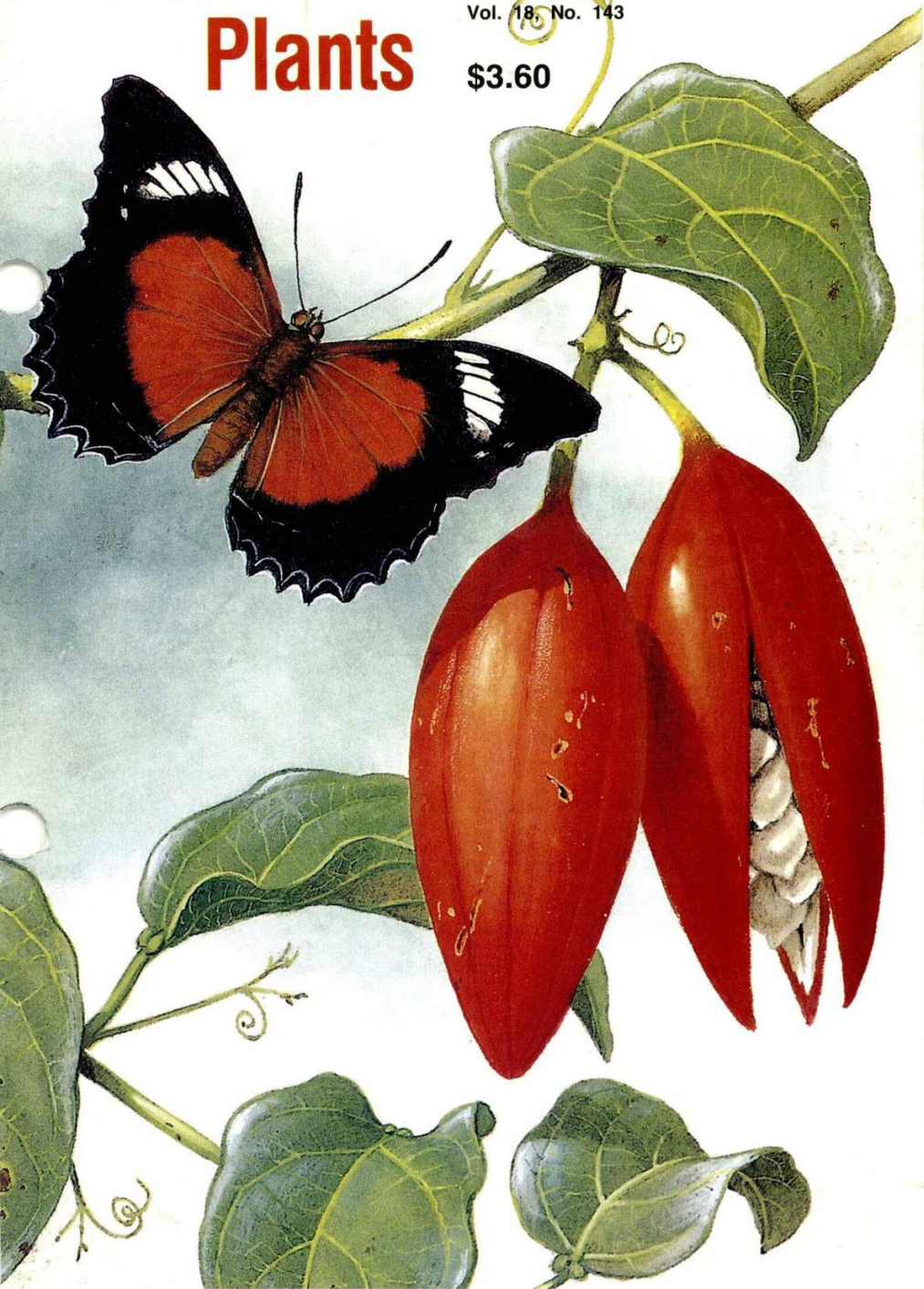


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Many readers will have been surprised on reading our last issue. The Society is very active in conservation in all states but it is only at the local level that this is evident. The members are like most Australians with a deep concern for the environment and the Australian way of life. We shall know soon if we have responsible government that shares this concern.

The human race can only survive on this fragile planet, in the long term, if we use it sympathetically. The word use is employed because we can only maintain and improve the standard of living world wide, by selfishly using the planets resources. It will require careful planning and sustaining resources to do this and a start should be made now. The recent conflict between the "greens" and the wood chipping supporters was not because of a conflict of interest in the long term but because there is not a long term management plan. The "greens" know that if the wood chip consumers do not use our forests they will strip other less developed nations for short term gain, people who do not have the resources for a managed sustainable plan. After all timber is a renewable resource by courtesy of the sun and is precisely the resource that should be exploited in mans efforts for survival. On the other hand the local forest community wants two things very badly, a management plan that will ensure their employment, not for just 20 years, but way into the future, and a healthy planet with adequate tree growth for its survival.

This issue is concerned with the environment as a whole, called by the "eggheads", the conservation of biodiversity. We largely confine our direct conservation activities to the plants as without plants, no other life is possible. The example here is butterflies, delightful creatures and an essential component in the cycle of life. Other issues were concerned with birds and land creatures. Our wildflowers are a critical factor in the survival of this planet and they also can give pleasure in landscaping.

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This issue, after butterflies, concentrates on small plants for containers, indoors, etc.

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COVER PLATE

by Wendy and William T. Cooper

Lacewing Vine, *Adenia heterophylla*, being visited by the Red Lacewing Butterfly, *Cethosia cydippe*. The fruits of the Lacewing Vine are as shown, 60–130 mm long hanging single or in bunches, axillary and terminal, seeds several, 6–10 mm diameter and not edible. The vine is a tendril climber to 30 m high, fruiting January to July. The leaves are simple, as shown, 5–25 cm long, glabrous (shiny and hairless) with two swollen glands at the leaf base. They are the food plant of the larvae of the Red Lacewing Butterfly. Distribution, lowland rainforest from Mackay, central Queensland, to Princess Charlotte Bay to the north, a plant in the Passionfruit family, see page 104. Reprinted with permission from "Fruits of the Rainforest", see page 118.

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Butterflies in the Garden

from *Butterfly Magic**
by Frank Jordan and Helen Schwencke

Our Garden No. 21

It's a beautiful vision — swarms of butterflies in all colours of the rainbow sailing around your garden, lazily alighting on a daisy, flitting from flower to flower. A magnificent dance that can be realised. With around 150 butterflies having been recorded for south-east Queensland requiring a vast range of host plants and habitats, I set about planning our garden, a 16 perch inner Brisbane suburban block. It contains exotic fruit trees and over 60 species of butterfly host plants.

The garden, to the uninitiated, looks messy and overgrown with a layering of trees, understorey shrubs, ground covers and vines around sunny areas and with low growing herbaceous plants. Helen and I keep samples of some host plants growing in pots for some of our favourite butterflies. We can bring them inside to raise the caterpillars free from their predators and parasites. They are a constant delight to the children.

Considering how isolated and distant our garden is from surviving native habitats, the garden has been a success. The butterflies breeding in the garden vary from year to year. During the last month the Zebra Blue, Big Greasy, Blue Triangle, Common Crow, Meadow Argue, Australian Admiral, Common Eggfly, Wanderer and Lesser Wanderer butterflies have laid eggs in the garden.

Every butterfly was once a caterpillar, and when fully grown, it undergoes a remarkable transformation called metamorphosis changing into a chrysalis. This immobile stage allows the body to reorganise itself and emerge as a butterfly. Only when this internal reorganisation is complete will the butterfly emerge.

Nectar plants in your garden will attract already existing butterflies, but unless you live near an area where butterfly host plants still exist (and human development is rapidly depleting their number) there will not be many butterflies to be attracted to your nectar plants. Why not grow butterfly host plants in your garden. Butterfly caterpillars are not going to indiscriminately gobble up every plant in your garden.

Butterflies tend to stay near their host plants. Should an adult need energy to fly around, it will obtain it from the source of nectar nearest to its host plant. You will quickly learn which nectar plants your pet butterfly prefers.

We hope you enjoy your butterfly garden as much as we enjoy ours. The following notes and colour plate will help you decide to join us. The last issue brought us to the reality of the future of our land unless we do something to stop the slide. I hope this article will encourage others to stop and think about the future and nature's beauty in our care. ►

***Butterfly Magic** is a small booklet published by Earthling Enterprises Pty Ltd. P.O. Box 5167, West End, Queensland 4101. It is available from the Sales Officer, SGAP Queensland Region, 28 McGhie Street, Zillmere, 4034 for \$6.80 plus \$1.80 postage. The text is compiled by Helen Schwencke and Frank Jordan and covers an area from the Sunshine Coast in Queensland to the Northern Rivers District of New South Wales. This article and associated colour plate are taken from the booklet with permission and sincere thanks. This Society has a special study group, Wildlife and Native Plants, that concerns the interaction of all nature's creatures and covering all of Australia. Enquiries should be directed to the State Secretary in your state as listed inside our rear cover. Other specialist groups are: Butterfly and other Invertebrates Club, c/- P.O. Box 5170, West End, Queensland 4101; Butterfly Club, Sunshine Coast Environment Council, Howard Street, Nambour, Queensland 4560; Western Australian Insect Study Society, c/- Curator, Western Australian Museum, Francis Street, Perth, Western Australia 6000.

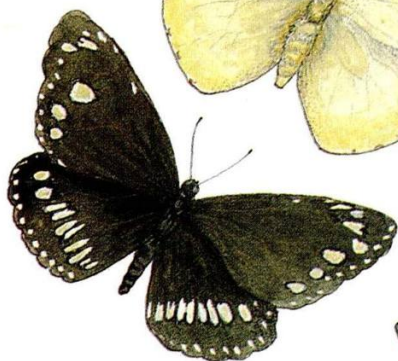
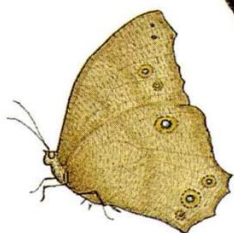


Top — Larvae of *Neolucia agricola* on the bud of *Eutaxia* species.

Centre left — Larvae of *Theelinestes serpentata* on a saltbush leaf; **Centre right** — the pupae.

Bottom — Pupae of *Ogyris genoveva* with attendant ants and pupae of *Jalmenus lithochroa* on *Acacia victoriae*.

Opposite — left to right and top to bottom: Joseph's Coat Moth described on page 136; Evening Brown Butterfly, page 135; Wanderer (not Australian); Painted Lady Butterfly, page 135; Common Grass Yellow Butterfly, page 136; Richmond Birdwing Butterfly, male, page 98; Common Eggfly Butterfly, male, page 135; Australian Fritillary Butterfly, page 136; Lemon Migrant Butterfly, page 99; Orchard Swallowtail Butterfly, male, page 99; Common Crow Butterfly, page 98; Tiny Grass-blue Butterfly, page 136.



Common Crow or Oleander Butterfly

Euploea core

The Common Crow is probably best known for its spectacular shiny metallic chrysalis. Children often find these on the very poisonous Oleander bush.

If you want to have this butterfly regularly visit and stay around in your garden, Monkey Rope, *Parsonsia straminea*, is a good host plant. It thrives in full sun and semi-shade. While its flowers are very small, they provide lots of nectar for butterflies and other insects. If pampered this vine can become quite rampant and can climb to the tops of tall trees, eventually smothering them. It is best on fences or to cover eyesores. Other host plants include wax flower, *Hoya australis*, and Kunkerberry, *Carissa ovata* (8.98)*. It is large and black with white spots around the edges of its wings. Its wingspan is about 9 cm. It often remains near the host plant for extended periods and can regularly be seen hovering and doing courting dance flights. The female butterflies lay small yellow eggs usually near the tips of shoots. The caterpillars are banded black and white with brown patches along their sides. They have four sets of black feelers along their body.

Richmond Birdwing Butterfly

Ornithoptera richmondii

The Richmond Birdwing is spectacular and it needs our help. It is one of Australia's largest butterflies. The females are larger than the males and have a wingspan of 18 cm. The male's inside forewings are velvety black and brilliant green and the outside wings are blue-green, black and sometimes have yellow spots. The females are different in colour, black or smokey-grey with white markings dusted with black and with some yellowish markings. Both males and females have a yellow and black abdomen and red patches on the thorax.

Fully grown Richmond Birdwing caterpillars vary in form between two extremes. They can be black with predominantly black fleshy spines with some spines bearing white and orange markings and a shiny black head, or whitish-grey with grey spines tipped with black, a brown head and some brown markings. Caterpillars bear four rows of spines along the body and grow to a plump cherry size before they pupate, suspended in a silk sling. Chrysalises are occasionally yellow but are usually green.

Aristolochia praefenosa, Birdwing Vine, is the favoured host of the birdwing in our region. Once established it is a vigorous climber. The flowers, which are only 2 cm long, have the unusual shape which is characteristic of the genus *Aristolochia*. Good growth is achieved in full sun to semi-shade together with a moist, fertile and well-drained soil. However, the plant is adaptable and can sometimes grow well in less than optimal conditions.

Aristolochia tagala, Pipeflower may be used as a host. This species is fast growing and in a favourable position produces an abundance of foliage but it is very frost tender. It becomes dormant and may even die back to ground level in winter. Occasionally plants succumb to root rot during the wet summer months. *A. tagala* is also a host plant for the Big Greasy Butterfly, *Cressida cressida*.

Aristolochia delatantha, Pipeflower is another host plant for this Birdwing. It comes in subspecies, one from north Queensland and one from the border Ranges, where it grows in cool mountain rainforests. It is not as leafy as *A. praefenosa*. The northern subspecies is not as robust during winter.

*The references given in this way refer to previous descriptions, in this case page 98 of Volume 8, A.P.

