many flowered, axillary, about 20 cm long, with blue to purple flowers. The seeds are black, reticulate.

This species is found in the south coastal regions of Western Australia.

8. H. volubilis

A twining perennial herb with alternate, linear-lanceolate leaves and linear stipules, 0.25 mm long. The flowers are solitary, axillary, white with mauve veining. The seeds are smooth, mottled pale and dark brown.

This species is found along the banks of the Margaret River in the south west of Western Australia.

9. H. vernonii

A perennial herb or shrub up to 90 cm tall, with alternate leaves, the lower ones usually lanceolate, the upper ones linear; stipules linear 0.5 mm long. The flowers are solitary in the upper axils, blue to mauve. The seeds are brown, smooth to lineolate.

ssp. vernonii

The leaves and stems are glabrous, the lower leaves are much broader than the upper.

This subspecies is found along the central and south coast of southern New South Wales and Eastern Victoria.

ssp. scaber

The stems are scabrous along the ribs. The leaves are lanceolate to oblanceolate to tricuspidate with scattered hairs on both surfaces.

This subspecies is found along the east coast of New South Wales.

10. H. epacroides

A spinescent shrub to 40 cm high with divaricate branches. The leaves are clustered occasionally alternate, linear to spathulate, with linear to lanceolate stipules 0.5 mm long. The flowers are solitary, pale blue, arising from the middle of the leaf cluster. The seeds are smooth, mottled pale and dark brown.

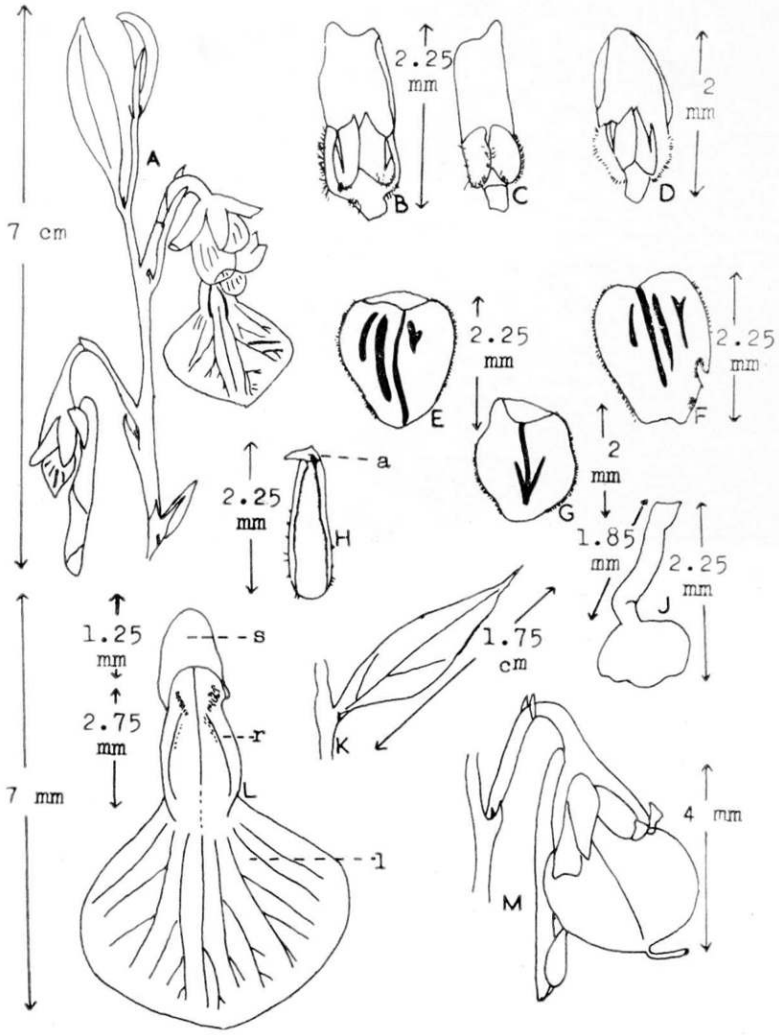
This species is found in the south west of Western Australia.

11. H. bilobus

An intricately branched shrub to 20 cm tall with divergent lateral branches. The leaves are scattered, usually clustered, obdeltoid, truncate, appearing bilobed as a result of the recurved central portion of the leaf apex, the stipules are linear 0.5 mm long. The flowers are pale blue, solitary, axillary or from the middle of the leaf cluster.

