HANDBOOKS to the FLORA OF SOUTH AUSTRALIA

Published by
THE FLORA AND FAUNA OF SOUTH AUSTRALIA HANDBOOKS COMMITTEE
(formerly the Handbooks Committee of the British Science Guild, South Australian Branch)
between 1921 and 2001
on behalf of the
GOVERNMENT OF SOUTH AUSTRALIA

administered by the
Board of the Botanic Gardens and State Herbarium,
Adelaide, South Australia

State Herbarium of South Australia
PO Box 2732
Kent Town SA 5071
Australia

Handbooks of the Flora and Fauna of South Australia, issued by the British Science Guild (South Australian Branch) and published by favor of the Honorable the Premier.

FLORA

OF

SOUTH AUSTRALIA.

Part III.

Meliaceae - Scrophulariaceae.

By J. M. BLACK.

WITH ILLUSTRATIONS BY THE AUTHOR.

[Wholly set up and printed in Australia, and registered by the Postmaster-General for transmission through the post as a book.]

Price: FIVE SHILLINGS.

ADELAIDE:
PRINTED BY R. E. E. ROGERS, GOVERNMENT PRINTER, NORTH TERRACE.

1926.

HANDBOOKS ISSUED AND IN COURSE OF PREPARATION.

*The Building of Australia and the Succession of Life, with special reference to South Australia Part I. (Price 5s.)	Walter Howchin, F.G.S.
The Building of Australia, etc. Part II.	do.
*Flora Part I. (Price 3s.)	J. M. Black (Orchidaceae R. S. Rogers, M.A., M.D.)
*Flora Part II. (Price 5s.)	J. M. Black.
*Flora Part III.	do.
Flora Part IV.	do.
Types of Vegetation in South Australia	T. G. B. Osborn, D.Sc.
Seaweeds	Edith M. Osborn, M.Sc.
Plant Pathology	Geoffrey Samuel, B.Sc.
Toadstools and Mushrooms...	J. B. Cleland, M.D.
Spiders	R. H. Pulleine, M.B.
Beetles	Arthur M. Lea, F.E.S.
Molluscs	Sir Joseph Verco, M.D., F.R.C.S.
Crustaceans (Malacostraca)	Herbert M. Hale.
†Fishes (Price 6s.)	Edgar R. Waite, F.L.S., C.M.Z.S.
Reptiles etc.	do. do.
†Mammals Part I. (Price 4s.)....	F. Wood Jones, D.Sc.
†Mammals Part II. (Price 4s.) ...	do. do.
†Mammals Part III. (Price 5s.) ..	do. do.

Parts issued are marked *

Completed subjects are marked †

Handbooks of the Flora and Fauna of South Australia, issued by the British Science Guild (South Australian Branch) and published by favor of the Honorable the Premier.

FLORA

OF

SOUTH AUSTRALIA.

Part III.

Meliaceae - Scrophulariaceae.

By J. M. BLACK.

WITH ILLUSTRATIONS BY THE AUTHOR.

[Wholly set up and printed in Australia, and registered by the Postmaster-General for transmission through the post as a book.]

Price: FIVE SHILLINGS.

ADELAIDE:

PRINTED BY R. E. E. ROGERS, GOVERNMENT PRINTER, NORTH TERRACE.

1926.

FLORA, PART I., 154 PAGES.
PUBLISHED 1922, PRICE 3s.

FLORA, PART II., 203 PAGES.
PUBLISHED 1924, PRICE 5s.

FAMILY 65A.—MELIACEAE.

Differs from *Rutaceae* in the stamens usually united in a tube, the ovary quite syncarpous, 3-5-celled, and the leaves without oilglands. Trees or shrubs.

Melia azedarach, L., called in Australia "White Cedar," is a favorite ornamental tree with panicles of lilac flowers, yellowish drupes, and bi-tripinnate leaves. Southern Asia. The var. *australasica*, C. DC, is a native of north-eastern Australia. *Swietenia mahagoni* Jacq., which produces the true mahogany of tropical America, also belongs to this family.

1. OWENIA, F. v. M.

After Sir Richard Owen, 1804-1892, comparative anatomist and superintendent of the natural history collections of the British Museum).

1. **O. acidula,** F. v. M. A small glabrous tree, with pendulous branches and the young shoots glutinous; leaves alternate, pinnate, with 9-25 linear-lanceolate oblique leaflets, 2-4 cm long, mostly alternate; no stipules; flowers small, subsessile, in axillary racemes much shorter than leaves; sepals 5, imbricate, orbicular, 2 mm long; petals 4 mm. long; staminal tube 10-toothed at summit, with 10 anthers protruding between the teeth; ovary superior, 3-celled, on a very small disk; ovules 1 in each cell; style simple, with a glandular ring at summit, on which the conical stigma is seated; fruit, a plum-like globular drupe, about 2½ cm. in diam., with a crimson rather acid mesocarp; endocarp bony; seeds without albumen, the radicle superior.

Sandhills north of Cooper's Creek. Sometimes called "Sour plum."—Western New South Wales and Queensland; Central Australia.

FAMILY 69.—CALLITRICHACEAE.

A family consisting of only 1 genus.

1. CALLITRICHE, L.

(From Greek *kallos*, beautiful; *thrix, trikhos*, hair.)

Flowers unisexual, without calyx or corolla; male flower a single stamen with rather long filament; female flower a 4-celled ovary, each cell containing 1 pendulous amatropous ovule; styles 2, filiform, stigmatic in almost all their length; fruit a 4-lobed capsule, separating finally into 4 1-seeded indehiscent compressed fruitlets, rounded at both ends; seeds albuminous, with central embryo, superior radicle and ventral rhaphe. Slender glabrous aquatic herbs, with opposite entire leaves; flowers minute, monoecious, subsessile, usually solitary in each axil, each flower between 2 bracteoles, which are sometimes wanting. *Water Starwort.*

1. **C. stagnalis,** Scop. Leaves small, flaccid, the lower submerged ones narrow, the upper ones obovate, 3-nerved, tapering into a petiole; fruits on very short peduncles; fruitlets ½ mm. long, narrowly winged.

In water or along damp watercourses throughout the State. Most of the year.—Throughout the old world.

C. Muelleri, Sond., with subrhomboid leaves and broadly winged fruitlets, belongs to the eastern States and may be found here.

FAMILY 70.—STACKHOUSIACEAE.

Flowers bisexual, regular; calyx more or less deeply 5-lobed; petals 5, united or free, imbricate in bud; stamens 5, perigynous, inserted on the margin of a thin disk lining the calyx-tube, opposite to the calyx-lobes and included in the corolla; ovary syncarpous, superior, 3-5-lobed and 3-5-celled, with 1 erect anatropous ovule in each cell; styles or stigmas 3-5; fruit of 3-5 indehiscent fruitlets, leaving a persistent axis; seeds albuminous, with a membranous testa; embryo straight, with inferior radicle. Herbs usually glabrous, with alternate entire leaves; stipules absent or minute and caducous.

A family of only 2 genera, and almost entirely Australian.

Petals united; carpels 3	STACKHOUSIA 1.
Petals free; carpels 5	MACGREGORIA 2.

1. STACKHOUSIA, Sm.

(After John Stackhouse, 1742-1819, a Cornish botanist, who wrote chiefly on seaweeds).

Calyx small, campanulate, 5-lobed; petals united in a tubular corolla with 5 spreading lobes; stamens 5; ovary 3-celled; style 1, with 3 lobes stigmatic along the inner face; fruitlets 3. Perennial herbs; flowers in terminal spikes, with a small bract and 2 bracteoles at base of each flower.

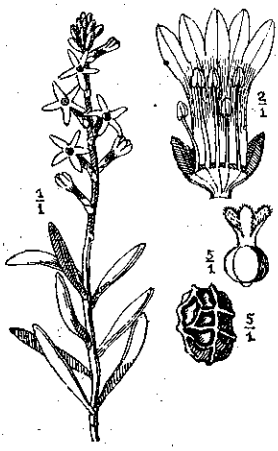

FIG. 159.—Stackhousie monogyna.

A. Flowering spikes dense.
Fruitlets rounded on back, strongly reticulate ..... *S. monogyna* 1.
Fruitlets with 3 sharp dorsal angles ..... *S. spathulata* 2.
A. Flowering spikes interrupted; flowers small: fruitlets muricate.
Corolla lobes acute ..... *S. viminea* 3.
Corolla-lobes blunt ..... *S. muricata* 4.

1. **S. monogyna,** Labill. (1804). Glabrous, with erect slender or stout usually simple stems; leaves linear or lanceolate, rather thick, acute, 1-4 cm. long; flowers yellow, pale yellow, or almost white, at first crowded, often distant in fruit, so that the spike lengthens considerably; calyx 3 mm. long; corolla-tube about 7 mm. long, the lobes shorter, obtuse; fruitlets obovoid, 2-2½ mm. long, reticulate with prominent nerves.—*S. linariifolia,* A. Cunn. (1825).

All over the State as far north as the Flinders Range and as far west as Fowler's Bay. Oct.-Dec.—Eastern States.

S. flava, Hook. has been recorded for South Australia, but if that is really a distinct species, with denser spikes, smaller flowers, and "rather acute corolla-lobes," no specimen which I have seen from our State answers this description, especially as regards the last character. Bentham says—"Different as are the extreme forms, the numerous specimens I have had before me show scarcely any definite limits between *S. monogyna, pubescens, Hueyelii, flava, muricata* and *viminea.*"

2. **S. spathulata,** Sieb. Glabrous, with branching procumbent stems; leaves thick, obovate or spathulate, 1½-3 cm. long, obtuse or the upper ones sometimes oblanceolate and subacute; flowers much as in the preceding, in dense spikes, the lowest flowers often in the axils of the uppermost leaves; calyx-lobes broader; fruitlets 4 mm. long, each with 3 acute vertical angles or narrow wings on the back.

Kangaroo Island; coast near MacDonnell Bay; Robe; Coonalpyn. May-Nov.—Eastern States.

3. **S. viminea,** Sm. Glabrous, with slender erect stems; leaves usually narrow-linear, 1-3 cm. long; spikes slender, long, the flowers arranged in distant clusters of 1-3; calyx 1½ mm. long, with acute lobes; corolla greenish-yellow, the tube about 4 mm. long, with acute or acuminate lobes; fruitlets 2½ mm. long, prominently reticulate or muricate, obovoid.

Sandhills near Ooldea. Winter and spring.—All the States except Tasmania.

4. **S. muricata,** Lindl. Scarcely differs from the preceding except in the calyx and corolla-lobes obtuse and the leaves even narrower.

Arkaringa Creek (Far North).—Eastern States.

2. MACGREGORIA, F. v. M.

(Named by Mueller in 1873 after John Macgregor, a member of the Victorian Parliament).

1. **M. racemigera,** F. v. M. Small glabrous annual, with slender branching stems; leaves narrow-linear, 8-15 mm. long; flowers white, showy, in terminal racemes, with a bract at base of each pedicel: calyx 5-partite, 2½ mm. long: petals 5, free, spathulate, about 8 mm. long, with claws longer than calyx; stamens 5, on a very short disk lining the calyx-tube; anthers crowned by a small white terminal appendage; ovary 5-celled; stigmas 5, shortly united at base; fruitlets 5, small, with hooked hairs.

Central Australia and western New South Wales; probably inhabiting our intermediate north-eastern country.

FAMILY 71.—SAPINDACEAE.

Flowers regular (in our genera), polygamous, bisexual or unisexual; sepals 3-5, free or united; petals 5 or none; stamens usually 8, between the ovary and the surrounding disk; ovary syncarpous, mostly 3-4-celled, entire or lobed; style simple; ovules 1-2 in each cell, campylotropous; fruit indehiscent or separating into fruitlets which are often winged; seed exalbuminous, arillate or not; testa crustaceous; embryo thick, curved; radicle usually inferior. Trees or shrubs (in our genera), with alternate simple or compound leaves without stipules in our genera.

Cardiospermum Halicacabum, L., the Balloon Vine, a favorite climber, belongs to a section of this family with irregular flowers. A closely allied family is *Aceraceae*, containing the genus *Acer*, the Maple, which has winged fruits like *Atalaya*. Another allied family, the *Anacardiaceae*, comprises the Pepper-tree (*Schinus molle*, L.) from South America, widely planted in Australia and southern Europe.

A. Ovary-cells with 1 ovule each.

Leaves mostly pinnate; fruitlets with a terminal wing: petals present ..... ATALAYA 1.

Leaves simple; fruit lobed, not splitting into fruitlets; petals absent ..... HETERODENDRON 2.

A. Ovary-cells with 2 ovules each; petals none; fruitlets often with dorsal wings ..... DODONAEA 3.

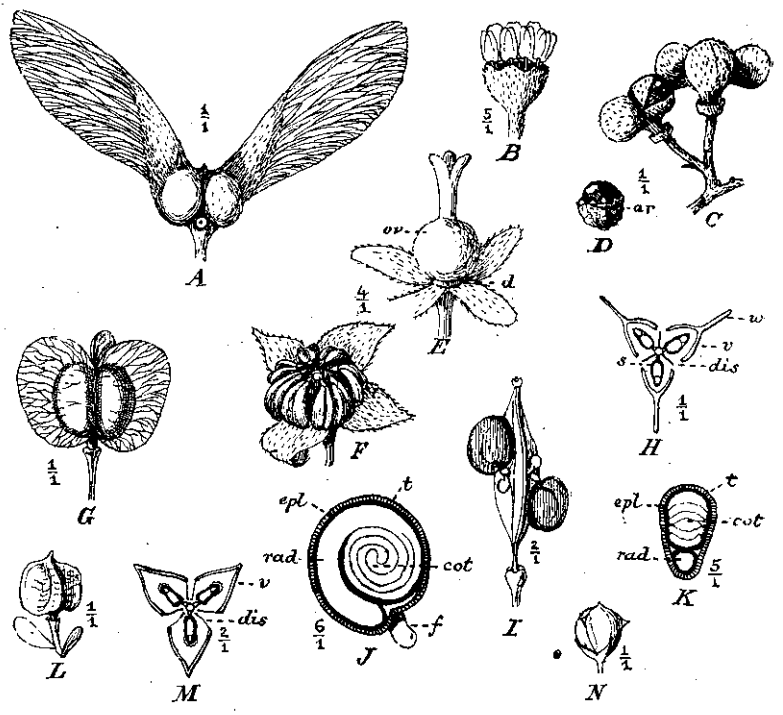

FIG. 160.—**Sapindaceae.** A, Two winged fruitlets of *Atalaya hemiglauca*. B-D, *Heterodendron oleifolium:* B, male flower; C, 2 fruits; D, seed; *ar*, arillus. E-K, *Dodonaea viscosa*: E, female flower; F, male flower; G, capsule; H, transverse section of capsule, showing septifragal dehiscence; *v*, seceding valve; *w*, wing; *dis*, dissepiment; *s*, seed; I, axis, dissepiments and 2 seeds after the valves have fallen; J, vertical section of the ascending seed; *t*, crustaceous testa; *epl*, membranous endopleura; *cot*, cotyledons; *rad*, radicle; *f*, funicle; K, transverse section of seed. L, capsule of *D. bursariifolia;* M, transverse section of same, showing septicidal dehiscence. N, capsule of *D. hexandra*.

1. ATALAYA, Blume.

(From *atalay*, the native name of *A. salicifolia* in Timor.)

1. **A. hemiglauca,** F. v. M. *White-wood.* A small tree, glabrous and glaucous except the flowers and fruits; leaves usually paripinnate, with 2-6 coriaceous oblong reticulate leaflets 6-20 cm. long, or the younger ones entire or with 1 or 2 lobes; flowers polygamous, in large panicles; sepals 5, orbicular or ovate, 3-4 mm. long, imbricate; petals 5, oblong, pubescent, 4-8 mm. long; stamens 8, inserted inside the annular disk; ovary 3-celled, pubescent; fruit splitting septicidally into 3 indehiscent 1-seeded pubescent samaras 3-4 cm. long, including the broad terminal reticulate wing. (Fig. 160, A.)

Far North; western New South Wales; Queensland; central and tropical Australia. Good feed for stock.

2. HETERODENDRON, Desf.

(Greek *heteros*, different, variable; *dendron*, a tree.)

1. **H. oleifolium,** Desf. A small tree, appressed-hoary all over; leaves lanceolate or linear-lanceolate, stiff, greyish-green, 4-14 cm. long; flowers usually bisexual, in short panicles; calyx small, cup-shaped, irregularly toothed at summit; petals none; stamens 6-15, exserted; ovary 2-4-celled; style short, thick; fruit of 1-4 persistent globular 1-seeded lobes, which open irregularly or are tardily circumsciss; seeds globular, black, glossy, about 5 mm. diam., with a large scarlet arillus. (Fig. 160 B-D.)

Northern Yorke Peninsula to Flinders Range and Far North; Murray lands: Eyre Peninsula and westward to Ooldea. Summer.—Dry parts of Australia. A fodder tree. The specific name indicates the resemblance of the leaves to those of the olive. Called by bushmen "Bullock Bush," "Rosewood," and other names.

3. DODONAEA, L.

(From Dodonaeus, the Latinised name of Rembert Dodoens, 1517-85, Flemish botanist, born at Malines, professor of medicine in the University of Leyden.)

Flowers mostly unisexual, dioecious or slightly monoecious or polygamous; sepals 3-4, rarely 5, valvate, usually deciduous; petals none; disk inconspicuous; stamens 6-10, usually 8, with short filaments; ovary 3-4-celled, viscid, with 2 collateral ovules in each cell, 1 usually ascending and the other pendulous; style shortly lobed at summit, sometimes long; capsule often turning red or purple, opening in as many valves as there are cells, usually septifragally (*i.e.*, the valves fall off and the dissepiments remain attached to the persistent central axis), or rarely septicidally (*i.e.*, the dissepiments split vertically into 2 halves which remain attached to the valves and break away from the persistent axis), the valves often bearing a membranous dorsal vertical wing as in some *Zygophylla*; seed usually 1 in each cell, compressed-ovoid or compressed-globular, ascending or pendulous, in both forms with the embryo coiled and the cotyledons turned towards the inner (ventral) edge of the seed, but in the ascending seed the radicle is inferior and in the pendulous one it is superior. Shrubs usually more or less viscid; leaves simple or imparipinnate (or in *D. stenozyga* practically paripinnate), exstipulate. *Native Hop, Hopbush.* The capsules are said to have been used in early colonial days as a substitute for hops.

A. Leaves simple.
  B. Leaves entire or slightly sinuate or toothed.
    C. Capsule broadly winged, septifragal.
      D. Leaves with very short petioles.
        Leaves oblong-cuneate ..... *D. viscosa* 1.
        Leaves oblanceolate or linear ..... *D. attenuata* 2.
        Leaves broadly cuneate, rather short ..... *D. cuneata* 3.
      D. Leaves with conspicuous petioles ..... *D. petiolaris* 4.
    C. Capsule not or scarcely winged, septifragal (except *D. bursariifolia*).
      E. Leaves obovate or orbicular; sepals 4.
        Capsule septifragal ..... *D. Baueri* 5.
        Capsule septicidal ..... *D. bursariifolia* 6.
      E. Leaves almost filiform; sepals 3 ..... *D. hexandra* 7.
  B. Leaves pinnatifid with blunt lobes; capsule broadly winged ..... *D. lobulata* 8.
A. Leaves pinnate; capsule septifragal.
  F. Capsule broadly winged, glabrous; leaflets oblong or linear.
    Rhachis of leaf dilated ..... *D. microzyga* 9.
    Rhachis of leaf not dilated, almost terete ..... *D. stenozyga* 10.
  F. Capsule not winged, glandular-hairy; leaflets obovate *D. humilis* 11.

1. **D. viscosa,** L. Viscid shrub, 2-4 m. high, glabrous except the flowers; leaves oblong-cuneate or broadly oblanceolate, 3-8 cm. long, 6-14 mm. broad, tapering into a short petiole, glossy-green above, the divergent lateral nerves rather conspicuous; flowers in short panicles or racemes; sepals 4, pubescent; ovary very viscid; capsule usually 3-winged and red, 10-18 mm. long, and broader than long, including the rounded wings; seeds dull or scarcely shining, almost black, 2-3 mm. long. (Fig. 160, E-K.)

Southern districts to Flinders Range; South-East; Eyre Peninsula and westward to Gawler and Everard Ranges. Aug.-Nov.—Throughout Australia and the warmer regions of the globe.

2. **D. attenuata,** A. Cunn. Like the preceding, but the leaves narrow-lanceolate, 2-4 mm. broad, obtuse or acute, sometimes slightly sinuate; ovary usually pubescent; seeds very dull; a shrub usually 1-2 m. high.

Kangaroo Island to Flinders Range and Far North ; Murray lands ; westward to Ooldea.—Temperate Australia.

Var. linearis, Benth. Leaves narrow-linear, acute, 1-2 mm. broad.—Kangaroo Island ; Flinders Range to Far North.—Temperate Australia.

3. **D. cuneata,** Rudge. Fruits of *D. viscosa*, but the leaves broadly cuneate, mucronulate and very obtuse or truncate at summit, 15-25 mm. long, 6-10 mm. broad at summit ; racemes short.

Murray lands. Winter.—Eastern States.

4. **D. petiolaris,** F. v. M. Like *D. viscosa*, but the leaves broader towards base, 2-4 cm. long, 12-20 mm. broad in the middle, tapering into a petiole 5-10 mm. long ; racemes short ; seeds dull.

Far North and westward to Musgrave Range ; Central Australia.—Western New South Wales.

D. procumbens, F. v. M., with cuneate leaves, narrow and entire, or broad and 3-lobed at summit, 8-15 mm. long, narrow-winged capsules and long styles, is recorded in the Flora Australiensis for " Clayey banks, 18 miles W. of Glenelg River." It belongs to the hilly regions of Victoria. I have seen no local specimen.

5. **D. Baueri,** Endl. Small rigid glabrous shrub ; leaves obovate or orbicular, slightly sinuate, 6-12 mm. long, with immersed resin-glands ; flowers solitary, drooping, on short peduncles ; sepals ovate ; capsule 4-5-angled, 5 mm. long, 6 mm. broad, truncate, wingless or with very narrow wings at the summit of the angles, the seceding valves deeply boat-shaped.

Yorke Peninsula northward to Flinders Range ; Eyre Peninsula ; Murray Lands ; Kangaroo Island. Summer.—Western Victoria and New South Wales.

6. **D. bursariifolia,** Behr et F. v. M. Small glabrous shrub ; leaves obovate-cuneate, obtuse, entire, 8-20 mm. long, coriaceous ; flowers usually 2-3 together on short erect peduncles ; sepals linear-lanceolate ; capsule mostly 3-angled, 7-8 mm. long and broad, the angles acute but scarcely winged ; ripe dissepiments splitting and falling off with the valves ; seeds with a loose wrinkled hyaline coat outside the testa. (Fig. 160, L-Ms).

Gawler northward to Flinders Range ; Murray Lands ; Yorke and Eyre Peninsulas. July-Nov.—Dry districts of temperate Australia.

7. **D. hexandra,** F. v. M. Low slender intricate shrub ; leaves subterete or almost filiform, acute, with revolute margins, 1-2 cm. long, ½-1 mm. broad ; flowers usually solitary, on short recurved peduncles ; sepals 3, ovate-lanceolate, persistent under the fruit ; anthers 6 ; capsule viscid, globular, 5-6 mm. diam., obtusely 3-angled, with a minute deltoid wing on the upper edge of each angle ; seeds black, shining. (Fig. 160, N.)

Murray Lands on both sides of the river ; Yorke and Eyre Peninsulas. Throughout the year.

8. **D. lobulata,** F. v. M. Tall or medium glabrous viscid shrub ; leaves rigid, linear-cuneate or oblanceolate in outline, obtusely lobed or almost pinnatifid, 1½-4 cm. long ; flowers solitary or 2-3 in a short raceme ; sepals ovate, in the male flowers 3 with 6 stamens, or 4 with 8 stamens ; capsule of *D. viscosa*, drooping, mostly 3-winged, about 10 mm. long and rather broader ; seeds shining.

Tickera scrub northward to Flinders Range ; Murray scrub and north thereof ; Eyre Peninsula ; Gawler Range and west thereof. Most of the year.—Western New South Wales ; West Australia.

9. **D. microzyga,** F. v. M. Small rigid glabrous viscid shrub, 50 cm. to 1½m. high ; leaves short, of 3-7 oblong varnished leaflets, 2-4 mm. long, obtuse, rigid, sometimes cuneate and notched at summit, always opposite ; rhachis very slightly dilated, 1-furrowed above ; male flowers not seen ; capsules of *D. viscosa*, 12-15 mm long and rather broader, 3-4-winged, solitary on spreading peduncles 6-8 mm. long ; seed 4 mm. long, brown, dull.

Beltana (Flinders Range) to Far North ; westward to Musgrave Range and Ooldea. According to J. E. Brown (For. Fl. S.A., part 6) it occurs on Yorke Peninsula and between Clare and Auburn, with (according to the plate) rather more numerous leaflets.—What is probably a West Australian form has rather longer leaflets (8 mm.), sometimes 3-toothed at summit.

10. **D. stenozyga,** F. v. M. Viscid glabrous shrub with very slender branchlets : leaves paripinnate, or the terminal leaflet minute, of 2-6 linear-terete leaflets 10-15 mm. long, about 1 mm. broad, channelled above, the 2 uppermost leaflets opposite and terminating

a rhachis and petiole similar in shape to the leaflets; flowers solitary; capsule of *D viscosa*, usually 4-winged, 10-15 mm. long, on slender peduncles of 6-10 mm.; seeds dull.

Near Kapunda; Murray Lands and north thereof; Yorke and Eyre Peninsulas to Fowler's Bay.—Drier parts of temperate Australia.

11. **D. humilis,** Endl. Shrub with minutely pubescent branches; leaves glabrous, of 5-13 stiff opposite obovate or broadly cuneate leaflets, 5-10 mm. long, crenate-toothed at summit; rhachis more or less dilated; flowers in short terminal corymbs; sepals ovate, persistent; anthers tipped by a stalked gland, spirally twisted after dehiscence: capsule subglobular truncate, scarcely 4-lobed, 7-8 mm. diam., beset with conspicuous red glandular hairs.

Coonalpyn (90-mile Desert); Kangaroo Island; Yorke and Eyre Peninsulas.

FAMILY 72.—RHAMNACEAE.

Flowers bisexual, regular; sepals, petals, and stamens 5, perigynous or epigynous, inserted at the summit of the hollow receptacle, which resembles a calyx-tube; sepals deltoid or lanceolate, valvate, glabrous inside, with a raised line running down the centre; petals shorter than sepals, concave, sometimes none; stamens opposite the petals, alternate with the sepals and outside the annular disk which is usually apparent round the summit of the ovary when inferior; ovary usually more or less inferior, rarely superior or almost so, mostly 3-celled, rarely 2-celled; style entire or lobed; ovule solitary in each cell, erect, anatropous; fruit a drupe or usually a capsule splitting septicidally at the summit, the lower part of the exocarp remaining attached to the receptacle, while the endocarp separates into usually 3 1-seeded coriaceous or membranous fruitlets, without leaving any central axis; seed erect, usually ovoid-compressed, arillate and albuminous; embryo straight, with a short inferior radicle. Shrubs or small trees, with simple alternate leaves (in our genera); flowers small.

The allied family of *Vitaceae*, whose fruit is a berry, contains *Vitis vinifera*, L., the Wine Grape, in which the 5 petals are united at summit and fall off as a cap, and the popular climbers *Parthenocissus* (*Ampelopsis*) *quinquefolia*, the Virginia Creeper, and *P.* (*A.*) *tricuspidata*, the Japanese Ivy, the latter always with adhesive disks on the tendrils.

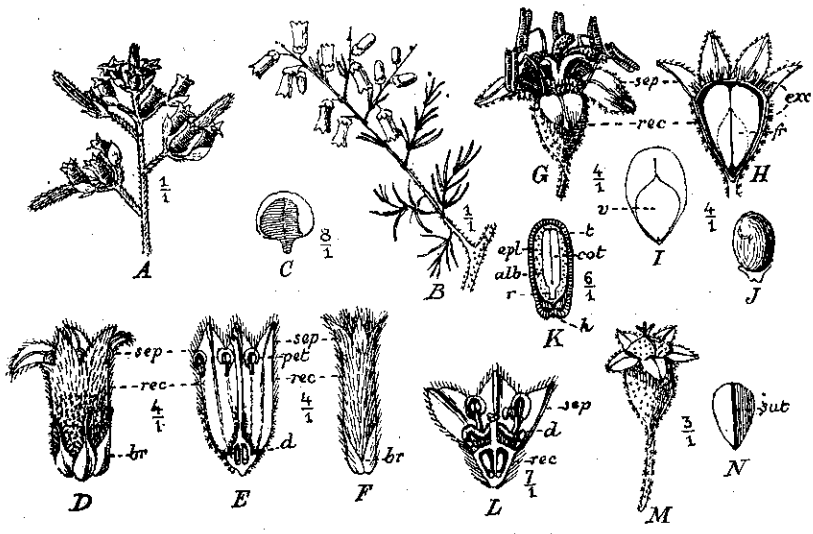

FIG. 161.—*Rhamnaceae*. A, part of inflorescence of *Cryptandra Waterhousei*, showing 3-flowered partial cymes. B-C, *C. amara*, var. *longiflora*: B, flowering branch; C, petal. D, flower of *C. hispidula*: *br*, bracts; E, vertical section of same: *pet*, petals; *d*, hairy inconspicuous disk. F, flower of *C. leucophracta*: *br*, bracteoles. G-K, *Pomaderris racemosa*: G, flower; H, vertical section of fruit: *sep*, sepals; *rec*, receptacle; *exc*, exocarp; *fr*, 2 fruitlets (endocarp); I, fruitlet: *v*, ventral valve, which falls off and releases the seed; J, seed and aril; K, vertical section of seed through narrow diameter: *t*, crustaceous testa; *epl*, membranous endopleura; *alb*, albumen; *cot*, cotyledons; *r*, radicle. L, vertical section of flower of *Spyridium spathulatum*: *d*, thick glabrous conspicuous disk. M, flower of *Trymalium Wayi*; N, fruitlet of same: *sut*, ventral suture.

A. Fruit 3-celled, not winged, separating into fruitlets; seeds albuminous.
  B. Ovary superior; sepals caducous: glabrous introduced shrub ..... RHAMNUS 1.

B. Ovary partially or wholly inferior; sepals persistent at least for some time; hairy shrubs; genera all Australasian.
C. The hollow receptacle adnate to the ovary and disk up to the sepals.
D. Petals none (in our species); flowers pedicellate; disk inconspicuous; bracts caducous ..... POMADERRIS 2.
D. Petals enclosing the anthers; disk conspicuous.
Flowers pedicellate; bracts caducous ..... TRYMALIUM 3.
Flowers sessile in heads surrounded by persistent bracts and floral leaves ..... SPYRIDIUM 4.
C The hollow receptacle produced for some distance above the ovary and disk; flowers with persistent bracts, rarely in heads ..... CRYPTANDRA 5.
A. Fruit 1-celled, winged; seeds without albumen; glabrous tree ..... VENTILAGO 6.

1. RHAMNUS, L.

(Greco-Latin *rhamnos*, some thorny shrub.)

FIG. 162.—**Rhamnus, Alaternus.**

*1. **Rh. Alaternus,** L. *Buckthorn.* Glabrous shrub; leaves alternate, ovate, acute, stiff, serrate, 2-4 cm. long; flowers small, greenish, dioecious, in short axillary racemes; sepals 5, spreading, caducous; receptacle cup-shaped, persistent; petals none; stamens 5; ovary superior, usually 3-celled; fruit a small black globular or ovoid drupe, containing 3 bony 1-seeded nutlets.

A hedge-plant, gone wild on Black Hill and near the sea. Aug.-Sept.—Mediterranean region.

2. POMADERRIS, Labill.

(From Greek *pôma*, a lid; *derris*, a skin: alluding to the membranous valve by which the fruitlets of many species open.)

Sepals 5, spreading or finally reflexed; petals absent (in our species), never enclosing the anthers; stamens 5, with rather long filaments which are inflexed behind the anthers: hollow receptacle not extended upwards beyond the adnate part of the ovary, which is almost wholly inferior, 3-celled, rarely 2-celled, the summit hairy; disk obscure or none; style usually 3-branched, the branches clavate; capsule small, more or less pear-shaped, the rather thin exocarp protruding and concave above the receptacle, opening in 3 deltoid valves, the endocarp separating into 3 coriaceous 1-seeded fruitlets, which open on the inner face, often by a small door-like valve extending upwards from the base; seeds ovoid, dorsally compressed, with a crustaceous testa; funicle dilated into a cup-shaped aril at the base of the seed. Shrubs with a tomentum of stellate hairs, usually intermixed with longer simple hairs: leaves petiolate, flat, green above, whitish or rusty below; flowers small, pedicellate, stellate-tomentose, in small umbel-like cymes forming racemes or panicles; buds globular; bracts caducous.

A. Leaves not 2-lobed; sepals white or pink inside; stipules caducous.
B. Leaves ovate-lanceolate, rather large.
Flowers in leafy panicles; style divided to middle — *P. apetala* 1.
Flowers in axillary racemes; style cleft almost to base ..... — *P. halmaturina* 2.
B. Leaves small obtuse; flowers in racemes.
Leaves ovate or orbicular ..... — *P. racemosa* 3.
Leaves fan-shaped, very small ..... — *P. flabellaris* 4.
A. Leaves 2-lobed or obcordate; sepals yellow inside; stipules persistent ..... — *P. obcordata* 5.

1. **P. apetala,** Labill. Tall shrub: leaves ovate-lanceolate, denticulate, rather acute, 4-10 cm. long, stellate-tomentose below with prominent nerves, glabrous above, but the nerves impressed so as to give a wrinkled appearance: flowers in loose pyramidal panicles: receptacle 1 mm. long; sepals 1½-2 mm. long; style divided to middle, the branches with almost capitate stigmas: fruitlets opening by a short valve.

Only known in our State by 2 specimens from "near Gladstone." Sept.-Nov.—Victoria; New South Wales; Tasmania.

2. **P. halmaturina,** J. M. Black. Shrub 2-3 m. high ; leaves as in the preceding, 3-7 cm. long, but scabrous with minute hairs above ; flowers in axillary racemes shorter or longer than leaf ; receptacle 1 mm. long : sepals 2-2½ mm. long ; style-branches almost free, clavate, with almost capitate stigmas ; fruitlets opening by a valve half their length.

Cygnet River and Hog Bay River, K.I.

3. **P. racemosa,** Hook. Small shrub, often under 1 m. high ; leaves ovate, orbicular, or ovate-oblong, obtuse, 6-25 mm. long, entire or obscurely toothed, glabrous or almost so above, stellate-tomentose below ; flowers in short axillary and terminal racemes ; receptacle 1½ mm. long ; sepals 2 mm. long ; style divided to the middle, the branches stigmatic along the inner face ; fruitlets opening by a valve half their length. (Fig. 161, G-K.)

Southern districts to Flinders Range ; Kangaroo Island ; Murray Lands ; Yorke and Eyre Peninsulas ; South-East. Sept.-Dec.—Victoria ; New South Wales ; Tasmania.

4. **P. flabellare** (F. v. M.) J. M. Black. Small shrub ; leaves small, fan-shaped, crenulate, narrowed abruptly into a short petiole, 5-6 mm. long, 7-8 mm. broad, stellate-tomentose on both faces, more densely below ; flowers in short dense racemes, with a rusty tomentum ; receptacle 1mm. long ; sepals 2-2½ mm. long ; style divided below the middle, the branches stigmatic along inner face ; fruit unknown.—*Trymalium flabellare,* F. v. M. ex Reiss.in Linnaea 29 : 281 (1857).

Near Port Lincoln, E. P. Sept-Nov.

5. **P. obcordata,** Fenzl. Low shrub ; leaves broadly or narrowly cuneate, sometimes almost obcordate, 2-lobed and mucronate at summit, the margin entire or denticulate, 7-15 mm. long, subglabrous above, stellate-tomentose beneath ; flowers in small terminal corymbs, on pedicels which lengthen in fruit to about 7 mm. ; receptacle scarcely 1 mm. long ; sepals 2 mm. long, yellow inside ; style divided almost to middle ; stigmas capitate. fruitlets opening along the inner suture without a deciduous valve.

Southern districts ; Kangaroo Island ; Yorke and Eyre Peninsulas ; South-East. Aug.-Oct.—West Australia.

3. TRYMALIUM, Fenzl

(From Greek *trymalia,* an aperture : alluding to the 3 slits at the summit of the fruit when it opens.)

1. **T. Wayi,** F. v. M. et Tate. Small graceful shrub, with slender hoary branches ; leaves obovate-cuneate, 8-20 mm. long, green and glabrous above, silky-tomentose below ; stipules persistent ; flowers pedicellate, in short raceme-like panicles, stellate-tomentose ; sepals 5, about 1 mm. long, persistent, pale-yellow inside, petals 5, minute, hood-shaped, enclosing the 5 ovoid anthers ; receptacle and fruit as in *Pomaderris* ; disk annular, 5-lobed ; style 3-branched almost to base ; capsules pear shaped, 3 mm. long, on pedicels about as long : fruitlets usually 3, coriaceous, opening along the inner angle : seeds crustaceous. (Fig. 161, M-N.)—*Cryptandra Wayii,* F. v. M. et Tate.

Onkaparinga and Torrens Rivers northwards to Rocky River and Flinders Range ; Kangaroo Island. Aug.-Oct. The specific name commemorates Sir Samuel Way, 1836 1916, Chief Justice of South Australia, and for 2 years President of the Royal Society.

4. SPYRIDIUM, Fenzl.

(From Greek *spyridion,* a little basket : alluding to the flowerheads surrounded by leafy bracts.)

Sepals 5, persistent ; petals 5, minute, hood-shaped, enclosing the 5 ovoid anthers on short filaments, the claws of the petals and the filaments inserted in the notches between the lobes or undulations of the disk ; hollow receptacle not or very slightly extended above the ovary and disk : disk annular, more or less lobed, usually close above the ovary, which is wholly inferior, 3-celled, pubescent at summit ; style entire or minutely 3-lobed ; capsule small, crowned by the persistent sepals and disk : endocarp separating into 3 or (by abortion) fewer coriaceous or membranous 1-seeded fruitlets, with or without a ventral suture along the inner face ; seeds of *Pomaderris.* Hairy shrubs, with coriaceous shortly petiolate leaves ; stipules usually persistent : flowers small (2-3 mm. long), sessile in heads or clusters surrounded by persistent imbricate brown bracts, each head usually subtended by a spreading floral leaf, attached by its articulate petiole to the branchlet or rhachis on which the flowerhead is seated, the heads often united into compound heads with several floral leaves. A purely Australian genus, which Mueller, in his later years, united with *Cryptandra.*

A. Leaves broad, ovate, obovate or oblong, entire (except sometimes in *S. coactilifolium*).

B Flowerheads arranged like a cyme, usually 1 sessile in the fork between 2 stalked heads.

C. Leaves ovate.
Leaves with nerves deeply impressed above.... *S. parvifolium* 1.
Leaves with raised reticulate nerves above.... *S. phlebophyllum* 2.
C. Leaves obovate, smooth above..... *S. spathulatum* 3.
B. Flowerheads dense, compound, none sessile in the fork; leaves ovate.
Leaves subacute, glabrous above ..... *S. thymifolium* 4.
Leaves very obtuse or notched, softly hairy above.. *S. cordifolium* 5.
A. Leaves narrow, owing to the revolute edges, rather broad when the edges are not rolled back.
D. Flowers silky with rather long simple hairs.
E. Leaves entire, the under surface often concealed by the revolute edges and the leaf appearing deeply grooved below.
F. Leaves mucronulate.
G. Floral leaves white-velvety, broader than the stem-leaves.
H. Leaves 6-15 mm. long, spreading or suberect; mucro straight or slightly bent; heads sessile or stalked.
Leaves oblanceolate, deeply 1-furrowed above ..... *S. verrilliferum* 6.
Leaves linear or linear-lanceolate, not or very slightly furrowed above.... *S. phylicoides* 7.
H. Leaves 3-6 mm. long, erect, narrow-linear, with recurved mucro; heads sessile .... *S. leucopogon* 8.
G. Floral leaves glabrous and no broader than the almost subulate stem-leaves..... *S. ericocephalum* 9.
F. Leaves without a mucro, linear, very obtuse, tomentose; floral leaves white, conspicuous.
Heads depressed, leaves slightly furrowed above ..... *S. halmaturinum* var.
Heads globular, very white; leaves narrower, unfurrowed above ..... *S. bifidum* var.
E. Leaves cuneate, notched or 2-lobed, softly hairy all over.
Leaves broad-cuneate; heads depressed; fruitlets coriaceous..... *S. halmaturinum* 10.
Leaves narrow-cuneate; heads very white, globular; fruitlets membranous ..... *S. bifidum* 11.
D. Flowers hoary with short stellate hairs; leaves grey, broad-linear; floral leaves like stem-leaves.... *S. subochreatum* 12.

1. **S. parvifolium** (Hook.) F. v. M. Shrub 1-2 m. high, with slender branches: leaves ovate or orbicular, mostly 5-15 mm. long, hairy but green on the upper face, with the nerves deeply impressed, whitish-tomentose below; flowerheads compound, 1 sessile in the forks between 2 stalked heads, approximate and each with a whitish or grey orbicular floral leaf; brown bracts surrounding each primary head ovate, silky; flowers densely white-silky; capsule obovoid, brown, subglabrous; fruitlets crustaceous, with distinct ventral suture.—*Cryptandra Hookeri*, F. v. M.
Mount Lofty Range to Flinders Range; South-East. Aug.-Oct.—Victoria; New South Wales; Tasmania.

2. **S. phlebophyllum**, F. v. M. Low shrub; leaves obovate or ovate-oblong, 7-15 mm. long, rigid, glabrous above with dense raised reticulations, white silky below; flowerheads sessile in the forks or shortly stalked, each usually with a white-velvety floral leaf; flowers woolly or pubescent; disk almost divided into 5 glands; capsule obovoid, 3 mm. long, crustaceous, white-silky: fruitlets coriaceous, with ventral suture.
Flinders Range from S. of Quorn to Mounts Lyndhurst and Livingston. Most of the year.

3. **S. spathulatum**, F. v. M. Erect shrub, 1-2 m. high; leaves obovate-cuneate, mucronate, 5-15 mm. long, green and almost glabrous above, silvery- or golden-pubescent below, rarely pubescent on both faces; flowerheads dense or composed of 3 or 4 crowded heads shortly stalked or almost sessile, each head or cluster of heads with a silky obovate-cuneate white floral leaf; flowers silky; bracts very sticky, almost glabrous; capsule obovoid, hard, brown, subglabrous, 3 mm. long, enclosed in the enlarged bracts; exocarp hard and adhering to the receptacle; fruitlets membranous, without any ventral suture. (Fig. 161, L.)
Mount Lofty Range; Kangaroo Island; Eyre Peninsula. Most of the year.

4. **S. thymifolium,** Reiss. Small shrub about 50 cm. high, sometimes flowering when under 10 cm. high; branchlets slender, white or rusty with a rather loose stellate tomentum; leaves flat or somewhat concave above, ovate and subacute or sometimes almost orbicular and subcordate at base, 7-20 mm. long, 4-15 mm. broad, green, glabrous above with the nerves somewhat impressed, tomentose below with the nerves prominent; stipules brownish-black; heads almost woolly, 4-9 mm. across, compound, with 2-3 orbicular floral leaves, white-velvety above; bracts dark-brown, ciliate; capsule ovoid, almost glabrous; fruitlets membranous, without suture; seed mottled.—*S. Stuartii,* Reiss. et F. v. M.; *S. coactilifolium,* Reiss., var. *integrifolium,* Benth.; *Cryptandra obovata,* Tate non Hook. f.

Mt. Compass to Encounter Bay; Kangaroo Island; near Fowler's Bay. Spring and summer.

5. **S. coactilifolium,** Reiss. Shrub with the branches rusty-tomentose; leaves ovate-oblong, rounded at base, obtuse and notched at summit, 6-15 mm. long, softly stellate-pubescent on both faces, the margins thickened; compound flowerheads densely compact, mostly with 4-5 orbicular notched or entire white-velvety floral leaves; flowers funnel-shaped, silky, 3 mm. long; disk lobed, raised some distance above ovary; brown bracts ovate, ciliate; capsule obovoid, brown, crustaceous, 2½ mm. long, glabrous except at base; fruitlets membranous, without distinct suture.

Scrub near Encounter Bay. Summer.

6. **S. vexilliferum** (Hook.) Reiss. Small shrub, 30-50 cm. high, with slender branches, the young shoots with a golden or rusty chiefly stellate tomentum; leaves rather distant, spreading, narrowly oblanceolate or oblong-cuneate 8-15 mm. long, 1½-4 mm. broad, rather obtuse but mostly mucronate, shining and glabrous or slightly scabrous above, with the midrib deeply impressed, white or rusty-tomentose below; margins recurved or revolute; stipules narrow, 1-2 mm. long; flower heads compact, depressed, 4-6 mm. across, shortly stalked, with 1-3 white velvety ovate or oblong floral leaves much longer than the heads; capsule blackish-brown, ovoid, crustaceous, 2½ mm. long, becoming glabrous; fruitlets membranous, without distinct suture.—*Cryptandra vexillifera,* Hook.

Mt. Lofty Range; Kangaroo Island; near Port Lincoln. Most of the year.—Victoria; New South Wales, Tasmania. The specific name denotes the resemblance of the floral leaf to a standard (*vexillum*).

Var. *latifolium,* Benth. Leaves ovate-oblong or obovate-oblong, 4-7 mm. broad, very obtuse, the margins less recurved.—Kangaroo Island; South-East.

7. **S. phylicoides,** Reiss. Low shrub, the branchlets with a close stellate tomentum; leaves linear or linear-lanceolate, rigid, 5-14 mm. long, mucronulate, the revolute margins often hiding the white-tomentose under surface, glabrous above and faintly 1-furrowed or merely convex, 1-3 mm. broad, stipules broad, 2-4 mm. long, those on the young shoots conspicuous; heads shortly stalked or sessile, 5-7 mm. across, with 2-5 floral leaves shorter and broader than the stem leaves, white-tomentose above; capsule ovoid or subglobular 2-3 mm. long, crustaceous, with a few woolly hairs; fruitlets membranous, with a faint ventral suture; seed shining, brown or mottled.—*S. vexilliferum,* Benth. partly, not of Reiss.

Kangaroo Island; 90-Mile Desert; Yorke and Eyre Peninsulas to Fowler's Bay; North Pearson Island. Spring and summer. In maritime situations the leaves are often of a greyish green, suberect, with closely revolute margins. The specific name denotes the resemblance to some of the narrow-leaved species of the South African genus *Phylica.*

8. **S. leucopogon,** F. v. M. Fragm. 9: 136 (1875). Small slender erect shrub; leaves more or less erect and sometimes appressed, crowded and concealing the branchlets, narrow-linear, 3-6 mm. long, ½-¾ mm. broad, with a recurved mucro, glabrous above, the undersurface hidden by the revolute margins; heads 5-10 mm. across, very white and almost woolly, as in *S. bifidum,* sessile among the last leaves, with 2 or 3 floral leaves a little broader than the stem-leaves and white-tomentose.—*Trymalium leucopogon,* F. v. M. ex Reiss. in Linnaea 29: 274 (1858); *Spyridium subochreatum,* Benth. partly, not of Reiss.; *S. eriocephalum,* Fenzl, var. *adpressum,* J. M. Black.

Near Port Lincoln. Spring and summer.

9. **S. eriocephalum,** Fenzl. Low slender shrub, the young branches with a whitish mostly simple tomentum; leaves linear, spreading, rigid, mucronate, 3-10 mm. long, under 1 mm. broad and the undersurface quite hidden by the revolute margins, glabrous and often rough with minute tubercles above, the rigid mucro more or less reflexed; heads compound, 5-7 mm. across, rather flat-topped, sessile among the last leaves or shortly stalked, usually with 1 or 2 glabrous floral leaves like the stem-leaves, the surrounding brown bracts conspicuous; fruit as in *S. vexilliferum.*

Kangaroo Island; Murray lands to Bordertown; Monarto. Spring and summer.—Western Victoria and New South Wales; Tasmania.

Var. *glabrisepalum*, J. M. Black. Sepals viscid, glabrous, so that the heads, which are shortly stalked, have not the woolly appearance of those of the type.—Kangaroo Island.

10. **S. halmaturinum,** F. v. M. Low shrub with a greyish-green tomentum; leaves rather crowded, oblong-cuneate, 8-12 mm. long, 4-7 mm. broad at summit, which consists of 2 short obtuse parallel or divergent lobes, hairy on both faces, almost villous beneath, midrib impressed above, margins slightly recurved; flowerheads dense, with 4-5 white-velvety notched or 2-lobed floral leaves; sepals silky; receptacle becoming glabrous; bracts ciliate; disk raised some distance above the ovary; capsule about 3 mm. long, ovoid-oblong, black, hard, almost glabrous; fruitlets coriaceous, with ventral suture; seed brown, glossy.

Var. *scabridum* (Tate) J. M. Black. Leaves oblong-linear, about 2 mm. broad, scarcely cuneate, notched at summit by the reflexed point, the margins recurved, slightly scabrous, sometimes clustered.—*Cryptandra scabrida*, Tate.

Var. *integrifolium*, J. M. Black. Leaves entire, oblong-linear, 1½-2 mm. broad, obtuse or rounded at summit, margins recurved, the tomentum on the upper face closer; floral leaves ovate-oblong or oblong, white, entire.

The type and varieties come from various parts of Kangaroo Island and appear endemic there. Spring and summer.

11. **S. bifidum,** F. v. M. Small shrub with slender often drooping branches; leaves linear-cuneate, more or less deeply 2-lobed at summit, the lobes divergent, obtuse or subacute, pubescent, and with impressed midrib above, tomentose and with revolute margins below, 6-12 mm. long, 2-7 mm. broad at the top of the lobes, rarely some of the leaves linear and entire; flowerheads dense, woolly, prominent, subglobular, 6-12 mm. diam., with 4-5 white-velvety floral leaves, usually notched or lobed, narrow, or rather broad; flowers silky; capsule 3 mm. long, densely silky or villous; endocarp almost hyaline, without a suture, sometimes adherent to the epicarp and receptacle.

Southern part of Flinders Range and of Eyre Peninsula. Aug.-Nov.—Western Victoria. The form with broader leaves comes chiefly from near Marble Range, E.P.

Var. *integrifolium*, J. M. Black. Leaves all entire, 5-10 mm. long, about 1 mm. broad, linear, obtuse; floral leaves oblong, white, obtuse, 2-3 mm. broad; heads and fruit as in the type.—Pt. Lincoln to Marble Range, E.P.

12. **S. subochreatum** (F. v. M.) Reiss. Shrub sometimes over 1 m. high, hoary with a very close grey stellate tomentum; leaves linear or linear-oblong owing to the revolute margins, rarely almost flat and ovate-lanceolate, 6-12 mm. long, hoary above, more densely so below; stipules brown, 3-7 mm. long, larger than in other species; compound heads globular, 8-12 mm. diam., with conspicuous brown bracts and 3-4 floral leaves similar to the stemleaves: flowers stellate-hoary (in all our other species they are silky villous with long simple hairs); receptacle ovoid; capsule obovoid, crustaceous, scarcely 2 mm. long, hoary with a short close stellate tomentum, usually containing only 1 seed; endocarp almost hyaline without ventral suture and more or less adherent to exocarp.

Murray scrub on both sides of river; scrub near Hoyleton. Sept.-Dec.—Western Victoria and New South Wales; West Australia.

Var. *laxiusculum*, J. M. Black. Leaves smaller, becoming glabrous above; stipules less conspicuous and earlier deciduous; flowers with white or grey stellate pubescence, in rather loose and sometimes larger compound heads.—Near Keith; Wirrega. The small flower clusters which compose the head are often few-flowered partial shortly pedunculate cymes, thus showing a tendency towards *Trymalium*, but the single flowers are sessile or almost so and the habit is that of the type.

5. CRYPTANDRA, Sm.

(From Greek *kryptos*, hidden: *anēr, andros*, a man: the anthers are hidden within the hoodshaped petals.)

Differs from *Spyridium* in the hollow receptacle extended upwards considerably beyond the ovary and disk; petals hoodshaped, enclosing the anthers: disk indistinguishable from the hairy summit of the ovary, or rarely conspicuous; ovary inferior or partially superior, 3-celled: style minutely 3-lobed: capsule enclosed in or crowned by the persistent sepals and free part of the receptacle, separating into 3 or fewer coriaceous fruitlets, which are keeled by the inner suture: seeds of *Pomaderris*. Hairy shrubs, with usually very small leaves: stipules persistent: flowers small, mostly with persistent brown bracts at base, distinct or crowded into small heads.

A. Flowers tubular, sessile in dense heads with floral leaves; disk inconspicuous; leaves short.
  Floral leaves like the terete stemleaves: style as long as flower; ovary conical ..... *C. hispidula* 1
  Floral leaves broad, white: stem-leaves ovate, concave above: style short: ovary almost flat-topped ..... *C. leucophracta* 2.

A Flowers in loose heads or short spikes or racemes : leaves terete, short, grooved beneath by the revolute margins ; disk inconspicuous ; ovary almost flat-topped.
B. Flowers hoary with short stellate hairs : brown bracts short ..... *C. tomentosa* 3
B. Flowers silky with simple hairs.
Brown bracts only covering base of receptacle ... *C. amara* 4.
Brown bracts covering the whole receptacle ..... *C. propinqua* 5.
A. Flowers in loose cymes ; leaves linear, rather long ; disk prominent ..... *C. Waterhousei* 6.

1. **C. hispidula,** Reiss. Small shrub, 20-30 cm. high, the branchlets rather rough with stellate hairs ; leaves clustered, terete, 3-6 mm. long, ½ mm. thick, glabrous or almost so, the undersurface concealed by the revolute margins ; flowers sessile, solitary or 2-8 in terminal heads surrounded by leafy bracts, each flower subtended at base by 4-5 lanceolate acuminate ciliate brown bracts nearly ½ its length ; flower tubular, 4-6 mm. long, silky and stellate-hairy outside, the sepals much shorter than the receptacle ; style nearly as long as flower, stellate-hairy towards base, dilated downwards into the conical summit of the ovary, which is half-inferior. (Fig. 161, D-E.)

Usually in swampy country near Myponga, Mt. Compass, Encounter Bay, and Goolwa ; also Kangaroo Island. Most of the year.

2. **C. leucophracta,** Schlecht. Low shrub with spreading branches, flowering when under 10 cm. high : branchlets rusty with a stellate tomentum ; leaves obovate, tapering into a short petiole, 4-6 mm. long, green, pubescent and concave above with a recurved point, silky, white or rusty below : flowers sessile, few or numerous in a dense head 5-10 mm. diam., surrounded by broad ciliate brown bracts and several almost orbicular floral leaves which are white-velvety above, with lanceolate bracteoles at base of flowers : flower silky, tubular, 4-6 mm. long, the receptacle 5 times as long as the short sepals ; disk inconspicuous ; capsule obovoid, 2½ mm. long, the free part of the receptacle withering and falling off early ; fruitlets coriaceous, opening by the inner suture. (Fig. 161, F.)—*Stenanthemum leucophractum* (Schlecht.) Reiss.

Southern districts ; Kangaroo Island ; Murray lands : Yorke and Eyre Peninsulas. Spring.—Western Victoria.

3. **C. tomentosa,** Lindl. Small shrub, 25-80 cm. high, with slender hoary branches ; leaves usually terete, 2-6 mm. long, under 1 mm. broad when the margins are closely revolute, but 1-2 mm. broad when the undersurface is somewhat exposed ; flowers sessile, in loose few-flowered heads or short spikes at the ends of the short branchlets, which are sometimes spiny : flower campanulate, 3 mm. long, the sepals as long as the receptacle and hoary with a short dense stellate pubescence, the receptacle, with its turbinate adnate base, slightly hairy or almost glabrous, the brown bracts not extending much beyond the adnate base ; capsule obovoid, 2½-3 mm. long, almost flat-topped, free for about ⅓ of its length.

Mt. Lofty and Barossa Ranges ; Murray lands : Yorke and Eyre Peninsulas, and westward to Fowler's Bay. Winter and spring.—Western Victoria and New South Wales.

4. **C. amara,** Sm. Low shrub under 1 m. high, with rigid intricate branches ; branchlets stellate-hoary, ending in a spine ; leaves as in the preceding (in the eastern States they are sometimes oblanceolate and flat) : flowers subsessile, solitary or in 2-3-flowered clusters on very short peduncles, the whole resembling short leafy spikes on the short branchlets, sometimes almost contracted into small heads ; flower broadly campanulate, 3 mm. long, silky with mostly simple hairs, the sepals considerably shorter than the receptacle, the brown bracts broad, obtuse and only covering the short turbinate adnate base of the receptacle.

Murray lands on both sides of river, and southward into the 90-Mile Desert. Winter and spring.—Eastern States.

Var. *longiflora*, F. v. M. Flowers racemose, tubular, 5-6 mm. long, usually solitary, erect or drooping, on very short peduncles, which are often beset with smaller and narrower bracts than the broad basal ones ; capsule globular, stellate-hoary, about 4 mm. diam., free for ⅓ of its length. (Fig. 161, B-C.)

Near Clare and northward to Burra, Spalding, and Bundaleer Range.—Eastern States.

5. **C. propinqua,** A. Cunn. Small shrub, with rigid hoary branches and short almost spiny spreading branchlets which bear dense spikes of 3-8 sessile flowers at their summits ; leaves terete, 2-4 mm. long, usually clustered and sometimes reduced to the stipules on the flowering branchlets ; flower campanulate, about 6 mm. long, silky with mostly simple

hairs outside, the sepals lanceolate and as long as the receptacle; brown bracts broad, obtuse, unequal in length and imbricate in several rows, ciliate and covering the receptacle up to the sepals.

Between Fowler's Bay and Ooldea. Winter and spring.—Western New South Wales and Victoria.

6. **C. Waterhousei,** F. v. M. Erect, somewhat viscid shrub, with simple appressed hairs; leaves linear, 10-25 mm. long, sometimes very silky, the margins revolute; flowers in loose terminal cymes, the partial cymes 3-flowered or 1-flowered by abortion, the central flower subsessile and embraced by the stipules of the floral leaf, the 2 lateral flowers shortly pedicellate and embraced by oblique brown bracts; flower turbinate, 3 mm. long, hairy, the disk undulate and prominent above the ovary, as in *Spyridium*, the receptacle not much extended above the disk; capsule ovoid-oblong, over 3 mm. long adnate almost to the summit; fruitlets coriaceous, keeled by the ventral suture. (Fig' 161, A.)—*Spyridium Waterhousei*, F. v. M.; *Stenanthemum Waterhousei* (F. v. M.) Benth.

Most parts of Kangaroo Island. Sept.-Oct.

C. uncinata (F. v. M.) Grüning is a very doubtful species. The leaves are 10-20 mm. long, under 1 mm. thick, terete, with a hooked point, grooved underneath. Tate, in Trans. Roy. Soc. S.A. 6 : 112 (1883) gives "Murray scrub near the Great Bend" as the place where Mueller collected his specimen. This name was sometimes given in early colonial days to the North-west Bend, near Morgan. Search in this locality has been unsuccessful. See under *Beyeria uncinata*, p. 358.

6. VENTILAGO, Gaertn.

(From Latin *ventilare*, to fan, to wave to and fro: alluding to the winged fruits.)

1. **V. viminalis,** Hook. *Supple Jack.* Small glabrous tree with flexible branches; leaves narrow-lanceolate, 5-10 cm. long, the lateral nerves very oblique, almost longitudinal; flowers small, in axillary raceme-like panicles; sepals over 2 mm. long, spreading, caducous; receptacle small, depressed, with a thick adnate disk in which the 2-celled ovary is slightly immersed; style shortly 2-branched; petals none; stamens 5; fruit a small globular 1-celled 1-seeded nut, about 25 mm. long, including the straight oblong terminal wing, the receptacle persistent at the base of the nut; seed globular, exalbuminous.

Western New South Wales and along the Finke River in Central Australia; therefore probably in our Far North-East. A fodder tree.

Family 73.—TILIACEAE.

Differs from *Malvaceae* in the free stamens with 2-celled anthers, and from *Sterculiaceae* in the stamens always free and the anthers opening inwards instead of outwards. The stamens are usually many. The family includes the European linden or lime-tree (*Tilia* species), also *Corchorus capsularis*, L., and *C. olitorius*, L., tall annuals of Asia and Africa from whose fibres jute is made. The latter species also grows in tropical Australia.

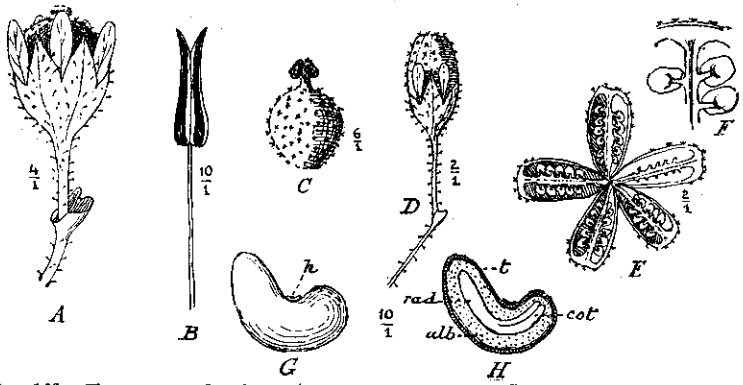

Fig. 163.—**Hymenocapsa longipes.** A, flower. B., stamen. C, pistil. D, capsule, with persistent calyx and petals. E, capsule split into 5 valves. F, seeds *in situ*, enlarged. G, seed: *h*, hilum. H, vertical section of seed: *t*, testa; *alb*, albumen; *rad*, radicle; *cot*, cotyledons.

1. HYMENOCAPSA, J. M. Black.

(From Greek *hymên, hymenos*, membrane; *kapsa*, case, capsule: alluding to the membranous fruit.)

1. **H. longipes** (Tate) J. M. Black. Small glandular-hairy perennial with prostiate wiry stems leaves alternate, oblong-lanceolate, shortly petiolate, coarsely serrate,

10-15 mm. long, almost glabrous or with a few stellate hairs beneath; stipules deltoid; flowers 1-2 on filiform axillary peduncles 8-15 mm. long, with a small notched or bifid bract at summit embracing the base of the pedicel, which is straight and 2-5 mm. long; calyx campanulate, persistent, 3-4 mm. long, glandular-hairy, with 5 lanceolate lobes as long as the tube; petals 5, oblanceolate, hypogynous, 5 mm. long; stamens 5, hypogynous, opposite the petals, the anthers linear, basifixed, with 2 parallel cells sharply pointed and opening longitudinally; ovary superior, 5-celled, with several amphitropous horizontal ovules in 2 rows in each cell; style short, simple, with 5 minute stigmatic lobes at summit; capsule ovoid-oblong, 6 mm. long, stellate-hairy, separating loculicidally into 5 crustaceous or membranous valves, each with 10-14 albuminous subreniform seeds; testa coriaceous; endopleura hyaline; embryo curved; cotyledons plano-convex, together terete and of the same diameter as the radicle. (Fig. 163.)—*Corchorus longipes*, Tate, in Trans. Roy. Soc. S.A. 22 : 119 (1898).

Near Farina (Flinders Range). This plant has the capsule opening as in *Corchorus*, and, as Tate observes, it has the habit of *C. vermicularis*, F. v. M., but it differs from *Corchorus* in the sepals united for half their length, the stamens equalling the petals and sepals in number, the linear anthers with pointed cells and the embryo with narrow not leafy cotyledons. It appears to be an anomalous genus, occupying a position between the tribes *Brownlowieae* and *Tilieae*.

Family 74.—MALVACEAE

Flowers regular, usually bisexual; calyx persistent, campanulate, with 5 valvate lobes; petals 5, hypogynous, cohering and usually hairy at base, twisted in bud; stamens numerous, united in a tube which surrounds the ovary and is usually adnate to the base of the petals; anthers 1-celled, reniform, with prickly pollen-grains; ovary superior, of 2-many united carpels, which are whorled round the central axis (elongated receptacle or torus); styles united at least in the lower half; ovules amphitropous or half-anatropous, 1 or more attached to the inner angle of each cell; fruit separating septicidally into as many laterally compressed fruitlets as there are carpels in the ovary, and leaving the persistent central axis, or remaining a loculicidal capsule; seeds usually reniform, with crustaceous testa and very little albumen; embryo with broad cotyledons folded several times, the radicle inferior in ascending seeds, superior in pendulous ones. Herbs or shrubs, with alternate petiolate stipulate leaves, often palmately lobed; flowers often large and showy, sometimes with 3 or more bracteoles upon or close under the calyx, forming an outer calyx or involucre. *Mallow Family.*

A family containing many ornamental plants, such as *Lagunaria Patersonii*, G. Don, a Queensland tree, with large pink solitary flowers and ovate entire leaves, often planted in our streets, and *Hibiscus rosa-sinesis*, L., with bright red flowers and long protruding style, a garden shrub from eastern Asia.

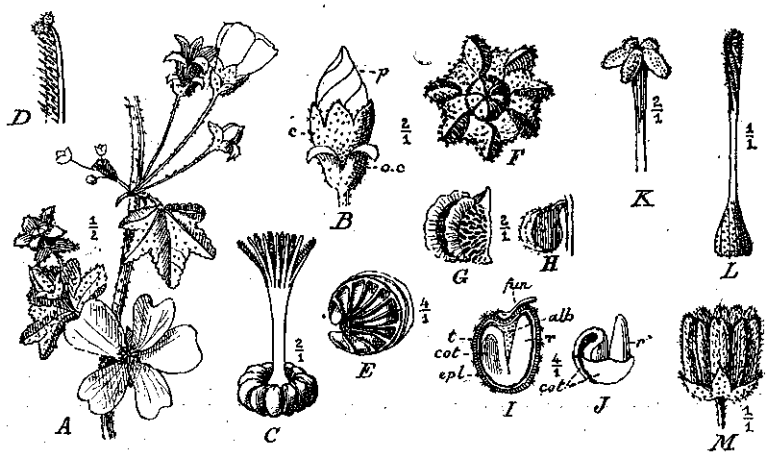

Fig. 164.—**Malvaceae.** A-E, *Lavatera plebeja*: A, flowering branch; B, opening flower; *p*, twisted petals; *c*, calyx; *o.c*, outer calyx; C, syncarpous ovary and style; D, upper part of style-branch enlarged, with 2 pollen-grains at summit; E, fruitlet. F-J, *Sida corrugata*, var. *goniocarpa*: F, fruit viewed from above; G, fruitlet; H, pendulous seed; I, seed cut vertically; J, embryo; *fun*, funicle; *t*, testa; *epl*, endopleura; *r*, radicle; *cot*, cotyledons; *alb*, albumen. K, stigma and part of style of *Hibiscus Huegelii*. L, ovary and style (pistil) of *Gossypium Sturtii*. M, capsule of *Abutilon halophilum*.

A. Fruit separating into fruitlets, except in *Howittia* and some *Abutilons*.
  B. Style-branches as many as carpels. (Tribe *Malveae*.)
    C. Ovule solitary in each cell.
      D. Outer calyx of 3 bracteoles; ovule ascending, with a ventral rhaphe.
        E. Stigmas decurrent: sides of fruitlets radiately ribbed.
          Bracteoles united at base ..... LAVATERA 1.
          Bracteoles distinct ..... MALVA 2.
        E. Stigmas terminal; bracteoles distinct ..... MALVASTRUM 3.
      D. Outer calyx absent; ovule pendulous, with a dorsal rhaphe.
        Stigmas decurrent ..... PLAGIANTHUS 4.
        Stigmas terminal ..... SIDA 5.
    C. Ovules 2 or more in each cell, usually ascending or the lower ones pendulous; stigmas terminal.
      F. Outer calyx of 3 distinct bracteoles ..... MODIOLA 6.
      F. Outer calyx absent.
        Capsule 2-3-celled ..... HOWITTIA 7.
        Capsule 5-15-celled ..... ABUTILON 8.
  B. Style-branches twice as many as carpels, with terminal stigmas; ovule solitary; outer calyx of 5 bracteoles. (Tribe *Ureneae*.) ..... PAVONIA 9.
A. Fruit a loculicidal capsule, usually 5-celled; outer calyx present: style-branches as many as carpels. (Tribe *Hibisceae*.)
  G. Style-branches free or connate, with capitate stigmas; bracteoles 5-12 ..... HIBISCUS 10.
  G. Style-branches connate, with decurrent stigmas.
    Bracteoles 4-7, narrow, shorter than calyx ..... CIENFUEGOSIA 11.
    Bracteoles 3, broad, longer than calyx ..... GOSSYPIUM 12.

1. LAVATERA (Tourn.) L.

(After a physician and naturalist of Zurich named Lavater.)

Outer calyx of 3 ovate leafy bracteoles united for about one-third; petals notched; ovary of 6-15 1-ovulate cells; style-branches stigmatic along the inner face: fruit orbicular, umbilicate, separating septicidally into a whorl of indehiscent reniform fruitlets with radiating ribs on their sides; the persistent central axis or column with a whorl of small vertical wings which are part of the pericarp of the seceding fruitlets; seeds ascending. Herbs or under-shrubs more or less stellate-hairy, with large flowers: leaves on long petioles, the lower ones suborbicular cordate, the uppermost longer than broad, the lobes crenate. In all our species the central axis has a small conical summit and is not longer than the fruit.

A. Outer calyx shorter than calyx proper.
  Calyx-lobes exceeding and concealing the fruit .... *L. plebeja* 1.
  Calyx-lobes appressed to fruit but not wholly concealing it ..... *L. cretica* 2.
A. Outer calyx longer than calyx ..... *L. arborea* 3.

1. L. plebeja, Sims. *Australian Hollyhock.* Stems erect, woody towards base; whole plant more or less tomentose with minute stellate hairs, 1-3 m. high, annual or perhaps biennial; leaves 5-7-lobed, 2-15 cm. broad; flowers in axillary clusters on peduncles 1-4 cm. long; calyx about 10 mm. long, nearly twice as long as the outer calyx, the lobes much exceeding and concealing the ripening fruit, finally spreading; petals lilac, pink or white, 25-30 mm. long; fruitlets usually 10-15, flat and almost smooth on the back, the dorsal edges acute, slightly wrinkled and raised. Flowering in desert situations at 30 cm. high. (Fig. 164, A-E.)

All over the State. July-Dec.—Temperate Australia. The garden hollyhock is *Althaea rosea,* Cav., from China. It differs in having an outer calyx of 6-9 bracteoles.

Var. *eremaea,* J. M. Black. A desert form with smaller flowers and shorter peduncles, leaves thicker and more velvety, as in the following variety but the calyx-lobes purely valvate and the fruit as in the type.—Ardrossan, Y.P.; Caroona, E.P. Ooldea; Franklin Islands: along the Great Bight.

Var. *tomentosa*, Hook. f. in Hook. Journ. Bot. 2 : 412 (1840). Stout maritime shrub, 1-2 m. high, with spreading branches and covered with a dense velvety stellate tomentum ; peduncles 1-2 cm. long ; calyx-lobes reduplicate-valvate, so that the closed calyx appears 5-ribbed ; petals white, about 25 mm. long ; fruitlets with sharp raised edges, so that the whole fruit has 10-12 radiating ridges.—*L. australis*, A Cunn. ex Hook. f., l. c.—Althorpe Islands and neighboring coast of Yorke Peninsula. Spring and summer.—Victoria : Tasmania · West Australia.

*2. **L. cretica,** L. Resembles *L. plebeja*, but is smaller about 1-1½ m high, not woody at base, usually annual ; many of the hairs simple or forked ; calyx-lobes villous and not completely concealing the fruit ; petals pale lilac (20 mm long) ; bracteoles ovate, obtuse, about half as long as calyx ; fruitlets 8-10, almost smooth and rounded on back, without acute edges.

Waste places near settlements. Sept.-Nov.—Mediterranean region.

*3. **L. arborea,** L. *Tree Mallow.* Biennial, 1-3 m. high : resembles var. *tomentosa* of *L. plebeja* in leaves and clothing, but the broad obtuse bracteoles are at least as long as the calyx, the petals purplish-pink with dark veins, the calyx-lobes appressed to but not completely concealing the fruit ; fruitlets 6-9, flat and slightly wrinkled on the back, with acute slightly raised dorsal edges.

An escape from gardens near Robe, Hamilton, and other places. Sept.-Oct.—British Isles ; Mediterranean region.

2. MALVA, L.

(Latin name for several species in this and allied genera.)

Outer calyx of 3 distinct bracteoles inserted towards the base of the 5-lobed calyx ; otherwise as in *Lavatera*, except that the flowers are small in our 2 introduced species. *Mallow.*

Bracteoles ovate ; petals twice as long as calyx..... *M. nicaeensis* 1.
Bracteoles linear ; petals scarcely exceeding calyx ..... *M. parviflora* 2.

*1. **M. nicaeensis,** All. Annual with rather stiff simple hairs ; leaves orbicular-cordate, 3-6 cm. broad, on long petioles, with 5-7 rounded crenate lobes ; flowers in axillary clusters ; calyx-lobes deltoid, ciliate, almost concealing the ripe fruit ; bracteoles ovate-acute, attached about halfway up calyx, which is 5 mm. long ; petals light-purple, twice as long ; fruitlets 8-10, glabrous or pubescent, reticulate and strongly wrinkled on back, but without raised edges.

Common in settled districts. Aug.-Nov.—Mediterranean region. The specific name refers to the town of Nice, in France.

Fig 165.—**Malva parviflora.**

*2. **M. parviflora,** L. Like the preceding, but the hairs fewer and mostly stellate ; calyx-lobes broadly ovate, finally spreading outwards and exposing the fruit ; bracteoles linear, attached at base of calyx ; petals pink or almost white, scarcely longer than calyx ; fruitlets 8-12, glabrous or pubescent, transversely wrinkled on back and with raised denticulate dorsal edges, so that the whole fruit has 8-12 radiating ridges.

Settled districts to the Far North. April-Nov.—Mediterranean region.

3. MALVASTRUM, A. Gray.

(Adapted from Malva, mallow.)

Differs from *Malva* in the style-branches terminating in small capitate stigmas.

1. **M. spicatum** (L.) A. Gray. Erect herb, 30-50 cm. high, rather rough with stellate hairs ; leaves ovate-lanceolate, 2-5 cm. long, crenate-serrate ; flowers sessile in a dense terminal spike ; calyx villous, 6 mm. long, with 5 acuminate lobes ; outer calyx of 3 separate linear bracteoles ; petals yellow, slightly exceeding calyx ; fruitlets 8-12, bristly towards summit, often finally dehiscing along the inner suture, smooth on the sides.

Flinders Range to Far North. Flowering irregular.—New South Wales ; Queensland ; Northern Territory ; Timor ; tropical America.

4. PLAGIANTHUS, Forst.

(From Greek *plagios*, oblique; *anthos*, flower: alluding to some peculiarity in the species first described.)

Calyx campanulate, 5-toothed or 5-lobed, without any outer calyx; style-branches stigmatic along the inner face; ovary-cells 3-7, with 1 pendulous ovule in each cell: fruitlets separating from the slender axis. Herbs or shrubs with small, sometimes dioecious flowers.

A. Flowers sessile or almost so, small, greenish or yellowish; leaves rather thick.
  B. Herbs; leaves flat, stalked; flowers bisexual.
    Stem simple, bearing long terminal flower-spikes: glabrous plant ..... *P. spicatus* 1.
    Stem branching from base; flowers mostly in axillary clusters; downy plant..... *P. glomeratus* 2.
  B. Small shrubs with small sessile channelled mostly 3-toothed leaves; flowers dioecious.
    Leaves fleshy, longer than broad, scaly ..... *P. microphyllus* 3.
    Leaves herbaceous, broader than long, stellate-hoary ..... *P. incanus* 4.
A. Flowers long-stalked, dioecious, rather large, white.... *P. Berthae* 5.

1. **P. spicatus** (Hook.) Benth. Stout glabrous herb, the erect stem simple or scarcely branched, 30 cm. to over 1 m. high; lower leaves on long petioles, ovate or oblong, serrate, 2-7 cm. long, the upper ones narrower; flowers sessile, usually solitary within the blade and stipules of a floral leaf resembling a trifid leafy bract, the whole forming a dense cylindrical spike 15-60 cm. long; calyx 5-angled, about 6 mm. long; petals notched, oblong, scarcely exserted; fruit convex at summit by the connivent points of the 5 fruitlets, which are trigonous, almost smooth and shorter than calyx.

Round the coast from the South-East to Eyre Peninsula. Summer.—Temperate Australia.

2. **P. glomeratus** (Hook.) Benth. Stellate-pubescent herb 15-30 cm. high, branching from base; leaves petiolate, obovate or obovate-cuneate, toothed chiefly toward the summit; flowers sessile, few in axillary clusters occupying the greater part of the branches and sometimes condensed into a spike near the summit; calyx as in the preceding, but pubescent; petals entire; fruit shaped as in the preceding, but the 5 fruitlets reticulate on the flat back and honeycombed on the 2 sides.—*P. spicatus*, var. *pubescens*, Benth.

Yorke Peninsula to Flinders Range and Far North. Most of the year.—Western Victoria and New South Wales; West Australia.

3. **P. microphyllus,** F. v. M. Low rigid shrub, about 50 cm. high, hoary with minute fringed scales, the branchlets sometimes spine-tipped; leaves sessile, alternate or clustered, fleshy, oblong-cuneate, mostly 3-8 mm. long, obtuse or 3-toothed at summit, channelled above or almost flat; flowers dioecious 1-2 sessile in the axils; calyx 3-4 mm. long, with 5 deltoid teeth; petals scarcely longer, lanceolate; ovary-cells and style-branches usually 3, but most of the carpels abortive, so that usually only 1 becomes a membranous fruitlet with 1 seed.

Salt swamps all round the coast and sometimes inland. Summer.—Temperate Australia.

4. **P. incanus,** J. M. Black. Near the preceding, but the radiating hair-branches are free in most of their length and not appressed to the leaf or branchlet, so that the plant is stellate-hoary rather than scaly; leaves sessile, obovate-truncate in outline, bluntly 3-lobed at summit, shortly cuneate at base, concave above, about 3 mm. long by 4⅓ mm. broad when flattened out; flowers dioecious, sessile, usually 3 together in the axils of 3 clustered leaves, the clusters alternate and approximate; male calyx 3 mm. long, 5-lobed; female flowers not seen.

Gawler Ranges, E.P. Sept.-Dec.

5. **P. Berthae,** F. v. M. Small stellate-pubescent shrub, with slender branches: leaves ovate or obovate-cuneate, 10-20 mm. long, coarsely toothed except towards the base, on slender petioles 3-10 mm. long; flowers dioecious, usually twin in the axils, on filiform peduncles 7-25 mm. long or one of the 2 peduncles bearing twin flowers; calyx 5-7 mm. long, with 5 acuminate lobes; petals conspicuous, white, obovate, 12 mm. long in male flowers, 6 mm. long in the female; style-branches 6-7, terete; ovary 6-7-celled, pubescent; ripe fruit not seen.

Ardrossan, Y.P.; Murray lands.—West Australia.

P. pulchellus (Bonpl.), A. Gray, a tall shrub with ovate-cordate crenate leaves and small white flowers in axillary paniculate racemes, has been recorded from the Mount Gambier district, but I have seen no specimen.—Eastern States.

5. SIDA, L.

(From Greek *sidè*, used by different classical authors to denote a pomegranate and a water-lily.)

No outer calyx; style-branches with terminal capitate stigmas; ovary-cells 5 or more, each with 1 pendulous ovule; fruit umbonate or flat at summit, the fruitlets usually seceding from the slender axis, indehiscent or opening at the summit in 2 valves. Stellate tomentose herbs or shrubs, with yellow or yellowish flowers; leaves petiolate; stipules subulate, caducous.