Aristolochia elegans, Brazilian Dutchman's Pipe Vine is sometimes planted by gardeners. While related to the Birdwing Vine, its flowers are much larger than those of the native species. Female butterflies will lay eggs on this plant but the caterpillars are eventually poisoned by eating the leaves.

If you are lucky enough to get some caterpillars, you will discover their voracious appetites and find your plant being denuded. It will quickly recover except on the odd occasion when a caterpillar ringbarks a stem close to the ground. This inconvenience can be avoided by growing several vines. While there is no problem with wild Birdwing Butterflies breeding in your garden, in Queensland it is illegal to keep these butterflies in captivity without a permit.

Lemon Migrant Butterfly

Catopsilia pormona

If you see a lemon-lime coloured butterfly with a 7 cm wingspan sipping through your garden it is likely to be the Lemon Migrant butterfly restlessly searching for its host plant, a Golden rain tree, the introduced *Cassia fistula* or the native *Cassia brewsteri* (8:98, 393, 359). The lovely shade of yellow is a miracle of recycling — the colour is derived from uric acid, a waste product of metamorphosis. The colour of these butterflies can vary from very pale to fairly bright, making them hard to recognise at times.

The caterpillars are green with a creamish-white racing stripe down each side and are well camouflaged. The new growth of their plant is preferred as food. Watching a mature caterpillar string itself up in a sling and split out of its caterpillar skin while still staying suspended by its silk threads is fascinating.

Orchard Swallowtail Butterfly

Papilio aegaeus

Orchard Swallowtails are elegant black and white butterflies with 12 cm wingspans. With wings open the male is mostly black with cream patches, while the female has a predominantly whitish upperwing with dark veins, while the lower wing is white and black and fringed with red and blue spots.

Orchard Swallowtail caterpillars are green with brown and white diagonal stripes and some spikes. Young caterpillars look something like bird droppings. An interesting feature of these caterpillars is that when annoyed two bright red protrusions come out of their heads. The citrus odour they exude is pungent. It suspends itself by its tail and with a thread before pupating.

The native Finger-Lime, *Microcitrus australasica* (8:231 9:375) is one of Australia's citrus-related fruits. It is an edible fruit probably best for making jams and jellies. The plant is slow growing and eventually becomes a small tree of around 2 m. It likes a shady to sunny position. The leaves of this plant are fairly small and it has sharp thorns.

The butterfly's caterpillars also eat any of the introduced citrus family, such as orange, mandarin or lemon trees. Grow whichever of these trees meets your own needs and attract this butterfly to your garden. The caterpillars may set back a small tree but have an insignificant effect on larger ones. You may even get the attractive Dingy Swallowtail, *Papilio anactus*.

Continued on page 135

Vol. 18—Page 99



The John Hunt Garden (above and below). John standing in one of the watercourse paths. Heavy pruning and no watering. This section was created in the early 1980s using the method described opposite. Other photographs of the garden are in Volume 13, pages 49, 360 and 361. He also has areas where the plants are kept small for a floral spectacular.



Creating an Australian Garden

by John Hunt*

Is the following scheme original? Very experienced growers over the last 50 years have been stumbling towards solutions without realising that they all lead to this scheme. Every gardening book you read says over and over again, "... good drainage". When it comes to advise on how to achieve this authors get vague or simply say create mounds as in Diagram 1, or built up beds. Even more disastrous is the advice "study the conditions under which the plant grows naturally and copy this".

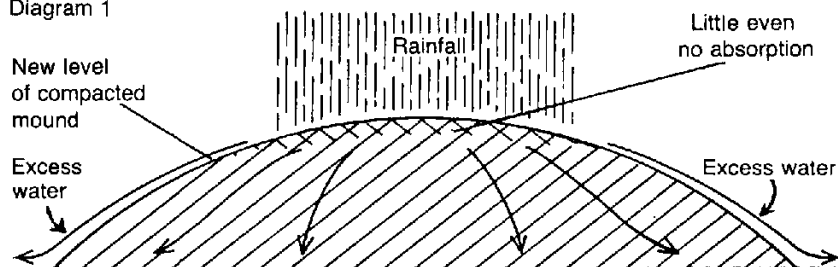
John Hunt's scheme is for economical use of water over dry spells, making maximum use of rain, and the conditioning of plants to cope during very wet periods. It encourages good deep root systems that contract, proliferate, and contract again as the plant needs them to maintain health throughout the year and for good productive life. Good below ground conditions are ensured. These introductory paragraphs are by the editor. The following notes are by John Hunt.

Mounding and Channelling

The plant should be planted in a "well drained spot". The most obvious way to improve drainage has been by raising the level of the soil to form a raised plant bed or mound. Any excess rainfall is therefore able to drain off by running away down the sides of the raised garden mound and the absorbed water is drained more quickly to the previous soil level.

Mounding or raising of garden plots has usually resulted in successful plant growth and at times, very spectacular growth. I have observed, however, that over a period of time, plants "go off". That is, they grow well for a period and then suddenly die or, alternatively, flourish in rainy periods but become sparse and miserable specimens in drier periods.

Diagram 1



*Creating An Australian Garden by John Hunt

Published by Kangaroo Press

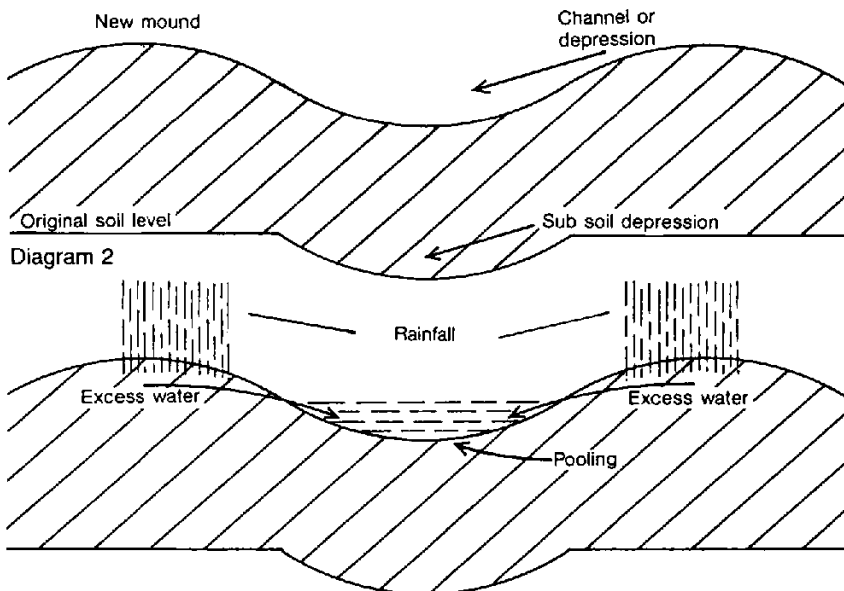
The above article has been based upon this book of the same name. It is a practical book for creating an Australian garden. The procedure detailed is an original idea that will revolutionise home gardening, especially with wildflowers. This practical, easily implemented scheme is suited to all areas of Australia-Tasmania, Victoria, north to Cairns and west to Perth. A seemingly improbable statement? Take a little time to see why.

The author examines the various aspects that need to be considered when creating a productive garden climate, soil drainage, competition, maintenance and plants. Each of these factors are discussed in some detail in a very simple but competent way. However it is the section relating to the practical way to physically construct the garden as summarised above that make the book unique. \$19.95 at your bookseller or as advised inside our rear cover.

The plants nominated in this book are basically for temperate areas, Melbourne to Brisbane. Alternative plants for cooler or tropical areas are given in many previous issues of Australian Plants, but the procedures above apply in all areas of Australia.

The soil in a fresh mound has been opened up, loosened and aerated, and is initially more friable and rainfall is readily absorbed through the surface. This makes for better root penetration and better growth. Over short periods of time the raised garden or mound compacts downwards as air pockets disappear, the humus content decomposes and soil nutrients are depleted by the plants. The plants' roots now begin to lack the moisture they require and can no longer penetrate the drying hardened ground, plant viability wanes.

To maintain the favourable garden conditions which exist in the early days of mounding I recommend that the garden level be raised to form a bed or mound but that the design of the mounding structure be altered as in Diagram 2.



The raised garden mound should be channelled by the creation of large depressions forming gullies, holes and valleys which are not open ended; that is, the mound should not be shaped like an inverted saucer or box shaped, but like a saucer or tyre. Additionally, the area directly below the depression or gully should be excavated to form a corresponding depression in the original level of the soil upon which the mound was constructed. This will therefore catch excess water in rainy periods and it will be retained in the depressions.

The object of mounding and channelling has been to increase the moisture content in well drained soil and to create an environment where dramatic changes of moisture content are substantially reduced. Additionally, the increased moisture level and the ability of the plant to gain access to more moisture when it needs it make for stable growing conditions, eliminating the danger of stresses caused by climatic changes.

Warmth speeds up the nutrient cycle; therefore, an area which receives good annual rainfall and is exposed and open is the one which will achieve optimum results. Nutrients from rain and decomposition of organic matter collect in the valleys and will not be washed or blown away providing a natural plant food.

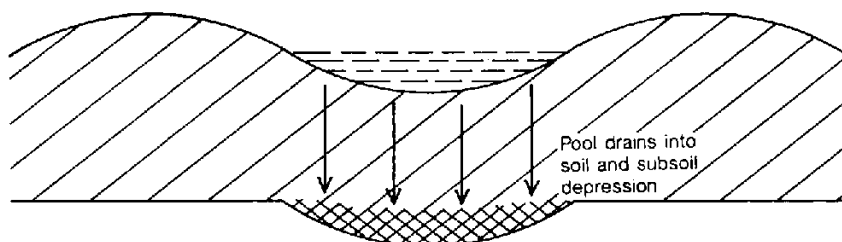


Diagram 3. The excess water eventually drains into the subsoil depression.

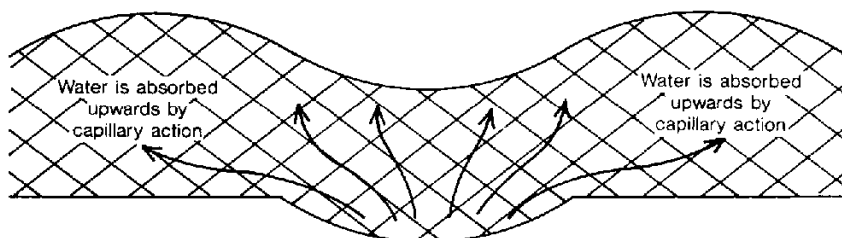


Diagram 4. The water in the subsoil depression is absorbed by capillary action back upwards into the surface soil.

How I constructed my self watering garden

Initially the ground upon which the garden was to be constructed was flat and had no contour. The soil was extremely hard packed loam with clay content embodied with shale and sandstone rock. The soil could not be turned and a mattock blow would only penetrate the surface to a depth of two or three centimetres. I created a small long depression in the soil and kept filling it with water until the soil began to moisten and soften in time over a sufficient area. I then began to excavate a trench as shown in Diagram 5.

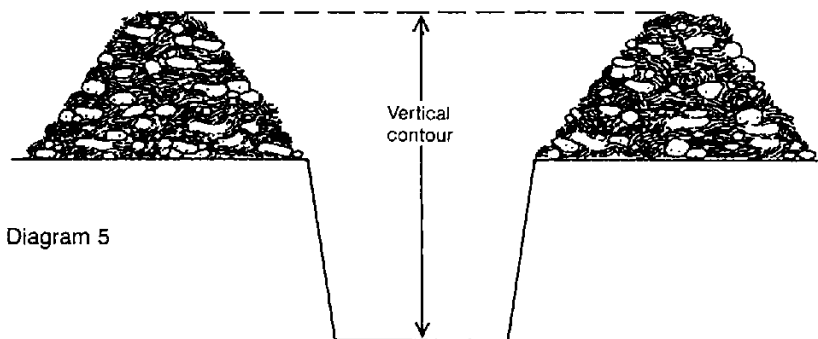
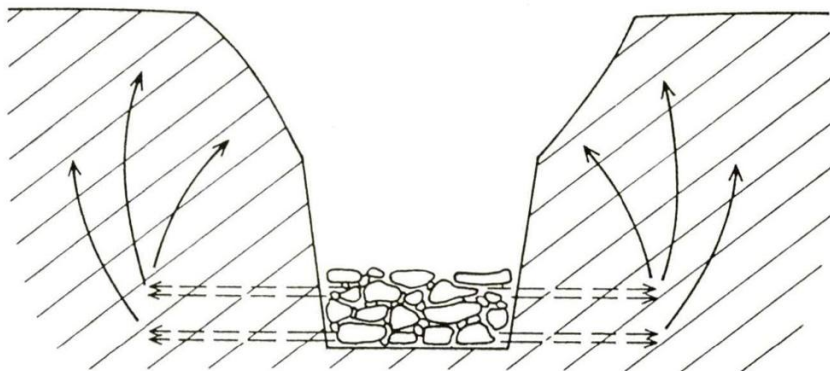


Diagram 5

The trench was constructed to a depth of half a metre, by half a metre wide with a length of 25 metres. This creates a difference in contour of a metre. To raise the garden relying only upon introduced soil would have been very expensive. The trench was backfilled with rocks, bricks, stones and old pipes to form a rubble drain which from above simulates a dry creek bed.

Diagram 6



Because the natural soil was reasonably heavy with a clay content and not much humus I built up the mounds by adding and mixing decomposed mulch together with introduced garden soil obtained from a local supplier.

Over a period of four years external artificial watering was required on only two occasions. The dry creek bed was filled with water in a time of extreme drought. On other occasions the "dry creek" became filled with water which could only slowly drain into the subsoil. The lush growth and longevity of all the various plants grown in this particular area is directly due to the increased water retention and the stable moist conditions created by the irrigation effects of water supply by capillary action. ■

The Passionfruit Family

by D. R. Satterthwait*

This plant family is represented in Australia by two genera *Adenia* and *Passiflora*. One species of *Adenia*, *A. heterophylla* is native to Australia. The type species is illustrated on our cover with a simple description in its caption. Another form, subspecies *australis*, occurs along the north coast of Australia from WA, through NT and the Gulf of Carpentaria to the Torres Strait Islands. The fruit of subsp. *australis* are smaller, 4–7 cm long and more rounded at the base.