This species is found in the Norseman and near coast areas of Western Australia.

The Flower of *Hybanthus*



FIGURE—*Hybanthus volubilis.* A—Inflorescence. B—Posterior surface of anterior anther. C—Anterior surface of anterior anther. D—Posterior anther. E—Posterior surface of inner petal. F—Anterior surface of inner petal. G—Outer petal. H—Sepal. J—Ovary. K—Leaf. L—Anterior petal. M—Capsule. a = apex recurved; s = spur; r = raised ridges; l = anterior petal, white with mauve markings.

Article is based on "A Revision of the Australian Species of *Hybanthus* Jacquin" by Eleanor M. Bennett in "Nuytsia", Vol. 1, No. 3, 1972, published by the Department of Agriculture, Western Australia. This source of the above sketches is gratefully acknowledged.



Hybanthus aurantiacus Photography by H. A. Morrison

A hardy plant often found in rocky places in dry parts of northern Australia. It is one of the two Australian species with yellow or orange flowers.

KEY TO THE AUSTRALIAN HYBANTHUS SPECIES

1. Flowers solitary, subtended by one pair of bracts.
   2. Inner lateral petals lanceolate falcate.
      3. Gland at base of anterior anthers elongated, glabrous or tipped with tuft of long hairs ..... *1. H. enneaspermus*
      3. Gland at base of anterior anthers sessile, usually densely hirsute ..... *2. H. aurantiacus*
   2. Inner lateral petals oblong.
      4. Anterior petal 6 mm long or longer.
         5. Plant twining ..... *8. H. volubilis*
         5. Plant a shrublet, never twining ..... *9. H. vernonii*
      4. Anterior petal 3-5 mm long.
         6. Plant glabrous or with few scattered hairs ..... *4. H. floribundus*
         6. Plant densely hirsute.
            7. Leaves linear; sepals glabrous or sparsely pubescent ..... *10. H. epacroides*
            7. Leaves obovate to bilobed; sepals densely hirsute along margins and veins ..... *11. H. bilobus*
1. Flowers not solitary (or if solitary several pairs of sterile bracts present below flower).
   8. Inflorescence racemose.
      9. Inner lateral petals lanceolate-falcate *5. H. monopetalus*
      9. Inner lateral petals oblong.
         10. Stipules triangular, prominent. Racemes about 20 cm long. *7. H. calycinus*
         10. Stipules absent or very small. Racemes 2-3 cm long .... *6. H. debilissimus*
   8. Inflorescence dichasial or branched.
         11. Stipules flat. Anterior petal 9 mm or more long ..... *3. H. cymulosus*
         11. Stipules terete. Anterior petal less than 9 mm long .... *4. H. floribundus*

GROWING HYBANTHUS SPECIES

SEEDS: I have successfully germinated seeds of *H. enneaspermus, ssp. enneaspermus* and *H. aurantiacus* mainly for cytological work. The seeds germinated within 2 weeks, those being soaked in water often showing germination within 3 days. Seeds of *H. calycinus* and *H. floribundus* failed to germinate although they were tested and found to be viable. After examining the seeds at 18 months intervals it appeared that the embryo continues to mature, and that the maturity of the embryo may to a certain extent control seed germination.

AUSTRALIAN VIOLA



Photography by M. Hodge

Viola hederacea **(top)**

Viola betonicifolia **(bottom)**

See next page for Australian Violaceae



Violaceae in Australia

By L. PEDLEY

Queensland Herbarium,
Dept. of Primary Industries, Qld.

The best-known species of the family Violaceae are the cultivated pansies, violas and common violets. These are plants of north temperate regions and give a false impression of the distribution of the family, which is widely spread, but which probably originated in the tropics and subtropics. *Viola* is also misleading in another way. Its species are herbaceous, with zygomorphic ("irregular") flowers highly modified to facilitate pollination by insects. Towards the end of the growing season apetalous flowers that do not open (i.e. cleistogamous) are produced. These develop viable seeds. On the other hand *Rinorea,* usually considered the most primitive member of the family, has actinomorphic ("regular") flowers with no special adaptions to ensure pollination.