A. Calyx without prominent nerves or angles: fruitlets honeycombed on the sides.
  B. Calyx-lobes not enlarged after flowering.
    C. Calyx-lobes obtuse.
      Fruitlets wrinkled on back ..... *S. corrugata* 1.
      Fruitlets not or scarcely wrinkled on back ..... *S. intricata* 2.
    C. Calyx-lobes acute.
      Leaves lanceolate-oblong ..... *S. virgata* 3.
      Leaves orbicular-cordate ..... *S. cardiophylla* 4.
    C. Calyx-lobes acuminate, with long woolly points .... *S. cryphiopetala* 5.
  B. Calyx-lobes enlarged and thinner after flowering.
      Calyx-lobes subacute, herbaceous ..... *S. petrophila* 6.
      Calyx-lobes rounded, scarious ..... *S. calyxhymenia* 7.
A. Calyx prominently 10-nerved and angled; fruitlets reticulate on the sides ..... *S. rhombifolia* 8.

1. **S. corrugata,** Lindl. Stellate-hoary undershrub with prostrate or procumbent stems; leaves orbicular or ovate, cordate at base, 8-20 mm. long, crenate, petiolate; flowers 1-2 in the axils on slender peduncles 8-15 mm. long; calyx about 4 mm. long, the broad obtuse lobes spreading under the ripe fruit: petals yellow, longer than calyx; fruit 5-7 mm. diam., depressed-globular, convex and radiately grooved in the centre, deeply wrinkled round the circumference, composed of 6-10 fruitlets, which are 1-grooved towards summit.

Yorke Peninsula to Flinders Range and Far North; westward to Ooldea. Flowering irregular.—Temperate Australia.

Var. *angustifolia*, Benth. Only differs in the lanceolate-cordate leaves, usually less densely tomentose.—Southern districts to Far North · Murray lands.—Eastern States.

Var. *pedunculata*, J. M. Black. Leaves ovate-lanceolate, not or scarcely cordate, the lower ones 4-5 cm. long, the upper narrower: the lower flowers in leafless axillary racemes, the upper solitary; fruits usually 8-9 mm. diam. and pubescent.—*S. pedunculata*, A. Cunn. —Far North.—Western New South Wales.

Var. *trichopoda*, Benth. A rather slender intricate form, with lanceolate leaves not or scarcely cordate; peduncles filiform, longer than the leaves, hairy or glabrous.—*S. trichopoda*, F. v. M.—Far North; Tarcoola.—Drier parts of the eastern States.

Var. *goniocarpa*, F. v. M. Leaves ovate-oblong; fruit 7-8 mm. diam., pubescent, with 7-8 prominent radiating ribs or angles, due to the rather broad wings which rise from the 2 outer margins of each fruitlet.—North of Cooper's Creek.—Western New South Wales and Queensland. (Fig, 164, F.-J.)

Some of these varieties appear specifically distinct from each other and from the type, but there are often intermediate forms which it is difficult to place.

2. **S. intricata,** F. v. M. Near the preceding, but the leaves sometimes only 4 mm. long, varying to ovate or oblong cordate and 8-20 mm. long, the peduncles 3-12 mm. long; the flowers smaller and the fruits 3-5 mm. diam., not at all or scarcely wrinkled on the circumference, consisting of 5-8 fruitlets.

Gladstone to Flinders Range and Far North; Murray lands and north thereof; westward to Ooldea. Flowering irregular.—New South Wales; Northern Territory; West Australia. Mueller reduced this later to a form of *S. corrugata*, and some specimens are intermediate.

3. **S. virgata,** Hook. Erect stellate-hoary, sometimes rusty shrub; leaves petiolate, the lower ones oblong-lanceolate, often over 3 cm. long, the upper ones oblong-linear, all denticulate, or the upper ones almost entire; flowers yellow, solitary, on slender peduncles jointed below flower, the subtending leaves sometimes reduced to bracts; calyx about 4 mm. long, the lobes acute or acuminate; fruit 5-6 mm. diam., pubescent, the centre convex and grooved, circumference wrinkled, of 5-8 fruitlets.

Murray lands to Far North; westward to Pidinga.—New South Wales; Central and tropical Australia.

4. **S. cardiophylla,** F. v. M. Small shrub with a dense velvety stellate tomentum; leaves rather thick, orbicular-cordate, 8-20 mm. diam.; flowers yellow, solitary or few in axils on short peduncles; calyx 4-6 mm. long, with acute lobes: fruit small, not grooved in centre, of about 6 fruitlets.—*S. macropoda*, F. v. M., var. *cardiophylla*, Benth.

Near Lake Frome.—Central and West Australia.

5. **S. cryphiopetala,** F. v. M. Shrub with a thick velvety stellate tomentum; leaves thick, ovate-lanceolate or oblong, 1½-5 cm. long, the young ones sometimes rusty in color, the nerves prominent; flowers solitary on articulate peduncles; calyx woolly-tomentose, 6-10 mm. long, the lobes acuminate and longer than tube; petals equalling or exceeding calyx, drying yellow or pale-pink; fruit almost conical in centre, pubescent, 4-5 mm. diam., slightly wrinkled on circumference, usually of 5-6 fruitlets.

Flinders Range to Far North and westward to Everard Range; near Iron Knob, E.P. —Central Australia.

6. **S. petrophila,** F. v. M. Hoary-stellate shrub, with leaves like those of *S. virgata*, always serrulate; flowers 1-2 in axil, appearing clustered at the ends of the branchlets; peduncles articulate; young calyxes usually with a dark pubescence, lengthening to 8-10 mm. and spreading under the fruit, the lobes ovate-lanceolate and much longer than the tube; petals longer than calyx, yellow or sometimes drying whitish; fruit 6-7 mm. diam., pubescent, convex in centre, slightly wrinkled on circumference, usually of 7 fruitlets.

Wallaroo northwards to Flinders Range and Far North; towards Broken Hill; near Iron Knob, E.P.—Western New South Wales.

7. **S. calyxhymenia,** J. Gay. Erect shrub with leaves and inflorescence of the preceding, but the leaves less sharply toothed; calyx 5-angled, thinner, less densely pubescent, with broader and more obtuse lobes and flatter base, finally membranous and 10-12 mm. long, spreading under the fruit; petals light-yellow, scarcely exceeding calyx; fruit 5-6 mm. diam., grooved and subconical in centre, wrinkled on the circumference, of 5-6 fruitlets.

West of Oodnadatta; Tarcoola.—West Australia.

8. **S. rhombifolia,** L., var. *incana*, Benth. Undershrub with a close greyish stellate tomentum; leaves lanceolate or linear-oblong, 2-5 cm. long, obtuse, irregularly crenulate, hoary on both faces; flowers solitary, on axillary peduncles articulate above the middle, 2-4 cm. long in flower and fruit and exceeding the leaf; calyx 10 mm. long, 10-ribbed, stellate-pubescent outside, the lobes as long as the tube and pubescent with simple hairs inside; petals yellow; fruit globular, about 6 mm. diam., formed of 8-10 fruitlets, which are vertically 2-ribbed and transversely wrinkled on the back, reticulate on the sides, and tapering upwards into 2 erect beaks or awns, which are short or nearly as long as the fruitlet and barbellate with short reflexed hairs.

Near Oodnadatta; north of Cooper's Creek.—Queensland; Central Australia. The type which is found in eastern and tropical Australia, as well as Asia and America, differs in usually smaller leaves, narrowed towards base and glabrous above, and in shorter peduncles.

S. inclusa, Benth., which has a remarkable calyx and fruit, has been found on the Finke River, Central Australia, and may therefore occur in our territory. The fruiting calyx is membranous, about 20-nerved, and completely encloses the large orbicular fruit, which is about 25 mm. across, covered with stiff spines 3-4 mm. long and barbellate with stellate hairs; the fruitlets are over 20 and adhere firmly together, at least for a long time. It may be the same as *S. platycalyx*, F. v. M.—Chiefly tropical Australia.

FIG. 166.—**Modiola caroliniana.**

6. MODIOLA, Moench.

(From the Latin *modiolus*, the nave of a wheel: alluding to the shape of the fruit.)

*1. **M. caroliniana** (L.) G. Don. Perennial herb with ascending stems rooting at nodes; hairs scattered, stellate or simple; leaves long-petiolate, suborbicular, palmatifid into 5-7 crenate lobes; peduncles long, solitary, axillary; calyx villous, slightly exceeded by the red petals, with 3 lanceolate bracteoles attached just below its base; ovary villous at summit, with many 2-ovulate cells; style-branches with capitate stigmas; fruit about 8 mm. across, flat and villous at summit, of about 20 fruitlets, which are grooved and villous on the back, shortly 2-awned at summit, glabrous and transversely wrinkled below, divided by an incomplete partition into 2 super-posed cells, each containing 1 seed.—*M. multifida*, Moench (1791); *Malva caroliniana*, L. (1753).

Mount Lofty Range; South-East. Nov.-Feb.—Temperate South America.

7. HOWITTIA, F. v. M.

(Named in 1855 after Dr. Godfrey Howitt, a physician of Melbourne, interested in botany.)

1. **H. trilocularis,** F. v. M. Stellate-tomentose shrub; leaves shortly petiolate, ovate-lanceolate, obtuse, 3-6 cm. long, green above, whitish below, scarcely toothed; peduncles 1-3, axillary; calyx about 7mm. long, without an outer calyx; petals violet, more than twice as long; styles connate, with 3 capitate stigmas; capsule depressed-globular, shorter than calyx, opening loculicidally in 3 valves, each cell with 2 ascending glabrous seeds.

Recorded by Mueller as having been found by the Rev. J. E. Tenison-Woods in the Tatiara country; does not appear to have been collected since. Oct.-Dec.—Victoria; New South Wales.

8. ABUTILON (Tourn.) Gaertn.

(From aubûtîlûn, the name quoted by the Arabian physician Avicenna as belonging to a plant of this or some allied genus.)

Differs from *Sida* in the ovary-cells having each 3 or more, rarely 2 ovules: petals obovate, mostly yellow; capsule umbilicate at summit, consisting of 5-15 fruitlets united at base or entirely seceding, opening in 2 valves. Tomentose shrubs or herbs, with leaves on rather long petioles and caducous subulate stipules; flowers on solitary axillary peduncles articulate above the middle or near the summit.

Under the name of Chinese lantern (from the shape of the handsome drooping flowers) several foreign species and hybrids therefrom are cultivated in gardens.

A. Fruitlets not seceding from the axis, but forming a several-celled subtruncate capsule which opens loculicidally at the summit.
  B. Fruitlets not exceeding calyx, angular or almost rounded at the upper outer edge, not awned.
    C. Calyx-lobes shorter than tube.
      Petals much longer than calyx; fruiting calyx not umbilicate ..... *A. leucopetalum* 1.
      Petals scarcely longer than calyx; fruiting calyx umbilicate at base ..... *A. cryptopetalum* 2.
    C. Calyx-lobes longer than tube..... *A. otocarpum* 3.
  B. Fruitlets exceeding calyx, with divergent awns.
    D. Capsule 15 mm. long..... *A. Theophrasti* 4
    D. Capsule 6-7 mm. long.
      Leaves usually acute, not lobed..... *A. oxycarpum* 5.
      Leaves rounded, with 3-5 shallow lobes ..... *A. malvifolium* 6.
A. Fruitlets distinct and finally seceding from the axis, rounded or angular at the upper outer edge.
  E. Leaves cordate-orbicular.
    Capsule about as long as calyx, 6-7 mm. long..... *A. Fraseri* 7.
    Capsule twice as long as calyx, 10-12 mm. long .. *A. halophilum* 8.
  E. Leaves oblong; capsule 6-7 mm. long ..... *A. macrum* 9.

1. **A. leucopetalum,** F. v. M. Shrub, often flowering when only 30 cm. high, clothed with a dense velvety stellate tomentum mixed with long spreading hairs on the branches and base of the calyx; leaves soft and rather thick, orbicular, ovate or ovate-lanceolate, cordate, crenate, sometimes acuminate, 2-8 cm. long; calyx tubular-campanulate, 14-20 mm. long, 10-nerved and somewhat 5-angled, the acuminate lobes shorter than tube; petals about twice as long as calyx, yellow or white (or at least drying white), adnate near the base as far as the middle of the pubescent staminal tube; capsule as long as calyx tube, villous at summit, 7-10-celled, each cell with 2-3 dark minutely pubescent seeds.—*A. Mitchellii,* Benth. (1863); *Sida leucopetala,* F. v. M. (1860).

Flinders Range to Far North, in which it extends from Cordillo Downs to the Everard Range.—Western New South Wales and Queensland; central and tropical Australia. The East-Australian *A. tubulosum,* Hook., differs from this in a rather longer calyx, shorter fruit, and the corolla adnate to the glabrous staminal tube for about 12 mm. from its base, the claws and tubular part of the corolla being also glabrous, whereas in *A. leucopetalum* these parts are pubescent, as is also the staminal tube, and the attachment of the tube and corolla is only for 5-7 mm. from the base. Mueller's specific name ("white-petalled") is usually, perhaps always, inappropriate, but it cannot be altered. *A. tubulosum* has been recorded from the northern districts of South Australia, but all the specimens I have seen from this State are *A. leucopetalum.*

2. **A. cryptopetalum** F. v. M. Low shrub, 25-60 cm. high, hoary-pubescent; leaves cordate, suborbicular to ovate-lanceolate, crenate, 1½-6 cm. long, velvety; flowers solitary; petals pale-yellow, scarcely exceeding calyx, which in fruit is about 10 mm.

long and of the same breadth, 10-ribbed, flattish and umbilicate at base, the lobes short and broad; peduncle longer than petiole; capsule nearly as long as calyx, of 7-10 acutely pointed fruitlets; seeds wrinkled, almost glabrous.

Has only been collected at Tarcoola, but probably grows in other places, as it has been found near the Darling River, N.S.W., and in West Australia.

3. **A. otocarpum.** F. v. M. Small shrub, with a densy velvety tomentum, the hairs spreading on the branches and petioles; leaves orbicular or broadly ovate, crenate, thick, 1½-5 cm. long; flowers solitary on short peduncles, often appearing clustered at ends of branchlets; calyx about 12 mm. long, strongly 5-keeled or almost winged from summit to base, and umbilicate in fruit, the acuminate lobes longer than tube; petals yellow, scarcely exceeding calyx; capsule shorter than calyx, of 10-20 fruitlets, which are rounded or very slightly angled at summit, each containing about 3 glabrous wrinkled seeds.

Far North and westward to Gawler Range and Ooldea. Most of the year.—Western New South Wales and Queensland; central and tropical Australia.

4. **A. Theophrasti,** Medic. (1787). Softly pubescent, stout erect annual, 30 cm. to over 1 m. high; leaves orbicular-cordate, acuminate, with broad shallow crenatures or almost entire, 2-10 cm. long; flowers solitary on short peduncles, which in fruit become rather stout and often 2-4 cm. long; calyx about 10 mm. long in fruit, the broad lobes exceeding the tube; petals yellow, exceeding calyx; capsule blackish, truncate, much longer than calyx, nearly 2 cm. diameter, of 10-15 fruitlets, each with 2 diverging awns and containing 2-3 dark smooth pubescent seeds.—*A. Avicennae,* Gaertn. (1791).

Murray lands to Cooper's Creek; cultivated land in southern districts (probably as an introduced weed). Spring and summer.—Eastern States; Mediterranean region and Asia; introduced weed in Africa and America.

5. **A. oxycarpum,** F. v. M. (1863). Small slender herb, with a close stellate tomentum and usually longer single spreading hairs on the branches and petioles; leaves cordate, ovate-lanceolate, acuminate, crenate, 1½-8 cm. long, whitish below; flowers solitary or twin, on slender peduncles sometimes exceeding the leaves and 2-4 cm. long in fruit; calyx about 5 mm. long, the lanceolate lobes slightly longer than tube; petals yellow, exceeding calyx; capsule usually twice as long as calyx, truncate and about 8 mm. in diam. at summit, of 10 or fewer fruitlets, each with 2 short spreading-erect awns about 2 mm. long and 2-3 glabrous seeds, finally separating from the axis.—*A. australe,* Garcke (1861); *Sida oxycarpa,* F. v. M. (1860).

Gawler Range to Far North and westward to Everard Range.—New South Wales; Queensland; West Australia.

Var. *incanum,* Benth. Leaves velvety, cordate, ovate or suborbicular, obtuse or acuminate.—Gawler Range, E.P.—Queensland; West Australia.

6. **A. malvifolium** (Benth.) J. M. Black. Small tomentose undershrub, with longer simple hairs among the stellate ones; leaves cordate, orbicular or ovate, crenate, 1-4 cm. long, very obtuse, often becoming subglabrous, usually with 3-5 very shallow lobes; flowers yellow, solitary, on peduncles about as long as petioles; calyx about 6 mm. long, the broad lobes longer than tube; fruit usually of 5-7 fruitlets awned as in *A. oxycarpum,* but only slightly exceeding calyx; seeds glabrous or pubescent.—*A. oxycarpum* F. v. M., var. (?) *malvaefolium,* Benth.

North of Cooper's Creek.—Western New South Wales.

7. **A. Fraseri,** Hook. Small erect undershrub, with long simple hairs mixed with the stellate pubescence; leaves cordate, orbicular or ovate, obtuse or subacute, crenate, 1½-5 cm. long; flowers solitary, axillary, on peduncles which usually lengthen in fruit to 2-4 cm. and often exceed the petioles; calyx about 7 mm. long, broad and umbilicate at base in fruit, the acute broad-lanceolate lobes rather longer than tube; petals yellow, twice as long as calyx; fruit 7-8 mm. diam., about as long as calyx, usually of 10 greenish fruitlets, often becoming almost glabrous, subobtuse or minutely pointed at summit, each with 2 pubescent seeds.

Northern part of Flinders Range to Far North.—Dry parts of all States except Victoria and Tasmania.

8. **A. halophilum,** F. v. M. Small undershrub with soft stellate tomentum; leaves orbicular or obovate, very obtuse or notched, subcordate, crenate except near base, 1-3 cm. long; flowers more or less dioecious; calyx and corolla as in *A. Fraseri,* the former umbilicate in fruit, on a peduncle about as long as petiole; fruit larger than in other species, about 14 mm. diam. by 10 mm. long, of about 10 obtuse distinct fruitlets, with 2 densely pubescent seeds in each. (Fig. 164, M.)—*A. Fraseri,* Hook., var. *halophilum,* Benth.

Flinders Range to Far North.—Western New South Wales.

9. **A. macrum,** F. v. M. Slender stellate-hoary undershrub, with the habit of *Sida virgata*; leaves narrowly or broadly oblong, serrate, 1½-2½ cm. long, on short petioles; flowers solitary, on peduncles about as long as leaves; calyx 3-4 mm. long; corolla yellow, not much longer; fruit truncate, about twice as long as calyx, 5-6 mm. diam., of about 10 obtuse fruitlets, each with 2-3 sparsely pubescent seeds.

Inland from Fowler's Bay.—Central Australia.

9. PAVONIA, Cav.

(After José Pavón, Spanish botanist, died 1844, joint author with Ruiz of the Flora peruviana et chilensis.)

*1. **P. hastata,** Cav. Small minutely stellate-tomentose shrub; leaves oblong-lanceolate, 2-5 cm. long, hastate with small lobes at base, crenate; flowers on solitary axillary peduncles; calyx about 6 mm. long, with an outer calyx of 5 free alternate ovate bracteoles almost as long and attached near its base; petals reddish, streaked, shorter than calyx and closed over the 5 stamens; ovary-cells 5, each with 1 ascending ovule, style-branches 10, with terminal capitate stigmas; fruitlets 5, indehiscent, reticulate, with a prominent dorsal rib.

Roadsides near Victor Harbor. Summer.—New South Wales; Queensland; temperate South America. Our specimens have clandestine or cleistogamous flowers as described above, but the type has open petals twice as long as calyx, and more numerous stamens.

10. HIBISCUS, L.

(Greco-Latin name for some sort of mallow.)

Calyx 5-lobed, with an outer calyx of free or partially united bracteoles, usually half as long as calyx; petals often large, obovate-cuneate, pubescent on the part exposed in bud and usually with a blotch of darker color towards the base; filaments mostly short and numerous along the staminal tube and at its summit; ovary 5-celled with 3 or more ovules in each cell; style-branches 5, free and erect-spreading, or connate almost to the stigmas, so that the style appears simple; stigmas capitate, globular or oblong; capsule enclosed in the calyx, umbilicate at summit, opening loculicidally in 5 valves. Herbs or shrubs usually stellate-hairy; leaves petiolate, with subulate or small and caducous stipules.

A. Outer calyx of free linear bracteoles.
  B. Leaves green, with scattered hairs, usually 3-lobed.
    C. Calyx shortly lobed, bladdery ..... *H. Trionum* 1.
    C. Calyx deeply lobed, not bladdery.
      Style-branches free; filaments long ..... *H. brachysiphonius* 2.
      Style-branches connate; filaments short..... *H. Huegelii, var.*
  B. Leaves whitish or greyish, tomentose, 3-lobed or undivided.
    Buds acuminate, ribbed; leaves reticulate below; style-branches connate..... *H. Pinonianus* 3.
    Buds acute, smooth; leaves with only the midribs prominent below; style-branches free... *H. brachychlaenus* 4.

A. Outer calyx of bracteoles united in the lower part.
  D. Leaves whitish or greyish, tomentose, undivided.
    E. Style-branches free; leaves ovate-lanceolate.
      Outer calyx cut about halfway into broad lobes *H. Sturtii* 5.
      Outer calyx cut almost to base into subulate teeth..... *H. Krichauffianus*, 6.
    E. Style-branches connate; leaves orbicular; lobes of outer calyx clavate ..... *H. Farragei* 7.
  D. Leaves green, with scattered hairs, deeply divided; style-branches connate..... *H. Huegelii* 8.

1. **H. Trionum,** L. *Bladder Ketmia.* Low annual, sparsely beset with stellate hairs, which are longer on the calyx; leaves 3-7 cm. long, palmatipartite into 3 oblong or spathulate toothed or bluntly lobed divisions; flowers rather large, pale-yellow, on solitary axillary peduncles; calyx becoming membranous, inflated, and 15-20 mm. long in fruit, with more than 20 green nerves; bracteoles about 10; style-branches free; capsule globular, hairy, with numerous smooth blackish glabrous seeds.

Far North; a weed in settled districts. Summer.—Throughout Australia, Asia, and Africa; introduced in America.

2. **H. brachysiphonius,** F. v. M. Low perennial or undershrub, scabrous with scattered stellate hairs; leaves green, the lower ones obovate, crenate, the upper ones 2-3 cm. long, more or less deeply cut into 3 obovate-cuneate lobes or segments crenate in the upper part; flowers small, pink, on solitary peduncles which are sometimes 12 cm. long; brac-

teoles about 10, rigid; calyx about 12 mm. long, with long lanceolate lobes; staminal tube short, with long filaments at summit; capsule globular, glabrous; seeds villous.
Near Lake Eyre.—Western New South Wales and Queensland.

3. **H. Pinonianus,** Gaudich. Stellate-tomentose shrub; leaves orbicular or ovate in outline, 2-6 cm. long, with 5 very shallow crenate lobes, or palmatifid into 3 broad rounded coarsely crenate lobes, strongly reticulate and rather rough below; flowers on stout solitary peduncles usually shorter than petiole; buds acuminate, ribbed; calyx 20-25 mm. long, scabrous, with lobes much longer than tube, lanceolate-subulate, 3-5-nerved; bracteoles linear, 8-10, unequal; petals lilac, 5-7 cm. long, 1-toothed at the upper outer edge; style-branches connate; stigmas subsessile, subglobular, resembling a 5-lobed capitate stigma at the summit of the style; capsule shorter than calyx, acuminate, tomentose, with many woolly seeds.
Everard to Musgrave Ranges; between Wynbring and Ooldea. Winter and Spring.—West Australia.
Var. *Drummondii,* J. M. Black. Stellate clothing more scabrous; leaves more deeply cut into 3 narrow oblong or oblong-cuneate coarsely toothed lobes.—*H. Drummondii,* Turez.—Minnipa, E.P.; north of Murat Bay.—West Australia.

4. **H. brachychlaenus,** F. v. M. (1862). Stellate-tomentose rather scabrous shrub; leaves deeply divided into 3-5 oblong-cuneate toothed or bluntly lobed divisions, 2-5 cm. long, the middle one usually the longest, or some of the upper leaves undivided and linear-oblong; flowers on stout solitary peduncles longer than petiole; buds golden-pubescent, smooth, acute; calyx 12-15 mm. long, the lanceolate lobes about as long as tube, the nerves concealed among the dense tomentum; bracteoles 7-10, linear; petals 4-5 cm. long, lilac or purple, toothed at outer margin; style-branches free, with capitate usually penicillate stigmas; capsule equalling or slightly exceeding the calyx, acuminate, pubescent, with many woolly seeds.—*H. microchlaenus,* F. v. M. Fragm. 2: 116 (1861, *nomen nudum*); *H. intraterraneus,* J. M. Black (1925).
Everard Range. Winter and Spring.—West Australia; Central and tropical Australia. The specific name refers to the short outer calyx, the bracteoles unequal in length but not exceeding half the length of the calyx proper. Bentham describes the leaves as "ovate or lanceolate, mostly undivided;" probably they vary considerably in shape.

5. **H. Sturtii,** Hook. Small undershrub with a grey tomentum like that of *H. Krichauffianus;* leaves ovate, ovate-lanceolate, or oblong-lanceolate, 2-3 cm. long, obtuse, crenate or toothed; peduncles solitary, short, or sometimes longer than leaf; calyx about 12 mm. long, the lobes lanceolate; bracteoles united in a cup with 7-8 deltoid teeth or lobes and about as long as the calyx-tube; petals about 3 cm. long, purplish; style-branches free, with penicillate stigmas; capsule globular, silky.
Far North.—New South Wales and Queensland. Bentham says: "Seeds glabrous or rarely woolly." Our specimens from Birksgate Range (also from Central Australia), with narrow leaves and no flowers, have densely pubescent seeds; those from near Lake Frome, with broad leaves, are in flower only. Further knowledge of these desert plants will probably show that *H. Sturtii,* as described by Bentham, is a collective species requiring subdivision. Hooker's type, from the interior of Queensland, and also common in New South Wales, has the outer calyx with broad rounded spreading lobes as long as the calyx proper and almost glabrous seeds. Our form, which also occurs in Western New South Wales, was classed by Bentham as var. *grandiflora.*

6. **H. Krichauffianus,** F. v. M. (1859). Shrub with a close velvety whitish tomentum; leaves ovate or ovate-lanceolate, almost truncate, 2-4 cm. long, crenate-toothed; flowers on short solitary peduncles about as long as the petiole; calyx 10-12 mm. long, nerveless, with lanceolate lobes; bracteoles 6-8, linear, united close to base, sometimes as long as calyx; petals 2½-3 cm. long; style-branches free, with capitate penicillate stigmas; capsule globular, silky, with pubescent seeds.—*H. Krichauffii,* F. v. M. (1868).
Murray lands; Far North; west of Lake Torrens.—Western New South Wales.

7. **H. Farragei,** F. v. M. Stellate-tomentose shrub over 1 m. high, with stout rigid branches; leaves orbicular-cordate, irregularly toothed, somewhat angled on the margin but scarcely lobed, 4-10 cm. diam., green above, whitish below; flowers usually 2-3 on very short pedicels rising from a stout axillary peduncle or forming a short terminal raceme; calyx 10 mm. long, the lobes lanceolate, with obtuse spreading tips; outer calyx a cup with 8-10 clavate lobes with spreading tips, shorter than calyx; corolla 4-5 cm. long, purplish; stigmas of *H. Pinonianus;* capsule globular, stellate-tomentose; seeds black, angled, with a glabrous wrinkled testa.
Murray lands and north thereof; Flinders Range and westward to Everard Range; near Fowler's Bay. Spring and summer.—Western Victoria and New South Wales; Central Australia; West Australia. The name "Desert Rose" has been applied to this and the following species.

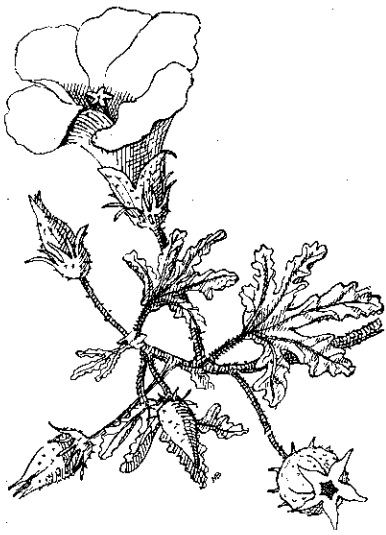

FIG. 167.—**Hibiscus Huegelii.**

8. **H. Huegelii,** Endl. (1837). Shrub 1-2 m. high, somewhat scabrous with scattered stellate hairs; leaves 2-5 cm. long, green on both faces, cut to the middle or more deeply into 3-5 obovate or oblong obtusely lobed divisions; peduncles solitary, usually longer than the leaves; calyx 20-25 mm. long, with lanceolate subulate 3-5-nerved lobes; bracteoles united near base in a cup with 8-10 subulate teeth: petals 5-7 cm. long, lilac or reddish-purple, 1-toothed at the upper outer edge, without a purple blotch at base; stigmas subsessile, fusiform, spreading stellately; capsule ovoid, pubescent; seeds almost glabrous. (Fig. 164, K.)—*H. Wrayae*, Lindl. (1840); *H. Huegelii*; Endl., var. *Wrayae*, Benth.

Mt. Compass (Mt. Lofty Range); Yorke Peninsula to Flinders Range; Eyre Peninsula. Sept.-Oct.—West Australia. Diels states that var. *glabrescens*, Benth. (which is Endlicher's type) and var. *Wrayae* Benth. grow together along the River Moore, W.A., and are scarcely distinguishable from each other.

Var. *leptochlamys*, Benth. Leaves with broad or very narrow divisions; bracteoles free to the base; petals with a purple blotch at base; stigmas of *H. Pinonianus*.—Fowler's Bay and near Ooldea.—West Australia.

11. CIENFUEGOSIA, Cav.

(After Bernardo Cienfuegos, a Spanish botanist who lectured at the University of Alcalá de Henares in 1599, and published his "Historia de las plantas" about 1630.)

Distinguished from *Hibiscus* by the stigmas not capitate, but decurrent for a short distance from the summits of the connate style-branches, the style appearing simple, subclavate and grooved (often spirally) in the upper part at the junction of the style-branches; the outer calyx consists of fewer bracteoles. The name was given by Cavanilles in 1787 and altered to *Fugosia* by A. L. de Jussieu in 1789.

1. **C. hakeifolia** (Giord.) Hochr. Shrub 1½-3 m. high, appearing glabrous except on the back of the petals, but with a very few scattered stellate hairs on the calyx and leaves leaves linear, 5-10 cm. long, 1-4 mm. broad, sometimes clustered, undivided or trifid into linear sometimes pinnatifid lobes; peduncles solitary, stout, axillary; calyx 20-25 mm. long, the lanceolate-acuminate 3-nerved lobes longer than the tube; bracteoles subulate, 4-7, united towards base, shorter than calyx-tube and usually attached a little below it; petals lavender or purple, with darker blotch at base, 1-toothed, 6-7 cm. long; capsule ovoid, pubescent, about as long as calyx, 5-valved, with numerous woolly seeds.—*Fugosia hakeaefolia* (Giord.) Hook.; *Hibiscus hakeaefolius*, Giord. (1833).

Flinders Range; Eyre Peninsula and along Great Bight. Summer.—West Australia. Grown in gardens as an ornamental shrub.

12. GOSSYPIUM, L.

(From *gossypion*, stated by Pliny to be the name of the African cotton-tree, *G. arboreum*, L., in Upper Egypt.)

The style as in *Cienfuegosia*, but differs from that genus and from *Hibiscus* in the 3 broad heart-shaped bracteoles, imbricate at base and much longer than the calyx. The cotton of commerce is chiefly derived from *G. barbadense*, L., Sea Island Cotton: *G. herbaceum*, L. and *G. hirsutum*, L., Upland Cotton. Cotton consists of the long woolly hairs covering the whole of the seed.

1. **G. Sturtii,** F. v. M. *Sturt's Rose.* Glabrous shrub about 1 m. high, with black-dotted branches; leaves petiolate, stiff, ovate or orbicular, 2-6 cm. long, mucronate, entire; peduncles short, rigid; calyx truncate, minutely 5-toothed, concealed by the outer calyx of 3 ovate-lanceolate more or less cordate many-nerved bracteoles, 20-25 mm. long and black-dotted like the calyx; petals 4-6 cm. long, pale-purple with a reddish blotch at base; capsule ovoid, glabrous, black-dotted, 4-5-valved, about 16 mm. long, nearly 3 times longer than calyx and rather shorter than bracteoles, with many silky-pubescent angular seeds. (Fig. 164, L.)—*Sturtia gossypioides*, R. Br.; *Cienfuegosia gossypioides*, Hochr.

Northern part of Flinders Range to Far North and westward to Birksgate Range. Winter and spring.—Western districts of New South Wales and Queensland.

FAMILY 75.—STERCULIACEAE.

Flowers regular, bisexual or unisexual; calyx with 5 valvate lobes; petals 5, twisted in bud, or minute or none; stamens 5-15, more or less united or free, when 5 they are opposite the petals and sometimes alternate with 5 staminodes; anthers 2-celled; ovary superior, 3-5-celled, with 2 or more anatropous or amphitropous usually ascending ovules in each cell; styles free or united in an apparently simple or 5-branched style; fruit a small loculicidal capsule or the carpels becoming large separate follicles; seeds albuminous, with a coriaceous testa; cotyledons broad and flat; radicle inferior. Shrubs or trees with alternate petiolate usually stipulate leaves.

Theobroma Cacao, L., the cocoa-tree, belongs to this family, and is a native of the West Indies and Central America. Cocoa and chocolate are made from its large seeds ("cocoa-beans.")

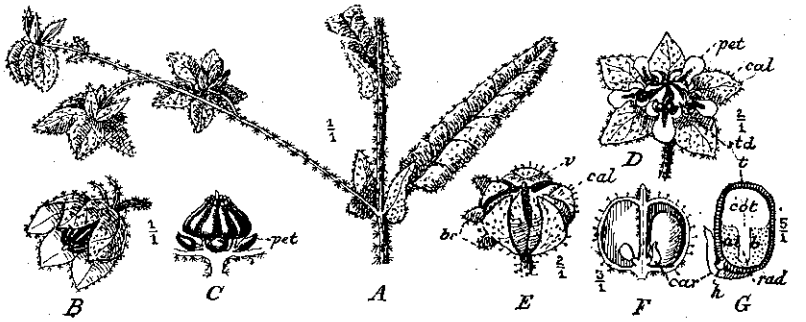

FIG. 168.—**Sterculiaceae.** A, flowering branch of *Thomasia petalocalyx*. B-C, *Lasiopetalum Schulzenii*: B, flower; C, stamens surrounding ovary; *pet*, petals. D, flower of *Commersonia Tatei*; *pet*, petals; *cal*, calyx; *std*, staminodes. E-F. *Lasiopetalum Baueri*; E, capsule; *v*, valve of capsule; *cal*, calyx; *br*, bracteoles; F, one of the 3 valves, showing 1 ripe seed in one half-cell, and 1 abortive ovule in the other; G, vertical section of seed; *car*, caruncle; *h*, hilum; *rad*, radicle; *cot*, cotyledons; *alb*, albumen.

A. Flowers bisexual: calyx persistent; stamens 5; ovules ascending; fruit a loculicidal capsule; stellate-tomentose shrubs.
  B. Petals not longer than calyx, with a broad concave base embracing the anther and a short linear lamina; stamens united in a short cup at base with 5 alternating staminodes; seeds usually carunculate. (Tribe *Buettnerieae*).
    Staminodes simple ..... RUELINGIA 1.
    Staminodes 3-partite ..... COMMERSONIA 2.
  B. Petals flat, longer than calyx; staminodes present. (Tribe *Dombeyeae*) ..... MELHANIA 3.
  B. Petals minute, glandlike; calyx bracteolate; stamens free, without staminodes; seeds carunculate. (Tribe *Lasiopetaleae*).
    Stipules absent; calyx 5-partite ..... LASIOPETALUM 4.
    Stipules present; calyx 5-lobed ..... THOMASIA 5.
A. Flowers unisexual; calyx deciduous; petals none; stamens 10-15, united in a tube; ovules horizontal; fruit of larger separate fruitlets; glabrous tree. (Tribe *Sterculieae*) ..... BRACHYCHITON 6.

1. RUELINGIA, R. Br.

(Named by Brown in 1821 after "John Philip Rüling, author of an essay on the natural orders.")

1. R. magniflora, F. v. M. Stellate-velvety shrub 1-2 m. high; leaves lanceolate-oblong, obtuse, crenate-toothed, 3-5 cm. long, the nerves prominent below; stipules setaceous; flowers few in shortly pedunculate leaf-opposed cymes; calyx 5-rayed at summit in bud by the meeting of the lobes, about 10 mm. long and petaloid in flower, tomentose on both sides, with broadly deltoid lobes; petals much shorter than calyx, with a broad concave base, truncate and notched at summit and a small linear lamina, about 2 mm. long, rising from the notch; staminodes thin, lanceolate, longer than the

5 alternate stamens; ovary stellate-pubescent; styles 5, almost free except at summit; capsule not seen.—*Commersonia magniflora*, F. v. M.

Everard Range to Birksgate Range. Winter.—Central Australia.

R. Kempeana, F. v. M., occurs near the Finke River and in the Great Victoria Desert, W.A., so that it may be found in our Far North-West. It resembles the preceding, but is smaller in all parts; the leaves 1-2½ cm. long, sometimes almost ovate, with curly edges; cymes almost sessile; buds not rayed at summit; calyx 4 mm. long, not much exceeding the petals.

2. COMMERSONIA, Forst. et f.

(After the French naturalist Philibert Commerson, born in 1727. He sailed with the Bougainville expedition in 1766, took part in its explorations, and died in the Isle of France (Mauritius) in 1773.)

1. **C. Tatei,** F. v. M. Small slender shrub with close stellate tomentum; leaves on very short petioles, clustered, 5-10 mm. long, oblong-cuneate, toothed or lobed in upper part, whitish below, with recurved-undulate margins; flowers mostly 2-3 in pedunculate axillary cymes; calyx whitish, 5-rayed at summit in bud, owing to the reduplicate-valvate lobes, 5 mm. long in flower; petals shorter or about as long as calyx, with a broad truncate concave base and obovate lamina, red-spotted in centre; staminodes 3-partite, the central division broadly lanceolate, the 2 lateral ones filiform and shorter, the staminodes longer than the 5 alternate stamens with red globular-celled anthers; styles 5, short, free; ovary almost glabrous; capsule not seen. (Fig. 168, D).

Near Port Lincoln and towards Edillilie, E.P. Sept.-Dec.

3. MELHANIA, Forsk.

(Said to have been named by Forskål after a "Mount Melhan," in Arabia.)

1. **M. incana,** Heyne. Small slender shrub, whitish with a soft stellate tomentum; leaves oblong, serrulate, 2-5 cm. long; peduncles axillary, articulate, bearing usually 1-2 flowers; calyx divided into 5 lanceolate-subulate sepals about 8 mm. long; petals broad, flat, yellow; bracteoles 3, subulate; stamens 5, united towards base, with 5 alternate flat linear staminodes; style-branches 5; capsule ovoid, about as long as calyx, opening loculicidally in 5 valves, tomantose; seeds 6-8 in each cell, trigonous, tuberculate.

Near Oodnadatta.—Central Australia; western New South Wales; Queensland; India.

4. LASIOPETALUM, Sm.

(From Greek *lasios*, hairy, shaggy; *petalon*, leaf, petal: alluding to the hairy calyx.)

Calyx 5-partite, petaloid, subtended by 1-3 unilateral bracteoles united at base, erect or spreading; petals 5, minute, gland-like, reddish; stamens 5, free, with short filaments and dark-colored linear-oblong connivent anthers opening by terminal pores; ovary usually 3-celled, with 2 ovules in each cell; style simple, slender; capsule globular, loculicidal, shorter than calyx; seeds usually solitary in each cell, blackish, carunculate, resembling those of some *Euphorbiaceae*. Stellate tomentose shrubs; leaves entire, shortly petiolate, without stipules; flowers often drooping, pedicellate in cymes on leaf-opposed peduncles. This genus and *Thomasia* are endemic in Australia.

A. Style glabrous; bracteoles 3; leaves coriaceous.
  B. Bracteoles much longer than calyx, which is glabrous inside; leaves ovate ..... *L. discolor* 1.
  B. Bracteoles shorter than or about as long as calyx: leaves oblong, lanceolate-oblong or linear, only the midrib prominent beneath.
    C. Calyx glabrous inside ..... *L. Behrii* 2.
    C. Calyx tomentose inside.
      Bracteoles not half as long as calyx; leaves narrow *L. Baueri* 3.
      Bracteoles as long as calyx; leaves broader..... *L. Tepperi* 4.
A. Style hairy; bracteoles 1-2; leaves ovate, rather flaccid *L. Schulzenii* 5.

1. **L. discolor,** Hook. Leaves ovate or ovate-lanceolate, obtuse, 2-7 cm. long, cordate or truncate at base, green and becoming glabrous above, white-tomentose beneath; cymes contracted into heads; calyx whitish, about 5 mm. long, softly tomentose outside, glabrous inside; bracteoles twice as long, oblong-linear, pink, spreading in flower; ovary silky-villous.

Yorke Peninsula; Kangaroo Island; South-East; Eyre Peninsula. Sept.-Jan.—Tasmania; West Australia.

2. **L. Behrii,** F. v. M. Leaves lanceolate-oblong or linear-oblong, obtuse, 3-6 cm. long, 5-15 mm. broad, glabrous above, hoary or rusty beneath with a close tomentum;

calyx pinkish, 5-angled, 6-8 mm. long, hoary outside, glabrous inside; bracteoles linear, 2-3 mm. long; ovary tomentose.

Scrub near Dublin, Halbury, and Wasleys; Yorke and Eyre Peninsulas; Fowler's Bay; Strathalbyn and Monarto South to Murray scrub and 90-Mile Desert; Kangaroo Island. Sept.-Dec.—Western Victoria and New South Wales.

3. **L. Baueri,** Steetz. Leaves narrow- or broad-linear, obtuse, with recurved margins, 2-5 cm. long, 2-7 mm. broad, becoming glabrous above, closely hoary or rusty beneath; cymes few-flowered, on slender peduncles; calyx pink, 5-angled, 5-6 mm. long, tomentose outside, with red glandular hairs mixed with the stellate ones, tomentose also inside; bracteoles oblong, about 2 mm. long; ovary tomentose. (Fig. 168, E-F.)

Southern districts; Kangaroo Island; Murray scrub to Bordertown; Eyre Peninsula. Sept.-Jan.—Victoria; New South Wales.

4. **L. Tepperi,** F. v. M. Leaves lanceolate-oblong, obtuse, 2-6 cm. long, 5-10 mm. broad, hoary or rusty beneath with a close tomentum, the older ones glabrous above; cymes rather crowded; calyx about 7 mm. long, pink, tomentose on both sides; the 2 lateral bracteoles about as long as calyx, the central one rather longer, all linear-lanceolate; ovary tomentose.

Hills near Yorke Valley, Y.P. Resembles *L. Behrii* in leaf and size of flower, but differs in the bracteoles and clothing of calyx.

5. **L. Schulzenii,** F. v. M. Leaves not stiff as in the other species, broadly ovate, subacute, deeply cordate at base, 3-7 cm. long, sometimes sinuate, tomentose on both faces, paler beneath; cymes many-flowered; calyx pale pink or brownish, 7-8 mm. long, tomentose outside, glabrous inside; bracteoles 1-2, subulate, about 2 mm. long; ovary tomentose; style bearded with stipitate reflexed hair-clusters. (Fig. 168, B-C.)

Kangaroo Island; Yorke and Eyre Peninsulas; South-East. Sept.-Nov.

5. THOMASIA, J. Gay.

(After a Swiss collector of plants named Thomas.)

1. **Th. petalocalyx,** F. v. M. Low loosely stellate-tomentose shrub, 30-80 cm. high; leaves soft, oblong, obtuse, 2-4 cm. long, 5-10 mm. broad, with nerves impressed above and undulate recurved margins; stipules large, leafy, oblique or half-cordate at base; flowers drooping, few, in racemes on slender peduncles; calyx heliotrope, opening to 15 mm. diam., broadly 5-lobed to below the middle, the midrib and pinnate veins conspicuous; bracteoles at base of calyx 3, lanceolate; petals minute, gland-like; anthers 5, dark, linear, on short filaments, opening in short terminal slits; style simple, slender; capsule loculicidal, enclosed in calyx, with 1-4 carunculate seeds in each of the 3 cells. (Fig. 168, A.)

Southern districts; Kangaroo Island; 90-Mile Desert to Naracoorte. Most of the year.—Victoria; West Australia.

6. BRACHYCHITON, Schott et Endl.

(From Greek *brakhys*, short; *khitôn*, an undergarment: alluding to the loose covering of the seed.)

1. **B. Gregorii,** F. v. M. *Desert Kurrajong.* Glabrous tree except on the flowers; leaves said to be deciduous, on long slender petioles, 8-14 cm. long, deeply palmatifid into 3-5 linear-lanceolate acuminate lobes; flowers monoecious or polygamous, in small axillary panicles; calyx petaloid, pale-yellow, often reddish on the margins, broadly campanulate, about 20 mm. in length, the broad-lanceolate lobes longer than tube, stellate-pubescent outside, glabrous inside; petals none; female flowers with an ovary of 5 pubescent carpels; styles 5, united under the capitate stigmas; anthers in 5 bundles surrounding the base of the ovary, with a very short staminal tube; male flowers with the filaments united into a staminal column bearing the anthers in a globular head; fruit of 5 (or fewer by abortion), hard ovoid beaked stipulate follicles, 4-5 cm. long, containing each about 12 seeds; each seed with a loose brittle hairy coat (cell-like extension of the endocarp) which remains attached to the inside of the follicle when the seeds drop out, giving it a honeycombed appearance; albumen adhering to cotyledons; radicle next the hilum.—*Sterculia diversifolia,* G. Don, var. (?) *occidentalis,* Benth.

Sandhills between Musgrave and Birksgate Ranges.—West Australia. The specific name commemorates A. C. Gregory, who conducted several exploring expeditions, in one of which (search for Leichhardt, 1855) Mueller accompanied him as botanist.

B. acerifolius, F. v. M. (*Sterculia acerifolia,* A. Cunn.) the " Flame Tree " of New South Wales, with broadly 5-7-lobed leaves and campanulate scarlet glabrous flowers; *B. populneus,* R. Br. (*Sterculia diversifolia,* G. Don) the " Kurrajong " of Eastern Australia, with leaves entire or broadly 3-lobed and flowers whitish or greenish-yellow and pubescent outside, red and yellow inside, and a hybrid form (*B. populneo-acerifolius,* F. v. M.), with the leaves of *B. populneus* and bright-red glabrous flowers, are ornamental trees frequently planted in streets and public places.

FAMILY 76.—DILLENIACEAE.

Flowers sometimes irregular, bisexual; sepals 5, persistent, imbricate; petals 5, deciduous, imbricate; stamens few or many; gynoecium of few 1-celled carpels with ascending anatropous ovules and separate styles; rhaphe ventral; seeds arillate, with crustaceous testa; embryo minute at the base of the albumen; stipules absent or minute and caducous. The family takes its name from *Dillenia*, a genus of handsome trees belonging to tropical Asia. There are 5 genera in Australia, of which 1 is represented in our State.

The allied family of the *Camelliaceae* includes many handsome evergreen shrubs, also that which produces the tea of commerce (*Camellia sinensis* (L.) O. Kuntze or *Thea sinensis*, L.).

1. HIBBERTIA, Andr.

(Named by Andrews in 1800 after George Hibbert, London merchant and patron of botany; Fellow of the Linnean Society, 1793; maintained a botanical garden at Clapham; died in 1837 or 1838.)

Petals yellow, usually obovate-cuneate, notched and slightly undulate on the upper margin; stamens 4-150, unilateral or surrounding the carpels in a ring, free or shortly united at base; anthers oblong, usually opening in 2 parallel slits; carpels 2-3; styles filiform, with minute terminal stigmas; fruiting carpels enclosed in calyx, opening along the inner suture; seeds ovoid or subglobular, usually reddish-brown, shining, more or less enclosed in the aril, which is often jagged or fringed. An almost entirely Australian genus of small shrubs, with almost sessile leaves.

A. Stamens all fertile, on one side of the 2 pubescent carpels, which usually cohere towards base.
  B. Leaves linear or oblong, rigid, with revolute margins.
    C. Leaves obtuse.
      D. Sepals silky or villous.
        Leaves with rather short hairs, 2 mm. or more broad ..... *H. sericea* 1.
        Leaves villous, 1 mm. broad ..... *H. paeninsularis* 2.
      D. Sepals pubescent or glabrous ..... *H. stricta* 3.
    C. Leaves acute, pungent ..... *H. acicularis* 4.
  B. Leaves mostly obovate ..... *H. Billardieri* 5.
A. Stamens placed all round the 3 glabrous carpels.
  E. Stamens under 40, without staminodes; carpels free; leaves linear, with incurved or involute margins.
    F. Stamens 8-12; anthers opening in terminal pores or short slits.
      Bracts 3, large, scarious ..... *H. virgata* 6.
      Bract usually 1, small ..... *H. fasciculata* 7.
    F. Stamens 25-35; anthers opening in longitudinal slits: leaves terete ..... *H. crispula* 8.
  E. Stamens 100-150, with a few staminodes outside; leaves oblong-lanceolate, with recurved margins: carpels united towards base ..... *H. glaberrima* 9.

1. **H. sericea** (R.Br.) Benth. Small procumbent or suberect shrub, 15-50 cm. high; branchlets silky-villous or velvety; leaves broad-lanceolate or oblong, subobtuse, 4-14 mm. long, 2-3½ mm. broad, with margins revolute but usually not reaching the midrib, softly stellate-tomentose on both faces and usually with some longer simple hairs on the upper face, sometimes becoming almost glabrous above; flowers terminal or on short axillary branches, sessile among dense sometimes broad floral leaves; 2 outer sepals more or less silky-villous, the 3 inner ones ovate, 6-9 mm. long; petals deeply notched, stamens 10-16; carpels 2, densely pubescent, 4-5 ovulate.—*H. densiflora*, F. v. M.

Mt. Lofty and Barossa Ranges; Kangaroo Island; Yorke and Eyre Peninsulas; Murray lands; South-East. Most of the year.—Victoria; Tasmania; New South Wales.

Var. *major*, J. M. Black. A stouter plant, larger in all parts; leaves linear-oblong, 15-20 mm. long; sepals very silky, 10-15 mm. long; stamens 10-20; carpels 6-8-ovulate —Kangaroo Island; near Port Lincoln.

Var. *scabrifolia*, J. M. Black. Leaves 4-12 mm. long, scabrous above with rather long simple stiff hairs, more cuneate towards base than in the type, the margins usually reaching the midrib and sometimes so inrolled as to conceal it and give the leaf a linear appearance; flowers closely sessile; outer sepals villous but scarcely silky, 6-9 mm. long; ovules 4-6 in each carpel: stamens 8-14.

Encounter Bay; Kangaroo Island; Murray scrub and 90-Mile Desert; near Millicent and Lake Bonney, S.E.; Streaky Bay. This is perhaps the South Australian form to which Bentham refers as "almost the same" as *H. stricta*, R.Br. var. *hirtiflora*, Benth. (*Pleurandra calycina*, A. Cunn.), an East-Australian variety or species.

2. **H. paeninsularis,** J. M. Black. Dwarf shrub with villous branches; leaves crowded, subterete, 5-8 mm. long, scarcely 1 mm. broad, villous with long white simple spreading hairs especially in the lower part, finally almost glabrous, the revolute margins concealing the under surface; flowers sessile above floral leaves; sepals acuminate, villous on back; petals slightly notched, scarcely exceeding them; stamens unilateral, 4-7; carpels 2, tomentose, 3-5 ovulate.

Coomunga, E.P.

2. **H. stricta,** R. Br. Low usually erect shrub, or the longer branches drooping; branchlets closely stellate-pubescent or almost glabrous; leaves narrow-linear, obtuse or subobtuse, 3-15 mm. long, 1-2 mm. broad, scabrous above and below with simple or stellate hairs, the margins revolute to the broad prominent midrib; flowers sessile or on peduncles 4-12 mm. long; sepals 5-8 mm. long, sparsely stellate-pubescent, inner ones ovate; petals deeply notched; stamens 4-10; carpels 2, pubescent, 4-6-ovulate.

Mount Lofty Range and foothills near Adelaide; Kangaroo Island; Murray lands and 90-Mile Desert; South-East; Eyre Peninsula. Aug.-Jan.—Eastern States and West Australia. When the peduncles are very long there is usually a small leafy bract some distance below the calyx.

Var. *glabriuscula,* Benth. Whole plant glabrous or nearly so; flowers sessile; stamens about 8.—Mt. Lofty Range; near Port Adelaide and Aldinga; Murray lands and 90-Mile Desert; Kangaroo Island; Yorke and Eyre Peninsulas.—Victoria; New South Wales; Tasmania.

Var. *canescens,* Benth. Leaves and sepals grey, with a close soft stellate pubescence; flowers sessile; stamens 10-12.—Murray lands; Flinders Range.—Eastern States. Very near some forms of *H. sericea,* but without the villous calyx.

Var. *oblonga,* J. M. Black. Leaves rather crowded, linear-oblong, 4-8 mm. long, 1½-2½ mm. broad, very scabrous above with short simple or forked hairs, stellate-hairy below with a very broad midrib; peduncles about 5 mm. long; carpels 4-ovulate.—Ravine Creek, K.I.

4. **H. acicularis** (Labill.), F. v. M., var. *sessiliflora,* J. M. Black. Low, almost glabrous procumbent shrub about 30 cm. high; leaves narrow-linear, 5-10 mm. long, under 1 mm. broad, tapering to a pungent mucro, glabrous or scabrous with minute scattered hairs above, the margins recurved and showing only the broad midrib; flowers sessile or subsessile; sepals 5-6 mm. long, glabrous; stamens 4-8; carpels 2, pubescent, 2-4-ovulate.

Mt. Lofty Range; Strathalbyn; Bundaleer; southern part of Flinders Range. Sept.-Nov.—An apparently endemic variety. The type, which inhabits the eastern States, has pedunculate flowers.

5. **H. Billardieri,** F. v. M. Slender straggling shrub; branches stellate-hairy; leaves obovate or ovate-oblong, 5-12 mm. long, 2-8 mm. broad, usually almost flat, the margin more or less recurved, scabrous with scattered stellate or short simple hairs above, minutely stellate-hairy below; midrib narrow; flowers small, on filiform peduncles which become 10-15 mm. long; sepals 4 mm. long, sparsely stellate-pubescent; petals slightly notched, about as long as calyx; stamens 4-8; carpels pubescent, 2-ovulate.—*Pleurandra ovata,* Labill., not *Hibbertia ovata,* Steud.

Kangaroo Island; Yorke Peninsula. Most of the year.—Eastern States and Tasmania.

6. **H. virgata,** R. Br. Small slender glabrous shrub; leaves oblanceolate-linear, slightly concave above, 10-30 mm. long, about 1½ mm. broad, alternate or somewhat clustered; flowers sessile; sepals oblong, about 8 mm. long, mucronate, with scarious margins and 3 broad brown bracts about ½ as long as calyx; petals 12-15 mm. long, scarcely notched; stamens 10-12, placed all round the 3 glabrous 2-ovulate carpels.

Mt. Lofty Range; Encounter Bay; Kangaroo Island. Sept.-Nov.—Victoria; New South Wales; Tasmania.

Var. *crassifolia* (Benth.), J. M. Black. Leaves 7-25 mm. long, pubescent with short curly hairs or becoming glabrous, usually very narrow and channelled above, but sometimes flattish and about 2 mm. broad; bracts glabrous or pubescent; carpels usually 2-ovulate.—*H. glandulosa,* Schlecht.; *H. fasciculata,* var. *crassifolia,* Benth.; H. *virgata,* var. *incana.* J. M. Black.—Aldinga scrub; Murray lands on both sides of the river; Kangaroo Island: South-East.

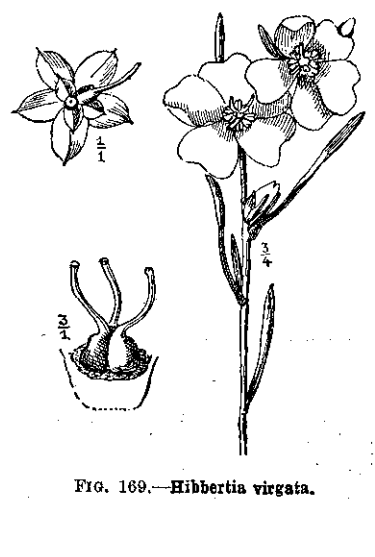

FIG. 169.—**Hibbertia virgata.**

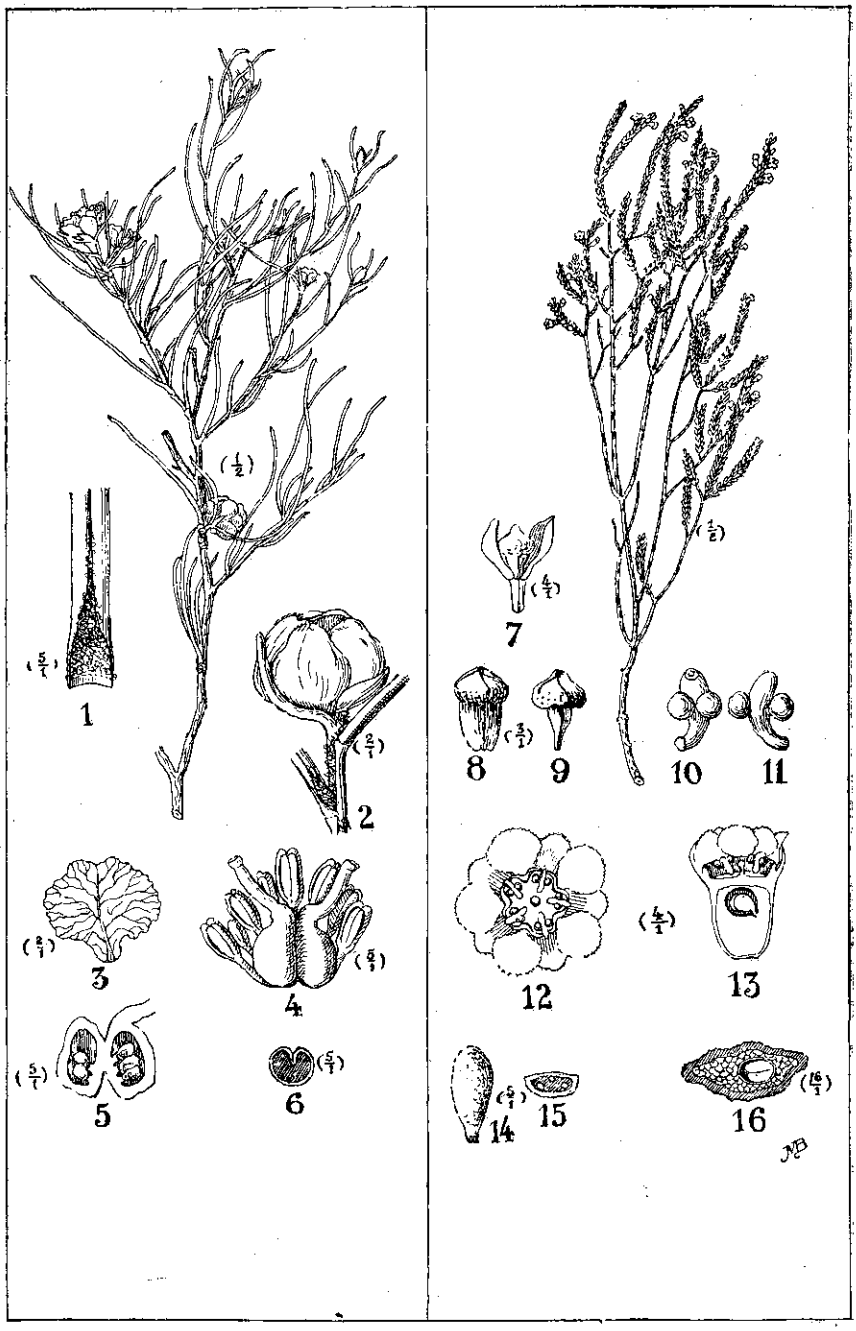

PLATE 35.—(1-6), **Hibbertia crispula ;** (7-16), **Thryptomene Elliottii.**

7. **H. fasciculata,** R. Br. Small slender procumbent shrub, with pubescent branchlets ; leaves clustered, crowded, narrow-linear, flattish above, convex beneath, 4-10 mm. long, ½ mm. broad, more or less hairy, sometimes silky-villous ; flowers sessile ; sepals ovate-oblong, mucronate 5-7 mm. long ; bracts usually 1, small, or none except a few

reduced leaves under the calyx; petals about 8 mm. long, not or scarcely notched; stamens 8-12; carpels 3, glabrous, 2-ovulate.

South-East; southern part of Kangaroo Island. Aug.-Dec.—Victoria; New South Wales; Tasmania.

Var. *pubigera*, Benth. Leaves thicker, 1 mm. broad, 5-15 mm. long, not so crowded, hoary with minute hairs, mucronulate; flowers on longer shoots; carpels with 2-4 ovules each.—Near Port Adelaide and southward towards the Grange.

8. **H. crispula,** J. M. Black. Small wiry shrub, glabrous except for a minute curly tomentum on the inner side of the leaf-base; leaves sometimes clustered, terete, 2-4½ cm. long, 1 mm. thick, 1-furrowed above by the incurved margins; flowers sessile; sepals obovate, ciliolate, 5-7 mm. long; bracts about 5, scarious, small, ciliate; petals obovate, slightly exceeding calyx; stamens 25-35; carpels 3, glabrous, 4-6-ovulate; aril fringed, as long as seed.

Sandhills, near Ooldea Soak. Most of the year.

PLATE 35 (1-6).—1, base of leaf; 2, bud; 3, petal; 4, 2 of the carpels and some stamens; 5, carpel split open; 6, transverse section of leaf.

9. **H. glaberrima,** F. v. M. (1862). Glabrous shrub; leaves lanceolate or linear-lanceolate, 3-10 cm. long, 3-12 mm. broad, tapering in lower part; flowers on peduncles 2-3 cm. long, with a linear leafy bract at base of calyx; sepals ovate, 15-18 mm. long; petals rather longer, orbicular; stamens 100-150, all round the 3 carpels, which are glabrous 6-9-ovulate: a few staminodia on the outside of the stamens.

Everard Range.—Central Australia. Owing to the union of *Candollea*, Labill. with *Hibbertia*, and the existence of *C. glaberrima*, Steud. (1844), as the name of a West Australian plant, our species was re-named *H. Muelleri Ferdinandi* by Gilg (1895). But, as *H. glaberrima*, F. v. M., represents the first application of that specific name in the genus *Hibbertia*, it cannot, under art. 53 of the international rules, be altered in favor of another species transferred to *Hibbertia* from *Candollea*.

FAMILY 77.—GUTTIFERAE.

A large family, with a gynoecium of usually 2-5 superior carpels, each with several anatropous ovules; many stamens often arranged in bundles; exalbuminous seeds and simple opposite or whorled leaves. Only 2 genera in Australia and 1 in this State.

1. HYPERICUM (Tourn.) L.

(From *hypericon*, Greco-latin name of some plants of uncertain identity.)

Sepals 5, imbricate; petals 5, twisted, yellow or orange; stamens many; filaments filiform; anthers subglobular, with a small gland at summit; carpels 3 (rarely 2 or 4), united in a superior ovary with 3 parietal intruding placentas bearing numerous ovules; styles 3, with terminal stigmas; fruit a 3-valved septicidal capsule; seeds minute, numerous, oblong, obtuse. Glabrous herbs with regular bisexual flowers and opposite entire sessile exstipulate leaves dotted with transparent oilglands.—*St. John's Wort.*

A. Petals slightly longer than sepals, without dots; stamens mostly free; capsule smooth, short.
  Erect plant; leaves stem-clasping ..... *H. gramineum* 1.
  Weak procumbent plant; leaves not stem-clasping .... *H. japonicum* 2.
A. Petals twice as long as sepals, black-dotted; stamens in bundles; capsule striate, long ..... *H. perforatum* 3.

1. **H. gramineum,** Forst. f. Perennial with erect or ascending rather rigid quadrangular stems; upper leaves oblong-lanceolate, 5-25 mm. long, stem-clasping by the broad base, with recurved margins, the lower ones smaller and ovate; flowers pedicellate in dichotomous cymes, sometimes solitary and auxillary, or only 1 terminal; sepals 5-8 mm. long; petals rather longer; stamens 20-50; ovary 1-celled; capsule smooth, scarcely exceeding the calyx, the three placentas finally separating from the valves; seeds straw-colored, ¾ mm. long, with longitudinal ribs and fine transverse lines.

Southern districts to Flinders Range and Far North; Kangaroo Island; South-East; Sept.-Jan.—Throughout Australia; New Zealand; New Caledonia.

2. **H. japonicum,** Thunb. Smaller, with slender procumbent almost terete stems; leaves ovate, flat, 4-8 mm. long; flowers fewer, often single and terminal; sepals about 4 mm. long; stamens fewer; ovary 1-celled; capsule as in the preceding; seeds ½mm. long.

Moist parts of Mount Lofty Range, such as Myponga and Square Waterhole. Summer. Victoria; New South Wales; Tasmania; New Zealand; eastern Asia.

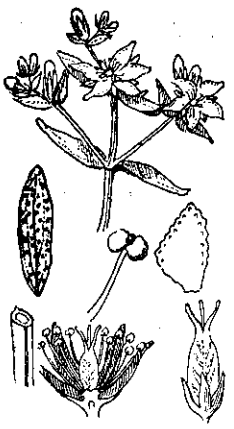

FIG. 170.—**Hypericum perforatum.**

*2. **H. perforatum,** L. Near *H. gramineum,* but the stems rather stouter, taller (to 80 cm. high), compressed-terete, with 2 opposite decurrent raised lines; leaves narrower towards base, and (like the sepals) with some black as well as transparent dots; flowers in broad corymbs; petals twice as long as calyx, with black dots along margin; stamens 50-100 in 3 bundles; ovary 3-celled by the intruding placentas; capsule twice as long as calyx, with many raised oblique linear glands; seeds golden-brown, 1 mm. long, pitted.

Mt. Lofty Range; Eyre Peninsula. Nov.-Feb.—Europe; western Asia.

FAMILY 78.—ELATINACEAE.

Flowers regular, bisexual; sepals and petals 3-5, imbricate; stamens as many, free, opposite the sepals; ovary superior, of as many cells and very short styles as there are sepals; stigmas terminal, capitate; ovules many in each cell, anatropous, on axile placentas; capsule small, more or less septifragal; seeds straight or slightly curved, oblong, obtuse, wrinkled, without albumen. Small herbs with opposite stipulate leaves.

Water-plants; sepals obtuse	ELATINE 1.
Land-plants; sepals acute	BERGIA 2.

1. ELATINE, L.

(Greco-latin name of some plant believed to be a *Linaria.*)

1. **E. gratioloides,** A. Cunn. Small creeping glabrous annual; leaves opposite, thin, ovate or oblong, 3-10 mm. long, tapering into a very short petiole; flowers minute, sessile, axillary, solitary, alternate; sepals 3, very thin but greenish, ovate; petals 3, larger, orbicular, pink; stamens 3; capsule depressed-globular, membranous, usually 3-celled, septifragal; seeds 12-50 in capsule, $\frac{1}{2}$-$\frac{3}{4}$ mm. long, straight or slightly curved, with longitudinal ribs and numerous transverse lines.—*E. americana* (Pursh) Arnott, var. *australiensis,* Benth.

Lake Bonney (River Murray); Lake Torrens; Flinders Range; swamps in South-East.—Temperate Australia; New Zealand; Fiji. *E. americana* is distinguished by having the flower-parts in 2's, not 3's.

2. BERGIA, L.

(After Dr. Petter Jonas Bergius, 1730-90, Swedish physician and botanist.)

1. **B. trimera,** Fisch. et Mey. (1836). Procumbent slender annual, almost glabrous except for spreading hairs on the stems; leaves opposite, ovate-lanceolate, 5-20 mm. long, tapering at base, glandular-serrulate; stipules lanceolate, serrulate; flowers small, shortly pedunculate in dense axillary clusters; sepals (and other flower-parts) usually 3, very rarely 4, acute, $\frac{3}{4}$ mm. long, serrulate towards summit; petals pink, oblong-ovate, about as long; stamens opposite sepals; carpels (cells) opposite petals; capsule globular, about equalling calyx, half-septifragal, *i.e.,* part of the membranous dissepiments remains attached to the central axis and part to the margins of the valves; seeds many, reddish, under $\frac{1}{2}$ mm. long, reticulate-pitted.—*B. tripetala,* F. v. M. (1858); *B. ammannioides,* Roxb., var. *triandra,* Wight (1833); var. *trimera,* Benth. (1863).

Far North and North-East, usually on soil subject to floods. Winter and spring.—Western Victoria and New South Wales; Central Australia; India.

B. ammannioides, Roxb., larger, more hairy, with flower-parts in 5's, and the carpels opposite the sepals, occurs in western Victoria and New South Wales and will probably be found in our State.

FAMILY 79.—FRANKENIACEAE.

Flowers regular, bisexual; calyx tubular, persistent, furrowed, with 5 rarely 4 valvate teeth; petals 5, rarely 4, free, with a long claw which bears an erect scale at summit, the lamina imbricate and finally spreading; stamens 4-6; ovary superior, 1-celled, with 2-3 parietal or basal placentas and few or many anatropous ovules; style filiform, with as many branches as placentas, the stigmas decurrent about half-way down the branches; fruit a small capsule enclosed in the calyx and opening in 2-3 valves between the placentas; seeds with crustaceous testa and straight embryo in the axis of the albumen. Dwarf shrubs, articulate at the nodes; leaves opposite, sometimes clustered, sessile or subsessile,

the margins slightly recurved to revolute, with stipules, each pair united at base by a membranous usually ciliolate sheath; flowers solitary, sessile, often forming cymes. A family of 4 or 5 genera, of which only one exists in Australia.

1. FRANKENIA, L.

(After Johan Frankenius, 1590-1661, professor of botany at the University of Upsala, Sweden.)

A. Placentas parietel. (Section *Toichogonia*, Niedenzu.)
  B. Placentas 3, each bearing several ascending ovules with ventral rhaphe and inferior micropyle.
    C. Leaves shortly petiolate.
      Leaves subterete, almost glabrous ..... *F. pauciflora* 1.
      Leaves obovate, hairy ..... *F. pulverulenta* 2.
    C. Leaves sessile, linear, ashy.
      Leaves flattish; erect plant ..... *F. foliosa* 3.
      Leaves subterete; creeping plant..... *F. muscosa* 4.
  B. Placentas 2-3, each bearing 1-2 pendulous ovules with dorsal rhaphe and superior micropyle; leaves sessile.
    Placentas 3, each bearing 2 ovules; leaves ovate-cordate, glabrous ..... *F. cordata* 5.
    Placentas 2-3, each bearing 1, rarely 2, ovules; leaves subterete, ashy ..... *F. fruticulosa* 6.
A. placentas basal, each bearing 1 ovule on a long funicle which is erect in the lower part, deflexed and often twisted in the upper part; micropyle superior. (Section *Basigonia*, Niedenzu.)
  Placentas 3, rarely 2; leaves petiolate, hairy .... *F. serpyllifolia* 7.

1. **F. pauciflora,** DC. Diffuse shrub scarcely 30 cm. high; branches pubescent; leaves subterete, 4-7 rarely 10 mm. long, glabrous above but sometimes white-incrusted, with revolute margins usually concealing the midrib, the petioles very short, ciliate; calyx subglabrous, 5-6 mm. long; petals pink, 5 rarely 4; stamens 6; placentas each 3-6-ovulate; seeds smooth.

In salt ground all round our coasts, and sometimes in similar situations inland, such as Lake Torrens. Summer.—Most parts of Australia.

PLATE 36 (1-6).—1, pistil; 1a, upper part of style-branch, showing stigma; 2, ovule and funicle; 3, ovary spread open; 4, transverse section of leaf; 5, seed; *rh*, rhaphe; *h*, hilum; 6, transverse section of seed: *aa*, albumen; *cc*, cotyledons,

2. **F. pulverulenta,** *L.* Small, with prostrate minutely pubescent stems; leaves obovate, flat, about 4 mm. long, tapering into a short ciliate petiole, green and glabrous above, mealy with short white scaly hairs below; calyx 4 mm. long, almost glabrous; petals violet; placentas each 8-12-ovulate.

Seashore near Port Pirie.—Victoria (Geelong); Mediterranean region; South Africa. As this plant was collected by the Baudin expedition as early as 1801 on the east coast of Australia it is probably indigenous.

3. **F. foliosa,** J. M. Black. Stems short, erect, with a dense minute pubescence; leaves in dense approximate clusters, sessile, broad-linear, 3-7 mm. long, about as long as the internodes, whitish with a thick scaly crust and minute hairs, margins revolute but midrib usually conspicuous below; calyx ovoid-oblong, 5 mm. long; petals pink; stamens 6; placentas each 8-9-ovulate; seeds papillose.

Farina (Flinders Range) to Marree. Summer.—Victoria (Sea Lake).

PLATE 36 (7-9).—7, transverse section of leaf; 8, pistil; 9, vertical section of seed.

4. **F. muscosa,** J. M. Black. Small moss-like plant, colored and clothed like the preceding; stems ascending and often rooting at nodes; leaves sessile, opposite, approximate, linear-subterete, 3 mm. long and much longer than the internodes; margins revolute, and midrib prominent; calyx 5 mm. long, obtusely 5-toothed; placentas about 5-ovulate.

Far North.—Central Australia.

PLATE 36 (19-20).—19, pair of leaves; 20, transverse section of leaf.

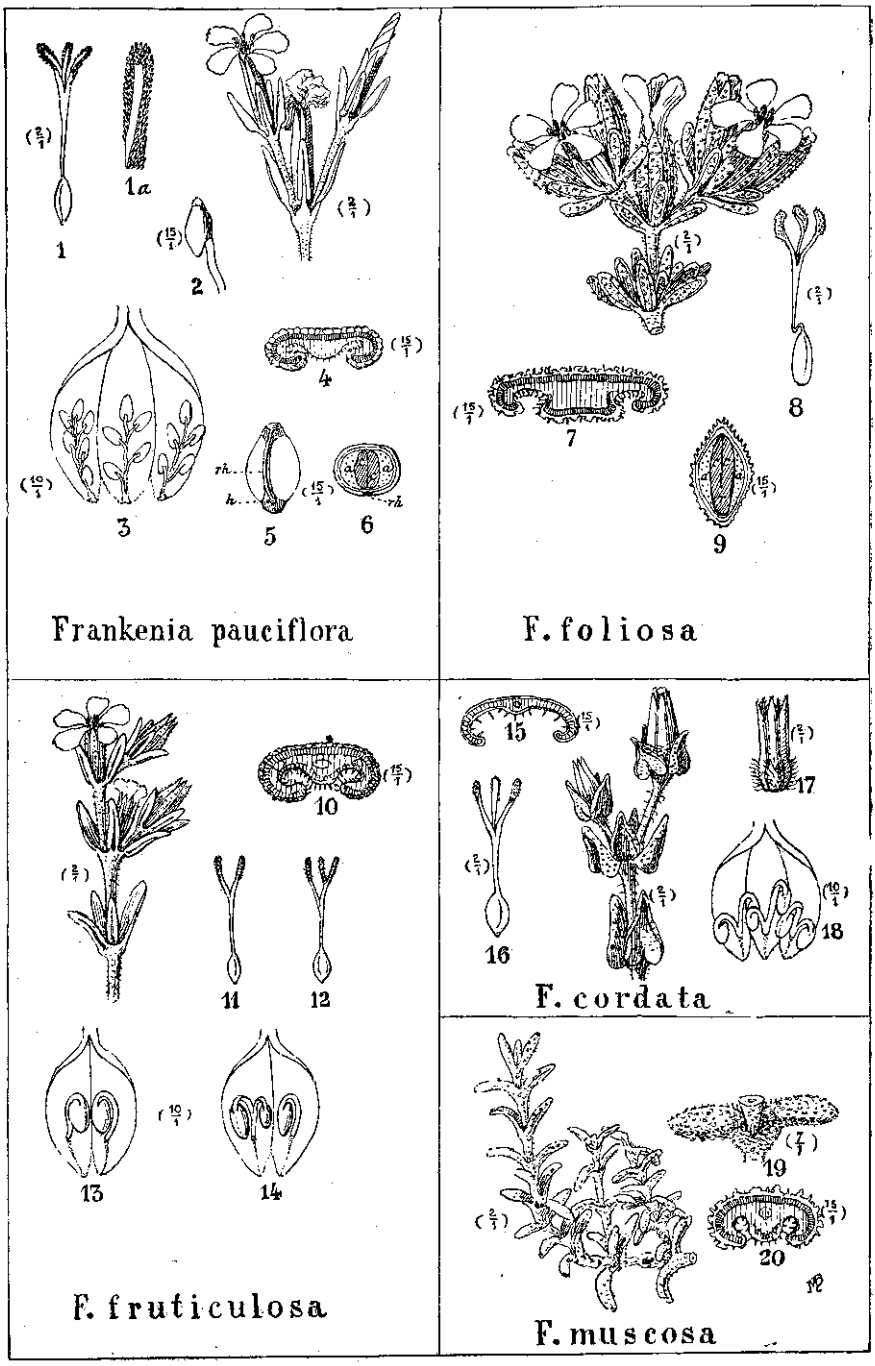

PLATE 36.—(1-6) **Frankenia pauciflora** ; (7 9) **F. foliosa** ; (10-14) **F. fruticulosa** ; (15-18) **F. cordata** ; (19--20) **F. muscosa.**

5. **F. cordata,** J. M. Black. Branches subglabrous; leaves ovate or oblong, more or less cordate at base, sessile, 4-6 mm. long, glabrous and pitted above, puberulent below, with revolute margins; calyx 6 mm. long, with spreading hairs on the ribs towards the base, glabrous above; stamens 4-6; placentas 2-ovulate.

Everard Range.—Central Australia.

PLATE 36 (15-18).—15, transverse section of leaf; 16, pistil; 17, calyx; 18, ovary spread open.

6. **F. fruticulosa,** DC. Small straggling shrub like F. *pauciflora;* leaves sessile, crowded, subterete, 2-4 mm. long, glabrous but usually white-incrusted above, the revolute margins mostly concealing the midrib; calyx puberulent, 3-4 mm. long, 4-5-toothed; petals 4-5, white; stamens 6; placentas 2, rarely 3, each with 1 rarely 2 ovules.

Ardrossan, Y.P.; Murat Bay; Franklin Islands; probably Murray lands. Summer.—Victoria (Murrayville).

PLATE 36 (10-14).—10, transverse section of leaf; 11, 12, pistils; 13, 14, ovaries spread open.

7. **F. serpyllifolia,** Lindl. Stems erect, branching, 15-30 cm. high; branches, leaves, and calyx puberulent with minute hairs to almost bristly with longer spreading hairs; leaves shortly petiolate, 3-7 mm. long, subterete with revolute margins to almost flat and ovate or ovate-oblong, midrib inconspicuous; flowers numerous in loose or compact cymes; calyx 5-8 mm. long; petals 5, bright or pale pink; stamens 6; placentas 3, basal, each with 1 ovule on a long bent funicle; seeds usually 1-2 in the capsule, transparently papillose or smooth.—*F. pauciflora,* DC. var. *serpyllifolia,* Benth.

Flinders Range to Far North, and westward to Everard Range; Lake Eyre Basin; Tarcoola; Fowler's Bay towards head of Bight and Ooldea (with rather shorter leaves and sometimes only 2 placentas). Most of the year.—Western New South Wales; western Queensland; Central Australia.

PLATE 12 (2), page 186.—7, flowering branch of broad-leaved form; 8, transverse section of leaf; 9, flowering branch of narrow-leaved form; 10, transverse section of leaf; 11, pistil; 12, ovary spread open; 13, seed and 1 valve of capsule.