The passionfruit group of plants *Passiflora* has 370 species throughout the world, only three of which are native to Australia. These have been described and illustrated in colour in *Australian Plants* Vol. 6: 13, 14. They are grown for their ornamental value not the fruit, the typical passionfruit flowers being large and showy. It is often grown on a fence or trellis.

Passiflora aurantia has entire leaves (without serrations), the lobes usually rounded, the central lobe being widest at the base with two glands at the top of the petiole (leaf stalk). The flowers are whitish turning to orange-pink or red, 5–11 cm diameter.

Passiflora cinnabarina is similar to the above species except that the lobes of the leaf are usually pointed, the central lobe being widest above its base. It does not have petiolar glands. Seed from this attractive red-flowered vine has been marketed for horticultural use worldwide.

Passiflora herbertiana differs from the above species in that the plant is pubescent (silky hairy) at least on young stems, petioles or one leaf-surface. Glands are present on most petioles, at the top. The flowers are greenish-yellow turning orange-pink, 4–6.5 cm diameter.

*These notes are based upon "Flora of Australia", Volume 8, available for \$30 as indicated inside our rear cover.

Fragrant Native Gardens

Tiny Things

by Dr Judyth McLeod

The scent produced by a plant is not always in proportion to its size. The tiny plants of the bush — the annuals and ground orchids, the small rushes and lilies, grasses and groundcovers, the herbs, sub-shrubs and epiphytes — often hold powerful and delicious scents within their flowers or leaves. Many of the plants described below can also be incorporated into herb gardens. Australia has its own species of mints, basil, cynoglossums and other herbs.

Many tiny plants are ideal for a rockery, where they can receive excellent drainage and can be displayed to perfection. Tiny, fragrant plants frequently lend themselves to pot culture and give particular pleasure when they can be grown on their own under optimum conditions and viewed and sniffed individually. You will be well repaid by adding the smaller plants in creative ways to your garden. Consider creating Australian pennyroyal lawns in a damp and shady area; using fragrant spilling plants over banks or making stone trough-gardens similar to those used to display the tiny alpine flowers.

A Portfolio of small fragrant native plants

Many of the species have been described with cultivation details in previous issues, some with colour photographs. The references are given in brackets. Of the remainder I was not able to get suitable photographs — Editor.

Basilicum polystachion, (syn. *Plectranthus parviflorus*) Musk Basil, of Queensland, is a close relative of the true basil and is a pleasantly aromatic plant in all parts. It cannot, however, be used as basil for culinary purposes since it causes sores in the mouth. In native and traditional medicine practices, the crushed leaves were applied to sprains and used in the treatment of fever. It requires normal, sunny garden conditions and is not frost resistant. It is propagated by seed. Previously described in Volume 10 page 307 (10:307)

Blennodia canescens, Wild Stock, is a little annual found in arid areas of all mainland states in Australia. It has the most delicious clove scent that is freely given off in spring by the modest four-petalled pink, white or mauve flowers. It is propagated by seed and requires a sunny, well drained site. The plant branches from the base and grows to around 45 cm.

Bulbine bulbosa, Bulbine Lily or Native Leek, is not an onion-scented species. The common name only refers to the bulbous base of the plant to which the foliage dies back at the end of the growing season. It is very faintly scented, but, when planted in drifts, a sweet and delicate fragrance is carried on the air. This is a common species of the east-coast mainland states, Tasmania and South Australia. The crystalline, golden-petalled, starry flowers are borne on slender leafless stems up to 30 cm high from mid-spring to early autumn. The buds are striped green and the petals retain the green midrib underneath. It is propagated by seed and requires a well-drained soil.(10:331 16:347)

Fragrant Native Gardens by Dr. Judy McLeod Available from your bookseller or for \$20 as advised inside our rear cover. The article above was based upon a chapter in the book of this name and reprinted by permission of the publisher, Simon and Schuster. A book in the Mount Annan Series, each by selected authors. By basing the article upon the book and capturing the sensitivity of the obviously competent dedicated author, the reader may judge just how valuable this small 138 page book will be to them. The book refers to the value of using plants to produce fragrance in your garden and I have chosen that section dealing specifically with tiny plants. These tiny plants have not received the prominence they deserve often being overshadowed by more flamboyant flowering plants, but their fragrances complement the garden presentation.

Calomeria amaranthoides (syn. *Humea elegans*), Plume Bush or Incense Plant, is not a little plant at around 2 m in height but a biennial herb nevertheless, with large, sticky, "weedy" leaves and spectacular and beautifully plumed heads of pink to red flowers in summer. The flowers have a strong scent variously described as incense-like or similar to ripe banana. The foliage contains the same scent. Its major requirement is ample water. It has considerable potential as filler material, and is propagated by seed.

Calostemma purpureum, Garland Lily, is a very beautiful bulb deserving to be far better known. It has strap-like leaves and bears umbels of a dozen or more deep crimson, tubular flowers, each with a frilled inner-trumpet of gold and protruding golden stamens. It could be compared in quality to the exotic Scarborough Lily, and has the added advantage of a delicate fragrance. It grows on coastal cliffs in both Victoria and South Australia and proves an excellent plant for the seaside garden. It is also widespread along the banks of inland rivers and in rocky sites in New South Wales, where it occurs west of Narrabri and Gilgandra districts. It can be propagated by seed. (5:76 7:106, 291, 329 17:41)

Crinum flaccidum, Darling Lily or Murray Lily, occurs in all mainland states. It is an exceptionally beautiful, bulbous perennial, with shortish strap-like leaves. Its flowering stems, approximately 60 cm in height, carry umbels of up to 15 white buds that are blushed pink and open to gleaming white trumpet flowers with broad tepals and a heavy, but delightful, scent. They occur from the end of spring to mid-summer. The scent strengthens in the evening and like many members of the Amaryllidaceae, the fragrance in heavy concentrations can be unpleasant to some noses. This *Crinum* occurs along river margins in seasonally wet areas. It is propagated by seed (the bulbs are deep in the soil). It requires full sun and grows well in a range of soils. (3:263 5:77 6:35 7:106, 274, 330)

Crinum pedunculatum, Swamp Lily, is a large bulbous perennial which can reach a height of almost 2 m in ideal conditions, with broad, smooth, strap-like leaves up to 1.3 m long and 10 cm wide. Up to 20 open, white, trumpet flowers with drooping narrow petals are borne in umbels in summer on thick stems approximately 1.5 m tall. They have a beautiful fragrance. This species grows in damp, coastal situations of Queensland and New South Wales, including the upper tidal reaches of creeks and rivers and on protected sea cliffs or sand dunes in northern New South Wales. It is very tolerant of a range of light conditions, has some frost resistance and will tolerate wet feet. Propagate by seed. (16:296).

Crowea exalata, is a little compact shrub to an average height of 70 cm, this is a very decorative choice for a rock garden since it grows well in full sun and a well-drained soil. The nearly linear leaves are very aromatic when crushed, with sweet aniseed notes, and the flowers are charming, being waxy, pink and star-shaped. They are borne on the bush from summer to mid-autumn (later in some districts). A good mulch should be used. This species is frost hardy and is propagated by cuttings. (10:172 12:64, 184 14:363, 364, 366 15:218 17:55, 80).

Cymbopogon ambiguus, is closely related to the popular Asian herb, Lemon Grass (*Cymbopogon citratus*). This tufted grass is also very strongly lemon scented when the narrow greyish-green leaves are crushed. This species grows readily in moist soil in a sunny position, and can be propagated by division of the clump or by seed. It has a wide distribution through Queensland, New South Wales, South Australia, Western Australia and the Northern Territory. (8:265).

Cymbopogon oblectus, occurs throughout mainland Australia and shares the lemon scent of the previous species.

Cymbopogon refractus, is a tuft-forming grass with narrow, wiry leaves and occurs in Queensland, the Northern Territory, New South Wales and Victoria. Unlike the two previous species it is ginger-scented when crushed. It requires full sun and good drainage, and is propagated by division or by seed. (18:39).

Cynoglossum suaveolens, Sweet Hounds Tongue. Various species of *Cynoglossum* have entered cultivation either for their beautiful forget-me-not flowers or their herbal use as a fabric dye. This species lacks the spectacular flowers of others, being very small and white, but has an unexpected sweet fragrance. The flowers appear from spring to summer. It is a perennial, occurring throughout the eastern states, and can be propagated by division of plants or by seed. It grows well in full sun and normal garden treatment for perennials. It can be also grown successfully in a pot.

Cynoglossum australe, Australian Forget-me-not, differs from the previous one in that it possesses more spectacular blue flowers in spring, but to compensate they are only lightly fragrant. It occurs in Queensland, New South Wales, Victoria and South Australia. It requires the same growing conditions. It can be propagated by seed or by the removal of rooted side shoots.

Arthropodium fimbriatum syn. *Dichopogon fimbriatus*, Chocolate Lily. The flowers in spring and summer offer an extraordinary scent, that of rich aromatic chocolate. Add to this virtue edible tubers and beautiful spikes of nodding, mauve flowers on smooth, wiry stems emerging from a tufted, grass-like plant. This species occurs in southern Australia in open forest and grassland. It can be grown by seed or by division. It requires a sunny position with no competition from other plants. It will grow on a range of soils. (12:51, 122, 124 16:324).

Drosera whittakeri, Scented Sundew. The sundews are insectivorous plants. They have glandular hairs on the leaves that exude a sticky substance that attracts, holds and subsequently digests the insect protein. This apparently barbaric act is, in fact, a means of obtaining nitrogen in a low-fertility environment. See Carnivorous Plants, page 137. From Vic. and S.A. it forms small rosettes of green leaves, often deeply blushed with crimson. The unusually large white flowers in spring have a sweetly delicate scent, photo page 120. Its natural environment is a boggy acid soil. Grow in a small artificial boggy area of the garden to which plenty of peat has been added. Less ambitiously (such an area can house many interesting species) *Drosera* species can be grown in a pot stood in a large saucer of water, or alternatively in a terrarium, see page 126. Propagated by seed. (9:254 11:360 13:69).

Franklandia triaristrata, Plumed Lanolin Bush. Chocolate fragrance is rare in the world's flora but it does occur in a few Australian plants. This species has tubular flowers that have four elongated petals, somewhat resembling a white tobacco flower and shares with it an increasing fragrance as the evening draws on. The flowers, with their strong delicious chocolate scent, are borne in racemes from spring to early summer. This species occurs in the southwestern corner of Western Australia and forms a rather straggly bush to about one metre. It requires some shade and very well-drained soil. Propagated by cuttings. It is on the rare list, too delightful a scented plant to be lost. (9:322 10:357 11:177).

Harmsiodoxa puberula, Scented Cress, is an annual species from arid inland areas of the Northern Territory, Queensland, New South Wales and Victoria. It flowers in late winter and spring with dense heads of lavender flowers that emit an exceptionally strong, sweet scent *en masse*. It is propagated by seed, and requires a sunny, well-drained site.

Libertia pulchella, Pretty Grass-flag, forms iris-like clumps to 30 cm tall. The flower stems, which are a little taller than the leaves, bear dainty white flowers with delicate fragrance in early summer. Plant in a moist shady position, *en masse* it gives off a delicate, but delightful, fragrance. It occurs in Victoria, New South Wales and South Australia. Propagated by seed. (11:360 14:280 16:207).

Macgregoria racemigera, Carpet-of-snow, occurs in arid areas of northern Australia. It is an annual well worthy of introduction into inland gardens. It is an arid-zone plant and, as the name implies, produces a very attractive massed display of white starry flowers in spring. They have a strong, sweet, musk fragrance. It can be grown in the same manner as spring annuals, propagated by seed sown in autumn in seedling mix before transplanting. (13:214).

Mentha australis, River Mint. Australia has several native mints, and this one is probably the most widely grown in gardens to date. It is a lax little perennial, with lanceolate leaves that have a strong peppermint fragrance, and it bears tiny white- or lavender-lipped flowers in dense spikes in the upper leaf axils in late spring or summer. Distributed in all states, on stream and river banks, it often reveals its modest presence by its scent when trodden on. It is easily propagated in the same way as exotic mints by cuttings and by division. It requires regular watering and grows well with the addition of compost to the soil. It should not be consumed by pregnant women. (6:147 10:301 17:162).

Mentha diemenica, Slender Mint, grows to between 10 and 20 cm in height, with narrow ovate approximately 2 cm long leaves that have a strong mint fragrance. The tiny lipped, pink flowers are borne in spikes and appear from summer to early autumn. This species occurs in Tasmania, Victoria, South Australia, and New South Wales. It has a suckering habit and makes a pleasant mint lawn. It is propagated by cuttings and suckers, and should be located in a moist or regularly watered site. (6:246 10:330 12:64 17:162, 163).

Mentha laxiflora, is a suckering species. It occurs in New South Wales and Victoria, and is associated with higher altitudes. It has lanceolate leaves of substantial length, averaging between 4 and 5 cm long. It shares the scent of *Mentha viridis*, of roast lamb fame. The spikes of tiny lipped flowers are lavender or white, summer to early autumn. It is propagated by cuttings or suckers. It requires ample water, a well-composted, moisture-retentive soil and approximately 70 per cent shade or more. (10:330).

Mentha satureioides, Native Pennyroyal, has a creeping habit with slender opposite green leaves and inflorescence of tiny white flowers in spring. All parts of the plant have an intense, hot, minty scent and have a similar use to the herb, Pennyroyal. Like the traditional herb it should not be taken by pregnant women since it is an abortifacient. A small lawn, well watered, can be most attractive.