The family consists of about 900 species in 22 genera. It is not well represented in Australia, having only 18 species in four genera. *Rinorea* is represented by one species in Australia. Botanists differ as to whether it is endemic Australian species or only a minor variant of a species that ranges from India to the Pacific Islands. It is a tree up to 10 m tall found in rainforest from the Daintree River to Iron Range. *Hymananthera* is restricted to Austalia, New Zealand and Norfolk Island. There is probably only one variable species in south-eastern Australia. It is a shrub, sometimes with spiny branches, with regular flowers. *Hybanthus,* with 11 species in mainland Australia, is the best developed genus and the only one that extends to Western Australia and the Northern Territory. *Hybanthus* has zygomorphic flowers with one petal spurred and much larger than the other, and nectaries at the base of two of the anthers. Though some species are woody, it is more closely related to *Viola* than it is to the other woody genera, with regular flowers that occur in Australia.

Species of *Viola* occur naturally in Australia, but with only five species out of a total of about 500 it is not well represented. The genus is best developed in temperate regions, in Australia in the south-east. All five species are found in Tasmania. Two species have rather restricted ranges, but the other are widely distributed. *V. cunninghamii* occurs in New Zealand and Tasmania. *V. hederacea* is a common plant in south-eastern Australia and has also been recorded from the Malay Peninsula. Intermediates between it and *V. sieberana* are reported to occur in north-eastern Victoria and on Kangaroo Island. *V. betonicifolia* ranges from south-eastern Asia through the East Indies and New Guinea to Tasmania and South Australia. The species is quite variable and three subspecies are usually recognised. Native violets are easy to grow, occupy little space and should be more widely cultivated.

An interesting characteristic of some Violaceae is their ability to acumulate high levels of some metals when growing on mineraliferous soils. Some species of *Hybanthus,* including *H. floribundus,* and of *Rinorea,* are reported to be hyperaccumulators of nickel and may be of some use as indicator plants in prospecting for this mineral.

THE CRADLE OF INCENSE

The Genus Prostanthera—by George W. Althofer

Announcing the publication of a new book of exceptional value and interest. A life's study of our beautiful Mint Bushes called in scientific terms as the genus *Prostanthera.* So why the odd title—"The Cradle of Incense"?

There will be fuller details of the fascinating book in our next issue. Available for purchase in August, 1978, you are invited to send an advance order at the introductory price of $15.00, post free.

With 192 pages, including 70 colour photos of our beautiful mint bushes, and 38 pages of simple clear sketches, this book is exceptional value.

ACACIAS OF NEW SOUTH WALES—by Inez Armitage

Announcing the publication of a new book that has long been needed. A book produced in clear, simple language of the wattles of N.S.W. All species are illustrated by line drawings that will enable you to identify the wattles growing naturally anywhere in N.S.W. Illustrated further by 54 colourplates, this 200 page book will be of exceptional value at the introductory price of $7.50, post free. Orders will be received for dispatch by mail to your home during August, 1978.

The book is being published by the N.S.W. Region of the Society and your financial support by ordering early will relieve them of a large financial problem caused by their desire to produce this book to the high standard achieved.

BOOKS PUBLISHED BY THE SOCIETY

AUSTRALIAN INDIGENOUS ORCHIDS — by A. W. Dockrill. The new price for this valuable book is $30.00, incl. postage, available from the Editor.

This large book is the only authoritative reference to the epiphytic orchids of Australia and those terrestrial orchids found in the tropics. For the huge number of terrestrial orchids found elsewhere you are referred to past issues of "Australian Plants". "Australian indigenous Orchids" will be maintained up to date by the publication of new research in "Australian Plants" and the eventual publication of all species in full colour. If you have a good colour slide of a species not already illustrated then send it to the Editor for inspection. To keep your copy of "Australian Indigenous Orchids" up to date all purchasers may obtain free on request supplements issued from time to time. There are two supplements to date and a third one in preparation. Do not write for it yet; wait for the announcement of its availability. If you are keen on Australian Orchids this is the book you must have.

NORTH AUSTRALIAN PLANTS — 1 by Jenny Harmer. Price $7.50 plus 60c post.

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

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

WEST AUSTRALIAN PLANTS FOR HORTICULTURE. Parts 1 & 2, by K. Newby. Each available at $7.50 plus 60c postage from the Editor.

On the right-hand pages of these books there is a full colour plate of a W.A. wildflower, and on the page opposite is a description of this plant together with another plant or plants from the same genus. The descriptions are clear and in simple terms, with a special section on propagation and horticulture treatment and potential. Part 2, recently published, carries 42 colour plates never before presented—excellent value.