FAMILY 80.—VIOLACEAE.

Flowers bisexual; sepals and petals 5, imbricate; stamens 5, subsessile, the anthers connivent round the pistil, opening inwards, the connective extended upwards beyond the anther in a membranous appendage, the connectives of the 2 lower anthers usually spurred at base; ovary superior, 1-celled, with usually 3 parietal placentas and 1-several anatropous ovules to each placenta; style simple, with a terminal stigma; fruit a small loculicidal capsule opening in 3 valves between the placentas, or rarely a berry; seeds with a straight embryo in the axis of the albumen. Herbs or shrubs with simple stipulate leaves.

A. Flowers irregular; placentas 3, each with few or several ovules; fruit a capsule; seeds with a more or less developed caruncle.	
Sepals shortly produced at base	VIOLA 1.
Sepals not produced at base	HYBANTHUS 2.
A. Flowers regular; placentas 2, with 1 ovule each; fruit a berry; seeds without caruncle	HYMENANTHERA 3.

1. VIOLA (Tourn.), L.

(Latin name for violet.)

Sepals produced into small appendages below their insertion on the peduncle; lowest petal scarcely longer than the others but pouched at base; the broad connective continued upwards behind and above the anther in a flat membranous appendage; style often bent near the base; capsule 3-valved, longer than calyx, glabrous in our native species; seeds ovoid; flowers single on long axillary 2-bracteate peduncles which are curved at summit; leaves radical or alternate on long petioles which are usually dilated in upper part.

A genus of many species inhabiting temperate countries. The Pansy is *V. tricolor,* L.

A. Stolons rooting; leaves in rosettes.	
Leaves reniform, often broader than long	*V. hederacea* 1.
Leaves rhomboid	*V. Sieberiana* 2.
A. Stolons absent; leaves lanceolate or oblong	*V. betonicifolia* 3.

1. **V. hederacea,** Labill. Usually stemless perennial, with slender stolons; leaves glabrous, reniform or suborbicular, mostly 8-15 mm. long and broader than long, entire or distantly toothed; stipules free; sepals lanceolate, 4-5 mm. long, scarcely produced

at base; petals twice as long, violet and white, the lateral ones bearded towards base inside, the lowest one scarcely pouched; style terete, not thickened towards summit; seeds brown.

South-East; Hindmarsh Valley; Kangaroo Island. The peduncles or scapes are usually not much longer than the leaves, but sometimes lengthen to 14 cm. Spring and summer.—Eastern States and Tasmania.

2. **V. Sieberiana,** Spreng. (1827). Glabrous and stoloniferous, stemless, sometimes scarcely 2 cm. high; leaves ovate-rhomboid, 5-10 mm. long, with a few coarse teeth in the upper part, tapering into the petiole; stipules free; flowers as in the preceding but smaller, the petals pale-blue or whitish, all glabrous inside; seeds white.—*V. hederacea,* Labill., var. *Sieberi,* Hook. f.; *V. Sieberi,* Hook. (1835).

Mt. Lofty and Barossa Ranges; Kangaroo Island. Spring and summer.—Victoria; Tasmania. There is sometimes a microscopic pubesence on the inside of the 4 upper petals.

The Sweet Violet of gardens (*V. odorata,* L.), distinguished by broadly cordate pubescent crenate leaves, spurred lowest petal, globular pubescent capsule and pale caruncular seeds, has established itself at Long Gully, National Park.

3. **V. betonicifolia,** Sm. Perennial, without stem or stolons, usually glabrous; leaves radical, ovate to oblong-lanceolate, mostly 3-6 cm. long, obtuse, slightly and distantly crenate; stipules adnate to petiole; sepals oblong or lanceolate, 4-6 mm. long, with a short blunt basal appendage; petals twice as long, violet, the lateral ones bearded inside, the lowest one shortly pouched; style clavate, concave at summit; seeds brownish.

Mt. Lofty Range; South-East. Spring and summer. Apparently very rare.—Eastern States and Tasmania; Asia.

2. HYBANTHUS, Jacq. (1760).

(Greek *hybos,* hump; *anthos,* flower: alluding to the pouched petal).

Sepals without any free extension at base; lowest petal much longer than the others, pouched at base; anthers with a broad membranous usually yellow appendage at summit, the 2 lower ones more or less bearded on the connective; style clavate, incurved at summit; capsule glabrous, opening in 3 rigid boat-shaped valves; seeds ovoid-globular. Herbs or shrubs, with alternate or rarely opposite subsessile leaves and narrow caducous stipules; pedicels bibracteolate at base.—*Ionidium,* Vent. (1803).

A. Small undershrubs.
  Flowers solitary, axillary ..... *H. enneaspermus* 1.
  Flowers in short racemes ..... *H. floribundus* 2.
A. Slender herb ..... *H. Tatei* 3.

1. **H. enneaspermus** (L.), F. v. M. More or less pubescent with minute spreading hairs; leaves 2-4 cm. long, narrow-linear and entire or linear-lanceolate and distantly toothed; peduncles 1-flowered, much shorter than leaf; sepals lanceolate, green, 4 mm. long; lowest petal pink, more than twice as long as sepals, with a long claw and broad lamina; seeds longitudinally striate.—*Ionidium enneaspermum* (L.), Vent.; *I. suffruticosum* (L.), Ging.

Far North from Cooper's Creek to Everard Range.—Tropical and subtropical Australia; Asia; Africa.

2. **H. floribundus** (Lindl.), F. v. M. Glabrous; leaves linear-lanceolate, 1-3 cm. long) with a small recurved mucro; peduncles shorter or rarely longer than leaves, 2-4-flowered or 1-flowered by abortion; sepals ovate, almost petaloid, 3-4 mm. long, about as long as the upper and lateral petals, which are very obtuse, almost truncate; lowest petal about twice as long, the lamina blue or streaked with violet, yellow at base, the claw more or less hairy inside; seeds tuberculate.—*Ionidium floribundum* (Lindl.), Walp.

Mt. Lofty Range to Flinders Range and westward to Fowler's Bay; Murray lands; South-East. May-Oct.—Temperate Australia.

3. **H. Tatei,** F. v. M. Slender glabrous annual; leaves distant, 5-20 mm. long, alternate or opposite, the lower ones oblong, the upper linear; peduncles longer than leaves, 2-flowered; pedicels about as long as calyx; sepals ovate-lanceolate, green, 2 mm. long, shorter than the 4 smaller petals, of which the lateral 2 are broad, oblique, with several blue streaks, the two upper ones lanceolate, with 1 blue midnerve; the lowest petal 3 times as long as sepals, with a rounded veined lamina; seeds punctulate.

Wilpena Pound (Flinders Range). Spring.—New South Wales (Moorkai Hills, north of Broken Hill). This is a *nomen nudum* of Mueller in Trans. Roy. Soc. S.A. 4: 102 (1882), with a very short description by Tate, Fl. extratrop. S.A. 19 (1890).

3. HYMENANTHERA, R. Br.

(Greek *hymên*, membrane; *anthêr*, anther: alluding to the membranous staminal tube.

1. **H. angustifolia,** R. Br. Glabrous rigid shrub, resembling *Lycium australe*, the spreading branchlets often ending in a spine; leaves oblong or oblanceolate, entire, obtuse, coriaceous, 1-2 cm. long, alternate or clustered; stipules minute, caducous; flowers small, solitary or twin, axillary, on very short peduncles with 2 bracts a little below the cup shaped calyx; sepals orbicular, under 2 mm. long; petals yellowish, equal, ovate-oblong, 3-4 mm. long, the upper part reflexed; anthers subsessile, united in an urn-shaped tube round the pistil, terminating upwards in 5 fringed appendages and with a broad erect basal scale outside behind each of the anthers; ovary with 2 placentas, each 1-ovulate; style with a 2-lobed stigma; berry purple; seeds 1-2, subglobular.—*H. dentata*, R. Br. var. *angustifolia*, Benth.; *H. Banksii*, F. v. M.

Gorge of the Onkaparinga. Oct. Apparently not collected since 1882.—Tasmania.

FAMILY 81.—THYMELAEACEAE.

Flowers regular, bisexual or dioecious; sepals 4, small, obtuse, imbricate, seated on the summit of the tubular receptacle and spreading in flower; petals absent; stamens 2-8, perigynous, inserted inside the receptacle; ovary superior, within the base of the receptacle, with 1 pendulous anatropous ovule; style simple, with a small capitate stigma; fruit (in our genera) small, indehiscent, dry and nutlike, or succulent and drupaceous. Shrubs or herbs, with opposite or alternate entire exstipulate leaves.

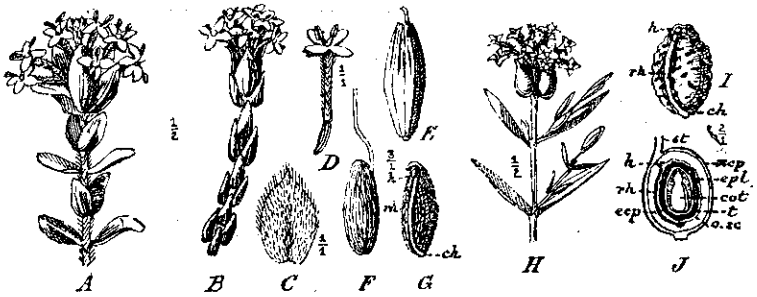

FIG. 171.—**Thymelaeaceae.** A, *Pimelea humilis.* B-G, *P. glauca;* B, flowering branch; C, inside of 2 inner bracts; D, flower; E, persistent base of receptacle, enclosing the fruit: F, nut, showing the membranous pericarp and style; G, seed, showing the hyaline outer coat covering the dark striate testa. H, *P. stricta.* I-J, *P. microcephala:* I, seed with hyaline outer coat; J, vertical section of drupe; *st*, base of style; *xcp*, exocarp; *ecp*, endocarp; *o. sc*, outer seed coat; *h*, hilum; *rh*, rhaphe *ch*, chalaza; *t*, testa; *epl*, endopleura; *cot*, cotyledons.

Stamens 2	PIMELEA 1.
Stamens 8	THYMELAEA 2.

1. PIMELEA, Banks et Sol.

(From Greek *pimelê*, fat: probably alluding to the fleshy cotyledons.)

Receptacle slender, petaloid, usually circumsciss some way below the place of insertion of the stamens and shortly above the fruit, the upper part falling off with the sepals, the lower part persistent and swollen in fruit; stamens 2, inserted near summit of the tubular receptacle or torus and opposite the 2 outer sepals; style long, slender, rising from one side of the ovary and near its summit; fruit loosely surrounded by the withered persistent part of the receptacle; pericarp greenish but soon membranous, the endocarp rarely distinct and then succulent (a drupe); seed more or less ovoid or ovoid-conical with a hyaline closely adherent outer coat which is usually curved downward at summit just above the hilum, a dark crustaceous testa and membranous endopleura; embryo straight, with fleshy mostly broad cotyledons, longer than the superior radicle; albumen usually scanty or sometimes almost absent; floral base or common receptacle usually

pubescent or villous; flowers mostly white, sometimes yellow, sessile, usually in terminal heads, surrounded by an involucre of leafy bracts.

A. Leaves all or mostly opposite.
  B. Flowers mainly bisexual.
    C. Involucral bracts 4, broader than leaves; shrubs glabrous except the inflorescence.
      D. Bracts silky inside.
        E. Leaves ovate or broad-lanceolate; 2 inner bracts ciliate; anthers with narrow connective.
          Bracts remaining silky inside; receptacle glabrous towards base ..... *P. glauca* 1.
          Bracts becoming glabrous inside; receptacle long-haired towards base..... *P. ligustrina* 2.
        E. Leaves lanceolate; heads drooping outwards; anthers with broad connective..... *P. stricta* 3.
      D. Bracts glabrous on both sides; heads drooping.
        Bracts 12-15 mm. long; connective narrow *P. spathulata* 4.
        Bracts 15-25 mm. long; connective broad . *P. macrostegia* 5.
    C. Involucral bracts 4, similar to leaves, slightly pubescent inside; branches silky; connective narrow *P. humilis* 6.
  B. Flowers mainly dioecious; bracts 2-4; flowers small; connective narrow.
    F. Flowers pubescent.
      G. Shrub glabrous except inflorescence; leaves linear, 10-12 mm. long; fruit a drupe..... *P. microcephala* 7.
      G. Shrubs with pubescent branchlets; fruit dry or almost so.
        Leaves rounded, 4-9 mm. long..... *P. flava* 8.
        Leaves lanceolate, 10-25 mm. long ..... *P. petrophila* 9.
    F. Flowers and whole plant glabrous except floral base; leaves rounded, 4-8 mm. long ..... *P. serpyllifolia* 10.

A. Leaves all or mostly alternate.
  H. Flowers mainly bisexual.
    I. Flowers in terminal spikes.
      J. Spikes long, interrupted.
        Annual; leaves linear; connective narrow.. *P. trichostachya* 11.
        Dwarf villous shrub; leaves oblong-lanceolate; connective broad ..... *P. Williamsonii* 12.
      J. Spikes short, dense; leaves linear ..... *P. simplex* var.
    I. Flowers in heads.
      K. Involucral bracts mostly 3-4.
        L. Small hairy shrubs; leaves oblong; flowers yellow; connective broad.
          Flowers 8-12 mm. long, longer than bracts *P. curviflora* 13.
          Flowers about 4 mm. long, scarcely exceeding bracts..... *P. micrantha* 14.
        L. Sparsely hairy annual; leaves linear; flowers small, white; connective narrow..... *P. simplex* 15.
      K. Involucral bracts 5-20, more or less villous; leaves oblong; connective broad.
        M. Bracts shorter than flowers.
          Bracts about 8; leaves 8-15 mm. long; flowers silky all over ..... *P. octophylla* 16.
          Bracts 5-6; leaves 4-6 mm. long; flowers glabrous at base ..... *P. phylicoides* 17.
        M. Bracts about as long as flowers.
          Bracts about 8; flowers with basal hairs as long as receptacle..... *P. villifera* 18.
          Bracts about 20; flowers silky all over.... *P. petraea* 19.
  H. Flowers dioecious; shrub with silky-pubescent leaves; connective broad ..... *P. ammocharis* 20.

1. **P. glauca,** R. Br. Small erect shrub, 10-50 cm. high, glabrous except inflorescence; leaves opposite, sometimes imbricate, ovate-lanceolate, acute, 8-15 mm. long, concave above, with midrib prominent below; involucral bracts 4, ovate, acute, 8-15 mm. long, shorter than the erect flowerhead, the 2 inner bracts silky inside and ciliate with long hairs on the margin, the 2 outer concave and keeled; receptacle 12-15 mm. long, glabrous

in lower persistent part, silky above ; floral base villous with hairs as long as fruits ; nut oblong ; testa black, finally striate longitudinally, hooked at summit. (Fig. 171, B-G.)

Southern districts ; Kangaroo Island ; Murray lands ; southern part of Flinders Range ; South-East ; Eyre Peninsula. Most of the year.—Eastern States and Tasmania.

2. **P. ligustrina,** Labill. Erect shrub, glabrous except inflorescence ; leaves opposite, spreading, flat, paler below, broad-lanceolate, 2-3 cm. long, the upper ones ovate ; involucral bracts 4, ovate, acute, 7-10 mm. long, distinctly penninerved, pubescent inside and the inner 2 with conspicuous cilia, but becoming almost glabrous under fruit, shorter than the flowerheads ; receptacle pubescent, about 12 mm. long, with longer hairs towards base ; sepals pubescent, anthers exserted on rather long filaments ; floral base with short erect hairs ; nut ovoid, bristly at summit ; testa black, smooth, shining.

South-East ; apparently rare. Summer.—Victoria ; New South Wales ; Tasmania.

3. **P. stricta,** Meisn. Erect slender shrub to 1 m. high, glabrous except inflorescence, and resembling *P. glauca* and *P spathulata ;* leaves opposite, rather narrowly lanceolate, 1-2 cm. long, usually channelled above ; involucral bracts 4, ovate-acuminate, silky-white inside, concave, 9-15 mm. long, shorter than the flowerheads, which usually droop outwards from the centre of the plant ; sepals sometimes pink ; receptacle silky-villous, the persistent base becoming almost glabrous ; floral base pubescent ; anthers almost sessile ; nut oblong ; testa black, longitudinally striate. (Fig. 171, H.)

Southern districts northward to Flinders Range ; Kangaroo Island. June-Nov.—Victoria ; New South Wales ; Tasmania.

4. **P. spathulata,** Labill. Small shrub up to 1 m. high, glabrous except inflorescence ; leaves opposite, flat, or channelled above, linear-oblong, subacute, 8-20 mm. long ; involucral bracts 4, quite glabrous, ovate, subacute, 12-15 mm. long, spreading in flower, nearly as long as the drooping flowerheads ; receptacle silky-pubescent, the longer hairs of the persistent furrowed base wearing off at maturity ; filaments short ; floral base pubescent ; nut oblong ; testa black, longitudinally striate.

Mt. Lofty Range. Sept.-Dec.—Victoria ; New South Wales ; Tasmania.

5. **P. macrostegia** (Benth.) J. M. Black. Shrub, glabrous except inflorescence ; leaves opposite, oblong-lanceolate, obtuse, 2-3 cm. long, flat or with slightly recurved margins, on a petiole about 2 mm. long ; involucral bracts 4, ovate, glabrous, thin, 15-25 mm. long, almost as long as the drooping flowerheads ; receptacle with dense silky caducous hairs outside and short hairs in the throat inside, the persistent base becoming almost glabrous ; sepals glabrous ; anthers exserted on long filaments ; floral base pubescent ; nut ovoid ; testa black, punctulate.—*P. ligustrina,* Labill., var. ? *macrostegia,* Benth.

Kangaroo Island. Oct.-Dec.

6. **P. humilis,** R. Br. Dwarf shrub, 10-20 cm. high, the stems villous and sometimes procumbent ; leaves opposite, flat, glabrous, spreading, broadly oblong or ovate-oblong, obtuse, 6-15 mm. long ; involucral bracts 4, oblong or ovate-oblong, obtuse, flattish, 10-18 mm. long, more or less pubescent inside, at least along the midrib, about as long as the flowerheads or shorter ; receptacle silky-villous, 12-15 mm. long ; anthers exserted ; floral base pubescent ; nut ovoid-oblong ; testa black, longitudinally striate. (Fig. 171, A.)

Southern districts ; Ninety-Mile Desert ; South-East. Oct.-Dec.—Victoria ; New South Wales ; Tasmania.

7. **P. microcephala,** R. Br. Glabrous shrub except the flowers, small or sometimes over 2 m. high ; leaves opposite, linear-lanceolate, 1-2½ cm. long ; involucral bracts usually 2, sometimes 3 or 4, scarcely broader than the stem-leaves and longer than the small mainly dioecious flowers ; male receptacle about 5 mm. long, silky-pubescent ; female receptacle still smaller, scarcely exceeding the ovary, pubescent, circumsciss irregularly about the middle of the fruit ; female sepals minute ; filaments short ; floral base pubescent ; fruit a small ovoid red or green drupe, with succulent endocarp ; testa black, wrinkled. (Fig. 171, I-J.)

Murray lands and north thereof ; Flinders Range and adjoining plains to Far North westward to Gawler Range and Ooldea. Throughout the year.—Dry districts of temperate Australia.

Var. *glabra,* F. v. M. et Tate. Receptacle glabrous : sepals slightly pubescent, becoming glabrous.—Everard Range to Birksgate Range. One fruiting specimen from the latter place is quite glabrous, even on the floral base, and therefore approaches closely to *P. pauciflora,* R. Br.

8. **P. flava,** R. Br. Small dichotomously branched shrub under 1 m. high; branchlets pubescent; leaves opposite, glabrous, ovate or orbicular, obtuse or subacute, 4-9 mm. long, the midrib and sometimes the lateral nerves prominent below; involucral bracts 4, like the leaves and about as long as the small mainly dioecous flowerheads, or the two lower bracts slightly removed down the branch; heads terminal or in the forks; flowers silky-pubescent; male receptacle 4-6 mm. long; female receptacle about 3 mm. long, circumsciss at summit of the ovoid fruit; testa black, striate longitudinally; floral base pubescent.

Round the coasts and inland in the southern districts, Murray lands and Eyre Penisnula. Most of the year.—Temperate Australia. In our State the flowers are white, but in the typical form, found in Tasmania and the eastern States, they are yellow.

9. **P. petrophila,** F. v. M. Near *P. flava,* but the leaves are larger, broad or narrow-lanceolate, nerved below, 1-2½ cm. long; involucral bracts 2, similar to or rather broader than the leaves and longer than the flowerheads; flowers mainly dioecious, white, silky-pubescent; male receptacle 4-5 mm. long; filaments short; female receptacle rather shorter, circumsciss above the nut.

Flinders Range. Sept.-Dec.

10. **P. serpyllifolia,** R. Br. Low spreading glabrous shrub about 50 cm. high; leaves opposite, mostly crowded, obovate or orbicular, 4-8 mm. long, coriaceous, slightly concave; involucral bracts 4, broader or nearly the same as stem-leaves, equalling the small glabrous pale-yellow more or less dioecious flowers; male receptacle 3 mm. long, funnel-shaped, the sepals ovate; female receptacle about as long, but ovoid-oblong, not circumsciss; floral base pubescent; anthers subsessile; fruit ovoid; exocarp adherent to the slightly succulent endocarp; testa of seed black, punctulate.

All round our coasts and sometimes in scrub country several miles inland. Most of the year.—Temperate Australia.

11. **P. trichostachya,** Lindl. Erect branching slender annual 20-40 cm. high, glabrous except the inflorescencem, or the young leaves slightly hairy; leaves alternate, linear, 5-15 mm. long; involucral bracts 2 or 3, leafy, caducous; flower heads globular, soon lengthening into rather loose hairy spikes 3-6 cm. long; flowers small, the receptacle 3-4 mm. long, silky-villous with long spreading hairs, the sepals yellow, very small; anthers enclosed; nut oblong-conical; testa finely striate longitudinally.

Murray lands to Far North; Eyre Peninsula. Most of the year.—Western Victoria, New South Wales and Queensland; Central Australia; West Australia (Barrow Range).

12. **P. Williamsonii,** J. M. Black. Dwarf shrub about 20 cm. high, silky-villous all over; leaves crowded, erect, oblong-lanceolate, alternate, flat, 10-15 mm. long; flower-heads at first globular and surrounded by a few small leaves or bracts, afterwards lengthening into a loose hairy spike 3-7 cm. long; flowers small, the receptacle about 4 mm. long, the oblong sepals 1 mm. long, the basal part covered with long hairs; anthers subsessile; nut ovoid; testa black, almost smooth.

Parilla. Most of the year.—Victoria (near Murrayville).

PLATE 13 (2), page 198.—5, flower; 6, upper part of circumsciss receptacle with sepals spread open; 7, pistil; 8, nut, showing pericarp; 9, the black seed covered by the transparent outer coat after removal of pericarp; 10, seed; 11, embryo; 12, transverse section of fruit: *a*, pericarp; *b*, hyaline outer coat of seed; *c*, testa; *d*, endopleura; *e*, albumen; *f*, cotyledons.

13. **P. curviflora,** R. Br. Small shrub, 30-60 cm. high, with appressed-pubescent branches, all the hairs very white; leaves alternate below, mostly opposite on the flowering branches, concave, oblong or oblanceolate, 1-2 cm. long, glabrous above, appressed-pubescent below; involucral bracts 4, shorter and broader than the leaves, pubescent outside, almost glabrous inside, shorter than the yellow pubescent polygamous flowers; receptacle 6-9 mm. long, often curved; filaments very short; floral base pubescent; nut oblong-conical; testa blackish, almost smooth.

Southern districts, including Kangaroo Island and Yorke Peninsula. July-Dec.—Victoria; New South Wales; Tasmania.

14. **P. micrantha,** F. v. M. Smaller and more densely silky; leaves rarely opposite, smaller, pubescent on both faces, 4-10 mm. long; involucral bracts 3-6, silky on both faces, about as long as the small terminal and axillary flowerheads; flowers polygamous, silky; receptacle 3 mm. long; floral base pubescent; nut ovoid-conical; endocarp hyaline: testa black, finely striate longitudinally.—*P. curviflora,* R. Br., var. *micrantha,* Benth.

Southern districts to Flinders Range; Murray scrub; Eyre Peninsula to Fowler's Bay. Most of the year.—Drier parts of Victoria and New South Wales.

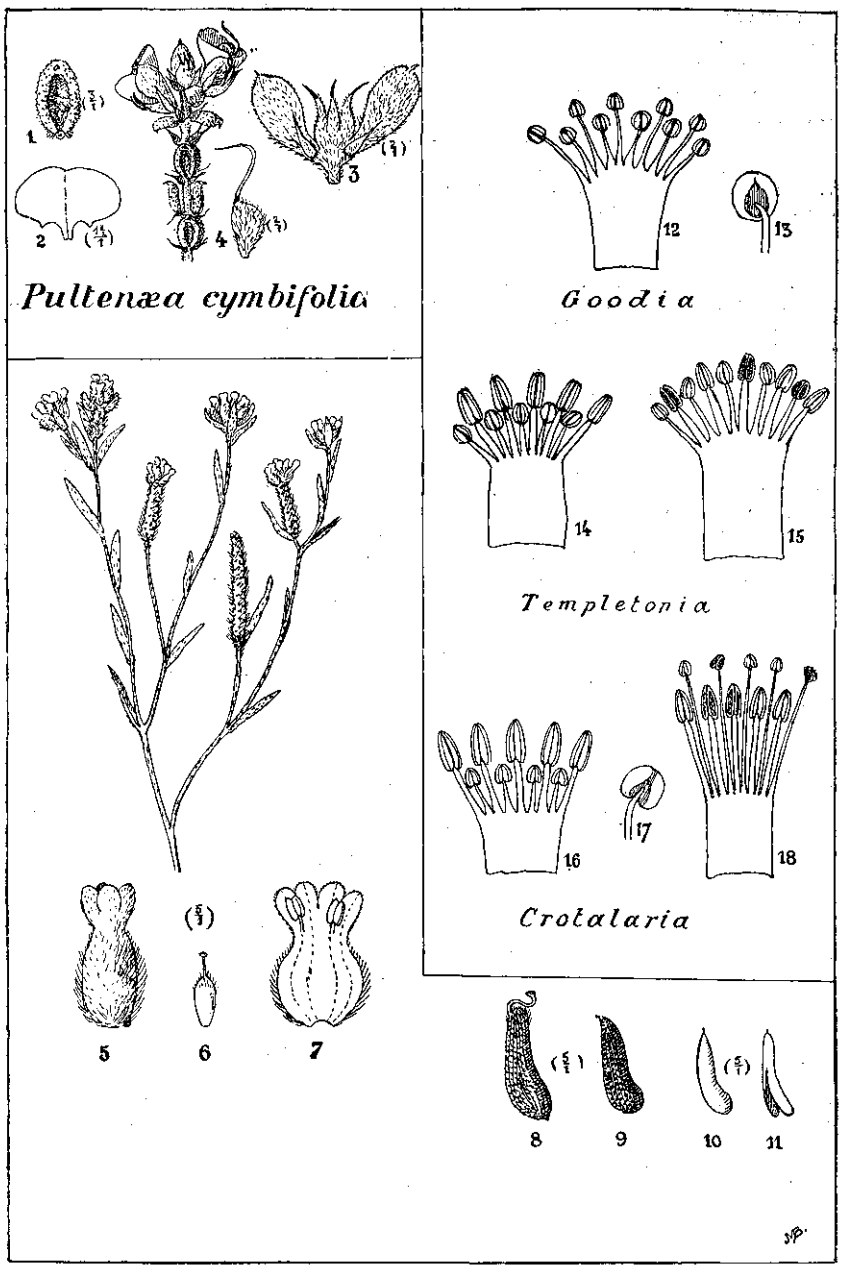

PLATE 37.—1-4, **Pultenaea cymbifolia**; 5-11, **Pimelea simplex,** var. **continua**; 12-18, **Goodia, Templetonia, Crotalaria** (stamens in bud and flower).

15. **P. simplex,** F. v. M. Erect slender annual 15-30 cm. high, with scattered appressed hairs on stems and foliage or quite glabrous except the inflorescence; leaves linear, acute, 7-15 mm. long, alternate; involucral bracts 3 or 4, leafy, caducous; flowerheads globular, small; floral base pubescent, not lengthening in fruit; flowers small, white with appressed

pubescence; receptacle 3-4 mm. long, the sepals very small, yellowish; fruit of *P. trichostachya*.

Flinders Range to Far North: westward to Gawler Range, Fowler's Bay and Ooldea. Most of the year.—Western Victoria and New South Wales.

Var. *continua*, J. M. Black. The downy floral base lengthening into a dense continuous fruiting spike 4-12 mm. long.—*P. continua*, J. M. Black.—Ketchowla (east of Hallett).

PLATE 37.—5, flower (receptacle and sepals); 6, pistil; 7, flower spread open (inner view); 8, nut, showing the membranous pericarp and curved style; 9, seed, showing the rugulose testa after removal of the adherent pericarp and hyaline outer coat; 10 smooth endopleura enclosing the embryo; 11, embryo.

16. **P. octophylla,** R. Br. Low erect shrub 30-60 cm. high, the branches at first woolly, leaves alternate, oblong, erect, 8-15 mm. long, silky-villous or becoming glabrous, with the midrib prominent below; involucral bracts about 8, like the leaves, shorter than the large drooping heads; flowers pale-yellow, silky villous; floral base villous; receptacle 8-14 mm. long; nut ovoid-conical; testa black, smooth, shining.

Southern districts; Yorke and Eyre Peninsulas; Murray lands to Bordertown. Most of the year.—Victoria; New South Wales.

17. **P. phylicoides,** Meisn. Small erect shrub, 20-40 cm. high, with villous branches; leaves opposite or alternate, oblong, mostly 4-6 mm. long, concave, crowded, appressed, rigid, sparsely villous or almost glabrous, with midrib prominent below; involucral bracts 5-6, slightly broader than leaves, shorter than the erect flowerheads; receptacle 6-7 mm. long, silky pubescent in upper part, glabrous at base and villous towards summit of part surrounding ovary; sepals lanceolate, pubescent, 3 mm. long; anthers almost sessile; floral base villous; nut ovoid; testa black, smooth, shining.

Southern districts, including Kangaroo Island; Murray lands; near Mt. Gambier. Sept.-Jan.—Victoria; New South Wales.

P. Husseyana, F. v. M., a *nomen nudum* recorded by Tate in Trans. Roy. Soc. S.A., vol. 19 (1895) is the form with almost glabrous leaves found at Mt. Compass and Encounter Bay.

18. **P. villifera,** Meisn. Silky-villous shrub; leaves alternate, crowded, appressed, concave, soft, 5-8 mm. long, oblong-lanceolate; involucral bracts about 8, like the stem-leaves, almost as long as the dense globular flowerheads; receptacle 5 mm. long, the long hairs from the basal part as long as the receptacle itself; filaments short; style exserted; nut ovoid conical; testa black, smooth.

Between Fowler's Bay and Ooldea.—West Australia.

19. **P. petraea,** Meisn. Near *P. octophylla*, but the leaves more crowded and softer and the involucral bracts 15-20; flowerheads smaller and more compact; filaments longer, so that the anthers are clearly exserted.

Flinders Range; Gawler Range.—Western New South Wales.

20. **P. ammocharis,** F. v. M. Shrub under 1 m. high; leaves alternate, 6-12 mm. long, crowded, oblong, covered with a soft silvery appressed pubescence; flowerheads depressed globular, sessile, surrounded by several involucral bracts like the stem-leaves or a little broader; flowers dioecious; male receptacle 6-8 mm. long, silky villous; sepals obtuse, 2½ mm. long; anthers almost sessile; female receptacle shorter, with long, spreading silky hairs on basal part; fruit not seen.

Yaninee, E.P.—Central and northern Australia and probably in our Far North-West.

2. THYMELAEA (Tourn.) Scop.

(Greco-Latin name of the Mediterranean shrub *Daphne Gnidium*, L.).

*1. **Th. Passerina,** (L.), Lange. Glabrous annual, except the inflorescence, 20-50 cm. high; leaves alternate, linear-lanceolate, about 10 mm. long; flowers bisexual, greenish, sessile between 2 bracts, usually twin in the axils of the upper leaves and forming a long slender leafy spike; receptacle 2½ mm. long, pubescent, with 4 small ovate sepals at summit; stamens 8, inserted in 2 rows in the receptacle; nut enclosed in the receptacle; testa black, crustaceous.—*Passerina annua*, Wikstr.

Near Strathalbyn. Summer.—Mediterranean region.

FAMILY 82.—LYTHRACEAE.

Flowers bisexual, regular; sepals 4-6, small, lobe-like, or tooth-like, often with the same number of external appendages or accessory sepals, all seated on the summit of the ribbed tubular or campanulate receptacle; petals 4-6, inserted at the summit between the sepals or absent; stamens 4-12, perigynous, inserted inside the receptacle; ovary superior, 2-3-celled, with numerous anatropous ovules on septal placentas; style 1, simple, with capitate stigma; fruit a capsule; seeds without albumen; embryo straight. Herbs with entire usually opposite exstipulate leaves.

Petals conspicuous; receptacle tubular; capsule cartilaginous, septicidal	*Lythrum* 1.
Petals minute or none; receptacle campanulate; capsule hyaline, bursting irregularly	*Ammannia* 2.

1. LYTHRUM, L.

(Greek *lythron*, gore: a name attributed to some plant by Dioscorides).

Receptacle tubular, 8-12-ribbed; sepals 4-6, much shorter than receptacle, alternate with 4-6 external appendages; petals 4-6; stamens as many or twice as many; ovary 2-celled; capsule oblong, enclosed in the persistent receptacle, splitting septicidally at summit; flowers subsessile; leaves sessile.

A. Rather large-flowered perennials.	
Leaves opposite; flowers clustered	*L. Salicaria* 1.
Leaves alternate; flowers solitary	*L. flexuosum* 2.
A. Small-flowered procumbent annual	*L. Hyssopifolia* 3.

1. **L. Salicaria,** L. *Purple Loosestrife.* Erect pubescent perennial, rarely subglabrous, 50 cm. to 1 m. high; leaves lanceolate, opposite, slightly stem-clasping, 2-5 cm. long; flowers clustered in the axils of leafy bracts forming a long terminal spike; receptacle 5 mm. long, with 5-6 short sepals at summit and 5-6 longer subulate outer appendages (about 2 mm. long); petals 5-6, blue or purplish, about 8 mm. long; stamens usually 12, 6 longer than the others.

Marshes at Myponga and other moist spots in the Mount Lofty Range; probably also in the South-East. Summer.—Temperate Australia except the West; Europe; western and northern Asia; Africa; North America.

*2. **L. flexuosum,** Lag. (1816). Glabrous perennial, with stems creeping and then ascending; leaves as in the following; flowers solitary in the axils; receptacle 7-8 mm. long, much constricted in the lower half; sepals 6, broad, membranous, with 6 outer appendages of about the same length; petals 6, purplish, as long as the receptacle; stamens 12, 6 of them exserted.—*L. Graefferi,* Ten. (1819).

Moist places near McLaren Vale. Summer.—Mediterranean region.

3. **L. Hyssopifolia,** L. *Lesser Loosestrife.* Glabrous procumbent or ascending annual; leaves mostly alternate, oblong or linear-lanceolate, 5-25 mm. long; flowers solitary, in most of the axils; receptacle about 3 mm. long, in fruit 4-6 mm. long, with 4-6 broad membranous sepals and 4-6 longer green lanceolate outer appendages; petals 4-6, blue, red, or purplish, about half as long as the receptacle; stamens 4-6, enclosed.

Near streams or in flooded places throughout the State. Summer.—Temperate parts of Australia and of the world.

2. AMMANNIA (Houston), L.

(After Johannes Ammann, 1707-42, German botanist, Fellow of the Royal Society of London and professor of botany at St. Petersburg).

1. **A. multiflora,** Roxb. Erect glabrous annual, 6-30 cm. high, with quadrangular stems; leaves opposite, lanceolate or oblong, 5-30 mm. long, often narrowed below the middle, but cordate-auriculate at base; flowers minute, 4-12 in short axillary dense or rather loose cymes; receptacle campanulate, 1 mm. long, globular and membranous in fruit, crowned by 4 small broad sepals; stamens 4, inserted in the receptacle; petals 4, minute, obovate; style ½-1 mm. long; capsule globular, hyaline, 1½-2 mm. diam., 2-celled, exceeding the sepals, splitting transversely and irregularly, with numerous seeds.

Moist places along the River Murray and in the Far North. Throughout the year.—Eastern States and central Australia; Asia and northern Africa.

Rotala occultiflora, Koehne, var. *Leichhardtii,* Koehne, a small annual with filiform sometimes simple stems 3-5 cm. long, has been found south and west of the MacDonnell Range and may have been overlooked in our Far North or North-West. Leaves opposite, oblong-lanceolate, obtuse, 3-6 mm. long; flowers small, solitary in the axils, subsessile

between 2 lanceolate herbaceous bracteoles often twice as long as the cupshaped membranous receptacle, which is scarcely 1 mm. long and is surmounted by 5 minute tooth-like sepals; petals none; stamens 2-3; stigma subsessile; capsule membranous, scarcely exceeding the receptacle, 3-valved, with several seeds.—*R. verticillaris*, Tate non L.—Also in Queensland. Our few specimens show no lower leaves whorled in 3's and 4's, as described by Koehne. *Rotala* L. differs from *Ammannia* in the solitary flowers and septicidal capsule finely and transversely striate under the lens.

FAMILY 83.—MYRTACEAE.

Flowers bisexual, regular; sepals and petals 4-5, usually imbricate, inserted at the summit of the cylindrical or cup-shaped receptacle; in *Eucalyptus* they are united to form a double cap, which covers the stamens in the bud; stamens perigynous or epigynous, numerous or rarely few, inserted near the summit of the receptacle; anthers usually dorsifixed and versatile; ovary inferior, more or less adnate to the receptacle, 2-10-celled with axile placentas, or sometimes 1-celled, each placenta bearing 1-several anatropous or campylotropous ovules; style 1, with a small terminal stigma; fruit usually a capsule adnate to the receptacle and opening loculicidally at the summit, rarely succulent or an indehiscent nutlet; seeds without albumen; embryo straight or curved. Trees or shrubs with simple entire often aromatic leaves, coriaceous or rigid, dotted with small resinous immersed glands; stipules none or rarely minute and caducous. Where the word "fruit" is used in the descriptions, it includes the adherent receptacle. *Myrtle Family.*

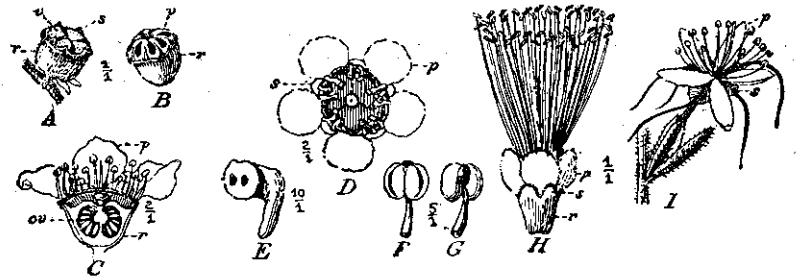

FIG. 172.—**Myrtaceae.** A, fruit of *Leptospermum myrsinoides*. B, fruit of *L. coriaceum*. C, vertical section of flower of *L. scoparium*. D, flower of *Baeckea Behrii*, viewed from above. E, stamen of same. F, stamen of *B. crassifolia* (front view). G, back view of same, showing red gland. H, flower of *Callistemon rugulosus*. I, flower of *Calythrix tetragona*. Abbreviations: *r*, receptacle; *ov*, ovary; *s*, sepal; *p*, petal; *v*, valve.

A. Fruit a 3-10-celled capsule (succulent in 1 species of *Kunzea*); placentas axile. (Tribe *Leptospermeae*).
  B. Flowers solitary, sessile or subsessile in the axils of leaves or bracts; petals free, orbicular; shrubs.
    C. Stamens not exceeding the petals; anthers with a terminal gland
      Leaves opposite; anthers opening by slits or pores ..... BAECKEA 1.
      Leaves alternate; anthers opening by slits . LEPTOSPERMUM 2.
    C. Stamens longer than petals; anthers dorsifixed, opening by parallel slits.
      D. Stamens all free.
        Sepals persistent; flowers in heads ..... KUNZEA 3.
        Sepals deciduous; flowers in spikes ..... CALLISTEMON 4.
      D. Stamens connate in 5 bundles opposite the petals MELALEUCA 5.
  B. Flowers in mostly axillary umbels; sepals and petals united in the shape of a cap; chiefly trees .... EUCALYPTUS 6.
A. Fruit 1-celled, indehiscent, nut-like; placenta lateral or rarely basal; mostly slender heath-like shrubs. (Tribe *Chamaelaucieae*).
  E. Style bearded towards summit; stamens 10, in 1 row, alternating with as many staminodes; receptacle cylindrical; petals ovate, white; anthers globular, opening in pores; leaves opposite.
    Sepals entire ..... DARWINIA 7.
    Sepals with 1-6 long hairs at summit ..... HOMORANTHUS 8.

E. Style glabrous; ovary with a broad or narrow layer of rather loose tissue between its outer wall and its inner one, which encloses the ovules .....
F. Stamens 5, without staminodes; anther-cells distinct, almost globular, opening by short often divergent slits; petals orbicular; receptacle more or less cupshaped.
Stamens opposite petals ..... MICROMYRTUS 9.
Stamens alternate with petals ..... THRYPTOMENE 10.
F. Stamens about 20, in several rows; anthers opening by parallel slits; petals oblong.
Sepals ending in a long bristle or awn; receptacle fusiform, beaked ..... CALYTHRIX 11.
Sepals obtuse, awnless; receptacle almost obconical ..... LHOTZKYA 12.

1. BAECKEA, L.

(After Dr. Abraham Baeck, Swedish naturalist and physician, 1713-95).

Receptacle cupshaped or turbinate, 2-3 mm. broad at summit; sepals 5, imbricate, broader than long and very obtuse, persistent; petals 5, orbicular, about 3 times as long as sepals, with scarcely any claw; stamens 10-15, in 1 row, inflexed in bud; ovary slightly convex at summit, 3-celled; style filiform, inserted in a depression at summit of ovary; capsule opening at summit in 3 valves, more or less protruding above the fruiting receptacle. Glabrous shrubs, with small opposite linear subsessile leaves; flowers small, axillary, white or pink.

A. Stamens 10 or 15, of which 5 are opposite the centre of the petals; filaments filiform, the connective surmounted by an ovoid gland; anthers opening by slits; receptacle reddish.
B. Stamens 10, opposite each sepal and petal; flowers stalked.
Leaves flat; peduncles bracteolate ..... *B. ramosissima* 1.
Leaves subterete, peduncles naked ..... *B. crassifolia* 2.
B. Stamens 15; flowers sessile; leaves very small .... *B. ericaea* 3.
A. Stamens about 12, none opposite the centre of the petals; leaves with a recurved point; filaments clavate; anthers opening by pores; receptacle green ..... *B. Behrii* 4.

1. **B. ramosissima,** A. Cunn (1825). Small slender diffuse shrub; leaves linear-lanceolate, thickish, flat, 3-8 mm. long; flowers solitary, axillary, with 2 broad bracteoles about the middle of the peduncle, which is 4-8 mm. long; sepals reddish, ciliolate; petals pink, 3 mm. diameter; stamens 10, the petaline ones with 5-6 minute red subulate staminodes between each filament and petal; anther-cells ovoid, with the gland prominent behind them; ovary with 3-4 ovules in each cell; capsule half-superior; seeds granular.—*B. diffusa,* Sieb. (1828).

Near Myponga and Square Waterhole (Mt. Lofty Range); Kangaroo Island. Sept.-Jan.—Victoria; New South Wales; Tasmania.

2. **B. crassifolia,** Lindl. Small slender shrub about 30 cm. high; leaves thick, plano-convex, sometimes almost ovoid, 1-2 mm. long, rarely narrow, linear and 3-7 mm. long; flowers solitary in the axils of short branchlets on peduncles 1-2 mm. long; sepals reddish; petals white or pale-violet, 2 mm. diam.; ovary with 2 ovules in each cell; stamens 10, with prominent gland. (Fig. 172, F-G).

Southern districts; Yorke and Eyre Peninsulas; Murray scrub. Spring and summer. —Western Victoria and New South Wales.

3. **B. ericaea,** F. v. M. Very near the preceeding, but the leaves, 1-3 mm. long, are even closer together on the branchlets, so as to appear imbricate; flowers sessile, with 2 or 3 scarious bracts under the receptacle; stamens 15, 5 of them opposite the centre of the petals.

Kangaroo Island and probably the Murray lands.—North-western Victoria.

4. **B. Behrii** (Schlecht.) F. v. M. *Broombush.* Shrub 1-2 m. high, with erect branches; leaves mostly erect, subterete, 3-7 mm. long, with a recurved point; flowers 1, rarely 2, on a peduncle finally almost as long as the leaf, articulate and bearing 2 linear caducous bracteoles a little below the flower; petals white, 3-4 mm. diam.; stamens

about 12, irregularly disposed, mostly opposite the sepals; filaments clavate; anther-cells appearing almost as one, opening in 2 terminal pores; ovary almost flat-topped, with 12-15 ovules in each cell; style very short. (Fig. 172, D-E).

Rare in the southern districts; Murray lands to Bordertown; Eyre Peninsula. Sept.-Dec.—Dry parts of temperate Australia.

2. LEPTOSPERMUM, Forst et f.

(Greek *leptos*, slender; *sperma*, seed: alluding to the narrow seeds.)

Receptacle cupshaped; sepals 5, scarious, whitish, usually deciduous; petals 5, white, orbicular, longer than sepals; stamens numerous, short, in a single row, free; anthers dorsifixed, the connective with a small globular gland; ovary 4-10-celled, with numerous ovules in each cell on peltate axile placentas; style filiform, inserted in a depression at summit of ovary; capsule opening at the broad summit, more or less protruding above the woody fruiting receptacle; seeds narrow-linear, many sterile, the fertile ones broader and narrowly winged. Shrubs with small rigid entire subsessile leaves; flowers sessile or subsessile, solitary and axillary, or 2 or 3 together at the end of short branchlets, each flower surrounded by several broad scarious imbricate caducous bracts.

A. Receptacle glabrous; shrubs glabrous except sometimes the young silky shoots.
- Ovary 3-8-celled; leaves oblanceolate, flat..... *L. coriaceum* 1.
- Overy 5-celled; leaves lanceolate, concave ..... *L. scoparium* 2.

A. Receptacle pubescent or silky; ovary 4-5-celled.
- Receptacle and leaves silky; sepals rather large ... *L. pubescens* 3.
- Receptacle with appressed shining hairs; leaves glabrous; sepals minute ..... *L. myrsinoides* 4.

1. **L. coriaceum** (F. v. M.) Cheel. *Green Tea-tree.* Glabrous shrub; leaves coriaceous, rigid, obscurely 1-3-nerved, oblanceolate or oblong-cuneate, acuminate, 8-25 mm. long; sepals triangular, pubescent inside; receptacle glabrous; capsule 5-7 mm. across, convex at summit and nearly half-superior, 3-8-celled. (Fig. 172, B.)—*L. laevigatum* (Gaertn.) F. v. M., var. *minus*, F. v. M.

Murray lands: Yorke and Eyre Peninsulas and westward to Ooldea. Most of the year.—North-western Victoria and Western New South Wales.

L. laevigatum (Gaertn.) F. v. M., which differs in broader ovate-oblong leaves, and the capsule 7-10-celled, rather broader and scarcely protruding beyond the receptacle, is a rare shrub at Pt. Elliot and Victor Harbor and probably an escape. It is the common tea-tree round the shores of Port Phillip and is also found on the coasts of Tasmania and New South Wales.

2. **L. scoparium,** Forst et f. *Tea-tree.* Rigid glabrous shrub, mostly 1-2 m. high; leaves crowded, broad- or narrow-lanceolate, rigid, concave, pungent-pointed, 10-15 mm. long, often spreading; receptacle and sepals glabrous, the latter ovate; capsule 6-7 mm. across, 5-celled, protruding above the receptacle.—*L. floribundum* (Ust. et Roem.) Salisb.

Southern districts, chiefly in the Mt. Lofty Range; Kangaroo Island; South-East. Most of the year.—Temperate eastern Australia: New Zealand ("manuka"). The early colonists are said to have used the leaves as tea.

3. **L. pubescens:** Lamk. *Silky Tea-tree.* Tall shrub, usually 4-5 m. high, with pubescent branchlets; leaves obovate-oblong, elliptical or almost linear, acute or mucronate, 6-15 mm. long, hoary with a silky pubescence which gives the plant a greyish appearance; receptacle silky or woolly; sepals triangular, silky or shortly pubescent outside, 3 mm. long and as long as the receptacle; capsule 6-8 mm. across, 5-celled, the valves protruding above the receptacle.—*L. lanigerum* (Ait.) Sm. partly.

Near water, Mt. Lofty Range; Kangaroo Island; South-East. Oct.-Jan.—Western Victoria and New South Wales. Leaves narrower and more silky and flowers smaller than in the true *L. lanigerum*, which inhabits eastern Australia.

4. **L. myrsinoides,** Schlecht. Small shrub, 1-1½ m. high, glabrous except sometimes the young shoots pubescent; leaves oblanceolate, rigid, concave, 4-10 mm. long; flowers numerous, mostly terminating very short branchlets; receptacle white with appressed silky pubescence; sepals much shorter (scarcely 1 mm. long), glabrous; capsule 4-sometimes 5-celled, scarcely protruding. (Fig. 172, A.)

Southern districts including Kangaroo Island; Ninety-Mile Desert to South-East. Sept.-Dec.—Victoria: New South Wales.

3. KUNZEA, Reichb.

(After Gustav Kunze, 1793-1851, German botanist, entomologist and physician, who wrote principally on the ferns.)

1. **K. pomifera,** F. v. M. Almost glabrous shrub, the stems prostrate, sometimes rooting; leaves alternate, stiff, glabrous, ovate or orbicular, about 5 mm. long, with a recurved mucro; flowers few, sessile, in dense terminal heads; bracts broad, pubescent, caducous; receptacle pubescent, ovoid and 3-4 mm. long in flower; sepals 5, triangular, green, pubescent, much shorter; petals, 5, orbicular, white, scarcely exceeding the sepals; stamens numerous, in 2 or 3 rows, the anthers dorsifixed, with a small gland on back, the white filaments 4 times longer than the petals; ovary 3-celled, with numerous ovules in each cell on a peltate placenta; receptacle globular and succulent in fruit, about 8 mm. diam., crowned by the small persistent sepals.

Mostly along the coasts of St. Vincent's Gulf, Kangaroo Island, and the South-East; also in the Finniss Scrub and 90-Mile Desert. Summer.—Western Victoria. The berries, called "muntries" in Victoria, are used for making tarts.

4. CALLISTEMON, R. Br.

(From Greek *kallos,* beauty; *stémón,* a stamen.)

Receptacle campanulate; sepals 5, imbricate, ovate, more or less scarious, deciduous; petals 5, orbicular, longer than sepals; stamens numerous, much longer than petals, in 3 or 4 rows, free; anthers dorsifixed, without glands; ovary 3-celled, pubescent at summit, with numerous ovules in each cell; style as long as stamens; fruiting receptacle hard and woody, closely sessile on branch, enclosing the sunken capsule, which opens at summit; seeds linear. Mostly tall shrubs, with alternate narrow entire coriaceous leaves; flowers showy, closely sessile in dense cylindrical or oblong spikes, at first terminal, but the rhachis soon growing out into a leafy shoot, the buds usually enclosed in large scarious caducous bracts; flowers and stamens spreading horizontally from the rhachis of the spike, the whole inflorescence thus resembling a *bottle-brush,* the name popularly given to the genus, which is purely Australian.

A. Leaves lanceolate, 3-6 mm. broad; filaments glabrous.
  Filaments crimson, about 20 mm. long ..... *C. rugulosus* 1.
  Filaments pale, about 8 mm. long ..... *C. salignus* 2.
A. Leaves terete.
  Filaments about 18 mm. long, hairy towards base.. *C. teretifolius* 3.
  Filaments about 7 mm. long, glabrous ..... *C. brachyandrus* 4.

1. **C. rugulosus,** DC. (1828). *Scarlet Bottle-brush.* Shrub 1½-4 m. high, glabrous except the young silky leaves; leaves narrow-lanceolate, tapering at both ends, 2-6 cm. long, 3-5 mm. broad, rigid, pungent-pointed, prominently or faintly glandular-tuberculate on one or both faces, the midrib and margins thickened; flower-spikes 5-10 cm. long; rhachis and flowers sometimes pubescent at first, but becoming glabrous; receptacle about 4 mm. long; petals about 5 mm. diam., pink or pale; stamens 15-25 mm. long, the filaments crimson, the anthers yellow; fruit globular-truncate, 6-9 mm. broad.—*C. coccineus,* F. v. M. (1859).

Southern districts to southern part of Flinders Range; Kangaroo Island; 90-Mile Desert to Naracoorte; Yorke Peninsula. Oct.-Dec.

Var *laevifolius,* F. v. M. Leaves smooth.—Eyre Peninsula.—*C. laevifolius* (F. v. M.) Cheel (1925).

2. **C. salignus** (Sm.), DC. Erect shrub, 2-4 m. high; leaves glabrous except the young ones, narrow-lanceolate, less rigid and pungent than in the preceding, 3-8 cm. long, 3-5 mm. broad, penninerved, the midrib and margins rather prominent; spikes 5-8 cm. long, the rachis, receptacle, and sepals at first pubescent, then glabrous; receptacle 4 mm. long; sepals pink; petals pale-green, 3-4 mm. diam.; stamens 7-10 mm. long; filaments very pale-pink or yellowish; anthers greenish-yellow; fruit ovoid-truncate, 4-5 mm. broad.

Var. *australis,* Benth. Rhachis and flowers glabrous from the first.—*C. paludosus* (Schlechtd.) F. v. M.

Creeks and gulies in Mt. Lofty and Barossa Ranges. Summer.—Temperate Australia except the West.

3. **C. teretifolius,** F. v. M. Glabrous shrub, except on the young leaves; leaves terete, rigid, 5-12 cm. long, 1½ mm. diam., pungent-pointed; spikes 5-7 cm. long; rhachis and flowers glabrous or pubescent; receptacle 4 mm. long; petals 4 mm. diam.; stamens 15-20 mm. long; filaments crimson, bearded towards base; anthers purple; fruit globular, about 7 mm. diam.

Flinders Range from Crystal Brook northwards to Wilpena. Oct.-Dec.

4. **C. brachyandrus,** Lindl. Shrub with the young leaves silky; adult leaves glabrous, terete, rigid, pungent-pointed, 2-3½ cm. long, 1 mm. diam., 1-furrowed above; spikes about 3 cm. long, the rhachis and flowers pubescent, becoming glabrous; receptacle 3 mm. long; petals greenish, 4 mm. diam.; stamens 6-8 mm. long; filaments red or pink; anthers yellow; fruit globular, 6-7 mm. diam.

Murray lands. Summer.—North-west Victoria; western New South Wales.

5. MELALEUCA, L.

(Greek *melas*, black; *leukos*, white: so-called from the black trunk and white branches of some Asiatic form of M. *leucadendron*, L.).

Receptacle mostly cupshaped or campanulate; sepals 5, usually deciduous in fruit; petals 5, orbicular, concave, longer than sepals, the claw minute in most species; stamens numerous, much longer than petals, arranged in 5 bundles opposite the petals, the lower part of each bundle consisting of the filaments united in a flat claw, the upper part consisting of the free filaments; anthers dorsifixed; ovary 3-celled, pubescent on the convex summit, with a central depression around the style; ovules numerous in each cell, usually on a peltate placenta; fruiting receptacle small, woody, closely sessile, enclosing the sunken capsule, which opens at summit in 3 valves and is occasionally separable; seeds linear-cuneate, many sterile. Shrubs or small trees, with coriaceous entire usually subsessile or rarely sessile leaves; flowers closely sessile, in heads or spikes, the rhachis usually growing out early into a leafy shoot; bracts often caducous before flowering.

A. Leaves all or almost all opposite.
  B. Filaments red, pink, or purple; flowers in heads or short spikes.
    C. Staminal claws much longer than petals; leaves narrow; fruit rounded at base; fruiting rhachis not thickened ..... *M. Wilsonii* 1.
    C. Staminal claws much shorter than petals; fruit truncated at both ends, broader than long, the rhachis thickened.
      D. Receptacle sessile by the broad flat base.
        Leaves ovate, 2-5 mm. long ..... *M. gibbosa* 2.
        Leaves oblanceolate, 4-18 mm. long ..... *M. decussata* 3.
      D. Flowering receptacle rounded at base ..... *M. decussata* var.
  B. Filaments white or whitish.
    E. Leaves with a petiole about 1 mm. long.
      F. Leaves 5-7-nerved, ovate, acute; flowers in spikes *M. squarrosa* 4.
      F. Leaves nerveless, 3-10 mm. long .....
        Flowers in axillary clusters; leaves elliptical, acuminate ..... *M. acuminata* 5.
        Flowers in terminal heads; leaves linear-lanceolate, obtuse ..... *M. halmaturorum* 6.
    E. Leaves sessile by a flat circular base, 4-6 mm. long .. *M. quadrifaria* 7.
A. Leaves all or almost all alternate.
  G. Filaments purple; leaves lanceolate, 3-nerved; flowers in heads ..... *M. squamea* 8.
  G. Filaments white or whitish.
    H. Leaves linear lanceolate; flowers in spikes.
      Leaves 5-10 mm. long; style slender, with minute stigma ..... *M. pubescens* 9.
      Leaves 15-50 mm. long; style stouter, with broad stigma ..... *M. linophylla* 10.
    H. Leaves linear, terete or subterete.
      I. Leaves 15-50 mm. long; flowers in heads; receptacle pubescent.
        Leaves with a straight point, slightly flattened ..... *M. glomerata* 11.
        Leaves with a curved point, terete ..... *M. uncinata* 12.
      I. Leaves 3-8 mm. long, obtuse; receptacle glabrous.
        Flowers in axillary or lateral clusters; fruit corky ..... *M. fasciculiflora* 13.
        Flowers in terminal heads; fruit smooth .. *M. pauperiflora* 14.

1. **M. Wilsonii,** F. v. M. Straggling shrub, 20-150 cm. high, glabrous or the young leaves pubescent; leaves decussate, linear-lanceolate, 8-15 mm. long, 1-2 mm. broad, plano-convex, obscurely 3-nerved below; flowers 2-5, in axillary or terminal subglobular clusters; bracts persistent during flowering; receptacle glabrous, cupshaped, 2½ mm.

long ; sepals lanceolate, same length ; petals 2½-3 mm. long ; staminal claw much longer than petals ; filaments 10-15, red or pink ; fruit truncate, 4 mm. across and 5-angled at summit by the persistent harbacious part of sepals, the rhachis not thickened.

Ninety-mile Desert to Bordertown. Oct.-Dec.—North-western Victoria.

2. **M. gibbosa,** Labill. Glabrous shrub 2-3 m. high ; leaves decussate, crowded, sessile, ovate, subacute, spreading, concave above, keeled below, 2-5 rarely 7 mm. long, often recurved in upper part, thick and rigid ; flowers decussate in heads which soon become short spikes ; receptacle 1½ mm. long, 2 mm. broad, flat-based ; sepals very short, almost truncate, scarious, caducous ; petals 2 mm. diam. ; staminal claws much shorter than petals, the filaments purple or pink, 15-20 ; fruits 5 mm. broad towards base, slightly immersed in the thickened woody rhachis, so as to form cylindrical spikes about 2 cm. long.

Kangaroo Island ; South-East. Summer.—Victoria ; Tasmania.

3. **M. decussata,** R.Br. Closely allied to the preceding ; the flowers with the same broad flat base, and differing chiefly in the leaves, which are oblanceolate or linear, nerveless or faintly 1-3-nerved, concave above, 4-18 mm. long, 1-3½ mm. broad, usually erect.

Mt. Lofty Range to Encounter Bay ; Eyre Peninsula. Summer.—Victoria.

Var. *ovoidea,* J. M. Black. Flowering receptacle rounded at base, but later becoming flattened and broad as in the type ; sepals green except the scarious margin ; leaves oblanceolate or sometimes almost obovate, 3-8 mm. long, 2-3½ mm. broad.—Encounter Bay ; Goolwa ; southern Yorke Peninsula ; Kangaroo Island ; South-East. This is a connecting link with *M. gibbosa,* but although some of the leaves are almost as small as those of that species, there are always others on the same plant which are longer and narrower and the texture is thinner.

4. **M. squarrosa,** Donn. *Bottle-brush Tea-tree.* Erect shrub of 3-5 m. high, glabrous or the young shoots pubescent ; leaves mostly opposite, ovate, acute, rigid, 5-7-nerved, spreading, 7-10 mm. long, 5-7 mm. broad ; flowers in cylindrical spikes, at first terminal, or sometimes growing below the ends of the branches, 2-4 cm. long ; rhachis pubescent ; bracts leafy ; receptacle cupshaped, 2½ mm. long ; sepals short, green, obtuse ; petals white, 1½ mm. long ; staminal claw much shorter than petals, with 7-12 white filaments, drying pale-yellow ; anthers oblong ; fruits subglobular, 4 mm. broad, forming a rather dense spike.

Swamps in the South-East to north of Naracoorte ; Kangaroo Island ; also recorded from Square Waterhole. Summer.—Victoria ; New South Wales ; Tasmania.

5. **M. acuminata,** F. v. M. Glabrous shrub. 1-2 m high, with ashy rather rough bark and slender branches ; leaves mostly opposite and decussate, lanceolate or elliptical, flat, acuminate, 5-10 mm. long, 2½-4 mm. broad, conspicuously black-dotted ; flowers 3-5, in axillary or lateral clusters on the previous year's branches ; receptacle campanulate, 2½-3 mm. long ; sepals deltoid, green ; petals pink or white, about 2 mm. long ; staminal claws slender, longer than petals, each with 9-16 white filaments ; fruits ovoid-truncate, about 3 mm. broad.

Eastern part of Mt. Lofty Range to Lake Alexandrina ; Murray scrub ; Yorke and Eyre Peninsulas ; Kangaroo Island. Sept.-Nov.—Drier parts of temperate Australia.

6. **M. halmaturorum,** F. v. M. Glabrous shrub or tree, 2-7 m. high, with white papery deciduous bark ; leaves decussate, crowded, linear-lanceolate, obtuse, thick, almost flat, 3-7 mm. long, 1-2 mm, broad, nerveless, slightly recurved in upper part, often glandular-tuberculate ; flowers few or many in terminal heads, the rhachis pubescent ; receptacle cupshaped, 2-3 mm. long ; sepals green, lanceolate, equalling the receptacle ; petals white, 2½-3 mm. long ; staminal claw shorter than petal, with 8-12 white filaments : fruits few together, ovoid-truncate, 4-5 mm. across.—*M. pustulata,* Benth. partly, not of Hook. f.

Near salt or brackish water along the coast from Beachport to Victor Harbor, Glenelg, Port Lincoln and Port Elliston, rarely inland. Oct.-Dec.—Western Victoria. The specific name—"of the kangaroos"—was given on account of the type being found on Kangaroo Island.

PLATE 38.—1, flower ; 2, petal ; 3, leaf ; 4, fruiting branch ; 5, vertical section of fruit ; 6, transverse section of fruit ; 7, 3-celled capsule ; 8, an old tree, about 7 m. high, growing beside the Patawalonga Creek, Glenelg.

7. **M. quadrifaria,** F. v. M. Almost glabrous shrub, only the flowering branchlets thickened and pubescent ; leaves quite sessile, decussate, crowded, linear, acute, plano-convex, 4-6 mm. long, scarcely 1 mm. thick, almost peltately affixed at base and leaving a conspicuous circular scar on the branch after falling ; flowers about 15 in a terminal head ; receptacle campanulate, 3 mm. long ; sepals deltoid, short ; staminal

claw about as long as petal, bearing 7-11 white filaments; fruits globular, 3 mm. diam., forming a dense globular cluster.

Near Eucla.—West Australia.

PLATE 39.—(1-4). 1, flowering branch; 2, fruiting branch; 3, under-surface of leaf, showing the oblique orbicular base; 4, transverse section of leaf.

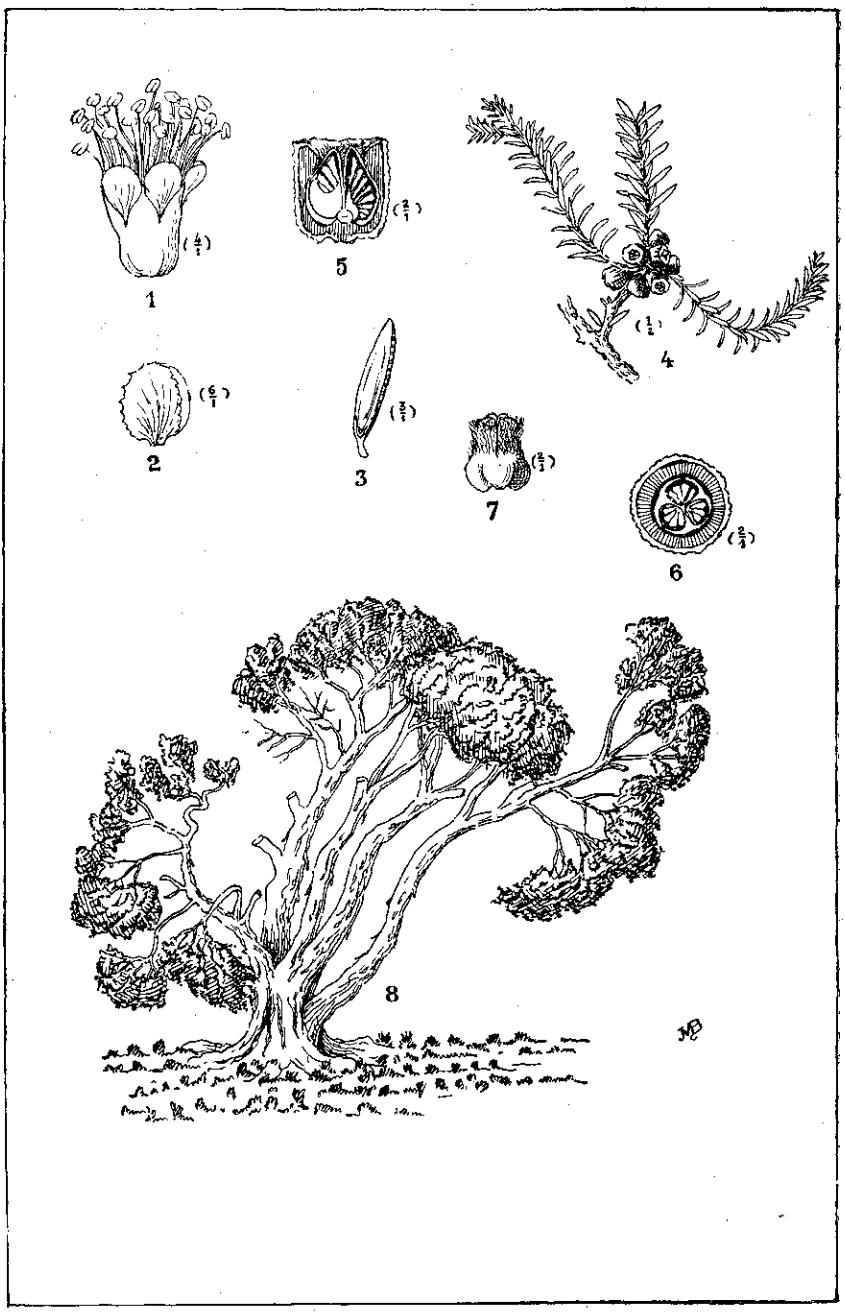

PLATE 38—**Melaleuca halmaturorum.**

8. **M. squamea,** Labill., var. *glabra,* Cheel. Glabrous shrub or the young shoots villous; leaves alternate, crowded, spreading, lanceolate, incurved towards summit, 3-nerved, 4-8 mm. long; flowers in small terminal heads, the rhachis silky, the bracts broad, 3-nerved and persistent during flowering; receptacle about 3 mm. long, campanulate, glabrous; sepals short, deltoid, green; petals purple, 2 mm. diam.; staminal claw much shorter than petal, with 5-7 purple or pink filaments; fruits almost urn-shaped, 6-7 mm. broad, in a dense globular cluster.

Myponga and Mt. Compass (Mt. Lofty Range); Kangaroo Island; between Mt. Gambier and Glencoe, S.E. Oct.-Dec.—Victoria; New South Wales; Tasmania. The type, found in the eastern States, has the receptacle villous.

9. **M. pubescens,** Schau. (1843). *Black Tea-tree.* Shrub or small tree, 3-6 m. high, with rough brown bark, glabrous or the young shoots pubescent; leaves alternate, flat, mostly spreading and recurved, thick, rigid, obscurely 1-3-nerved, linear-lanceolate, 5-10 mm. long, 1-2 mm. broad (in South-Eastern forms 3 mm. broad); flowers in loose leafy cylindrical spikes 2-4 cm. long, the flowering rhachis pubescent or almost glabrous; receptacle ovoid, 3 mm. long, glabrous or very rarely pubescent; sepals deltoid, obtuse, green, short; petals white, about 2 mm. long, with a more conspicuous claw than usual; staminal claw shorter than petal, with 8-12 white filaments; fruits globular or ovoid, 4-5 mm. broad.

Southern districts to Flinders Range; Kangaroo Island; Murray lands and north thereof; Yorke and Eyre Peninsulas; westward to Ooldea and Fowler's Bay; South-East. Chiefly spring and summer.—Victoria; New South Wales. *M. pubescens* was collected by Allan Cunningham in 1817 on the New South Wales or Victorian coasts. *M. parviflora,* Lindl. (1839) non Otto (1822) and *M. Preissiana,* Schau. (1844), both of which names have been applied to our plant, were described from West Australian specimens and appear, according to L. Diels and W. V. Fitzgerald, to represent a different tree with smooth greyish paper-bark.

M. armillaris, Sm., var. (?) *tenuifolia,* Benth. (*M. cylindrica* R. Br.) is recorded by Bentham for Kangaroo Island, apparently in error. The original label shows that the "Dunk River," mentioned in Fl. Aust. 3: 146, should be "Duck River," probably the locality of that name near Parramatta, N.S.W.

10. **M. linophylla,** F. v. M. Tall glabrous shrub, with slender greyish branches; leaves alternate, linear-lanceolate, flat, narrowed at both ends, 1½-5 cm. long, about 2 mm. broad, obscurely 1-nerved; flowers in rather loose spikes of 2-2½ cm. long, below the ends of the branchlets, the glabrous rhachis often growing out rapidly; receptacle sessile by a broad base, glabrous, 1½ mm. long; sepals deltoid, green with a narrow scarious border, about ½ mm. long, pubescent inside, more or less persistent; petals 2 mm. long; staminal claw longer than petals, with about 15 filaments pinnately arranged from near base of claw; fruits in a loose spike, subglobular or ovoid-truncate, 2-3 mm. thick. —*M. trichostachya,* Tate non Lindl.

Northern part of Flinders Range to north of Cooper's Creek. Summer.—Tropical Australia. This should probably include *M. dissitiflora,* F. v. M., as suggested by Bentham.

11. **M. glomerata,** F. v. M. (1859). A "white tea-tree," with whitish papery bark; leaves alternate, hoary-pubescent or becoming glabrous, linear, sometimes almost terete but always more or less flattened, 1½-5 cm. long, obscurely 1-grooved below, 1-2½ mm. broad, mucronate or almost pungent; flowers about 12 in dense globular heads on short axillary peduncles; rhachis pubescent, growing out after flowering; receptacle cup-shaped, pubescent, 2 mm. long; sepals short, obtuse, green, pubescent; petals 1½ mm. long; staminal claw about as long as petal, with 3-8 whitish filaments; fruits globular-truncate, 2-2½ mm. broad, forming a dense globular cluster.—*M. hakeoides* F. v. M. (1866).

Flinders Range to Far North and westward to Musgrave Range. Most of the year. —Western New South Wales; Central and West Australia.

12. **M. uncinata,** R. Br. *Broombush.* Shrub with erect branches and grey papery bark, 1-3 m. high, glabrous except on the young shoots; leaves terete, with numerous immersed glands, 1½-4 cm. long, 1 mm. thick, alternate, acute and terminating in a fine usually curved point; flowers in dense globular or shortly oblong heads; rhachis pubescent; receptacle cup-shaped, 1½ mm. long, silky-pubescent; sepals very short, obtuse; petals 1½ mm. long; staminal claws longer than petals, each with 4-7 white filaments; anthers broader than long; fruits subglobular, 2-3 mm. broad, prismatic in lower half by compression into a dense oblong or globular spike 6-12 mm. long.

Southern districts; Kangaroo Island; Murray scrub to Bordertown; Yorke and Eyre Peninsulas and westward to Kingoonya. Summer.—Drier parts of temperate Australia.

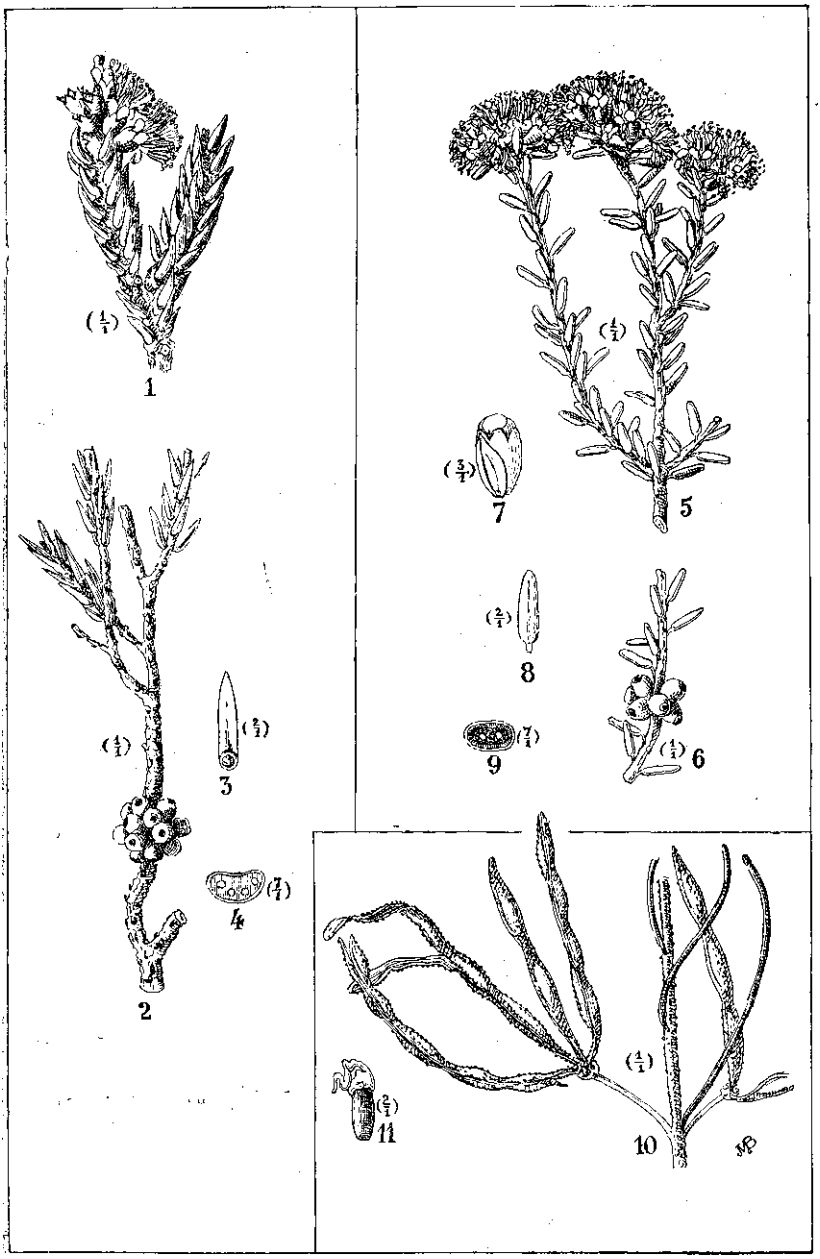

PLATE 39.—1-4, **Melalenca quadrifaria ;** 5-9, **M. pauperiflora ;** 10-11, **Acacia Menzelii.**

13. **M. fasciculiflora,** Benth. Glabrous shrub 2-5 m. high, dwarfed in exposed maritime situations ; bark white, papery ; leaves alternate, crowded, linear, obtuse, plano-convex, 3-8 mm. long, 1-1½ mm. broad, with 2-4 parallel rows of glands on the convex lower surface ; flowers in small approximate clusters along the previous year's branches or males in small terminal heads ; receptacle cup-shaped, about 2½ mm. long ; sepals deltoid, green ; petals white, nearly 2 mm. long, the claw rather longer than usual ; staminal claws about as long as petals, each with usually 7-12 white filaments, rarely

15-18; fruits ovoid-truncate, corky, angled, 4-5 mm. across, solitary or in dense clusters of 2-6.—*M. ericifolia,* Tate non Sm.

Near salt or fresh creeks or swamps or on sandhills near sea; Torrens Valley (Mt. Lofty Range); Encounter Bay; Kangaroo Island; Eyre Peninsula; South-East. Summer.—West Australia.

14. **M. pauperiflora,** F. v. M. Shrub 2-3 m. high, with greyish loose papery bark, glabrous except the young shoots; leaves alternate, compressed-terete, 4-6 mm. long, obtuse, nerveless, with a shallow groove along the upper face; flowers in small terminal heads of 3-15, the rhachis pubescent, not growing out until after flowering; bracts brown, deciduous after flowering; receptacle ovoid, 3 mm. long; sepals green, obtuse, with scarious margins; petals 2 mm. long; staminal claw shorter than petal, with 7-15 white filaments; fruits globular, 4-5 mm. diam., in small clusters.

Dublin scrub and probably Yorke Peninsula; Murray lands; Minnipa, E.P.; Murat Bay; Kingoonya. Flowering irregular.—West Australia.

PLATE 39.—(5-9). 5, flowering branch; 6, fruiting branch; 7, bud and bract; 8, leaf; 9, tranverse section of leaf.

6. EUCALYPTUS, L'Hérit.

(From Greek *eu,* well; *kalyptos,* covered; alluding to the cap or lid which covers the stamens in the bud.)

Receptacle more or less campanulate, turbinate or obconical; sepals and petals united in a cap, lid or *operculum,* which is continuous with the receptacle in bud and falls off in flower, perhaps always seceding as 2 distinct caps, but the calycine one usually falls off when very young and small, leaving the more persistent petaline cap; stamens numerous, in several rows, the filaments usually white, erect for about half their length and then abruptly inflexed in bud, the inner ones shorter, the outer ones in some species barren (without anthers), all finally spreading and forming the showy part of the flower; ovary adnate to the lower part or to the whole of the receptacle, glabrous and convex at summit, mostly 3-4-celled, with numerous ovules in each cell; style usually reaching to the summit of the cap; fruit consisting of the hardened capsule and receptacle, the valves sometimes exserted; seeds numerous, but only a few in each cell fertile, the testa smooth and glossy, rarely winged. Glabrous trees or shrubs, secreting resinous gums: leaves of seedlings or shoots ("suckers") from felled trees often broad, subsessile and more or less opposite, rarely hairy, differing in shape from the adult leaves, which are glabrous, alternate, leathery, usually petiolate, lanceolate and 8-12 cm. long or more, often hanging vertically, penninerved, the edges consisting of a thick marginal nerve like the midnerve (midrib), the finer lateral nerves extending from the midrib to the intramarginal nerve, which runs round the edge, the blade often oblique towards its base; flowers usually in pedunculate axillary umbels, sometimes forming panicles; bracts and bracteoles so early caducous as to be seldom seen.

The receptacle consists at its summit of the outer edge, or summit of the epidermis, on which the cap rests; next to this is a ring, usually narrow, rarely broad and deciduous, which supports the stamens, and inside this is the disk, which may be more or less sunk within the receptacle, or rarely (as in *E. pyriformis*) erect and annular; these layers (with the exception of the epidermis) form what is called the *rim* (Plate 173, O), which extends inwards as far as the valves of the capsule, and which may be flat, or slope upwards (exserted and convex) or downwards (inserted and either slightly convex or concave), or, where the capsule is more deeply sunk in the receptacle, the rim may be very broad and extend more or less vertically downwards, as the inner layer of the receptacle, until it meets the capsule; in this last case the summit of the rim is narrow.