Microsorium scandens, Fragrant Fern. Relatively few ferns worldwide possess any fragrance, but the rhizomes of this species contain coumarin, a substance that has the scent of newly mown hay. It is native to the eastern mainland states, growing in moist, shady areas. Its leaves are filmy, lobed or entire, and grow to 0.5 m. It is propagated by division or by spores. (7:104).

Myosotis exarrhena, Sweet Forget-me-not, is a perennial native Forget-me-not with tiny typical flowers, usually white, that have an unexpected delicate, sweet scent. Its flowers appear in spring and early summer. It occurs in moist, partially shaded areas in Tasmania, Vict. and into New South Wales. It grows well in shade and is tolerant of quite heavy shade. It needs a moist, well-composted soil to perform optimally, and can be propagated both by seed and by cuttings.



△ *Aphanopetalum resinosum*, see page 114. Photograph by Murray Fagg, Aust. Nat. Botanic Garden.

▽ *Hoya macgillivray*, see page 114. Photograph by R. Hotchkiss, Aust. Nat. Botanic Garden.



Nicotiana velutina, Native Tobacco. The flowers of this Queensland species, like many of the genus, are nocturnal. The small tubular, white summer flowers greatly increase their fragrance as the evening draws on. The rosettes of simple leaves reach a diameter of approximately 40 cm before sending up a flowering stem to about 80 cm. It is propagated by seed. This species occurs on sandy soil and well-drained loams. (7:280, 282 8:266).

Ochrosperma citriodorum (syn. *Baeckea citriodora*), is a shrublet only 20 cm high and wide, but makes its presence known by its intensely lemon-scented foliage. The tiny lanceolate leaves are 2 mm long and densely arranged along the stems. The spring flowers are white and average 3 mm in diameter. It is native to New South Wales, and is propagated by cuttings.

Ocimum sanctum, Sacred Basil, occurs in northern Australia. It has been questioned whether it is endemic and therefore extends the distribution of this species from tropical Asia to northern Australia, or whether it is an early exotic introduction. It is a short-lived perennial in tropical conditions, but is annual in cooler areas. It forms a small shrub with numerous long spikes of pale lavender flowers in purple bracts in late summer. The fragrance is extraordinary, intense, warm; a mixture of clove and incense that can be quite intoxicating. The slightest touch to any part releases the scent. It is propagated by seed and completely frost intolerant.

Ocimum tenuiflorum, is a small, twiggly perennial species of Basil that reaches approximately 30 cm high and branches out from the base. All parts are strongly mint scented, and this species has fly-repellent properties. The leaves are broadly lanceolate and grey-green. The spikes of flowers are purple, with the typical lipped flowers of the genus and appear in late summer. It is native to Queensland, occurring on basalt soils and in open bushland. It can be propagated by seed and by cutting. (10:307).

Pelargonium australe, is a variable species that occurs in all states except the Northern Territory. I first encountered it near Bicheno on Tasmania's east coast. This particular form has a strong rose fragrance, pink-mauve flowers and is low and spreading. However, the same species may form a neat, full, small bush, have pale flowers or be only faintly aromatic. The lesson is to take cuttings from a really well-scented type, with good form being a secondary consideration. It is grown by cuttings or from seed (although the progeny raised from seed may not have the virtues of the parent plant). It grows well in full sunshine and responds to regular watering. (6:314 9:254 11:160).

Plectranthus suaveolens. There are fourteen species of this genus native to Australia, the majority having pleasantly scented, handsome foliage (although there are some black sheep with an unpleasant leaf scent). *Plectranthus suaveolens* is a low-growing species, with green, finely hairy, ovate leaves that have a sweet scent when crushed and spikes of blue flowers in summer. *Plectranthus mirus*, from northern Queensland, and *Plectranthus argentatus* is arguably the handsomest of the Australian species, with large, velvety, silver-grey leaves, but unfortunately, not strongly aromatic. Easily propagated by cuttings, they grow well in frost-free areas with light shade. (10:315, 326).

Prophys amboinensis, is a beautiful species with heads of white tubular flowers on fleshy stems to about 0.6 m and broad cordate leaves, with a superficial resemblance to *Agapanthus*. It flowers from spring to summer and dies down in the dry season. It is a northern Queensland species of forest floors in medium to heavy shade. It has no frost tolerance. It has long been used by Queenslanders as a pot plant, grown in well-composted loam. The flowers have a delicate, sweet, lily fragrance. It is propagated by seed. (13:69 16:269).

Pterocaulon serrulatum, is a species that deserves to be introduced into any herb or fragrance garden in lower rainfall areas for the strong fruit salad fragrance in the foliage. The heads of greenish flowers are not spectacular and appear sporadically throughout the year. The plant is erect growing to around 65 cm. It requires full sun and excellent drainage. This species is widely distributed throughout mainland Australia.

Pterocaulon sphacelatum, Apple Bush, is an erect herb up to 1 m in height, with globose inflorescences of greenish-white flowers that occur throughout the year. The fragrance of the leaves is superb, being that of ripe apples. It is widely distributed in mainland Australia. Propagate by seed and grow in very well-drained soils in full sun. (8:261 9:247).

Sowerbaea juncea, Vanilla Plant or Rush Lily, is found in wet, sandy, peaty soils near coastal swamps, and is one of our most beautiful small plants. It forms a tufted plant with many tiny rush-like leaves. From the base arise slender flowering stems, each bearing a dense terminal umbel of lilac flowers in spring with yellow stamens and the most delicious scent of vanilla. Propagate by seed or by division. Ideal for a rockery in full sun with moist soil. It occurs in all eastern states. Another species, *Sowerbaea laxiflora* from Western Australia with the same scent is similar but carries fewer flowers per umbel. (12:64 15:266 16:299, 304).

Teucrium corymbosum, Forest Germander, deserves introduction into herb gardens. It is perennial herb to 60 cm, with fine lanceolate leaves that are strongly aromatic and small white lipped flowers. It occurs from the coast to the mountains on richer soils and inland on red soils in New South Wales, Victoria, Tasmania and South Australia. Propagated by seed. (10:305). ■

Australian Climbers in Containers

by Denise Greig

Contained climbers are perfect for those gardeners who have very limited ground space, such as an inner-city courtyard, townhouse, patio or sundeck. Even a shady balcony can be transformed into a miniature jungle with the use of shade-loving climbers from rainforests. In many cases where a pergola is erected to cover an existing paved area, climbers may be grown in a large pot or tub, and trained up supports to cover its sheltering rafters. Some species of climber are also useful for indoor decoration. Inside the house, a vigorous single specimen or groups of climbing plants can make interesting room dividers or indoor screens.

Climbing plants in containers must be given support, otherwise they will become spill-over plants. There are various supports, such as totem poles, tree-fern slabs, stakes, trellises and wire frames, available. Some species, such as *Hoya*, *Billardiera* and *Hibbertia dentata*, can be coaxed into formal geometric shapes by training them round shaped metal frames. When contained, most climbing plants will rarely achieve the heights they would in the ground. They are more "well-behaved" and can easily be controlled by regular trimming. Good drainage and good quality potting mix, with the possible addition of compost, is recommended. Thorough and regular watering, particularly through summer, is required with an occasional application of slow-release fertiliser.



△ *Scaevola albida*, coastal form to 50 cm tall unless pruned to size.

Plants for containers and rockeries

Horticultural Gem

▽ *Scaevola striata*, to 20 cm tall. *Scaevola pilosa* is similar, different pattern on the flower.





△ *Dampiera eriocephala* grows extremely well as a container plant with large heads of brilliant flowers to 40 cm tall. It is similar to *Dampiera welsiana* which has non-hairy leaves. Photo, Ivan Holliday.

Plants for containers and rockeries

Horticultural Gem

▽ *Dampiera coronata* (syn. *D. cauloptera*) an erect perennial to 40 cm tall producing masses of flowers 3 cm across. Photo, N. Marriott.



Container Plants Indoors. To revitalise and freshen the plant, most plants require periods of rest in a sheltered spot in the garden. Gentle cleaning of foliage with a soft, moist cloth keeps plants fresh indoors. Climbers from the tropics and rainforests, especially those with adventitious roots, benefit from a regular misting with water to help raise the humidity and keep the plant in good condition. Plants grouped together will also help to create more humid conditions. Draughty locations should be avoided.

Climbers suitable for growing in containers

Agapetes meiniana, a bushy, shrubby, semi-climber. Attractive foliage and flowers. Suitable for baskets. Can be grown indoors. (9:333, 334).

Aphanopetalum resinosum, Gum Vine, a bushy, stem twiner. Rampant in a garden. Provide a humus-enriched soil with good moisture retention. Grows well in shade and can be used indoors. Photograph on page 109.

Billardiera bicolor, Painted Billardiera, a slender twiner suitable for a tub with trellis support. Flowers in autumn. (15:269, 272, 277).

Billardiera bignoniacea, Orange Bell Climber, a slender twiner and an attractive tub plant for a shady spot, provide plenty of water. (11:295 15:271, 272).

Billardiera cymosa, Sweet Apple Berry, a slender, decorative, long-flowering, light climber for tub. (7:291, 328 11:295 15:269, 271, 276).

Billardiera erubescens, Red Billardiera, a slender twiner with attractive bright red flowers for long periods. Provide good support. (4:299 15:266, 269, 271).

Billardiera longiflora, Purple Apple Berry, a slender twiner with attractive flowers and fruit. Tub plant for a shaded verandah or courtyard. (12:148 15:278).

Billardiera ringens, Chapman River Climber, a shrubby twiner to be grown in a large tub. Spectacular orange-red flowers. (15:232, 269, 273).

Billardiera scandens, Common Apple Berry, a shrubby twiner that can be an attractive tub plant for a verandah or trained up posts. (6:147 7:142 15:276).

Calamus caryotoides, Fish-tail Lawyer Cane, a climbing palm with spines. An excellent indoor plant with ornamental foliage. (18:78).

Chorizema diversifolium, Twining Flame Pea, a slender colourful climber for a hanging basket or tub. (17:122, 124).

Cissus antarctica, Kangaroo Vine, a woody tendril climber that has become a popular foliage plant for baskets and pots, indoors. (13:64 17:258).

Dioscorea transversa, Native Yam, a perennial climber with annual twining stems. It requires a climbing frame. Suited to shade or indoors. Expect deciduous stems and leaves. (13:69 17:30, 31).

Freycinetia excelsa, Climbing Pandan, a semi-epiphyte with adventitious roots. Provide a totem or solid tree-fern log on which to cling.

Hibbertia dentata, Trailing Guinea Flower, a slender long-flowering twiner. It can be trained on a frame for formal geometric shapes. (6:178 11:360 12:66).

Hibbertia scandens, Guinea Flower, a long-flowering twiner. In a large container it will quickly cover a wire support. (12:230 16:280).

Hoya australis, Common Wax Flower, a slender twiner with fragrant white flowers. It grows best when trained to climb upwards. (8:82 12:66 16:195, 274).

Hoya macgillivrayi, a slender twiner with spectacular dark red flowers that is suitable as an indoor plant. (13:69). Photograph on page 109.

Hoya nicholsoniae, a slender twiner that may be grown indoors. It has attractive foliage and creamy-white fragrant flowers. (13:69).

Piper novae-hollandiae, Giant Pepper Vine, a moderately vigorous climber with adventitious roots that needs tall fibrous support. It is good indoors in a well-lit position. (16:260, 262, 274).

Pothos longipes, Pothos, a moderately vigorous climber needing a fibrous totem for support, shade, humidity and moisture. Good indoors. (16:257, 267).

Rhaphidophora australasica, a moderately vigorous climber. A beautiful foliage plant for tropical climates that has proven a rewarding indoor plant further south.

Rhaphidophora pinnata, Native Monstera, a moderately vigorous root climber. It is a good foliage plant for verandahs in tropical climates and a good indoor plant in a well-lit position. (5:10 13:70 16:266 18:56). ■

Ground Covers in Containers

by Denise Greig

A large number of ground covers are suitable for growing in containers. Some long-flowering species, such as *Scaevola aemula* and *Dampiera diversifolia*, are popular hanging basket subjects. Ground covers with long trailing stems look their ornamental best in very tall containers or large agricultural pipes where they can attractively cascade over the sides. Smaller species like the *Brachyscome*, some *Goodenia*, Guinea Flower or the Native Violet look good covering bare soil in a container which holds a tree or palm.

All contained plants require good drainage and good quality potting mix. Thorough and regular watering, particularly through summer is required. While most ground covering plants can be used for growing in containers, the following are particularly attractive:

Acacia cultriformis, 'Austraflora Cascade', a form with long trailing stems and spectacular flowers for a tall containers or large agricultural pipe. (15:195, 196).

Acacia pilosa, a dome-shaped, spreading shrub that becomes a good specimen plant in a medium-sized container.

Acacia pravissima, 'Golden Carpet', a shrub with long trailing stems that becomes a good weeping plant in a tall container. (15:197).

Austromyrtus dulcis, Midgen Berry, a dome-shaped, spreading shrub that has prolific flowering and attractive young growth. It is suitable for large baskets.

Banksia serrata, 'Austraflora Pygmy Possum', a dense shrub with horizontal branches making an outstanding specimen plant in large tubs. (15:200 17:65).

Brachyscome angustifolia, Stiff Daisy, a small, spreading long-flowering perennial that is suitable for pots or baskets. Keep it well watered. (17:346).

Brachyscome formosa, Pilliga Daisy, a small, suckering perennial that can be grown at the base of taller plants. (15:266 17:347).

Brachyscome multifida, Cut-leaf Daisy, a compact but slightly trailing perennial that has long flowering periods. It may be used in pots, baskets and at the base of taller plants. (5:91, 199 6:147 7:109 12:184 15:193 16:173 17:338, 343).