WEST AUSTRALIAN PLANTS — A Descriptive Catalogue (2nd Edition), by Dr. J. S. Beard. Available from the Editor for $7.50 plus 60c postage.

This is the only complete reference to the flora of Western Australia. Thousands of species are listed and many shown in full colour. Against each species is recorded the height of the plant, the flower colour, the period of flowering and the native locality.

THE LANGUAGE OF BOTANY — by C. N. Debenham. Price $3.90 plus 60c post.

Do you know the meaning of the terms used by botanists, or the various forms of plant life, or how they grow, or the meanings of the plant names? All this is vital to the understanding of living plants and their adequate description. This book is now the prescribed reference at most universities and colleges in Australia, but you need not be a student botanist to make good use of it.

RAINFOREST PLANTS

An issue is in preparation to present the rain forest flora of Australia. This has two aspects; the magnificent plants that have survived in our rain forests and have proved valuable horticultural subjects in the garden situation, and the creation or maintenance of rainforest areas either in the garden on a miniature scale or in a larger natural area. We need slides.

One such project is the "Crommelin Park and Native Arboretum", adjacent to the University of New South Wales Crommelin Biological Research Station at Pearl Beach, New South Wales. The Committee for this project is anxious to establish contact with anyone who may be able to contribute or exchange plants and seeds. Please write direct to Mr. R. Payne, Crommelin Park and Native Arboretum Committee, C/- 28 Nerra Road, Umina, N.S.W. 2257.

AUSTRALIAN PLANT PIONEER—Bill Cane

A recent issue recorded the contributions made by Leo Hodge to the area of cultivation of Australian wildflowers. Much of Leo's work was done in association with his friend Bill Cane. Bill brought a new dimension into Leo's life, broader horizons in propagation and plant selection. Bill Cane must be recognised as the master or leader in plant selection and propagation, at least in South-Eastern Australia and especially for his beloved Victoria.

His early life as a beekeeper brought him into close contact with nature and the Victorian bushland, stimulating an interest in wildflowers. To this day he has the constant urge to find a plant that is better than he has seen before, or to find a plant that is rare and beautiful, or to find the unusual. This led him to develop propagating techniques based on what he sees in the wild and what he judges from his basic instinct and love for plants, is the best way. His passion for the very best forms of plants and the exceptional skills at propagation, led to the establishment of Clearview Nurseries.

The name "Clearview" arose from the position of his home, miles out of town, with views of Mt. Wellington and the Australian Alps, but to my mind typifies the outlook of this gentle, thoughtful, industrious little man who is so highly regarded by all those who are fortunate enough to meet him. Small in stature, a giant among men with vision and strength of purpose. I am sure he would wish full recognition to go to the perseverance, understanding and charm of his lovely wife.

Bill only grows the best and my concern is that much will be lost as his main interest is improvement, letting others follow in his wake and commercialise work. Only a few have been recorded such as *Eriostemon verrucosus* 'Clearview Double'. My only regret is that he will not find the time to register his magnificent plants properly. In his drive to find new plants he has been responsible for many new finds and the naming of *Banksia canei* is some small recognition.

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

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

SURREY BEATTY & SONS

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

Telephone: (STD 02) 602-7404, 602-3126

Notes and Colour Slides Required

An issue is in preparation on plants in the family Lamiaceae. This includes such widely grown plants as *Prostanthera* (for which no further information is required now), *Westringia, Hemigenia, Hemiandra* and *Plectranthus.* Please help with notes on cultivation experience and colour slides or prints. Other genera in the family for which this assistance is also required are: *Scutellaria, Mentha, Epimiridi, Ocimum, Basilicum, Ajuga, Teucrium, Eichlerago, Wrixonia* and *Microcorys.*

An issue is also in preparation on Myoporaceae, which comprises the genera *Myoporum* and *Eremophila.*

Notes and slides are still required on *Phebalium* and *Eriostemon.* Why not let us know how well you grow these excellent garden plants?



MOLYNEUX NURSERIES Pty. Ltd.