The large trees with stout single stems are known as "gums" or "gum-trees"; the smaller shrubby species are usually called "mallees," but they sometimes bear the same name when growing rather taller, and with a single slender stem, in dense scrub.

A genus of about 200 Australian species exclusive of supposed natural hybrids, to which in some cases specific names have been applied. A few species also occur in New Guinea and other northern islands. It is one of the most difficult Australian genera to classify, on account of the close relationship of many species and the remarkable variability of all parts of the plant. The time of flowering is so erratic that no season is here recorded.

Some of the Gippsland eucalypts rank among the loftiest trees in the world, but the heights recorded in Baron v. Mueller's day, and accepted by him, appear to have been much exaggerated. These heights were from 400 to 500ft. (122 to 152 m.) for the loftiest trees. In 1888 rewards totalling £120 were offered to anyone who could point out a tree of 400ft. The highest tree which could then be found proved, when scientific measurements were taken, to be a specimen of *E. regnans,* F. v. M. (*E. amygdalina,* Labill. var. *regnans,* F. v. M.), 326ft. 1in. high (nearly 99½ m.), growing on Mount Baw Baw, Gippsland. Probably none of our South Australian species are much more than 40 m. (about 130ft.) high. When growing near the sea eucalypts are liable to become twisted and stunted.

The principal works dealing with the genus are by George Bentham in the Flora Australiensis, vol. 3 (1866), F. v. Mueller in Eucalyptographia (1879-84), J. H. Maiden in the Critical Revision of the genus Eucalyptus (1903-1925), and by R. T. Baker and H. G. Smith in Research on the Eucalypts and their essential oils (1920). A number of our common gums are beautifully illustrated in J. E. Brown's Forest Flora of South Australia. Eucalypts have been profitably cultivated in the Mediterranean region, California, Florida, Argentina and other countries. Among species from the other States grown for ornament in South Australia may be mentioned : *E. calophylla*, R.Br., with large drooping urn-shaped fruits ; *E. cornuta*, Labill. (Yate gum) and *E. Lehmannii*, Preiss, both with very long cylindrical caps ; *E. ficifolia*, F. v. M., with scarlet flowers and large urnshaped fruits ; *E. globulus*, Labill. (Tasmanian Blue Gum), with warted receptacle and cap ; *E. tetraptera*, Turcz., with very large red 4-angled receptacle.

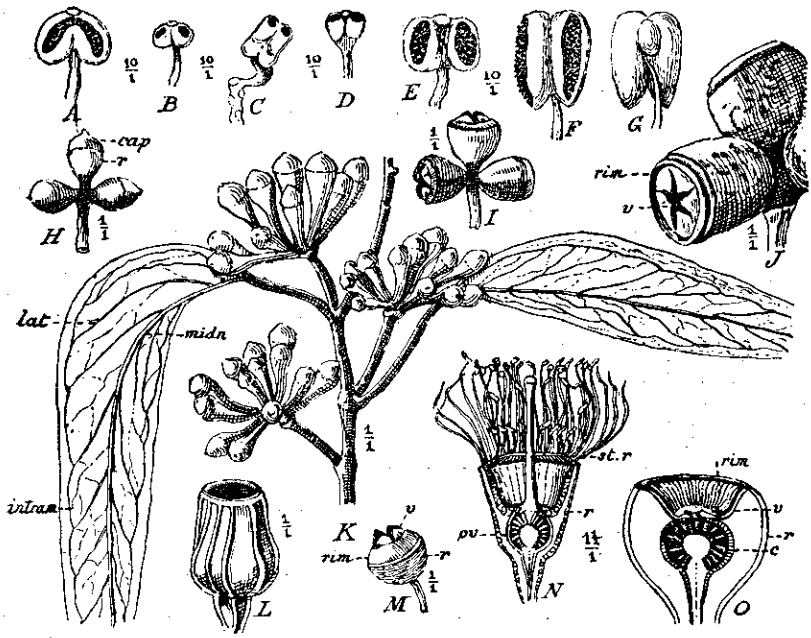

FIG. 173.—**Eucalyptus.** A-G, anthers : A, *E. obliqua ;* B, *E. Behriana ;* C, *E. leucoxylon ;* D, *E. leptophylla ;* E, *E. oleosa ;* F-G, *E. cosmophylla* (front and back view). H, buds of *E. viminalis.* I, fruits of same. J, fruits of *E. cosmophylla.* K, flowering branch of *E. obliqua*, showing 3 umbels in bud. L, fruit of *E. angulosa.* M, fruit of *E. rostrata.* N-O, *E. leucoxylon :* N, vertical section of flower ; O, vertical section of fruit (the staminal ring has fallen off). Abbreviations : *r*, receptacle ; *v*, valve ; *c*, capsule ; *ov*, ovary ; *st. r*, staminal ring ; *midn*, midnerve *lat*, lateral nerve ; *intram*, intramarginal nerve.

A. Stamens all fertile.

B. Anthers reniform, dorsifixed, about 1 mm. long and broad, the cells divergent and finally confluent at summit, so that the anther appears 1-celled. (Series 1, *Renantherae*. Fig. 172, A).

C. Lateral nerves of leaves sloping very obliquely, some almost parallel to midrib ; cap hemispherical, shorter than receptacle ; fruits 6-8 mm. long ; trees.

Bark smooth ..... *E. pauciflora* 1.

Bark rough ..... *E. vitrea* 2.

C. Lateral nerves oblique ; cap hemispherical.

D. Cap ⅓ length of receptacle ; fruit pear-shaped with narrow rim ; tall tree with rough bark.. *E. obliqua* 3.

D. Cap equalling or slightly shorter than receptacle.

E. Mallee, with smooth bark ; fruit ovoid, with broad convex rim ..... *E. diversifolia* 4.

E. Tall trees, rarely mallees, with rough bark ; fruits depressed-globular, with broad very convex rim ..... *E. Baxteri* 5.

B. Anthers minute, subglobular, about ½ mm. long and broad, basifixed or nearly so, opening towards the summit in pores or short slits, with small gland near summit. (Series 2, *Porantherae*. Fig. 172, B, D).
F. Cap hemispherical, shorter than receptacle.
G. Umbels few-flowered, paniculate.
H. Fruits sessile, very small; leaves ovate; mallee — *E. Behriana* 8.
H. Fruits pedicellate, small; leaves lanceolate; trees.
I. Bark rough, furrowed; intramarginal nerve removed from edge — *E. largiflorens* 7.
I. Bark smooth; intramarginal nerve almost or quite merged in edge.
Fruit pear-shaped, 6-8 mm. long — *E. intertexta* 8.
Fruit depressed-globular, 4 mm. long — *E. microtheca* 9.
G. Umbels axillary or lateral; mallee or tree; fruits ovoid.
Cap slightly shorter than receptacle; fruit 5-6 mm. long — *E. odorata* 10.
Cap ½ length of receptacle; fruit about 9 mm. long — *E. Lansdowneana* 11.
F. Cap conical, about as long as receptacle; capsule sunk.
J. Trees with brown furrowed bark; leaves lanceolate.
Leaves green; fruit ovoid, 5-7 mm. long — *E. microcarpa* 12.
Leaves whitish; fruit oblong, 12 mm. long — *E. albens* 13.
J. Mallee, with smooth bark; fruit pearshaped, 3-6 mm. long; leaves very narrow — *E. leptophylla* 14.
B. Anthers rather square or almost obovoid, about 1 mm. broad and not much longer, basifixed or nearly so, with gland at summit, opening in parallel or slightly divergent slits. (Series 3, *Platyantherae*. Fig. 172, E).
K. Disk not prominent in fruit.
L. Cap hemispherical, shorter than receptacle; leaves linear-lanceolate; fruits sessile, small, with broad raised rim — *E. cneorifolia* 15.
L. Cap conical, usually longer than receptacle; mallees; valve-points subulate, protruding in fruit; rim narrow at summit.
M. Leaves lanceolate, green or whitish, petiolate.
Fruit globular or ovoid, 5-6 mm. long — *E. oleosa* 16.
Fruit urnshaped, 10 mm. long — *E. Flocktoniae* 17.
M. Leaves broad, sessile or very shortly petiolate, whitish — *E. Gillii* 18.
K. Disk forming a raised ring within the staminal ring; fruits large, more or less depressed-globular; desert mallees with very thick leaves.
N. Fruit 1-2½ cm. broad.
Fruit 4-ribbed — *E. pachyphylla* 19.
Fruit smooth — *E. Oldfieldii* 20.
N. Fruit 5-6 cm. broad — *E. pyriformis* 21.
B. Anthers oblong or cuneate, 1-2 mm. long, ¾-1 mm. broad, opening in parallel slits, dorsifixed, with gland at back. (Series 4, *Macrantherae*. Fig. 172, F-G).
O. Receptacle entire at summit; stamens free.
P. Bark usually smooth, except at base of stem.
Q. Trees.
R. Fruit 5-15 mm. long; umbels axillary or lateral.
S. Fruit-valves not or scarcely protruding; rim narrow at summit.
Fruit 7-10 mm. broad, 3-celled — *E. cladocalyx* 22.
Fruit 12-20 mm. broad, 4-5-celled — *E. cosmophylla* 23.
S. Fruit-valves protruding; rim broad, more or less ascending.

T. Cap usually beaked; umbels 4-12-flowered ..... *E. rostrata* 24.
T. Cap conical: umbels mostly 3-flowered.
Fruit globular-truncate, 6-8 mm. long *E. viminalis* 25.
Fruit turbinate, 5 mm. long..... *E. rubida* 26.
R. Fruit 20-30 mm. long, more or less urn-shaped; leaves very thick and rigid, with approximate almost transverse lateral nerves; umbels corymbose.
Peduncles and pedicels slender..... *E. terminalis* 27.
Peduncles and pedicels thick ..... *E. pyrophora* 28.
Q. Mallees, rarely trees; capsule more or less sunk; fruit-valves enclosed (except sometimes subulate and protruding in *E. dumosa*).
U. Leaves alternate, thick and stiff.
V. Fruit hemispherical to urnshaped, 6-15 mm. long.
W. Cap about as long as receptacle, beaked or conical; fruit more or less ribbed; peduncles broad, flattened.
Fruit rather large; flowers pedicellate ..... *E. angulosa* 29.
Fruit smaller; flowers sessile .... *E. conglobata* 30.
W. Cap shorter than receptacle, often truncate or ribbed; flowers shortly pedicellate or sessile; peduncles narrower, angular or terete.
Fruit ribbed lengthwise ..... *E. dumosa* 31.
Fruit smooth ..... *E. incrassata* 32.
V. Fruit pear-shaped, 15-20 mm. long; flowers pedicellate; peduncles terete ..... *E. pimpiniana* 33.
U. Leaves opposite, glaucous, mostly connate at base ..... *E. gamophylla* 34.
P. Bark rough.
X. Trees.
Leaves lanceolate, to 20 cm. long; fruit ovoid, sessile ..... *E. elaeophora* 35.
Leaves broad, to 10 cm. long; fruit obconical, pedicellate ..... *E. ovata* 36.
X. Mallee; leaves lanceolate, whitish; fruit with broad convex rim ..... *E. Morrisii* 37.
O. Receptacle 4-toothed at summit; bark smooth, fruit globular, stamens in 4 bundles..... *E. eudesmioides* 38.
A. Outer stamens without anthers; anthers of fertile stamens truncate, oblong, about ½ mm. broad, basifixed, opening in 2 terminal pores. (Series 5, *Heterostemones*. Fig. 172, C, N.)
Y. Umbels axillary or lateral; bark smooth and light-colored, at least on upper part of trunk.
Z. Large tree; leaves lanceolate ..... *E. leucoxylon* 39.
Z. Mallees or small trees; leaves narrow, black-dotted.
Fruit 4-ribbed, 10-12 mm. long ..... *E. calycogona* 40.
Fruit almost smooth, 4-7 mm. long ..... *E. gracilis* 41.
Y. Upper umbels panicled or corymbose; tree with smooth upper bark ..... *E. fasciculosa* 42.

1. **E. pauciflora,** Sieb. (1827). *South-Eastern White Gum.* Tree to 20 m. high with smooth whitish-grey bark except at base; leaves lanceolate with almost longitudinal lateral nerves; umbels 5-12-flowered, axillary or lateral, sometimes forming a short narrow panicle; receptacle shortly pedicellate, twice as long as the hemispherical cap; fruits ovoid-truncate, 6-8 mm. long, mostly 3-celled, the rim broad, flat or slightly concave, the valves not protruding.—*E. coriacea*, A. Cunn. (1843)

Dismal Swamp to Benara, S.E.—Victoria; New South Wales; Tasmania. This tree has not been recorded of late years in our South-East, and it scarcely differs from *E. vitrea* except in the description of its height and of "the inner whitish-grey bark almost to the ground" given by J. E. Brown in For. Fl. S.A. Part 4. The 2 species occupy the same swampy districts and *E. vitrea* is certainly common.

2. **E. vitrea,** R. T. Baker (1900). Tree 5-7 m. high, with rough brown fibrous bark on the stem and most of the branches, sometimes dwarfed to a shrub; leaves broad- or narrow-lanceolate, the lateral nerves almost longitudinal; umbels 4-12-flowered, axillary or lateral; receptacle about 4 mm. long, 2-3 times longer than the depressed convex umbonate cap and tapering into a short pedicel; fruits ovoid-truncate or pear-shaped, 6-7 mm. long, 7-8 mm. broad, mostly 3-celled, the rim rather broad, flat, or convex, the capsule slightly sunk.—*E. amygdalina,* Tate not Labill.; *E. virgata,* Benth. partly, not Sieb.; *E. Sieberiana,* F. v. M. partly.

Scrub at Naugwarry, S.E.; between Mt. Gambier and Glencoe and towards Lake Bonney. Maiden believes this to be a natural stabilised hybrid of *E. amygdalina* and *E. pauciflora.* If it should prove to be the same as *E. vitellina,* Naudin (1891), described from a tree grown in the south of France, the latter name would have priority. When the fruits are rounded at summit they are very like those of *E. cneorifolia,* but the latter are sessile.

3. **E. obliqua,** L'Hérit. *Stringybark.* Tree to 30 m. high, the tall straight stem and older branches covered with a rough fibrous greyish bark, rarely a mallee-like shrub in poor soil; leaves glossy, dark-green, lanceolate or ovate-lanceolate, very oblique at base, the lateral nerves conspicuous, very oblique, the intramarginal nerve distant from edge; umbels 4-15-flowered, mostly lateral (extra-axillary); receptacle 6 mm. long, obconical, tapering into a short pedicel and 3 times as long as the hemispherical umbonate cap; style not dilated at summit; fruits ovoid-truncate or pear-shaped-truncate, slightly contracted at summit, 7-14 mm. long, 9-13 mm. thick, the rim broad, slightly convex but deflexed within the receptacle, the capsule mostly 4-celled, more or less deeply sunk in the receptacle. (Fig. 173, A, K).

Mount Lofty Range; Kangaroo Island; South-East.—Victoria; New South Wales; Tasmania. Called "Messmate" in the Eastern States. Timber useful for many purposes —known as "Tasmanian Oak" or "Australian Oak" among cabinetmakers. When the bark is very thick, both this species and *E. Baxteri* are called "Woollybutt" in the Mount Lofty Range.

4. **E. diversifolia,** Bonpl. (1813). A scrub mallee usually 3-6 m. high, with smooth greyish bark peeling off in ribbons; leaves mostly under 9 cm. long and narrow-lanceolate, rarely broad, the nerves inconspicuous; umbels mostly 3-6-flowered, axillary or lateral; receptacle hemispherical, 4 mm. long, subsessile or on a pedicel 2-5 mm. long, about as long as the hemispherical or shortly conical cap; upper part of filaments not inflexed in the ordinary way, but spirally twisted under the cap; fruit turbinate or almost hemispherical, 7-10 mm. long, 8-12 mm. broad, mostly 4-celled and often mealy at summit, the rim broad, exserted and slightly convex or almost flat, the valves brittle and caducous, mostly 4 and nearly level with the rim.—*E. santalifolia,* F. v. M. (1855); *E. viminalis,* Labill., var. *diversifolia,* Benth.

Murray scrub and 90-Mile Desert; Kangaroo Island; Yorke and Eyre Peninsulas; South-East.—Victoria (near Portland). The small-fruited form is found on Kangaroo Island, as well as the typical larger one. Sometimes called *White Mallee.*

5. **E. Baxteri** (Benth.) Maiden et Blakely. *Brown Stringybark.* Tree with rough brown or greyish fibrous bark, straight and tall (to 30 m. high) in the upper part of the Mt. Lofty Range, smaller on lower levels and dwarfed to a low shrub in poor soil or near the sea; leaves thick, dark-green, mostly ovate-lanceolate, shining, the lateral nerves very oblique; umbels 4-14-flowered, axillary or lateral, on thick peduncles only 3-10 mm. long; buds sometimes rugose; receptacle about 6 mm. long, sessile, rather longer than the hemispherical cap; fruits depressed-globular or turbinate, woody, mostly 4-celled, 7-10 mm. long, 8-15 mm. thick, the rim broad, exserted and more or less convex, the valves protruding or level with the summit.

Mount Lofty Range to Encounter Bay; Kangaroo Island; South-East.—Western Victoria.

Up to the year 1921 this species of Stringybark was accepted as *E. capitellata,* Sm., of which the type came from the neighborhood of Sydney, but in that year Maiden (Crit. Rev. part 45) placed it with *E. Blaxlandii,* Maiden et Cambage, a tree of the Blue Mountains, distinguished chiefly by the smooth branches, a character which does not agree with our Stringybark. Later (in 1925) Maiden came to the conclusion that our plant, and that found about Portland and other parts of western Victoria, is the same as that described by Bentham (Fl. Aust. 3 : 207) as *E. santalifolia,* F. v. M. var. (?) *Baxteri,* quoting *E. Baxteri,* R. Br. Herb. as a synonym. The species was, however, never described by Brown. Mr. Maiden (in a letter written a fortnight before his decease) distinguished the new species from *E. capitellata* by "smaller and rounder juvenile leaves, slightly broader seedling leaves, varying from oblong to lanceolate and broad-elliptical, mostly rugose buds and more turbinate to globular fruits." Two seedlings, which I have

from Myponga, show the leaves, both opposite and alternate, varying from ovate to ovate-oblong, the youngest with scattered stellate hairs beneath.

Var. *pedicellata*, Maiden et Blakely, Flowers and fruits on pedicels 2-3 mm. long and very thick below the bud, so that the fruits are not compacted into such a dense head.—Mt. Lofty Range; 90-Mile Desert from Lameroo to Bordertown and Naracoorte; in the drier localities it is often a small tree or mallee.

6. **E. Behriana,** F. v. M. A spreading mallee, 2-6 m. high, usually with smooth bark; leaves broad-lanceolate, thick and shining, mostly about 7 cm. long; umbels 2-7-flowered, forming rather narrow terminal panicles; receptacle sessile, 4 mm. long, twice as long as the hemispherical umbonate cap; fruits ovoid-truncate, about 5 mm. long and broad, usually 4-celled, the rim narrow at summit, the capsule sunk. (Fig. 173, B).

Near Gawler and Nuriootpa; southern part of Flinders Range; 90-Mile Desert.

7. **E. largiflorens,** F. v. M. (1854). *River Box.* Usually a tall tree, with drooping branches and deeply-furrowed greyish-brown persistent bark; leaves rather narrow-lanceolate, usually pale-colored, the intramarginal nerve 1-2 mm. from the edge; umbels 3-8-flowered, in axillary or terminal panicles shorter than the leaves; receptacle 3-4 mm. long, on a short pedicel and 3 times as long as the hemispherical cap, which is double, the outer calycine cap small and caducous; fruits ovoid-truncate, 4-5 mm. long and broad, usually 4-celled, on pedicels 2-5 mm. long; the rim slightly concave, the capsule sunk.—*E. pendula*, A. Cunn. (1840-41) name only; *E. bicolor*, A. Cunn. (1848).

Along the River Murray.—Eastern States. Cunningham's name of *E. bicolor* was published by Hooker in Mitchell's Tropical Australia in 1848, with the statement:—"A species closely allied to *E. haemastoma*, Sm., but the marginal nerve is not so close to the edge of the leaf (this is the 'Bastard Box' of the carpenters)." This statement does not appear to constitute a valid description according to art. 37 of the international rules.

8. **E. intertexta,** R. T. Baker. *Red Box.* Tree varying in height, with smooth greyish-white bark except towards the base of the stem, where it is hard, rough, dark, and persistent; leaves lanceolate, pale-colored, the intramarginal nerve usually contiguous to or completely merged in the thick margin, so that the lateral nerves appear to run directly into the latter; flowers and fruits of *E. fasciculosa*, except that all the stamens are fertile and the anthers rather larger and opening in parallel slits instead of terminal pores; it differs also in the timber, which is red, very tough and interlocked.

West of Port Augusta; Flinders Range towards Lake Frome; Everard and Birksgate Ranges; also recorded from "Murray Desert."—Western New South Wales; Central Australia; West Australia (Cavenagh Range).

9. **E. microtheca,** F. v. M. *Coolabah, Swamp Box, Desert Box.* A tree with rough, dark or ashy-grey bark and smooth drooping branches; leaves lanceolate, drying a slaty-green, the nerves inconspicuous, the intramarginal one close to edge; umbels 3-6-flowered, on slender peduncles, mostly in terminal or axillary panicles; receptacle hemispherical, 2½ mm. long, shortly pedicellate, about as long as the conical cap; fruit depressed-globular, 4 mm. long by 5 mm. broad, the rim very narrow, the 3-4 valves usually exserted when open.—*E. brachypoda*, Benth. partly, not Turcz.

Country round Lake Eyre to Cooper's Creek and northwards to Queensland border, also south of Lake Frome; growing beside creeks or waterholes.—New South Wales; Queensland; Northern Territory; West Australia. The fruit resembles that of *E. rostrata*, but the latter has a broad rim and sharper valves. "Burke's Tree," at Innamincka, is *E. microtheca*.

10. **E. odorata,** Behr et Schlechtd. A variable species, typically a small tree with several medium-sized stems ascending from a large bulbous base (*Peppermint*), or on poor soil with slender stems and a shrubby appearance (*Black Mallee, Whipstick Mallee* or *Whipstick Peppermint*), or on richer soil a tree with a single stout stem; bark usually rough, dark-brown or black; leaves narrow to broad-lanceolate, dark or light-green on both faces, mostly under 10 cm. long, the lateral nerves rather distant and usually prominent, the intramarginal nerve 2-3 mm. from the edge; umbels 3-10-flowered, axillary or lateral, on peduncles 3-10 mm. long; receptacle about 5 mm. long, rather longer than the hemispherical or shortly conical cap and tapering into a short slender pedicel; filaments usually white, sometimes pink; style dilated at summit; fruit ovoid-truncate or pear-shaped-truncate, 5-6 mm. long and about as broad, the rim narrow at summit, the capsule 4-5-celled, rather deeply sunk.—*E. cajuputea*, F. v. M.

Southern districts to Flinders Range and eastward to Broken Hill; Yorke and Eyre Peninsulas to the Great Bight; Murray lands; South-East. The leaves are sometimes (in "whipstick" forms) whitish or ashy-grey, as well as the receptacle; the fruits sometimes glossy.—Western Victoria and New South Wales.

It has been suggested that some of the tree-like, single-stemmed forms found on the Adelaide foothills and near Mount Remarkable, with some of the fruits larger than usual, may be hybrids between *E. odorata* and *E. leucoxylon*. Peppermint is occasionally called "water-mallee" on Eyre Peninsula, on account of the natives obtaining water from the roots.

11. **E. Lansdowneana,** F. v. M. et J. E. Brown. Tree 3-10 m. high, called locally "Red Mallee" or "Red-flowering Mallee," with a single stem and bark rough and flaky towards base, smoother above; leaves resembling those of *E. odorata*; umbels 3-6-flowered, axillary and lateral, on stout angular peduncles swollen at summit; receptacle 5-6 mm. long, angular, subsessile, the very short pedicel as thick as the receptacle, which is twice as long as the hemispherical cap; filaments crimson or pink, the outer ones barren; style not dilated at summit; fruits ovoid-oblong-truncate, about 9 mm. long and broad, usually with 2-4 narrow ribs, 4-5-celled, the rim narrow at summit, the capsule sunk.—*E. Behriana*, var. *purpurascens*, F. v. M.; *E. odorata*, Behr et Schlechtd., var. *purpurascens*, Maiden.

From near Port Lincoln northwards to Gawler Ranges.

12. **E. microcarpa,** Maiden (1923). *Box.* Usually a tall tree, with brown or greyish bark, lighter in color and smoother than that of *E. odorata* and vertically furrowed; leaves of *E. odorata*; umbels 3-10-flowered, axillary and lateral, or forming short terminal panicles; receptacle shortly pedicellate and about as long as the conical cap; style slightly dilated at summit; fruit ovoid-truncate, 5-7 mm. long, 5-6 mm. broad, the rim narrow at summit, the capsule 4-5-celled, deeply sunk.—*E. hemiphloia*, F. v. M. partly; *E. hemiphloia*, var. *microcarpa*, Maiden (1910).

Creeks near Mt. Remarkable and southward to Wirrabara (Flinders Range).—Victoria; New South Wales; Queensland.

13. **E. albens,** Miq. *White Box.* Medium-sized tree, with bark as in *E. microcarpa*; leaves thick, whitish, ovate-lanceolate or lanceolate, the intramarginal nerve removed from the edge; umbels 3-8-flowered, lateral or in short terminal panicles; receptacle whitish, about 8 mm. long, tapering into a thick short pedicel and about as long as the conical cap; fruit oblong-truncate, about 12 mm. long, about 8 mm. broad, whitish, the rim narrow at summit, the capsule 4-5-celled, deeply sunk.

Mt. Remarkable to Wirrabara.—Victoria; New South Wales.

14. **E. leptophylla,** F. v. M. *Narrow-leaved Red Mallee*; *March Mallee* (so-called in parts of Mt. Lofty Range, because it usually flowers Jan.-March). Mostly a "whipstick mallee," with several slender stems and usually red branches, sometimes a small gum; inner bark smooth, grey or reddish; leaves linear-lanceolate, copiously black-dotted, mostly 3-7 cm. long, about 6 mm. broad, long-pointed, tapering into a petiole of 3-7 mm. long; umbels 3-12-flowered, axillary; receptacle 3-4 mm. long, shortly pedicellate, about as long as the subconical cap; fruit cup-shaped or pear-shaped-truncate, often glossy-brown, 3-6 mm. long, 3-5 mm. broad, the rim narrow at summit and then sloping shortly downwards, the capsule sunk, the valves usually 3, erected as far as the summit but scarcely protruding. (Fig. 173, D).

Southern districts; Kangaroo Island; Yorke and Eyre Peninsulas and westward to Ooldea; Murray lands; 90-Mile Desert; Coorong.—Temperate Australia. United with *E. uncinata*, Turcz. by Bentham and later by Mueller, but treated by Maiden as a distinct species, chiefly on account of the narrower seedling-leaves and longer petioles. The fruits resemble those of *E. odorata*, *E. Behriana*, and *E. gracilis*, but the rim is more conspicuous.

15. **E. cneorifolia,** DC. *Narrow-leaf Mallee.* A mallee or sometimes a tree to 12 m. high, with rough bark on stem; leaves linear-lanceolate, 5-9 cm. long, 6-9 mm. broad, pointed, resembling those of *E. leptophylla*, but without the black dots; umbels 3-12-flowered, axillary, on peduncles only 2-4 mm. long; receptacle sessile or almost so, 4-5 mm. long, slightly longer than the hemispherical or bluntly conical cap; fruits in dense globular clusters, cup-shaped or globular-truncate, 4-6 mm. long, 5-7 mm. broad, the rim broad, the valves usually 3 and slightly protruding.

Kangaroo Island. The principal source from which eucalyptus oil is distilled on the island. The specific name implies the likeness of the leaves to those of *Cneorum tricoccum*, L., a South-European shrub.

16. **E. oleosa,** F. v. M. *Red Mallee.* A scrub mallee 3-5 m. high, sometimes reduced to a whipstick mallee, or a single-stemmed tree to 12 m. high; upper stem and branches usually with smooth white or red bark, the outer bark rough and dark towards the base and often peeling off in strips, sometimes the whole stem rough-barked; leaves narrow or broad-lanceolate, dark-green, light-green or very pale, occasionally black-

dotted, in desert places sometimes very thick and stiff, the nerves inconspicuous; umbels 4-12-flowered, axillary or lateral; receptacle cup-shaped, 4-5 mm. long, on a pedicel 3-7 mm. long, shorter than the cap, which is 7-14 mm. long, conical with a straight beak, or sometimes bluntly and shortly conical and not much longer than the receptacle; style not dilated at summit; fruit usually globular-truncate, rarely almost ovoid-truncate, but always more or less contracted towards summit, usually 4-6 mm. long, and about as broad in the middle, the rim rather narrow at summit, the capsule sunk, but the slender points of the 3-4 valves always protruding unless broken off in age, the small fruits sometimes glossy and ribbed or angled. (Fig. 173, E).

Southern districts to Flinders Range and at least as far north as Parachilna; between Broken Hill railway and Lake Frome; Kangaroo Island; Yorke and Eyre Peninsulas and westward to Ooldea and Musgrave Range; Murray lands and 90-Mile Desert.—Western Victoria and New South Wales; Central Australia. West Australia. A form with very narrow glossy leaves, only 7-10 mm. broad, growing in the scrub near Pinnaroo, has a blunt conical cap, and 3-celled globular fruit, 4 mm. long, with a rather broad rim. It is only 1-2 m. high and is locally called "Green Mallee." At Minnipa, E.P., it is a tree, known as "Sandhill Mallee." Towards Ooldea it is a "Water Mallee" (from the water-storing roots) and has sometimes almost prostrate stems. Forms on Eyre Peninsula with very small fruits (not more than 4 mm. long) and narrow leaves are called "Kong Mallee," a name also given to *E. gracilis.*

Maiden distinguished the pale-leaved form as var. *glauca* (1912), and subsequently as a separate species, *E. transcontinentalis* (1919), based on the glaucous leaves and the long cap. The color of the leaves is very variable and our specimens show that the long cap, whether tapering into a beak or merely conical, is found with green and narrow leaves as well as with those that are quite pale in color, while specimens with whitish leaves have sometimes short obtuse caps.

17. **E. Flocktoniae,** Maiden. Differs from the preceding chiefly in the larger urnshaped fruits, 9-10 mm. long, by about 8 mm. broad in the lower part, angled longitudinally at least when dry; cap about 6 mm. long, broad at base.

Scrub between Moonta and Maitland; Eyre Peninsula.—West Australia.

18. **E. Gillii,** Maiden. *Curly Mallee* (from the often crooked growth of stems and branches). A mallee about 6 m. high, which chiefly differs from *E. oleosa* in the broad sessile or subsessile ovate-cordate acuminate leaves, 3-4 cm. long, 2-3 cm. broad, thick and rigid, pale-colored; bud whitish; cap beaked, about 10 mm. long; fruits subglobular-truncate, 6-7 mm. long and broad, with protruding valve-points.

Between the Flinders Range and Lake Frome.—New South Wales (north of Broken Hill).

Var. *petiolaris,* Maiden. Leaves about the same size and silvery color, but ovate-lanceolate or lanceolate, not cordate, on petioles 2-3 mm. long.—Flinders Range; said also to occur near Gawler. This variety forms a transition towards *E. oleosa.*

19. **E. pachyphylla,** F. v. M. Some fruits gathered by Helms near the Birksgate Range appear to belong to this species; they are from a mallee about 5 m. high, 4 in the umbel, woody, on pedicels of 2 mm.; in outline they are depressed globular, about 15 mm. long and 25 mm. broad at the summit of the depressed hemispherical receptacle, which is about as long as the much-exserted suberect rim, shaped like that of *E. pyriformis,* although on a much smaller scale, the inner disk rising above the remains of the staminal ring and slightly concave, the 4 valves finally protruding; the receptacle has several ribs rather prominent at its summit and becoming faint towards its base. This species has the thick stiff ovate-lanceolate leaves of *E. Oldfieldii,* and umbels axillary or lateral, on very short peduncles. It inhabits western Queensland, central and West Australia.

20. **E. Oldfieldii,** F. v. M. A smooth-barked mallee; leaves ovate-lanceolate, very thick and stiff, pale-colored at least when dry. Specimens from Missionary Plain, MacDonnell Range, have the 3-6-flowered umbels and beaked cap of *E. Drummondii,* Benth., but the very short pedicels of *E. Oldfieldii,* so that Mueller may have been right in uniting the 2 species. In these specimens the receptacle is broadly hemispherical, about 4 mm. long and 8 mm. broad; the conical-acuminate cap, with a point or beak turned to one side, is more than twice as long; pedicel 2 mm. long. Specimens with similar leaves were collected by S. A. White in the MacDonnell Range and also at Mt. Ilbillie, Everard Range, bearing 3-5-fruited umbels, the fruits very shortly pedicellate, depressed-globular, 9-12 mm. long, 10-16 mm. broad, woody, 3-4-celled, with broad exserted convex rim and protruding valves. They resemble those of *E. Baxteri,* but the disk is raised, so that a small valley occurs between it and the valves. Quite similar fruits, 4-7 in the umbel, were gathered by R. Helms south of the Musgrave Range. Maiden considers these to be *E. Ewartiana,* Maiden, formerly placed by him under *E. Oldfieldii,* but which he now distinguishes from that species by more numerous flowers

and rather longer pedicels and from *E. Drummondii* by shorter pedicels and a hemispherical cap as long as the receptacle. All these forms or species are also found in West Australia.

21. **E. pyriformis,** Turcz. *Ooldea Mallee.* A mallee 3-5 m. high with rough dark bark on the stem; leaves lanceolate, pale-green, thick and stiff; flowers large and showy, 1-3 on thick deflexed peduncles; receptacle hemispherical, about 2-3 cm. long and 3½ cm. broad at summit, thick, ribbed, on a short thick pedicel and rather shorter than the conical acuminate cap; filaments crimson, yellow or cream-colored; style not dilated at summit; fruit woody, depressed-globular in outline, 3½-4 cm. long, 5-6 cm. broad, the receptacular part coarsely ribbed, the rim very broad, much exserted and divided into 2 parts by the remains of the staminal ring, which is 8-10 mm. distant from the edge of the receptacle and rather prominent, the inner disk very prominent, almost erect and slightly concave on the outside, the 4-5 valves scarcely protruding.

Tarcoola; Ooldea; near Everard Range.—West Australia. The specific name does not refer to the fruit, but to the pear-like shape sometimes assumed by the bud.

22. **E. cladocalyx,** F. v. M. (1852). *Sugar Gum.* A small straggling gum in the typical locality (Marble Range, E.P., where it is called *White Gum*), a handsome erect tree 25-35 m. high in the Flinders Range, with a dense head of dark-green foliage; bark smooth and whitish after the greyish outer bark has peeled off; leaves mostly broad-lanceolate, glossy, paler beneath, often somewhat convex above, the lateral nerves fairly prominent; umbels 4-14-flowered, mostly lateral, rarely axillary; receptacle cylindrical, about 8 mm. long, tapering into a short pedicel and nearly 3 times as long as the depressed-hemispherical cap; fruit ovoid-oblong-truncate or narrowly urnshaped, 10-14 mm. long, 7-10 mm. broad in the middle, contracted at orifice, irregularly ribbed or striate, the rim narrow at summit, the capsule deeply sunk, 3-celled.—*E. corynocalyx*, F. v. M. (1860).

Crystal Brook to Mount Brown (Flinders Range); Eyre Peninsula; Kangaroo Island. The tall form is often cultivated: its name of Sugar Gum is due to sheep and cattle liking the young sweetish foliage.—Reported by Mueller from the "Lower Wimmera," Victoria.

23. **E. cosmophylla,** F. v. M. *Scrub Gum* (Mt. Lofty Range); *Bog Gum* (Kangaroo Island). From a dwarf shrub about 1 m. high to a somewhat straggling tree over 10 m. high, with smooth pale-colored bark; leaves broad-lanceolate, thick and stiff, oblique at base, the intramarginal nerve 2-3 mm. from the edge; umbels mostly 3-flowered, on a very short thick axillary or lateral peduncle; receptacle subsessile, cupshaped, when flowering 10 mm. long, rather longer than the hemispherical umbonate cap; style not expanded at summit; fruit ovoid-truncate, not contracted at summit, woody, 12-15 mm. long and broad, or hemispherical and 20 mm. broad, the rim slightly exserted, narrow at summit, then shortly sloping downwards, the capsule sunk, the 4-5 valves acuminate, ascending when ripe and sometimes shortly protruding. (Fig. 173, J).

Mt. Lofty Range to Encounter Bay; Kangaroo Island. The localities of the Coorong and Marble Range, E.P., given by J. E. Brown, seem doubtful. A species peculiar to South Australia.

24. **E. rostrata,** Schlechtd. *Red Gum.* A stately spreading tree sometimes over 30 m. high, with a smooth whitish or greyish bark, the rough outer bark often adhering near the base or rarely higher up on the stem; leaves narrow-lanceolate, dark-green on both faces; umbels 4-12-flowered, lateral or axillary; receptacle hemispherical, 2-4 mm. long, usually rather shorter than the hemispherical-beaked cap, and on a slender pedicel 4-8 mm. long; ovary conical, with a short style not dilated at summit; fruit depressed-globular, about 5 mm. long and 7 mm. broad, the rim broad, convex, exserted, the 4 valves protruding and almost erect. (Fig. 173, M).

All over the State except the dry creckless area north of the Great Bight. In our northern districts it is confined to the banks of creeks and watercourses, but in the moister south it may be also found on alluvial flats. The timber is usually red and in durability equals that of the Jarrah of West Australia (*E. marginata*, Sm.). Some of our northern trees are said to have a white timber. The specific name "beaked" refers to the pointed cap. Rarely, however, the cap is conical or almost hemispherical and merely umbonate at summit.—Temperate Australia.

25. **E. viminalis,** Labill. *Manna Gum.* Tall tree, the inner bark greyish-white, the outer bark dark and rough, seceding from the upper part of the stem or persistent on the whole stem; leaves like those of *E. rostrata* and like them, sometimes very long (to 20 cm.); umbels 3-7-flowered, often 3-flowered, axillary or lateral; receptacle hemispherical, about 3 mm. long, equalling the conical cap and subsessile, except the central flower of the triplet, which has a pedicel of about 2 mm.; style slightly dilated at summit; fruit globular-truncate or ovoid-truncate, 6-8 mm. long and about as broad, the rim rather broad, somewhat exserted and convex, the valves usually 4 and finally protruding. (Fig. 172, H-I).

Mount Lofty Range; Kangaroo Island; South-East. In summer sap exudes through the bark and forms a sweetish substance called "manna."—Eastern Australia and Tasmania.

26. **E. rubida,** Deane et Maiden. *Candlebark* or *White Gum.* A tall tree with white smooth bark on the branches and greater part of the straight stem, and outer dark bark near the base; timber red (whence the specific name); leaves narrow-lanceolate, to 20 cm. long; umbels mostly 3-flowered, axillary or lateral; receptacle turbinate, 3-4 mm. long, subsessile, that of the central flower on a pedicel of about 2 mm., rather longer than the bluntly conical cap; fruit turbinate, not contracted at summit, about 5 mm. long and broad, the rim rather broad, scarcely exserted, the 3-4 valves finally protruding.—*E. viminalis,* Labill. var. *microcarpa,* F. v. M.; *E. viminalis,* Benth. partly, not Labill.; *E. Gunnii,* Hook. f., var. *rubida,* Maiden.

Mount Lofty Range.—Eastern Australia and Tasmania. The sucker leaves of *E. rubida* and *E. Gunnii* are almost orbicular, while those of *E. viminalis* are broad-lanceolate. The fruits of *E. rubida, viminalis* and *ovata* are very much alike, but those of *rubida* are smaller. With us the umbels of *rubida* appear to be always 3-flowered, but in the Eastern States they are 3-7-flowered. This gum is also said to exude manna at times.

E. kalangadooensis, Maiden et Blakely is a suggested hybrid between *E. rubida* and some other species. It is described as a tall tree with smooth bark; leaves lanceolate, glossy; umbels 4-10-flowered; receptacle 5-6 mm. long, about as long as the beaked cap; fruit turbinate, 10 mm. long, with a broad convex rim and 3-5 acute protruding valves.—Near Kalangadoo, S.E.

27. **E. terminalis,** F. v. M. *Whitewashed Gum; Bloodwood.* A tree, often tall and stately, sometimes with smooth snowy-white bark; leaves very rigid, lanceolate, drying pale-green or slate-color, the lateral nerves numerous and approximate, the intramarginal nerve very close to or absorbed in the thick marginal nerve; sucker-leaves ovate or ovate-lanceolate, petiolate, the shoot, petioles and underface of midrib covered with stiff spreading hairs; umbels 3-6-flowered, on terete peduncles, in broad terminal corymbs or panicles; bud obovoid; receptacle about 10 mm. long, more than twice as long as the hemispherical cap, shortly pedicellate; fruit urnshaped, 25-28 mm. long, about 25 mm. broad in the swollen lower part, the rim narrow at summit, the 4-5-celled capsule deeply sunk; seeds broadly winged; timber red.

Near Warburton River to Everard Range.—New South Wales; Queensland; Northern Territory; West Australia. In Central Australia, and probably in our State, the bark is smooth and white; in other places the rough outer bark is more or less persistent, sometimes flaking off and showing a reddish smoother inner bark.

28. **E. pyrophora,** Benth. (1866). *Bloodwood.* A tree with smooth pale flaky bark; leaves lanceolate, even more rigid than in *E. terminalis,* drying pale, with the same almost obsolete intramarginal nerve and the same numerous lateral nerves running in parallel lines to the edge and very slightly oblique; umbels 3-6 flowered, forming a broad terminal corymbose panicle, on stout terete peduncles fully 3 mm. thick; bud 12-15 mm. long, pearshaped, tapering into a pedicel 3 mm. thick, the receptacle much longer than the hemispherical umbonate cap; fruit not seen, but according to Maiden's drawings ovoid-oblong-truncate, gradually contracted towards the summit, about 30 mm. long by 20 mm. broad, the rim narrow at summit, the capsule deeply sunk.

Cordillo Downs (north of Cooper's Creek).—Western New South Wales; Queensland; Northern Territory.

E. polycarpa, F. v. M. (1859) is placed as a variety of *E. pyrophora* by Maiden, who regards as the type of *E. polycarpa* a specimen from Charlotte Waters, close to our border. His drawing of this specimen (Rev. Euc. part 40, plate 166) shows slender pedicels as in *E. terminalis,* with which species *E. polycarpa* was united by Bentham. If the latter species is united with *E. pyrophora,* it should, as the older name, have precedence and *E. pyrophora* should become a variety of it.

29. **E. angulosa,** Schau. *Desert Mallee.* A mallee 2-5 m. high, with smooth bark peeling off in long strips to the base; leaves lanceolate or broad-lanceolate, thick and stiff, mostly under 10 cm. long, usually pale-green and black-dotted, the nerves inconspicuous, the intramarginal one removed from the edge; umbels 3-7-flowered, mostly axillary, on stout compressed peduncles dilated upwards and 3-6 mm. broad at summit; receptacle subcylindrical, constricted near middle, ribbed longitudinally, 8-10 mm. long, on stout pedicels 3-6 mm. long; cap hemispherical with a thick beak and slightly shorter than receptacle; style diminished towards summit; fruit ovoid-truncate, subcylindrical or urnshaped, 9-20 mm. long, 8-15 mm. broad, with about 10 prominent longitudinal ribs, or sometimes the ribbing is faint, the summit of the rim narrow, the capsule 3-4-celled, sunk. (Fig. 173, L.)—*E. incrassata,* Labill., var. *angulosa,* Benth.

Mt. Compass to Encounter Bay and Waitpinga scrub; Kangaroo Island; Murray scrub on both sides of river and 90-Mile Desert; Yorke and Eyre Peninsulas to Ooldea.—Western Victoria and New South Wales; West Australia. Differs from *E. dumosa* and *E. incrassata* not only in the size and strong ribbing of the fruit, but also in the broad almost truncate base.

30. **E. conglobata** (R. Br.) Maiden. Usually a medium-sized tree, with smooth often ribbony bark; leaves as in *E. angulosa*, the hooked point frequently conspicuous; heads 4-8-flowered, on thick angular peduncles only 2-4 mm. long; young bud almost globular, the outer calycine cap very small and soon falling off; receptacle closely sessile, hemispherical, nearly as long as the shortly conical cap (5 mm.); fruits broadly hemispherical, about 6 mm. long by 8-10 mm. broad, sometimes 2-ribbed, forming a dense globular cluster, the capsule somewhat sunk, the rim rather broad and sloping downwards, the 4 valves triangular and without fine points, finally slightly protruding.—*E. dumosa*, A. Cunn, var. *conglobata* (R. Br.) Benth.

Near Port Lincoln, E.P.—West Australia.

Var. *anceps* (R. Br.) Maiden. Usually a mallee; receptacle sessile, ovoid, longer than the hemispherical umbonate cap; peduncles thick and flattened to a breadth of 4-6 mm.; fruit truncate, ovoid or ovoid-oblong, slightly ribbed, 7-9 mm. long, 6-8 mm. broad, the valve-points sometimes almost protruding.—Kangaroo Island; Eyre Peninsula.—West Australia.

31. **E. dumosa,** A. Cunn. *White Mallee.* A mallee, 2-8 m. high, with smooth whitish bark except towards the base; leaves as in the 2 preceding, but the intramarginal nerve usually closer to the edge; umbels usually 3-8-flowered, axillary or lateral, on rather thick short peduncles; receptacle more or less ribbed, ovoid-truncate, 4-7 mm. long, sessile or on a very short thick pedicel; cap radiately ribbed, hemispherical, quite obtuse or umbonate, rather shorter than receptacle; stamens sometimes 10-12 mm. long; fruit turbinate or ovoid-oblong, truncate and not contracted at summit, 6-8 mm. long and about as broad at summit, more or less conspicuously ribbed, the rim with a narrow summit, then sloping shortly downwards, the capsule 4-5-celled, somewhat sunk.—*E. incrassata*, F. v. M. partly, not of Labill.

From near Gawler northwards to Flinders Range; Kangaroo Island; Murray scrub; Eyre Peninsula and westward to the Great Bight. On Kangaroo Island it is called "Waikerie Mallee."—Western districts of Victoria and New South Wales.

32. **E. incrassata,** Labill. A white mallee like *E. dumosa* in foliage and umbels, the leaves sometimes (as also in that species) of a greyish-green; receptacle about 6 mm. long, subsessile, smooth, longer than the shortly conical or obtuse smooth or slightly ribbed cap; fruit much as in the preceding, but smooth or slightly angular near the base. Very closely related to *E. dumosa*, and they should perhaps be united under Labillardière's name. Both are distinguished from *E. conglobata* var. *anceps* chiefly by the much narrower subterete peduncles.

Bundaleer Hills to Flinders Range, Murray lands and northward towards Broken Hill railway; 90-Mile Desert; near Ooldea.—Western Victoria; West Australia.

Var. *protrusa*, J. M. Black. Fruit verging to hemispherical, shortly pedicellate, 6-9 mm. broad at summit, the valves shortly protruding, as in *E. oleosa*; cap with flattish ribbed summit.—Ooldea and eastward thereof.

Species 29 to 32 were placed by Bentham under two (*E. dumosa* and *E. incrassata*); by Mueller in the Eucalyptographia they were all treated as *E. incrassata*; in the earlier part of his Revision Maiden described them as *E. incrassata* and varieties thereof; later he restored the varieties to specific rank. There is a good deal to be said for the varietal arrangement, because all these species tend to run into one another. All are called "water-mallees" in desert country, on account of the moisture which the natives obtain from the roots.

33. **E. pimpiniana,** Maiden (1912). A mallee 1-2 m. high; leaves thick, very stiff, mostly ovate-lanceolate, pale-colored, 6-10 cm. long, 2½-5 cm. broad, the lateral nerves very obscure; umbels drooping, 3-6-flowered, axillary or lateral, sometimes terminating a very short branch, on stout terete peduncles about 15 cm. long; receptacle obconical, 12-15 mm. long, about as long as the conical cap, which is swollen at base, tapering into a thick pedicel 5-10 mm. long; style not dilated at summit; fruit pearshaped-truncate, 15-20 mm. long, 12-15 mm. broad in upper part, faintly ribbed, the rim narrow at summit, 3-4-celled; capsule deeply sunk.—*E. Isingiana*, Maiden (1922).

Sandhills at Immarna (on the East-West Railway, east of Ooldea). The native name of this mallee is said to be "pimpin."

34. **E. gamophylla,** F. v. M. A mallee 6-8 m. high; leaves ovate, ovate-lanceolate or lanceolate, horizontal, usually opposite and each pair united by their bases, the upper ones sometimes sessile or shortly petiolate, mostly minutely mealy and with a whitish or bluish tint; umbels 2-5-flowered, sometimes twin in the axils or even subpaniculate; receptacle 4-6 mm. long, twice as long as the hemispherical cap, on a pedicil of 2-4 mm. long; fruit pearshaped, contracted at orifice, whitish, 10-12 mm. long, about 8 mm. broad, rim very narrow at summit, capsule sunk, 3-4-celled.

South Australian part of Blyth Range; also near our border along the Finke River, C.E.—Central and West Australia.

35. **E. elaeophora,** F. v. M. *Bastard Box.* Small or medium-sized rather straggling tree, sometimes mallee-like, with rough greyish persistent bark on all or most of the stem; leaves lanceolate, to 20 cm. long, black-dotted, the intramarginal nerve about 2 mm. from edge; sucker-leaves usually orbicular, glaucous; umbels 3-7-flowered, axillary and lateral, on compressed 2-edged peduncles 7-10 mm. long; receptacle sessile or thickly subsessile, about 5 mm. long, more or less angular, longer than or equalling the subconical cap; fruit sessile, ovoid-truncate, usually not contracted at orifice, 7-8 mm. long, 8-10 mm. broad at summit, sometimes with 1 or 2 faint ribs, rarely almost obconical and prominently 2-ribbed, the rim rather narrow, the 3-4 valves scarcely or quite protruding, sometimes woolly inside.

Mount Lofty Range and at least as far north as Clare; Kangaroo Island; Yorke Peninsula.—Victoria; New South Wales. This species was united by Bentham, and later by Mueller, with *E. goniocalyx*, F. v. M., which scarcely differs from it except in being a tall tree with smooth bark on the stem, flaky only towards the base. The latter may be found in some wet parts of our State.

36. **E. ovata,** Labill. *White Swamp Gum* (from the pale timber). A rather straggling tree, 10-15 m. high, with a rough dark flaky bark, except on the branches, which are smooth; leaves broad-lanceolate or ovate-lanceolate, rarely exceeding 10 cm. in length and usually shorter, sometimes 4-5 cm. broad; umbels 3-9-flowered, lateral or axillary; receptacle turbinate, 6 mm. long, usually almost twice as long as the hemispherical umbonate cap, tapering into a short pedicel; fruit broadly obconical or turbinate, 7-9 mm. long and about the same breadth at its summit, the rim narrow convex and slightly raised in the form of a ring round the summit, the 3-5 valves about level with the summit or slightly protruding.—*E. Gunnii*, F. v. M. not Hook. f.; *E. Stuartiana*, F. v. M. partly; *E. acervula*, Hook. f.; *E. paludosa*, R. T. Baker; *E. Gunnii*. J. E. Brown, For. Fl. S.A. pt. 1 not Hook. f.

Kuitpo Forest to Encounter Bay (Mount Lofty Range); Kangaroo Island; Cape Northumberland, Penola, Glencoe, Millicent (South-East).

Var. *grandiflora*, Maiden. Cap about as long as receptacle, with a longer point; fruit sometimes 10 mm. broad at summit, the rim broader and more exserted, the valves protruding.—Glencoe; Kalangadoo.

37. **E. Morrisii,** R. T. Baker. *Grey Mallee.* A mallee 2-5 m. high, with rough grey fibrous bark; leaves lanceolate, whitish, about 7-10 cm. long, the intramarginal nerve 1-2 mm. from edge; umbels 2-7-flowered, on thick angular axillary or lateral peduncles 5-8 mm. long; receptacle hemispherical 5 mm. long, subsessile, the cap rather ovoid-truncate than broadly conical, 6 mm. long; fruit obovoid, about 10 mm. long by 9 mm. broad, the rim broad, at first flat, finally much exserted and convex, the 3-4 valves protruding.

Mount Patawurta, near Mooloolo (Flinders Range).—New South Wales (between Cobar and Bourke).

38. **E. eudesmioides,** F. v. M. *Desert Gum.* A medium-sized or tall tree, sometimes reduced to a small mallee, with smooth silver-grey bark; leaves greyish-green, opposite or alternate, lanceolate broad-lanceolate or ovate, mostly 4-8 cm. long, the lateral nerves rather conspicuous and the intramarginal one removed from edge; umbels 3-5-flowered, on terete axillary peduncles; receptacle campanulate about 5 mm. long, shortly pedicellate, with 4 minute obtuse teeth at summit, which disappear in fruit; cap depressed-hemispherical, much shorter than receptacle; stamens arranged in 4 bundles; fruit usually globular-truncate, sometimes mealy-white, about 10 mm. long and broad, contracted towards the mouth, the rim narrow, the capsule sunk, mostly 3-celled.

Near Birksgate and Blyth Ranges.—Central Australia; West Australia. Usually grows on sandhills or sandy plains. The specific name means "like *Eudesmia*," a genus proposed by Robert Brown to include Eucalypti which have the stamens in 4 bundles alternate with 4 small tooth-like projections terminating 4 angles of the receptacle.

39. **E. leucoxylon,** F. v. M. *Blue Gum.* Large tree to 30 m. high, the bark smooth, white, with bluish or light-purple patches, the deciduous bark dark and rough; leaves lanceolate, the intramarginal nerve 3 mm. from the edge in the broader leaves; umbels mostly 2-3-flowered, axillary; receptacle cup-shaped or obconical, 5-6 mm. long, about as long as the conical-acuminate cap, whose point is turned to one side; pedicel slender, thickened towards summit, as long or longer than the receptacle, sometimes 15 mm. long in fruit; outer stamens barren, the staminal ring broad, incurved and falling off before the fruit ripens, the filaments white, pink or red; fruit ovoid-truncate, slightly contracted towards summit, 8-12 mm. long and nearly as broad, the rim broad, inserted and subconvex, the capsule rather deeply sunk, usually 5-celled. (Fig. 173, C, N-O).

Southern districts to southern part of Flinders Range; Kangaroo Island. The specific name ("white-wood") refers to the timber, described by J. E. Brown as "yellow-white or pale pinkish-white." Towards the Murray the growth is sometimes small and mallee-like. About Wirrabara and Mt. Remarkable the bark is sometimes rough and dark all over the stem.—Victoria; New South Wales.

Var. *macrocarpa,* J. E. Brown. This is the large-fruited form, with a larger receptacle, stamens white or red and fruit 15-18 mm. long and rather less in breadth.—Kangaroo Island; Port Lincoln to Marble Range, E.P.; near Cape Northumberland, S.E. There are, however, intermediate forms, as regards size of flower and fruit, from the Mt. Lofty and Flinders Ranges.

Var. *pauperita,* J. E. Brown. This is the small-fruited form. A large spreading or sometimes quite small tree, the bark of the whole stem often dark and rough; receptacle shorter and turbinate; cap shorter and not curved at summit; fruit subglobular-truncate, 7-8 mm. long, 8-9 mm. broad, the capsule 5-6-celled, very slightly sunk; pedicels shorter,—Morphett Vale; Clare, Tanunda and Truro northwards to Gladstone and Flinders Range at least as far as Farina; 90-Mile Desert to Bordertown.—Western Victoria.

40. **E. calycogona,** Turcz. A mallee 5-10 m. high, or sometimes a whipstick mallee, with a smooth pale bark on the upper part of the stems, dark and rough on the lower; leaves narrow-lanceolate, glossy, pointed, mostly 6-10 cm. long, 10-15 mm. broad, black-dotted; umbels 3-7-flowered, axillary; receptacle obconical, 4-angled, glandular-dotted, 7-8 mm. long, twice as long as the shortly conical cap and tapering into a pedicel 2-6 mm. long; outer stamens barren; style dilated at summit; fruit narrow-urnshaped, 10-12 mm. long, 6-7 mm. broad, acutely 4-ribbed, the summit of the rim narrow, the capsule deeply sunk, 4-celled.—*E. gracilis,* F. v. M. partly.

Encounter Bay; Murray scrub on both sides of river; 90-Mile Desert; Yorke and Eyre Peninsulas.—Western Victoria; West Australia.

41. **E. gracilis,** F. v. M. *Red Mallee* (when the inner bark and timber are reddish); *White Mallee* (when they are whitish or grey). A mallee or sometimes a fairly tall slender single-stemmed tree, the inner bark smooth and covering most of the stem and branches, the outer bark rough and peeling off near the base; leaves as in *E. calycogona,* but sometimes only 6-8 mm. broad; umbels 3-7-flowered, axillary or lateral; receptacle cup-shaped, glandular-dotted, 3 mm. long and three times as long as the depressed-hemispherical cap, shortly pedicellate; outer stamens barren; fruit pearshaped-truncate, 4-7 mm. long and about as broad, the rim rather broad, sloping downwards, the capsule sunk, 3-4-celled.

Roseworthy to Kadina and northwards to the Flinders Range; Murray lands on both sides of river; 90-Mile Desert; Yorke and Eyre Peninsulas and westward to Fowler's Bay and Ooldea. In parts of Eyre Peninsula it is known as *Kong Mallee.*—Western Victoria and New South Wales; West Australia. The fruits are much like those of *E. fasciculosa, E. largiflorens* and *E. odorata,* but (as regards the two former) they are not paniculate, and, as regards all three, the leaves are narrower and usually shorter.

42. **E. fasciculosa,** F. v. M. *Pink Gum* (from the pink or reddish timber); *White Gum* (from the color of the bark). Tree 6-20 m. high, with smooth whitish inner bark, the rather rough brown outer bark sometimes maintaining itself for some distance up the stem; leaves lanceolate or broad-lanceolate, dark-green on both faces, the lateral nerves indistinct; umbels 3-8-flowered, forming short subcorymbose terminal panicles; receptacle 2-4 mm. long, rather longer than the shortly conical cap and tapering into pedicels 2-4 mm. long; outer stamens barren; fruit pearshaped-truncate, 6-8 mm. long, 5-6 mm. broad, the summit of the rim narrow, the capsule 4-celled, sunk.—*E. paniculata* Sm., var. *fasciculosa,* Benth.

Mt. Lofty Range to Encounter Bay; Monarto South and towards the Murray; Coorong; Kangaroo Island. Usually a medium-sized straggling tree, but sometimes taller and erect. In some parts of the Mt. Lofty Range it is known as Sand Gum.

7. DARWINIA, Rudge.

(After Dr. Erasmus Darwin, 1731-1802, English physician and poet, grandfather of the great naturalist, Charles Darwin).

Receptacle cylindrical-campanulate, 5-ribbed; sepals 5, petaloid; petals 5, as long as the sepals; stamens 10, short, alternating with 10 minute staminodes, all united in a short ring at base; anthers globular, opening in 2 small pores; ovary 1-celled, enclosed in the lower part of the receptacle, with few ovules on a short basal placenta; style exserted from flower, bearded towards summit; fruit indehiscent, consisting of the somewhat hardened receptacle and ovary, usually 1-seeded; testa thin. Low glabrous shrubs; leaves small, opposite, narrow (scarcely 1 mm. broad), entire, almost sessile, with immersed oil-glands; flowers subsessile, with 2 scarious bracteoles enclosing them and about as long as the receptacle. Genus limited to Australia.

Flowers in small, subglobular heads; erect shrub ..... *D. micropetala* 1.
Flowers solitary, axillary; prostrate shrub ..... *D. homoranthoides* 2.

1. **D. micropetala** (F. v. M.) Benth. Small erect slender shrub; leaves decussate, linear, plano-convex, obtuse, 2-3 mm. long; flowers in small terminal compound corymbose heads; bracts leafy; bracteoles pink; receptacle 2-3 mm. long, papillose between the ribs; sepals and petals ovate-oblong, about 1 mm. long, white; anthers purple; ovules 3-4.

Kangaroo Island; near Yallum, S.E. Most of the year.—Western Victoria.

2. **D. homoranthoides** (F. v. M.) n. comb. Stems prostrate; leaves decussate, linear, plano-convex, mucronulate, 6-8 mm. long; flowers drooping, solitary in the leaf-axils of the branchlets; bracteoles broad, keeled; receptacle about 5 mm. long, papillose between the ribs near the summit; sepals and petals white, 3 mm. long, the sepals lanceolate, the petals ovate; anthers red; style finally 20 mm. long; ovules 2-10.—*D. Schuermannii* (F. v. M.) Benth. (1866); *Schuermannia homoranthoides*, F. v. M. (1852); *Genetyllis Schuermannii*, F. v. M. (1858).

Southern part of Eyre Peninsula. Summer.

Chamaelaucium uncinatum, Schau., the "Geraldton Wax-plant," is a West Australian shrub often grown for ornament. It differs from *Darwinia* in the parallel anther-cells opening in slits, with a large gland at back; the leaves are linear, to 25 mm. long, hooked at end, the flowers 2-4 in small terminal corymbs, the bracteoles forming a membranous caducous hood over the buds; sepals very short and broad.

8. HOMORANTHUS, A. Cunn.

(From Greek *homoros*, bordering on, closely resembling; *anthos*, flower: alluding to the similarity to allied genera.)

1. **H. Wilhelmii** (F. v. M.) Cheel. Erect slender glabrous shrub; leaves opposite, sessile, narrow-linear, plano-convex, 5-7 mm. long; flowers in dense terminal corymbs on peduncles 2-3 mm. long; bracteoles 2, membranous, enclosing the bud, caducous; receptacle cylindrical, 5-ribbed, 3 mm. long; sepals white, ovate, each terminating in a digitate fringe of 3-6 hairs, of which the longest exceed the petals, which are ovate, white and 2 mm. long; stamens 10, short, alternating with 10 minute staminodes; anthers red, globular, opening in 2 pores; style exserted, bearded towards summit; ovules 4-6, collateral on a short almost basal placenta in the 1-celled ovary.—*Verticordia Wilhelmii*, F. v. M.

Southern part of Eyre Peninsula. Summer.

9. MICROMYRTUS, Benth.

(From Greek *mikros*, small; *myrtos*, the myrtle).

Receptacle 5-angled or 5-ribbed; sepals 5, small, persistent, petaloid, shorter than the petals; petals 5, orbicular; stamens 5 (in our species), short, inflexed, opposite the petals; ovary 1-celled, with few ovules collaterally attached near the summit; style short, with a capitate stigma; fruit indehiscent, crowned by the persistent sepals; seed usually solitary, with a thin testa. Low glabrous shrubs, with small opposite imbricate leaves; flowers solitary, axillary; bracteoles 2, scarious, enclosing the buds, caducous. A purely Australian genus.

Surface of receptacle granular; peduncles 2-3 mm. long.... *M. flaviflora* 1.
Surface of receptacle smooth; peduncles ½ mm. long ..... *M. ciliata* 2.

1. **M. flaviflora**, F. v. M. Slender erect shrub, under 1 m. high; leaves decussate, obovate-oblong, 2-4 mm. long, convex below, with a very narrow membranous denticulate margin; flowers few towards the summits of the branchlets, shortly pedunculate; receptacle obconical, 5-angled, granular, 3 mm. long; sepals rounded; petals yellow, finely denticulate, 2½ mm. long; anthers with a rather large globular gland on the back; ovules about 10, at the summit of a thick placenta.—*Thryptomene flaviflora*, F. v. M.

Near Musgrave Range. Winter and spring.—Central Australia; West Australia (Victoria Desert).

2. **M. ciliata** (Sm.) J. M. Black. Slender erect shrub about 50 cm. high; leaves decussate, obovate or oblong, trigonous, obtuse, 1½-3 mm. long, the upper ones minutely denticulate under the lens; flowers almost sessile, appearing clustered in the upper axils of branchlets; receptacle cup-shaped, 5-ribbed, 2½ mm. long; sepals orbicular, pink; petals pale pink, about 2½ mm. long; anthers usually with 2 small glands on the back; ovules 4, suspended at summit of ovary.—*M. microphylla* (Sieb.) Benth.; *Thryptomene ciliata* (Sm.) F. v. M.; *Imbricaria ciliata*, Sm. (1797).

Murray scrub (Pinnaroo); Ninety-Mile Desert. Sept.-Dec.—Victoria; New South Wales.

10. THRYPTOMENE, Endl.

(From Greek *thryptomenê*, diminished, made small; alluding to the lowly stature of most of the species).

Slender glabrous shrubs with the small opposite leaves, dotted with immersed glands, and the heath-like appearance of *Micromyrtus*, but differing in the stamens (5 in our species) alternate with the orbicular petals and opposite the sepals; anthers with the connective extended beyond the distinct cells into a conspicuous gland; ovary 1-celled; ovules 2-4, at first horizontal or ascending on a lateral placenta, the ripening ones becoming pendulous; ovules 1 or 2; flowers solitary in each axil, but rather crowded in the upper part of the branchlets, forming dense leafy racemes.

A. Receptacle not or faintly ribbed; petals longer than sepals.
  Receptacle covered with intricate wrinkles; sepals cordate ..... *Th. Maisonneuvii* 1.
  Receptacle smooth; sepals orbicular ..... *Th. Elliottii* 2.
A. Receptacle 10-ribbed; petals not longer than sepals
  Leaves linear ..... *Th. ericaea* 3.
  Leaves obovate ..... *Th. Miqueliana* 4.

1. **Th. Maisonneuvii,** F. v. M. (1864). Branches often whitish with the decurrent remains of the fallen leaves; leaves decussate, closely imbricate on the branchlets, obovate, 1½-2 mm. long, 1-1½ mm. broad, plano-convex, the immersed glands in 2 rows on the underface; flowers few, almost sessile; bracteoles with a green keel, often persistent during flowering; receptacle cup-shaped, 2 mm. long, rugulose and minutely granular, not ribbed; sepals deltoid, cordate, with a broad scarious margin; petals white, 2½ mm. diameter; anther-cells divergent, opening in short slits, with a large gland at back; ovules 4, in 2 rows in the comparatively large cavity of the ovary.—*Th. auriculata*, F. v. M. (1876).

Near Everard and Musgrave Ranges; between Ooldea and Ouldabinna. Winter and spring.—Central and West Australia (Victoria Desert).

2. **Th. Elliottii,** F. v. M. Branches often whitish, with the decurrent bases of fallen leaves; leaves decussate, loosely imbricate, obovate-oblong, plano-convex, 2-3 mm. long, 1½ mm. broad; flowers on peduncles scarcely half as long as leaves; bracteoles caducous; receptacle suboveid, 3 mm. long, compressed and 2-edged in lower part, expanded towards the summit, faintly ribbed, at least when dry; sepals white, broad, obtuse, 1 mm. long, scarcely exceeded by the white petals; anther-cells globular, distinct, opening by short slit, the connective extended into a gland much longer than the anther; cavity of ovary small, near summit of receptacle, with 2 collateral ovules attached to a nearly basal lateral placenta.—*Th. Whiteae*, J. M. Black.

Lake Torrens westward to Ooldea and Ouldabinna. Winter and spring.

PLATE 35 (page 388).—(7-16). 7, bud with bracteoles; 8, bud; 9, the same, showing lateral compression of the receptacle; 10, stamen (front); 11, stamen (back); 12, flower viewed from above; 13, vertical section of flower; 14, leaf (under-surface); 15, transverse section of leaf; 16, transverse section of upper part of receptacle, showing ovary and 2 ovules.

3. **Th. ericaea,** F. v. M. Leaves decussate, loosely imbricate or spreading, linear, plano-convex, 3-5 mm. long, 1 mm. broad; flowers in the axils below summits of branchlets on peduncles about ½ as long as leaf; bracteoles narrow, caducous; receptacle campanulate, 2½ mm. long, 10-ribbed; sepals ovate, whitish, about 1 mm. long; petals white, nearly as long; anther-cells globular, divergent, opening in slits, with a prominent gland behind; ovules 2 in a small cavity near summit of receptacle.

Kangaroo Island. Sept.-Dec.

4. **Th. Miqueliana,** F. v. M. Very near the preceding, but the leaves are obovate cuneate, subobtuse, slightly concave above, 2-5 mm. long, 1½-2 mm. broad; flowers the same, but on shorter peduncles only 1 mm. long.

Near Moonta; Eyre Peninsula. July-Nov.—Victoria; New South Wales.

Th. calycina (Lindl.) n. comb. is recorded by Tate for the Murray lands, I do not know on what authority. It has leaves much like *Th. Miqueliana*, but flatter and longer (5-10 mm. long, 2-4 mm. broad), while the receptacle is not ribbed and the peduncles are much longer. It does not appear to have been found further west than the Grampians in Victoria.—*Th. Mitchelliana* F. v. M.

11. CALYTHRIX, Labill.

(From Greek *kalyx*, cup, calyx; *thrix*, a hair: the sepals end in a long hair or bristle.)

1. **C. tetragona,** Labill. Glabrous or shortly hairy shrub, 50 cm. to over 1 m. high, the branches sometimes long and drooping; leaves alternate, linear, 2-10 mm. long, under 1 mm. thick, often terete when fresh, 3- or 4-angled when dry, on a very short petiole; flowers subsessile, solitary in the upper axils, forming leafy heads; bracteoles 2, scarious, keeled, persistent, enclosing the receptacle, which is 5-10 mm. long when in flower, fusiform and 10-ribbed in the lower part, tapering into a narrow neck or beak; sepals 5, spreading, persistent, ovate, about 2 mm. long, each with a hair-like awn longer than petals; petals 5, pink or white, oblong, about 5 mm. long; stamens about 20, nearly as long as petals; ovary 1-celled, adnate to the fusiform part of the receptacle, with 2 erect collateral ovules on a filiform placenta; fruit indehiscent, 1-seeded (Fig. 172, I).

Southern districts, including Kangaroo Island and northwards to Flinders Range; Murray lands to Bordertown; Yorke and Eyre Peninsulas. Aug.-Jan.—Temperate Australia. Varies much in hairiness and length of leaf. The leaves and bracteoles may be glabrous along with hairy or glabrous branchlets; the bracteoles are usually ciliate and the leaves are sometimes scabrous-hairy.

C. longiflora, F. v. M. is found on the Finke River and in western Queensland and New South Wales, and may occur in our Far North. It has acute petals, 8-10 mm. long; receptacle 12 mm. long, the slender part rather thicker; leaves 2-3 mm. long, nearly 2 mm. broad, trigonous and ciliolate in upper part.

12. LHOTZKYA, Schau.

(After Dr. Johann Lhotzky, an Austrian botanist born in Galicia in 1800; came to Australia in 1832, and lived for some years in New South Wales and Tasmania.)

Scarcely differs from *Calythrix* except in having no awn at the summit of the 5 persistent scarious sepals; petals oblong, pink or white, much exceeding the sepals; receptacle more or less cylindrical, 10-ribbed; stamens about 20, in several rows, nearly as long as petals, the inner ones shorter; ovary 1-celled, with 2 erect collateral ovules on a filiform placenta extending from base to summit through the loose tissue of the ovary. Low slender heath-like shrubs with small scattered crowded linear trigonous or almost plano-convex leaves; flowers subsessile, solitary, axillary; bracteoles 2, concave, keeled, embracing the receptacle.

A. Bracteoles acute, not ciliate; plant glabrous ..... *L. glaberrima* 1.
A. Bracteoles obtuse, ciliate or fringed; plants more or less hairy.
Sepals orbicular, 1 mm. long ..... *L. alpestris* 2.
Sepals truncate, ¼ mm. long ..... *L. Smeatoniana* 3.

1. **L. glaberrima,** F. v. M. Glabrous; leaves 2-5 mm. long, 1-1½ mm. broad, more or less spreading; flowers in small leafy spikes below the ends of the branchlets; bracteoles acute, green or becoming scarious with a green keel, mucronulate, not ciliate, shorter than receptacle; receptacle obconical, 2 mm. long; sepals orbicular, whitish, 1 mm. long; petals 4 mm. long.

Encounter Bay; Kangaroo Island. Spring and summer.

Var. *magnisepala*, J. M. Black. Bracteoles longer than receptacle, which is 1½ mm. long; sepals ovate, 2 mm. long.—Middle and western end of Kangaroo Island.

2. **L. alpestris** (Lindl.) n. comb. Near the preceding, but the branchlets pubescent and the leaves with a few short stiff hairs; bracteoles obovate, obtuse, with scarious broad ciliolate margins, about as long as receptacle, which is obconical, about 3 mm. long and hairy towards summit; sepals orbicular, 1 mm. long; petals 4-5 mm. long.—*L. genetylloides*, F. v. M. (1855); *Genetyllis alpestris*, Lindl. (1839).

Scrub in the South-East. Spring and summer.—Western Victoria.

Var. *bracteosa*, Benth. Stem-leaves glabrous; floral leaves or bracts unlike them, ovate, thin, herbaceous, ciliate; receptacle glabrous or pubescent towards summit.—South-Eastern scrub.—Western Victoria.

3. **L. Smeatoniana,** F. v. M. Beset with minute spreading hairs; leaves 2-3 mm. long, about ½ mm. broad; flowers few in small heads, the rhachis not growing out (in the single specimen available); bracteoles obovate, very obtuse, hairy on back with a broad fringed scarious margin, as long as the receptacle, which is glabrous, 2½ mm. long, slightly constricted at summit; sepals almost truncate, about ¼ mm. long; petals almost ovate, 4 mm. long.

Karatta, K.I. Summer.

FAMILY 84.—OENOTHERACEAE.

Flowers regular, bisexual; sepals and petals 4-5, inserted at the summit of the tubular receptacle, the sepals valvate, the petals twisted in bud; stamens usually twice as many as petals, epigynous; ovary inferior, adnate to the lower part or to the whole of the receptacle, with as many cells as sepals; style 1, with capitate or lobed stigma; ovules numerous, anatropous, on axile placentas; fruit usually a long capsule; seeds without albumen; embryo straight, with very short radicle. Herbs or shrubs, with simple exstipulate leaves.

The family includes several handsome garden plants, such as the *Fuchsia* (whose fruit is a berry), *Clarkia* & *Godetia*.

A. Receptacle extending above the ovary; sepals 4 ..... OENOTHERA 1.
A. Receptacle not extending above the ovary.
Sepals 4, deciduous; seeds hair-tufted ..... EPILOBIUM 2.
Sepals usually 5, persistent; seeds naked ..... JUSSIEUA 3.

1. OENOTHERA, L.

(Greco-Latin name of some plant, probably belonging to this family.)

Sepals 4, lanceolate; petals 4, obovate, spreading; tubular receptacle extending far above the ovary, the free part falling off with the sepals, petals, and 8 stamens; anthers dorsifixed, versatile; style long, with 4 spreading stigmatic lobes; ovary 4-celled; capsule opening loculicidally from the summit downwards by 4 valves, leaving the persistent axis. Herbs with alternate leaves and large solitary axillary flowers.

A. Leaves almost entire; capsule ribbed.
Receptacle 3-4 cm. long ..... *O. odorata* 1.
Receptacle 8-12 cm. long ..... *O. longiflora* 2.
A. Leaves deeply divided; capsule winged ..... *O. acaulis* 3.

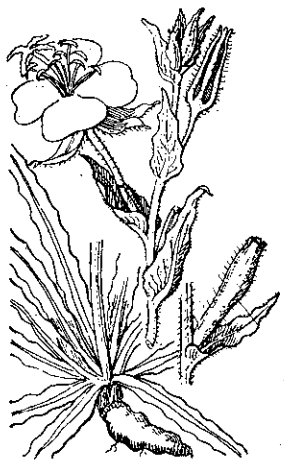

PLATE 174.—**Oenothera odorata.**

* 1. **O. odorata,** Jacq. Biennial, with stiff stem villous in the upper part; leaves sessile, wavy on the edges, with minute distant teeth, the radical ones in a rosette, narrow-lanceolate, 10-20 cm. long, glabrous, narrowed at both ends, the stem-leaves broader, hairy and half-clasping; flowers sessile in a long leafy spike; petals notched, yellow, fading purplish, about ¾ as long as the receptacle, which is 3-4 cm. long; capsule clavate, hairy, about 3 cm. long; seeds smooth or slightly angled.

Sandhills near sea and Adelaide plains. Most of the year.—Chili.

*2. **O. longiflora,** Jacq. Differs from the preceding chiefly in the longer receptacle (8-12 cm. long), about 3 times longer than the petals.

Sandhills at Encounter Bay.—Temperate South America.

**O. biennis*, L. Differs from *O. odorata* in the petals withering yellow, half as long as the receptacle; capsule oblong, tapering towards summit; seeds angled. It is a North American plant said to be introduced in Victoria and New South Wales.

3. * **O. acaulis,** Cav. Prostrate, hoary perennial; leaves petiolate, oblong in outline, lyrate-pinnatisect, becoming glabrous, 10-20 cm. long, the lower segments short and narrow; petals white, about ½ length of the slender receptacle, which is 8-12 cm. long; capsule 4-winged towards summit, about 2 cm. long, sessile.

Mount Lofty Range; Clare. Oct.-Dec.—Chili. All these species are probably garden escapes.

2. EPILOBIUM, L.

(From Greek *epi*, upon; *lobos*, pod: the flower rests on the narrow pod-like capsule.)

Sepals and petals 4, caducous; stamens 8; anthers dorsifixed; slender tubular receptacle not extending above the 4-celled ovary; style filiform; stigma entire, clavate; capsule long, terete, opening loculicidally by 4 valves from the summit downwards; seeds minute, oblong, with a tuft of long hairs at the chalazal end. More or less hoary or pubescent herbs, with sessile or subsessile leaves and solitary axillary white, pink, or purple pedunculate flowers. *Willow Herb.*

A. Leaves mostly alternate, acute; hoary plant..... *E. junceum* 1.
A. Leaves mostly opposite; subglabrous plants.
Leaves rather broad, obtuse; petals 5-8 mm. long.. *E. glabellum* 2.
Leaves narrow, acute; petals about 16 mm long... *E. pallidiflorum* 3.

1. **E. junceum,** Sol. Hoary-pubescent herb, with stiff ascending stems usually 30-50 cm. high; leaves all, except some of the lowest, alternate, narrow-lanceolate, sessile, distantly toothed, 1-5 cm. long; sepals about 5 mm. long; petals a little longer; capsule about 5 cm. long.

Southern districts to Flinders Range; Eyre Peninsula. Summer.—Temperate Australia; New Zealand.

2. **E. glabellum,** Forst. More glabrous than the preceding, varying much in size, and the leaves almost all opposite except the floral ones; flowers and capsule as in the preceding, or the sepals sometimes only 3 mm. long; leaves glabrous, oblong or ovate-oblong, obtuse, sometimes 15 to 20 mm. broad, the teeth more equal and approximate.

Echunga to Encounter Bay (Mt. Lofty Range); Kangaroo Island. South-East. Summer.—Temperate Australia; New Zealand. Some small specimens from Dismal Swamp, near Mt. Gambier, have all the upper stem-leaves alternate. Others from Myponga have the leaves all opposite, except the floral ones, 8-15 mm. long, with very short petioles which become connate on the stem, thus approaching *E. confertifolium,* Hook. f.

3. **E. pallidiflorum,** Sol. Stems erect from a procumbent base, hoary; leaves opposite except the floral ones, linear-lanceolate, distantly toothed, 2-5 cm. long, 3-4 mm. broad, glabrous except for rows of short curly hairs along the margins and midrib below; sepals 8-10 mm. long; petals 15-18 mm. long, pale or purple; capsule 5-7 cm. long.

Mt. Lofty Range; South-East. Summer.—Victoria; Tasmania.

3. JUSSIEUA, L.

(Dedicated to a French family of celebrated botanists, of whom the first was Antoine de Jussieu, 1686-1758, and the most famous was his nephew Antoine-Laurent de Jussieu, 1748-1836, the founder of the natural system of classifying plants.)