Correa 'Dusky Bells', a dome-shaped spreading shrub with pretty deep-pink flowers throughout cooler months, suits pots or baskets. (15:228 17:55 18:26).

Dampiera diversifolia, a prostrate perennial growing masses of small blue flowers. It is a beautiful hanging basket subject. Page 113 for other species. (12:245, 249 17:55 18:26).

Eremophila debilis syn. *Myoporum debile*, Winter Apple, prostrate, trailing to spill over containers. A long flowering period is followed by ornamental berries. ►



△ *Drosera binata*, Forked Sundew, see page 127. Photograph by J. B. Fanning.

Plants of Prey, Carnivorous Plants, see page 138 for details of plants of prey.

- ▽ *Drosera menziesii*, Pink Rainbow Sundew, can be climbing or erect to 35 cm tall with flowers to 2 cm across in clusters of 1–6.





△ *Drosera leucoblata*, a pygmy sundew to 5 cm tall.

Plants of Prey, Carnivorous Plants see page 138, cultivation on page 126

▽ *Drosera bulbosa*, Red Leaved Sundew, 3 cm tall, flowers to 3 cm across.



Goodenia hederacea, Forest or Ivy Goodenia, a small, spreading perennial that is a decorative plant for the base of taller plants or in baskets. (10:258).

Goodenia humilis, Swamp Goodenia, a small, suckering perennial for pots and baskets, with a humus-rich soil with moisture retention. (10:258 11:301, 360).

Grevillea. Forms of this amazingly versatile group of plants for containers:

Grevillea banksii, 'Ruby Red', a prostrate shrub with attractive foliage and bright red flowers. It needs a large basket or tub. (14:339).

Grevillea juniperina, 'Prostrate Yellow Form', a prostrate shrub that is an attractive, adaptable plant for large tubs. Prolific flowers. (12:326 13:51).

Grevillea lanigera, 'Prostrate Form', with trailing branches. Its beautiful foliage and flowers will trail over tall containers or large baskets. (12:354).

Grevillea thelemanniana, 'Grey-leaved Form', trailing branches and profuse flowers in winter and spring, good cascading plant for large containers. (13:358).

Hemandra pungens, Snakebush, a dwarf, spreading shrub for pots or baskets producing masses of flowers. (5:267 6:150 7:318 10:328 11:241 13:54 14:18).

Hibbertia diffusa, Wedge Guinea Flower, a small, spreading shrub producing masses of bright yellow flowers making it a good basket plant. (6:178).

Hibbertia obtusifolia, 'Prostrate Form', a ground-hugging shrub that is excellent as a container plant. Tip prune regularly. (4:196 12:64 13:54 14:18).

Hibbertia pedunculata, an almost prostrate shrub well suited as a basket plant. It has a long flowering period from spring to autumn. (12:319 15:266 17:84).

Hibbertia procumbens, Spreading Guinea Flower, a completely prostrate shrub producing masses of bright yellow flowers in spring and summer. For use in baskets or pots. (4:195 6:178 7:382 13:54).

Lobelia membranacea, a carpeting perennial producing masses of sky-blue flowers in spring and summer, a good basket plant but needs moisture. (8:83).

Persoonia chamaepitys, Prostrate Geebung, a small, prostrate trailing shrub with attractive foliage producing masses of bright yellow flowers. It is a superb trailing plant for pots or baskets. (12:319 13:244, 262 17:84, 85).

Pultenaea spinosa, Spiny Bush-pea, a prostrate, trailing shrub with long cascading branches that need a tall container for best display. (12:118 15:182).

Scaevola species for containers, see the photographs on page 112.

Scaevola aemula, Fairy Fan Flower, a spreading perennial with purple flowers over long periods. Good for baskets or pots. (5:11, 12, 302 12:66).

Scaevola 'Angela Ratcliffe', a prostrate, spreading perennial. A pretty hanging basket or container subject with masses of purple flowers in spring. (12:321).

Swainsona formosa, Sturt's Desert Pea, a prostrate, creeping perennial that needs deep containers. It has stunning red and black flowers. (15:344 17:342). ■

Fruits of the Rainforest by Wendy and William Cooper.

I was astonished when I discovered this incredible book. The work and dedication that must have gone into the collection of fruits of 600 species of rainforest plants would have been outstanding. Each left hand page of the book has a description of 4-5 species and opposite is a large full colour plate of the fruit of the species described. The fruits are painted full size and in authentic colour with sections through them showing how they are made up. The seed contained in the fruits is also shown with correct size. I found the book just in time to reproduce a portion of one of the large colour plates on the cover of this issue, it shows as well the Red Lacewing Butterfly. This book is such a superb piece of work I shall have more to say about it in a coming issue. It is exciting. For the first time the casual ignorant observer can identify rainforest plants simply by observing the fruit. A Reader's Digest publication, but with a page size of 29 x 19 cm, it is available for \$75.00. William Cooper, the artist, has also produced 10 books on birds and if he will contact me I shall be pleased to promote them also — Editor.

Terrarium Gardens

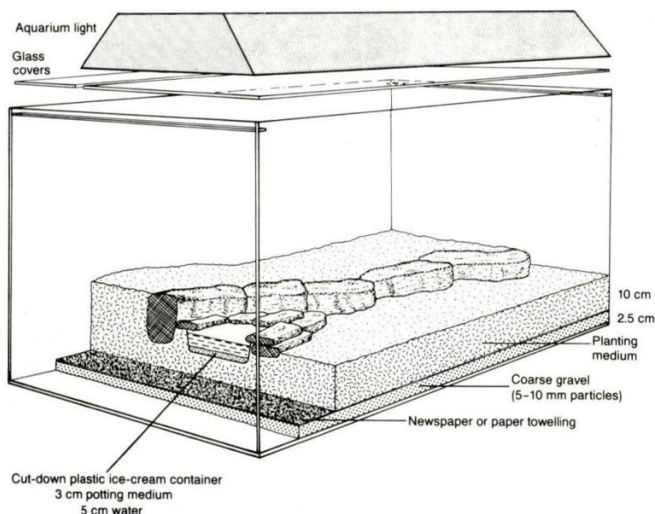
by John Wrigley and Murray Fagg*

Terrariums are indoor gardens and provide another extension to the ways of growing plants indoors. A well-designed, healthy terrarium is a wonderful feature in a room, and can be an expression of its owner's horticultural, artistic and landscaping ability. Many of the design principles of outdoor landscaping can be applied to a terrarium — but all in miniature. The terrarium environment is a very humid one and careful selection of plants is essential for good results. The humid atmosphere can often be increased by the inclusion of a miniature pool or waterway in the landscape.

Terrariums may be built in various ways. Some people prefer to use a glass bowl, often referred to as a goldfish bowl; others prefer a glass aquarium. I think that an aquarium gives you a greater opportunity to use imagination in landscaping and design. Both styles, however, can be used effectively.

Setting up a Terrarium

Let us establish a terrarium using a standard three-foot aquarium as the example. First, spread about 2.5 cm of gravel, with particle size of between 0.5 and 1 mm, over the bottom of the tank. Cover the gravel with paper towelling or newspaper. This will prevent the planting medium from clogging the drainage. The planting medium should consist of two parts of standard potting mix with an additional part of peat moss added to it. The minimum depth of the planting medium should be 10 cm.



***Growing Native Plants Indoors** by John Wrigley and Murray Fagg. Available at your bookseller or for \$20 as advised inside our rear cover. The article above was based upon a chapter in the book of this name and reprinted with permission of the publisher, Simon and Schuster. A book in the Mount Annan Series, each by selected authors. This small 180 page book is a valuable, practical guide to any who wish to decorate their homes with living wildflowers. I have chosen to base the above article on the chapter, "Native Plants for Terrariums", as a graphic guide to the competent practical approach taken by the authors. Other chapters such as "Requirement for Good Culture", "Pests and Diseases", "Propagation", "Foliage Plants", "Flowering Plants For Baskets and Pots" and "Native Plants For Aquariums" are equally well presented for your advice.



△ *Drosera glanduligera*, Scarlet Sundew, see page 127. Photograph by K. Newby.

Plants of Prey, Carnivorous Plants, see page 138 for other plants of prey.

▽ *Drosera whittakeri*, Notched Sundew, see pages 107 and 126. Photograph by Neil Marriott.

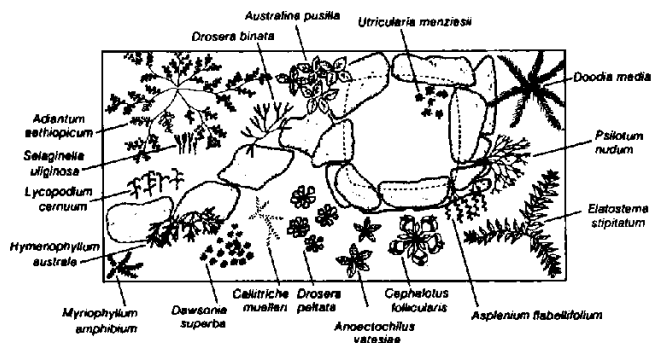




Byblis gigantea, Rainbow Plant, because of the iridescent pinkish mauve flowers to 50 cm across, defying accurate reproduction. A flytrap plant, a carnivorous plant, trapping insects on the sticky glands on the flower stalk. See Plants of Prey on page 138.

Landscaping the Terrarium

It is important to establish some interesting contouring in the planting medium and this is best done by using rocks to build up sections towards the back of the tank. The planting medium will obviously be deeper here and more suited to larger plants.



If a pool is to be included, an easy method is to use an empty ice-cream container. Take a 4-litre plastic ice-cream container and cut it down with a pair of scissors to about 8 cm deep. Bury this container in the medium so that the top is level with the surface. Then use stones to conceal the outline of the container and also the exposed white sides. Place about 3 cm of potting medium in the bottom of the container and cover it with 1 cm of coarse, washed sand. This will keep the water in the container clear. Finally, arrange the rocks so that they appear in a natural configuration and carefully fill the container with water, having first placed a plastic bag on top of the sand to stop it being disturbed. Remove the plastic bag. The terrarium is now ready to be planted.

Planting the Terrarium

The position of the plants you have chosen is important to achieve a balanced and aesthetically pleasing effect. Larger plants, such as ferns, are best put near the back and sides of the tank. Mosses can be used to cover rocks, particularly those near the pool; the use of *Dawsonia superba*, the giant moss, is very effective for this purpose. One or two small aquatics, such as *Utricularia* spp. (bladderworts) may be used in the pool, carefully pushed into the medium. A feature plant such as a jewel orchid, sundew or pitcher plant should be used as a focal point and positioned just off centre and near the front of the terrarium.

Maintaining the Terrarium

It is essential to have covers for the terrarium and normally these come with the purchase of the aquarium. Whether the tank is completely covered or whether the covers are partly opened will depend on the room temperature, the terrarium's position in the room and also on the contents of the terrarium. You should adjust this once the terrarium is set up. While a humid atmosphere is essential, however, it is important not to let the front of the tank be obscured by condensation. By adjusting the covers, a happy medium can be achieved.

Proper light is also essential and this is best provided by setting up a standard aquarium light with a plant light tube (available from aquarium stores). Allowing about 12 hours of light each day using a time switch usually gives satisfactory results. If you are using a goldfish bowl for a terrarium, then you have to rely on natural light for plant growth, so position the bowl near a window.

It is difficult to be exact about how often you should water your terrarium. It depends on many factors, such as room temperature, how well covered the terrarium is, type of plants used. But remember, the pool should be kept up and the peaty medium should never look pale in colour. Assess terrarium regularly.

Control of plant growth is another small maintenance task. It frequently happens that one species has a tendency to become dominant in a terrarium. Pruning or the removal of runners may be required to keep it in check. This is really just a matter of observation to maintain a balance in the landscape.

An Added Fascination, Living Creatures?

It can also be exciting to extend the scope of a terrarium by adding animals such as frogs, skinks or even newts to the landscape. These are readily accommodated and will not upset the plant life. However, it is important to remember to feed them daily. Small pieces of chopped-up meat placed on a rock is the easiest way to feed them and if the same rock is used each time, they will come to expect it at that spot. Remove any uneaten meat after an hour or so.

Collecting Plants for the Terrarium

Some of the plants mentioned in the following descriptions will be available from nurseries that concentrate on marsh plants or carnivorous plants. If you decide to collect a species, remember that creeks, lakes and swamps are sensitive habitats and it is important not to cause disturbance or damage when collecting plants. Many of the commonest plants found in and near creeks and lakes in most areas are not native species. These can become troublesome weeds in wet areas and they should not be transported to other natural areas. Avoid protected or rare plants. Obtain all the orchid species and carnivorous plants (the Sundews and Pitcher Plants) from specialist nurseries or licensed growers.

Pests and Diseases

If you are careful that the plants you put in the terrarium are free of pests such as aphids, mealy bugs, slugs and snails before planting, then the terrarium will remain virtually pest free. If the contents become too wet, however, there is a danger that fungus may develop; spraying with a multipurpose fungicide will usually overcome this problem. It is probably safest to remove any animals from the terrarium for several hours when spraying. As well, the terrarium should be dried out a little, by removing the covers for a day or so.

Adiantum aethiopicum, Common Maidenhair Fern, is a dainty, but vigorous fern found in moist places in all states. It has a branched, creeping rhizome with erect fronds rising to about 30 cm. The much-divided, lacy fronds are borne on reddish-brown, shiny stems and consist of many tiny, almost round, sometimes lobed, leaflets. It grows strongly in a terrarium where its underground rhizomes rapidly shoot up new fronds. Plant towards the back or sides of the tank. (7:103).

Adiantum diaphanum, Filmy Maidenhair Fern, is a dainty fern with a creeping rhizome often found on wet rock faces in rainforests in eastern mainland Australia. The slender fronds, rarely exceeding 20 cm high, are semi-erect. They are pinnate or bipinnate with dark green leaflets, about 8 mm in diameter. It is less vigorous than *A. aethiopicum* and well worth a place in a terrarium. It may be used near a pool or in the middle ground of the landscape.