Belfast Road, Montrose, 3765. Phone: 728-1353

trading as AUSTRAFLORA NURSERY

the authorities on Australian plant cultivation

present these exclusive features:

- Over 2000 species under propagation.
- Plants available in 5, 10, 14, 18 and 22 cm personalised "re-cycla-pots".
- Mail orders throughout the Commonwealth.
- Our own personally-packed "Garden-Aid" products:
  - ** Molyneux Gypsum — turns clay into workable soil.
  - ** Molyneux Space — based on our soil-less potting mix. It eases plants into their new environment.
  - ** Molyneux Nitrogen Active Fertilizer — applied with a watering-can, it makes nitrogen available to plants within a few days.
- Library and book sales.
- Gallery, specialising in pottery containers.
- Ferns, orchids, indoor plants and hanging baskets.

Open Mon.-Sat.: 9 a.m.-5.30 p.m. — Sun: 10 a.m.-5.30 p.m.

AUSTRAFLORA IS AUSTRALIAN PLANTS

JOHN and ANNA TOPP

NATIVE PLANT NURSERY

LOT 58, CRANBOURNE-FRANKSTON RD., CRANBOURNE STH., VIC.—Ph.: (059) 78-2286
(300 metres east of Hastings-Dandenong Road intersection)
WIDE RANGE OF GOOD QUALITY PLANTS AT NEAR WHOLESALE PRICES
CLOSED TUES. and WED. — WHOLESALE and RETAIL

LAKKARI
NATIVE PLANT
NURSERY
(Lakkari means Banksia Integrifolia)

RUSSELL and SHARON COSTIN, *Retail & Wholesale Growers of Native Trees, Shrubs, Ground Covers and Creepers — Also Ferns, Palms, Cycads, Indoor Plants*
Specialists in Honey Flora
Many selected Natives unique to Queensland as well as new cultivars and hybrids.
477 REDLAND BAY ROAD, CAPALABA, QLD. 4157
Open 7 days — Phone: Brisbane 206-4119



Generally 150-200 species available, many rare
Open Wed. to Sun. 10am to 5pm and by arrangement.

Cedar Wattles Native Plants
89 BLUES POINT RD. NORTH SYDNEY. PHONE 929-6583

DEANES ORCHID NURSERY

Specialising In Australian Native Orchids
Please send for descriptive list. Plants sent anywhere.
Nursery open every weekend — Weekdays phone (02) 651-1798
29 HEMERS ROAD, DURAL, N.S.W. 2119

CLEARVIEW NURSERY, W. Cane, Box 19, Maffra, Vic. 3860. Specialist in developed plants

BELBRA NURSERY
In the heart of the Grampians
LARGE RANGE OF AUSTRALIAN NATIVES
Closed Wednesday only
BOX 12, HALL'S GAP, VIC. 3381

NAROOMA NATIVE NURSERY
(H. & N. RYAN, Proprietors)
15 TILBA ST., NAROOMA, N.S.W., 2546
PHONE 132
Good variety of Native Plants — Open all week except Sunday morning.
First Class Holiday Accommodation available at Nursery site.
Write for Brochure

WIRRIMBIRRA
Hume Highway, between Tahmoor and Bargo, N.S.W. 2574
AUSTRALIAN PLANTS
Wide Range — Phone: Bargo 84-1112
OPEN SEVEN DAYS A WEEK

FOR SALE
NATIVE PLANT NURSERY
ON THE GOLD COAST
Excellent Figures and Potential.
3 B/R F/F Home on 1¾ acres.
PHONE (075) 37-1227 FOR DETAILS

FLORA TERRA *Australis*
COLLECTORS **NURSERIES** NATIVE PLANT SPECIALIST KEVIN REED
Cnr BELLEVUE CRES and SEAFORD RD SEAFORD Vic 3198
Huge selection from ground cover to trees, rare and the common, sizes large or small
Open Saturday and Sunday
(Closed Mon. and Tues.)

PRESERVATION BY CULTIVATION
Closed Tuesdays
FLORALANDS
KARIONG, via GOSFORD, N.S.W. 2250 — Prop. Brian & Lyn Parry
A large variety of the most popular native plants at nursery
PHONE: Gosford 40-1142
Send $1.50 for descriptive catalogue.