1. **J. repens,** L. Herbaceous perennial, creeping or floating, villous at least on the young parts; leaves alternate, obovate to lanceolate, 3-6 cm. long, glossy above, tapering into a petiole, at the base of which are 2 small stipule-like vesicles; flowers solitary, axillary, on peduncles shorter than leaf; sepals 5, lanceolate, 6-10 mm. long, persistent for a long time, equalling or rather longer than the cylindrical receptacle, which is not produced above the 5-celled ovary; petals 5, obovate, bright yellow, longer than sepals; stamens 8; stigma capitate; capsule cylindrical, about 2 cm. long.

Chiefly in the Murray River. Summer.—Eastern Australia; warm parts of the globe.

FAMILY 85.—HALORRHAGIDACEAE.

Flowers bisexual or unisexual, regular; sepals and petals 2-4, inserted at the summit of the more or less cupshaped receptacle, the petals caducous; stamens 4-8, with basi-fixed mostly broad-linear anthers; ovary inferior, adnate to receptacle, 1-4-celled, with 1 pendulous anatropous ovule in each cell; styles as many as cells, with papillose or plumose stigmas; fruit consisting of the coherent receptacle and ripened ovary, small, indehiscent, with 1-4 cells and seeds, or separating into 4 indehiscent fruitlets; testa membranous; embryo cylindrical, in the axis of the albumen, with a long superior radicle and short cotyledons. Herbs or undershrubs, sometimes aquatic, with exstipulate leaves.

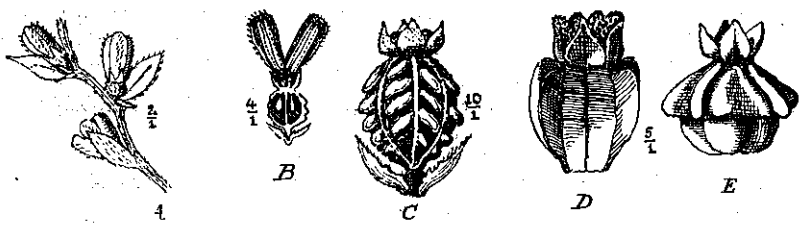

FIG. 175.—**Halorrhagidaceae.** A-C, *Halorrhagis tetragyna:* A, part of raceme: B, flower cut vertically, showing 2 petals, stamens, cells, and ovules; C, fruit with 2 bracteoles at base. D, fruit of *H. acutangula.* E, fruit of *H. semiangulata.*

A. Land-plants (except *Halorrhagis Brownii*); fruit of coherent carpels.
  Fruit 1-seeded ..... *Loudonia* 1.
  Fruit 2-4-seeded ..... *Halorrhagis* 2.
A. Water-plants: fruit breaking into 4 nut-like carpels .. *Myriophyllum* 3.

1. LOUDONIA, Lindl.

(After John Claudius Loudon, born in Lanarkshire, 1783, died in London, 1843, landscape gardener and author of numerous horticultural and botanical works.)

Sepals 2-4, broad, much shorter than receptacle; petals 2-4, concave, as long as or longer than the oblong receptacle, which has 2-4 longitudinal wings; stamens twice as many as petals; ovary at first 2-4-celled and 2-4-ovuled, becoming 1-celled and 1-seeded by suppression of the dissepiments and abortion; styles 2-4, short, with obliquely capitate stigmas; fruit 1-seeded, with 2-4 membranous reticulately-veined wings. Glabrous perennials, with stiff erect terete stems and alternate sessile linear leaves; flowers yellow, on filiform pedicels, in dense terminal corymbose panicles.

A. Flower-parts 2 ..... *L. Behrii* 1.
A. Flower-parts 4.
Epicarp membranous ..... *L. aurea* 2.
Epicarp spongy ..... *L. Roei* 3.

1. **L. Behrii,** Schlechtd. Stems slender, rigid, about 30 cm. high; leaves 1-2 cm. long, distant; corymbs forming a narrow panicle; sepals, petals, styles and ovules 2, the sepals very broad and obtuse; stamens 4; fruit compressed, obovate, broadly 2-winged, 8-10 mm. long and nearly as broad. Not infrequently some of the flowers have 3 sepals, petals, styles, and wings, but 4 stamens.

Southern districts; Kangaroo Island; Yorke and Eyre Peninsulas. Sept.-Dec.—Victoria; New South Wales.

2. **L. aurea,** Lindl. Differs from the preceding by the sepals 4, shortly acuminate, the petals normally 4, rarely more, the stamens 8 and styles 4; fruit ovoid or oblong, 6-8 mm. long, with 4 broad wings.

Flinders Range and northern part of Eyre Peninsula.—West Australia.

3. **L. Roei,** Schlechtd. Differs from the preceding chiefly in the fruit, 8-10 mm. long, with 4 very narrow wings, inflated by the fibrous-spongy epicarp; panicle denser and narrower.

Has been collected on sandhills south of the Gill Range (Central Australia) near our border. A. K. Schindler, in Engler's Pflanzenreich, records it for South Australia on the strength of 2 specimens collected by Max Koch, probably in the Flinders Range.—West Australia.

2. HALORRHAGIS, Forst.

(From Greek *hals, halos,* the sea; *rhax, rhagos,* a grape-berry, because of locality and appearance of fruit in the first New Zealand species found).

Sepals 2-4, usually persistent and rather shorter than the receptacle, which has usually 8 longitudinal nerves; petals 2-4, oblong, boatshaped, mostly hairy on back, caducous, longer than sepals; stamens 4-8; ovary 2-4-celled, the cells 1-ovulate; styles 2-4, with capitate stigmas; fruit a small 2-4-celled nut, often ribbed, angled or winged. Perennial often scabrous herbs; flowers small, 2-bracteolate, very shortly pedicellate in the axils of leafy bracts, racemose, often monoecious, sometimes almost dioecious, the male receptacle usually minute. *Raspwort.*

A. Flowers solitary in the axils; flower-parts 4. (Section *Monanthus,* Schindler).
B. Leaves opposite; flowers racemose.
C. Fruit wrinkled or tuberculate; hairy plants.
Leaves lanceolate ..... *H. tetragyna* 1.
Leaves ovate ..... *H. teucrioides* 2.
C. Fruit smooth, shining; glabrous plant; leaves ovate ..... *H. micrantha* 3.
B. Leaves alternate; hairy plant; fruit wrinkled; flowers panicled ..... *H. elata* 4.
A. Flowers 1-6, clustered in the axils. (Section *Pleianthus,* Schindler).
D. Fruit not winged.
E. Flower-parts 4, rarely 3; stamens 8; land-plants.
Scabrous-hairy plant; fruit tuberculate-rugose *H. heterophylla* 5.
Glabrous plant; fruit smooth or wrinkled ... *H. mucronata* 6.
E. Flower-parts 2; stamens 4; water-plant ..... *H. Brownii* 7.
D. Fruit with vertical membranous wings or prominent stiff angles; leaves alternate.
F. Flower-parts 4; stamens 8.
G. Leaves narrow, rigid, sessile.

H. Fruit 4-winged ; scabrous-ciliate plant ..... *H. ciliata* 8.
H. Fruit 4-angled ; almost glabrous plants.
Angles vertical, along whole length of fruit. *H. acutangula* 9.
Angles oblique, only on upper part of fruit . *H. semi-angulata* 10.
G. Leaves petiolate, lanceolate ; fruit 4-winged ... *H. odontocarpa* 11.
F. Flower-parts 3 ; stamens 6 ; fruit 3-winged ..... *H. Gossei* 12.

1. **H. tetragyna** (Labill.) Hook. f. Stems mostly ascending, 20-60 cm. long, the whole plant more or less scabrous with short appressed hairs ; leaves opposite, the uppermost linear-lanceolate, the lower ones lanceolate or obovate, minutely and distantly serrate, 7-15 mm. long ; flowers solitary, in slender bracteate racemes, the ovate-lanceolate bract shorter than or only half as long as the flower, which is about 4 mm. long ; receptacle glabrous or pubescent on the ribs ; bracteoles broad, membranous, reddish, ciliate, shorter than receptacle ; fruit globular, grey, 1½ mm. long, with 3-4 oblique oblong tubercles between the ribs. (Fig. 175, A-C.)
Southern districts ; Kangaroo Island ; 90-Mile Desert ; South-East. Oct.-Dec.—Eastern States.

2. **H. teucriodes**, DC. Stems erect or ascending, to about 30 cm. long, scabrous with short hairs ; leaves opposite, ovate or ovate-lanceolate, coarsely crenate-serrate, sometimes almost cordate at base, 8-15 mm. long ; flowers solitary, the bract ovate-lanceolate, shorter than or rather longer than the flower ; receptacle globular ; pubescent ; bracteoles lanceolate, hairy, entire or almost so, shorter than receptacle ; fruit globular, about 1½ mm. long, transversely tuberculate or wrinkled.
Southern districts to Flinders Range ; Kangaroo Island. Sept.-Dec.—Eastern States.
Var. *Meziana* (Schindler), J. M. Black. The leaves sometimes longer (to 3 cm. long), the bracteoles ovate, glabrous, pink, rather deeply toothed and acuminate.—*H. Meziana*, Schindler.—Southern districts ; Kangaroo Island ; Yorke and Eyre Peninsulas.—Victoria ; Tasmania.

3. **H. micrantha** (Thunb.) R.Br. Glabrous, with ascending usually slender stems ; leaves opposite, rather thin, orbicular or ovate, 7-10 mm. long, closely crenate-serrate ; flowers in filiform racemes ; bracts and bracteoles minute ; receptacle about ½ mm. long ; fruit subglobular, finely 8-ribbed, otherwise smooth and shining.
Wet parts of Mt. Lofty ; Kangaroo Island ; South-East. Summer.—Eastern Australia ; eastern Asia and Bengal.

4. **H. elata**, A. Cunn. Erect, to 50 cm. high, more or less scabrous with short spreading hairs ; leaves oblanceolate or linear-lanceolate, 1-4 cm. long, entire or distantly serrate in upper part, rigid, mostly alternate ; flowers solitary, in bracteate racemes forming a terminal panicle, the lanceolate bracts twice as long as receptacle, which is subglobular, 1 mm. to nearly 1½ mm. long, faintly 8-nerved, pubescent ; bracteoles membranous, hairy, about ½ as long as receptacle ; fruit ovoid, blackish, 1½ mm. long, wrinkled by 3-4 transverse ridges.
Southern districts to Flinders Range. Oct.-Nov.—Eastern States.

5. **H. heterophylla**, Brongn. (1829). Plant always more or less scabrous with short stiff hairs, 15-50 cm. high ; stems erect or ascending ; leaves opposite or alternate, often on the same plant, narrow or broad-lanceolate, cuneate in the broader ones, entire, 3-toothed or 3-lobed in upper part, mostly thick and rigid, sometimes coarsely serrate with distant spreading teeth, scabrous-ciliate or scabrous all over, 1-3 cm. long ; flowers 1-4 in the axils of lanceolate bracts which become very small towards the summit of the raceme ; bracteoles very narrow ; receptacle broad-based, hairy, 1-2 mm. long ; fruit ovoid or subglobular, hard, about 3 mm. long, smooth near the summit, transversely tuberculate-rugose in the lower three-quarters.—*H. ceratophylla*, Endl. (1833) ; *H. aspera*, Lindl. (1848).
Southern districts to Far North ; Yorke and Eyre Peninsulas ; Murray lands to South-East. Most of the year.—Eastern States ; Central Australia. Varies greatly in the leaf, which is 1-8 mm. broad, and may be entire or 3-toothed near summit, the middle tooth or lobe the largest, or it may have 2-6 conspicuous or inconspicuous teeth along each margin. Where the leaf is linear, it may be entire or have a long acute tooth or lobe on each margin. The serrate leaves often resemble those of *H. elata*.

6. **B. mucronata** (Nees) Benth. Glabrous all over, rather slender, to 50 cm. high ; leaves alternate, linear, rather thick, 1½-4 cm. long, 1-3 mm. broad, with a sharp callous point ; flowers 1-5 in bracteate racemes forming terminal panicles ; bracts or floral leaves linear-lanceolate ; bracteoles minute, about as long as the receptacle ; petals 4, glabrous ; styles and ovary-cells 4, said to be sometimes 3 ; fruit ovoid, smooth, about 2 mm. long.—*H. digyna*, F. v. M. partly not Labill.

Mt. Lofty Range; Kangaroo Island; Murray lands.—Victoria; West Australia.
Var. *trachycarpa*, J. M. Black. Fruit globular, 4-ribbed, transversely wrinkled.—Myponga. I have not seen any specimens of the type, and quote the localities from Bentham.

7. **H. Brownii** (Hook. f.) Schindler. Semi-aquatic glabrous herb, with procumbent rooting stems; leaves alternate, 1-2 cm. long, once or twice pinnatisect, the rhachis and lobes narrow-linear; flowers 1-4 in the axils of the upper leaves, the bracteoles minute; sepals, petals and styles 2; stamens 4; fruit compressed-ovoid, 2 mm. long, slightly wrinkled.—*Meionectes Brownii*, Hook, f. (1841); *H. Meionectes*, F. v. M. (1888).
Swamps and rivers in southern districts and South-East; Kangaroo Island. Summer.—Temperate Australia.

8. **H. ciliata,** J. M. Black. Branches scabrous with short hairs; leaves alternate, narrow-lanceolate, distantly serrate in upper part, sessile, 1-2 cm. long, scabrous-ciliate, rigid, the uppermost almost entire; flowers mostly 2-3 in the axil, shorter than the leafy ciliate bracts, the bracteoles about as long as receptacle, linear-lanceolate, green, ciliolate; fruit depressed-globular in outline, 2½ mm. long, 4 mm. broad, including the 4 broad ciliolate wings, 4-celled, the space between the wings tuberculate or transversely rugose.
Murray lands. Summer. Resembles *H. acutangula*, but differs in the fruit and the short stiff hairs. The localities where specimens have been obtained are Mannum and Geranium.

9. **H. acutangula,** F. v. M. Glabrous erect herb; leaves alternate, stiff, pale-colored, subercct, narrow-lanceolate, 1½-3 cm. long, serrate in upper part, sessile; flowers mostly 2-4 together, forming dense terminal racemes, the bracts leafy, the bracteoles broad-lanceolate, as long as the flowers; receptacle acutely 4-angled, glabrous; fruit ovoid, 3-4 mm. long, prominently 4-angled or almost 4-winged, smooth between the angles. (Fig. 175, D.)
Southern districts; Kangaroo Island; Yorke and Eyre Peninsulas; Murray lands. Summer.

10. **H. semi-angulata,** J. M. Black. Almost glabrous herb; leaves alternate, narrow lanceolate, stiff, sessile, distantly serrate, 15-25 mm. long, glabrous except on the ciliolate margins; flowers mostly 3-4 in the axil, the bracts leafy, serrulate, the bracteoles linear-lanceolate, green, about as long as the flowers; receptacle 4-angled, glabrous; petals 4, glabrous; fruit depressed, subglobular, 2¼ mm. long, 4 mm. broad, 4-celled, smooth, the upper half prominently obliquely and rigidly 4-angled, broader than and overhanging the rounded lower half. (Fig. 175, E.)
Known only by one specimen from Yalata (near Fowler's Bay) preserved in the Tate Herbarium.

11. **H. odontocarpa,** F. v. M. Glabrous or slightly hairy erect herb; leaves alternate, broad-lanceolate, coarsely serrate, rather thin, 2-4 cm. long, tapering into petioles 5-10 mm. long; flowers mostly 3-6 in the axils, forming dense racemes, the upper bracts shorter than the flowers, the bracteoles minute, scarcely longer than the pedicels of the female flowers; styles 4, finally divergent; fruit ovoid, about 4 mm. long and broad, 4-celled, the 4 wings sometimes extending upwards and downwards from the ovary, so that they appear more or less lobed at base and summit, the space between the wings often tuberculate; female flowers and fruits on pedicels 1-2 mm. long.
Murray lands to Far North. Most of the year.—Western New South Wales; central Australia.

12. **H. Gossei,** F. v. M. Erect glabrous herb; leaves alternate, tapering at base into a short petiole, narrow-lanceolate, 2-3 cm. long, distantly and very shortly toothed in upper part; flowers 2-5 in the axils of small bracts, forming dense racemes, the bracteoles minute; sepals 3, broad and obtuse; petals and styles 3; stamens 6; fruit ovoid, 3-celled, about 5 mm. long, the 3 wings rounded and extended above and below the ovary.
Birksgate Range.—Central and West Australia.

3. MYRIOPHYLLUM, L.

(Greco-Latin *myriophyllon*, the name of some many-leaved plant, from Greek *myrios*, innumerable; *phyllon*, leaf.)

Male flowers with a very small receptacle and 4 short sepals; petals 4, hood-shaped, small, but much longer than the sepals; stamens 2, 4, or 8; female flowers without petals, the 4 sepals minute and alternate with the styles or absent; ovary 4-celled (in all our species), with 1 ovule in each cell; styles 4, short, erect, usually penicillate; fruit

separating, sometimes tardily, into 4 small 1-seeded nut-like fruitlets. Aquatic glabrous herbs, the submerged leaves usually finely pinnatisect; flowers very small, mostly monoecious in the upper axils, 2-bracteolate, the upper ones chiefly male, the lower female. An almost cosmopolitan genus. *Water Milfoil.*

A. Stamens 8; anthers linear, with very short filaments; stems 10 cm. to over 1 m. long.
  B. Leaves all opposite and entire, obovate ..... *M. amphibium* 1.
  B. Lower leaves whorled, the submerged ones finely dissected.
    C. All leaves whorled.
      D. Upper leaves narrow, as well as the lower ones.. *M. propinquum* 2.
      D. Upper leaves broader and shorter than the lower ones.
        Floral leaves ovate, toothed or entire..... *M. elatinoides* 3.
        Floral leaves oblong, pinnatifid or rarely entire *M. verrucosum* 4.
    C. Upper leaves opposite; all leaves pinnatisect ..... *M. Muelleri* 5.
A. Stamens 2, anthers ovoid; leaves mostly alternate and entire; stems about 2 cm. long ..... *M. integrifolium* 6.

1. **M. amphibium,** Labill. Small herb, usually reddish all over, with creeping and rooting stems; leaves all opposite, oblanceolate or obovate, obtuse, entire, tapering towards base, 5-8 mm. long; male sepals oblong; fruitlets ovoid, about 1 mm. long, smooth or almost so.

Mt. Compass, Myponga, and Square Waterhole (Mt. Lofty Range); Kangaroo Island, Summer.—Victoria; West Australia.

M. pedunculatum, Hook. f., which differs from the preceding in linear leaves and very shortly pedunculate tuberculate fruitlets, has been recorded for the Mt. Gambier District, I do not know on what authority.—East Australia.

2. **M. propinquum,** A Cunn. (1839). Stems ascending or erect, sometimes rather stout; leaves all in whorls of usually 4-5, the submerged ones pinnatisect with capillary segments, the emerged leaves narrow-linear, entire or serrate, or the lower ones pinnatipartite with short filiform divisions; floral leaves narrow, 5-25 mm. long; male sepals oblong, conspicuous; fruitlets ovoid, tuberculate, about 1 mm. long.—*M. variaefolium,* Hook. f. (1840); *M. intermedium,* Clarke partly not DC.

Streams, lakes, and swamps in Mt. Lofty Range, Kangaroo Island; South-East; River Murray. Summer.—Temperate Australia.

3. **M. elatinoides,** Gaudich. Leaves all whorled, the submerged ones pinnatisect with capillary segments, the emerged ones in whorls of 4, sometimes 5 or 6, oblong-lanceolate, 5-10 mm. long, obtuse, entire, or slightly serrate; sepals small, acuminate; fruitlets ovoid, about 1 mm. long, smooth, cohering for a long time.

Similar localities to the preceding. Summer.—Victoria; New South Wales; Tasmania; New Zealand; South America.

4. **M. verrucosum,** Lindl. Usually slender; leaves in whorls of 3 to 6, the submerged ones pinnatisect with capillary segments, the emerged ones pinnatifid or pinnatipartite with obtuse lobes narrower than the rhachis or central portion of leaf, the floral ones in whorls of 3 or 4, ovate-oblong, pinnatifid or sometimes entire, about 5 mm. long; sepals minute; fruitlets 4, about 1 mm. long, obtusely angled on the back and more or less tuberculate.

Streams and swampy ground throughout the State to the Far North. Summer.—Throughout Australia.

5. **M. Muelleri,** Sond. Slender submerged herb; the lowest leaves in whorls of 3, 5-15 mm. long, the upper ones opposite, all pinnatisect into capillary segments; flowers monoecious in the upper axils, each of the males enclosed in a hoodshaped bract; sepals minute; fruitlets 4, ovoid-oblong, smooth, 1½ mm. long.

Swamps and waterholes throughout the State. Summer.—Victoria; West Australia.

6. **M. integrifolium.** Hook. f. Minute herb, 1-2 cm. high; leaves all alternate or the lower ones opposite, entire, linear or subulate, 3-5 mm. long by ½ mm. broad; sepals obsolete; stamens 2 (said to be sometimes 4), the filaments as long as or longer than the anthers; styles very short; fruitlets 4, smooth, ovoid-oblong, ½-¾ mm. long.

Near the Murray and other waters in southern districts; Kangaroo Island; South-East. Summer.—Temperate Australia.

Family 86.—UMBELLIFERAE.

Flowers usually bisexual and regular, or the outer petals longer than the inner; sepals 5, small, sometimes obsolete; petals 5, usually bent inwards, at least in bud, inserted with the sepals and stamens at the summit of the receptacle and round an epigynous mostly 2-lobed disk; stamens 5, opposite the sepals; ovary inferior, adnate to receptacle, 2-celled, with 1 pendulous anatropous ovule in each cell; styles 2, free, or their bases thickened and confluent with the disk; fruit separating into 2 nutlike 1-seeded fruitlets (half-fruits or *mericarps*), which sometimes hang for a time at the summit of the free persistent carpophore which is a slender simple or 2-branched column rising from the pedicel and forming part of the ripe receptacle, or the carpophore may be adnate to the fruit and fall off with one of the fruitlets or be nearly obsolete; each fruitlet with normally 5 primary longitudinal ribs, namely 1 *dorsal*, on the back of the fruitlet, 2 *lateral*, on the inner margin close to the *commissure* (the more or less flattened internal surface where the 2 fruitlets meet), and 2 *intermediate*, between the dorsal and lateral ribs on each side; in some genera there are 4 secondary ribs situated between the primary ones; inside these secondary ribs or in the furrows between the primary ones, and within the pericarp, are often 4 oil-channels (*vittas*) and 2 at the commissure, or 6 in all, but sometimes the vittas are more numerous; seed adherent to pericarp; testa thin; embryo small, near the summit of the seed, with superior radicle and surrounded by the copious horny albumen. Herbs with often hollow stems and alternate mostly divided leaves, the petiole usually dilated into a broad concave leaf-sheath; no stipules except in *Hydrocotyle*: flowers small, usually white or pink, rarely yellow, in simple or compound umbels, rarely in heads, with usually a whorl of bracts (*involucre*) at the base of each umbel; where the umbel is compound the partial umbels (*umbellules*) are also usually subtended by bracts called an *involucel*. The lower (lateral) peduncles supporting the umbels are often leaf-opposed (*i.e.*, opposite to the stem-leaves), owing to an extension of the main axis of the flowering branch by a shoot rising from the axil of the leaf subtending the terminal umbel, which thus becomes lateral.

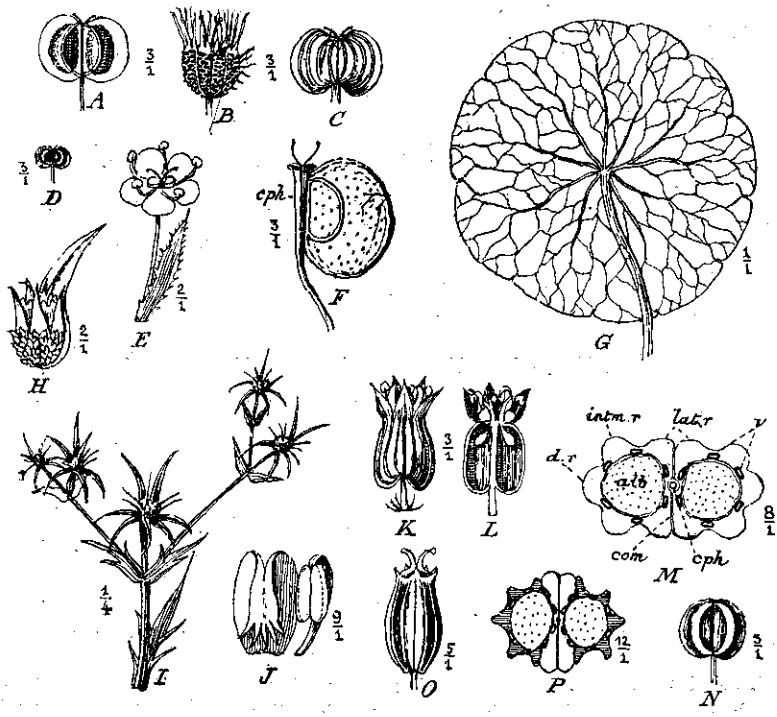

Fig. 176.—**Umbelliferae.** A, fruit of *Hydrocotyle pterocarpa*. B, fruit of *H. comocarpa*. C, fruit of *Centella asiatica*. D, fruit of *Hydrocotyle callicarpa*. E-F, *Didiscus glaucifolius*: E, flower and bract; F, fruit. G, peltate leaf of *Hydrocotyle vulgaris*. H-J, *Eryngium rostratum*: H, flower and bract; I, flowering stem; J, petal and stamen. K-L, *Xanthosia pusilla*: K, flower; L, vertical section of flower. M-N, *Apium australe*: M, transverse section of fruit; N, fruit. O-P, *Lilaeopsis australica*: O, fruit; P, transverse section of fruit. Abbreviations: *cph*, carpophore; *d. r*, dorsal rib; *intm. r*, intermediate rib; *lat. r*, lateral rib; *v*, vitta; *com*, commissure; *alb*, albumen.

A. Flowers in simple umbels; leaves and involucres not spiny.
B. Fruit without vittas, laterally compressed; seed flat or convex along the narrow commissure.
C. Fruitlets without wings or with very narrow rib-wings.
D. Fruitlets 7-9-ribbed.
Leaves reniform; water-plant; involucral bracts small ..... CENTELLA 1.
Leaves 3-partite; land-plant; involucral bracts conspicuous ..... XANTHOSIA 2.
D. Fruitlets 5-ribbed.
Leaves often orbicular with small scarious stipules ..... HYDROCOTYLE 3.
Leaves palmately divided, without stipules .. DIDISCUS 4.
C. Fruitlets with 2 conspicuous divaricate wings ..... ULDINIA 5.
B. Fruit with vittas, slightly compressed laterally.
Leaves reduced to terete, septate phyllodes; seed flat along the commissure ..... LILAEOPSIS 6.
Leaves pinnatisect; seed furrowed along the commissure ..... OREOMYRRHIS 7.
A. Flowers in dense heads; leaf-lobes and involucres spiny; seed flat along the commissure ..... ERYNGIUM 8.
A. Flowers in compound umbels.
E. Leaves entire, sessile; seed flat along the commissure BUPLEURUM 9.
E. Leaves more or less deeply divided, petiolate.
F. Fruit prickly, scarcely compressed; vittas present.
Fruit prickly on the secondary ribs; seed flat along the commissure ..... DAUCUS 10.
Fruit prickly all over; seed furrowed along the commissure ..... TORILIS 11.
F. Fruit without prickles.
G. Vittas absent; fruit compressed laterally.
H. Fruitlets 5-ribbed.
I. Seed deeply furrowed along the commissure.
Fruit oblong, with a long beak; ribs inconspicuous ..... SCANDIX 12.
Fruit ovoid, not beaked; ribs prominent.... CONIUM 13.
I. Seed convex at the commissure; ribs thin; involucral bracts small ..... TRACHYMENE 14.
H. Fruitlets 7-9-ribbed; ribs thin; seed flat at commissure; involucral bracts conspicuous XANTHOSIA 2.
G. Vittas present; fruitlets 5-ribbed; seed flat or convex along the commissure.
J. Involucral bracts present.
Water-plant; leaves once pinnatisect; flowers white..... SIUM 15.
Land-plant; leaves twice pinnatisect, flowers greenish-yellow ..... PETROSELINUM 16.
J. Involucral bracts none or very few and small.
K. Flowers white; fruit compressed laterally .. APIUM 17.
K. Flowers yellow.
Leaf-segments filiform; fruit scarcely compressed ..... FOENICULUM 18.
Leaf-segments ovate; fruit flattened by dorsal compression ..... PASTINACA 19.

1. CENTELLA, L.

(Said to be a Latinised diminutive of Greek *kentron*, a sharp point or bristle, but the application is not obvious).

1. **C. asiatica** (L.) Urb. Stems creeping and rooting at nodes; leaves cordate or reniform, entire, sinuate or crenate, glabrous, 2-3 cm. long, the petioles glabrous, or hairy, scarious at base but not stipulate; flowers 2-3 in simple umbels with 2 ovate bracts at base; sepals minute; petals white or pink, imbricate; fruit about 2½ mm. long, compressed laterally, each fruitlet 7-9-ribbed; carpophore adnate to the narrow commissure, almost obsolete. (Fig. 176, C.).—*Hydrocotyle asiatica*, L.

In or near water, southern districts; Kangaroo Island, River Murray; South East.—Throughout Australia and New Zealand; Asia; Africa; America.

2. XANTHOSIA, Rudge.

(From Greek *xanthos*, yellow: the color of the hairs on some species).

Sepals conspicuous, broad-lanceolate, acute, attached to receptacle by their broad bases (in our species); petals much inflexed at summit; fruit laterally compressed, without vittas; fruitlets obtuse on back, more or less 9-ribbed, the primary and often the secondary ribs prominent and incurved at base; carpophore adnate to the narrow commissure, almost obsolete. Perennial herbs with divided leaves; flowers on very short pedicels in leaf-opposed umbels.

Leaves once divided; umbels simple..... *X. pusilla* 1.
Leaves twice or thrice divided; umbels compound ..... *X. dissecta* 2.

1. **X. pusilla,** Bunge. Small procumbent plant, villous with spreading hairs, the stems 4-15 cm. long; leaves trisect, the segments lanceolate, 6-15 mm. long, longer than the broad channelled petiole; umbels simple, sessile or pedunculate, 2-4-flowered, surrounded by about 5 linear bracts rather longer than the flowers; sepals acute, about 2 mm. long; petals narrow; fruit oblong, 3½ mm. long, with 4-6 ribs on each side. (Fig. 176, K-L.)

Mt. Lofty Range to Encounter Bay; Yorke Peninsula. Sept.-Oct.—Victoria; Tasmania; West Australia.

2. **X. dissecta,** Hook. f. Stems ascending, 3-25 cm. long; leaves once or twice trisect, 8-30 mm. long, the ultimate segments cuneate and irregularly tripartite, glabrous at least when mature; petiole terete, slender, 1-grooved, longer than leaf, usually sprinkled with branched hairs; peduncles slender, usually hairy, shorter or not longer than petiole, bearing a compound umbel of 3-4 short rays, the umbellules 3-6-flowered; bracts of involucre linear, those of the involucel broad, trisect, hairy; flowers and fruit smaller than in the preceding, the latter about 2½ mm. long, usually 6-ribbed on each side.

Mt. Lofty Range; Kangaroo Island; Eyre Peninsula; South-East. Sept.-Nov.—Eastern States. There are sometimes 1 or 2 flowers in the centre of the umbel, at the base of the rays. Most of our specimens have so much in common with the West Australian *X. peduncularis*, Benth. (except as regards the peduncle longer than leaf), that one is inclined to think the latter should be united to *X. dissecta*.

3. HYDROCOTYLE (Tourn.) L.

(From Greek *hydôr*, water; *kotylê*, a dish or plate: alluding to the shape of the leaves slightly depressed in the centre.)

Sepals almost obsolete; petals straight at summit, acute; fruit compressed laterally without vittas, each fruitlet 5-ribbed, the intermediate ribs usually prominent; carpophore undivided. Small herbs with petiolate leaves orbicular or cordate in outline; stipules scarious, more or less adnate to the petiole; flowers in simple axillary umbels or heads, sometimes with small involucral bracts. *Pennywort.*

A. Perennials with creeping stems rooting at the nodes; fruits smooth except in *H. comocarpa;* carpophore almost obsolete, adnate to the commissure, falling off with fruit.
  B. Leaves almost entire, peltate ..... *H. vulgaris* 1.
  B. Leaves palmatilobed or palmatifid.
    C. Flowers mostly unisexual, the pedicels becoming 3-6 mm. long..... *H. laxiflora* 2.
    C. Flowers bisexual; fruits subsessile or the fruits on pedicels 1-2 mm. long.
      D. Fruitlets flat, narrowly winged on back..... *H. pterocarpa* 3.
      D. Fruitlets convex on sides.
        Fruitlets smooth, glabrous ..... *H. hirta* 4.
        Fruitlets rugose, bristly ..... *H. comocarpa* 5.
  B. Leaves palmatisect; fruitlets convex ..... *H. tripartita* 6.

A. Annuals with procumbent or ascending stems; stem-leaves divided, the radical ones withering early and usually entire; carpophore becoming free and persistent on pedicel.
  E. Fruits slightly compressed laterally (fruitlets convex on sides).
    F. Fruit wrinkled, with thick prominent ribs not much curved ..... *H. medicaginoides* 7.
    F. Fruit with the prominent intermediate ribs curved so as to enclose a circular pit on each side.
      G. Fruit smooth between the ribs; stems short ... *H. callicarpa* 8.

G. Fruit with a row of tubercules between the ribs; stems diffuse.
Stems filiform ..... *H. trachycarpa* 9.
Stems stout ..... *H. crassiuscula* 10.
G. Fruit pitted on back between the ribs.
H. Fruit 2½-3mm. broad.
Fruit minutely pitted ..... *H. capillaris* 11.
Fruit broadly pitted or rugose ..... *H. pilifera* 12.
H. Fruit 1¼ mm. broad ..... *H. rugulosa.*
E. Fruits flat, smooth, with prominent dorsal rib ..... *H. diantha* 14.

1. **H. vulgaris,** L. Glabrous; stems slender, sending up from each node 1-3 orbicular centrally peltate broadly crenulate leaves, 2-5 cm. diam., on long petioles; flowers subsessile, umbellate or whorled, on peduncles shorter than petioles, with minute bracts; fruit 2 mm. long by 3 mm. broad. (Fig. 176, G.)

Near water, southern districts to Flinders Range; Murray River; South-East. Summer.—Most of Australia; Europe; Africa.

2. **H. laxiflora,** DC. Beset with white spreading hairs; flowering branches ascending from the creeping stems; leaves orbicular-cordate, 1½-3 cm. diam., palmately 5-9-lobed; the lobes crenate; flowers numerous in globular umbels mainly unisexual, the males on longer pedicels than the females; peduncles often longer than petioles; fruit scarcely notched at summit, about 2½ mm. broad.—*H. Candollei,* F. v. M.

Southern districts to Flinders Range; 90-Mile Desert; South-East. Oct.-Dec.—Eastern States.

3. **H. pterocarpa,** F. v. M. Glabrous; stems creeping and leaves often rising directly from the nodes; leaves orbicular-cordate or reniform, 1½-3½ cm. diam., with 7-11 broad crenatures or shallow lobes, the sinus very narrow; flowers subsessile in a head, on peduncles shorter than petiole; fruit flat, nearly 3 mm. long and 4 mm. broad, the dorsal rib with a wing about ½ mm. broad, the intermediate ribs obscure, the lateral ones rather prominent. (Fig. 176, A.)

In water, Mt. Lofty Range; Glenelg River, S.E. Summer.—Victoria; Tasmania; New Zealand.

4. **H. hirta,** R. Br. Very slender and more or less hairy, especially on the lower face of the leaves, which are orbicular-cordate or reniform, usually 6-20 mm. diam., with 5 crenulate lobes either shallow or reaching to the middle or a little deeper; peduncles shorter than petioles, with a small head of subsessile flowers; fruit 1-1½ mm. long, 1½-2 mm. broad, the dorsal and intermediate ribs prominent, the back rounded.

Moist places, southern districts; South-East. Summer.—Temperate Australia.

A glabrous specimen from Beachport with reniform leaves, each having about 7 very broad crenatures or lobes and a narrow sinus between them, and unripe fruit resembling that of *H. hirta,* may be *H. plebeja,* R. Br., a West Australian species.

5. **H. comocarpa,** F. v. M. Small, procumbent, loosely hairy on stems and petioles; leaves orbicular-cordate or reniform, 5-10 mm. diam., cut to about the middle into 5-7 crenate lobes; flowers 12-20, subsessile in small heads on short peduncles; fruits subtruncate, 1½ mm. long, 2 mm. broad, the summit surrounded by a row of flat white hairs or bristles as long as the fruit, the dorsal edge obtuse, the sides transversely wrinkled. (Fig. 176, B.)

Kangaroo Island. Sept.-Nov.

6. **H. tripartita,** R. Br. Small, slender and usually hairy, or the stems sometimes elongated; leaves reniform in outline, mostly 3-6 mm. broad, divided to base into 3-5 3-toothed cuneate segments; stipules entire; peduncles filiform, shorter than petioles, with 3-6 almost sessile flowers; fruits 1 mm. long, nearly 1½ mm. broad, the intermediate ribs rather prominent, the back rounded.

South-East. Summer.—Eastern States.

7. **H. medicaginoides,** Turcz. Slender almost or quite glabrous annual, the stems 3-6 cm. long; leaves reniform, 4-10 mm. broad, divided to middle or deeper into 3 entire or toothed lobes; stipules ciliate; peduncles filiform, with a head of 6-12 almost sessile flowers; fruits about 1 mm. long and 2 mm. broad, the prominent dorsal and intermediate ribs forming 3 thick wings to each fruitlet, wrinkled between the ribs.

LeFevre Peninsula; Yorke and Eyre Peninsulas; probably Murray lands.—Western Victoria; West Australia.

8. **H. callicarpa,** Bunge. Slender annual 1-7 cm. high; glabrous or the leaves and petioles sparsely hairy; leaves reniform in outline, 3-10 mm. broad, 3-5-lobed halfway or sometimes nearly to base, the lobes entire, toothed or crenate; stipules fringed; peduncles 3-12-flowered; fruits under 1 mm. long, 1-1½ mm. broad, finally black, on distinct capillary pedicels about 1 mm. long, smooth, the intermediate ribs very prominent and curved so as to enclose a circular pit on each side of the fruit. (Fig. 176, D).

Southern districts; Kangaroo Island; Yorke and Eyre Peninsulas; South-East. Sept.-Oct.—Temperate Australia.

9. **H. trachycarpa,** F. v. M. Slender glabrous annual, the procumbent filiform stems often lengthening to 20 or 30 cm.; leaves reniform in outline, thin, 10-25 mm. broad, 3-5-lobed to about the middle, the lobes mostly broad and bluntly or sharply toothed; stipules ciliolate; peduncles capillary, 3-12-flowered; fruits about 1 mm. long and 2 mm. broad, on pedicels 1½-2 mm. long, the intermediate ribs prominent and curved so as to form a circular tuberculate pit in the centre, with a single row of tubercles between the intermediate and dorsal ribs.

Mooloolo, Mt. Parry and Wilpena Pound (Flinders Range); Everard Range. Winter and spring.—Western New South Wales; Central Australia. The tubercles are sometimes faint or almost absent, in which case the species is distinguished from *H. callicarpa* by the diffuse stems.

10. **H. crassiuscula,** F. v. M. Glabrous annual resembling the preceding, but the diffuse stems, 6-30 cm. long, stouter and rigid; leaves 10-15 mm. broad, divided to base into 3 toothed or lobed segments; stipules ciliate, adnate up to the truncate summit; peduncles short, rigid, about 8-flowered; fruits 1½ mm. long, 2½-3 mm. broad, with a central pit and tubercles as in the preceding, on pedicels about 1½ mm. long.

Kangaroo Island. Sept.-Oct.

11. **H. capillaris,** F. v. M. Small, glabrous, the slender stems 2-5 cm. long; leaves 2-8 mm. broad, divided to about the middle into 3 entire or crenate lobes; stipules ciliate or fringed; peduncles short, with 3-6 subsessile flowers; fruits about 1 mm. long by 2 mm. broad, on pedicels about ½ mm. long, the intermediate ribs curved so as to form a smooth circular central pit, the back of each fruitlet punctulate with minute pits between the intermediate and dorsal ribs.

Moist places, southern districts; Kangaroo Island; Yorke and Eyre Peninsulas; South-East. Spring.—Temperate Australia.

12. **H. pilifera,** Turcz. Annual 3-12 cm. high, with scattered hairs; leaves reniform in outline, 8-30 mm. broad, 5-lobed to middle, the lobes broad and crenate; stipules conspicuous, adnate to petiole, fringed; peduncles with a head of 6-20 flowers; fruits 1½-2 mm. long, 2-3 mm. broad, the curved intermediate ribs enclosing a circular pit; the space between the intermediate and dorsal rib transversely rugose or broadly punctulate; ribs thick, obtuse; pedicels thick, shorter than fruit.

Between Marree (Hergott) and Strangways Springs; Muloowurtie, Y.P.—West Australia.

13. **H. rugulosa,** Turcz. Slender glabrous annual, 2-6 cm. high; leaves 4-8 mm. broad, divided below the middle into usually 3 lobes, entire or again 3-lobulate; stipules ovate, scarious; umbels 2-4 flowered, on very short slender pedicels; fruits about 1 mm. long, 1¼ mm. broad, obtuse and rugulose on back, with a few minute irregular pits and 2 larger obscure, central pits formed by the thick intermediate ribs.

Muloowurtie, Y.P.—West Australia.

14. **H. diantha,** DC. Small slender glabrous procumbent annual; leaves reniform in outline, about 5 mm. broad, bluntly 5-7-lobed; stipules entire; umbels sessile or shortly pedunculate, mostly 2-5-flowered; fruits flat, 2 mm. long, 2½ mm. broad, the dorsal rib prominent, almost winged, on pedicels 1-2 mm. long, the intermediate rib also prominent.

In wet soil at Karatta, Kangaroo Island. Sept.-Nov.—West Australia.

4. DIDISCUS, DC.

(From Greek *dis*, twice; *diskos*, quoit, disk: meaning a "double disk," in allusion to the shape of the fruit).

Sepals minute; petals straight at summit; fruit compressed laterally; fruitlets 5-ribbed; disk flat; carpophore undivided, persistent. Herbs with ternately divided leaves and petioles widened and ciliate towards base; flowers in simple umbels on terminal or leaf-opposed peduncles, with an involucre of short linear bracts often slightly united at base.

A. Small annuals; umbels 3-12-flowered.
  B. One fruitlet smooth or granular, the other muricate. *D. pusillus* 1.
  B. Fruitlets equally clothed.
    Fruitlets bristly with flat hairs ..... *D. cyanopetalus* 2.
    Fruitlets woolly with intricate hairs ..... *D. ornatus* 3.
A. Coarse erect annuals or biennials; umbels with 50 or more flowers.
    Hairy plant ..... *D. pilosus* 4.
    Glabrous and glaucous plant ..... *D. glaucifolius* 5.

1. **D. pusillus,** (DC.) F. v. M. (1875). Somewhat hairy erect or ascending annual, usually 3-12 cm. high; leaves palmatisect into 3-5 narrow-cuneate mostly lobed segments on petioles often longer than leaf; umbels 6-12-flowered; petals white; fruit 3-5 mm. broad, the outer carpel muricate with short barbellate bristles, the inner smooth or tuberculate on margin.—*Trachymene pilosa,* Sm. (1819); *Dimetopia pusilla,* DC. (1830); *Didiscus pilosus* (Sm.) Domin (1908) non Benth.

Southern districts; Kangaroo Island; Yorke and Eyre Peninsulas. Sept.-Nov.—Temperate Australia. The name *Didiscus pilosus* having been given by Bentham in 1837 to another species, and being then the first application of the name in this genus, it cannot, under art. 53 of the international rules, be lawfully transferred to this species, as proposed by Domin.

2. **D. cyanopetalus,** F. v. M. Scarcely differs from the preceding except that the umbels are 3-5-flowered, the petals bluish, and both fruitlets covered with purplish flat simple or barbellate hairs or bristles.—*Trachymene cyanopetala* (F. v. M.) Benth.

Southern districts; Murray lands; Yorke and Eyre Peninsulas. Aug.-Oct.—Western Victoria and New South Wales; West Australia.

3. **D. ornatus** (Endl.) Domin. Near the 2 preceding, but the leaf-segments are entire or lobed; umbels mostly 3-6-flowered; petals white; both fruitlets densely covered with fine white woolly hairs so that they appear almost globular, the whole fruit 6-8 mm. broad.—*Cesatia ornata,* Endl. (1838); *Dimetopia eriocarpa,* F. v. M. (1855); *Trachymene eriocarpa* (F. v. M.) Benth. (1866).

Flinders Range and towards Lake Frome; Eyre Peninsula. Aug.-Oct.—Western New South Wales; West Australia. Differs from the preceding in the narrower leaf-segments and involucral bracts, and especially in the much finer hairs, so intricate that they make the fruits appear like small balls of down.

Var. *semilanatus,* J. M. Black. Sides of fruitlets shortly tomentose, the dorsal rib densely woolly, so as to appear narrowly winged.—Between Marree and Strangways Springs.

4. **D. pilosus,** Benth. (1837). Stout erect annual or biennial, 30-50 cm. high; leaves 1-2 cm. long, palmatisect into 3 cuneate incised or lobed segments, sparsely hairy beneath; petioles rather shorter, dilated and ciliate-fringed at base; umbels many-flowered, on peduncles 3-8 cm. long and sometimes 2-3 rising from the same node; petals white; involucral bracts linear, rather shorter than pedicels; fruitlets very flat, but not winged, 4-5 mm. long, 3-4 mm. broad, minutely tuberculate, one usually smaller than the other, rarely abortive, the intermediate rib slender and curved, the dorsal rib being sometimes grooved so as to appear minutely 2-winged.—*Trachymene australis,* Benth. (1866); *Didiscus compositus,* Domin. (1908); *D. Benthamii.* Domin. (1908).

Along the Murray River above Morgan. Summer.—Temperate Australia.

5. **D. glaucifolius,** F. v. M. *Wild Parsnip.* Near the preceding, but glabrous and glaucous, except the linear-lanceolate ciliate or almost serrate involucral bracts; petiole of radical leaves longer than lamina, fringed and dilated at base; petals bluish or rarely white; fruitlets of *D. pilosus,* sometimes 6 mm. long and 5 mm. broad, but one always abortive. (Fig. 176, E-F.). *Trachymene glaucifolia* (F. v. M.) Benth.; *D. bialatus,* Domin.

Flinders Range to Far North and westward to Ooldea. Aug.-Oct.—Temperate Australia.

D. Gilleniae, Tate, from the MacDonnell Range near Alice Springs, is a smaller plant with similar mostly radical hairy leaves, the many-flowered umbels on rather long chiefly radical peduncles, the petals whitish and the fruit woolly as in *D. ornatus.*

5. ULDINIA, J. M. Black.

(From *ŭldilnga gabi,* the native name of the Ooldea Soak).

1. **U. mercurialis,** J. M. Black. Small prostrate rigid sparsely hairy annual; leaves mostly radical, orbicular-cordate in outline, 10-15 mm. long, palmately divided into 3 obovate-cuneate irregularly lobed segments; petiole long, ciliate at base; stem-leaves smaller and less divided, sometimes opposite; flowers shortly pedicellate, 4 in a simple umbel on an axillary peduncle 5-7 mm. long; involucral bracts 4, lanceolate, about as

long as flowers ; sepals obsolete ; petals blue, ovate, imbricate, not inflexed at summit ; fruit compressed laterally, without vittas, orbicular, 3 mm. long, 6-ribbed on each side ; fruitlets obtuse on back, with 2 rows of hooked prickles along the dorsal rib, the intermediate ribs with fainter prickles and terminating at the summit in 2 divaricate lanceolate vertical wings, 3-5 mm. long, bordered by small hooked prickles and spreading outwards at right angles to the fruit ; carpophore adnate to the narrow commissure, almost obsolete.

Ooldea. Aug.-Sept.

PLATE 40 (2).—F, radical leaf ; G, upper part of stem ; H, fruitlet ; I, transverse section of fruit.

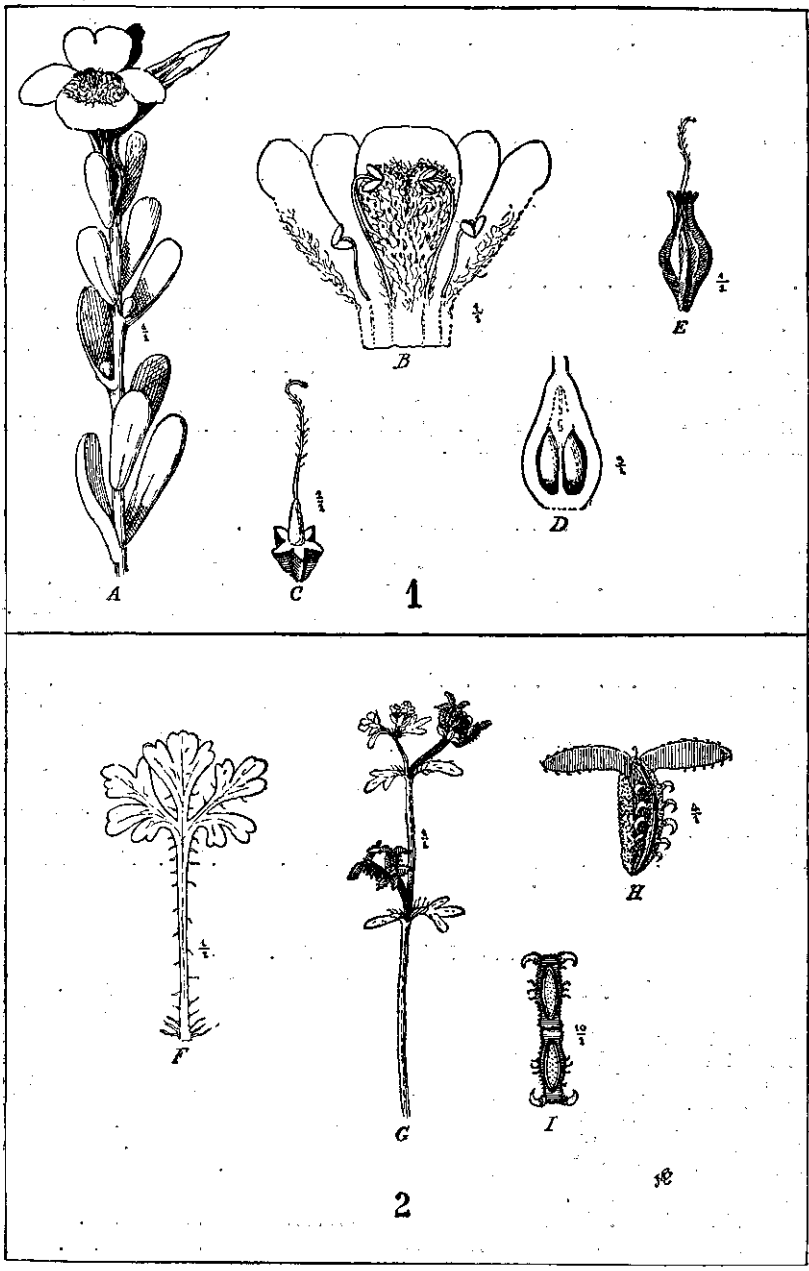

PLATE 40.—(1) **Eremophila pentaptera ; (2) Uldinia mercurialis.**

6. LILAEOPSIS, Greene (1891).

(From Greek *opsis*, resemblance, and *Lilaea*, the name of a genus in *Scheuchzeriaceae* with grass-like leaves, commemorating the French botanist, A. R. Delile).

Sepals minute; petals acute, concave; fruit slightly compressed laterally, the fruitlets 7-ribbed owing to a thick corky secondary rib close to or continuous with the lateral rib on each side of the flat commissure; vittas 1 under each furrow and 2 or 4 along the commissure, to which the carpophore is adnate. Small weak swamp herbs, creeping and rooting at the nodes, with linear-terete hollow phyllodes (the leaf-blades having aborted), marked by transverse partitions, and clustered at the nodes; umbels simple, on slender peduncles rising from the nodes, with minute involucral bracts.—*Crantzia*, Nutt. (1818) non Sw. (1788) nec Scop. (1777).

Fruit orbicular-ovoid; vittas 6 ..... *L. Brownii* 1.
Fruit ovoid-oblong; vittas 8 ..... *L. australica* 2.

1. **L. Brownii** (L.) A. W. Hill. Phyllodes to 18 cm. long and usually much longer than the peduncles, which are 1-3 cm. long; umbels 4-6-flowered, the pedicels 1-1½ cm. long; fruit broadly ovoid, about 2 mm. long and broad, the ribs prominent, but only the 2 next the commissure corky.

Harriet River, K.I. Sept.—Tasmania.

2. **L. australica** (F. v. M.) A. W. Hill. Phyllodes to 7 cm. long and rather longer than the peduncles, which are 1-3 cm. long; umbels mostly 2-4-flowered, the pedicels about 1 cm. long; fruit ovoid-oblong, contracted towards base, 2½-3 mm. long, 1½ mm. broad, with a vitta between the lateral rib and the corky rib next the commissure, so that the total is 8. (Fig. 176, O-P.)—*Crantzia australica*, F. v. M.

Kangaroo Island; River Murray; near Glenelg.

All species of *Lilaeopsis* were formerly united under the name of *L. lineata* (Michx.) Greene or *Crantzia lineata* (Michx.) Nutt.

7. OREOMYRRHIS, Endl. (1839).

(From Greek *oros*, *oreos*, mountain; *myrrhis*, the fragrant European herb known botanically as *Myrrhis odorata*, and in England as Sweet Cicely or Myrrh).

A genus of about 6 species, confined almost entirely to the southern hemisphere.—*Caldasia*, Lag. (1821) non Mutis (1810) nec Willd. (1807).

1. **O. andicola** (H. B. et K.) Endl. Erect pubescent perennial, about 30 cm. high; leaves radical, or the stem ones often whorled, twice or thrice pinnatisect, 2-10 cm. long, the ultimate lobes linear-lanceolate, on slender petioles about as long; umbels simple, about 20-flowered, on long stiff peduncles, with 6-11 entire or toothed bracts; sepals inconspicuous; petals ciliate or hairy on back; fruit oblong-conical, 4-6 mm. long, slightly compressed laterally; fruitlets bluntly 5-ribbed, with 1 vitta under each furrow and 2 at the deeply furrowed commissure; carpophore undivided, persistent.—*Caldasia andicola*, Lag.

Rare in the Mt. Lofty Range; perhaps in South-East. Sept.-Nov.—Eastern States; New Zealand; South America.

8. ERYNGIUM (Tourn.) L.

(Greco-Latin *eryngion*, name of some prickly plant, perhaps of this genus.)

Sepals lanceolate-acuminate, pungent, longer than the scaly receptacle; petals with a long inflexed point so as to appear notched at the bend; fruit ovoid, scarcely compressed, covered with small bladdery scales, the ribs inconspicuous; vittas absent; carpophore adnate to the commissure. Glabrous herbs; leaves usually with rigid spiny lobes, alternate when radical, opposite or whorled under the flowering branches or peduncles; flowers sessile in compact pedunculate heads, with a bract under each flower, the outer or involucral bracts linear-lanceolate, pungent and longer than the flowers. These plants are unlike the other umbelliferous genera and resemble thistles.

A. Flowerheads globular.
Erect plant ..... *E. rostratum* 1.
Prostrate plant ..... *E. vesiculosum* 2.
A. Flowerheads cylindrical; leaves lanceolate or linear ... *E. plantagineum* 3.

1. **E. rostratum,** Cav. *Blue Devil.* Stems erect, rigid, ribbed, 15-30 cm. high, branching; radical leaves 12-25 cm. long, pinnatipartite, not very stiff, the rhachis broad-linear, parallel-nerved, 4-5 mm. broad, with transverse partitions not visible externally, the segments linear, pungent-pointed, spreading, entire or pinnatipartite, opposite or alternate; petiole long or short, similar to rhachis; stem leaves similar but shorter; flowerheads ovoid-globular, with numerous rigid pungent linear-lanceolate often purplish bracts; inflexed point of petals broad and fringed towards the end. (Fig. 176, H.-J.)

Southern districts to Flinders Range; Kangaroo Island; South-East. Summer.—Temperate Australia; temperate South America.

2. **E. vesiculosum,** Labill. Stem almost none; branches long, prostrate; radical leaves oblanceolate or oblong, 4-15 cm. long, including the petiole, with coarse spreading spiny teeth; floral leaves shorter, with fewer teeth; peduncles radical or from the nodes of the branches, bearing globular heads, with numerous pungent linear-lanceolate bracts; inflexed point of petals fringed.

Southern districts; Kangaroo Island; South-East. Summer.—Eastern States; New Zealand.

3. **E. plantagineum,** F. v. M. Apparently a very variable species; stems erect, slender or rather stout, often branching at summit; leaves chiefly radical, lanceolate and more or less deeply divided into spiny divaricate segments, or linear, flaccid and grasslike, and then 10-25 cm. long and 2-4 mm. broad, entire or with a few spiny spreading teeth or lobes near the summit, compressed-hollow and marked with distant transverse partitions; floral leaves shorter, reflexed; peduncles rarely radical, usually on the branches or terminating the stems, bearing cylindrical flowerheads; bracts narrow, pungent, about 5 outer ones forming an involucre, only a few of the inner ones surpassing the head; inflexed point of petals fringed.

Near Cooper's Creek; apparently rare. Except for the oblong-cylindrical head it scarcely differs, in the grass-leaved form, from *E. rostratum,* Cav. var. *subdecumbens,* Benth. (1866) which, according to Wolff, is the same as var. *paludosum,* Moore et Betche (1893).—North-western New South Wales; Queensland.

* *E. campestre,* L., an erect European species, has appeared near Angaston. It has bipinnatipartite radical leaves, 8-15 cm. broad, the rigid segments oblong, decurrent, with coarse prickly teeth, on long rigid cylindrical petioles; stem-leaves sessile, with broad toothed auricles; heads ovoid-globular, surrounded by 4-6 narrow bracts; petals with entire points.

9. BUPLEURUM (Tourn.) L.

Greco-Latin *bupleuron,* the name of some umbelliferous plant and meaning "ox-rib").

*1. **B. semicompositum,** L. Small slender glabrous branching annual; leaves linear, 1-3 cm. long; umbels compound, of 3-5 unequal filiform rays; involucre and involucel of 3-5 linear 3-nerved bracts; umbellules 3-6-flowered; sepals obsolete; petals inflexed; fruit subglobular, about 1 mm. long, studded with little white tubercles concealing the ribs; carpophore undivided, persistent; no vittas.

Southern districts; Murray lands; Eyre Peninsula. Sept.-Nov.—Mediterranean region.

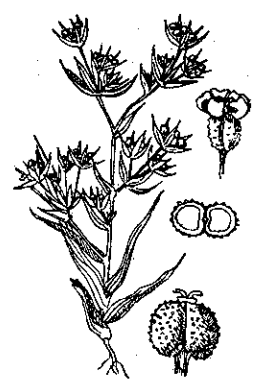

FIG. 177—**Bupleurum semicompositum.**

10. DAUCUS (Tourn.) L.

(Greco-Latin *daucus,* a name probably applied to several umbelliferous plants).

Sepals short; petals with inflexed point; fruit ovoid, slightly compressed dorsally, prickly; fruitlets 9-ribbed, the primary ribs inconspicuous, bearing small divergent bristles, the 4 secondary ones prominent, each with 1 row of long prickles; vittas 6; carpophore bifid, persistent. Herbs with petiolate pinnatisect leaves and compound umbels.

Slender annual; umbel-rays few ..... *D. glochidiatus* 1.
Stout biennial; umbel-rays numerous ..... *D. Carota* 2.

1. **D. glochidiatus** (Labill.) Fisch. Mey. et Avé-Lall. *Native Carrot.* Usually a slender and erect annual, 2 to over 30 cm. high, sprinkled with short stiff hairs; leaves bipinnatisect, the ultimate segments ovate, incised; umbels of 2-5 unequal rays; umbellules 1-6-flowered, with unequal pedicels; bracts of the involucre pinnatisect,

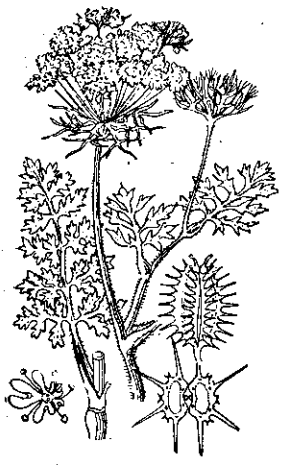

FIG. 178.—**Daucus Carota.**

those of the involucel narrow, often entire; fruit 4-5 mm. long, the prickles often reddish, subulate, or hollow and almost bladdery, always reflexed-barbellate at summit, or sometimes all the way.—*Scandix glochidiata,* Labill. (1804); *Daucus brachiatus,* Sieb. (1830).

All over the State. Aug.-Nov.—Temperate Australia; New Zealand; Western America. The fruits are known to stockmen as "carrot-burs." The umbels, whose branching is very irregular, often grow close to the base of the plant and the fruits are sometimes almost sessile.

*2. **D. Carota,** L. *Wild Carrot.* Stout erect sparsely hairy biennial; leaves bipinnatisect, with ovate or oblong incised segments; umbels large, of 30-60 slender unequal rays, which are bent inwards at maturity; umbellules about 20-flowered; bracts of involucre pinnatisect, those of the involucel linear, the outer ones trifid; fruit 3-4 mm. long, the prickles not barbellate.

Settled districts, especially the Mt. Lofty Range. Nov.-April. This is the cultivated carrot gone wild.—Europe; Western Asia.

11. TORILIS, Adans.

(A diminutive of *Tordylium,* another genus of *Umbelliferae.*)

*1. **T. nodosa** (L.) Gaertn. Sparsely hairy procumbent annual; leaves once pinnatisect, the primary segments ovate-oblong with linear lobes; umbels sessile or on very short leaf-opposed peduncles, subglobular, of 2-3 short rays or reduced to a cluster; involucre none; involucel of linear bracts; sepals lanceolate; petals with inflexed points; fruits ovoid, 3-4 mm. long, the inner ones in each umbel tuberculate, the outer ones having the inner fruitlet tuberculate and the outer one irregularly covered with barbellate prickles; ribs inconspicuous; 1 vitta under each furrow; carpophore bifid, persistent.—*Caucalis nodosa* (L.) Scop.

Southern districts; Kangaroo Island. Sept.-Dec.—Europe.

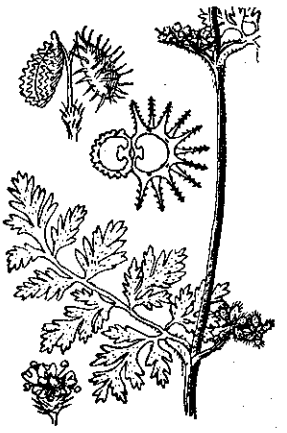

FIG. 179.—**Torilis nodosa.**

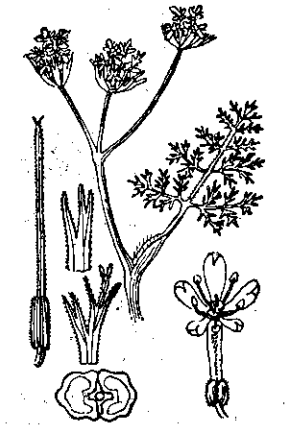

FIG 180.—**Scandix pecten-Veneus.**

12. SCANDIX (Tourn.) L.

(Greco-Latin name of this or some closely allied plant).

*1. **S. pecten-Veneris,** L. *Venus's Comb.* More or less hairy annual; leaves twice or thrice pinnatisect, with short linear lobes; umbel of 2-3 rays, without involucre; flowers few and almost sessile in umbellule, with involucel of 5 usually lobed bracts; sepals none; petals with inflexed point; fruit linear-oblong, prolonged into a stiff beak 3-5 cm. long; fruitlets slightly compressed laterally, 5-ribbed, without vittas; carpophore persistent.

Settled districts. Sept.-Dec.—Europe; Western Asia.

13. CONIUM, L.

(Neo-Latin, from Greek *kóneion,* hemlock).

*1. **C. maculatum,** L. *Hemlock; Carrot Fern.* Tall erect glabrous biennial, with striate purple-spotted hollow stem; leaves mostly bipinnatisect, with lanceolate pinnatipartite segments; umbel of 10-15 rays, with about 5 small reflexed involucral bracts; umbellules many-flowered, with 3 small unilateral bracts; sepals

none; petals with inflexed point; fruit about 3 mm. long, subglobular, somewhat compressed laterally; fruitlets with 5 prominent often undulate ribs; no vittas; carpophore undivided, persistent.

Here and there in settled districts. Oct.-Nov. A handsome plant, escaped from gardens, but both the fruits and leaves are poisonous.—Europe; western Asia.

14. TRACHYMENE (Rudge) DC.

(From Greek *trakhys*, rough; *mênê*, moon: alluding to the appearance of the fruit).

1. **T. heterophylla,** F. v. M. Glabrous perennial herb, with ascending slender stems 10-30 cm. long; leaves narrow-linear, plano-convex, 1-2 cm. long, some of the lower ones trifid; umbels small, compound, of 1-3 short rays, with few-flowered umbellules; bracts of involucre and involucel short, subulate; sepals minute; petals incurved; disk flat; fruit slightly compressed laterally 1½ mm. long, 2½ mm. broad, sparsely tuberculate; fruitlets 3-ribbed (dorsal and 2 lateral), narrowed towards commissure; no vittas; carpophore undivided, persistent.—*Siebera heterophylla* (F. v. M.) Benth.

Mt. Lofty Range to Encounter Bay; Kangaroo Island. Summer.—Victoria.

Var. *Tepperi*, J. M. Black. Leaves cuneate, 5-10 mm. long, most of them acutely 3-lobed at summit.—Cape Borda, K.I.

15. SIUM (Tourn.), L.

(Greco-Latin *sion*, probably the name of the species described below).

1. **S. latifolium,** L. var. *univittatum*, J. M. Black. *Water Parsnip.* Erect glabrous perennial 60 cm. to 1 m. high, with hollow furrowed stem; leaves pinnatisect, the lower ones with 8-9 pairs of ovate-oblong sessile regularly toothed segments 1-4 cm. long, the upper ones with fewer irregularly toothed segments; umbels terminal and leaf-opposed, of 8-15 unequal rays; involucre and involucel of 4-8 linear-lanceolate usually entire bracts; sepals obsolete or almost so; petals with acute inflexed point; fruit subglobular, somewhat compressed laterally, nearly 2 mm. long; fruitlets with 5 obtuse ribs, 1 fruitlet often abortive; 1 broad vitta under each furrow; carpophore bifid, more or less adherent to the broad commissure.—*S. latijugum*, J. M. Black non Clarke; *Carum sioides*, J. M. Black.

Beside watercourses in the Mount Lofty and Barossa Ranges. Dec.-Mar.—Victoria. Our plant has some of the characters of *S. erectum*, Huds. (*S. angustifolium*, L.) It differs from all other forms of *Sium*, except the Indian *S. latijugum*, in the single vittas, and in this respect it draws close to the genera *Apium* and *Carum*; on the other hand the vittas are not filiform, but broad and flattened, occupying the whole breadth of the furrow. The typical *S. latifolium* is European.

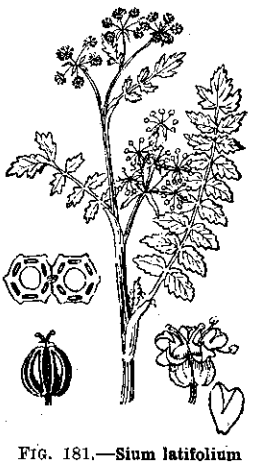

FIG. 181.—**Sium latifolium** var. **univittatum.**

16. PETROSELINUM, Hoffm.

Greek *petroselinon*, probably parsley; from *petra*, rock; *selinon*, some umbelliferous plant).

*1. **P. sativum,** Hoffm. *Parsley.* Glabrous aromatic biennial, with striate erect stem; leaves triangular in outline, bipinnatisect, the segments petiolulate, ovate, incised, often curled in the cultivated form; umbels on long peduncles, 8-20-rayed; involucre of about 3, involucel of several short linear bracts; umbellules many-flowered; sepals none; petals incurved, greenish-yellow; fruit ovoid, slightly compressed laterally; fruitlets 5-ribbed, with 1 vitta in each furrow; carpophore bisect, persistent.—*Carum Petroselinum* (L.) Benth.

An escape here and there in settled districts. Summer.—Probably a native of the east Mediterranean region.

17. APIUM (Tourn.) L.

(Latin for celery).

Sepals obsolete; petals broad, with inflexed point; fruit subglobular, compressed laterally; fruitlets with 5 prominent ribs and 1 vitta under each furrow; carpophore undivided, persistent. Glabrous herbs with hollow stems and divided leaves; umbels compound, terminal and leaf-opposed, without involucre or involucel.

A. Fruit almost covered by the corky ribs.
Leaf-lobes ovate to linear-lanceolate ..... *A. australe* 1.
Leaf-segments filiform ..... *A. leptophyllum* 2.
A. Fruit with narrower ribs and broad furrows between them; leaf-segments broad ..... *A. graveolens* 3.

1. **A. australe,** Pet.-Thou. (1804). *Sea Celery.* Perennial with procumbent or ascending angular stems, long and stout or short and slender; leaves rather thick, pinnatisect into 3-5 segments, which are again 3-partite into incised obovate lobes, or the segments are deeply divided, sometimes almost to the base, into 3 linear-lanceolate usually entire lobes or segments; umbels sessile or subsessile, of 3-6 long or short rays; fruits about 2 mm. long and broad, each fruitlet with 5 thick prominent ribs, almost concealing the narrow furrows. (Fig. 176, M-N.).—*A. prostratum,* Labill. (1804).

Along the greater part of our coast, rare near fresh water inland. Summer.—Temperate Australia; New Zealand; temperate South America. This variable species has been known by 2 names among Australian botanists. Labillardière published it as a *nomen nudum* in the "Relation du voyage à la recherche de la Pérouse," in 1800, but did not describe it until 1804. His name and that of Petit-Thouars are therefore of the same date. J. D. Hooker first united them in the Flora Tasmaniae (1860), and chose the name *A. australe,* which, under art. 46 of the international rules, remains the valid one.

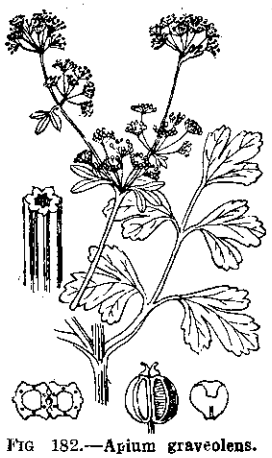

FIG 182.—Apium graveolens.

2. **A. leptophyllum** (DC.) F. v. M. Slender annual, the stems 30-70 cm. long; lower leaves petiolate, upper sessile, alternately divided into numerous almost filiform segments, scarcely ½ mm. broad; umbels mostly sessile, of 2-3 slender rays; fruit as in the preceding.

Finniss River at Dingabledinga. Summer. Eastern States; America.

*3. **A. graveolens,** L. *Celery.* Aromatic biennial; lower leaves pinnatisect into 3-5 ovate-cuneate segments, each more or less deeply 3-lobed; umbels sessile or subsessile, of 4-8 unequal rays; fruit about 3 mm. long, each fruitlet with 5 slender whitish ribs.

Near water, Mt. Lofty Range. Summer. This is the cultivated celery gone wild.—Most parts of the globe.

18. FOENICULUM (Tourn.) L.

(Latin name of the plant).

*1. **F. vulgare,** Mill. (1768). *Fennel.* Erect glabrous aromatic biennial, 1-2 m. high; leaves 3-4 times pinnatisect, with numerous filiform segments; umbels large, of 10-30 rays on long peduncles; flowers yellow, numerous in the umbellules; involucre and involucel wanting; sepals none; petals obtuse; fruit oblong, 5 mm. long, each carpel with 5 prominent ribs and 1 vitta to each furrow; carpophore bipartite, persistent.—*F. officinale,* All. (1785).

Settled districts. Sept.-Dec.—Europe; western Asia.

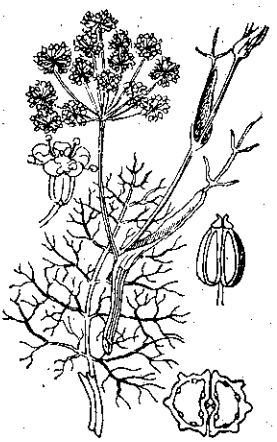

FIG. 183.—Foeniculum vulgare.

19. PASTINACA (Tourn.) L.

(Latin for the parsnip.)

*1. **P. sativa,** L. *Parsnip.* Finely pubescent biennial, about 1 m. high; stem erect, angular-grooved; lower leaves pinnatisect into 5-9 ovate or oblong lobed and sharply-toothed segments; umbels large, of 6 to over 20 unequal rays; involucres and involucels none or of 1-2 bracts; sepals none; petals yellow, with incurved point; fruit compressed dorsally so as to be almost flat, ovate; fruitlets with 3 ribs on the flat back (1 dorsal, 2 intermediate), the 2 lateral ribs extended into narrow wings, the 4 alternating vittas visible externally as dark lines, the 2 commissural vittas not reaching the summit or base of fruitlet; carpophore bipartite, persistent.

Near Millicent, S.E., and probably elsewhere. Summer. An escape from gardens.—Europe to Siberia.

Family 87.—EPACRIDACEAE.

Flowers regular, bisexual; sepals 5, imbricate, more or less rigid, usually minutely ciliolate; corolla tubular, with 5 rarely 4 or 6 lobes; stamens as many as corolla-lobes, usually inserted on the corolla-tube and perigynous, in *Sprengelia* free and hypogynous; anthers 1-celled, opening by a longitudinal slit; ovary superior, usually 5-celled, supported and surrounded near the base by an almost entire or more or less 5-lobed hypogynous disk, which is rarely absent; style simple, with a small terminal stigma; ovules anatropous, solitary or several in each cell; fruit a drupe or a capsule opening loculicidally; seeds with a straight terete embryo much shorter than the albumen. Heath-like shrubs, with leaves alternate, exstipulate, sessile or subsessile, rigid, entire, usually crowded, finely nerved below, often pungent; flowers usually with 2 broad ciliolate bracteoles and 1 or more imbricate bracts.

Most of our genera resemble in habit the Heath (*Erica*) of Europe and South Africa and the Heather or Ling (*Calluna*) of Europe, and the name "heath" has been transferred to many of our species. The *Ericaceae* differ from *Epacridaceae* chiefly in the 2-celled anthers and the stamens usually twice as many as the corolla-lobes, so that they are both opposite to and alternate with the lobes, while in *Epacridaceae* they are always alternate with the lobes and equal to them in number. The latter family belongs almost entirely to the southern hemisphere. *Styphelia, Astroloma, Lissanthe, Brachyloma, Acrotriche Monotoca* and *Sprengelia* are limited to Australia. *Leucopogon* and *Epacris* are chiefly Australian.

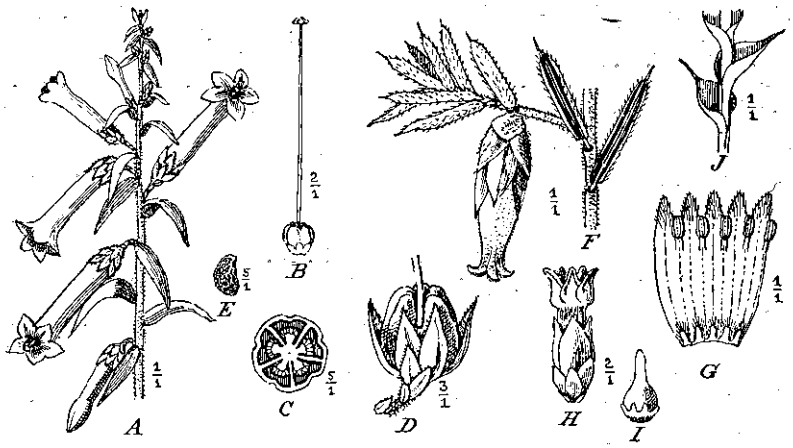

Fig. 184.—**Epacridaceae.** A-E, *Epacris impressa*: A, flowering branch; B, pistil; C, transverse section of ovary; D, capsule; E, seed. F-G, *Astroloma conostephioides*: F, flowering branch; G, corolla spread open. H-I, *Brachyloma ericoides*: H, flower; I, pistil. J, leaves of *Sprengelia incarnata*.

A. Ovules solitary and pendulous in each cell of the ovary; style terminal; fruit a more or less succulent drupe. (Tribe *Stypheliеae*.)
  B. Corolla-lobes valvate in bud.
    C. Anthers exserted from the corolla-tube ..... Styphelia 1.
    C. Anthers enclosed in corolla-tube or appearing at the throat.
      D. Corolla-tube with 5 tufts of hairs or scales inside below the middle ..... Astroloma 2.
      D. Corolla-tube glabrous below the middle.
        E. Corolla-lobes glabrous inside.
          Ovary 5 celled; bracteoles somewhat removed from calyx ..... Lissanthe 3.
          Ovary 1-celled; bracteoles close under calyx Monotoca 4.
        E. Corolla-lobes bearded all over inside ..... Leucopogon 5.
        E. Corolla-lobes bearded at tip only ..... Acrotriche 6.
  B Corolla-lobes more or less imbricate in bud, the tube with reflexed hairs or scales in the throat ..... Brachyloma 7.

A. Ovules several in each cell of ovary on axile placentas; style inserted in a central depression between the carpels; fruit a capsule dehiscing in 5 valves. (Tribe *Epacrideae*.)
- Leaves narrowed and articulate at base ..... EPACRIS 8.
- Leaves with a broad adnate sheathing base, which falls off with the leaf ..... SPRENGELIA 9.

1. STYPHELIA, Sol. ex Forst. f.

(From Greek *styphelos*, hard, rough: alluding to the stiff prickly-pointed leaves.)

1. **S. exarrhena,** F. v. M. (1867). Small shrub with pubescent branchlets; leaves ovate or ovate-lanceolate, tapering into a pungent mucro, slightly convex above, glossy and glabrous, 5-7 mm. long; flowers whitish, solitary or twin on very short axillary peduncles; bracts small; bracteoles half as long as sepals, which are acuminate and 3 mm. long; corolla-tube scarcely exceeding sepals, glabrous inside except for a few slender hairs in the throat; the lobes mucronate, revolute, as long as the tube, densely bearded inside; stamens exserted; anthers linear, versatile, on filaments 2-3 mm. long, inserted at summit of tube; ovary glabrous, of 5 cells containing 1 ovule each; style slender, exserted; disk subtruncate or minutely 5-toothed; fruit a drupe with a 5-celled bony endocarp.—*Leucopogon exarrhenus*, F. v. M. (1859); *Styphelia pusilliflora*, F. v. M. (1864); *Leucopogon hirtellus*, F. v. M. var. *glabrifolius*, J. M. Black (1912); *L. intermedius*, Cheel (1915).

Encounter Bay; Ninety-Mile Desert; Monarto South; Eyre Peninsula. Most of the year. The specific name means "with protruding anthers."

Var. *hirtella*, J. M. Black. Leaves ciliolate and more or less pubescent; flowers as in type.—*Leucopogon hirtellus*, F. v. M.; *Styphelia hirtella*, F. v. M.—Encounter Bay.

S. adscendens, R. Br. has been recorded for our South-East, I do not know on what authority. It has lanceolate scabrous ciliolate leaves about 15 mm. long and flowers solitary in the axils, the corolla-tube nearly 15 mm. long and considerably exceeding the sepals, with 5 dense tufts of hair below middle of tube; disk of 5 free scales.—Victoria; New South Wales; Tasmania.