Albany Pitcher Plant, *Cephalotus follicularis*. The colour varies, the more common pitchers being a pale green colour, to 5 cm long. A fascinating plant grown in a pot or terrarium as opposite. A carnivorous plant, refer to others on page 138, Plants of Prey.

Adiantum hispidulum, Rough Maidenhair Fern, has creeping rhizomes and erect fronds found in various habitats in the eastern mainland states and the Northern Territory. The much-divided fronds are 30 cm high and are borne on stiff but slender, black stems, which are rough to the touch. The leaflets are dark green, about 1.2 cm in diameter, with a minutely toothed edge. (10:378 15:240).

Anoectochilus yatesiae, A Jewel Orchid, is a tiny terrestrial orchid found on the floor of northern Queensland rainforests. Plants develop a rosette of two to six ovate leaves from a fleshy, creeping rhizome. The leaves are about 4 cm long and beautifully marked with sparkling silver veins on a dark green background. One to four shyly opening flowers are held on an erect stem to 15 cm. They are green and brown with a white lip and grow to about 1.2 cm long. This plant is quite rare, but is a delightful addition to a terrarium and may be used as a feature as the silver veins tend to shine in the light. It must never dry out but at the same time should never be allowed to become soggy. The rhizome should be just covered with potting medium. Some success has been achieved by growing it in live sphagnum moss. (8:90).

Asplenium flabellifolium, Necklace Fern, is a tiny fern with short, creeping rhizome, found in a variety of habitats in all states. The slender fronds are pinnate and rarely exceed 15 to 20 cm. They are limp and arching and tend to produce plantlets at their tip. These form roots and another plant begins to grow. The leaflets are fan-shaped and mostly about 1.2 cm across. It does well in a terrarium but does not become invasive. It may be used near the middle or front of the tank. It transplants readily. (9:243).

Australina pusilla, Small Shade Nettle, is a small, spreading plant from damp shady areas in south-eastern Australia. It tends to root at the nodes. The toothed, dark green leaves are elliptical and vary greatly in length from 1 to 6 cm; they are most commonly about 2 cm long. Flowers are insignificant. This hardy little plant is an excellent ground cover for a terrarium. Its spread may be easily controlled by pruning. (15:239, 240 17:270).

Callitriche muelleri, Round Water Starwort, is a creeping plant that can either be found growing in damp soil or as an aquatic from northern Queensland to southern Victoria. The slender stems root at the nodes. The tiny, light green leaves are mostly about 6 mm long and diamond-shaped. The plants tend to spread along the substrate and then become semi-erect providing an interesting contrast. As it will seed itself it may, have to be controlled. (17:149, 162).

Centrolepis strigosa, is a small, tufted annual sedge found in moist ground in all states of Australia. It forms cushion-like clumps up to 10 cm across and usually less than 10 cm high. The fine, terete leaves are bright green and the insignificant flowers are borne on similar stems, a little taller than the leaves. This is a delightful little plant that will seed itself in the terrarium, but does not become a pest. Being an annual, the old plants will die out. It looks very effective planted near the pool.

Cephalotus follicularis, Albany Pitcher Plant, is a mat-forming, insectivorous plant restricted to a few swampy areas near Albany, Western Australia. The plant forms a rosette of true leaves which are spatulate, light green and up to 5 cm long. These are mixed with modified leaves shaped like little, lidded green pitchers, which are used as insect traps. The pitchers may reach 4 cm high, but in young plants they are much smaller. The flowers are green and borne on an erect stem which may reach 40 cm high. Insects are attracted to the pitcher and once inside, are prevented from leaving by the slippery sides and inward curving, brownish teeth surrounding the entrance. The pitcher contains digestive enzymes which convert the insect to usable plant food.

Albany Pitcher Plant should be used as a feature in a terrarium. It is often available from nurseries specialising in carnivorous plants. It grows readily, but requires particularly good light. Insects may be fed to the plant, but these appear to be unnecessary for good growth. Propagated from both seed or by division.

Cheirostylis ovata, is a miniature, terrestrial orchid found in leaf mould, often on shallow or sandy soil on the edge of rainforests. It occurs in northern New South Wales and Queensland. It is reduced to a fleshy rhizome in the dry season (winter). In summer it produces two to seven, prettily veined, ovate leaves about 3 cm long. An erect spike holds several, small white flowers, which sometimes self-pollinate and fail to open. It is not easy to grow, but I have had success with it in an terrarium, where it has flowered. The rhizome should be placed on the surface of the soil and in the growing season, tiny hair roots are produced which cling on to organic matter in the medium. It should be placed in a position where it can be partly dried out when it becomes dormant, without disturbing other inhabitants. It is a challenging plant, but worth the effort.

Crassula helmsii, Swamp Stonewort, is a terrestrial plant, but here it behaves rather differently, forming mats in damp ground. The bright green leaves are much more crowded and the stems tend to overlap each other making a good ground cover. It seeds itself but is not too rampant. (11:360 17:158).

Dawsonia superba, Giant Moss, forms extensive colonies in moist, shady places, often on clay soils in eastern Australia. This is one of the largest mosses in the world, with stems sometimes reaching 50 cm high. It is, however, usually considerably smaller than this. Each erect stem looks like a miniature pine tree with dark, bluish-green leaves about 2 cm long. The fruiting body is borne terminally on a slender stem to 5 cm long. This is an ideal plant to use as a ground cover around the pool. It transplants readily, although it is often deep rooted. Its form and leaf colour are features. It tends to shrivel when conditions are dry but quickly rejuvenates when water is applied.

Doodia media, Common Rasp Fern. The genus *Doodia* is not well understood and it is often difficult to accurately determine species. *Doodia media* is described here, but it is similar to *Doodia caudata*, which may also be used in terrariums. Both are widespread in eastern Australia. They are small, clumping ferns with pinnate fronds to 30 cm, but often smaller. A hardy fern it is easy to grow and frequently forms new plants from spores in the terrarium. It is best positioned near back or sides of the tank.

***Drosera* species.**

Carnivorous plants, see page 138

There are 54 species of *Drosera* in Australia and most of them are suitable for growing in a terrarium. They are insectivorous plants with sticky hairs on the leaves which snare small flying or crawling insects. These are slowly ingested by the plant and converted to plant food. Collectively, the species in this genus are known as sundews. The perennial species are mostly easy to grow, provided they are given ample moisture and good light: the standard, peaty terrarium mix will be suitable. Some species have tuberous roots and others have roots but both types will transplant, if care is taken. All species can be grown from seed which should be sprinkled on a peaty mix in a pot and kept moist. Some species can be propagated from leaf cuttings. The leaf should be cut from the plant and laid flat on a pot of peat or sphagnum moss, ensuring thorough contact with the medium. The pot must be kept humid by covering with a plastic bag. After several weeks, small plantlets will appear around the leaf. Only a few species of sundew are described here but these are typical of the genus and others may be treated in similar fashion.

Drosera adelae, Lance-leaved Sundew, is a small, rosetted plant with fibrous roots and lanceolate leaves to 20 cm long. It occurs only in northern Queensland near creeks in gallery forests. The leaves have the sticky hairs on the top surface only. The small, greenish flowers are borne on an erect stem about 25 cm high. It is cold-sensitive but if winter room temperatures are kept above 10°C, it will grow satisfactorily. The flowers are not spectacular, but the large, prominently veined leaves are attractive. (13:69).

Drosera auriculata, Tall Sundew, is an erect plant with a small, rosette and a leafy stem to 70 cm, but usually much less. It is widespread in moist areas of south-eastern Australia. Plants are tuberous. The rosette soon dies but the stem leaves are round and joined to the stem by a central leaf stalk. They are light green and about 1 cm across. The open, white or pink flowers are about 1.2 cm in diameter and borne on a terminal spray to 10 cm long. It grows strongly from autumn to early summer then tends to become dormant. At this time it should be kept a little drier or the tuber may rot. The plant should be positioned near the back of the tank, but where it can be easily seen. (4:287 13:69).

Drosera binata, Forked Sundew, is a fibrous-rooted plant with several leaves rising from the base, this species is found in eastern Australia and west to the Mt Lofty Ranges in South Australia. It is common on wet rock ledges and in sandy peat in swamps. Each leaf is borne on a stalk which may reach 25 cm. The leaf forks once or twice, with each segment up to 10 cm long. The white, open flowers are over 2 cm across and held on a branched stem longer than the leaves. It is a particularly easy and rewarding species for beginners. It is hardy, providing it is kept moist and the flowers are showy, photo on page 116. Easy to propagate by leaf cuttings. (5:33, 170 9:254 11:175, 360 13:69).

Drosera glanduligera, Pimpernel Sundew or Scarlet Sundew, is a tiny, rosetted plant found in swampy areas of temperate Australia. It has fibrous roots and may die out in dry conditions. Fifteen to 20 round leaves, 1 cm in diameter, are held on stalks about 6 mm long. The orange flowers (1 cm in diameter) are held on a stem 5 cm long and clothed with sticky hairs. This is a wonderful little plant with very brightly coloured flowers in spring. Keep moist. It looks best if grown with several plants together. Photo on page 120. (12:288 13:69).

Drosera peltata, Pale Sundew, is very similar to *D. auriculata* differing only in small botanical details, and distribution extends to northern Queensland and the Northern Territory. (11:360 13:69).

Drosera prolifera, Trailing Sundew, is a fibrous-rooted, rosetted plant found only along the streams rising from Thornton's Peak in northern Queensland. The leaves are kidney-shaped, about 1.5 cm across and held on flattened stalks to 4 cm long. The reddish flowers, 5 mm in diameter, are borne on a slender stem to 15 cm long. A new plant is formed when the tip of the flowering stem touches the ground. It is very easy to grow if kept moist, forming little mats.

Drosera schizandra, Notched Sundew, is a fibrous-rooted plant that forms a rosette and is found in northern Queensland. The flat leaves are obovate and up to 10 cm long by 5 cm wide. The red-pink flowers are 1 cm across on a stem to 10 cm high. It is closely related to *D. adelae*. (13:69).

Drosera spatulata, Common Sundew, is a fibrous-rooted, rosetted plant very common in wet ground in eastern Australia. The leaves are spatulate and up to 2 cm long, often with a red tint. The erect spike of tiny, white or pink flowers is usually about 15 cm long. This plant is very easily grown, the red colour of the leaves being more apparent in high light. It will readily seed. (13:69).

Drosera whittakeri, Scented Sundew, is a tuberous, rosetted plant common in Vic. and S.A. The yellow-green leaves are spatulate and grow up to 3 cm long. A large, single white flower, 2 cm in diameter, is borne on a stalk to 5 cm long, photo on page 120. It is an excellent plant for the front of a terrarium. It is very showy in flower with a pleasant perfume, see page 107 for pot culture. (9:254 11:360).

Elatostema reticulatum, Rainforest Spinach, is a sprawling plant found in wet, coastal rainforest gullies from northern Queensland to southern New South Wales. The rough-textured, toothed leaves are asymmetrically elliptical, grow to 15 cm long, and are borne on succulent stems. The green flowers are very small and borne in clusters in the axils of the very decorative leaves. It is easy to grow and can be propagated from cuttings. It is only suited to very large tanks. (17:268, 270).

Elatostema stipitatum, is a prostrate plant found from south-eastern Queensland to north-eastern New South Wales in wet rainforest gullies. The asymmetrically obovate leaves are borne on succulent stems. Each leaf is roughly textured and about 5 cm long, bearing rounded teeth around the margins. Flowers are small and green and borne in the leaf axils. Pruning may be necessary to control its spread.

Goodyera grandis, is a terrestrial orchid from the floor of northern Queensland rainforests. Three to six ovate leaves, mostly about 12 cm long are scattered around the succulent stem. Terminal flowering stems that bear 10 to 20 dull brown, open flowers, each about 1.5 cm across, appear in spring. It does well in a terrarium provided temperatures can be kept above 10°C. The flowers are more interesting than beautiful. It should be kept damp but not soggy.

Goodyera viridiflora, is a terrestrial orchid from the floor of the northern Queensland rainforests. Four to eight ovate leaves are borne on a succulent stem about 15 cm tall. They are about 8 cm long and have wavy margins. The very pretty green open flowers, 1 cm in diameter are held on a terminal spike about 15 cm high. Do not keep it too wet and temperatures must not drop below 10°C.

Gratiola peruviana syn. *G. latifolia*, Austral Brooklime, is a creeping perennial widespread in damp areas in temperate Australia. The stems root at the nodes. The bright green leaves are opposite, ovate, and mostly about 2 cm long. The trumpet-shaped, pale-pink flowers are about 1.5 cm in diameter and are borne on a long, slender stalk. Very easily grown, this plant makes a good ground cover for a terrarium. The flowers are showy and the foliage is decorative. Pieces of the plant will root if pushed into the medium.

Hetaeria oblongifolia, is a terrestrial orchid found on the rainforest floor in northern Queensland. A rosette of four to eight ovate, dark green is formed on a succulent stem. Leaves reach up to 8 cm in length. Tiny green and white flowers are borne on a terminal stem to 25 cm high. Not particularly ornamental, it will probably hold more interest for collectors. The temperature should be kept above 10°C.

Hetaeria polygonoides, A Jewel Orchid, is a terrestrial orchid from the rainforest floor of northern Queensland. Five to nine asymmetrically ovate leaves are borne in a rosette. Each leaf is up to 8 cm long and is dark, velvet green with a silvery-white central stripe. The green and white flowers are borne on a terminal stem about 15 cm long. Although it is quite rare it is occasionally offered by specialist native orchid growers. The sparkling leaves of this plant are a feature and should be used as such in the terrarium. The temperature should not be allowed to drop below 10°C. (3:350).