FOREST NATIVE NURSERY
AUSTRALIAN NATIVE PLANTS FOR SYDNEY GARDENS
$2.50 posted (Catalogue)
9 Namba Rd., Duffy's Forest, N.S.W. 2084
(beside Waratah Park), (02) 450-1785

MICHIE'S KENTLYN NATIVE PLANT NURSERY
Specialising In Australian Plants
Beth & Bob Michie Invite you to call
96c George's River Road, Kentlyn, 2560
Phone: Campbelltown 25-1583
Closed Tuesday and Wednesday only

Cranebrook Native Nursery
R23 Cranebrook Rd., Cranebrook, NSW
4 miles north of Penrith, between Tadmore and Taylor Rds.
Open 10 a.m.-6 p.m. Closed Sundays.
(047) 77 4256 — No Mail Orders

NANGANA NATIVE PLANT NURSERY
COCKATOO-WOORI YALLOCK ROAD
6.4 km from Cockatoo, Vic.
Large range, including over 100 Grevilleas (5 cm to bucket size)
PHONE: (059) 68-8337
Open every day except Tues. and Wed.
(also closed June and July)

GRASSTREE
NATIVE PLANT NURSERY
BROWN'S RD., ROSEBUD SOUTH, 3939
(Opposite Hyslops Rd.)
10 a.m. to 5 p.m. — Wed. to Sun. Inc.
Over 1000 Species in Propagation.
Nursery In Natural Bushland Setting.

WANTED TO BUY
Palm, Shrubs and Tree Seed of Australian and Exotic Species in batches of 100 grams or more.
FLAMINGO ENTERPRISES PTY. LTD.
P.O. Box 1037, EAST NOWRA, N.S.W., 2540

PARSONS NATIVE PLANT
NURSERY
Trees, Shrubs, Ground Cover, Climbers
Specialising In Grevilleas
Open Thur., Fri., Sat., 9-5; Sun., 9-1
Warrandyte Road, Research, Vic. 3096

TASMANIAN FOREST SEEDS
T. WALDUCK
"Summerleas Farm", Kingston, Tas. 7150
All Tasmanian Tree Species and Ornamental Shrubs.
Send S.A.E. for free list.
Sales by packet or in bulk

Nindethana Native Plant Seeds
By Packet, Ounce or Pound
Large selection. Send for free list.
NINDETHANA
Narrikup, 6326, W.A.

How can You Help with Your Journal, "Australian Plants"?

This journal is produced on a non-profit making basis by honorary officers. It needs your help. You can help by:

(a) After reading the articles, grow some plants and report your results.
(b) If you have been successful with some plants let us know.
(c) If you are a competent photographer contact the Editor—he needs help.
(d) Send your complaints to the Editor—for the rest, let us be united and support those working hard for you. Give us good publicity and publicise the Journal for what it is—the best of its type in the world.

Past Issues of "Australian Plants" Available

Because of the vast wealth of our flora there is very little repetition, each volume becoming a valuable reference book in itself. Each volume has a separate abridged index, but a composite index for volumes 1-8 incl. will be available shortly as a separate book from the Editor for $2.00 including postage.

It is intended to maintain all volumes in print in bound hard-cover form, beautifully presented with gold-lettered green vinyx covering. Each volume has bound with it another Society book as indicated below. The retail price is $15.00, but they are available by mail from the Editor at $12.00 each including postage. They are excellent value.

VOLUME No. 1. Issues 1-12 — to be reprinted in 1979. Watch for announcements.
VOLUME No. 2. Issues 13-20, no longer available—to be reprinted in 1980.
VOLUME No. 3. Issues 21-28, bound with "Catalogue of Cultivated Australian Plants".
VOLUME No. 4. Issues 29-36, with "West. Aust. Plants for Horticulture—Part 1".
VOLUME No. 5. Issues 37-44, bound with "The Language of Botany".
VOLUME No. 6. Issues 45-52, with "West. Aust. Plants for Horticulture—Part II".
VOLUME No. 7. Issues 53-60, bound with "North Australian Plants".
VOLUME No. 8. Issues 61-68, bound with "The Cradle of Incense".
VOLUME No. 9. Issues 69-76. Each issue to date available at $1.00 post free.

Binders for holding "Australian Plants"

D-ring binders of excellent quality labelled in gold on the spine and the cover, "Australian Plants", are available from the Editor for $3.00 plus 60c postage. They are not volume numbered. They are to suit the holes drilled in old issues of "Australian Plants", but at the request of Society officers from the States concerned only N.S.W. members will receive their issues already drilled, from December, 1978.