2. ASTROLOMA, R. Br.

(From Greek *astron*, star; *lôma*, fringe: alluding to the tufts of hair inside the corolla-tube.)

Corolla-lobes valvate, spreading, bearded inside, much shorter than the tube, which is furnished with hairs or scales inside below the middle; filaments short, flattened, inserted in the throat; ovary of 5 cells; style as long as or surpassing corolla-tube; stigma capitate; drupe greenish, with a 5-celled bony endocarp; disk almost entire. Low shrubs; flowers axillary, solitary, subsessile, with bracts which pass gradually into the bracteoles and sepals.

- Prostrate shrub; corolla-tube much longer than sepals.... *A. humifusum* 1.
- Erect shrub; corolla-tube scarcely exceeding sepals ..... *A. conostephioides* 2.

1. **A. humifusum** (Cav.) R. Br. *Native Cranberry.* Small intricate prostrate or ascending shrub; leaves linear, 5-12 mm. long, 1-2 mm. broad, pungent-pointed, scabrous, ciliolate; sepals mucronate, about 5 mm. long; corolla bright-red, 10-15 mm. long, with 5 tufts of erect hairs inside the tube below the middle; drupe globular, or ovoid, greenish, 8-10 mm. diam.—*Styphelia humifusa* (Cav.) F. v. M.

Southern districts; Kangaroo Island. Summer and autumn.—Temperate Australia. Fruit sweet and edible.

Var. *denticulatum* (R. Br.) J. M. Black. Leaves lanceolate, 2½-3½ mm. broad; corolla 15-25 mm. long.—Southern districts to Flinders Range and 90-Mile Desert; Yorke and Eyre Peninsulas.—*A. denticulatum*, R. Br.

2. **A. conostephioides,** (Sond.) F. v. M. (1869). *Flame Heath.* Small erect shrub, 40 cm. to 1 m. high, with pubescent branchlets; leaves linear or linear-lanceolate, 8-20 mm. long, pungent-pointed, glabrous or pubescent, the margins more or less recurved not scabrous-ciliolate; flowers horizontal or drooping; bracts and sepals turning red, the latter 12-15 mm. long; corolla bright-red, 18-20 mm. long, constricted at summit, the tube with 5 bearded scales near the base inside. (Fig. 184, F-G).—*Stenanthera conostephioides*, Sond. (1844-5); *Styphelia Sonderi*, F. v. M. (1867).

Southern districts; Kangaroo Island; Murray lands; Eyre Peninsula; South-East. Most of the year.—Victoria; New South Wales. The specific name denotes similarity to a West Australian genus of the same family (*Conostephium*).

3. LISSANTHE, R. Br.

(From Greek *lissos*, smooth; *anthos*, flower: the corolla lobes are not bearded).

1. **L. strigosa** (Sm.) R. Br. Small stiff glabrous shrub, from 40 cm. to over 1 m. high; leaves linear, biconvex or sometimes almost subulate, rigid, pungent-pointed, 10-15 mm. long, with 3-5 thick longitudinal nerves below; flowers small, 2-4 in very short dense axillary and terminal racemes, the 2 bracteoles at the base of each pedicel; sepals ovate, 1 mm. long; corolla urn-shaped, snow-white, the lobes short, valvate, spreading, glabrous, the swollen tube hairy above the middle inside, with the enclosed stamens inserted near the summit; style short, pubescent, with small stigma; drupe berry-like, globular, about 4 mm. diam., with a hard 5-celled endocarp.—*Styphelia strigosa*, Sm.

Mt. Lofty Range; Kangaroo Island; Eyre Peninsula. Winter and spring.—Eastern States.

4. MONOTOCA, R. Br.

(From Greek *monos*, one; *tokos*, a birth: the ovary has only 1 ovule).

1. **M. scoparia** (Sm.) R. Br. Small almost glabrous shrub; leaves oblong-linear, pungent-pointed, 7-12 mm. long, about 2 mm. broad, convex above, paler and finely nerved below; flowers small, in axillary clusters of 2-4; bract and bracteoles very broad; sepals ovate, obtuse, 1½ mm. long; corolla about 2 mm. long, quite glabrous, the valvate lobes mostly erect, the stamens enclosed and inserted near summit of tube; style short, thick; ovary 1-celled, with 1 ovule; drupe about 2 mm. long.—*Styphelia scoparia*, Sm.

Lucindale, S.E.—Eastern States.

M. elliptica (Sm.) R. Br. has been recorded for the South-East, I do not know on what authority. It is a tall shrub or small tree, the leaves similar but sometimes 25 mm. long, the flowers in short racemes often exceeding the leaves or growing out into leafy branches with solitary axillary flowers.—Eastern States.

5. LEUCOPOGON, R. Br.

(From Greek *leukos*, white; *pógōn*, beard: alluding to the white-bearded corolla-lobes).

Corolla-tube short, about as long as the scarious sepals, without hair-tufts or scales below the middle inside, the lobes valvate in bud, spreading or recurved in flower, densely bearded inside; stamens enclosed, the short filaments inserted near summit of tube; ovary 2-5-celled; fruit a small drupe. Shrubs with small usually white flowers, sessile or subsessile, clasped at the base by 2 broad ciliolate bracteoles.

A. Flowers in terminal and axillary spikes; anthers with sterile tips.
  B. Spikes rather long, dense, with small white bracts; leaves flat, comparatively large, with a callous obtuse point; drupe berry-like.
    Leaves lanceolate ..... *L. australis* 1.
    Leaves oblanceolate and broader ..... *L. parviflorus* 2.
  B. Spikes short and dense; leaves comparatively small; drupe rather dry.
    C. Leaves oblong, hairy, spreading, with slightly recurved edges ..... *L. hirsutus* 3.
    C. Leaves more or less erect, with incurved edges, very rigid; branches wiry.
      D. Leaves ovate-cordate, 2-4 mm. long ..... *L. costatus* 4.
      D. Leaves lanceolate, 8-15 mm. long.
        Leaves several-nerved; ovary 2-celled ..... *L. concurvus* 5.
        Leaves 3-nerved; ovary 4-5-celled ..... *L. virgatus* 6.
A. Flowers axillary only; drupe rather dry.
  E. Flowers few in very short dense spikes, rarely solitary; anthers obtuse, without sterile tips.
    F. Leaves with more or less recurved edges, mucronate; ovary 5-celled.
      Leaves broad-linear, 6-12 mm. long..... *L. ericoides* 7.
      Leaves orbicular, 5-8 mm. diam. ..... *L. cordifolius* 8.
    F. Leaves with much incurved edges, lanceolate, pungent; ovary 3-celled ..... *L. rufus* 9.
  E. Flowers solitary (the spike reduced to 1 terminal flower); leaves small, subovate.
    Leaves erect, glabrous, flattish, obtuse, shortly petiolate ..... *L. Woodsii* 10.
    Leaves spreading, sparsely pubescent, mucronate, with recurved edges, sessile by a broad subcordate base ..... *L. Clelandii* 11.

1. **L. australis,** R. Br. Tall glabrous shrub; leaves lanceolate, 2-3 cm. long, 3-4 mm. broad, flat or slightly convex above, and with 3 parallel nerves more prominent than the others; flowers in dense spikes, terminal and in the upper axils, rather shorter than the leaves; sepals obtuse, 2 mm. long; drupe ovoid-globular, with 5 or rarely 3 or 4 cells; style short.—*Styphelia australis* (R. Br.) F. v. M.

Mt. Lofty Range; South-East. Sept.-Oct.—Temperate Australia.

2. **L. parviflorus** (Andr.) Lindl. Very like the preceding; but the leaves are stiffer, and although almost acute are oblanceolate in outline and 4-8 mm. broad in the upper part; flowers in dense spikes, terminal and in the upper axils, usually longer than the leaves; drupe globular, white, 4 5-celled.—*Styphelia parviflora,* Andr. (1803); *S. Richei,* Labill. (1804); *Leucopogon Richei* (Labill.) R. Br. (1810).

All round our coasts. Aug.-Oct.—Temperate Australia.

A small specimen from Rocky River, K.I., has very short spikes and the unripe fruits 2-celled only, pointing to *L. lanceolatus* (Sm.) R.Br., an East-Australian species resembling the 2 preceding, but with 2-celled ovaries and a reddish drupe. More material is required before there can be any certainty about including this species in our flora.

3. **L. hirsutus,** Sond. Procumbent or trailing softly villous shrub; leaves spreading, oblong or ovate-oblong, slightly convex and very hairy above, obtuse, 5-8 mm. long, 2-3 mm. broad, scarcely stiff; flowers 1-5 in axillary or terminal spikes scarcely longer than the subtending leaves, which dwindle into small leafy bracts at the base of each flower; bracteoles and sepals rather obtuse, ciliolate, the latter about 1½ mm. long; corolla 1¾ mm. long, the lobes not so densely bearded as in other species; ovary 2-celled; style short, thick; drupe depressed-globular, oblique, 2-celled or often 1-celled and 1-seeded.—*Styphelia hirsuta* (Sond.) F. v. M.

Mt. Compass and towards Encounter Bay; Kangaroo Island. Sept.-Oct.—West Australia.

4. **L. costatus,** F. v. M. Small shrub with wiry glabrous branches; leaves thick, ovate or ovate lanceolate, subcordate at base, 2-4 mm. long, obtuse, recurved towards summit, stem-clasping towards base, ciliolate, the nerves prominent beneath; flowers in short dense spikes at end of branchlets; sepals obtuse, ciliate, 2 mm. long; bracteoles scarcely half as long; corolla-tube shorter than sepals; ovary glabrous, 2-celled; style short, thick; disk truncate.—*Styphelia costata,* F. v. M.

Encounter Bay; Kangaroo Island; 90-Mile Desert. Sept.-Nov.—Western Victoria.

5. **L. concurvus,** F. v. M. Low straggling shrub with wiry glabrous or villous branches; leaves rather thin but rigid, ovate-lanceolate, subobtuse, slightly concave above, 8-15 mm. long, glabrous or ciliate with long hairs and sometimes hairy below, with 5-12 longitudinal nerves; flowers in short dense terminal or axillary spikes; sepals subobtuse, 3 mm. long, ciliate; bracteoles half as long; corolla-tube much shorter than calyx and shorter than the lobes; ovary glabrous, 2-celled; style short, thick; disk undulate.—*Styphelia concurva,* F. v. M.

Mt. Lofty Range to Encounter Bay; Kangaroo Island. Most of the year.

6. **L. virgatus** (Labill.) R.Br. Low usually erect shrub with wiry glabrous branches, the flowering ones often zigzag; leaves mostly erect or even appressed, lanceolate or linear-lanceolate, acute, 8-15 mm. long, concave above, 3-nerved below, glabrous or ciliolate under lens; flowers in short dense terminal or axillary spikes; sepals obtuse, 2½ mm. long; bracteoles half as long; corolla-tube shorter than sepals and as long as lobes; ovary glabrous, 4-5-celled; style short, thick; disk subtruncate.—*Styphelia virgata,* Labill.

Mt. Lofty Range; South-East. Aug.-Jan.—Victoria; New South Wales; Tasmania.

7. **L. ericoides** (Sm.) R.Br. Low slender shrub with pubescent branches; leaves glabrous, broad-linear, convex above, 6-12 mm. long, with a fine pungent mucro; flowers 1-5, in very short axillary spikes; sepals 1½ mm. long, subobtuse; bracteoles half as long; corolla-tube rather longer than sepals and longer than the lobes; ovary slightly pubescent, 5-celled; style shorter than corolla-tube, with capitate stigma; disk almost divided into 5 obtuse scales; fruit 3 mm. long, sparsely pubescent, usually compressed-ovoid and the fertile cells reduced to 2.—*Styphelia ericoides,* Sm.

Between Millicent and Penola, S.E. Sept.-Nov.—Eastern States.

L. collinus (Labill.) R.Br., which resembles the preceding, but has broader non-pungent leaves, blunter sepals, anthers with sterile tips, and a 2-celled ovary, has been recorded for our Tatiara country, probably in error. It inhabits eastern Victoria, New South Wales, and Tasmania.

8. **L. cordifolius,** Lindl. Shrub with pubescent branchlets; leaves glabrous, spreading, orbicular-cordate, mucronate, 5-8 mm. diameter, flat or slightly convex above; flowers

1-3, on very short axillary peduncles; sepals 3-3½ mm. long, obtuse; bracteoles not half as long; corolla-tube as long as sepals and rather longer than lobes; ovary glabrous, 5-celled; style slender, exserted; disk 5-toothed; drupe ovoid, 6 mm. long.—*Styphelia cordifolia,* F. v. M.

Teatree Gully, Golden Grove (Mt. Lofty Range); Murray lands; Yorke and Eyre Peninsulas to north of Fowler's Bay. Most of the year.—Temperate Australia.

9. **L. rufus,** Lindl. Erect glabrous shrub 50 cm. to 1 m. high, with wiry reddish branchlets; leaves lanceolate, often erect, rounded at base, pungent-pointed, very concave above, 8-15 mm. long, finely nerved below, all but the mid-nerve diverging towards the denticulate margins; flowers 1-5, in very short erect axillary spikes; sepals acute or subobtuse, about 4 mm. long; bracteoles about ⅓ as long; corolla-tube rather shorter than sepals and about as long as lobes; ovary glabrous, 3-celled; style exceeding sepals, hairy in lower part, with capitate stigma; drupe ovoid-oblong, surpassing the sepals, often ripening only 1 seed.—*Styphelia rufa* (Lindl.) F. v. M.

Mt. Lofty Range to Encounter Bay and Monarto South; Kangaroo Island; Eyre Peninsula. Summer.—Victoria; New South Wales.

10. **L. Woodsii,** F. v. M. Small glabrous erect shrub; leaves erect, ovate-oblong, 3-4 mm. long, slightly concave above, prominently nerved below and contracted into a short petiole; flowers solitary, axillary, drooping, on bracteate peduncles half as long as leaves; sepals acute, about 2 mm. long; bracteoles half as long; corolla drying black, the tube as long as sepals and equalling the lobes; ovary 5 celled; style slender, exserted, glabrous; drupe oblong, surpassing the sepals.—*Styphelia Woodsii,* F. v. M.

Kangaroo Island; Yorke and Eyre Peninsulas; South-East. Summer.—Western Victoria; West Australia.

11. **L. Clelandii,** Cheel. Low erect shrub, with pubescent branchlets; leaves spreading, convex above, suborbicular to ovate, 2-4 mm. long with a pungent mucro, minutely pubescent on both faces or glabrous above, sessile by a broad base; flowers solitary, axillary, drooping on very short peduncles; sepals 2-3 mm. long, acuminate; bracteoles ⅓ as long; corolla-tube shorter than sepals and about as long as the lobes; ovary pubescent, 2-3-celled, the disk divided almost to base into 5 lanceolate scales; style slender, exceeding corolla-tube; drupe obovoid-oblong, pubescent, becoming 1-celled and 1-seeded.

Coonalpyn (90-Mile Desert); Kangaroo Island. Summer. The Coonalpyn specimen is in flower, the island one in fruit only, but they appear to be the same.

6. ACROTRICHE, R. Br.

(From Greek *akron,* summit, extremity; *thrix, trikhos,* hair: alluding to the tuft of hairs at the summit of the corolla-lobes.)

Corolla-lobes valvate in bud, spreading in flower, with a tuft of long hairs inside at the summit; stamens enclosed, the short filaments inserted at summit of corolla-tube; ovary 2-6-celled; style short; disk truncate or obscurely lobed; drupe with hard endocarp. Low shrubs with small sessile spicate flowers, each with a small bract and 2 bracteoles.

A. Flowers in very short dense spikes, mostly in the axils of the previous year's leaves.
  B. Leaves pungent-pointed.
    C. Leaves with 3-7 parallel nerves.
      Leaves linear-lanceolate, hairy ..... *A. serrulata* 1.
      Leaves lanceolate, glabrous ..... *A. affinis* 2.
    C. Leaves ovate-lanceolate, many-nerved, the outer nerves divergent ..... *A. patula* 3.
  B. Leaves obtuse, ovate, many-nerved ..... *A. cordata* 4.
A. Flowers in dense spikes, crowded together at the base of the plant, without any leaves.
  Leaves ovate-lanceolate, 2-4 mm. long; drupe large.. *A. depressa* 5.
  Leaves lanceolate, 8-12 mm. long; drupe small..... *A. fasciculiflora* 6.

1. **A. serrulata** (Labill.) R. Br. Dwarf mostly prostrate shrub, with pubescent branchlets; leaves linear-lanceolate, flat, with a long pungent mucro, spreading, 5-10 mm. long, ½-1½ mm. broad, ciliate and more or less beset with spreading hairs or almost glabrous, the midrib and often 2 lateral nerves prominent below, but all parallel; flowers in short dense cluster-like spikes; sepals obtuse, 2 mm. long; bracteoles half as long; corolla pale-green, the tube swollen and twice as long as calyx, the lobes obtuse, only 2 mm. long, the throat closed by 5 hairy scales; ovary 5-6-celled; drupe succulent, globular, greenish, 3 mm. diam.—*Styphelia serrulata,* Labill.

Mt. Lofty Range to Encounter Bay. Aug.-Oct.—Victoria; New South Wales; Tasmania.

2. **A. affinis,** DC. Differs from the preceding chiefly in the leaves, which are shorter, much thicker, and more rigid, lanceolate, 5-6 mm. long, 2 mm. broad, with a short pungent mucro, smooth and glabrous except for a minute ciliation visible under the microscope, with 3-7 parallel nerves on the under-surface, of which the midnerve is prominent.—*A. patula,* Hook. f. non R. Br.

Coonalpyn (90-Mile Desert); Beachport, S.E. Spring.—Victoria; Tasmania.

3. **A. patula,** R. Br. Diffuse stiff shrub with pubescent branchlets; leaves glabrous, spreading, glossy-green above, pale beneath, ovate-lanceolate, almost cordate at base, pungent-pointed, 10-15 mm. long, 4-8 mm. broad, obscurely many-nerved beneath, the outer nerves divergent; flowers almost clustered, as in the preceding and of the same size; corolla greenish, the tube twice as long as the obtuse sepals and funnel-shaped above them, the throat closed by a ring of hairs; ovary 5-celled; drupe depressed-globular, pink, 3-4 mm. diam.—*Styphelia patula* (R. Br.) Spreng.

Along the coast near Adelaide, and in similar positions on Kangaroo Island and Yorke and Eyre Peninsulas. June-Oct.

4. **A. cordata** (Labill.) R. Br. (1810). Low glabrous shrub; leaves ovate-oblong, thick and rigid, 6-10 mm. long, slightly concave above, with a blunt callous point and 3 obscure parallel nerves below, the outer nerves pinnate and divergent, on petioles about 1 mm. long; flowers as in the preceding; sepals obtuse, 1½ mm. long; corolla greenish, the tube scarcely twice as long and closed by hair-tufts in the throat; ovary 4-celled; drupe depressed-globular, smaller and less exserted from the calyx than in the 2 preceding.—*Styphelia cordata,* Labill. (1804); *Acrotiche ovalifolia,* R. Br. (1810); *S. ovalifolia* (R. Br.) Spreng.

Usually coastal; near Strathalbyn and along the Lower Murray; 90-Mile Desert; Kangaroo Island; Yorke and Eyre Peninsulas; South-East. July-Sept.—South-western Victoria; West Australia. Labillardière's inappropriate name is due to the fact that in some West Australian specimens the upper leaves are subcordate, although, as he himself says, "some are ovate."

5. **A. depressa,** R. Br. *Native Currant.* Low spreading rigid shrub, with pubescent branchlets; leaves glabrous, crowded, spreading or reflexed, olive-green and slightly convex above, paler beneath, ovate-lanceolate, acutely mucronate, 2-4 mm. long, sessile; flowers in dense spikes 15-25 mm. long, mostly crowded on the old wood; sepals obtuse, 2-2½ mm. long; corolla-tube not twice as long, the throat closed by hair-tufts; ovary 2-4-celled; drupe pink or purple, globular or ovoid, about 8 mm. thick, the mesocarp very juicy; endocarp 3-4-angled, ripening 1-2 seeds.—*Styphelia depressa* (R. Br.) Spreng.

Mt. Lofty Range to Encounter Bay and Monarto South; Kangaroo Island; Lower Murray region; 90-Mile Desert. The fruits, which grow at the base of the often prostrate stems, are gathered in Sept. and Oct., and are used for making jams and jellies.—North-western Victoria; West Australia.

6. **A. fasciculiflora** (Regel) Benth. Intricate rigid shrub up to 1 m. high, with hairy branches; leaves crowded, spreading, lanceolate, pungent-pointed, 8-12 mm. long, dark-green, convex and sprinkled with spreading hairs above, paler beneath; spikes short, dense, usually crowded into thick cylindrical masses at base of stems; sepals obtuse, about 4 mm. long, reddish; corolla pink in upper part, the tube rather longer than sepals, with hairy scales in throat; ovary 3-4-celled; drupe depressed-globular, pink, about 3 mm. thick.—*Styphelia fasciculiflora* (Regel) F. v. M.

Mt. Lofty Range. June-Nov.

7. BRACHYLOMA, Sond.

(From Greek *brakhys,* short; *lôma,* edge, fringe: alluding to the hairs or scales in the throat of the corolla-tube.)

Corolla-tube glabrous inside, except at the summit, where it has tufts of reflexed hairs or hairy scales at the base of each lobe; lobes imbricate, slightly bearded or papillose all over inside; filaments very short, inserted at summit of tube; stamens included; ovary 4-5-celled; style short; disk 5-toothed or 5-lobed; fruit a drupe. Shrubs with solitary axillary flowers on short peduncles.

A. Corolla-tubes obtuse, erect; bracts few below the bracteoles ..... *B. ericoides* 1.
A. Corolla-lobes acute, spreading; no bracts below the bracteoles.
Leaves with a pungent mucro ..... *B. ciliatum* 2.
Leaves almost obtuse ..... *B. daphnoides* 3.

1. **B. ericoides** (Schlechtd.) Sond. Straggling shrub, 50 cm. to 1 m. high, with pubescent branches; leaves linear, 6-10 mm. long, ½-1 mm. broad, tapering into a fine pungent mucro, flat or slightly convex above, paler and finely nerved below, ciliolate; peduncles 1-1½ mm. long; sepals pink, 4-5 mm. long, twice as long as the bracteoles; corolla pink or orange, 7 mm. long, constricted below the obtuse lobes, which are bearded near the centre inside, the tube about as long as sepals, with 5 reflexed ciliate scales in the throat; filaments obovate, flat; drupe small, globular. (Fig. 184, H-I.)

Mt. Lofty and Barossa Ranges; Kangaroo Island; Murray lands. Most of the year.—Western Victoria and New South Wales.

2. **B. ciliatum** (R. Br.) Benth. Low slender glabrous shrub; leaves oblong-lanceolate, 6-12 mm. long, 2½-3 mm. broad, tapering into a short pungent mucro, flat, ciliolate, with 3 parallel nerves below, the outer nerves pinnate; sepals 2 mm. long, acuminate; corolla-tube 3 mm. long, with 5 tufts of long hairs hanging down from the throat, the lobes lanceolate, almost papillose inside with minute scaly hairs; anthers almost sessile; drupe ovoid, 3-4 mm. long.

South-East. Oct.-Dec.—Western Victoria; Tasmania.

3. **B. daphnoides** (Sm.) Benth. Near the preceding; but a taller shrub, the leaves almost ovate, 3-4 mm. broad, with a hard obtuse not pungent point; corolla similar, but the tube 4-6 mm. long and much longer than the acute papillose lobes.

Recorded from the Tatiara district by Bentham.—Eastern States. The leaves resemble those of *Acrotriche cordata*, but are more inclined to be concave above.

8. EPACRIS, Forst. et f. emend. Cav.

(From Greek *epi*, on; *akris*, hilltop: habitat of several species.)

Corolla quite glabrous, the lobes imbricate in bud; filaments short, inserted in throat of corolla-tube; ovary 5-celled, with several ovules in each cell, the style inserted in a tubular depression extending half-way down the ovary; fruit a small capsule opening loculicidally, with numerous seeds. Shrubs with solitary axillary flowers on very short peduncles; bracts numerous, imbricate, passing into the sepals.

1. **E. impressa,** Labill. *Heath.* Slender erect shrub 20 cm. to 1 m. high, with minutely pubescent branchlets; leaves sessile, linear-lanceolate, pungent-pointed, 7-10 mm. long, spreading, glabrous or sometimes minutely pubescent, the midrib prominent below; flowers spreading or drooping; bracts and sepals whitish or pink, the latter about 3 mm. long, usually acute; corolla red or white, the tube 8-18 mm. long, with 5 pits towards base, the lobes short, obtuse, spreading; style long, slender, capitate; capsule globular, scarcely exceeding the sepals. (Fig. 184, A-E.)

Mt. Lofty Range; Kangaroo Island; 90-Mile Desert; South-East. Most of the year.—Victoria; New South Wales; Tasmania. The leaves are much like those of *Leptospermum scoparium*.

E. obtusifolia, Sm., with oblong obtuse leaves and sepals, and white flowers in leafy racemes; *E. lanuginosa*, Labill., with lanceolate pungent leaves and flowers in heads or leafy spikes, and *E. microphylla*, R. Br., with small broad cordate acute leaves and small flowers in long dense leafy spikes, have been recorded for our South-East by Mueller in his 2nd Census, I do not know on what authority. These 3 species have the corolla-tube shorter or scarcely longer than the sepals, and no pits. They usually inhabit hilly districts in the eastern States. *E. lanuginosa* may be found here, as it grows near Portland, Victoria.

9. SPRENGELIA, Sm.

(After Kurt Polycarp Joachim Sprengel, 1766-1833, German botanist and physician).

1. **S. incarnata,** Sm. Slender erect glabrous shrub, flowering when small, but sometimes 1-2 m. high; leaves olive-green, 6-10 mm. long, broad and stem-clasping above the stem-sheathing base, thence spreading and tapering to a pungent point; flowers in leafy terminal heads or spikes, the peduncles sometimes long and always densely bracteate; bracts or floral leaves like the stem-leaves but smaller; sepals lanceolate, pink, 5-6 mm. long; corolla pale-pink, as long as sepals, divided to near the base into 5 lanceolate spreading lobes; stamens free from corolla, the red filaments inserted at base of ovary, the anthers cohering in a ring round the slender style and beset with clavate hairs outside; ovary 5-celled, with several ovules in each cell, the style inserted in a tubular depression of the ovary; no disk; capsule opening loculicidally. (Fig. 184, J.).

Mount Lofty Range; Kangaroo Island; South-East; frequents swampy land. Summer.—Victoria; New South Wales; Tasmania.

FAMILY 88.—PRIMULACEAE.

Flowers bisexual, regular; calyx 4-5-lobed; corolla with 4-5 imbricate lobes; stamens 4-5, inserted on the corolla-tube opposite the lobes; ovary usually superior, 1-celled, with numerous half-anatropous ovules, tending towards campylotropous, arranged around a central placenta; style simple, with capitate stigma; fruit a dehiscent capsule; seeds albuminous. Herbs with simple entire exstipulate leaves.

A family which takes its name from *Primula*, a genus containing many well-known European plants, such as the Primrose (*P. vulgaris*, Huds.) and the Cowslip (*P. officinalis*, Jacq.).

A. Ovary superior; capsule circumsciss; staminodes absent; annuals.
  Flower-parts 5; corolla exceeding calyx ..... ANAGALLIS 1.
  Flower-parts 4; corolla shorter than calyx ..... CENTUNCULUS 2.
A. Ovary half-inferior; capsule 5-valved; staminodes present; perennial ..... SAMOLUS 3.

1. ANAGALLIS (Tourn.) L.

(Greco-Latin name of some small plant, which, according to Pliny, was used as a medicine in obstruction of the liver.)

Calyx and corolla divided almost to base, the 5 calyx-segments linear-lanceolate, those of the rotate corolla ovate; stamens 5, the ciliate filaments inserted on base of corolla; capsule circumsciss; seeds numerous, on a free central globular placenta; flowers solitary, axillary.

Flowers red ..... *A. arvensis* 1.
Flowers blue ..... *A. femina* 2.

*1. **A. arvensis,** L. *Scarlet Pimpernel.* Glabrous procumbent annual, with weak quadrangular stems and branches; leaves opposite, sessile, ovate; 5-12 mm. long; peduncles longer than leaves, finally recurved; calyx about 5 mm. long, slightly exceeded by the bright-red corolla, whose segments are denticulate and glandular on the margin; capsule globular, about as long as the calyx.

Chiefly in the hills and the South-East, but found as far north as the Flinders Range east of Lake Torrens. Sept.-Apl.—Europe.

FIG. 185.—**Anagallis femina.**

*2. **A. femina,** Mill. (1768). *Blue Pimpernel.* Near the preceding, but the flowers are blue and the leaves sometimes larger, to 20 mm. long.—*A. coerulea*, Schreb. (1771); *A. arvensis*, L. var. *femina*, Schinz et Thellung.

Same localities and season.

2. CENTUNCULUS, L.

(Latin name of some small plant whose identity is uncertain).

1. **C. minimus,** L. *Chaffweed.* Small slender glabrous annual, usually 1½-3 cm. high, but sometimes twice that height; leaves almost all alternate, ovate, 1-4 mm. long; flowers minute, solitary, axillary, subsessile; calyx-segments 4, linear-lanceolate; corolla shorter than calyx, with 4 spreading acute lobes; stamens 4; capsule shorter than calyx, circumsciss.

Not mentioned in the Flora Australiensis. Found in 1882 near Mt. Graham and Lake Edward, S.E., and about the same time in south-western Victoria. Probably introduced. Summer.—Europe; North Africa; America, but usually rare and localised, doubtless often overlooked.

3. SAMOLUS (Tourn.) L.

(Latin name of some marsh-plant mentioned by Pliny; identity quite uncertain).

1. **S. repens** (Forst.) Pers. (1805). Glabrous perennial; stems erect or procumbent; radical leaves petiolate, caducous; stem-leaves sessile or tapering into a very short petiole, alternate, thick, acute, sometimes green, flattish, oblanceolate or oblong and 12-50 mm. long, sometimes lanceolate, succulent, somewhat erect, concave above, whitish-tuberculate and 5-15 mm. long; flowers in short terminal racemes, each with a leafy bract at or near the base of the pedicel; calyx 3-6 mm. long, the 5 acute lobes

about as long as the tube, which is adnate to the lower half of the ovary; corolla white or pale-pink, with 5 ovate spreading lobes; staminodes 5, alternating with the 5 stamens; placenta with a filiform extension upwards to the summit of the ovary; capsule as long as calyx, opening in 5 valves.—*Sheffieldia repens*, Forst. (1776).

Usually near water and often in salt swamps; along our coasts, also in moist places inland. Summer.—Temperate Australia; New Zealand; New Caledonia.

FAMILY 89.—PLUMBAGINACEAE.

Flowers bisexual, regular; calyx tubular, 5-lobed, persistent; corolla of 5 petals, twisted in bud, more or less united in the lower part; stamens 5, opposite the petals; ovary superior, 1-celled, with 1 anatropous ovule suspended from a long basal filiform funicle; styles 5, free or united in lower part; fruit a 1-seeded capsule, indehiscent or opening irregularly; seed with thin testa and embryo straight in the axis of the albumen; radicle superior. Herbs or shrubs with simple alternate or radical leaves without stipules.

The family derives its name from the genus *Plumbago*, often represented in gardens by the shrubby *P. capensis*, Thunb., with pale-blue or white flowers. A tropical and sub-tropical species, *P. zeylanica*, L., with white flowers and petioles clasping the stem by 2 small auricles, occurs in the MacDonnell Range, but has not been found within our border. *Plumbago* has a cylindrical calyx covered with short stiff glandular hairs, a funnel-shaped corolla with long slender tube, and hypogynous stamens.

1. STATICE, L.

(Greco-Latin name of some astringent herb, from Greek *statikos*, stopping, astringent).

Calyx funnel-shaped, 5-nerved, with a 5-lobed membranous folded often petaloid limb; stamens inserted on base of corolla; styles free or almost so; fruit enclosed in calyx; seed oblong. Herbs with radical leaves; scapes with small scales at the base of the branches; flowers subsessile, erect, in panicles composed of 1-5-flowered sessile spikelets forming 1-sided spikes, each spikelet surrounded by 3 bracts, of which the inner one is the largest, coriaceous, with membranous margin and embracing the spikelet, each flower with a scarious 1-2-nerved bracteole; the spikelets rise from opposite sides of a zigzag axis and therefore really form a scorpioid cyme or cincinnus, with the appearance of a 1-sided spike.

A. Scapes and numerous branches slender, without wings; leaves entire, with very narrow membranous margin.
  Spikes rather dense ..... *S. occidentalis* 1.
  Spikes rather loose ..... *S. psiloclada* 2.
A. Scapes and branches 3-winged; spikes very short and dense; leaves lobed, without membranous margin.. *S. Thouinii* 3.

*1. **S. occidentalis,** Lloyd. *Sea Lavender.* Glabrous perennial, 20-30 cm. high; leaves in a radical rosette, oblanceolate, 3-6 cm. long, including the rather long petiole, finely mucronate; scapes branched from below the middle, the lower branches often barren; flowers in an oblong panicle, the spikelets close together on the branches; inner bract boat-shaped; calyx 6 mm. long, hairy on the green nerves, the lobes obtuse; corolla pale lilac.

Patawalonga Creek, Glenelg. Summer.—British and French coasts; Mediterranean region.

*2. **S. psiloclada,** Boiss. Near the preceding; leaves obovate-spathulate, 2-3 cm. long, including the petiole, rounded at summit and without a mucro; scape branched almost from base, the spikelets 2-3 mm. apart on the slender panicle-branches; calyx about 4 mm. long, hairy towards base; corolla lilac.

Port Adelaide River; Lefevre's Peninsula. Summer.—Mediterranean region.

*3. **S. Thouinii,** Viv. *Winged Sea Lavender.* Almost glabrous annual; leaves of radical rosette lyrate, sparsely ciliate; scapes 3-winged, each of the long wings ending above in a triangular lobe; spikelets crowded in short dense spikes at the summit of the short branches, which are articulate at base, obconical and 3-winged in the upper part, the wings ending in stiff pungent trigonous lobes; inner bract greenish, rigid, 2-keeled, with 2 subulate recurved horny teeth and 3 obtuse scarious lobes at summit; calyx glabrous, about 10 mm. long, the lobes acute, pale-violet, alternating with 5 slender bristles; corolla yellow.

Yorke and Eyre Peninsulas. Summer.—Eastern Mediterranean region.

FAMILY 90.—OLEACEAE.

Flowers regular, usually bisexual; calyx and corolla 4-6-lobed, rarely wanting; stamens 2, inserted on base of corolla or (in *Fraxinus*) at base of ovary; ovary superior, 2-celled, each cell containing 1-2 axile anatropous ovules; style simple; fruit a berry, drupe or samara; seed with straight embryo; cotyledons longer and broader than the small radicle. Trees or shrubs with exstipulate usually opposite leaves and mostly panicled flowers.

To this family belongs the Lilac (*Syringa vulgaris*, L.), a native of south-eastern Europe and western Asia.

A. Corolla-lobes 5-6; ovule ascending from an almost basal placenta; albumen almost absent. (Subfamily *Jasminoideae*).
  Fruit a berry ..... JASMINUM 1.
A. Corolla-lobes 4, or corolla absent; ovule pendulous from summit of cell; albumen usually present. (Subfamily *Oleoideae*).
  Fruit a large drupe; leaves simple ..... OLEA 2.
  Fruit dry, surmounted by a long wing; leaves pinnate ..... FRAXINUS 3.

1. JASMINUM (Tourn.), L.

(Latinization of Perso-arabic *yâsamîn*, jasmine).

1. J. lineare, R. Br. *Desert Jasmine.* Small shrub, mostly under 1 m. but sometimes 2 m. high, minutely hoary-pubescent or almost glabrous; leaves mostly opposite and 3-foliolate, the leaflets linear-lanceolate, the terminal leaflet 3-10 cm. long, the lateral ones shorter; flowers fragrant, in small axillary trichotomous panicles; calyx 2-3 mm. long, with usually 5 short teeth; corolla white, funnel-shaped, with 5-6 spreading imbricate lobes, the tube 6 mm. long; stamens 2, enclosed; ovary 2-celled, with 1 ovule in each cell; style 2-lobed at summit; berry black, globular, about 8 mm. diam.

Murray lands and north thereof; Flinders Range to Far North and westward to Birksgate Range. Summer.—Dry parts of Australia.

FIG. 186.—**Olea europaea.**

2. OLEA (Tourn.) L.

(Latin for the olive-tree and also its fruit).

*1. **O. europaea,** L. *Olive.* Small glabrous tree; leaves opposite, oblong-lanceolate, 3-8 cm. long, coriaceous, glossy above, whitish below; flowers in short axillary racemes, often compound towards the base; calyx about 2 mm. long, with 4 short teeth; corolla small, white, with a very short tube and 4 spreading valvate lobes; stamens 2, exserted; ovary 2-celled, with 2 ovules in each cell; style short; fruit an oblong fleshy drupe, black when ripe, about 25 mm. long, with a bony endocarp containing 1-2 seeds.

Cultivated since the early days of settlement and spontaneous on hillsides at Glen Osmond and sandhills at Encounter Bay. Oct.-Nov.—Eastern Mediterranean region; now cultivated in many countries. There is one Australian species, *O. paniculata*, R. Br., a native of New South Wales and Queensland.

3. FRAXINUS, L.

(Latin name of the ash-tree).

*1. **F. oxycarpa,** Willd. (1806). *Caucasian Ash.* Medium-sized tree; leaves opposite, imparipinnate, caducous, on long slender petioles, with 5-9 oblong-lanceolate sessile serrate long-acuminate leaflets, 3-5 cm. long, 10-18 mm. broad, glabrous or almost so; flowers bisexual or polygamous, in short dense sessile paniculate racemes appearing before the leaves and at first enclosed in broad brown tomentose bracts; calyx and corolla absent; stamens 2, hypogynous, arranged on either side of the 2-celled ovary with 1 ovule in each cell; anthers purple; style short; fruit a brown striate samara or winged nut, oblanceolate, narrowed towards base, drooping, 3-4½ cm. long, 7-10 mm. broad, the terminal wing flat, stiff, rounded, notched or acute at summit; seed 1.—*F. oxyphylla*, Bieb. (1808).

Gullies of the Flinders Range near Wirrabara. May-July. Probably an escape from the plantations of the Wirrabara Forest; planted in streets and parks, Adelaide. Nearly related to *F. excelsior*, L., the Common Ash of Europe.—Eastern Mediterranean region.

Family 91.—**LOGANIACEAE.**

Flowers regular, mostly bisexual; calyx and corolla 4-5-lobed; stamens 4-5, inserted in the corolla-tube and alternate with the lobes; ovary superior, 2-celled, with usually several ovules in each cell on septal placentas; styles 2, separate or united into 1; fruit a capsule (in our 2 genera), sometimes a berry. Herbs or shrubs with opposite simple usually entire leaves.

Australia has 6 genera of this family, one of which is *Strychnos*, represented by 2 species in eastern and northern Australia, both stated to be non-poisonous. Strychnine is obtained from the seeds of *S. nux-vomica*, L., an Indian tree. Curare and other deadly poisons for tipping arrows are made from the bark of species of *Strychnos* growing in South America, Africa and the East Indies. *Buddleia*, of which several species are cultivated as ornamental shrubs, also belongs to this family.

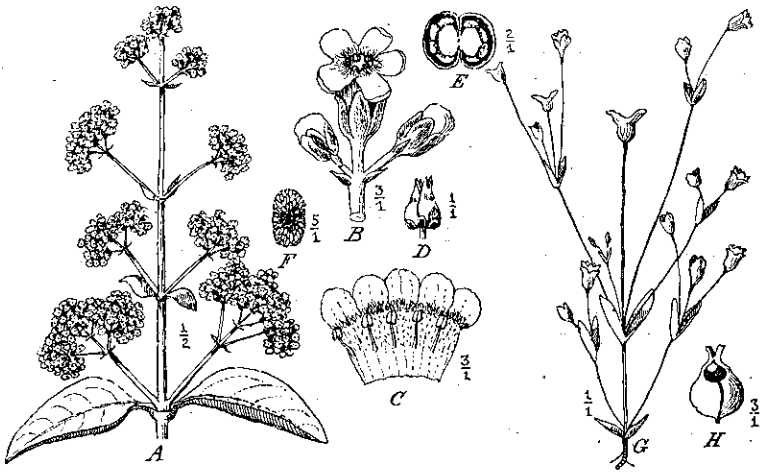

Fig. 187.—**Loganiaceae.** A-F, *Logania vaginalis*: A, flowering branch; B, partial cyme; C, corolla spread open; D, capsule; E, transverse section of capsule; F, seed. G-H, *Mitrasacme paradoxa*: G, plant; H, capsule.

Herbs; corolla-lobes 4, valvate	Mitrasacme 1.
Shrubs; corolla-lobes 5, imbricate	Logania 2.

1. MITRASACME, Labill.

(From Greek *mitra*, in the sense of an ecclesiastical mitre; *akmé*, summit: resemblance of the corolla of *M. pilosa* to a mitre).

Calyx 2 or 4-lobed; corolla-tube cylindrical, contracted at throat, with 4 valvate lobes; stamens 4, enclosed; ovary 2-celled, with several ovules in each cell; styles 2, short, more or less free; stigmas capitate; capsule small, scarious, opening at the summit by an aperture or pore between the bases of the styles; seeds minute. Slender herbs; leaves without stipules; flowers small.

A. Small glabrous annuals; calyx 2-lobed; peduncles much longer than leaves.	
Styles cohering at summit	*M. paradoxa* 1.
Styles distinct	*M. distylis* 2.
A. Hairy perennial; calyx 4-lobed; peduncles shorter than or slightly exceeding leaves	*M. pilosa* 3

1. **M. paradoxa,** R. Br. Slender erect somewhat wiry glabrous annual, 2-10 cm. high; leaves oblong, connate at base, 3-8 mm. long; flowers each terminating a long filiform peduncle, and usually forming a 2-5-flowered umbel; calyx campanulate, enlarged to about 4 mm. long in fruit, with 2 broad diverging lobes; corolla scarcely exceeding the flowering calyx, the subacute lobes shorter than the tube; styles separate at base, united near summit; capsule globular, enclosed in calyx. (Fig. 187, G-H).

Mt. Lofty Range northward to Flinders Range; Kangaroo Island; Yorke and Eyre Peninsulas; South-East. Sept.-Nov.—Temperate Australia.

2. **M. distylis,** F. v. M. A still smaller and more slender plant, about 15 mm. high, including the usually solitary capillary peduncles; leaves oblong-linear, 3-4 mm. long; fruiting calyx about 3 mm. long, the 2 lobes very obtuse; corolla scarcely

exceeding calyx, the lobes minute, obtuse, 5 times shorter than the tube; styles becoming quite distinct and often persistent on opposite sides of the small globular capsule.

Clarendon, McLaren Vale (Mt. Lofty Range); probably overlooked in many places owing to its minuteness. Oct.-Nov.—Victoria; Tasmania.

3. **M. pilosa,** Labill. Prostrate or ascending perennial, more or less clothed with short spreading hairs; leaves ovate-lanceolate, 4-7 mm. long; flowers solitary, axillary or terminal, on peduncles usually shorter than leaves; flowering calyx about 3 mm. long, hairy, enlarged in fruit, with 4 broad lobes; corolla-tube about as long as calyx, bearded in throat, the lobes shorter than tube; styles distant at base, united at summit and over-arching the ovoid capsule.

Between Mt. Burr and Mt. McIntyre, S.E. Nov.-Dec.—Victoria; New South Wales; Tasmania.

2. LOGANIA, R. Br.

(After James Logan, scientist, born in Ireland in 1674, became William Penn's agent in North America; wrote a Latin work on the sexuality of plants, which was published at Leyden in 1739; died in Philadelphia, 1751.)

Calyx 5-sect; corolla with 5 imbricate lobes; stamens 5; ovary 2-celled, with several ovules in each cell; style simple, with a capitate or oblong stigma; capsule coriaceous, ovoid and contracted towards summit, dehiscing septicidally and loculicidally at summit, so that it appears to open by 4 teeth, the 2 carpels finally almost separating. Shrubs; leaves connected at base by a more or less distinct stipular line; flowers small, in corymbose dichotomous or trichotomous axillary and terminal cymes, with 2 opposite bracts at each branching of the peduncles, rarely clustered; corolla white (in all our species), the rounded spreading lobes about as long as the tube; calyx usually purplish or blackish.

A. Stems leafy; calyx-segments obtuse; stamens inserted in middle of corolla-tube; anthers enclosed; flowers mostly dioecious.	
B. Leaves 2-8 cm. long.	
Leaves ovate, flattish, stalked	*L. vaginalis* 1.
Leaves lanceolate, recurved, sessile	*L. recurva,* 2.
B. Leaves 1-3 cm. long, flat or almost so.	
Leaves orbicular or obovate, very stiff	*L. crassifolia* 3.
Leaves ovate or broadly oblong	*L. ovata* 4.
B. Leaves 1-2 cm. long, linear, almost flat	*L. linifolia* 5.
B. Leaves 5-6 mm. long, ovate-oblong	*L. insularis* 6.
A. Stems without leaves; calyx-segments usually acute; stamens inserted in throat, shorter than corolla but with exserted anthers	*L. nuda* 7.

1. **L. vaginalis** (Labill.) F. v. M. Erect glabrous shrub 1-2 m. high; leaves ovate or obovate, flattish or concave above, acuminate, 2½-8 cm. long, the uppermost broad-lanceolate, glossy above, tapering into a short petiole, the lateral nerves conspicuous; cymes on long peduncles, forming loose pyramidal leafy panicles; calyx about 2 mm. long, glabrous; corolla 4-5 mm. long, bearded in the throat and with scattered hairs on the tube inside; capsule ovoid-acute, about 6 mm. long. (Fig. 187, A-F.)—*L. latifolia,* R. Br.; *L. longifolia,* R. Br. (1810); *Exacum vaginale,* Labill (1804).

Mt. Lofty Range to Flinders Range. July-Nov.—North-western Victoria; West Australia.

2. **L. recurva,** J. M. Black. Erect glabrous shrub about 1 m. high; leaves lanceolate, 2-4 cm. long, 3-8 mm. broad, narrowed at both ends but sessile and half-clasping at base, the margins recurved or revolute, grooved along the midrib on the upper face; cymes dense, forming long narrow leafy panicles; calyx 1½ mm. long, ciliolate; corolla 4 mm. long, bearded by a dense ring of hairs in the throat, the tube glabrous; capsule about 5 mm. long.—*L. longifolia,* R. Br. var. *subsessilis,* Benth.

Mt. Lofty Range; Ardrossan, Y.P. Aug.-Oct.

3. **L. crassifolia,** R. Br. Diffuse maritime shrub, only the branches scabrous with minute hairs; leaves orbicular or almost so, flat, mucronulate, very shortly petiolate; 1½-3 cm. long, very rigid, with thickened margins; cymes usually short and compact; calyx 2 mm. long, glabrous; corolla 4 mm. long, the lobes hairy in lower half and the tube pubescent inside almost to base; capsule 7-9 mm. long and about as broad at base.

In places round our coasts from the South-East northward and westward to Fowler's Bay; Kangaroo Island; and islands near Eyre Peninsula. Aug.-Oct.—West Australia.

Var. *minor,* J. M. Black. Smaller in all its parts; leaves thinner and tending to obovate or obovate-oblong, 1-2½ cm. long, on a petiole about 5 mm. long; branches minutely tuberculate.—Port Elliot; Port Lincoln.

4. **L. ovata,** R. Br. Erect glabrous shrub, about 1 m. high; leaves almost sessile, from broad-ovate to broad-oblong, acute, 1-3 cm. long; cymes compact, sometimes on long primary peduncles; calyx nearly 2 mm. long, glabrous; corolla 3-4 mm. long, bearded by a dense ring of hairs in the throat, the tube glabrous; capsule about 6 mm. long

Near the coast from the South-East to Kangaroo Island, Yorke and Eyre Peninsulas. July-Nov.—Victoria; West Australia.

5. **L. linifolia,** Schlechtd. Small slender erect shrub, the branchlets minutely pubescent; leaves linear or linear-lanceolate, obtuse, flattish, narrowed at both ends, subsessile, 10-15 mm. rarely 20 mm. long, 2-4 mm. broad; cymes comparatively loose, on slender peduncles; calyx 1½ mm. long, sparsely ciliolate; corolla cup-shaped, 2-3 mm. long, usually glabrous, or sometimes with a short ring of hairs in the throat and the lobes minutely pubescent inside; capsule 4-5 mm. long.

Mount Lofty Range and Encounter Bay; Murray lands; Kangaroo Island. Sept.-Nov.—Western Victoria; New South Wales.

L. stenophylla, F. v. M., a rigid glabrous shrub, with thick linear leaves 10-15 mm. long, the margins so revolute as almost to conceal the undersurface, is recorded by Tate for our far-western district, I do not know on what authority. It does not appear to have been yet found nearer our border than the Victoria Desert, W.A.

6. **L. insularis,** J. M. Black. Slender shrub, the branches scabrous with minute hairs; leaves ovate-oblong, thick, flattish, 5-6 mm. long, 2½-3 mm. broad, with recurved margins, contracted into a very short petiole; cymes short and few-flowered; calyx scarcely 1 mm. long, ciliolate; corolla spreading, almost rotate in appearance, about 2 mm. long and 4 mm. across, glabrous except for a ring of minute hairs or papillae in the throat; capsule not seen.

Cape Borda, K.I. Oct.

7. **L. nuda,** F. v. M. Rush-like undershrub, with striate stems and opposite branches, the leaves reduced to minute scales at the nodes; flowers clustered at the upper nodes; calyx 2½ mm. long, the segments ciliate, acute or rather obtuse; corolla 8 mm. long, the tube cylindrical, minutely pubescent inside and out, the lobes oblong, bearded on the lower half inside; ovary pubescent; capsule 4-5 mm. long.

The only specimen I have seen from our State is one collected near Ooldea by Warman.—Western New South Wales; West Australia.

FAMILY 92.—GENTIANACEAE.

Flowers regular, bisexual; calyx and corolla 4-5-lobed, rarely 6-lobed, the calyx persistent, the corolla usually withering on the fruit; stamens 4-5, inserted on the corolla-tube and alternate with the lobes; ovary superior, 1-celled with 2 rarely more parietal placentas or rarely 2-celled with septal placentas; placentas bearing numerous anatropous or amphitropous ovules; style simple, the stigma entire or of as many lobes as placentas; fruit a capsule opening septicidally in 2 valves or in 4 lobes at summit, or rarely indehiscent; seeds small; embryo straight in the albumen, with short cotyledons. Herbs, with exstipulate simple leaves.

A. Land-plants, with opposite leaves and bracts and usually a bitter taste; corolla-lobes imbricate and often twisted in bud. (Sub-family *Gentianoideae*).	
B. Corolla funnel-shaped; style deciduous.	
Calyx 4-5-sect; ovary 2-celled	SEBAEA 1.
Calyx 5-lobed; ovary 1-celled	ERYTHRAEA 2.
B. Corolla campanulate; style persistent, very short or obsolete	GENTIANA 3.
A. Water-plants, with alternate leaves and bracts, the leaves mostly radical; corolla-lobes induplicate-valvate in bud, winged when open. (Subfamily *Menyanthoideae*).	
Capsule opening in 4 valves; flowers panicled..	VILLARSIA 4.
Capsule indehiscent; flowers clustered or twin..	LIMNANTHEMUM 5.

1. SEBAEA, Sol. ex R. Br.

(After Albert Seba, 1665-1736, a Dutch traveller and collector of natural history specimens).

Calyx divided almost to base, the segments imbricate; corolla-tube cylindrical, the lobes short, spreading, twisted in bud; stamens inserted in throat, the anthers tipped by a stipitate gland and finally recurved at summit; ovary 2-celled, with 2 septal placentas; style notched at summit; capsule oblong, 2-valved, enclosed in calyx, the margins of

the valves inflexed, separating from the placental column; seeds minute, grooved. Small slender annuals with opposite leaves; flowers in terminal dichotomous bracteate cymes.

Flower-parts 5; corolla yellow ..... *S. ovata* 1.
Flower parts 4; corolla whitish ..... *S. albidiflora* 2.

1. **S. ovata** (Labill.) R. Br. Glabrous, erect, 6-25 cm. high; leaves in distant pairs, sessile, ovate or almost orbicular, about 6-15 mm. long; cymes long, rather loose; calyx 4 mm. long, the 5 segments acute, keeled; corolla slightly longer, yellow.
Southern districts to Flinders Range; Kangaroo Island; Murray lands; Yorke and Eyre Peninsulas; South-East Oct.-Jan.—Temperate Australia.

2. **S. albidiflora,** F. v. M. Very near the preceding, but the calyx-segments and corolla-lobes usually 4, obtuse, the corolla almost white.
South-East; southern Yorke Peninsula. Oct.-Dec.—Victoria; Tasmania.

2. ERYTHRAEA (Ren.) Neck.

(From the Greek *erythraios,* reddish: alluding to the color of the flowers).

Calyx of 4 or 5 subulate green ribs with membranous margins, almost free, or more or less united by the membranous tissue; corolla funnel-shaped, with cylindrical tube and 4-5 spreading lobes, twisted in bud; stamens inserted in throat, the anthers twisted spirally after shedding the pollen; ovary 1-celled, with 2 bifid parietal placentas; style slender; stigma more or less 2-lobed; capsule narrow-oblong, acute, 2-valved, incompletely 2-celled by the involute seed-bearing margins of the valves, enclosed in calyx or slightly exceeding it; seeds minute, wrinkled. Herbs with slender quadrangular stems and opposite leaves, the lowest often forming a radical rosette, which usually withers early.

Branches of cyme bearing leafy racemes ..... *E. australis* 1.
Branches of cyme naked up to the next cyme ..... *E. Centaurium* 2.

1. **E. australis,** R. Br. Erect glabrous annual, 10-45 cm. high; leaves sessile, broadly or narrowly oblong or lanceolate, 1-2 cm. long; flowers on pedicels of 2-5 mm. forming loose leafy racemes along the branches of dichotomous cymes, each flower with a leafy bract opposite the leaf; forks 1-flowered; calyx 6-8 mm. long, divided about half way; corolla longer, red or pink; stigma short and broad, 2-lobed or notched, sometimes very slightly.
All over the State, but apparently not common anywhere. Most of the year.—Throughout Australia; New Caledonia. Almost all our specimens show a great predominance of 5-parted flowers; the only one which I have seen with a large proportion of 4-parted flowers was from Coroona Station, near Iron Knob. I do not know how to distinguish this species from *E. spicata,* Pers., a Mediterranean plant with which it was united by Mueller, except by the longer flower-stalks, the usually more divided stigma, and perhaps by the radical rosette, which appears to be usual in our plant and is said to be absent in *E. spicata.* None of these are very satisfactory distinctive marks.

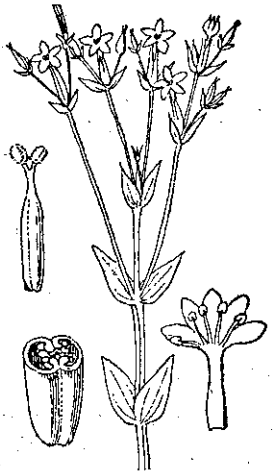

FIG. 188.—**Erythraea Centaurium.**

*2. **E. Centaurium,** Pers. *Common Centaury.* Like the preceding in foliage and flower; leaves broad or narrow, 1-3 cm. long; flowers subsessile, in dense or loose corymbose dichotomous cymes, with 2 opposite leafy bracts at each branching; calyx often divided to base into 5 linear segments; corolla longer, with 5 pink or red lobes; stigmas ovoid-oblong, separate.

Southern districts; Bordertown; South-East. Nov.-Feb.—Europe; western Asia. A variable species, from which a tonic decoction is sometimes made. It has been divided by some botanists into several species, the form with a long loose cyme occupying about half the stem being *E. pulchella* (Sw.) Horn. When the cyme is short and compact, with narrow leaves, it is *E. littoralis,* Fries, and when the leaves are broad it is *E. Centaurium* in the stricter sense. These forms appear to be represented in South Australia. Bentham states, however (Handb. Brit. Fl.), that they "run into one another so much that no precise limits can be assigned them."

3. GENTIANA (Tourn.) L.

Greco-Latin name of the Yellow Gentian, *G. lutea*, L., whose medicinal properties are said to have been discovered by Gentius, King of Illyria).

1. **G. diemensis,** Griseb. (1839). Glabrous erect annual, 12-40 cm. high; stems 1 or several, slender, wiry, almost simple or branching; leaves opposite, the lower ones ovate or oblong, 2-4 cm. long, including the rather long petiole, the upper leaves distant, narrower, 1-2 cm. long, spathulate but scarcely petiolate; flowers terminating long slender pedicels, forming few-flowered loose axillary and terminal cymes; calyx 7-10 mm. long, cut to below the middle into 5 linear-lanceolate lobes; corolla 12-15 mm. long, broadly campanulate, whitish, drying pale-yellow, deeply divided into 5 obovate lobes; stamens 5, inserted in tube; ovary 1-celled, with 2 parietal placentas; stigmas 2, sessile; capsule as in *Erythraea.*—*G. pleurogynoides,* Griseb. (1839).

South-East, apparently rare now: recorded by Mueller for "crest of Mount Gambier and Tilly's Swamp"; collected by Tate at Riddoch Bay in 1882. Oct.-Dec.—Eastern Australia; New Zealand. Our plant has hitherto been placed under *G. saxosa,* Forst. f. (1777) or *G. montana,* Forst. f. (1786), but Cheeseman, in his Manual of the New Zealand Flora (1906), states that these are 2 distinct perennial species probably confined to New Zealand. More closely related to the South Australian plant is *G. Grisebachii,* Hook. f., which was united with *G. montana* by Bentham, but which Cheeseman considers a distinct annual species. Only 2 species have been published from Australian specimens and both from Tasmanian material—*G. diemensis* and *G. pleurogynoides,* Griseb. The first is described as perennial and the second as annual; both have the flowers in corymbose cymes and have been united by various authors with *G. saxosa* or *G. montana.* They probably constitute one species, as Rodway (Tasm. Fl.) says the Tasmanian plants are "annual or the stock becoming perennial in favorable situations." The flowers agree exactly with our South-Eastern specimens. All the Australian forms, whether species or varieties, require a careful revision.

4. VILLARSIA, Vent.

(After Dominique Villars, French botanist and physician, 1745-1814; author of the "Histoire naturelle des plantes du Dauphiné," 1786-89).

Calyx 5-sect, the segments imbricate; corolla almost rotate, with a very short broad tube and 5 broad induplicate winged lobes; stamens 5, inserted in tube; ovary surrounded by 5 minute hypogynous glands, 1-celled, with 2 parietal placentas; style terminating in 2 broad stigmatic lobes; capsule 1-celled, oblong, almost enclosed in calyx, opening at summit in 2 broad valves. Perennial water-plants, the leaves alternate, almost all radical, broad, thickish, usually with both pinnate and palmate nerves, on long petioles which are dilated at base; flowers in a loose cymose panicle, with alternate bracts, the pedicels obconical at summit.

Corolla twice as long as calyx; stems stout	*V. exaltata* 1.
Corolla scarcely exceeding calyx; stems slender	*V. parnassiifolia* 2.

1. **V. exaltata** (Sims) F. v. M. (1868). Glabrous except the corolla, with rather stout erect stems 20-100 cm. high; leaves radical or often 1 leaf below the first branch of the panicle, ovate or orbicular, usually cordate at base, 2-8 cm. long; flowers showy; pedicels 1½-2 cm. long; calyx-segments 5, oblong-lanceolate, green, 8 mm. long; corolla bright-yellow, almost rotate, spreading to 20-35 mm. diam., with 5 ovate entire or crenulate-undulate lobes, bearded inside at base: seeds compressed-ovoid, smooth or granular, 1½ mm. long.—*Menyanthes exaltata* (Sol.) Sims (1807); *Villarsia reniformis,* R. Br. (1810); *Limnanthemum exaltatum* (Sims) F. v. M. (1875); *L. reniforme* (R. Br.) Tate (1890).

Water-plant growing near creeks and marshes: southern districts to Flinders Range South-East and probably most parts of the State. Summer.—Eastern States. The yellow, winged corolla resembles that of *Goodenia.*

2. **V. parnassiifolia** (Labill.) R. Br. Differs from the preceding in the stems and pedicels more slender, the latter often curved, the leaves rather smaller and the corolla-lobes narrower and only slightly, or scarcely at all, exceeding the calyx. Bentham, however says that slender specimens of *V. exaltata* also occur, in which case no distinction would remain except the size of the corolla, which can be properly seen only in the live plant.—*Swertia parnassiifolia* Labill. (1804); *Limnanthemum parnassiifolium* (Labill.) F. v. M. (1875).

Mount Lofty Range to Flinders Range; South-East.—West Australia. Perhaps these 2 species should be united, as has been done by one or two authors, in which case *V. parnassiifolia* has priority. The specific name records the resemblance of the leaves to those of a European swamp-plant, *Parnassia palustris,* L. Mueller says the seeds of *V. exaltata* are 1-1½ mm. long and those of *V. parnassiifolia* only ½ mm. long, but in our specimens they appear to be of nearly the same size.

5. LIMNANTHEMUM, S. G. Gmel.

(From Greek *limnê*, lake; *anthemon*, a flower.)

Differs from *Villarsia* in the capsule indehiscent or opening irregularly, and in the flowers clustered or twin at the nodes, not arranged paniculately; ovary 1-celled, with 2-5 placentas and stigmatic lobes.

Stems floating or prostrate; flowers clustered among the leaves ..... *L. crenatum* 1.
Stems suberect; flowers twin, bracteate..... *L. stygium* 2.

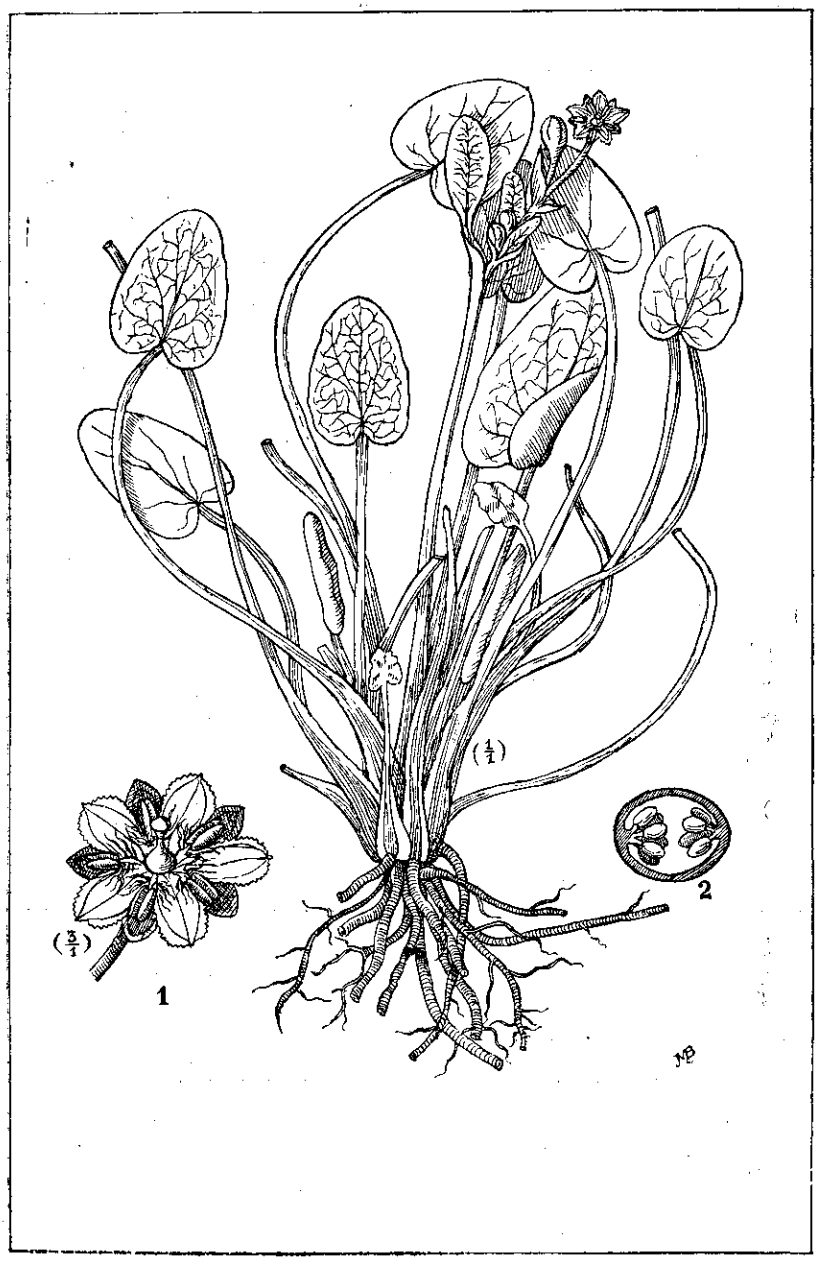

PLATE 41.—**Limnanthemum stygium.**

1. **L. crenatum,** F. v. M. Almost glabrous floating or creeping perennial; leaves 1 or more at the nodes of the long stems, mostly orbicular-cordate, sinuate-lobed, 3-6 cm. diam., on long petioles; flowers clustered at the nodes, on stout peduncles 2-6 cm. long and obconical at summit; calyx-segments membranous, lanceolate, about 6 mm. long; corolla more than twice as long, yellow, the lobes fringed, bearded at base and winged down the centre; ovary usually with 3-5 placentas and 3-5 broad fringed stigmatic lobes, which after flowering lose their fringes and remain at the summit of the short style as vertical wings; capsule membranous; seeds numerous, compressed-ovoid, smooth, shining, under 1 mm. long.

River Murray; mud round waterholes north of Cooper's Creek. Most of the year.—Eastern and tropical Australia.

2. **L. stygium,** J. M. Black. Small glabrous stolon-bearing perennial; leaves radical on long petioles, ovate-cordate, 2-2½ cm. long; stem erect or almost so, with 1 oblong leaf or large bract at base of infloresence; flowers twin, on short pedicels, with 2 approximate bracts at the base of each pair; calyx-segments herbaceous, ovate, 4 mm. long; corolla pink, drying orange, scarcely exceeding the calyx, the lobes denticulate, bearded at base behind the stamens; ovary with 2 placentas; stigmatic lobes 2, broad, entire: fruit unknown.

In water at Dismal Swamp, near Mt. Gambier. Dec. Near *L. exiliflorum,* F. v. M of Queensland.

PLATE 41.—1, flower; 2, transverse section of ovary.

FAMILY 93.—APOCYNACEAE.

Flowers regular, bisexual; calyx 5-sect, the segments imbricate; corolla 5-lobed; stamens 5, inserted in the corolla-tube and alternate with the lobes; anthers 2-celled, enclosed in tube (in our genera); pistil superior, formed of 2 or in 1 genus 4 carpels usually distinct as regards their ovaries but united above the ovaries in a single style; ovules anatropous, few or several in each carpel; fruit a drupe or follicle; seeds with usually a scanty albumen, the embryo straight. Shrubs or herbs with entire exstipulate opposite or rarely alternate leaves; flowers in cymes or solitary.

The name of the family is derived from *Apocynum* or Dogbane, a genus chiefly North American. A popular shrub belonging to it is the Oleander (*Nerium Oleander,* L.), a native of the Mediterranean region, with 5 fringed scales in the throat of the corolla and anthers attached to the stigma by filiform extensions. *Mandevilla suaveolens,* Lindl., from temperate South America, is a favorite climber with large white scented blossoms.

A. Shrubs.

Carpels 2; leaves opposite; corolla-lobes twisted-imbricate in bud	ALYXIA 1.
Carpels 4; leaves alternate; corolla-lobes indupli-cate-valvate in bud	NOTONERIUM 2.
A. Herb with creeping stems; leaves opposite; corolla-lobes twisted-imbricate in bud	VINCA 3.

1. ALYXIA, Banks ex R. Br.

(Derivation not given by Brown; probably from Greek *alyxis,* an escape, shunning: alluding to the lonely situations in which the plant grows; J. D. Hooker suggests *halysis,* a chain, because the fruit is sometimes jointed.)

The prior name of *Gynopogon,* Forst. et f. (1776) was placed on the list of rejections at the Vienna Congress.

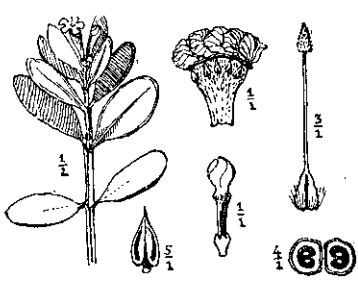

FIG. 189.—**Alyxia buxifolia.**

1. **A. buxifolia,** R. Br. Neat compact glabrous shrub, 1-2 m. high; leaves opposite, very shortly petiolate, thick, rigid, elliptical to almost orbicular, flattish, smooth, 1-3 cm. long; flowers few, subsessile, in small terminal clusters; calyx about 3 mm. long; corolla-tube cylindrical, orange, about 8 mm. long, with a thickened ring in the throat, the 5 broad spreading lobes much shorter, white; anthers acuminate, inserted near summit of tube; carpels 2, close together, only united by the style; stigma conical; ovules 4-6 along the inner wall of each carpel; drupe globular, orange, about 8 mm. diam., 1-seeded, or sometimes of 2, rarely more, globular superposed articles, each 1-seeded; seed broad, with wrinkled testa and ruminate albumen.

Along our coasts from the South-East to Eyre Peninsula; inland at places such as Halbury, Minnipa, and Ooldea. Summer.—Temperate Australia. One of the carpels usually becomes abortive after flowering.

2. NOTONERIUM, Benth.

(From Greek *notos*, the south ; *nérion*, the oleander.)

1. **N. Gossei,** Benth. Erect almost glabrous shrub ; leaves alternate, narrow-linear, 1½-3 cm. long ; flowers few, in terminal clusters ; corolla-tube about 4 mm. long (slightly exceeding the calyx), with 5 rows of hairs inside the upper part, the lobes spreading ; stamens inserted near base of tube, the anthers connivent round the stigma, but free ; carpels 4 (or 2 bipartite ?), on a 5-lobed membranous hypogynous disk ; stigma capitate ; ovule 1 in each carpel ; fruit unknown.

"Interior of South Australia" and "Central Australia." Collected by W. C. Gosse in 1873 and not re-discovered since. Gosse left Alice Springs in April, 1873, and explored north of the MacDonnell Range, thence travelling south *via* Ayers Rock and entering South Australia near the Mann Range ; continued westward to the Cavanagh Range and returned through the Musgrove and Everard Ranges to Charlotte Waters in December. The type was sent by Dr. Schomburgk to Bentham, but there is no specimen in the Schomburgk herbarium and no exact locality has been recorded.

FIG. 190.—**Vinca major.**

3. VINCA, L.

(From Latin *vinca-pervinca* or simply *pervinca*, the plant periwinkle.)

1. **V. major,** L. *Greater Periwinkle.* Perennial with long prostrate-rooting barren stems ; leaves opposite, ovate, shining, 2-5 cm. long, broad at base, shortly petiolate, ciliolate ; flowers solitary, axillary, on stiff flowering stems, the peduncles shorter than the leaves ; calyx 12-15 mm. long, nearly as long as corolla-tube, of 5 linear ciliate segments ; corolla blue, with broad spreading lobes ; stamens enclosed, the filaments bent and hairy at base ; carpels 2, distinct ; style swollen at summit into a ring, on which is seated the 5-angled stigma with a crown of hairs ; fruit of 2 divergent cylindrical follicles containing several seeds.

Gullies and moist places in the southern districts. July-Sept.—Native of Mediterranean region.

FAMILY 94.—ASCLEPIADACEAE.

Flowers regular, bisexual ; calyx 5-cleft, the segments imbricate in bud ; corolla more or less deeply 5-lobed, the lobes twisted-imbricate in bud, very slightly so in *Asclepias*, stamens 5, inserted at base of corolla and alternate with its lobes, the short filaments and the anthers united in a tube surrounding the pistil, the filaments and anthers bearing on their backs fleshy appendages which conceal them outwardly and are called the *corona*, or rarely the corona is free and membranous ; anthers 2-celled, opening inwards, the connective produced upwards in a short membranous appendage ; pollen consolidated into a waxy mass (*pollen-mass* or *pollinium*) in each anther-cell, the pollen-masses (when the anther opens) attached in pairs (1 from each adjoining anther) to small peg-like processes (*clips, corpuscles*) projecting from the 5 angles of the thick stigmatic head by means of 2 slender divergent arms (*caudicles*) ; pistil superior, of 2 distinct carpels with numerous anatropous ovules and closely surrounded by the staminal tube ; styles 2, short, united in a stigmatic head which bears the stigmas on its under-surface ; the combined stamens and pistil are called the *gynostegium* and form a short column in the centre of the flower ; fruit of two large follicles, or 1 by abortion ; seeds compressed, rather large, brown, albuminous, with a long tuft of silky hairs at the hilum ; embryo straight, with flat cotyledons. Herbs or shrubs, usually with a milky juice ; leaves opposite, entire, without stipules ; flowers usually cymose.

Cultivated members of this family are the Wax-plant (*Hoya carnosa*, R. Br., and *Stephanotis floribunda*, Brongn.), both fragrant twining shrubs, the cactus-like Carrion plant (various species of *Stapelia*) and many others.

A. Leafless shrub with thick succulent branches ; corona double ; pollen-masses pendulous ..... SARCOSTEMMA 1.
A. Leafy usually twining shrubs ; corona simple.
B. Pollen-masses pendulous ; corolla almost rotate.
C. Corona membranous, free from gynostegium, 20-lobed ..... CYNANCHUM 2
C. Corona fleshy, adnate to gynostegium, 5-lobed.
Corona-lobes acute ..... PENTATROPIS 3.
Corona-lobes obliquely truncate ..... ASCLEPIAS 4.
B. Pollen-masses erect ; corolla campanulate ..... MARSDENIA 5.

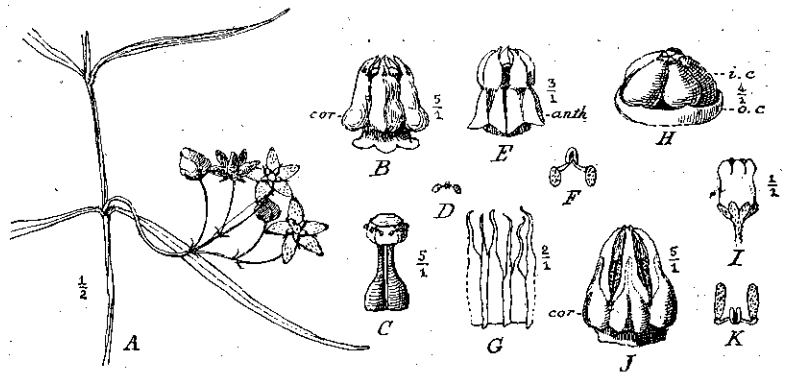

FIG. 191.—**Asclepiadaceae.**—A-D, *Pentatropis Kempeana:* A, flowering branch; B, corona surrounding gynostegium; C, pistil; D, pollen-masses with clip and caudicles. E-G, *Cynanchum floribundum:* E, gynostegium; F, pollen-masses; G, part of corona. H, corona of *Sarcostemma australe:* *i. c.*, inner corona; *o. c.*, outer corona. I-K, *Marsdenia australis:* I, flower; J, corona surrounding gynostegium; K, pollen-masses. Abbreviations: *cor*, corona; *anth*, anther.

1. SARCOSTEMMA, R. Br.

(From Greek *sarx, sarkos*, flesh; *stemma*, a crown: alluding to the fleshy corona.)

1. **S. australe,** R. Br. *Milk Bush; Tableland Caustic Bush.* Usually erect shrub, 1-2 m. high, the stems and branches succulent, green, glabrous, cylindrical, 5-10 mm. diam., or the branches are sometimes very long and trail on the ground; leaves reduced to minute opposite scales in distant pairs; flowers on short pubescent pedicels, few in sessile lateral umbels, or several in short dense sessile terminal racemes formed by a lengthening of the flowering rhachis to 4-6 mm.; calyx-segments small, deltoid; corolla almost rotate, the segments broad, obtuse, 4-6 mm. long; corona double, the outer one cup-shaped, surrounding the base of the gynostegium and scarcely half its length, the inner of 5 fleshy erect segments at the back of the anthers; stigmatic head flat; follicles broadly cylindrical, acute, smooth, 5-10 cm. long. (Fig. 191, H.)

Wallaroo northwards to Flinders Range and Far North; Murray lands and north thereof; Eyre Peninsula. Flowering irregular.—All States except Victoria and Tasmania.

2. CYNANCHUM, L.

(From Greek *kyón, kynos*, a dog; *ankhein*, to throttle: alluding to supposed poisonous properties of some European species.)

1. **C. floribundum,** R. Br. Small shrub about 1 m. high with somewhat twining branches, pubescent on the young parts; leaves petiolate, ovate-cordate or lanceolate, acuminate, 3-6 cm. long; flowers in irregular cymes, on rather long peduncles rising from between the petioles; pedicels and calyx pubescent, the segments 2½ mm. long; corolla almost rotate, about 8 mm. long, the segments white above, greenish below; corona forming a loose membranous tube round the stamens with 20 narrow acuminate lobes, the 10 outer ones parallel to the gynostegium, the 10 inner ones at right angles to them, all much surpassing the anthers and equalling the corolla-lobes; anthers terminating in conspicuous erect membranous appendages; follicles fusiform-acuminate, angular, sometimes curved, 3-5 cm. long. (Fig. 191, E-G.)

Flinders Range to Far North. Most of the year. The fruit, which is edible and astringent, is called "native pear" by bushmen; the fibres of the bast or inner bark are twisted into string by the natives.—Queensland; central and tropical Australia.

3. PENTATROPIS, R. Br.

(From Greek *pente*, five; *tropis*, keel: alluding to the 5 prominent corona-lobes.)

1. **P. Kempeana,** F. v. M. (1882). Slender almost glabrous twiner; leaves linear, flattish or with recurved margins, in distant pairs, 3-8 cm. long; flowers 3-7, in simple or irregularly compound umbels on solitary filiform peduncles rising between the leaves and much shorter than they; pedicels bracteate, 6-12 mm. long; calyx-segments lanceolate, nearly 2 mm. long; corolla almost rotate, becoming dark-purple, about 5 mm. long, divided almost to the base into ovate-lanceolate lobes, which are pubescent on the upper part inside; corona of 5 swollen lobes attached behind the anthers, protruding slightly beyond them in 5 free acute membranous points and continued downwards into 5 rounded basal protuberances which are sometimes called the outer corona; pollen-masses ovoid, obliquely sub-pendulous or almost horizontal; follicles slender-fusiform, acute, 8-15 cm. long. (Fig. 191, A-D).—*Daemia Kempeana,* F. v. M.

Far North and westward to Ooldea. Summer.—Central Australia; West Australia.

This differs from *P. atropurpurea*, F. v. M. (1869) only in the more deeply divided corolla and perhaps in the longer and more acute follicles; from *P. quinquepartita* F. v.M. (1869) only in the pubescent not villous inner surface of the corolla-lobes. Better acquaintance with these desert plants may prove that they are forms of a variable species. The corona and pollen-masses of our specimens and of *P. quinquepartita* as shown in plate 59 of Mueller's Plants indigenous to Victoria seem to me to belong rather to *Tylophora* than *Pentatropis*, but I have not ventured on any transfer, partly because it is difficult to ascertain the exact shape of these delicate organs in dried and relaxed specimens.

4. ASCLEPIAS, L.

(Greco-Latin name of a Mediterranean plant, now *Cynanchum Vincetoxicum* (L.) Pers., or Swallow-wort, a supposed antidote for poison, so called after Asklêpios, in Latin Aesculapius, the god of medicine.)

Corolla deeply divided into reflexed lobes; corona simple, of 5 fleshy concave lobes obliquely truncate at summit; anther-tips appressed on the truncate stigmatic head; pollen-masses pendulous; hair-tufts of seeds very long and silky. Shrubs or undershrubs, usually with umbellate flowers, the umbels in our species drooping, terminal and axillary, with pubescent peduncles and pedicels.