Hymenophyllum australe, Austral Filmy Fern, is a tiny fern, with fronds that are only one cell thick, found in highly humid areas of rainforest gullies on south-eastern Australia. It often grows on rocks or tree fern trunks. It has a creeping rhizome and much divided, translucent fronds which may reach 15 cm long. There are many filmy ferns native to Australia and all need similar conditions for growth. High humidity is essential and a terrarium provides a suitable environment. They are difficult to grow from spores so the best way to establish them is to collect a small rock with plants attached and place it near the pool. An occasional misting with a hand spray is also beneficial.

Lycopodium cernuum, A Club Moss, is a terrestrial plant found in damp, well-lit areas of rainforests, eucalypt forests, edges of swamps and cliff faces. It forms an underground rhizome with branching stems arising from it. These may reach 1 m in the field but are usually much smaller in cultivation. The tiny, crowded, stem-clasping leaves are about 6 mm long and a light green. (12:198).

There are several terrestrial club mosses native to Australia and all would be satisfactory in a terrarium. This species is larger than most but is the most common and easily grown. It may be propagated by layering the tip of a growing frond or by division which may be sometimes difficult to establish. Layering is done by securing the growing tip to the potting medium with a piece of wire. Roots will soon form where the stem is buried and the new plant can be cut from the parent. Smaller species such as *L. laterale* may be transplanted fairly readily.

Myriophyllum amphibium, Broad-leaved Water Milfoil, is a mat-forming plant found at the edge of swamps or in shallow water in South Australia, southern Victoria and Tasmania. The slender stems root at the nodes and may reach 6 cm high. The leaves are oblanceolate to 1.2 cm long. The flowers are insignificant. A hardy plant it can be used as a ground cover in a terrarium. Pieces of the stem will root easily when pushed into the growing medium.

Nepenthes mirabilis, Tropical Pitcher Plant, is a compact terrestrial plant or a scrambling vine found bordering swamps on Cape York. Mature leaves may reach 40 cm long and are tipped with a tendril that produces a pitcher at its apex. The pitcher is a trap for insects, which are dissolved by the plant and used for food. The cylindrical pitcher varies greatly in size from 3 to 18 cm long. It is green, often with reddish markings. Male and female flowers are borne on separate plants. The flowers are green and carried on an erect spike. Only young plants are suitable for growing in a terrarium and plants are often available from carnivorous-plant specialists. They provide a handsome focal point for the landscape and may be kept to a controllable size for at least a year. Temperature should not be allowed to drop below 10°C. Offshoots taken from the main stem will form roots and are ideal for this use. Photograph, page 136.

Nertera granadensis, Bead Plant, is a prostrate, mat-forming plant from alpine regions of New South Wales, Victoria and Tasmania. Stems tend to root at the nodes and the tiny, rounded leaves are about 4 mm long. Flowers are insignificant but the globular, orange-red fruits are well displayed and about 4 mm in diameter. This beautiful plant grows well in a cool terrarium. It is available from specialist nurseries. The display of fruit is outstanding and gives the plant its common name. (17:162).

Psilotum nudum, Skeleton Fork Fern, is a terrestrial or epiphytic plant widespread in eastern Australia. The species forms erect clumps in rock crevices or pendulous stems from the base of *Platyserium* spp. The terrestrial form is the best for terrarium culture. It develops stiff, divided fronds, triangular in cross-section with small scale-like lumps which contain the spores.

Fronds of Skeleton Fork Fern vary in height but are usually about 15 to 20 cm long on terrestrial forms. Plants grow slowly but their unusual leaf form is attractive. They will transplant if care is taken. They do not have true roots but develop hair-like structures on the rhizome which absorb water.

Seiagineila australiensis, is a tiny terrestrial plant from the floor of rainforests in Queensland. The prostrate, creeping, stem roots at nodes and forms mats. The spreading, linear leaves are about 3 mm long. This diminutive moss-like plant is an excellent ground cover for a terrarium. It hugs the ground tightly and is a vivid bright green. Transplants quickly take root if given ample moisture.

Selaginella uliginosa, Swamp Selaginella, is an erect plant from coastal heathy swamps in all states except South Australia. Plants are up to 30 cm high, often much smaller, and grow from an underground rhizome. The stems may be simple or sparsely branched and the tiny, lanceolate leaves are about 2 mm long. The erect stems look rather like a small conifer forest. They require ample moisture. Transplants move quite successfully, if not allowed to dry out.

Selenodesmium elongatum, A Filmy Fern, is a small, tufted, filmy fern found as a terrestrial near creeks in rainforests from northern New South Wales to northern Queensland. The lacy fronds are much divided and may reach 40 cm long. This plant is much coarser than the other Filmy Fern, *Hymenophyllum australe*, but is nevertheless a useful plant for the back or sides of a terrarium.

Utricularia dichotoma, Fairy's Aprons or Purple Bladderwort, is a small plant forming colonies in mud or shallow water in south-eastern Australia. Masses of tiny, spatulate leaves about 1 cm long are joined by slender stolons. The roots have minute bladders with which they trap small aquatic life. The flowering stem is about 15 cm high and bears three purple flowers. They have a prominent lip to 1.5 cm across giving the plant its common name, 'Fairy's Aprons'. In the terrarium landscape, the plant will grow well in the pool: in 1 to 2 cm of water, the plant will flower. A related species, *U. lateriflora*, will also grow in this way, but the flowers are smaller. Plants will transplant easily and specimens are occasionally available from carnivorous-plant specialists. (4:292 6:345, 347). See Plants of Prey, Carnivorous plants on page 137.

Utricularia menziesii, Redcoats, is a small plant of swampy areas in south-western Western Australia. This species forms mats of spatulate leaves about 1 cm long. The roots possess small bladders for trapping minute aquatic animals. The spectacular flowers are bright red with a spot of yellow at their centre, about 2.5 cm long and 1 cm across on short stems that grow to 3 cm high. This is the most highly prized of the Australian bladderworts — however, it is not easy to grow in a terrarium during autumn, winter and early spring, but after flowering it requires a dormant period. This corresponds to the dry summers of Western Australia. At this time, it should be removed to a pot and kept reasonably dry. When in active growth it should be given the wettest spot in the tank, but probably is best not submerged.

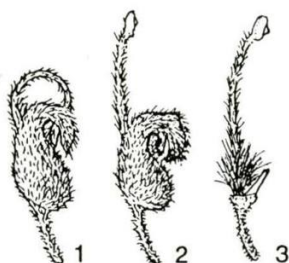
Zeuxine oblonga, is a terrestrial orchid from the floor of rainforests in eastern Australia from Cape York to Coffs Harbour. Plants form a rosette of several pale green, ovate leaves to 8 cm long. The small, green and white flowers are borne on a terminal stem to 45 cm high. This plant is mainly for collectors because when it flowers the leaves have usually died off. The flowers are very small and do not open properly. It is included here because a terrarium is probably the best means of cultivation. ■

Grevillea alpina

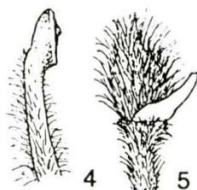
Mountain Grevillea or Cat's Claws

Notes by the Editor, based upon
The Grevillea Book, Volume 2
by Peter Olde and Neil Marriott*

Grevillea alpina, a horticultural gem with a host of quite spectacular forms, a profusion of variety in flower colour and foliage. The Grampians form is the type form as illustrated on page 140, the confluence being up to 3.5 cm long and 2–3 cm wide. The spectacular feature is the living colours. Plants are normally small and decumbent but can range to 2 m at Mt Zero. The Northern Victorian form such as that from the Warby Range, also shown on page 140, has smaller individual flowers in pendant clusters. The Goldfields form is a dense mounded plant to one metre with typically crowded foliage. The medium-sized flowers are usually of one colour, white and green, apricot, pink or red.



When conditions are to its liking, *Grevillea alpina* can be a long-lived species but it will require regular pruning at an early age to maintain a pleasing compact appearance. All forms grow best in cool, wet to hot dry climates. Most are intolerant of summer rainfall with its attendant humidity but it will withstand frost to 11°C. The species flourishes when planted in a very well-drained site in full sun to semi-shade in acidic sandy or gravelly loam or in dry, stony soils.



The sketches show the individual flower parts: 1, the flower (perianth) just prior to anthesis; 2, the flower just after anthesis; 3, the pistil, clearly evident in the photograph on page 140, which comprises the style with the pollen presenter in its tip; 4, the style end; 5, an enlargement of the lower section of the style. For a detailed description of how the *Grevillea* flower is structured and is pollinated, refer to Volume 1.

Editor's Comment. (Please do not attribute even any implication of my comments to anyone else, especially the authors.) Neil Marriott goes to great lengths to describe the natural growing conditions of each of the 340 species described in the book based upon very considerable experience as a horticulturist. One readily discerns a sense of frustration when it comes to exceptionally ornamental plants such as this one from his local area. He admits that it is known in the industry as a "drop dead plant". There is a need for more activity south of the border to research this plant for general horticulture and to develop a reliable grafting technique. Who will take up the challenge? ■

***The Grevillea Book, Volume 2** by Peter Olde and Neil Marriott

Now available this is a book you must have. Volume 1 was an introduction to this large group of 340 species. Every one of these species and probably 100 more forms are to be described, volume 2 describing 182, presented in alphabetical order, A to L. The value of the work and the breadth of its treatment is exceptional. For instance *Grevillea alpina*, which is widespread in Victoria in most areas from Melbourne north to New South Wales at Albury and the A.C.T. and west to the Grampians has many forms. There are eight colour plates of this species, two of which are reproduced on page 140 of this issue. The notes above are taken from two pages of description under the headings: Botanical description with related scientific references (this data is in small type and a knowledge of scientific terms is required to read it); Sketches of diagnostic features such as the flower detail reproduced above; Distribution, its natural occurrence; Ecology; Major distinguishing features; Related or confusing species; Variation, the various forms; Conservation status; Propagation; Horticultural features; Hybrids; Early history and comments. The book is available as indicated inside our rear cover for \$65, post free.

Australian Butterflies

A Field Guide

by Robert Fisher*

The butterflies we see are sexually mature creatures whose primary purpose is to mate and reproduce their species. As mature adults most butterflies do not live long, perhaps a few days or weeks, as they have many natural enemies and form an important part of many food chains. Much of their entire life is spent in the early or immature stages, as an egg, larva (caterpillar) or pupa (chrysalis).

Most butterfly eggs are within the range of 0.5 mm to 1.5 mm in diameter and are quite visible without magnification. All have a tiny hole at the apex, the micropyle, through which the sperm enters during fertilisation. The base of the egg is usually flattened and attached to the substrate with cement excreted by a gland in the female before it is laid.

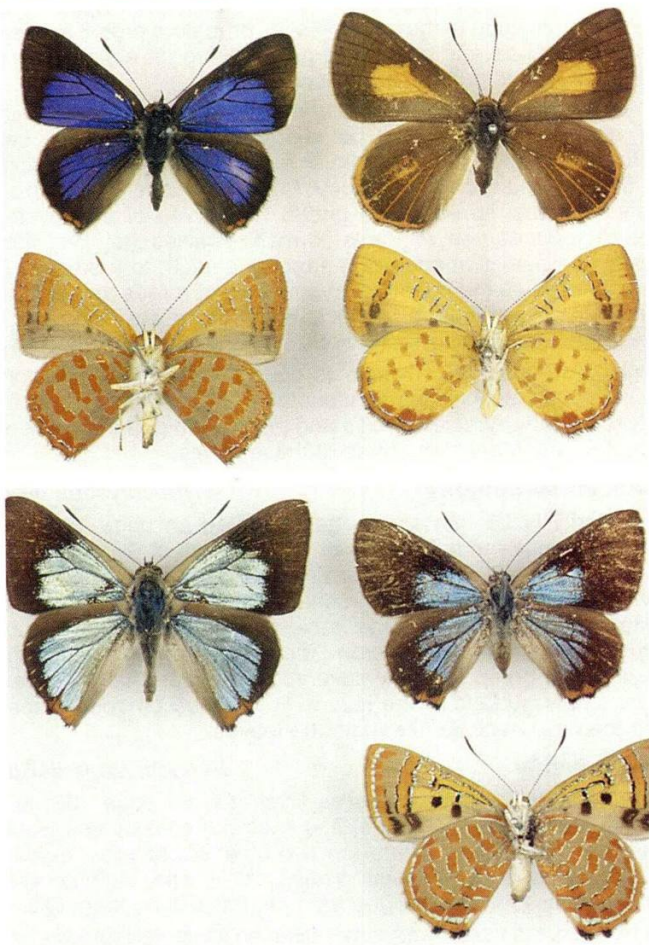
A very small number of Australian butterflies have larvae which are carnivorous and feed on the larvae and pupae of ants or other insects. Most species feed on plant material, especially leaves and flowers, although the plant species suitable for each butterfly species is often quite limited. After emerging from its egg the tiny larva will begin to feed, often making its first meal from its remnant eggshell. In the course of its growth the larva will shed its old skin or cuticle a number of times, revealing a new skin beneath. After about five changes the larva in most species will attach itself to a silken pad on the host plant and undergo a final transformation to form a pupa. This will be attached to the silken pad with a posterior cremaster, comprising a number of tiny anal hooks, and in some groups with a silken central girdle. Within the pupa a remarkable transformation occurs and in time the adult butterfly will emerge, dry its wings and begin to seek a mate. During this reproductive stage almost all butterflies need to feed on nectar from flowers, and sometimes fluids from rotting fruit, sucking these liquids through a tubular mouthpart, which remains coiled inside the head when not in use.

The entire period from egg to mature adult varies considerably from just a few weeks in some species under suitable seasonal conditions, to up to two years in at least one Australian butterfly. In temperate Australia some species will produce several generations during summer, but enter a stage of suspended development as eggs, larvae or pupae over the winter months.