The Society for Growing Australian Plants

The Society is for people interested in the Australian flora, its preservation and cultivation in the wild, in parks, and in public and private gardens. Preservation of our magnificent flora will, in the long term, depend on the knowledge accumulated, on its cultivation under a wide range of conditions. We hope to learn more about this by cultivating wildflowers in the garden, encouraging research on this aspect, and to record this in "Australian Plants".

The Society offers many services in all States, such as meetings, instruction, shows, field outings, seed, propagating aids and friendship, much on a mail basis for those who cannot or do not wish to attend meetings.

Enquiries for membership should be directed to:

SOCIETY FOR GROWING AUSTRALIAN PLANTS—N.S.W. REGION:
President: Mr. Hugh Stacy, 16 Booyong Avenue, Lugarno, N.S.W., 2210.
Secretary: Mr. Ray Page, 21 Robb Street, Revesby, N.S.W., 2212.
SOCIETY FOR GROWING AUSTRALIAN PLANTS—QUEENSLAND REGION:
President: Mr. L. Smith, Lot 29, Vores Road, Petrie, 4502.
Secretary: Mrs. Lorna Murray, P.O. Box 809, Fortitude Valley, Qld., 4006.
SOCIETY FOR GROWING AUSTRALIAN PLANTS—SOUTH AUSTRALIAN REGION (Inc.):
President: M. W. Pybus, 41 Harrow Road, Somerton Park, S.A., 5044.
Secretary: Dr. R. W. Riessen, Box 10, P.O., Blackwood, S.A., 5051.
SOCIETY FOR GROWING AUSTRALIAN PLANTS—TASMANIAN REGION:
President: Mrs. J. Closs, 7 Vyella Court, Austin's Ferry, 7011.
Secretary: Mrs. K. Korbett, 35 Pillinger Drive, Ferntree, 7101.
SOCIETY FOR GROWING AUSTRALIAN PLANTS—VICTORIAN REGION:
President: Mr. R. G. McDonald, Lot 104, Oakdale Road, P.O. Box 9, Upper Ferntree Gully, Vic., 3156.
Secretary: (Sister) E. R. Bowman, 4 Homebush Crescent, Hawthorn East, Victoria, 3123. Please do not call at private home—enquiries by telephone or mail only.
SOCIETY FOR GROWING AUSTRALIAN PLANTS—CANBERRA REGION:
President: Mr. Geoff Butler, 29 Milford Street, Latham, A.C.T., 2608.
Secretary: Mrs. Christine Tynam, P.O. Box 207, Civic Square, A.C.T., 2608.
WEST AUSTRALIAN WILDFLOWER SOC. (Inc.):
President: Dr. N. Marchant, P.O. Box 64, Nedlands, W.A., 6009.
Secretary: Miss B. Britton, P.O. Box 64, Nedlands, W.A., 6009.
Seed is in very short supply—try the commercial seedsmen, not W.A. Society.

"AUSTRALIAN PLANTS" IS AUSTRALIA'S NATIONAL PRESERVATION JOURNAL
(A non-profit making venture, produced quarterly, dedicated to preservation by cultivation)
PUBLISHING SECTION FOR SOCIETIES—Produced as a non-profit venture.
Managing Editor: W. H. Payne, assisted by P. D. Leak; Despatch by E. Hubner, H. Jones. Please do not telephone or call at private home—enquiries by mail only.

NON-MEMBERS: You may receive the next 4 issues direct to your home by forwarding an annual subscription of $3.00. Overseas subscription $4.20 Aust., £2.80 in English currency or $6.50 U.S. Send to The Editor, "Australian Plants", 860 Henry Lawson Drive, Picnic Point, N.S.W., 2213.

COPYRIGHT — All material copyright as directed by authors.



Patersonia glabrata — A Native Iris

Patersonia is a group of perennial herbs with deciduous, erect, linear leaves and a short rootstock. The flowers are large, usually blue, and very similar in the above picture, but some species are deeper in colour to purple, while a couple are a bright yellow. The plants require moist soil to flower freely in an open sunny position. They are very hardy and can withstand hot, dry conditions, bursting into vigour and flower if watered in late winter.

Characteristic of many of the "Wild Iris" that are usually a deep blue, although a beautiful yellow-flowered species is illustrated in a previous issue. These plants are easy to grow in difficult situations and are ideally suited for rockeries.

Surrey Beatty & Sons, Printers