Gomphocarpus was separated from *Asclepias* by Robert Brown on account of the absence of a curved horn rising from the interior of the corona-lobes, but since then it has been discovered that in some tropical African species the horn is present or absent in different flowers of the same species. As a result the 2 genera have been re-united in the Flora Capensis and the Flora of tropical Africa.

A. Stems stout; leaves ovate; corona-lobes not toothed... *A. rotundifolia* 1.
A. Stems slender; leaves linear-lanceolate; corona-lobes toothed.
Follicles tapering into a beak ..... *A. fruticosa* 2.
Follicles obtuse at summit ..... *A. physocarpa* 3.

FIG. 192.—**Asclepias rotundifolia.**

*1. **A. rotundifolia,** Mill. (1768). *Broad-leaved Cotton-bush.* Shrub about 1 m. high with stout pubescent spreading stems; leaves ovate-oblong, coriaceous, 2½-5 cm. long, with very oblique lateral nerves; umbels 10-20-flowered; corolla white inside, pubescent and purplish outside; outer edge of corona-lobes higher than the inner; follicles ovoid-acuminate, about 5 cm. long, pubescent and with a few soft spines.—*A. arborescens*, L. (1771); *Gomphocarpus arborescens* (L.) R. Br.

Mt. Lofty Range to Waitpinga. April-Aug.—South Africa.

*2. **A. fruticosa,** *L. Narrow-leaved Cotton-bush.* Slender erect shrub, 1-2 m. high, the branches white-pubescent; leaves linear-lanceolate, 5-10 cm. long; umbels loose, 3-10-flowered; corolla-lobes white, ciliate; corona-lobes compressed, the outer edge lower than the inner, which terminates in 2 incurved teeth; follicles as in the preceding, but covered with numerous soft spines.—*Gomphocarpus fruticosus* (L.) R. Br.

Mount Lofty Range. Nov.-Feb.—South Africa and Mediterranean region.

*3. **A. physocarpa** (E. Mey.) Schlechter. Like the preceding, except that the teeth of the corona-lobes are shorter and curve upwards and the follicles are ovoid-oblong, obtuse at summit and do not taper into the very short curved beak.—*Gomphocarpus physocarpus*, E. Mey.

Near Beachport. Summer.—South Africa.

5. MARSDENIA, R. Br.

(After William Marsden, 1754-1836, orientalist and numismatist; a friend of Sir Joseph Banks and Dr. Solander, in London; wrote a "History of Sumatra" and a "Dictionary and Grammar of the Malayan language.")

1. **M. australis** (R. Br.) n. comb. Long slender twiner, hoary on the stems, branches and peduncles; leaves linear, acute, shortly petiolate, hoary when young, thickish, 4-10 cm. long; flowers 6-15 in dense solitary umbels on short interpetiolar peduncles

and short pedicels; calyx-segments ovate, obtuse, pubescent, 3-4 mm. long; corolla campanulate, glabrous inside and out, 8 mm. long, the lobes obtuse, about 2 mm. long; corona adnate to stamens, the lower part consisting of 5 fleshy lobes often cordate at base; tapering into membranous linear points exceeding the anthers; stigmatic head conical, obtuse; pollen-masses oblong, erect; follicles ovoid-oblong, 4-8 cm. long, hoary, tapering towards the blunt summit, with thick endocarp. (Fig. 191, I-K).—*Leichhardtia australis*, R. Br. (1849); *Marsdenia Leichhardtiana*, F. v. M. (1866).

Flinders Range to Far North and westward to Ooldea. Called "native pear" by bushmen, from the shape of the fruit, which is eaten by the aboriginals.—Dry districts of Australia, usually near watercourses.

FAMILY 95.—**CONVOLVULACEAE.**

Flowers regular, bisexual; calyx persistent, of 5 imbricate sepals or 5-toothed; corolla more or less deeply 5-lobed, sometimes almost entire; stamens 5, inserted on the corolla-tube, alternate with the lobes or angles; ovary superior, 2-celled or of 2 distinct carpels, with 1-2 basal erect anatropous ovules in each cell or carpel; style 1 or 2; fruit usually a 1-celled or 2-celled capsule, 1-4-seeded, the broad membranous dissepiment (when present) remaining attached to the axis after the capsule opens; seeds with or without albumen; hilum large; embryo usually curved and cotyledons much folded. The flower parts are rarely 4 or 6 instead of 5. Herbs, rarely shrubby, often twining, with alternate exstipulate leaves.

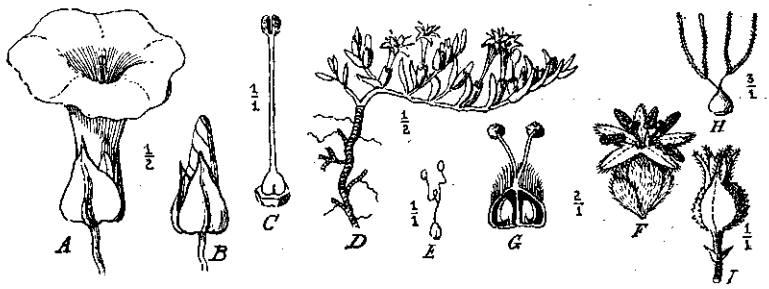

FIG. 193.—**Convolvulaceae.**—A-C, *Calystegia sepium*: A, flower; B, bud; C, pistil. D-E, *Wilsonia Backhousei*: D, plant; E, pistil. F.-G, *Cressa cretica*; F flower; G, pistil, with ovary laid open. H, pistil of *Evolvulus alsinoides*. I, young flower of *Ipomoea lonchophylla*.

A. Leafy plants; cotyledons folded or crumpled.
  B. Sepals free.
    C. Style 1, undivided up to the stigma; corolla often large, twisted in bud, the limb faintly 5-lobed, 5-folded in bud.
      D. Stigma entire or with 2 globular lobes ..... IPOMOEA 1.
      D. Stigmatic lobes 2, oblong.
        Bracts small, distant from calyx; capsule 2-celled ..... CONVOLVULUS 2
        Bracts represented by 2 large bracteoles enclosing the calyx; capsule 1-celled..... CALYSTEGIA 3
    C. Styles 2, free or united in lower part; corolla small.
      E. Styles more or less united towards base; stigmas capitate.
        Corolla-limb shortly 5-lobed and folded.... BREWERIA 4.
        Corolla-lobes as long as tube, imbricate ... CRESSA 5.
      E. Styles quite free.
        Styles undivided, with capitate stigmas; carpels 2, distinct; corolla-lobes longer than tube ..... DICHONDRA 6.
        Each style bifid, with linear stigmas; carpel 1; corolla-lobes very short ..... EVOLVULUS 7.
  B. Calyx 5-toothed; style bifid, with capitate stigmas; corolla-lobes imbricate ..... WILSONIA 8.
A. Leafless twining parasites; calyx 5-lobed; cotyledons none or rudimentary ..... CUSCUTA 9.

1. IPOMOEA, L.

(From Greek *ips, ipos,* mistakenly supposed by Linnaeus to mean the bindweed ; *homoios,* like.)

Corolla campanulate or tubular, the limb spreading, entire or slightly lobed, folded in bud ; stamens attached near base of corolla ; ovary 2-celled (in our species), with 2 ovules in each cell ; style filiform ; stigma capitate, entire, or with 2 small globular lobes ; fruit a capsule, splitting from the summit into 4-6 thin hard valves ; seeds usually 4, subtrigonous, convex on back ; flowers axillary ; peduncles solitary.

A. Corolla large (2-4 cm. long), campanulate ; leaves cordate ; peduncles much longer than pedicels ..... *I. Muelleri* 1.
A. Corolla small (about 1 cm. long), cylindrical.
B. Leaves cordate ; flowers almost racemose ; pedicels much longer than peduncles ..... *I. racemigera* 2.
B. Leaves not cordate or lobed at base ; peduncles and pedicels very short.
Leaves oblong, with lateral lobes or teeth, the upper lanceolate ; calyx 2-bracteolate..... *I. heterophylla* 3.
Leaves all lanceolate and entire ; calyx without bracteoles ..... *I. lonchophylla* 4.

1. **I. Muelleri,** Benth. Slender twiner, the petioles, peduncles, and pedicels usually scabrous with short spreading hairs, becoming glabrous ; leaves cordate-ovate, obtuse, 2-8 cm. long, with long rounded basal auricles, on petioles 1½-4 cm. long ; peduncles 2-8 cm. long, bearing 1-3 flowers in cymes on very short thick pedicels with 2 lanceolate bracts at their base ; sepals about 10 mm. long, acuminate, the 2 outer ones scabrous ; corolla pink, 3-4 cm. long ; capsule globular, glabrous, slightly exceeding calyx ; seeds pubescent.

North of Cooper's Creek.—Central and tropical Australia.

2. **I. racemigera,** F. v. M. et Tate. Slender twiner, the branches, pedicels and petioles rather rough with short spreading hairs ; leaves ovate-cordate, 2-5 cm. long, with scattered hairs on both faces, the upper floral ones narrower and much smaller, reduced almost to leafy bracts ; petioles sometimes longer than the lower leaves, very short in the upper ones ; peduncle about 1 mm. long, 1-flowered, the pedicel 3-5 mm. long in flower, to 10 mm. long in fruit, with 2 linear bracts where it joins the peduncle ; sepals hairy, 6-8 mm. long, the 2 outer ones ovate-lanceolate, attached by the middle and subcordate the inner ones narrower ; corolla about 12 mm. long, pubescent at summit of angles ; capsule subglobular, glabrous, slightly exceeding calyx ; seeds pubescent.

North of Cooper's Creek. Very near *I. plebeja,* R. Br., from which it seems to differ chiefly in the almost racemose inflorescence.—Central Australia.

3. **I. heterophylla,** R. Br. Stems prostrate or ascending, not twining, the whole plant villous with white hairs ; leaves oblong or lanceolate, 2-4 cm. long, obtuse, variously and coarsely lobed or toothed, chiefly near the base, the uppermost sometimes narrow-lanceolate and entire ; petioles 2-15 mm. long ; flowers solitary, almost sessile or on peduncles about 2 mm. long ; sepals lanceolate, villous, 7-8 mm. long, acuminate with long points and with 2 linear bracteoles at base about as long as sepals ; corolla pink, about 12 mm. long, narrow ; stigmatic lobes penicillate ; capsule globular, glabrous, shorter than calyx ; seeds pubescent.

Northern part of Flinders Range and Far North.—Queensland ; tropical Australia.

4. **I. lonchophylla,** J. M. Black. Stems not twining, scabrous with short hairs ; leaves lanceolate, entire, acute, 3-10 cm. long, at first hairy and scabrous-ciliate, soon becoming glabrous except for the cilia ; petioles 1-6 cm. long ; flowers solitary, rarely 2, on pedicels 2-4 mm. long, with a still shorter peduncle bearing 2 small bracts at the junction with the pedicel ; sepals 10 mm. long, ovate with long points, glabrous except for the conspicuous cilia ; corolla narrow, slightly exceeding calyx, pubescent at summit of lobes ; capsule globular, glabrous, about as long as calyx ; seeds closely pubescent. (Fig. 193, I.)

Far North, from Marree and the Alberga to the country between Cooper's Creek and the Queensland border.—Central Australia. This appears to have been hitherto included in *I. heterophylla,* from which it differs in the clothing, the leaves longer, always lanceolate and entire, the larger and merely ciliate sepals, the absence of bracteoles, &c. Both species appear to be annual.

2. CONVOLVULUS (Tourn.) L.

(Latin name of some bindweed, from *convolvere,* to roll together, entwine.)

Corolla campanulate ; ovary 2-celled, with 2 ovules in each cell ; style filiform, with 2 linear or oblong stigmatic lobes ; capsule 2-celled, cartilaginous, tardily and irregularly opening ; seeds usually 4, subtrigonous, convex on back. Herbs with slender trailing

or twining stems; peduncles solitary, axillary; bracts small, distant from calyx; leaves petiolate, lobed at base.

Sepals pubescent; leaves often much divided ..... *C. erubescens* 1.
Sepals glabrous; leaves entire except for the basal auricles *C. arvensis* 2.

1. **C. erubescens,** Sims. *Australian Bindweed.* Perennial, more or less pubescent, rarely almost glabrous, with thick rootstock; stems procumbent or twining; leaves very variable, 1-5 cm. long, lanceolate or ovate in outline, hastate or cordate at base, when narrow 3-lobed, the basal divergent lobes or auricles small, obtuse and usually again toothed or lobed, the central lobe longer and lanceolate or linear, when broad the leaf is faintly sinuate-lobed or undulate, or it may be variously incised, sometimes palmatifid or palmatipartite, in desert specimens it is often covered with a dense silvery pubescence; peduncles 10-30 mm. long, bearing 1 rarely 2-4 flowers on pedicels 5-15 mm. long, with 2 small linear bracts at the junction of peduncle and pedicel and similar bracts on the longer pedicels when there are more than 1; sepals ovate-acuminate, pubescent, 4-6 mm. long; corolla pink or white, 10-20 mm. long, the limb lobed or almost entire, 6-20 mm. diameter when expanded; capsule globular, about as long as calyx, usually pointed by the persistent base of the style; seeds glabrous and smooth, or in desert specimens sometimes rugulose or minutely pubescent.

Throughout the State. Spring and summer.—Temperate Australia.

* 2. **C. arvensis,** L. *Lesser Bindweed.* Perennial with long slender creeping rootstock, and prostrate or climbing stems, pubescent on the young shoots, finally glabrous; leaves lanceolate-hastate or ovate-hastate, 1½-4 cm. long; flowers solitary or twin, arranged as in the preceding; sepals ovate, obtuse, glabrous, about 4 mm. long; corolla pink, the limb about 25 mm. diam.; capsule reflexed, globular, about as long as calyx; seeds glabrous, slightly rough.

A troublesome weed, now widely spread in the settled districts and along railways. Nov.-Jan.—Almost cosmopolitan, but probably a native of Europe and Asia.

Polymeria longifolia, Lindl., a silky-pubescent perennial herb with narrow almost sessile leaves, minutely hastate at base and often over 5 cm. long, and pink corollas about 2 cm. long, was recorded for South Australia by Tate, probably on the strength of its having been collected "between Darling River and Cooper's Creek." No specimens appear to have been found in this State. It differs from *Convolvulus* in having 6-8 stigmatic lobes and only 1 ovule in each cell.

3. CALYSTEGIA, R. Br.

(From Greek *kalyx,* calyx; *stegê,* a covering: alluding to the 2 bracteoles enclosing the calyx.)

1. **C. sepium** (L.), R. Br. *Great Bindweed.* Perennial twiner, glabrous, or almost so; leaves ovate-hastate or lanceolate-hastate, 4-10 cm. long, acuminate, the basal auricles rounded or angular; peduncles long, axillary, solitary, the bracts represented by 2 large leafy bracteoles longer than and enclosing the calyx; sepals ovate-lanceolate, 12-15 mm. long; corolla campanulate, the limb pale lilac, the tube white, 4-5 cm. long; stigmatic lobes oblong; ovary incompletely 2-celled, surrounded at base by a fleshy 5-angled disk; capsule globular or ovoid, 1-celled, about as long as calyx, opening as in *Convolvulus;* seeds usually 1-3 in capsule, almost obovoid, black, 4-5 mm. long. (Fig. 193, A-C.)—*Convolvulus sepium,* L.

Along the rivers Torrens, Onkaparinga, and Murray. Summer.—Temperate Australia; Europe; temperate Africa and America. Probably the "woodbine" of Shakespeare. The specific name means "of the hedges."

4. BREWERIA, R. Br.

(After Samuel Brewer, who, about 1730, collected plants in England and Wales for Dillenius, first professor of botany at Oxford.)

1. **B. rosea,** F. v. M. Shrub about 80 cm. high, densely covered with a golden-brown tomentum; leaves subsessile, thick, ovate or orbicular, 6-12 mm. long; flowers subsessile, solitary or twin, axillary, 2-bracteolate, forming leafy spikes; sepals subequal, concave, lanceolate, 6-7 mm. long; corolla campanulate, pink, 12-15 mm. long, hairy on the outside of the limb; ovary hairy, 2-celled, with 2 ovules in each cell; style with 2 capillary unequal branches and capitate stigmas; capsule subglobular, hairy, enclosed in calyx.

Mt. Watson (near Birksgate Range).—West Australia.

5. CRESSA, L.

(From the Latin adjective *cressa*, Cretan: the plant grows in the island of Crete.)

1. **C. cretica,** L. Small branching greyish-pubescent perennial, usually 8-15 cm. high; leaves lanceolate or ovate, sessile, approximate, 3-7 mm. long; flowers subsessile, 2-bracteolate, singly terminal, or in short terminal leafy spikes, rarely in the forks; sepals obovate, hairy, 4 mm. long; corolla campanulate, white, 6 mm. long, with 5 spreading imbricate lobes about as long as the tube and hairy outside; anthers and styles exserted; ovary 2-celled, hairy at summit, with 2 ovules in each cell; styles described as "2, distinct from the base," but in all our specimens examined they were more or less united towards the base, although separable without much tearing; stigmas capitate; capsule 1-celled, usually 1-seeded, 2-4-valved. (Fig. 193, F-G).

Murray lands to Far North. Summer.—Throughout Australia; warmer regions on the globe, including the Mediterranean. The specific name has the same meaning if Latin as the generic one.

6. DICHONDRA, Forst. et f.

(From Greek *di-*, two; *khondros*, a grain: alluding to the 2 carpels).

1. **D. repens,** Forst. et f. Slender creeping perennial, rooting at nodes, more or less greyish-pubescent, with somewhat the aspect of *Viola hederacea*; leaves on long petioles, reniform or orbicular-cordate, 8-18 mm. broad; flowers solitary, axillary, on filiform peduncles shorter than petioles; sepals oblong, 2 mm. long; corolla white or pale yellow, rotate, rather longer than calyx, the 5 oblong valvate lobes twice as long as the tube; pistil of 2 distinct carpels, each with a lateral style, capitate stigma and 1-2 ovules; fruitlets 2, or 1 by abortion, obovoid, more or less pubescent, about as long as calyx, each containing 1 obovoid seed.

Southern districts to Flinders Range; Kangaroo Island; South-East. Sept.-Nov.—Throughout Australia; New Zealand; tropical parts of both hemispheres; South Africa and temperate South America.

7. EVOLVULUS, L.

(Formed in imitation of *Convolvulus*, to denote that the species are not twining.)

1. **E. alsinoides,** L. (1762). Perennial with erect or prostrate slender stems, 5-35 cm. long, the whole plant covered with a silky tomentum of long centrally attached hairs; leaves lanceolate or almost linear, sessile, 8-20 mm. long; flowers 1-3 on slender axillary peduncles along the greater part of the stems, the short pedicels with 2 bracts at base and recurved in fruit; sepals narrow-lanceolate, villous, about 4 mm. long; corolla blue or white, campanulate-spreading, scarcely exceeding the calyx, with 5 very shallow lobes folded in bud, hairy between them on the outside; ovary almost 1-celled, 4-ovulate; styles 2, distinct, each divided into 2 long branches which are stigmatic from their bases upwards; capsule globular, 1-celled, shorter than calyx, splitting into 4 thin valves and usually containing 4 subtrigonous seeds. (Fig. 193, H).—*E. linifolius*, L. (1762).

Flinders Range to Far North and westward to Wynbring.—Warmer parts of Australia and of the rest of the globe. The 2 synchronous species of Linnaeus were united by Bentham as *E. alsinoides* in the Niger Flora in 1849.

8. WILSONIA, R. Br.

(After John Wilson, who published in 1744 "A Synopsis of British plants"; died 1751.)

Calyx cup-shaped or tubular, with 5 lanceolate teeth shorter than tube, and pubescent inside; corolla salver-shaped, with a slender tube and 5 spreading lobes imbricate in bud, induplicate-valvate and inflexed at summit; ovary completely or incompletely 2-celled, 1 ovule in each cell; style 2-branched in upper half, each branch with a capitate stigma; capsule obovoid, membranous, 1-celled, indehiscent, much shorter than the enclosing calyx and containing usually 1 smooth black obovoid seed. Prostrate or diffuse perennials; leaves small, fleshy; flowers axillary, solitary, sessile or nearly so, usually white. A purely Australian genus.

A. Corolla-tube about as long as calyx; stigmas depressed-globular.
  Leaves concave, imbricate, silky-pubescent..... *W. humilis* 1.
  Leaves flattish, not imbricate, loosely hairy..... *W. rotundifolia* 2.
A. Corolla-tube much longer than calyx; leaves lanceolate, glabrous; stigmas ovoid ..... *W. Backhousei* 3.

1. **W. humilis,** R. Br. Prostrate slender shrub, hoary with a silky pubescence; leaves ovate or oblong, distichous on the short branches, mostly spreading, 2-3 mm. long, concave above and so densely crowded as to be imbricate; calyx 4 mm. long, pubescent; corolla slightly longer; anthers scarcely exserted.

Usually along salt swamps or brackish waters near coast, sometimes in similar situations inland. Sept.-Dec.—Temperate Australia.

2. **W. rotundifolia,** Hook. Small slender prostrate perennial, beset with rather spreading hairs which usually fall from the adult leaves; leaves orbicular or ovate, subsessile, 1½-4 mm. long, flattish or slightly concave above but not imbricate; calyx hairy, 5 mm. long; corolla rather longer, often yellow; anthers and stigmas more or less exserted.

Swampy ground along the coast and inland in most parts of the State. Resembles in aspect *Cressa cretica* and *Mimulus repens.* Sept.-Dec.—Temperate Australia.

3. **W. Backhousei,** Hook. f. Small procumbent almost glabrous perennial; leaves linear-lanceolate, flattish, 6-15 mm. rarely 20 mm. long; calyx glabrous outside, 6-7 mm. long; corolla much longer, the slender tube usually twice as long as calyx; anthers and stigmas much exserted; stamens inserted in throat of corolla, the anthers twisted spirally after emission of pollen. (Fig. 193, D-E.)

Encounter Bay; Kangaroo Island; coast and lakes near Beachport. Oct.Dec.—Temperate Australia. The specific name commemorates James Backhouse, English nurseryman, botanist and missionary of the Society of Friends, who collected plants in all the States during the years 1837-41.

9. CUSCUTA (Tourn.) L.

(Italian and Neo-Latin *cuscuta,* from Arabic *kushûtâ,* dodder.)

Calyx and corolla with 5 rarely 4 lobes, those of the corolla imbricate in bud; stamens inserted in throat of corolla, with a scale below each; ovary 2-celled, each cell 2-ovulate; capsule 2-celled, small, membranous, globular, opening irregularly, with 2-4 subtrigonous seeds; embryo spirally coiled round the albumen, with rudimentary cotyledons or none. Leafless annual parasites, the small root dying away as soon as the filiform twining yellowish or reddish stems have attached themselves by their suckers or haustoria to the host-plant. *Dodder.*

A. Flowers sessile or subsessile in small globular clusters.
  Calyx-lobes obtuse; stigmas capitate..... *C. australis* 1.
  Calyx-lobes acuminate; stigmas linear..... *C. epithymum* 2.
A. Flowers on pedicels of 4-8 mm., not in globular clusters *C. tasmanica* 3.

1. **C. australis,** R. Br. Flowers subglobular, about 3 mm. diam., minutely glandular-dotted, sessile or on pedicels 1-2 mm. long, forming globular clusters sometimes reduced to 2 or 3 flowers; calyx shorter than corolla, divided below the middle into obtuse lobes; scales fringed or bifid; styles distinct, with capitate stigmas; capsule depressed-globular, with a broad rhomboid area between the styles.

Renmark; Flinders Range to Far North. On various plants and sometimes shrubs such as *Cassia.*—Most parts of Australia; warmer parts of America and Asia.

*2. **C. epithymum,** L. Flowers nearly 4 mm. long, sessile in globular clusters; calyx divided to ¾ into 5 acuminate lobes, as long as corolla-tube; corolla-lobes acute; scales fringed, almost closing the tube; styles distinct, with linear stigmas.

Chiefly on small plants such as clover.—Europe; temperate Asia.

3. **C. tasmanica,** Engelm. Flowers about 4 mm. long, in small clusters of 2-5, on pedicels 4-8 mm. long; calyx nearly as long as corolla-tube, divided to ¾ into 5 very obtuse lobes; corolla campanulate, the lobes obtuse; scales large, fringed; styles distinct, with large capitate exserted stigmas.

Lakes near Beachport; recorded also from near the Murray. On lowly plants such as *Wilsonia Backhousei* and *Lepturus incurvatus.*—Victoria; Tasmania; New South Wales.

FAMILY 96.—BORRAGINACEAE.

Flowers regular (except in *Echium*); calyx with normally 5 segments or lobes, persistent; corolla tubular, with a 5-lobed limb; stamens 5, inserted on the corolla-tube and alternate with its lobes, usually with very short filaments and enclosed in the tube; ovary superior, originally of 2 carpels and therefore 2-celled, but usually 4-celled by spurious dissepiments; style terminal or inserted between the lobes; ovules anatropous, usually 2 in each cell of a 2-celled ovary and 1 in each cell of a 4-celled ovary; fruit dry or drupaceous, finally separating into 4, rarely 2 parts, called *nutlets* when they are dry, and *fruitlets*

or *pyrenes* when the exocarp is more or less succulent; the endocarp is always hard, sometimes bony; the small seed-like nutlets or fruitlets are attached to the receptacle or *gynobasis* by a part of their inner or basal surface called the *areole*: testa thin; embryo usually straight; cotyledons usually broad and longer than the superior radicle. In *Coldenia* the flower-parts are mostly 4, and in *Rochelia* the stamens are 3-4 and the calyx-segments are 6-8. Herbs or small shrubs with exstipulate leaves, alternate or very rarely a few opposite, the whole plant usually covered with more or less stiff hairs often seated on tubercles; flowers in scorpioid cymes or *cincinni*, i.e., the bracts terminating the lateral axes which constitute the apparently single floral axis are arranged in 2 rows along the lower side of this main floral axis, the corresponding flowers rising from the upper side. Thus the pedicels are normally placed more or less on the side of the axis opposite to the bract or leaf and not in its axil (leaf-opposed instead of axillary). The position of the bracts is, however, irregular; sometimes they are at a slight distance from the flower and sometimes (as in *Myosotis*) they are altogether absent. The end of the cyme is usually rolled backward in bud, whence the term "scorpioid"; later it resembles a 1-sided spike or raceme.

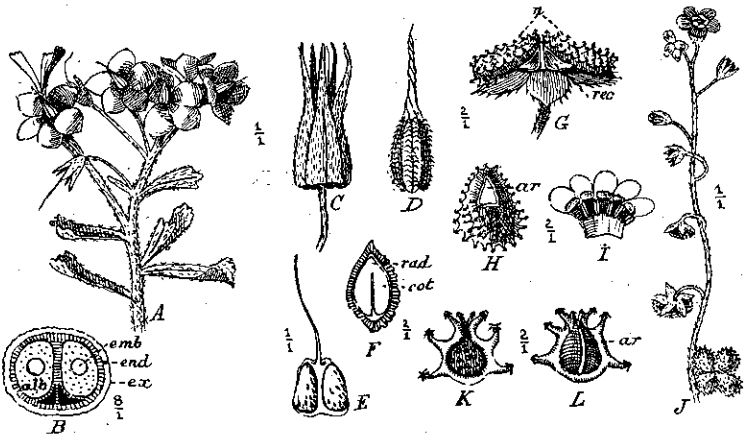

FIG. 194.—**Borraginaceae.** A, *Halgania cyanea*, flowering branch. B, *H. lavandulacea*, transverse section of drupe, showing 2 fertile cells containing 1 seed each, and 2 abortive sterile cells. C-F, *Trichodesma zeylanicum*: C, fruiting calyx; D, anthers and awns; E, fruit; F, vertical section of nutlet. G-J, *Cynoglossum australe*: G, fruit, with 2 nutlets in position and 2 removed; H, inner surface of 1 nutlet; I, corolla spread open; J, cyme. K-L, *Lappula concava*: K, outer face of nutlet; L, inner face of same. Abbreviations: *emb*, embryo; *ex*, exocarp; *end*, endocarp; *alb*, albumen; *n*, nutlets; *rec*, receptacle; *ar*, areole; *rad*, radicle; *cot*, cotyledons.

A. Ovary not lobed; style slender, terminal, with a minute stigma; filaments very short; fruit drupaceous; receptacle almost flat (Sub-family *Ehretioideae*).
  Style simple; anthers exserted, connate in a cone; flowers stalked; fruit 2-celled ..... HALGANIA 1.
  Style bipartite; anthers enclosed, free; flowers subsessile; fruitlets 4 ..... COLDENIA 2.

A. Ovary slightly 2- or 4-lobed; style short, subterminal, with a thick convex or conical entire or notched stigma; filaments very short; receptacle shortly convex or almost flat. (Sub-family *Heliotropioideae*.)
  Fruit dry or subdrupaceous, separating into 4 nutlets ..... HELIOTROPIUM 3.
  Fruit a drupe, separating into 2 fruitlets..... COCHRANEA 4.

A. Ovary usually deeply 2- or 4-lobed; seeds without albumen, the cotyledons flattish, broader than the short radicle. (Sub-family *Borraginoideae*.)
  B. Corolla regular; filaments very short.
    C. Anthers exserted, terminating in spirally twisted awns; style subterminal on the scarcely lobed ovary; nutlets 4, smooth, as long as the receptacle, in which they are sunk ..... TRICHODESMA 5.
    C. Anthers enclosed in corolla-tube, without terminal awns; ovary deeply lobed, the style inserted between the lobes and almost basal.

D. Receptacle conical or convex, at least half as long as nutlets.
E. Nutlets usually 4, beset with prickles; corolla with scales in the throat.
Nutlets convex or flat on the outer face.. CYNOGLOSSUM 6.
Nutlets with a tuberculate hollow in the centre of the outer face..... LAPPULA 7.
E. Nutlets without prickles, ovoid-trigonous; corolla without scales in throat.
F. Cymes bracteate; stigma capitate.
Nutlets 4; areole small, oblique ..... ERITRICHIUM 8.
Nutlets 2; areole along half the inner face ROCHELIA 9.
F. Cymes bractless; stigma notched; nutlets 4 AMSINCKIA 10.
D. Receptacle almost flat; nuts attached by a basal areole.
G. Areole flat; nutlets 4, erect.
Nutlets smooth, biconvex; corolla with scales in throat; bracts absent ..... MYOSOTIS 11.
Nutlets wrinkled, ovoid-trigonous; corolla without scales; bracts present ..... LITHOSPERMUM 12.
G. Areole concave; nutlets depressed; scales in throat; bracts present ..... ANCHUSA 13.
B. Corolla irregular, with an oblique limb; filaments and style long; nutlets as in *Lithospermum* ..... ECHIUM 14.

1. HALGANIA, Gaudich.

(After Emmanuel Halgan, 1771-1852, vice-admiral in the French navy; distinguished himself in the wars of the First Republic and the Empire.)

Calyx 5-lobed or 5-sect; corolla rotate, with a very short tube and 5 broad imbricate lobes; stamens inserted in the throat, with short filaments; anthers erect, united in a conical tube surrounding the style, hairy on the inner face, tapering into 5 terminal appendages which form a straight beak; ovary entire, 4-celled, with 1 ovule in each cell; style terminal, filiform, exceeding the anthers, with a minute stigma; fruit (in our species) obovoid, coriaceous, with a slightly succulent exocarp, indehiscent, wrinkled, about as long as calyx, by abortion 2-celled, with 1 albuminous seed in each cell, or 1-celled and 1-seeded; embryo erecte. Dwarf erect shrubs, with alternate sessile rigid leaves; flowers pedicellate in short erect cymes, with a very few irregularly placed and sized bracts; corollas (in our species) deep-blue.

The fruit is usually described as separating into two 2-seeded nutlets, and this appears to be the case in *H. littoralis*, *H. corymbosa* and perhaps in other species, but all the fruits of our 2 species which I have been able to examine are as described above. The genus is purely Australian.

Leaves usually with small spreading teeth; calyx-lobes subequal; hairs forked..... *H. cyanea* 1.
Leaves entire; calyx-segments unequal; hairs simple.... *H. lavandulacea* 2.

1. **H. cyanea,** Lindl. (1839). Small shrub, scabrous with appressed hairs attached by centre and more or less minutely glandular-hairy; leaves linear-cuneate or oblanceolate, obtuse, 4-25 mm. long, 3-toothed at summit or with more or less toothed margins, rarely entire; calyx 3-6 mm. long, with linear-lanceolate segments or almost deltoid lobes; pedicels 2-10 mm. long (Fig. 194, A).—*H. Preissiana*, Lehm. (1844-5); *H. strigosa*, Schlechtd. (1847).

Scrub near Strathalbyn; Murray lands to Flinders Range and Far North; westward to Gawler Range, Ooldea, and Fowler's Bay; Yorke and Eyre Peninsulas. Most of the year.—Temperate Australia.

2. **H. lavandulacea,** Endl. Small often viscid shrub, covered with short appressed unbranched hairs; leaves oblong or lanceolate, obtuse, 10-30 mm. long, with recurved margins, tomentose and usually white underneath, with a prominent midrib; calyx about 5 mm. long, the inner segments smaller than the broad outer ones; pedicels 3-10 mm long. (Fig. 194, B.)

Murray Scrub; Yorke and Eyre Peninsulas and along the Great Bight. Usually Sept.-Nov.—Victoria; New South Wales; West Australia.

2. COLDENIA, L.

(After Cadwallader Colden, born in Scotland in 1688, doctor of medicine and botanist, who described many American plants for Linnaeus; appointed Lieutenant-Governor of New York, 1761; died there, 1776.)

1. **C. procumbens,** L. Stiff prostrate scabrous-hairy annual; leaves alternate, petiolate obovate or oblong, undulate, crenate or obtusely lobed; flowers almost sessile, with leafy bracts; calyx of 4 segments under 2 mm. long; corolla scarcely longer, with a cylindrical tube and 4 short broad spreading imbricate lobes; stamens 4; ovary entire, 4-celled; style terminal, bipartite; fruit glandular-hairy, slightly succulent, separating finally into 4 1-seeded trigonous beaked fruitlets; seeds without albumen.

Cooper's Creek. Not re-discovered since Howitt's expedition.—Tropical Australia; Asia; Africa.

3. HELIOTROPIUM (Tourn.) L.

(Greco-Latin name "turning to the sun," applied by the ancients to more than one genus of plants whose flowers were supposed to follow the sun.)

Calyx mostly 5-sect, rarely 5-toothed; corolla with a cylindrical tube, 5 spreading lobes and a fold between the lobes; no scales in the throat; stamens enclosed, the filaments very short; style terminal, short, topped by the stigmatic cone; ovary 4-celled and slightly 4-lobed; nutlets 4 or fewer by abortion, sometimes slightly succulent, at first united to each other in the upper portion, finally separating from each other and from the short convex 4-angled receptacle; seeds with usually scanty albumen. Herbs; flowers usually white, sessile, in mostly dense rarely loose spike-like cymes, with or without bracts. *Heliotrope.*

H. peruvianum, L. is a favorite in gardens on account of its delightful scent, from which it is known as "Cherry Pie" or "Vanilla heliotrope."

A. Glabrous perennial, with narrow leaves; stigma sessile, convex ..... *H. curassavicum* 1.

A. Hairy plants.

B. Stigmatic cone with a thickened base; anthers not cohering; throat of corolla glabrous; flowers bractless.

C. Calyx divided almost to base, persistent on axis.

D. Leaves ovate, narrowed abruptly into a rather long petiole, somewhat scabrous with short hairs ..... *H. europaeum* 2.

D. Leaves oblong, tapering into a very short petiole, bristly with rather long hairs.

Flowers very small; style shorter than stigmatic cone ..... *H. undulatum* 3.

Flowers larger; style longer than stigmatic cone ..... *H. asperrimum* 4.

C. Calyx shortly 5-toothed, caducous; leaves ovate, tomentose ..... *H. supinum* 5.

B. Stigmatic cone depressed, the thick base ring-like; anthers cohering by their hairy tips; corolla-tube more or less swollen round the anthers, minutely bearded in throat; calyx 5-sect.

E. Flowers bractless, the cymes finally long and rather loose; leaves petiolate, ovate, silky..... *H. ovalifolium* 6.

E. Flowers with leafy bracts, the cymes dense; leaves sessile, small.

Leaves cottony-white, with recurved margins; corolla-lobes hairy ..... *H. filaginoides* 7.

Leaves greenish-white, flat; corolla-lobes almost glabrous ..... *H. heteranthum* 8.

1. **H. curassavicum,** L. Prostrate succulent glabrous and glaucous perennial, drying black; leaves oblanceolate or obovate-oblong, 1-nerved, 6-20 mm. long, tapering into a short petiole; calyx 2 mm. long, with 5 obtuse segments; corolla white, the tube as long as calyx, glabrous inside; anthers almost sessile at the base of the tube; stigma about as broad and long as the ovary; fruitlets succulent on back when fresh.

Along dry watercourses or in moist sand from Naracoorte to the Far North; most abundant in dry districts. Most of the year.—Temperate Australia; Africa; America; naturalised along the Mediterranean.

2. **H. europaeum,** L. Pubescent annual, 10-30 cm. high, sometimes ill-smelling; leaves ovate or somewhat oblong, subobtuse, 1-5 cm. long, greenish, but rather rough with short appressed hairs seated on crowded tubercles, the nerves prominent below, on slender petioles varying from ¼ to nearly as long as the leaf; flowers scentless, without bracts, the cymes sometimes 6-7 cm. long, but usually much shorter; calyx-segments lanceolate, 2-3 mm. long, hairy, persistent and more or less spreading after the fruit has fallen; corolla white, the tube as long as calyx, pubescent outside, glabrous within; anthers affixed about middle of tube; stigmatic cone much longer than the minute style; nutlets 4, tuberculate-rugose, glabrous or with a few small scattered hairs or pubescent on back.

Almost all parts of the State, sometimes numerous in cultivated land. Called Potato Weed in some districts. Plants growing close together and similar in all details bear glabrous fruits in some instances and pubescent ones in others. Most of the year.—Victoria; New South Wales; Mediterranean region.

FIG. 195.—**Heliotropium europaeum.**

3. **H. undulatum,** Vahl. Diffuse or ascending herb, the branches scabrous with spreading hairs; leaves oblong or oblanceolate, obtuse, 1½-5 cm. long, rugose above, with undulate recurved margins, scabrous with hairs seated on tubercles, tapering into short petioles; cymes without bracts; calyx 2 mm. long, the broad-lanceolate hairy segments not spreading after fruiting; corolla-tube equalling calyx, pubescent outside glabrous inside, the anthers attached rather above the middle, the limb small and narrow; style almost as short as in *H. europaeum*, and shorter than the stigmatic cone; nuts 4, rugulose, glabrous, 2 mm. long.

About Lake Eyre and northwards to Oodnadatta.—Central and tropical Australia; western Asia; northern Africa.

4. **H. asperrimum,** R. Br. Near the preceding, but a stiffer and rougher plant, about 30 cm. high; leaves similarly shaped, but with stiffer hairs or bristles seated on more crowded tubercles, usually thicker, the midrib and nerves more prominent below and the upper surface more wrinkled; flowers fragrant, the short cymes at first resembling a head; calyx 4 mm. long, the lanceolate segments very hairy; corolla tube a little longer, the spreading limb 5 mm. broad; style finally longer than the acute or obtuse stigmatic cone; nutlets 3-4, rugulose, glabrous, 3 mm. long.

From Gladstone northwards through the Flinders Range and westward to the Gawler and Musgrave Ranges. July-Oct.—West Australia; central Australia.

*5. **H. supinum,** L. Annual with almost prostrate white-tomentose stems; leaves petiolate, ovate, obtuse, 15-25 mm. long, pubescent above, white-tomentose below; cymes without bracts, sometimes 6-7 cm. long in fruit; calyx tomentose, ovoid, about 3 mm. long in flower, enlarged in fruit, with 5 small blunt teeth; corolla-tube of same length, hairy outside; anthers attached to middle of tube; style with deflexed hairs and equalling the stigmatic cone; nutlets usually 2-3, coherent, almost smooth, subacute, 3½ mm. long, bordered by a raised line, enclosed in the swollen calyx-tube and falling off with it.

Near Blanchetown, River Murray. Summer.—Mediterranean region.

6. **H. ovalifolium,** Forsk. Small annual, silky-pubescent with white appressed hairs; leaves petiolate, ovate, or ovate-oblong, obtuse, silky-white, 1-2 cm. long; cymes without bracts; calyx scarcely 2 mm. long, silky, 1 segment ovate, the other 4 linear-oblong; corolla-tube exceeding calyx, both tube and lobes hairy outside; throat pubescent inside; anthers acuminate, attached below middle of tube, cohering at summit by minute hair-tufts; stigmatic cone almost sessile on ovary, hair-tufted at summit; nutlets pubescent.

Near Cooper's Creek. Not collected since Howitt's expedition in 1861-62.—Central and tropical Australia; India; Africa.

7. **H. filaginoides,** Benth. Small white woolly-tomentose plant, about 10 cm. high, with many short branches; leaves crowded, oblong-lanceolate, obtuse, 3-6 mm. long, with recurved margins; flowers in dense head-like cymes with leafy bracts as long as the calyx, whose oblong segments are 3 mm. long; corolla silky outside almost to summit, the tube as long as calyx and with a ring of minute hairs in throat; anthers inserted about the middle of the tube, cohering by their long pubescent points; style about as long as the depressed stigmatic cone.

Blood's Creek (north of Oodnadatta) and towards Cooper's Creek.—Central Australia.

8. **H. heteranthum,** F. v. M. Near the preceding, but the leaves flat, lanceolate, 3-4 mm. long, greenish-white with appressed hairs; limb of corolla broader (about 5 mm. across when open) the lobes glabrous outside towards the summit.—*H. filaginoides*, Benth. var. *heteranthum*, F. v. M.

Charlotte Waters, close to our border.—Central and West Australia.

H. tenuifolium, R. Br. has been recorded by M. Koch from Mt. Lyndhurst in the Flinders Range, but I have seen no specimen from our State. It differs from the preceding in the longer narrow-linear acute leaves, the flowers distant along the cymes, the bracts small, the calyx about 3½ mm. long, with lanceolate very acute segments and the whole plant rather rough with short stiff appressed whitish hairs.—Central and tropical Australia.

4. COCHRANEA, Miers.

(After Thomas Cochrane, Earl of Dundonald, 1775-1860, officer in the British fleet during the Napoleonic wars; organised and commanded the Chilian fleet in the war of independence, 1818-21; admiral in the British fleet, 1851.)

*1. **C. anchusifolia** (Poir.) Gürke. Hairy perennial with the aspect of a *Heliotropium*: leaves oblong-lanceolate, sessile, 2-8 cm. long, undulate on margin; flowers not scented, sessile in dense bractless cymes; calyx-segments 3 mm. long, glandular-hairy; corolla-tube yellow, slightly longer, hairy outside and in the throat, with 5 short lilac rounded lobes; stigma convex, pubescent, almost sessile on the slightly 2-lobed 4-celled ovary; anthers inserted near base of corolla-tube; fruit subglobular, with succulent exocarp, separating into 2 2-celled fruitlets, each cell usually ripening 1 albuminous seed.—*Heliotropium anchusifolium*, Poir; *Tournefortia heliotropioides*, Hook.

An escape from gardens, near Adelaide; Flinders Range, near Quorn. Nov.-Jan.—Temperate South America.

5. TRICHODESMA, R. Br. (1810).

(From Greek *thrix, trikhos*, hair; *desmê*, a bond or bundle: alluding to the twisted hairs or awns which terminate the anthers.—*Pollichia*, Medic. (1783) has been placed on the list of rejected names.)

1. **T. zeylanicum** (Burm.) R. Br. *Cattle Bush.* A stiff annual, usually about 1 m. high, scabrous with short or rather long hairs often seated on tubercles, or the hairs so short and appressed that the leaf is scarcely scabrous; lower leaves opposite, upper ones alternate, oblong-lanceolate, linear-lanceolate or broadly lanceolate, 3-8 cm. long; cymes terminal, bracteate, becoming loose by the lengthening of the pedicels after flowering; calyx truncate at base, the segments lanceolate, acuminate, about 12 mm. long in flower, lengthening in fruit; corolla pale-blue, almost rotate, with a very short tube and 5 broad acuminate lobes longer than the calyx and twisted in bud; stamens inserted in the throat, the filaments very short, the 5 conspicuous anthers cohering in a cone by the curled hairs on the outer face, each anther terminating in a long awn, the awns twisting round each other spirally in a straight beak at least as long as the anthers; ovary entire, 4-celled, with 1 ovule in each cell; style terminal, filiform, with a minute stigma; fruit separating into 4 1-seeded nutlets, smooth on the outer face and often mottled, attached to 4 deep cavities of the receptacle by the tuberculate inner face. (Fig. 194, C-F.)—*Pollichia zeylanica* (Burm.) F. v. M.

Flinders Range to Far North; westward to Everard and Birksgate Ranges. Most of the year.—Central and tropical Australia; north-western New South Wales; West Australia; Asia; Africa.

Var. *sericeum*, Benth. Calyx-segments of the type, but whitish with a dense soft appressed pubescence, as are also the leaves.—Lake Eyre westward to Birksgate Range.—Queensland; central and West Australia.

Var. *latisepalum*, F. v. M. Calyx-segments ovate-lanceolate, about 8 mm. broad near base when in fruit.—Mt. Gunson (near Pernatty Lagoon); Mt. Parry (Flinders Range); near Oodnadatta.

6. CYNOGLOSSUM (Tourn.) L.

(Greek, *kynoglôsson*, from *kyôn, kynos*, a dog; *glôssa*, tongue: alluding to the shape of the leaves.)

Calyx 5-sect; corolla with a tube about as long as calyx, the throat more or less closed by 5 broad notched gland-like minutely papillose scales, the limb spreading, broadly 5-lobed; ovary 4-lobed; style short with a minute stigma; nutlets 4, or fewer by abortion, flat or convex on the outer face, rounded towards base, more or less beset with short prickles or bristles, each of which is tipped by 4-6 minute reflexed barbs, attached obliquely by a small subtriangular areole on the upper part of the inner angle to the convex receptacle. Hairy herbs, the lower leaves on long petioles, the upper sessile; flowers shortly pedicellate, with or without bracts, in loose raceme-like cymes, the pedicels recurved in fruit. *Hound's tongue.*

Cymes with bracts; fruit subglobular ..... *C. suaveolens* 1.
Cymes without bracts; fruit obliquely depressed from the centre outwards ..... *C. australe* 2.

1. **C. suaveolens,** R. Br. Erect perennial 10-50 cm. high, scabrous with short appressed hairs; leaves lanceolate or oblong, the radical ones (with petiole) 6-12 cm. long, the upper ones shorter, undulate, sessile; flowers fragrant or not, with small leafy bracts opposite or below the pedicels, which are much longer than the calyxes and 8-25 mm. long in fruit; calyx-segments 3 mm. long; corolla white or pale-yellow, the scales yellow, the tube almost as long as the calyx and the orbicular lobes; nutlets sometimes reduced to 1 or 2, ovoid-compressed, densely and equally prickly on the convex outer face, smooth on the inner face, leaving a subulate cord attached to the base of the receptacle.
Southern districts; South-East. Most of the year.—Eastern States.

2. **C. australe,** R. Br. Scabrous perennial with erect or spreading stems often over 1 m. long; leaves as in the preceeding; cymes bractless, the fruiting pedicels only 4-5 mm. long; calyx about 2 mm. long; corolla blue, about 4 mm. long, the tube equalling the calyx; fruit depressed into a convex shape, the nutlets ovate and almost flat on the upper face, prickly all over except near the small areole, the margin also ciliate-prickly. (Fig. 194, G-J.)
Mount Lofty Range; South-East. Oct.-Feb.—Eastern States.
Var. *Drummondii,* Brand. Nutlets with a more conspicuous prickly margin, but quite smooth or with a few scattered prickles on the upper and lower faces; flowers sometimes twice as large and white or pink; leaves sometimes softer.—*C. Drummondii,* Benth.—Flinders Range to Far North, from Strzelecki Creek to Musgrave Range.—Central Australia; New South Wales; West Australia.

7. LAPPULA (Rupp.) Moench (1794).

(Diminutive of Latin *lappa,* a bur: alluding to the prickly nutlets.—*Echinospermum,* Swartz, 1818.)

1. **L. concava,** F. v. M. Small procumbent annual, scabrous with short hairs; leaves oblanceolate, 10-25 mm. long; flowers with leafy bracts, in raceme-like cymes, on pedicels about 2 mm. long in flower, 5-8 mm. long and recurved in fruit; calyx-segments about 3 mm. long, spreading in fruit; corolla blue or violet, the tube about as long as calyx, with 5 white scales partially closing the throat, and 5 short lobes; ovary 4-lobed; nutlets 4, erect, almost triangular in outline, nearly 4 mm. long, the thick raised margins bearing 8-10 short prickles tipped by 4-5 reflexed barbs, as in *Cynoglossum,* the hollow thus created on the outer face studded with minute tubercles, the areole occupying nearly the whole of the convex inner face and attaching the nutlet to the narrow-conical receptacle. (Fig. 194, K-L.)—*Echinospermum concavum,* F. v. M.
Dublin, Wasleys, Strathalbyn; Murray lands to Flinders Range and Far North; westward to Ooldea; Yorke and Eyre Peninsulas. Nov.—Dry parts of temperate Australia.

8. ERITRICHIUM, Schrad.

(From Greek *erion,* wool: *thrix, trikhos,* hair.)

1. **E. australasicum,** A. DC. Small hairy procumbent or ascending annual, somewhat scabrous; leaves linear, obtuse, 1-2 cm. long, the larger ones sometimes opposite; flowers subsessile, with leafy bracts, distant in fruit; calyx-segments 5, linear or almost lanceolate, about 2 mm. long in flower, lengthening in fruit to 4-7 mm. and sometimes becoming rigid and curved as in *Rochelia:* corolla white, about as long, quite glabrous and without scales in throat, the 5 rounded lobes much shorter than tube; stamens 5, inserted below middle of tube, the filaments very short; ovary 4-lobed; style short, with a capitate stigma; nutlets 4, erect, acute, ovoid-trigonous, pearl-grey, rugose-reticulate, attached near the base by a small oblique areole to the shortly conical receptacle and keeled on the inner and outer faces.
Murray lands and Flinders Range to Far North; Yorke and Eyre Peninsulas; South-East. The South-Eastern specimens are more erect and the calyx-segments remain shorter in fruit.—Drier parts of temperate Australia.

9. ROCHELIA, Reichenb.

(Named in 1824 after Anton Rochel, director of the botanical garden at the University of Budapest.)

1. **R. plurisepala** (F. v. M.) nov. comb. Small procumbent scabrous-hairy annual closely resembling *Eritrichium australasicum:* leaves alternate, linear, 1-2 cm. long; flowers on pedicels 2-3 mm. long in fruit, with leafy bracts often somewhat removed from the flowers; calyx-segments 6-8, linear, about 3 mm. long in flower, becoming rigid and 5-6 mm. long in fruit, the upper part incurved or recurved, the lower part closely

embracing the fruit; corolla white, shorter than calyx, glabrous and without scales, the lobes 5 in the flowers examined—said to vary from 4-6—short, rounded; stamens 3-4, inserted below middle of tube; ovary 2-lobed, 2-celled, each cell 1-ovulate; style short, with a capitate or peltate stigma; nuts as in *E. australasicum*, but only 2, each 1-seeded, attached about ½ way by a rather broader areole to the conical receptacle.—*Maccoya plurisepalea*, F. v. M. (1859); *Rochelia Maccoya*, F. v. M. (1869).

From the Murray northwards to Lake Frome; near Carrieton; Flinders Range; Eyre Peninsula. Most of the year.—Western New South Wales; north-western Victoria. All our specimens and those from Broken Hill have 6-8 calyx-segments, but some from the Warrego River, N.S.W., have only 5 segments, all recurved, with the 3-4 stamens and the fruit of Rochelia. These latter are perhaps a variety or distinct species.

10. AMSINCKIA, Lehm.

(After Wilhelm Amsinck, 1752-1831, burgomaster of Hamburg; developed the botanical garden of that city.)

FIG. 196.—**Amsinckia angustifolia.**

*1. **A. angustifolia,** Lehm. Erect annual, villous and slightly scabrous, with long and short hairs intermixed; leaves linear-lanceolate, sessile, 2-8 cm. long; flowers bractless, in dense cymes which lengthen in fruit; calyx-segments bristly, about 5 mm. long, lengthening in fruit; corolla yellow, glabrous, without scales, the tube about as long, with 5 short spreading lobes; stamens inserted above middle of tube; ovary 4-lobed; style twice as long, with a capitate slightly 2-lobed stigma; nutlets 4, ovoid-trigonous, wrinkled-tuberculate, attached to the conical receptacle by a narrow areole occupying the lower half of the inner angle.

Woodville; Kapunda; Mt. Gambier. Sept.-Nov.—Chili; naturalised in Victoria and Mediterranean region.

11. MYOSOTIS (Rupp.) L.

(Greco-Latin *myosōtis*, the European Forget-me-not, the classic name being due to the resemblance of the leaves to the ears of a mouse or rat.)

1. **M. australis,** R. Br. *Southern Forget-me-not.* Slender erect or procumbent annual, subscabrous with short spreading hairs; lower leaves ovate-oblong or spathulate, 2-3 cm. long with the petiole, the uppermost smaller, sessile and stem-clasping; flowers on pedicels much shorter than calyx, in bractless raceme-like cymes, dense at first, then lengthening and interrupted; calyx 3 mm. long, the lower half covered with spreading hooked hairs, the 5 lanceolate lobes rather longer than the tube; corolla white (said to be sometimes blue), the tube a little longer than calyx, the limb nearly as long, spreading, with 5 oblong lobes, the throat bearing 5 broad gland-like notched yellow scales; ovary 4-lobed; style filiform, slightly swollen at the stigmatic summit; nutlets erect, usually only 1 or 2 ripening, compressed, ovate, smooth, shining, attached by a very small basal areole to the slightly convex receptacle.

Sea-coast near Adelaide and in the South-East; Mt. Lofty Range; Kangaroo Island. Sept.-Nov.—Temperate Australia; New Zealand. The principal European Forget-me-not is *M. palustris* (L.) Lamk.

12. LITHOSPERMUM (Tourn.) L.

(Greco-Latin *lithospermon*, from Greek *lithos*, stone; *sperma*, seed: alluding to the hard nutlets.)

Calyx 5-sect; corolla funnel-shaped, with a spreading 5-lobed limb, the tube usually pubescent inside and out; stamens inserted below middle of tube; ovary 4-lobed; style filiform, with a capitate notched stigma; nuts 4, bony, erect, ovoid-trigonous, attached by a broad basal areole to the almost flat receptacle. Hairy herbs, the lower leaves shortly petiolate, the upper sessile; flowers subsessile in the axils of leafy bracts, forming spike-like cymes.

Flowers white; fruiting cymes loose; leaves lanceolate.. *L. arvense* 1.
Flowers yellow; fruiting cymes dense; leaves linear..... *L. apulum* 2.

* 1. **L. arvense,** L. *Corn Gromwell*, often locally called *Sheep-weed.* Erect annual, 10-50 cm. high, scabrous with appressed hairs; leaves 1-nerved, the lower ones oblanceolate, to 10 cm. long or more, the upper lanceo- late, half-clasping, 1½-4 cm. long; fruiting cymes long and loose; calyx-segments linear, 5 mm. long, in fruit rigid,

spreading, and 10 mm. long; corolla white, hairy outside, the tube about as long as calyx, with 5 lines of short hairs running from base of lobes to stamens and a ring of 10 minute rounded scales at base and surrounding the ovary; nutlets acute, 2½-4 mm. long, tuberculate-wrinkled all over, except on the smooth areole, which bears 2 minute white tubercles.

Settled districts, and as far as Ooldea. Aug.-Dec.—Europe; Asia.

*2. **L. apulum** (L.) Vahl. *Black Weed.* Erect annual, 5-15 cm. high, scabrous with spreading hairs; leaves crowded, linear, 1-2½ cm. long; cymes compact in fruit; calyx-segments linear-lanceolate, 4-5 mm. long, not much longer in fruit; corolla yellow, pubescent outside, the tube rather exceeding the calyx, with a ring of hairs in the throat and 10 minute hairy scales at base; nutlets acuminate, barely 2 mm. long, smooth and glossy on the outer face, wrinkled on the 2 inner faces.

Southern districts. Aug.-Nov.—Mediterranean region.

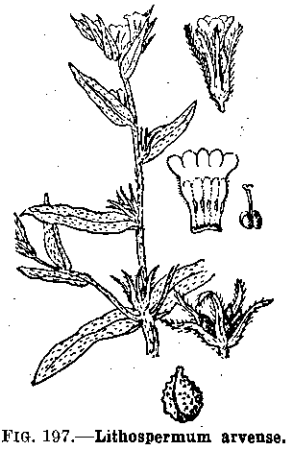

FIG. 197.—**Lithospermum arvense.**

13. ANCHUSA, L.

(Greco-Latin name of some plants of this genus).

*1. **A. capensis,** Thunb. Erect scabrous-hairy biennial; leaves linear-lanceolate, 3-7 cm. long, the upper sessile, the lower petiolate; flowers at first in dense cymes, with ovate-lanceolate bracts longer than the short pedicels but shorter than calyx; calyx 4 mm. long, with 5 obtuse segments, becoming globular in fruit; corolla blue, the tube as long as calyx, the spreading rounded lobes about as long as tube, the throat closed by 5 ovoid papillose scales alternating with the stamens; ovary 4-lobed, the small stigma notched; nutlets 4, depressed, wrinkled, with a swollen ring at base, attached by a broad concave areole to the almost flat or slightly convex receptacle.

Near Robe. Sept.-Nov.—South Africa.

14. ECHIUM (Tourn.) L.

(From Greek *ekhion*, applied to some plant of this genus and probably derived from *ekhis*, a viper).

Calyx 5-sect; corolla irregular, almost 2-lipped, with an oblique 5-lobed limb, glabrous inside, the throat open; stamens unequal, with long filaments; ovary 4-lobed; style long, filiform, bifid at summit; nutlets 4 or fewer, subconical-trigonous, keeled along the inner angle, tuberculate, inserted by a rather broad subtriangular basal areole on the almost flat receptacle. Coarse herbs, with stiff hairs seated on tubercles; radical leaves petiolate, forming a basal rosette, the upper ones sessile; flowers subsessile, in bracteate spike-like cymes. *Viper's Bugloss, Snake-weed.*

Two stamens exserted; flowers large, with a wide throat *E. plantagineum* 1.
All stamens exserted; flowers small, with a rather narrow throat ..... *E. italicum* 2.

FIG. 198.—**Echium plantagineum.**

*1. **E. plantagineum,** L. *Salvation Jane.* Erect biennial, 20-100 cm. high, scabrous-hairy; radical leaves ovate, large, the stem-leaves oblong or lanceolate, cordate at base, 3-9 cm. long; cymes forming a loose panicle; calyx-segments lanceolate, 8-10 mm. long; corolla purplish-red or rarely white, 20-30 mm. long, the tube dilated upwards; 2 of the stamens longer and exserted; nutlets 2-3 mm. long, strongly tuberculate.—*E. violaceum,* L.

Settled districts. May-Dec.—Mediterranean region.

*2. **E. italicum,** L. Stout biennial, 30-90 cm. high, bristly with longer, stiffer and more crowded white hairs, the young hairs yellowish; radical leaves long, broad-lanceolate; stem-leaves lanceolate, 5-8 cm. long; panicle pyramidal; calyx-segments about 5 mm. long, lengthening in fruit; corolla pink, 10-14 mm. long, the tube slender; all the stamens exserted; nutlets 3½ mm. long, whitish, strongly tuberculate, with 2 ridges on the outer face.

Mt. Lofty Range and towards the Murray. Summer.—Mediterranean region.

Family 97.—VERBENACEAE.

Flowers bisexual, irregular or almost regular; calyx with 4 or 5, rarely 6, lobes or teeth, persistent; corolla with a cylindrical tube and a limb (rarely 2-lipped) of 4-6 imbricate lobes; stamens inserted in the corolla tube, 4 in pairs or 4-6 alternate with the lobes; ovary superior, originally of 2 carpels, entire or shortly 4-lobed, often seated on a small disk, usually 4-celled by the instrusion of 2 secondary dissepiments, with 1 ovule in each cell (1-celled with 4 ovules in *Avicennia*); placentas axile; style rising from the summit of the ovary, usually more or less 2-lobed; fruit dry or drupaceous, generally enclosed in the calyx, indehiscent or separating septicidally into 2 or 4 nutlets or fruitlets; seeds 1 in each cell, or fewer by abortion; albumen scanty or absent; embryo straight, with an inferior radicle shorter than the thick cotyledons. Herbs, trees, or shrubs; leaves without stipules, opposite, alternate or whorled; flowers usually sessile or sub-sessile.

Lantana Camara, L., from tropical America, with its color-changing flowers, belongs to this family. It is to some extent established in Waterfall Gully.

A. Ovary 4-celled; corolla 5- rarely 6-lobed; inland herbs or small shrubs.
  B. Fruit dry; anthers without appendages.
    C. Fruit separating into 4 nutlets; stamens 4 ..... Verbena 1.
    C. Fruit indehiscent; stamens 5.
      Style entire or minutely notched ..... Newcastlia 2.
      Style deeply 2-lobed ..... Dicrastylis 3.
  B. Fruit a succulent drupe; stamens 4; anthers with minute appendages at base; style 2-lobed ..... Spartothamnus 4.
A. Ovary 1-celled; corolla 4-lobed; fruit 2-valved; maritime tree or stout shrub ..... Avicennia 5.

1. VERBENA (Tourn.), L.

(Applied by the German botanist Otto Brunfels, in 1530, to *V. officinalis*, apparently from *verbena*, the Italian and Spanish name of this plant, the classical Latin name of which was *verbenaca*).

Calyx minutely 4-5-toothed; corolla-tube bent, the limb with 5 spreading subequal lobes; stamens 4, in pairs, enclosed in tube; ovary 4-celled; ovules basal, ascending, anatropous; style thickened upwards and notched; nutlets 4, 1-seeded, the seeds exalbuminous, oblong, about 2 mm. long, convex on outer face, keeled on inner face. Herbs with quadrangular stems and branches, opposite leaves and flowers in bracteate spikes, the hairs short, simple, and usually stiff. *Verbena, vervain.*

A. Leaves deeply divided, with short broad petioles.
  Calyx 5-toothed ..... *V. officinalis* 1.
  Calyx 4-toothed ..... *V. supina* 2.
A. Leaves serrate, closely sessile.
  Tall plant; corolla not twice as long as calyx ..... *V. bonariensis* 3.
  Lowly plant; corolla thrice as long as calyx ..... *V. venosa* 4.

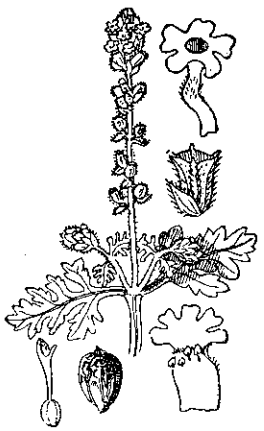

Fig. 199.—**Verbena supina.**

1. **V. officinalis,** L. *Common Vervain.* Erect perennial, 30-80 cm. high, somewhat scabrous with minute hairs; leaves ovate-cuneate, oblong or lanceolate, pinnatifid or coarsely toothed, petiolate, 2-10 cm. long; spikes slender, 3-25 cm. long, the lower flowers becoming distant; calyx 5-toothed, 3 mm. long; corolla rather longer, pale-pink or lilac, glabrous.

South-East to Far North and westward to Musgrave Range, but rather rare or localised. Most of the year.—Temperate Australia; temperate countries of the globe.

*2. **V. supina,** L. Sparsely hairy perennial, to 50 cm. high, with erect or procumbent stems; leaves petiolate, ovate-cuneate, 1-2½ cm. long, pinnatipartite, the lobes bluntly toothed; spikes dense, slender, sometimes ultimately 10 cm. long; calyx about 3 mm. long, 4-angled, 4-toothed; corolla rather longer, lilac, pubescent about middle of tube outside; nuts wrinkled in upper part of outer face.

Common on park lands and plains near Adelaide. Oct.-April.—Mediterranean region.

*3. **V. bonariensis,** L. Rigid erect scabrous-hairy perennial, 1½-2 m. high; leaves linear-lanceolate, half-clasping, 4-10 cm. long, coarsely serrate in upper part; spikes dense, 2-2½ cm. long, forming terminal corymbose panicles; calyx 5-toothed, 4 mm. long; corolla scarcely twice as long, bluish, pubescent outside and in the throat.

Mt. Lofty Range. Summer.—Temperate South America; introduced in many countries.

*4. **V. venosa,** Gill. et Hook. Scabrous hairy perennial, 20-30 cm. high, the stem creeping and rooting at base; leaves oblong-lanceolate, rigid, half-clasping, 3-6 cm. long, distantly serrate; spikes short and broad, forming a terminal panicle; calyx 5-toothed, about 4 mm. long; corolla bluish, the slender tube pubescent and 3 times as long as calyx.

Mt. Lofty Range near Waterfall Gully and Eagle-on-the-Hill.—Temperate South America.

2. NEWCASTLIA, F. v. M.

(After Henry Pelham Clinton, 5th Duke of Newcastle, 1811-64: he was Secretary of State for the Colonies, 1852-54, and supplied funds for the expedition of 1855 to northern Australia, Augustus Gregory being the leader and Mueller the botanist).

Calyx broad, with usually 5 valvate lobes; corolla with 5 equal lobes; stamens 5, alternate with the lobes; ovary 4-celled, with 1 ovule in each cell, or sometimes in the earliest stage 2-celled, with an incomplete dissepiment in each cell; ovules laterally attached at or above middle of cell, semianatropous; style short and notched or long, slender and entire; fruit enclosed in calyx, dry, indehiscent or very tardily dehiscing; seeds albuminous. Small shrubs, covered with a dense tomentum of stellately branched hairs; leaves entire; flowers sessile or subsessile, in dense spikes or heads or axillary. Genus limited to Australia and usually inhabiting very dry country.

A. Stamens enclosed in corolla-tube; style scarcely exserted; corolla more or less campanulate; leaves alternate.
  Corolla-tube as long as lobes; calyxes whitish, clustered; leaves ovate ..... *N. Dixonii* 1.
  Corolla-tube twice or thrice as long as lobes; calyxes golden, spicate; leaves linear ..... *N. chrysotricha* 2.
A. Stamens exserted; filaments rising from upper margin of corolla-tube; style longer than corolla, which is more or less tubular; flower-parts sometimes 6; leaves opposite.
  B. Flowers in terminal heads ..... *N. cephalantha* 3.
  B. Flowers in spikes.
    Leaves oblong, with dense tomentum on underface concealing lateral nerves ..... *N. bracteosa* 4.
    Leaves ovate, with finer tomentum not concealing the lateral nerves ..... *N. spodiotricha* 5.

1. **N. Dixonii,** F. v. M. et Tate. Erect densely tomentose shrub; leaves alternate or whorled, sessile, ovate, 7-15 mm. long, rather crowded; flowers few, axillary; calyx nearly 3 mm. long, the lobes shorter than tube; corolla about thrice as long, the lobes lanceolate, equalling the tube; stamens inserted near pubescent base of corolla; style short; ovary glabrous.

Near Renmark; sandhills near Crystal Brook.—West Australia (Victoria Desert). The West Australian specimen is in leaf only and therefore doubtful; the plant must be rare in our State, as it has not been re-discovered since 1887.

2. **N. chrysotricha,** F. v. M. Small erect tomentose shrub; leaves scattered, thick, sessile, broad-linear, 2-2½ cm. long, obtuse, becoming glabrous and wrinkled above, tomentose below with prominent midrib, the margins revolute; spikes golden, 6-14 cm. long, the flowers towards the base sometimes in distant clusters; calyx cup-shaped, 4 mm. long, densely yellow-tomentose, the lobes short, deltoid; corolla slightly longer, its obtuse lobes about ⅓ of the tube, which is hairy inside; stamens inserted near base of corolla-tube; style short; ovary villous near summit.

Near Birksgate Range (specimen in bud and doubtful).—West Australia (Great Victoria Desert).

3. **N. cephalantha,** F. v. M. Small erect shrub, covered with a dense close tomentum, yellowish on the branches, greyish on the leaves; leaves opposite, ovate-lanceolate or oblong-lanceolate, sessile, 1-2 cm. long, the margins recurved; flowers sessile in dense woolly heads or short spikes, 10-15 mm. long and nearly as broad, terminating short branchlets; bracts broadly orbicular, larger than the flowers and at first concealing them; calyx almost globular, about 3 mm. long, silky-villous with long much-

branched hairs, the lobes very small, acute ; corolla scarcely longer, its acuminate lobes ⅓ length of tube, the upper part villous inside ; stamens inserted at summit of corolla-tube and exserted ; style slender and exserted ; fruit globular, almost glabrous.

Far North from Cordillo Downs to Birksgate Range. Winter and spring.—Central and West Australia.

4. **N. bracteosa,** F. v. M. Erect shrub covered with a dense close greyish tomentum ; leaves opposite, thick, sessile, oblong or oblong-lanceolate, 1½-3 cm. long, the margins recurved ; spikes dense, 2-4 cm. long, the bracts large, ovate-acuminate, brown-tomentose, each containing a few flowers in its axil ; calyx subglobular, villous, 4 mm. long, the deltoid lobes short ; corolla rather longer, villous in throat, the lobes lanceolate-acuminate, rather shorter than the tube ; stamens inserted on upper margin of tube, exserted ; ovary almost glabrous, the style slender, exserted.

Near Birksgate Range.—Central and West Australia.

5. **N. spodiotricha,** F. v. M. Near the preceding, but the leaves are flatter, larger and broader, ovate-oblong, 3-5 cm. long, 12-25 mm. broad, conspicuously reticulate below, with a very short broad petiole about 2 mm. long ; tomentum everywhere close and whitish-grey ; spikes 3-6 cm. long, the bracts as in the preceding, but very early caducous ; calyx thick, nearly 4 mm. long, with a short tomentum, the lobes short, rounded ; corolla rather longer, densely bearded in throat, the acuminate lobes about as long as tube, at summit of which the 5 exserted stamens are attached ; style as in the preceding ; ovary papillose.

Near Birksgate Range—Central Australia.

3. DICRASTYLIS, Drumm.

(From Greek *dikroos*, forked ; *stylos*, style : alluding to the deeply cleft style).

Calyx and corolla usually 5-lobed ; stamens 5 ; ovary, ovules and seeds as in *Newcastlia*, but the style divided about ½ way into 2 slender branches, the style proper and often the base of the branches densely hairy ; fruit globular, indehiscent, enclosed in calyx. Small shrubs or undershrubs, with tomentum of stellately branched hairs ; leaves entire ; flowers sessile or subsessile, in cymes which are often reduced to globular clusters. A purely Australian genus inhabiting the dry north and west.

A. Corolla-lobes equal or almost so.
  B. Inflorescence a broad golden panicle ; leaves petiolate, opposite ..... *D. ochrotricha* 1.
  B. Inflorescence more or less spike-like, usually with a few branches or peduncles near the base of spike ; leaves sessile, scattered.
    C. Calyxes yellow-woolly ..... *D. Beveridgei* 2.
    C. Calyxes white-woolly.
      Basal peduncles short ; tomentum close ..... *D. Costelloi* 3.
      Basal peduncles longer and horizontal ; tomentum loose ..... *D. Doranii* 4.
A. Lowest corolla-lobe much longer than the others ; inflorescence a series of false whorls along the rhachis ; leaves often whorled ..... *D. verticillata* 5.

1. **D. ochrotricha,** F. v. M. Erect shrub under 1 mm. high, with spreading branched hairs on branches, the young parts often reddish ; leaves opposite, shortly petiolate, thick, velvety with a dense tomentum, lanceolate, 2-6 cm. long, 5-25 mm. broad, the upper face becoming finely wrinkled ; cymes opposite, pedunculate, sometimes with a few short umbel-like branches, the bracts few and inconspicuous, the whole forming a yellow-woolly somewhat leafy panicle ; calyx subglobular, silky-villous, about 4 mm. long, divided to base into 5 oblong segments ; corolla slightly longer, hairy outside and in throat, the lobes short, obtuse ; stamens affixed at summit of tube, scarcely exserted ; style short, enclosed ; ovary silky-villous.

Mt. Watson, Birksgate Range.—Central and West Australia. Specimens from the MacDonnell Range, C.A., have the calyxes covered with whitish or pinkish hairs.

2. **D. Beveridgei,** F. v. M. Small shrub with a whitish tomentum on the branches, greyish on the foliage, leaves sessile, scattered, 10-30 mm. long, 2-5 mm. broad, resembling those of *D. Doranii*, the youngest sometimes golden ; clusters few-flowered, dense, sessile, and becoming distant along a spike 5-10 cm. long, with sometimes 1 or 2 very short peduncles at base ; rhachis of spike or panicle loosely golden-tomentose ; bracts leafy, decreasing upwards until toward the summit they are much shorter than the clusters ; calyx 3 mm. long, loosely-golden-tomentose, subglobular, the lanceolate lobes longer

than tube; corolla slightly longer, stellate-pubescent in upper part outside, bearded in throat, the rounded lobes about ½ as long as the tube; stamens attached slightly below the lobes and scarcely exserted; ovary tomentose; style short.

Ooldea. Summer.—Central Australia. The type specimens, on which Mueller's original description was based, appear to have been in early flower and did not show the lower leaves.

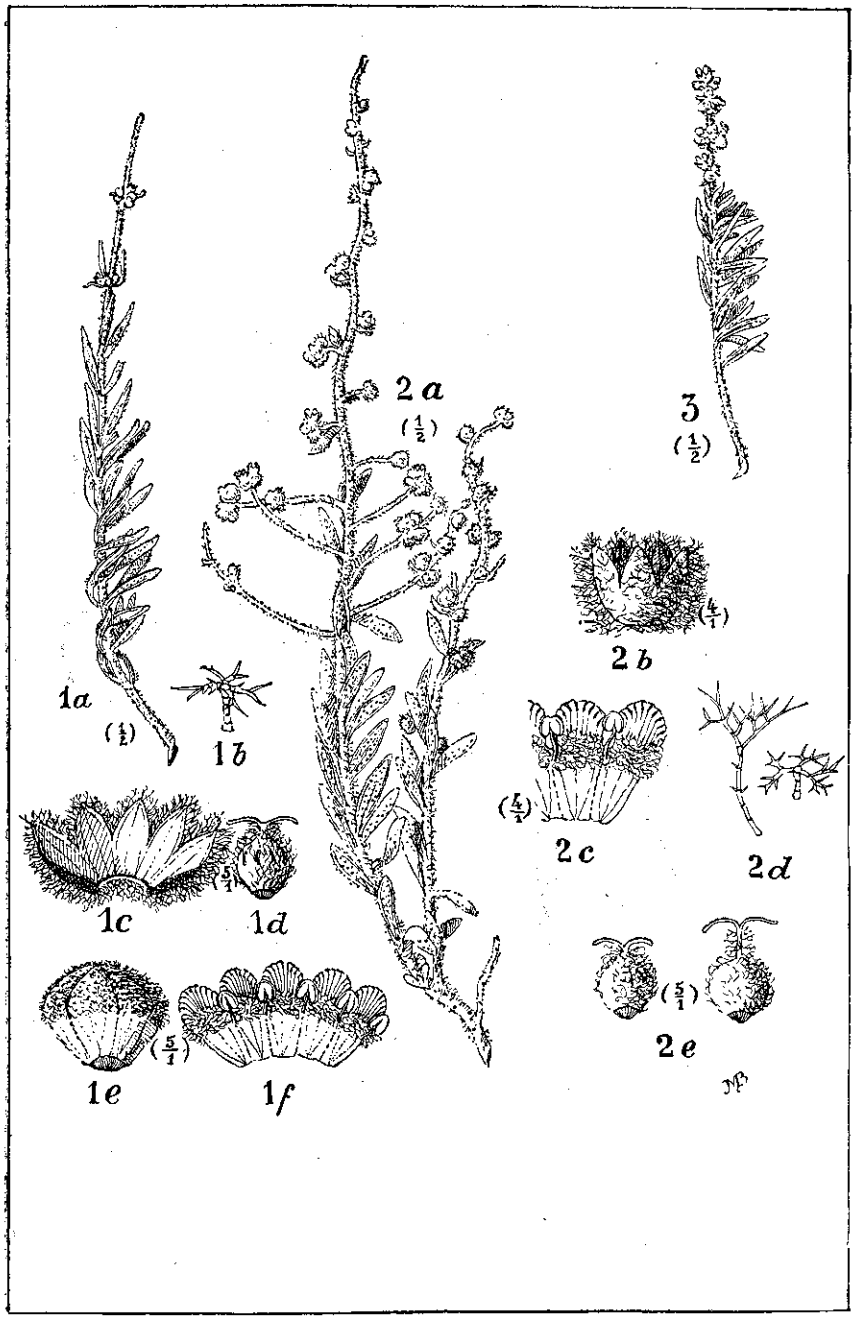

PLATE 42.—1 and 3, **Dicrastylis Costelloi**; 2. **D. Doranii.**

3. **D. Costelloi,** Bailey. Erect shrub about 50 cm. high, hoary with a dense close greyish tomentum; leaves scattered, sessile, linear-lanceolate, obtuse, 12-18 mm. long, about 2 mm. broad, rarely in whorls of 3, the margins recurved; flowers in sessile clusters along a short terminal spike-like panicle, or sometimes at the end of short branches near the base of the spike; bracts small, linear; calyx subglobular, about 3 mm. long, acutely 5-partite, with a close white tomentum; corolla slightly longer, shortly stellate-hairy outside on the upper part, bearded inside in the throat, with 5 short rounded lobes; stamens attached just below the corolla lobes, scarcely exserted; ovary tomentose, style short.

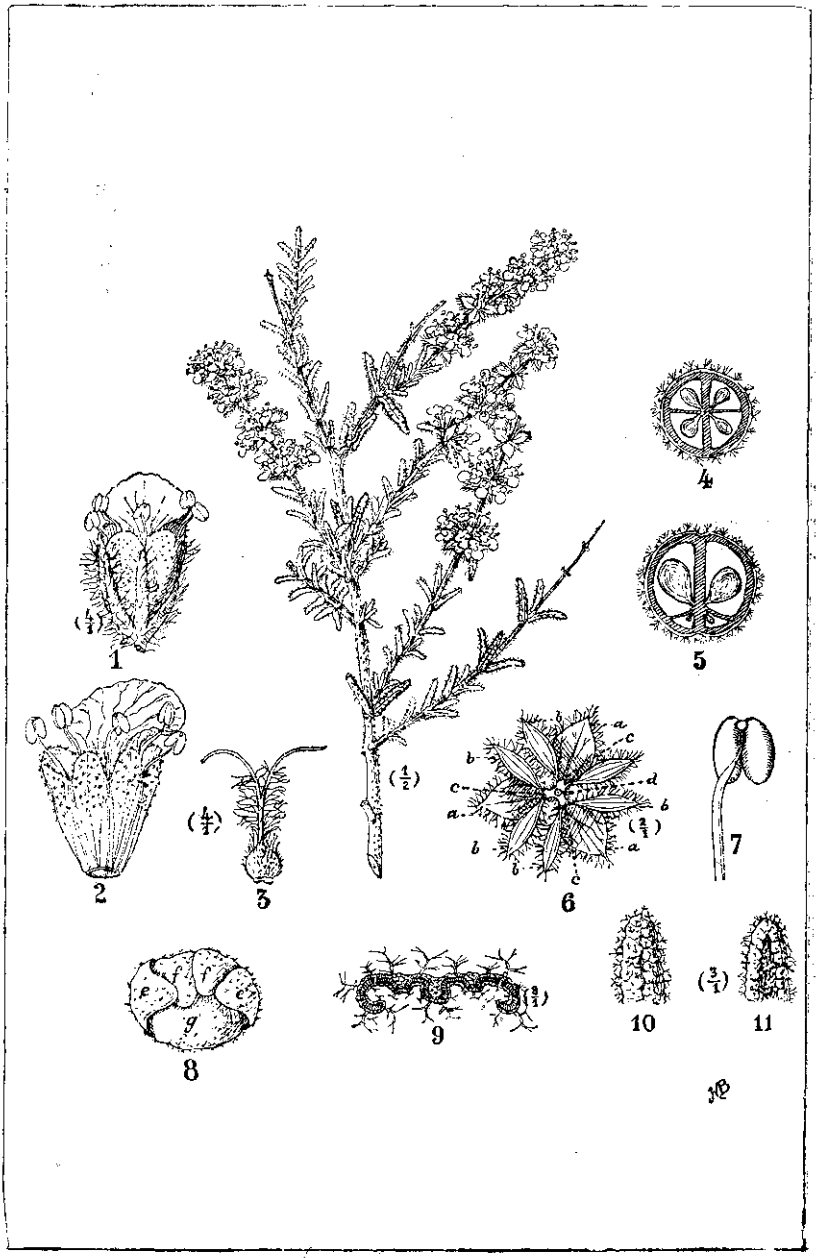

PLATE 43.—**Dicrastylis verticillata.**

Near Lake Eyre.—Western Queensland.