More than three-quarters of our Australian butterfly species occur in the tropical north and north-east of the continent, where the abundant tropical rainforest provides host plants and habitats. In the southern temperate areas, we find a smaller group of butterflies. Their appearance is seasonal, with activity at a minimum during the colder winter months. In the arid centre of the continent, population numbers vary enormously with seasonal conditions, reaching a peak after heavy rains have stimulated growth of vegetation and thus their host plants.

***A Field Guide to Australian Butterflies** by Robert Fisher Published by Surrey Beatty & Sons

This fascinating article is culled from a book of special value to all those interested in wildlife. The 250 page field guide describes and illustrates 200 of the 385 species of butterflies found in Australia. The above notes are a shortened quotation from the book where they are illustrated by sketches. The descriptions of just two butterflies are given on the next page indicating how the other 198 species are described. The description of each species is supported by illustrations in full colour as shown on various pages of this issue. Available for \$29.95 as suggested inside our rear cover or from the publisher, Surrey Beatty & Sons, 43 Rickard Road, Chipping Norton, New South Wales 2170.



Top: *Hypochrysops ignitus chrysonotus*, male butterfly.

Centre: Yellow Spot Jewel Butterfly, *Hypochrysops byzos byzos*, males (left) and females, described on page 134.

Bottom: Blue Jewel Butterfly, *Hypochrysops delicia delicia*, male (left) and females, described on page 134.

The Butterfly Family Lycaenidae

Blues, Coppers, Azures, Lycaenids

About one-third of Australian butterflies belong to this large, worldwide family. With the exception of the large *Liphyra brassolls major* (moth butterfly), its species are very small to medium in size, and while most are coloured some shade of blue or violet, some have orange or copper-coloured wings. In the genus *Hypochrysops*, confined mainly to Australian butterflies have green and bright red markings with metallic margins beneath their wings.

The remarkable *Ogyris*, with 12 Australian species, is remarkable for the richness and metallic lustre of the blues and violets that colour the uppersides of many species. Many lycaenids have filamentous tails to their hindwings, often arising from the eyelike spots near the edge of the wings. It is thought that these give protection to the butterflies, as predators probably mistake them for eyes and antennae and attack this part, tearing off a small portion of the wings and allowing the butterfly to escape.

Eggs of lycaenids are often mandarin-shaped and sculptured with spines, ridges or depressions and may be laid singly or in groups. Larvae are "onisciform", or shaped like a wood-louse or slater; the cuticle is thickened and the head is concealed beneath the body. Pupae are usually smooth and ovoid, and fastened by anal hooks and a girdle. The larvae of most lycaenids are associated to some degree with ants. In many species they live within an ant nest, usually of a particular species, emerging at night to feed on foliage. In a few Australian species the butterfly larvae are carnivorous and feed on aphids or even the larvae and pupae of the ants in whose nest they live. Butterfly larvae associated with ants secrete various chemicals through scattered glands.

The greatest diversity of lycaenids occurs in the east and north of the continent, and a few species in the arid interior. Host plants include mistletoes (*Loranthaceae*) many *Acacia* species and plants with pea-like flowers. Larvae feed on the flowers, leaves and buds of these plants.

Yellow Spot Jewel Butterfly

Hypochrysops byzos byzos

This butterfly is 25 mm across as illustrated on page 133, found from south-eastern Queensland to New South Wales, south of Sydney. A subspecies *hecalus* occurs in ACT, south-eastern New South Wales and in central and eastern Victoria. The egg is mandarin-shaped, with numerous pits, ridges and spines; white, and laid beneath the leaves of the host plant. Mature larvae: blue-green or yellowish with some brown markings, and with dense hairs. Pupae: bluish or yellowish green; densely covered with minute hairs. Larvae feed at night on the upper surface of the leaves of various *Pomaderris* species and rest during the day concealed beneath the leaves.

Blue Jewel Butterfly

Hypochrysops delicia delicia

This butterfly to 35 mm across as illustrated on page 133, is found in south-eastern Queensland to central and southern coastal New South Wales and the adjacent tablelands. There are two other subspecies, *delos* from the southern tablelands of New South Wales, ACT, and Victoria west to the Grampian Mountains; and *duaringae* from central and northern Queensland.

From beneath, the sexes are similar, although the female forewing is suffused with orange. The egg is mandarin-shaped and finely ridged; white or grey. Mature larvae: pink or grey with a brown dorsal line, and oblique brown subdorsal lines on each segment. Pupae: dark brown. Larvae feed at night on several *Acacia* species and are attended by small black ants which nest in borer holes and crevices in the host tree. ■

Common Eggfly Butterfly*Hypolimnast bolina*

Male Common Eggfly butterflies are territorial. In some years they can frequently be seen patrolling a patch of plants in your garden or in a forest clearing. The female and male butterflies are markedly different. The male is called the Blue Moon butterfly in New Zealand and is black with four blue and white patches on the inside wings. The females are larger, black, with brown and white patches and a tracing of white along the edge of the wing. Females have a 9 cm wingspan. Caterpillars and chrysalises are rarely seen. They hatch from pale yellow eggs

The Love Flower, *Pseuderanthemum variabile*, is a variable little plant which grows in the understorey of open forests. It comes in white to pink to mauve flowered forms. The leaves vary from plain green to dark green with reddish-purple undersides. Other common hosts for the Common Eggfly are *Sida retusa*, *Sida rhombifolia*, *Portulaca* spp. along with some roadside weeds. Other butterflies hosted by the Love Flower are the Blue Banded Eggfly, *Hypolimnast alimena*, Danaid Eggfly, *Hypolimnast misippus*, Australian Leaf-wing, *Doleschallia bisaltide* and the Blue Argus, *Junonia orithya*.

Evening Brown Butterfly*Melanitis leda*

The Evening Brown is rarely seen except when disturbed and at twilight. One way to see this butterfly is to find some (unparasitised) chrysalises and keep them for about a week. With a little luck you will see them emerge, pump up and dry their wings. Care needs to be taken not to disturb the process. The wingspan varies from 7 to 9 cm. When resting the Evening Brown looks like a dead leaf. The underside wings are marked with an intricate pattern of tiny eyespots, and shades of lighter and darker brown.

Evening Brown caterpillars are green with a fascinating purple-red head with two brushed-back spikes. They have a somewhat unusual shape in that they are thin at the head and tail end and thicker in the middle. They live on the underside of grass and also pupate there, forming green chrysalises. The butterfly is most likely to lay its eggs on plants in shady places.

The host food plant Kangaroo Grass, *Themeda triandra*, is worthwhile to grow simply for its lovely growth habit. It grows in clumps and reaches about 1 m tall with flower spikes to over 2 m. It makes an excellent species for gardens which aren't watered regularly. This butterfly also feeds on many species of native and non-native grasses, such as Blady Grass, *Imperata cylindrica* and Green Panic, *Urochloa maxima*.

Painted Lady Butterfly*Vanessa kershawi*

The Painted Lady is a medium sized butterfly with a wingspan of 5 cm. It is orange and black with white patches on the upper inside wing near the top. It has a row of four tiny circular blue spots on the inside hindwing. The outside wings are an intricate pattern of orange, white, brown, cream and black that when closed provide excellent camouflage. With wings open, it comes to rest quite frequently on its host plants, or flies around the plants as if on patrol. The caterpillars are not frequently seen as they feed at night. They range in colour from green to brown, covered with long branched spines. The chrysalis is also variable in colour, though usually brown and can be marked with silver or gold. The Paper Everlasting Daisy, *Bracteantha bracteata*, is one host plant, together with many weeds such as, Scotch Thistle, and Capeweed.

Australian Fritillary Butterfly

Argyreus hyperbius

The Australian Fritillary is a rare butterfly. It is light orange with lots of small black spots on its inside wings. Little is known about its life or about its caterpillars. Periodically the population builds up to reasonable numbers, and then it isn't seen again for many years. By growing its host plant in areas from which it has been eliminated through development, you may increase the possibility of having this butterfly return more frequently.

The beautiful Arrowhead Violet, *Viola betonicifolia* can form an open ground cover in sunny to dappled shade areas which are fairly moist. In the flowering season you can then get a carpet of the pretty purple flowers. The flowers come in many shades of light to dark purple. The leaves of this violet are also interesting in that they are long and arrowhead shaped.

Common Grass Yellow Butterfly

Eurema hecabe

The Common Grass Yellow is a beautiful little, very bright yellow butterfly with rounded black-edged wings, with a wingspan of about 4 cm. It is easy to breed in your garden. Several other species of Grass Yellow are distinguished by differences of the black markings on their wing edges. The little green caterpillars, which have a long yellowish stripe along each side of their body, grow to full size in a week in warm weather. They are well camouflaged when sitting on the midrib of an immature *Acacia* leaf. They form a green chrysalis which is suspended by its tail and by a fine silk sling. In warm weather they pupate for about a week before turning yellow and showing the black edges of the pattern on their wings through their pupa skins. An attractive little yellow butterfly emerges and pumps up its wings ready to fly away.

The Dwarf's Apple, *Breynia oblongifolia* is a shrub which grows to about three metres. The plant is openly branched in form and is fairly inconspicuous. It has small green pendulous flowers. The colourful dark pink globular berry is much favoured by the birds. Other hosts are juvenile pinnate *Acacia* leaves and a weed, *Sesbania cannabina*.

Tiny Grass-blue Butterfly

Zizula hylax

The Tiny Grass-blue is one of the smallest butterflies in Australia with a wingspan of less than 2 cm of which is known. Karamat, *Hygrophila angustifolia* is one host plant. It grows in *Melaleuca* swamps and it rapidly disappearing due to the clearance of these swamps for other purposes. Very easy to grow, does well in the shade to full sun, and even grows as a water plant. Try growing it in a pot on your frog pond. You can then raise frogs as well as butterflies. It is herbaceous and reaches up to 1 m in height. It can be grown in the ground but can only survive if it does not dry out. It dies back to ground level in winter. The small mauve flowers produce easy to germinate seed.

The Brown Soldier or Chocolate Soldier butterfly, *Junonia hedonia* also lives on this plant as does the **Blue Argus**, *Junonia orithya*.

Joseph's Coat Moth, *Agaristes agricola* is a pretty, predominantly black moth with yellow patches and blue lines on its upper wings and red and blue patches on its lower wings. It is easily mistaken for a butterfly. The striking caterpillars, banded white and black with some orange, bear rows of paddle-like hairs. The caterpillars eat *Cissus opaca* and *Cayratia clematidea*. Most moths fly at night, but this is one of the exceptions. ■



Nepenthes mirabilis, Tropical Pitcher Plant, a carnivorous plant (see page 138). It is described on page 129 where the cultivation of young plants are recommended for terrarium adornment. As shown above mature leaves, that can reach 40 cm in length, are tipped with a tendril that produces a pitcher at the apex. The cylindrical pitcher varies in size from 3 to 18 cm long, green but often with reddish markings. It is a pitfall trap. The rim of the pitcher is rigid, ribbing continuing in a curve into the pitcher and terminating there in downward pointing teeth. There are also long external ribs strengthening the walls of the pitcher. Until it is well developed the mouth of the pitcher remains hermetically sealed by a dense growth of interweaving hairs, like a firm cotton pad. The liquid within is sterile and has been used by native people for bathing sore eyes. As it matures the lid grows upwards and outwards to protect the opening from torrential downpours. On the undersurface of the lid and between the down-pointing teeth are numerous glands exuding nectar to attract insects. A waxy area causes ants, etc., to fall into the liquid in the bottom of the pitcher where they drown and are consumed as food for the plant. Notes by W. H. Payne relying heavily upon "Plants of Prey" by Rica Erickson. Photograph by John Wrigley, courtesy of Australian National Botanic Garden.

Plants of Prey — Carnivorous Plants

Most Australian species of carnivorous plants are fascinating little plants not widely grown as usually special conditions are required. Suddenly I find that most groups are mentioned in this issue. Please send me notes on your experiences in growing them. Editor.

Flypaper traps, species of *Drosera* (some described on pages 126/7 and illustrated on pages 116, 117, 120) and *Byblis*, the Rainbow Plant, illustrated on page 121. The plant is covered with numerous sticky glands which capture insects.

Pitfall traps, *Cephalotus* as pictured on page 124 and described on page 125, and *Nepenthes mirabilis* as described on page 129 and pictured on page 137.

Suction traps, *Utricularia* species as described on page 130. The beautiful miniature flowers are popularly called Fairy Aprons. They do not have roots but what appears to be fibrous root-like growths with their suction bladders at the end, are unusual leaf forms, hidden in moss or mud or drifting below the surface of water. Small water creatures such as mosquito larvae are sucked into bladders smaller than a grain of wheat.

Aldrovanda vesiculosa is a small plant to 15 cm long and 2 cm across, resembling a bottlebrush, quite rootless, floating erect just below the surface of water, often among reeds. The leaves, 1 cm long, are like spokes on a series of wheels each with 8 spokes. Sensitive to the touch, each will fold swiftly to catch its prey. It has tiny white flowers.

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Native Plant Regeneration Study Groups

Editor

There are a great many groups of people engaged in the restoration of selected pockets of degraded bushland or sand dunes in most parts of Australia. Many of these groups work under the name of various organisations such as Greening Australia or our Society or just plod along on their own "on the block down the street". We do not seek to change this but to assist. A great deal has been learnt by individuals and no doubt most wish that they knew that they were using the best methods. Hopefully all groups will have a copy of the "bible" on the matter, "Bush Regeneration" by Robin A. Buchanan (available by post for \$25 as directed inside our rear cover).

There is much more that can be done by guided research and dissemination of the basic practices already learnt. Two new study groups are being formed, one for bush regeneration and another for sand dune restoration and care. Readers who are interested in joining these study groups should contact their state secretary as listed inside our rear cover.

"Australian Plants", The Australian Flora Periodical

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Grevillea alpina — two forms, see page 131.