PLATE 42.—1*a*, a type specimen; 1*b*, hair from upper face of leaf; 1*c*, calyx spread open; 1*d*, pistil; 1*e*, corolla; 1*f*, corolla spread open; 3, specimen from Lake Eyre.

4. **D. Doranii,** F. v. M. Erect shrub 50 cm. to over 1m. high, with a loose white tomentum on the branches, greyish and closer on the foliage; leaves scattered, sessile, oblong-lanceolate, obtuse, 10-25 mm. long, 3-4 mm. broad, slightly wrinkled on the upper surface when old, the margins more or less recurved; panicle narrow, leafy towards base, the flowers few in small heads or clusters, which are sessile along the upper spike-like portion of the panicle, but towards the base terminate spreading branches or peduncles 5-35 mm. long; bracts leafy, small, linear; calyx subglobular, white-tomentose, about 3 mm. long, the deltoid lobes equalling the tube; corolla and stamens almost as in *D. Costelloi*, but the rounded corolla-lobes nearly as long as tube; ovary tomentose.

Lake Perigundi (Cooper's Creek).—Central and West Australia.

PLATE 42.—2*a*, flowering branch; 2*b*, calyx; 2*c*, part of corolla spread open; 2*d*, branch-hair and leaf-hair; 2*e*, pistil in bud and in flower.

Var. *eriantha*, F. v. M. Calyx with looser woolly tomentum, white or pink; pedunculate flower-clusters fewer and peduncles shorter.—Oodnadatta to Charlotte Waters.—Central Australia.

5. **D. verticillata,** J. M. Black. Small shrub with loose white tomentum; leaves mostly whorled in 3's, sessile, linear, obtuse, 7-10 mm. long, the margins recurved, often wrinkled and becoming glabrous; flowers in distant false whorls, each whorl composed of 3 few-flowered sessile clusters, with 2 lanceolate bracteoles below each cluster and 3 ovate bracts subtending the whole whorl, all the bracts and bracteoles ciliate; calyx 4 mm. long, divided to base into 5 linear segments; corolla hairy inside and out, the tube about as long as the calyx, the lowest lobe orbicular and nearly 3 times as long as the 4 other short rounded lobes; stamens 5, attached about middle of tube and exserted; ovary hairy.

North of Murat Bay. Resembles a Labiate.

PLATE No. 43.—1, flower; 2, corolla; 3, pistil; 4, transverse section of ovary; 5, the same more advanced, showing 2 ovules and 2 cells aborting; 6, bracts and bracteoles viewed from above, the flowers having been removed: *a*, *a*, *a*, bracts; *b*, *b*, bracteoles; *c*, *c*, *c*, bases of the 3 clusters; *d*, axis of inflorescence; 7, anther and part of filament; 8, corolla in bud viewed from above; *e*, *e*, lateral lobes; *f*, *f*, upper lobes; *g*, lowest lobe; 9, transverse section of leaf; 10, upper surface of leaf near summit; 11, lower surface of same.

4. SPARTOTHAMNUS, A. Cunn.

(From Greek *sparton*, a cord; *thamnos*, a shrub: referring to the almost leafless twiggy branches.)

1. **S. teucriifolius,** F. v. M. Erect shrub about 1 m. high, the young parts minutely grey-pubescent; branches slender, rigid, quadrangular, mostly opposite and divergent; leaves opposite, entire, linear- or ovate-lanceolate, 2-6 mm. long, very distant on the main branches; flowers solitary, axillary, on short branchlets; calyx about 4 mm. long, rather longer than peduncle, the 5 lanceolate lobes longer than the tube; corolla at least 3 times as long, the lobes oblong and the lowest lobe twice as long as the 4 others; stamens 4, somewhat exserted, attached towards base of tube, the filaments bearded in lower part; ovary glabrous, 4-celled, with 1 laterally attached semianatropous ovule in each cell; style filiform, exserted, 2-branched near summit; fruit a globular blackish drupe slightly exceeding the very open calyx and containing 4 1-seeded fruitlets; seeds albuminous.—*Spartothamnella teucriifolia* (F. v. M.) Briq.

Arkaringa Creek, near Everard Range.—Central and West Australia.

5. AVICENNIA, L.

After the Perso-Arabian physician Ibn Sînâ, 980-1037, whose name was Latinised as Avicenna, his medical works having a great repute in Europe during and after the middle ages.)

1. **A. officinalis,** L. *Mangrove.* Stout shrub or small tree, usually 1-3 m. high, glabrous except on the inflorescence; leaves opposite, coriaceous, shortly petiolate, lanceolate or ovate-lanceolate, 4-7 cm. long, glossy green above, whitish with minute scales below; cymes contracted into small heads of sessile flowers in the upper axils, the heads usually on stout angular peduncles; calyx 3-4 mm. long, of 5 almost orbicular ciliate segments or sepals, pubescent outside; corolla nearly twice as long, with 4 subequal ovate lobes, pubescent outside, glabrous and orange inside, and a very short tube; stamens 4, short, inserted in throat; ovary hairy at summit, 1-celled, with 4 orthotropous ovules pendulous from a central column; style very short, conical, bifid;

fruit a compressed-ovoid capsule, 3-4 cm. long, opening in 2 thick valves; seed 1; embryo with 2 large fleshy folded cotyledons and a hairy radicle, escaping from the capsule and germinating in the mud after the whole fruit has fallen.

Growing in mud close to the sea all round our coasts.—Along the coasts of Australia but not Tasmania; New Zealand; Asia; East Africa; Polynesia. The mangroves of tropical Australia include species belonging to the family *Rhizophoraceae*, in which the embryo usually germinates on the tree before falling into the mud, either with or without its pericarp. *Rhizophora* sends down aerial roots from the branches to the mud to act as stays, while *Avicennia* sends up through the mud erect aerial roots which appear above the surface.

Family 98.—LABIATAE.

Flowers mostly irregular and bisexual; calyx persistent, 5-toothed or 2-lipped; corolla 4- or 5-lobed, the limb usually 2-lipped, the upper or posterior lobes outside the others in bud; stamens inserted in corolla-tube, 4 in pairs of unequal length or all equal, or 2 stamens and 2 staminodes, or 2 stamens only; anthers 2-celled or sometimes 1-celled by abortion or by the confluence of the 2 cells; ovary superior, originally of 2 carpels, becoming 4-celled by secondary dissepiments and deeply 4-lobed, each cell with 1 erect anatropous ovule; style slender, rising between the 4 lobes of the ovary, shortly bifid at summit; fruit divided into 4 (or by abortion fewer) seed-like nutlets enclosed in calyx; seed solitary in each nutlet, erect; cotyledons fleshy, radicle inferior; albumen scanty or absent. Herbs or shrubs, the stems and branches almost always quadrangular; leaves opposite or rarely whorled, without stipules, often beset with glandular dots filled with resinous oil which renders the plants aromatic; flowers rarely solitary, usually in opposite cymes, which are frequently reduced to clusters, called *false-whorls* or *verticillasters*, in the axils of the stem-leaves or of bracts to which the leaves are reduced; they have often also 2 very small bracts or bracteoles at or near the base of the calyx.

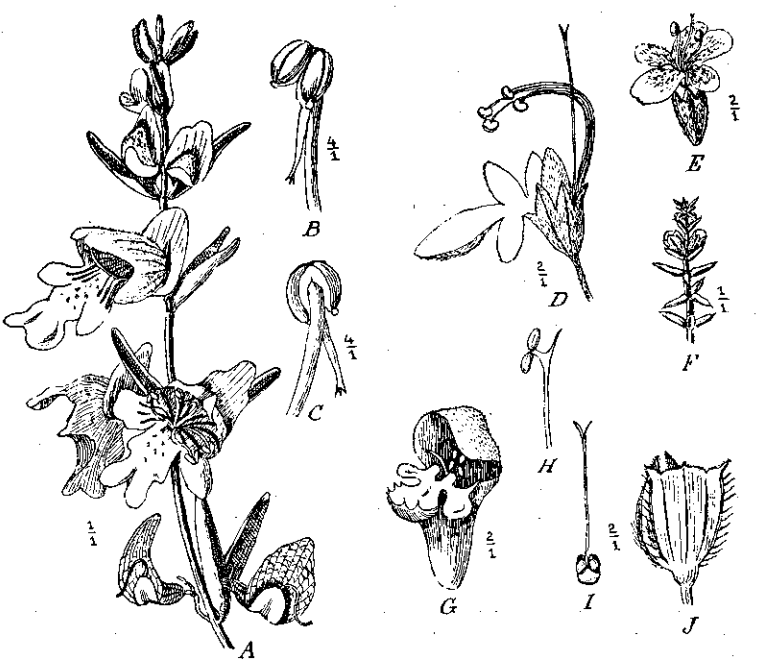

Fig. 200.—**Labiatae.**—A-C, *Prostanthera striatiflora*: A, flowering branch; B, face of anther; C, back of anther. D, flower of *Teucrium racemosum*. E-F, *Westringia rigida*: E, flower; F, budding branch. G-J, *Brunella vulgaris*: G, corolla; H, stamen; I, pistil; J, calyx.

A. Corolla almost 1-lipped; calyx 5-toothed; stamens 4; anthers 1-celled by confluence.
  Upper lip of corolla minute, truncate or notched, the lower lip of 3 unequal lobes ..... Ajuga 1.
  Upper lip so arranged that the lower lip appears to have 5 unequal lobes ..... Teucrium 2.

A. Corolla funnel-shaped, with 4 almost equal lobes; calyx 5-toothed; anthers 2-celled.
  Stamens 4; fragrant herbs ..... MENTHA 3.
  Stamens and staminodes 2 each; scentless plant . LYCOPUS 4.
A. Corolla with 2 distinct lips.
  B. Stamens 4, enclosed with the style in the corolla-tube.
    Flowers purple; calyx unequally 5-toothed; anthers 1-celled ..... LAVANDULA 5.
    Flowers white; calyx 10-toothed; anthers 2-celled MARRUBIUM 6.
  B. Stamens more or less exserted from the corolla-tube, 2 or 4.
    C. Calyx 2-lipped.
      D. Stamens 2, without staminodes; anthers 1-celled by abortion.
        Connective of anthers continuous with filament ..... ROSMARINUS 7.
        Filament appearing branched by the connective fixed transversely at its summit.. SALVIA 8.
      D. Stamens 4.
        E. Anthers 1-celled by confluence; stamens lying within the long lower lip of corolla ..... PLECTRANTHUS 9.
        E. Anthers (at least the upper 2) 2-celled, the lower pair of stamens longer than the upper pair.
          F. Lips of calyx entire or nearly so.
            Upper lip of calyx with a hollow protuberance; lower corolla-lip almost entire; anthers of lower stamens 1-celled; herb ..... SCUTELLARIA 10.
            Calyx without protuberance; lower corolla-lip 3-lobed; anthers all 2-celled, usually appendiculate; shrubs.. PROSTANTHERA 11.
          F. Upper lip of calyx 3-toothed, almost truncate, flattened, the lower lip 2-lobed; herbs.
            Corolla-tube scarcely longer than calyx, the upper lip hooded ..... BRUNELLA 12.
            Corolla-tube arched and much longer than calyx, the upper lip flattish ... MELISSA 13.
    C. Calyx almost equally 5-toothed.
      G. Stamens 4; anthers 2-celled, the cells placed end to end; upper corolla-lip hooded; leaves and flowers opposite; herbs.
        Nutlets truncate and angular at summit; anthers hairy ..... LAMIUM 14.
        Nutlets rounded at summit; anthers glabrous ..... STACHYS 15.
      G. Stamens 2, with anthers 1-celled by abortion and 2 staminodes; leaves and flowers whorled; shrubs ..... WESTRINGIA 16.

1. AJUGA, L.

(Latin name of a plant also called *abiga* and probably belonging to this genus.)

1. **A. australis,** R. Br. *Bugle.* Erect or ascending herb, 4-30 cm. high, softly pubescent with septate hairs; radical and lower leaves petiolate, ovate-oblong, bluntly and distantly toothed, 4-12 cm. long; floral leaves sessile, becoming gradually smaller and sometimes entire, oblong or oblanceolate; false-whorls usually about 10-flowered; calyx 5-toothed, 4-7 mm. long; corolla blue or purple, usually twice as long, the upper lip inconspicuous, the lower lip long and spreading, 3-lobed, the lateral lobes oblong, the middle one longer and obcordate; stamens 4 in pairs, projecting beyond the upper lip, with a ring of hairs just below them inside the corolla-tube; anthers 1-celled; nutlets obovoid, wrinkled, glabrous.

Southern districts to Flinders Range; Kangaroo Island; Murray lands; South-East. Sept.-Feb.—Temperate Australia.

2. TEUCRIUM (Tourn.) L.

(Greco-Latin *teucrion*, the name of a European species.)

Calyx with 5 subequal lanceolate teeth about as long as tube; corolla 2-lipped, the upper lip bifid, its 2 lobes placed laterally, so that the whole corolla appears 5-lobed, the lowest lobe (really the middle lobe of the lower lip) spreading, much longer than the others,

rounded, concave, the limb pubescent outside; stamens 4 in pairs, much exserted and arched over the corolla; anthers 1-celled by confluence; nutlets ovoid, pubescent. Herbs or undershrubs with opposite leaves. The English species are known as *Germander*; the Australian ones are endemic.

A. Flowers on axillary peduncles longer than calyx.
  B. Leaves entire, lanceolate; peduncles usually 1-flowered ..... *T. racemosum* 1.
  B. Leaves serrate.
    Peduncles usually 1-flowered; leaves obovate ... *T. grandiusculum* 2.
    Peduncles 5-7-flowered; leaves ovate-lanceolate.. *T. corymbosum* 3.
A. Flowers sessile in leafy spikes; leaves narrowly 3-lobed *T. sessiliflorum* 4.

1. **T. racemosum,** R. Br. Erect perennial with quadrangular stems, 20-40 cm. high, hoary with minute hairs or the hairs sometimes sparse on the leaves; leaves lanceolate or almost linear, 10-25 mm. long, shortly petiolate, entire, sometimes undulate on margin, the floral ones becoming gradually smaller: peduncles solitary in the axils, spreading, 1-flowered, usually longer than the floral leaf or bract and forming terminal leafy racemes; calyx 4-5 mm. long, the teeth shorter or longer than tube; corolla about twice as long, or sometimes more, white. (Fig. 200, D.)

Southern districts to Far North; Murray lands; Yorke and Eyre Peninsulas and westward to Tarcoola. Most of the year.—Temperate Australia.

Var. *triflorum*, J. M. Black. Lower peduncles 3-flowered, with pedicels mostly longer than calyx.—Eringa (north of Oodnadatta). This scarcely differs from the tropical *T. integrifolium*, F. v. M. except in the dense greyish tomentum.

Var. *tripartitum*, F. v. M. Leaves almost or quite divided into 3 linear leaflets, 5-8 mm. long, on each side of stem; flowers smaller, solitary.—Strzelecki Creek.—Dry western parts of New South Wales.

2. **T. grandiusculum,** F. v. M. Small shrub about 30 cm. high, minutely glandular-pubescent but green, the stems and branches almost cylindrical; leaves subsessile, broadly ovate-cuneate, 10-20 mm. long, serrate in upper part, the floral ones similar but smaller and crowded; peduncles solitary, axillary, mostly shorter than the leaves, 1-flowered, very rarely 2-flowered; calyx about 5 mm. long, the lobes acute; corolla white, fully twice as long.

Blyth Range; near Ooldea.—Central and West Australia.

3. **T. corymbosum,** R. Br. Erect perennial sometimes 1 m. high, hoary on the rigid quadrangular stems and branches and on the under-surface of the leaves, which are almost glabrous above, ovate-lanceolate, 2-7 cm. long, 10-30 mm. broad, coarsely serrate, the floral ones becoming gradually shorter; peduncles solitary, axillary, longer than the upper floral leaves or bracts, bearing loose cymes of usually 5-7 flowers; calyx hoary, about 5 mm. long; corolla white, about twice as long.

Gullies of Flinders Range at least as far north as Mt. Searle, near Lake Gillies, E.P. Summer.—Temperate Australia.

4. **T. sessiliflorum,** Benth. Perennial, 5-20 cm. high, more or less villous or pubescent with simple or forked hairs and subsessile glandular hairs; stems and branches quadrangular; leaves 10-25 mm. long, narrow-cuneate in lower part, 3-lobed in upper part, the lobes oblong, sometimes again lobulate or toothed, the margins recurved; flowers sessile, solitary, axillary, forming dense leafy spikes, the floral leaves gradually becoming ovate entire bracts; calyx villous, 4-5 mm. long; corolla not twice as long, white.

Dublin scrub to Flinders Range; Murray lands; Yorke and Eyre Peninsulas and westward to Fowler's Bay. Aug.-Jan.—Temperate Australia.

3. MENTHA (Tourn.) L.

(The Latin name of mint.)

Calyx 10-15-nerved, with 5 usually short teeth; corolla with tube not longer than calyx and 4 almost equal lobes shorter than the tube, the upper lobe usually notched; stamens 4, equal, erect, usually exserted; anthers 2-celled; nutlets ovoid, glabrous. Slender fragrant perennial herbs with flat opposite leaves and whorled flowers. *Mint.*

A. False-whorls in the axils of floral leaves.
  B. Plants green and almost glabrous.
    C. Leaves lanceolate, acute; whorls many-flowered... *M. australis* 1.
    C. Leaves ovate or oblong, obtuse; whorls few-flowered.
      Leaves ovate or ovate-lanceolate, broader towards base ..... *M. gracilis* 2.
      Leaves oblong, not broader towards base ..... *M. saturejoides* 3.

B. Plant grey-villous; leaves broadly ovate; whorls many-flowered ..... *M. Pulegium* 4.
A. False-whorls forming cylindrical spikes, the floral leaves reduced to narrow bracts; whorls many-flowered.
Leaves subsessile ..... *M. spicata* 5.
Leaves stalked ..... *M. piperita* 6.

1. **M. australis,** R. Br. Stems 30-60 cm. high; leaves lanceolate or ovate-lanceolate, 2-5 cm. long, entire or more or less serrate, acute, shortly petiolate, glabrous or pubescent below; flowers usually very numerous in the false-whorls, rarely reduced to few, subsessile; calyx cylindrical, 5-6 mm. long, hoary, the teeth lanceolate-acuminate, and pubescent inside; corolla white, the tube sparsely pubescent inside.
Most parts of the State, in moist places in the South, near watercourses and waterholes in the Far North.—Temperate Australia.

2. **M. gracilis,** R. Br. Very slender and almost glabrous; leaves ovate or ovate-lanceolate, sometimes almost truncate at base, subsessile, 4-12 mm. long, entire; flowers on short pedicels, in axillary 2-8-flowered whorls; calyx about 4 mm. long, pubescent, the teeth lanceolate, very acute, with long inflexed hairs round the margin inside; corolla not much longer.—*M. serpyllifolia,* Benth.
Mt. Lofty Range; South-East. Summer.—Eastern States.

3. **M. saturejoides,** R. Br. Near the preceding; leaves oblong or oblong-lanceolate, 10-30 mm. long; whorls 4-8-flowered; calyx cylindrical, 4-5 mm. long, the teeth deltoid, sometimes acuminate, furnished on the inner face with long inflexed hairs.
Mount Lofty Range to Flinders Range; Yorke and Eyre Peninsulas; River Murray; Bordertown; South-East. Summer.—Temperate Australia.

* 4. **M. Pulegium,** L. *Pennyroyal.* Plant 10-50 cm. high, more or less grey-villous; leaves shortly petiolate, ovate or almost orbicular, 10-15 mm. long, the floral ones smaller; false-whorls many-flowered, dense; calyx cylindrical, 3½ mm. long, the throat closed by a dense ring of white hairs, the two lower teeth narrower than the 3 upper; corolla twice as long, lilac, the lobes villous outside, the upper one entire.
Mt. Lofty Range; Murray River. Dec.-March.—Europe; western Asia. *Pulegium* is the old Latin name of this plant.

* 5. **M. spicata,** Huds. (1762). *Spear Mint.* Erect, glabrous or almost so, 50 cm. to 1 m. high; leaves almost sessile, lanceolate, serrate, 3-8 cm. long; spikes long, slender, not very dense towards base; calyx campanulate, about 2 mm. long, glabrous or minutely hairy; corolla spotted with lilac.—*M. viridis,* L. (1763).

Near creeks in Mt. Lofty Range. Summer.—Europe; North Africa. Cultivated and gone wild in many countries.

* 6. **M. piperita,** L. *Peppermint.* Differs from the preceding in the leaves on petioles 3-10 mm. long; spikes thicker and shorter; calyx 3 mm. long, cylindrical, glabrous except on the teeth, but with conspicuous oilglands.

Gullies of Mt. Lofty Range. Summer.—Europe; perhaps a hybrid; escaped from cultivation.

FIG. 201.—**Mentha spicata.**

4. LYCOPUS (Tourn.) L.

(A modern name, from Greek *lykos,* wolf; *pous,* foot: supposed resemblance of the leaf to a wolf's foot.)

1. **L. australis,** R. Br. Rigid erect perennial to 1 m. high, scantily and minutely hairy; leaves opposite, lanceolate, acuminate, coarsely and distantly serrate, subsessile, 6-12 cm. long; flowers in small dense axillary false-whorls with linear-lanceolate bracts; calyx 4 mm. long, the 5 lanceolate teeth as long as tube; corolla scarcely longer, white, with 4 subequal lobes, the upper one slightly notched and broader; 2 upper stamens fertile, with 2-celled anthers, the 2 lower reduced to the short filaments; nutlets obovate in outline, subtrigonous, smooth on outer face, papillose on the inner face.
Moist places in Mt. Lofty Range; River Murray; South-East. Summer.—Eastern States.

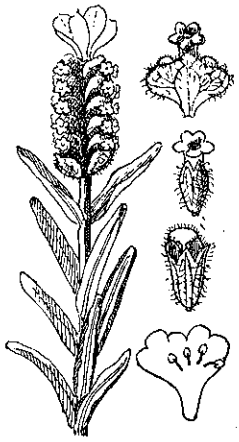

FIG. 202.—**Lavandula Stoechas.**

5. LAVANDULA (Tourn.), L.

(Medieval Latin *livendula, lavendula,* or *lavandula*; old Spanish *lavándula:* all meaning the plant lavender and of uncertain origin.)

*1. **L. Stoechas,** L. *French Lavender.* Grey-tomentose undershrub 30-60 cm. high; leaves linear or linear-oblong, with recurved edges, 1-2 cm. long, opposite or clustered at the nodes; flowers in dense oblong quadrangular terminal spikes, surmounted by several large sterile violet bracts; floral bracts fan-shaped, membranous, 3-lobed; calyx 4 mm. long, villous, 13-nerved, with the upper tooth clawed and broader than the other 4; corolla rather longer, dark-purple, 2-lipped, with 5 almost equal lobes; stamens 4, enclosed; anthers 1-celled; nutlets trigonous, shining.

From Inman River through the Mt. Lofty Range and as far north as Sevenhills. July-Nov.—Mediterranean region.

6. MARRUBIUM (Tourn.), L.

(Latin name of the plant).

*1. **M. vulgare,** L. *Horehound.* Whitish-tomentose perennial, 30-80 cm. high; leaves petiolate, orbicular, 1-3 cm. diam., irregularly crenate, wrinkled; false-whorls many-flowered, axillary, compact, distant; calyx 4 mm. long, tubular, 10-nerved, with 10 subulate recurved teeth; corolla white, 2-lipped, the upper lip 2-lobed, erect, the lower 3-lobed, spreading; stamens 4, enclosed; anthers with 2 divaricate cells; nutlets obovoid, subtrigonous.

Roadsides and pasture in most parts of the State. Sept.-Jan.—Europe; Western Asia,

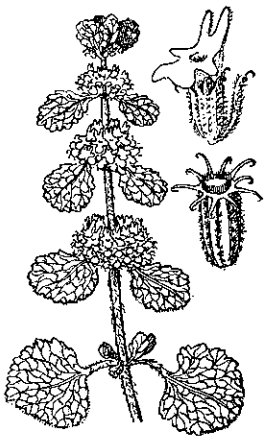

FIG. 203.—**Marrubium vulgare.**

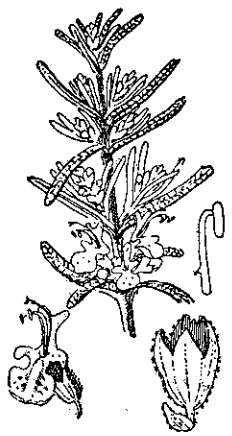

FIG. 204.—**Rosmarinus officinalis.**

7. ROSMARINUS (Tourn.), L.

(Latin name of the plant, meaning "sea-dew": grows near the coast in the south of Europe.)

*1. **R. officinalis,** L. *Rosemary.* Aromatic shrub; leaves linear, crowed, 2-3½ cm. long, with revolute margins, white-tomentose below; flowers in very short axillary racemes; calyx white-tomentose, the upper lip with 3 minute teeth, the lower one 2-lobed; corolla twice as long, whitish or pale-blue, the upper lip erect, notched, the lower lip spreading, with a large concave middle lobe; stamens 2, the connective long, continuous with the short filament, bearing a 1-celled anther, the junction between filament and connective marked by a short tooth (abortive branch of connective).

Waterfall Gully; Blackwood; a garden escape. July-Sept.—Mediterranean region.

8. SALVIA, L.

(Latin name of *S. officinalis*, L., the Garden Sage).

Calyx 2-lipped, 13-15-nerved, the upper lip 3-toothed, the lower bifid; corolla 2-lipped, the upper lip erect, hooded, entire or notched, the lower 3-lobed, the middle lobe the largest; stamens 2, the short filament terminating in a 2-branched connective, the longer branch bearing 1 cell of the anther and the shorter branch an abortive scale-like cell; nutlets ovoid-trigonous, smooth. Herbs or undershrubs with opposite leaves; flowers in bracteate false-whorls, forming long terminal racemes or panicles. *Sage, Salvia.*

Flowers racemose; leaves green ..... *S. Verbenaca* 1.
Flowers paniculate; leaves white-woolly ..... *S. Aethiopis* 2.

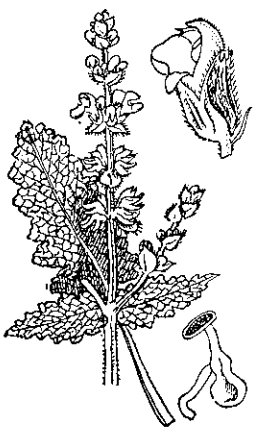

FIG. 205.—**Salvia Verbenaca.**

*1. **S. Verbenaca,** L. *Wild Sage.* Sparsely hairy perennial, 10-60 cm. high; leaves ovate-oblong, wrinkled, incised-lobate, 2-9 cm. long, the lower ones petiolate; flowers more or less fragrant, in whorls of about 6; bracts orbicular, acuminate; calyx 5-8 mm. long, with spreading hairs, the 2 lateral teeth of the upper lip connivent; corolla purplish, rarely white, slightly exceeding or twice as long as calyx, the upper lip arched or almost straight.—*S. horminoides*, Pourr.

Adelaide plains; Mt. Lofty Range; South-East. Most of the year.—Europe.

*2. **S. Aethiopis,** L. *Woolly Salvia.* White-woolly perennial, about 60 cm. high; leaves ovate-acute, the lower ones petiolate, 5-16 cm. long, incised-lobate, the upper ones shorter, sessile; flowers in whorls of 4-6, forming a loose dichotomous panicle; bracts broader than long, acuminate, strongly nerved; calyx woolly, 10-12 mm. long, the teeth terminating in a spine, the middle one of the upper lip very small; corolla white, nearly twice as long, the middle lobe of the lower lip bifid.

Hallett to Peterborough; Eyre Peninsula. Sept.-Jan.—Mediterranean region.

9. PLECTRANTHUS, L'Hérit.

(From Greek *plêktron*, a cock's spur; *anthos*, a flower: alluding to the spurred or gibbous base of the corolla.)

1. **P. parviflorus,** Henckel. Erect perennial, 30-80 cm. high, pubescent with septate often glandular hairs; leaves opposite, petiolate, rather thick, broadly ovate, coarsely crenate, 2-5 cm. long; flowers in whorls of 4-8, with minute caducous bracts, forming long racemes; pedicels slender, about as long as calyx; calyx 3 mm. long, 2-lipped, the upper lip broad and entire, the lower lip with 4 lanceolate teeth, the 2 lowest rather longer; corolla purplish, about 15 mm. long, the tube about twice as long as calyx, slightly gibbous at base, the upper lip erect, 4-lobed, the lower lip entire, concave, spreading, much longer than the upper and enclosing the 4 stamens with 1-celled anthers; nutlets smooth, shining, orbicular in outline.

Everard Range.—Eastern States; Central and tropical Australia; Pacific Islands. The typical *P. parviflorus* is described as having the whorls about 10-flowered.

10. SCUTELLARIA (Herm.) L.

(From Latin *scutella*, a small platter or cup: alluding to the shape of the calyx.)

1. **S. humilis,** R. Br. Slender almost glabrous perennial 15-30 cm. high; leaves opposite, petiolate, broadly ovate, 10-20 mm. long, more or less crenate, usually cordate or truncate at base, the floral ones gradually smaller and on shorter petioles; flowers solitary in each opposite axil, on pedicels about as long as calyx, all turned to one side of the rhachis; calyx shortly campanulate, 3-4 mm. long, with 2 entire lips and a hollow protuberance on the back of the upper lip, the whole calyx beset with minute hairs, scarious and somewhat enlarged in fruit, the upper lip, with the protuberance, finally falling off; corolla pink or purplish, about 6 mm. long, pubescent outside, with 2 3-lobed lips, the upper lip hoodshaped, shorter than the lower one; stamens 4, in pairs; anthers pubescent, those of the upper pair 2-celled, of the lower pair 1-celled; nutlets globular, granular.

Myponga (Mt. Lofty Range); Encounter Bay; Kangaroo Island; Murray River. Summer.—Victoria; New South Wales; Tasmania. The 2 species which inhabit the British Isles are there known as *Skullcap.*

11. PROSTANTHERA, Labill.

(From Greek *prosthêkê*, appendage; *anthêrê*, anther: alluding to the small appendages to the anthers.)

Calyx usually campanulate, 2-lipped, about 10-nerved, the lips entire or the lower one slightly notched; corolla-tube short, dilated into a broad 2-lipped limb, the upper lip erect, broadly 2-lobed, the lower lip spreading, 3-lobed, the middle lobe larger and usually obtusely notched; stamens 4, in pairs; anthers 2-celled, usually with 2 linear appendages penicillate at summit and attached to the back of the cells, the upper part of each appendage adnate to the cell, the lower part of one appendage often protruding like a short spur below the base of the cell, the other appendage remaining very short; style long and slender, the 2 terminal lobes sometimes minute; nutlets reticulate-rugose. Shrubs or undershrubs, mostly strong-scented, with opposite leaves which sometimes appear clustered; flowers usually solitary and axillary. A purely Australian genus.

A. Lower lip of corolla with a large middle lobe and much longer than the upper lip; calyx-lips usually closed over the fruit. (Section 1. *Euprostanthera.*)
B. Flowers mostly in very short bracteate axillary racemes or clusters, the uppermost without floral leaves; leaves suborbicular, petiolate ..... *P. rotundifolia* 1.
B. Flowers axillary, solitary, forming leafy racemes; leaves subsessile.
C. Branches bearing numerous spines; leaves ovate, very small ..... *P. spinosa* 2.
C. Branches not bearing spines.
D. Upper lip of calyx much longer than the lower.
E. Calyx becoming membranous and much enlarged in fruit.
F. Uppermost floral leaves or bracts shorter than the calyx.
Corolla purple-streaked; leaves oblong, concave; glabrous plant ..... *P. striatiflora* 3.
Corolla not streaked; leaves small, flattish, hoary ..... *P. Wilkieana* 4.
F. Uppermost floral leaves much longer than calyx; leaves terete or linear, silky.... *P. Baxteri* 5.
E. Calyx not much enlarged in fruit; upper floral leaves shorter than calyx; branches hoary *P. Behriana* 6.
D. Lips of calyx nearly equal; leaves ovate, minute, mostly clustered ..... *P. eurybioides* 7.
A. Lower lip of corolla shorter than the erect concave upper lip, the limb curved; stamens exserted from lower lip, the anther-appendages usually minute or absent; calyx-lips not closed over the fruit; leaves small, subsessile, often clustered. (Section 2. *Klanderia.*)
G. Calyx campanulate, with short broad blunt lips; plants with minute simple hairs.
H. Pedicels much shorter than calyx.
I. Leaves 3-10 mm. long.
Leaves linear-terete ..... *P. aspalathoides* 8.
Leaves orbicular or oblong ..... *P. calycina* 9.
I. Leaves 1-3 mm. long, ovate or oblong..... *P. microphylla* 10.
H. Pedicels nearly as long as calyx; leaves linear-oblong ..... *P. serpyllifolia* 11.
G. Calyx almost obconical, with long sharp lips; pedicels about as long as calyx; leaves minute; plant with minute stellate hairs mixed with the simple ones.. *P. chlorantha* 12.

1. **P. rotundifolia,** R. Br. Tall shrub with pubescent branches; leaves almost orbicular, glabrous, 4-7 mm. long, entire or slightly crenate, tapering abruptly into a short petiole; flowers on short pedicels with 2 minute bracteoles below the calyx, the lower flowers 1-3 on short axillary bracteate peduncles, the uppermost often clustered; calyx 3½ mm. long, the tube 10-ribbed, the lips broad and almost equal; corolla more than twice as long, pubescent outside; anther-appendages short.

Recorded by J. E. Tenison-Woods for our South-East; also said to grow along some part of the River Onkaparinga.—Victoria; New South Wales; Tasmania.

P. lasianthos, Labill. is stated by Mueller to grow from Mt. Gambier eastward to the northern coastal region of New South Wales, but I have seen no specimen from our South-East. It is a tall shrub or tree, with large glabrous oblong-lanceolate serrate leaves and hairy flowers opposite in pairs, forming an almost leafless terminal panicle.

2. **P. spinosa,** F. v. M. Slender rigid shrub, 60 cm. to 2 m. high, more or less hoary or pubescent, the branches opposite, spreading, beset with spines (reduced branchlets), 7-15 mm. long, often with 2 small leaves and smaller spines at base; leaves ovate, subsessile, 3-6 mm. long; pedicels axillary, 4-15 mm. long, with 2 narrow minute bracts below the middle; calyx 5-6 mm. long, the lips nearly equal or the upper one narrower and almost notched; corolla about twice as long, blue or purplish; one anther-appendage extending beyond the base of the cell.

Kangaroo Island; 90-Mile Desert; Wilpena Pound (Flinders Range); Eyre Peninsula. Oct.-Jan.—Victoria; New South Wales.

3. **P. striatiflora,** F. v. M. Strongly scented shrub 1-2 m. high, glabrous or nearly so; leaves subsessile, oblong-lanceolate or oblong, 5-25 mm. long, obtuse, mostly with slightly incurved margins, the floral ones becoming smaller until the uppermost are shorter than calyx; flowers axillary, the upper ones forming leafy racemes; calyx about 10 mm. long in flower, becoming membranous and 15 mm. long in fruit, the lips rounded and the upper much longer and broader than the lower; corolla more than twice as long as calyx, sparsely pubescent outside, white, with purple longitudinal streaks inside and yellow spots at the base of the long lower lip; one anther-appendage more than twice as long as the cell. (Fig. 200, A-C).

Flinders Range northward to Far North and westward to Everard Range.—Western New South Wales and Queensland; Central Australia. One of Helms's specimens from the head of the Arkaringa Creek with silky-pubescent linear-cuneate leaves to 35 mm. long and very few flowers, may be a form of this species, but both anther-appendages are short and scarcely protrude.

4. **P. Wilkieana,** F. v. M. Shrub, hoary with a close whitish pubescence; leaves lanceolate or ovate-oblong, 3-7 mm. long, sometimes clustered, flat or slightly channelled above, sessile; flowers axillary, shortly pedicellate, much longer than the floral leaves; calyx silky-pubescent, 7-8 mm. long, enlarged in fruit to about 15 mm., but retaining its pubescence, both lips obtuse and the upper one much longer and nearly twice as broad as the lower; corolla not twice as long as the flowering calyx, the limb pubescent on both sides; one anther-appendage about ½ as long again as the cell.

Near Birksgate Range.—Central and West Australia.

5. **P. Baxteri,** A. Cunn. var. *sericea,* J. M. Black. Erect shrub, the branchlets and foliage white with a close silky pubescence; leaves crowded, erect, terete, 10-20 mm. long, less than 1 mm. thick, acute, sessile; flowers axillary, on very short pedicels; calyx hoary, 4-6 mm. long in flower, becoming membranous, glabrous in the upper part and 10-15 mm. long in fruit, both lips rounded and the upper one much longer and broader; corolla slightly longer than calyx, the limb pubescent on both sides; one anther-appendage nearly twice as long as the cell.

Only known by the specimens collected 70 miles south-west of Mt. Watson, Birksgate Range, by the Elder expedition in 1891. The typical West Australian form has only the youngest leaves hoary and the adult ones quite glabrous; the leaves in the original specimens are 1-grooved along the inner face, but some from Gnarlbine, W.A., have the leaves quite terete, as in our variety, although glabrous.

Var. *crassifolia,* Benth. Leaves flattened but thick, silky-pubescent or becoming almost glabrous, linear-cuneate, 10-20 mm. long, 1-2 mm. broad.—Ooldea.—West Australia; Central Australia.

6. **P. Behriana,** Schlechtd. Erect shrub 1½-2 m. high, the branches appressed-hoary; leaves sessile, oblong-lanceolate or linear, 6-20 mm. long, concave above, almost glabrous; flowers axillary, sessile or almost so; calyx pubescent or villous, about 8 mm. long, the upper lip twice as long as the lower; corolla twice as long, violet or whitish, the limb pubescent inside and villous outside; one anther-appendage about twice as long as the cell.

Mt. Lofty and Barossa Ranges; Strathalbyn; Murray lands. July-Jan.

7. **P. eurybioides,** F. v. M. Small shrub, the branches shortly hairy, the leaves and calyxes beset with minute orbicular scales which cover the resinous glands; leaves sessile, thick, ovate, about 2 mm. long, the stem ones mostly clustered at the nodes; flowers axillary, subsessile, forming short leafy racemes; calyx about 5 mm. long, prominently ribbed, the lips nearly equal; corolla more than twice as long, glabrous, pink; one anther appendage twice as long as the cell.

Near Monarto South, Mount Barker and mouth of the Murray, apparently rare or localised. Sept.-Nov.

8. **P. aspalathoides,** A. Cunn. (1836). Small shrub with minutely hairy branches and strongly scented foliage; leaves linear, obtuse, compressed-terete, contracted towards base, usually clustered at the nodes, suberect, 3-8 mm. long, under 1 mm. broad, glabrous,

but the glands covered by minute orbicular scales; flowers axillary, on pedicels about 3 mm. long, with 2 subulate bracteoles at summit and subtending the calyx, which is 8-9 mm. long, the lips nearly equal, obtuse and slightly shorter than tube; corolla more than twice as long, bright-red, pubescent outside, the upper lip broad, notched, about twice as long as lower lip.—*P. coccinea*, F. v. M. (1856) partly.

Encounter Bay; Strathalbyn; Angaston; Kangaroo Island; Murray scrub. July-Dec.—Western Victoria and New South Wales. The specific name is derived from the resemblance to *Aspalathus*, a South African papilionate genus with small clustered leaves.

9. **P. calycina,** F. v. M. Low shrub with hoary branches; leaves very shortly petiolate, opposite or clustered, from almost orbicular to ovate or oblong, sparsely hairy or almost glabrous, 3-10 mm. long, the margins slightly recurved, the under surface paler and dotted with minute orbicular scales; pedicels axillary, 2-4 mm. long, with 2 linear bracteoles at base of calyx, which is broad, reddish, 10-15 mm. long, the lips broad, obtuse, nearly equal, much shorter than tube; corolla red, not twice as long as calyx, pubescent outside; anther-appendages very short.

Port Lincoln to Streaky Bay, E.P. Sept.-Dec.

10. **P. microphylla** (R. Br.) A. Cunn. Low shrub more or less beset with short curly hairs; leaves very shortly petiolate, ovate or oblong, 1-3 mm. long, flat, or slightly concave below, usually glandular-scaly, spreading or curved downwards, opposite or clustered; pedicels axillary, 1-3 mm. long, with 2 linear bracteoles just below the calyx; calyx 7-8 mm. long, almost glabrous or beset with curled hairs, the lips subequal, obtuse and much shorter than tube; corolla usually red or violet, pubescent outside, more than twice as long as calyx, the lower lip much shorter than the upper; one anther-appendage sometimes exceeding the cell considerably.—*P. coccinea*, F. v. M. partly; *Cryphia microphylla*, R. Br.

Kangaroo Island; Yorke and Eyre Peninsulas; probably Murray lands. Sept.-Jan.—Temperate Australia.

11. **P. serpyllifolia** (R. Br.) Briq. Low shrub, the branches appressed-pubescent or with short curly hairs; leaves spreading, very shortly petiolate, linear-oblong, almost glabrous or with curly hairs, 3-6 mm. long, opposite or clustered; the margins slightly recurved; pedicels axillary, 5-7 mm. long, with 2 linear bracteoles close below calyx, which is 8-10 mm. long, with broad obtuse lips, almost glabrous; corolla twice as long, drying yellowish or brown, pubescent outside; anther-appendages very short.—*Cryphia serpyllifolia*, R. Br.

Port Lincoln; Encounter Bay. Sept.-Dec. This species was united by Bentham to *P. microphylla*; Briquet, much later, united them as *P. serpyllifolia*. They seem to me to be distinct.

12. **P. chlorantha,** F. v. M. Low shrub, the branches, foliage, and calyx rather scantily beset with short simple hairs intermixed with short stellate hairs; leaves opposite, very shortly or scarcely petiolate, ovate or rhomboid, 1-4 mm. long, the margins recurved; pedicels axillary, 6-10 mm. long, with 2 narrow bracteoles close to or a little below calyx; buds acuminate; calyx green or with purplish ribs, contracted towards base, 10-12 mm. long, the lips narrow, acute, subequal, nearly as long as tube; corolla greenish or sulphur yellow, drying yellow or yellowish-brown, twice as long as calyx, pubescent outside; anther-appendages absent.

Hope Valley; Encounter Bay; Mt. Barker; Kangaroo Island; near Port Lincoln. Aug.-Jan. The leaves are sometimes so minute that the branches appear almost naked.

12. BRUNELLA (Tourn.) L.

(*Brunella* or *prunella* was the name given in medieval Latin to an inflammation of the throat, probably from the German *Bräune*, quinzy; the plant supposed to cure the disease was called by the old herbalists *herba brunellae*; it is now known as *B. vulgaris*.)

1. **B. vulgaris,** L. *Self-heal.* Ascending perennial herb to 40 cm. high, with scattered appressed hairs; leaves opposite, petiolate, ovate or oblong, 2-7 cm. long, entire or denticulate; flowers in crowded false-whorls of 6, each whorl sheltered by 2 broad acuminate bracts, the whole forming a dense terminal spike; calyx 8-9 mm. long, 2-lipped, the upper lip flat, subtruncate, very shortly 3-toothed, the lower with 2 lanceolate lobes; corolla violet, about 12 mm. long, the upper lip erect, hooded, entire, the lower one spreading, 3-lobed, the middle lobe larger and denticulate; stamens 4, in pairs, each filament with a small tooth near summit; anthers 2-celled, the cells divaricate; nutlets oblong, smooth. (Fig. 200, G.-J.)—*Prunella vulgaris*, L.

Mt. Lofty Range; South-East; in moist places. Summer.—Temperate Australia and most temperate countries.

13. MELISSA (Tourn.) L.

(Neo-Latin, from Greek *melissa*, a bee: plants visited for their honey; the classical name was *melissophyllon*).

*1. **M. officinalis,** L. *Balm.* Fragrant perennial herb, more or less hairy; leaves petiolate, ovate, crenate, 2-7 cm. long; whorls 4-10-flowered, distant, 1-sided, shorter than floral leaves; flowers pedicellate; calyx villous, 7-8 mm. long, the upper lip flattish, shortly 3-toothed, the lower with 2 lanceolate lobes; corolla white or pale-pink, twice as long, the tube curved, exserted, the upper lip erect, notched, the lower spreading, 3-lobed; stamens 4, the lower pair longer; anthers 2-celled; nutlets oblong, brown.

Near creeks in Mt. Lofty Range. Dec.-Jan.—Mediterranean region.

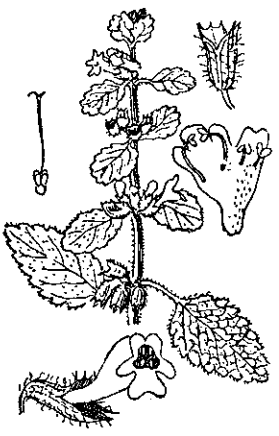

FIG. 206.—**Melissa officinalis.**

14. LAMIUM (Tourn.) L.

(Latin name of some species of dead-nettle).

*1. **L. amplexicaule,** L. *Henbit, Dead-nettle.* Low slender pubescent ascending annual; lower leaves small, petiolate; floral leaves orbicular-reniform, sessile, embracing the whorls, crenate-lobed, 2-4 cm. diam.; whorls dense, distant, axillary, about 12-flowered; calyx villous, 5 mm. long, with 5 almost equal subulate teeth; corolla often three times as long, purplish, with a long slender tube, the upper lip hooded, entire, villous outside, the lower lip 3-lobed, the lateral lobes small and inconspicuous, the middle one broad, notched; stamens 4, the lower pair longer; anthers hairy, the cells divaricate, opening by a common slit; nutlets trigonous.

Along Pinnaroo railway; near Mt. Gambier. Most of the year.—Europe; northern Asia.

15. STACHYS (Tourn.) L.

(Greco-Latin name of some plant).

Calyx about 10-ribbed, with a cylindrical tube and 5 pointed subequal teeth; corolla with a cylindrical tube, the upper lip erect and hooded, the lower one spreading, 3-lobed; stamens 4, in pairs, parallel, the lower pair longer; anther-cells divaricate, opening by a common slit; nutlets obovoid. Hairy herbs; flowers in false-whorls, in the axils of reduced floral leaves, forming terminal leafy spikes.

Green sparsely hairy annual ..... *S. arvensis* 1.
Densely white-woolly perennial ..... *S. lanata* 2.

FIG. 207.—**Stachys arvensis.**

*1. **S. arvensis,** L. *Hedge-nettle.* Weak ascending annual, with spreading hairs; leaves petiolate, ovate, 1½-4 cm. long, regularly crenate, truncate, or subcordate at base; whorls 4-6-flowered, the lower ones distant; calyx villous, 6-7 mm. long, with lanceolate subequal teeth as long as the tube; corolla scarcely longer than calyx, violet; nutlets tuberculate.

Roadsides and pastures in settled districts. Most of the year.—Europe; now almost cosmopolitan.

*2. **S. lanata,** Jacq. *Woolly Stachys.* Stout erect perennial, white with a dense appressed wool; leaves shortly petiolate, thick, soft, the nerves hidden by the wool, minutely crenulate, ovate-lanceolate, 5-8 cm. long; whorls many-flowered, crowded except towards base of spike; calyx woolly, about 9 mm. long, with short unequal teeth; corolla rather longer, purplish, woolly outside; nutlets smooth.

Roadsides in Mt. Lofty Range; a garden escape. Nov.-Jan.—Europe; western Asia.

16. WESTRINGIA, Sm.

(After Dr. John Peter Westring, a Swedish writer on lichens).

Calyx campanulate, 5-toothed, 5-nerved; corolla 2-lipped, the upper lip erect, 2-lobed, the lower lip spreading, 3-lobed; fertile stamens 2, with 1-celled anthers, opposite the upper lip, the 2 lower stamens reduced to staminodes, with 2 linear appendages (probably

abortive anther-cells) at summit of filament; style slender, exserted; nuts reticulate-rugose. Small shrubs with stiff whorled entire narrow leaves; flowers subsessile, axillary, usually 3 in the whorl, sometimes a few female, with the upper stamens barren.

A. Leaves sessile, horizontal, very short, about 1 mm. broad, in whorls of 3 ..... *W. rigida* 1.
A. Leaves on very short petioles, suberect or spreading, in whorls of 3 or 4.
Leaves 1 mm. broad; calyx-teeth about ½ of tube *W. anguslifolia* 2.
Leaves longer and 2 mm broad; calyx-teeth scarcely ½ of tube ..... *W. Dampieri* 3.

1. **W. rigida,** R. Br. An intricate shrub 30-50 cm. high; leaves sessile, linear or linear-lanceolate, 2-10 mm. long, about 1 mm. broad, always in whorls of 3, spreading or recurved, rigid and almost pungent-pointed, hoary beneath, rarely above, but the underface sometimes almost concealed by the revolute margins, the floral ones shorter than or as long as calyx; calyx 4-5 mm. long, hoary with a minute pubescence, the deltoid teeth about ⅓ as long as tube; corolla not twice as long as calyx, pubescent on limb inside and out, white, spotted with purple inside the lower lip. (Fig. 200, E-F).
Southern districts northwards to Far North; westward to Birksgate Range and Coldea; Murray lands; Yorke and Eyre Peninsulas and westward along Great Bight. Most of the year.—Western Victoria and New South Wales; West Australia.

2. **W. angustifolia,** R. Br. Shrub 50-80 cm. high, the young parts sometimes very hoary; leaves usually in whorls of 3, or sometimes, especially the lower ones, in whorls of 4, on very short almost erect petioles, linear, acute, 8-15 mm. long, 1 mm. broad, the margins revolute and often concealing the hoary undersurface, the leaf-blades from suberect to spreading, the floral ones as long as, or usually twice as long as calyx; calyx 4 mm. long, hoary, the deltoid teeth about ⅓ as long as tube; corolla scarcely twice as long as calyx, white or pale-violet, spotted on lower lip, the limb pubescent inside and out.—*W. cinerea,* R. Br.
Kangaroo Island; Murray lands; 90-Mile Desert; Yorke Peninsula, Port Lincoln, E.P. Aug.-Dec. In some specimens from the Murray scrub the uppermost leaves are almost sessile.—Victoria; Tasmania.

3. **W. Dampieri,** R. Br. Shrub approaching 1 m. high or more, the branches appressed-hoary; leaves linear, very shortly petiolate, 15-35 mm. long, 2 mm. broad, suberect, spreading or recurved, usually in whorls of 3, but sometimes the lower ones or those of a whole branch arranged in 4's, the margins revolute and sometimes concealing the minutely pubescent undersurface, the floral leaves usually twice or thrice as long as calyx; calyx 5 mm. long, hoary, the teeth scarcely ¼ of the tube; corolla more than twice as long as calyx, the limb pubescent outside, villous inside, white, more or less orange-spotted.—*W. grevillina,* F. v. M.
Coast of Kangaroo Island; from Port Lincoln round western coast of Eyre Peninsula to the Great Bight. Most of the year.—West Australia; Tasmania. The typical form, from near King George's Sound, appears to have the whorls more constantly 4-leaved than in our specimens.

Family 99.—SOLANACEAE.

Flowers regular or nearly so and bisexual; calyx persistent, at least at the base, usually with 5 teeth or lobes; corolla with 5 or rarely 4 lobes, which are imbricately or valvately folded in bud; stamens inserted on the corolla, as many as its lobes and alternate with them, or sometimes 4 only, with or without a rudimentary one opposite the 5th sinus; anthers mostly 2-celled; ovary superior, 2-celled, rarely becoming 4-celled by secondary dissepiments. usually seated on a fleshy disk; ovules several or numerous in each cell, anatropous or amphitropous, attached to thick septal placentas; style simple, terminal, with an entire or bilobed stigma; fruit a berry or capsule; seeds few to numerous, more or less reniform, the embryo curved in the albumen. Herbs or shrubs with alternate exstipulate leaves; flowers solitary or in cymes, without bracteoles and usually without bracts. In *Solanum. Datura,* and some other genera the leaves are often in pairs, a small and a large one.

Besides the useful or ornamental plants mentioned under the respective genera, the family comprises various species of *Capsicum,* originally from tropical America, whose pungent berries, when ground up, yield Cayenne pepper, red pepper, or chilies; also the garden *Petunias,* which are hybrids between 2 Argentine species of that genus.

A. Stamens as many as corolla-lobes, which are normally 5; embryo distinctly curved (except *Nicotiana*).
B. Fruit a berry; anthers 2-celled, opening inwards.

C. Corolla rotate or campanulate.
Calyx shorter or longer than fruit but not bladdery; anthers opening in pores ..... SOLANUM 1.
Calyx bladdery and loosely enclosing fruit; anthers opening in slits ..... PHYSALIS 2.
C. Corolla narrowly funnel-shaped; spiny shrubs..... LYCIUM 3.
B. Fruit a capsule.
D. Corolla small, campanulate, with lobes as long as tube; anthers 1-celled, opening outwards ..... ANTHOTROCHE 4.
D. Corolla large, funnel-shaped, with a long tube and shallow lobes; anthers 2-celled, opening inwards.
Calyx tubular, circumsciss; capsule prickly, 4-valved ..... DATURA 5.
Calyx campanulate, entirely persistent; capsule smooth, 2-valved ..... NICOTIANA 6.
A. Stamens fewer than corolla-lobes, *i.e.*, 4, in pairs, with sometimes a staminode representing the 5th one; anthers opening outwards; embryo very slightly curved.
Fruit a berry; anthers 1-celled ..... DUBOISIA 7.
Fruit a capsule; anthers 1- or 2-celled ..... ANTHOCERCIS 8.

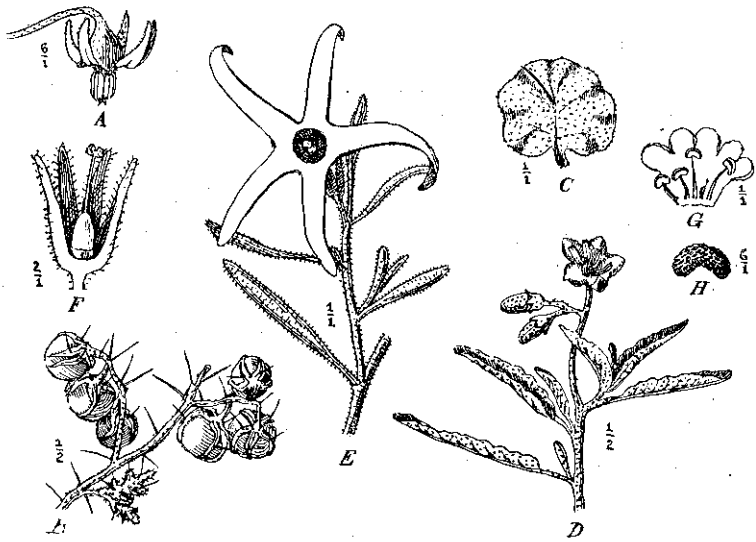

FIG. 208.—**Solanaceae.** A, flower of *Solanum nigrum*. B, fruiting branch of *S. petrophilum*. C, leaf of *S. oligacanthum*. D, flowering branch of *S. esuriale*. E, flowering branch of *Anthocercis angustifolia*; F, calyx and pistil of same, with one calyx-lobe removed. G, corolla of *Duboisia Hopwoodii* spread open; H, seed of same.

1. SOLANUM (Tourn.), L.

(Latin name of *S. nigrum*, the Black Nightshade).

Calyx with 5 rarely 4 usually spreading lobes; corolla rotate, with a very short tube and 5 or 4 folded lobes, often induplicate-valvate near the summit; anthers on very short filaments, connivent, exserted, opening at the summit in 2 pores; berry usually globular and 2-celled, with several flattened seeds. Herbs or shrubs; leaves usually petiolate; flowers mostly in lateral (extra-axillary) cymes, which may take the form of umbels or racemes, rarely solitary and axillary.

The most important species of foreign origin are the potato (*S. tuberosum*, L.), a native of Chile and Peru; the tomato (*S. Lycopersicum*, L. or *Lycopersicum esculentum*, Mill.), from Peru; and the egg-plant (*S. Melongena*, L.), probably from tropical Asia.

S. marginatum, L.f., a small shrub grown for ornament, with stout yellow prickles on branches, leaves, and calyx, a dense whitish tomentum except on the upper face of the leaves, which are large, ovate, and sinuate-lobed, green above except for a whitish margin, whitish flowers and a large yellow berry, 3-4 cm. diam., has escaped at Fifth Creek and Morphett Vale. It is a native of Africa.

A. Prickles absent.
  B. Annual, with scattered simple hairs; leaves ovate; flowers umbellate ..... *S. nigrum* 1.
  B. Glabrous shrubs; leaves lanceolate, entire or sometimes with a few lobes; flowers racemose.
    Peduncle below flowers rather long; berry orange ..... *S. aviculare* 2.
    Peduncle below flowers very short; berry purple *S. simile* 3.
A. Prickles present (except sometimes in *S. esuriale* and *S. coactiliferum*).
  C. Prickles on branches, more rarely on leaves, none on calyx.
    D. Leaves green on both faces, glabrous above, linear, slightly prickly ..... *S. ferocissimum* 4.
    D. Leaves closely grey-tomentose on both faces, without any prickles.
      E. Leaves orbicular; calyx-lobes short, rounded.
        Leaves rounded at base, shortly petiolate ... *S. orbiculatum* 5.
        Leaves cordate at base, sessile or subsessile .. *S. oligacanthum* 6.
      E. Leaves longer than broad; calyx-lobes short, acute.
        F. Berry yellow; leaves lanceolate, entire or sinuate.
          Flower-parts 5 ..... *S. esuriale* 7.
          Flower-parts 4 ..... *S. coactiliferum* 8.
        F. Berry black or reddish.
          Leaves ovate-lanceolate, broadly lobed towards base, becoming glabrous above.. *S. chenopodinum* 9.
          Leaves lanceolate, entire, tomentose on both faces ..... *S. Sturtianum* 10.
          Leaves with a soft loose tomentum, oblong, wrinkled, without prickles ..... *S. Oldfieldii* 11.
  C. Prickles on calyx, branches and usually on leaves.
    G. Leaves green above, glabrous or sparsely hairy, pinnatifid.
      Prickles dense; calyx enclosing berry ..... *S. hystrix* 12.
      Prickles scattered; calyx spreading at base of berry ..... *S. sodomaeum* 13.
    G. Leaves stellate-tomentose below or on both faces.
      H. Calyx shorter than berry; corolla-lobes and anthers equal.
        I. Leaves pinnatifid or pinnatipartite, green and almost glabrous above.
          Prickles short, red; leaf-lobes obtuse; calyx-lobes short, obtuse ..... *S. lacunarium* 14.
          Prickles longer, yellow; leaf-lobes subacute; calyx-lobes subulate ..... *S. cinereum* 15.
        I. Leaves sinuate-lobed or entire.
          J. Leaves with rounded lobes but scarcely pinnatifid, grey-tomentose on both faces or green above; calyx-lobes subulate..... *S. petrophilum* 16.
          J. Leaves entire or faintly sinuate-lobed.
            Leaves ovate-lanceolate, velvety-tomentose, with very few or no prickles; calyx-lobes subulate ..... *S. ellipticum* 17.
            Leaves ovate, sparsely hairy above, prickly; calyx-lobes broad-lanceolate.. *S. eremophilum* 18.
      H. Calyx much enlarged, enclosing berry; corolla-lobes and anthers unequal; leaves pinnatipartite, grey-tomentose ..... *S. rostratum* 19.

1. **S. nigrum**, L. *Black Nightshade.* Annual or biennial, 20-60 cm. high, green, but with some minute scattered appressed hairs; stems angular, rarely tuberculate; leaves petiolate, ovate, 2-7 cm. long, sinuate-toothed or almost entire; flowers 3-7 in umbel-like cymes, the common peduncle about as long as the pedicels, which are deflexed in fruit; calyx about 2 mm. long, with 5 rounded lobes; corolla fully twice as long, whitish, pubescent outside; berries globular, 7-9 mm. diam., first green, finally black or purplish-black. (Fig. 208, A.)

South-East to Far North; Eyre Peninsula. Most of the year.—Throughout Australia and almost cosmopolitan. *S. opacum*, A. Br. et Bouché, is described as Australian and as having dull-green berries, but seems to be only a form of *S. nigrum*. Australian experience goes to show that the ripe fruits are harmless when eaten. The style is bifid or sometimes appears as 2 distinct styles, or even 3 where the ovary is 3-celled.

2. **S. aviculare,** Forst. f. *Kangaroo Apple.* Erect glabrous shrub, about 2 m. high, but flowering when young and small; leaves petiolate, lanceolate, mostly 8-20 cm. long, usually entire, sometimes with 1 or 2 lanceolate lobes near the base, or pinnatifid with several lanceolate lobes along each margin; flowers 2-8, in loose pedunculate racemes; calyx with broad mucronate lobes, much shorter than the violet corolla, which is 20-25 mm. long and shortly lobed; berry globular or ovoid, drooping, 20-25 mm. diam., orange, edible.

Torrens Gorge and towards Encounter Bay; South-East. Summer.—Eastern States and Tasmania.

3. **S. simile,** F. v. M. Very near the preceding, from which it differs in the leaves all entire or a few with 1-6 short very obtuse lobes near the base, the peduncle (below the lowest flower of the raceme) usually shorter or almost none; corolla smaller; berry globular, purplish and about 15 mm. diam., when dry the seeds are prominent beneath the thin epicarp.

Dublin scrub and Yorke Peninsula to Flinders Range; Kangaroo Island; Eyre Peninsula; Murray lands; 90-Mile Desert. Most of the year.—Temperate Australia.

Var. *fasciculatum* (F. v. M.) J. M. Black. Leaves sometimes very narrow; berries conical or oblong, 15-28 mm. long.—*S. fasciculatum* F. v. M.—Eyre Peninsula.—West Australia.

4. **S. ferocissimum,** Lindl. Low shrub with scattered stellate hairs on the branches and lower face of leaves; leaves green, petiolate, linear-lanceolate, 2-4 cm. long, entire or hastate with 2 small lobes at base; prickles slender, yellowish, on branches and midrib of leaves; flowers small, in short racemes, the calyx 3 mm. long, deeply divided; berries small, globular, almost black.

Flinders Range near Lake Torrens; Everard Range.—Western New South Wales.

5. **S. orbiculatum,** Dun. Small shrub covered with a close dense velvety sometimes brown or golden stellate tomentum; prickles on the branches only; leaves orbicular, 5-20 mm. long, undulate, on petioles 3-10 mm. long; flowers in very short racemes; calyx with very short rounded lobes; corolla densely tomentose; berry globular, about 12 mm. diam.

Near Eucla.—West Australia.

6. **S. oligacanthum,** F. v. M. Scarcely differs from the preceding except by the tomentum usually paler in color, the leaves orbicular-cordate, more undulate, sessile or on petioles 1-2 mm. long; sometimes with 1 or 2 prickles on upper face. (Fig. 208, C.)

From Marree (Hergott) north-eastward to Cooper's Creek and the Queensland border.

7. **S. esuriale,** Lindl. Low undershrub, mostly 6-20 cm. high, greyish with a close velvety stellate tomentum, unarmed or with a few small prickles on the branches only; leaves petiolate, oblong-lanceolate to linear-lanceolate, obtuse, 2-5 cm. long, 4-20 mm. broad, entire or slightly sinuate-lobed, concave above; flowers 1-4 in the cyme, the pedicels sometimes long; flowering calyx 5 mm. long with 5 rather spreading acuminate lobes, enlarged in fruit and the lobes deltoid-acuminate; corolla purple, 10-14 mm. long, pubescent outside, 5-lobed almost to base; berry globular, yellow, 10-15 mm. diam. (Fig. 208, D.)

Murray lands northward through the Flinders Range to Far North. Most of the year. The specific name indicates that the berries, like those of several other native species, are eaten by the aboriginals. Called "tomato plant" in our northern areas.—Eastern States.

8. **S. coactiliferum,** J. M. Black. Differs from the preceding in the leaves more oblong and often more densely and softly tomentose, the common peduncle shorter or absent; lobes of calyx and corolla 4; stamens 4; prickles numerous or quite absent; berry sometimes almost 20 mm. diam. (Plate 10 (2), p. 164.)

Renmark and north thereof; Port Broughton; Tickera; Minnipa, E.P.; Murat Bay to Fowler's Bay and Ooldea.

9. **S. chenopodinum,** F. v. M. Small shrub with a minute greyish stellate tomentum; prickles few, on the branches only; leaves petiolate, ovate-lanceolate or lanceolate, obtuse, 2½-7 cm. long, sinuate-lobed and usually hastate or cordate at base, becoming green and glabrous above, paler beneath; flowers few in short racemes; calyx 3-4 mm. long, with 5 short lobes, scarcely enlarged in fruit; corolla 10 mm. long, not deeply divided into 5 lobes; berries globular, reddish-black, 7-8 mm. diam.

Flinders Range near Farina to Far North.—Western New South Wales; central Australia.

10. **S. Sturtianum,** F. v. M. Shrub to 1 m. high, with a dense close pale tomentum; branches usually with a few prickles; leaves petiolate, lanceolate, 4-7 cm. long; flowers in short racemes; calyx about 4 mm. long in flower, with short acute lobes, enlarged in fruit; corolla purple, about 25 mm. diam. when open, with short broad lobes; berries on erect pedicels, globular, 10-15 mm. diam, yellowish-brown at first, black when dry; seeds blackish, with a conspicuous wrinkled margin (in all the preceding species they are pale in color).

Flinders Range to Cooper's Creek and eastward to Broken Hill; Gawler Range.—Western New South Wales; central Australia.

11. **S. Oldfieldii,** F. v. M. var. *plicatile*, S. Moore. Small shrub with a rather loose stellate tomentum, especially on the branches and undersurface of leaves; prickles slender, few on the branches or absent; leaves petiolate, oblong, very obtuse, 12-20 mm. long, sinuate-lobed, thick and soft, the margins more or less folded inward at the sinuses; flowers often solitary; calyx very hairy, 5-6 mm. long, the lobes ovate-lanceolate, as long as the tube; corolla about 30 mm. diam., shortly lobed; berry globular, yellow.

East of Ooldea.—Near Coolgardie, W.A. The type, which inhabits West Australia, has larger and less wrinkled leaves.

12. **S. hystrix,** R. Br. Low glabrous rigid herb, beset with numerous straw-colored prickles, mostly about 10 mm. long; leaves petiolate, green, oblong, 3-6 cm. long, pinnatifid or pinnatipartite, with irregular rounded lobes, very prickly on both faces; flowers 1-5 in the cyme, the peduncle and pedicels prickly; calyx about 8 mm. long, densely prickly towards the base, the lobes broad, in fruit the tube becomes enlarged, globular, 20-25 mm. in diam., and completely encloses the globular berry; corolla lilac, about 25 mm. broad, with a few small prickles.

Fowler and Denial Bays northwards to Ooldea.—West Australia. The type was collected by Robert Brown at Petrel Bay, in the Isle of St. Francis (Nuyt's Archipelago), where he landed on Feb. 4, 1802, and appropriately named by him, *hystrix* being the Greek name of the porcupine. A West Australian form has short simple scattered hairs as well as the prickles.

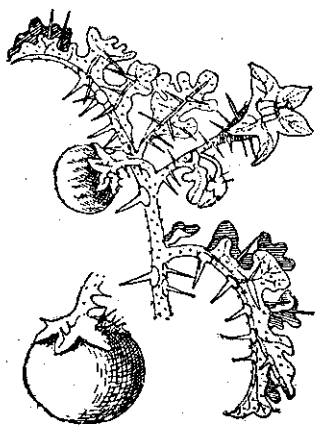

FIG. 209.—**Solanum sodomaeum.**

*13. **S. sodomaeum,** L. *Apple of Sodom.* Undershrub of 50 cm. to 2 m., with scattered prickles on branches, leaves and calyxes, and also sprinkled with minute stellate hairs; leaves petiolate, 4-15 cm. long, sinuate-pinnatifid and undulate, with rounded lobes, paler below; flowers few in short cymes; calyx 7-8 mm. long, the obtuse lobes equalling the tube; corolla violet, pubescent outside, 25-35 mm. diam.; berry depressed-globular, at first white with green stripes, yellow when ripe, about 30 cm. diam.; pulp very bitter and poisonous.

Settled districts. Oct.-Apl.—Mediterranean region; South Africa. Our form, which also occurs in southern Italy, is sometimes called var. *Hermannii*, Dun., the type having glabrous branches and leaves glabrous above.

14. **S. lacunarium,** F. v. M. Small slender perennial, 6-25 cm. high, hoary with a minute stellate tomentum except on the upper face of the leaves; prickles mostly 3-5 mm. long, red, on branches, leaves, and calyx; cymes few-flowered, on peduncles usually longer than the leaves, which are petiolate, pinnatifid or pinnatipartite, 2-7 cm. long, with oblong lobes, green and almost glabrous above, white tomentose below; calyx about 4 mm. long, with short broad obtuse lobes; corolla tomentose outside; berry yellow, about 10 mm. diam., globular, almost surrounded by the enlarged calyx.

Flinders Range to Far North; Berri (River Murray).

15. **S. cinereum,** R. Br. Undershrub about 1 m. high, with a soft dense grey stellate tomentum on branches, under-face of leaves and inflorescence; prickles slender, on branches leaves and calyxes; leaves petiolate, ovate or ovate-lanceolate in outline, acute at summit, 5-12 cm. long, pinnatifid with sinuate subobtuse undulate lobes, almost glabrous, green and glossy above, grey tomentose below; flowers 2-4 in pedunculate cymes; calyx about 12 mm. long, the lobes about as long as tube, subulate but not prominently ribbed or keeled as in *S. petrophilum;* cymes few-flowered, pedunculate; corolla purple, about 25 mm. across; berry globular, yellowish, 20-25 mm. diam.

Greenhill Road; Melrose; Woolundunga. Aug.-Oct. The leaves resemble those of *S. petrophilum* where the latter have a green upper surface, but *S. petrophilum* differs in smaller leaves with shallower rounded lobes, the calyx less prickly, the fruiting pedicels

shorter (about 10 mm. long) and the berry smaller and becoming hard.—Eastern New South Wales.

16. **S. petrophilum,** F. v. M. Low shrub, 40-50 cm. high, with a soft dense close sometimes rusty stellate tomentum; prickles numerous, brownish, often 10 mm. long, slender, on branches leaves and calyxes; leaves ovate-lanceolate or oblong, petiolate, 2-5 cm. long, undulate and sinuate-lobed, concave, green and sprinkled with stellate hairs above, or grey-tomentose like the under-surface; racemes few-flowered, pedunculate; calyx about 10 mm. long, the lobes 6-7 mm. long, very narrow and with a prominent midrib, so that they appear subulate; fruiting calyx not much enlarged, but by splitting appears to consist of little but the 5 subulate lobes, which are almost as long as fruit; corolla purple, tomentose outside, 30 mm. diam. when spread open; berry globular, 10-15 mm. diam., at first pale-green, then yellow and finally white, with a thick hard pericarp. (Fig. 208, B).

Flinders Range to Far North and westward to Everard, Musgrave, and Birksgate Ranges; Eyre Peninsula and Gawler Range. Most of the year.—Western New South Wales; West Australia.

17. **S. ellipticum,** R. Br. Low shrub with a dense but rather loose velvety-grey stellate tomentum; prickles slender, rather numerous on the branches, very few or none on the leaves and calyxes; leaves petiolate, ovate-lanceolate, obtuse or almost acute, thick and soft, entire or faintly sinuate or undulate, 3-10 cm. long, rounded at base, grey-tomentose on both faces; cymes few-flowered, on usually long peduncles; calyx 8-10 mm. long, the subulate lobes rather longer than tube, somewhat enlarged in fruit and the lobes then showing a broad base; corolla blue, 25-30 mm. across; berry globular, about 20 mm. diam., yellowish.

Flinders Range to Far North and westward to Ooldea; north of Broken Hill railway. Most of the year.—Western New South Wales; Queensland; Central and West Australia.

18. **S. eremophilum,** F. v. M. Low undershrub with tawny prickles 5-10 mm. long on branches, leaves and calyx; leaves petiolate, ovate, about 3 cm. long, greenish and sprinkled with stellate hairs above, grey-tomentose below; racemes short and few-flowered; flowering calyx about 6 mm. long, with broad-lanceolate lobes rather longer than tube; corolla violet, about 20 mm. diam.; berry globular, about 12 mm. diam.

Western side of Flinders Range between Rocky River and Nelshaby. Only known by the type specimen, collected by Mueller about 1850. The plant therefore appears to be very localised or else it is an aberrant form of some other species. It has also been recorded from the Macquarrie River, New South Wales.

* 19. **S. rostratum,** Dun. (1813). Annual, 30-60 cm. high, covered with a greyish stellate tomentum; prickles slender, numerous on stems and inflorescence, less so on leaves; leaves ovate-oblong in outline, petiolate, 2-6 cm. long, pinnatipartite, with obovate undulate lobes; cymes few-flowered, pedunculate; calyx about 6 mm. long, the lanceolate lobes longer than the prickly tube, enlarged in fruit to about 20 mm. long, enclosing the globular berry, the prickles becoming very long and dense; corolla yellow, tomentose outside, about 25 mm. across, with long lanceolate lobes of which one is longer than the others; 1 anther longer than the other 4; seeds blackish, minutely pitted.—*S. heterandrum,* Pursh (1814).

A weed now established in several settled districts, called in North America *Buffalo Bur.*—Western United States; Mexico.

2. PHYSALIS, L.

(From Greek *physallis,* a bladder, also a plant with a bladdery fruit-covering, perhaps the European *Ph. Alkekengi,* L. or Winter Cherry.)

* 1. **Ph. peruviana,** L. *Cape Gooseberry.* Herbaceous perennial, 40-80 cm. high, pubescent with simple hairs; leaves in pairs, but not really opposite, petiolate, ovate-acuminate, 5-10 cm. long, with faint sinuate teeth or almost entire, cordate at base; flowers solitary, axillary; calyx 5-lobed, when in fruit enlarged to about 3 cm. long, drooping, bladdery, reticulate, truncate and umbilicate at base, with 5 connivent teeth; corolla almost rotate, with 5 short lobes, pale-yellow, with 5 purple spots in the throat; anthers 5, opening in longitudinal slits; berry globular, yellow, edible, completely enclosed in the calyx.

Upper Hindmarsh Valley and along creeks near Yankalilla. Sept.-Jan.—A native of Peru, cultivated at the Cape of Good Hope and brought thence to New South Wales about the end of the 18th century.

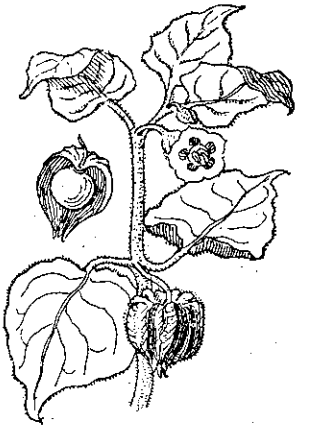

FIG. 210.—**Physalis peruviana.**

3. LYCIUM, L.

(Greek *lykion*, the name of some thorny shrub believed to be a native of Lycia.)

Calyx 4-5-toothed; corolla funnel-shaped, the limb spreading, with 4-5 lobes imbricate in bud; stamens more or less unequal, the anthers opening lengthwise; ovary 2-celled; fruit a berry; seeds suborbicular, compressed, almost smooth. Usually glabrous shrubs with greyish branches, more or less spiny; leaves entire, often clustered; flowers peduncular, solitary or clustered.

Corolla-lobes much shorter than tube ..... *L. australe* 1.
Corolla-lobes about as long as tube ..... *L. ferocissimum* 2.

1. **L. australe,** F. v. M. *Australian Boxthorn.* Intricate glabrous rigid shrub, 60 cm. to 1 m. high, the branchlets usually ending in a spine; leaves clustered, fleshy, oblanceolate or obovate, flat, 2-15 mm. long; flowers solitary at nodes; calyx 3 mm. long, shortly 4-5-toothed; corolla about 10 mm. long, the tube purplish, the limb white, with 4-5 ovate lobes about 3 mm. long; stamens enclosed, the filaments hairy towards base; berry orange or purple, oblong, 6-10 mm. long.

Kangaroo Island; Yorke Peninsula northward to Flinders Range; Murray lands and north thereof; Eyre Peninsula. Most of the year. The berries are eaten by the aboriginals.—Western Victoria and New South Wales.

FIG. 211.—**Lycium ferocissimum.**

*2. **L. ferocissimum,** Miers (1854). *African Boxthorn.* Glabrous shrub about 2 m. high, with stouter long often drooping branches; branchlets ending in a stout spine; leaves thickish, clustered, oblanceolate or obovate, 15-30 mm. long; flowers solitary or twin; calyx cylindrical, 7-8 mm. long, with 5 unequal ciliolate teeth, becoming cupshaped and deeply 2-3-lipped in fruit by splitting; corolla-tube slightly exceeding calyx, with a ring of hairs round the middle inside, the lobes violet at base and nearly as long as tube; stamens exserted, each filament with a downy tuft near its base; berry globular or subovoid, 10-12 mm. long, orange-red.—*L. campanulatum,* E. Meyer (1843, *nomen nudum*); *L. chinense,* J. M. Black (1909) non Mill.

Cultivated as a hedge and has escaped in many districts, especially near the sea. Most of the year.—South Africa. In Australia it has sometimes been called in error *L. horridum,* Thunb. and *L. afrum.* L.

**L. chinense,* Mill., a less rigid and less spiny shrub, with lanceolate or ovate-lanceolate leaves 3-7 cm. long; calyx campanulate, 4 mm. long; corolla-tube a little longer than calyx and about as long as the lobes; filaments bearded near base; berry ovoid-oblong, red, 8-12 mm. long, is much rarer as an occasional escape from hedges.

4. ANTHOTROCHE, Endl.

(From Greek *anthos,* a flower; *trokhos,* a wheel: alluding to the shape of the corolla-limb.)

1. **A. truncata,** Ising. Shrub about 2 m. high, covered with a dense close greyish stellate pubescence; leaves shortly petiolate, usually clustered at the nodes, ovate, ovate-oblong or almost orbicular, 5-12 mm. long; flowers subsessile, 1-4, each in the axil of the smaller leaves of each cluster; calyx cup-shaped, with broad base, 2½ mm. long, appearing somewhat truncate by the 5 very short obtuse lobes; corolla white, stellate-pubescent outside, the tube twice as long as calyx, the 5 oblong spreading lobes (induplicate-valvate in bud) scarcely as long as tube; stamens 5, enclosed, the anthers reniform and 1-celled by confluence, the filaments dilated and hairy towards base; ovary with a few stellate hairs, each of the 2 cells bearing 2-3 ovules; capsule small, 4-valved.

Ooldea. Sept.

A. Blackii, F. v. M., has been found near Mt. Olga in Central Australia, and in the Barrow Range and Victoria Desert in West Australia, so that it probably occurs in our intervening territory. It differs from *A. truncata* in the somewhat larger and thicker leaves and in the dense but rather loose tomentum, made up of longer branched stellate hairs, not sessile stellate hairs such as those of *A. truncata.* The calyx is about 6 mm. long, the corolla is of thicker texture, with the ovate lobes much longer than the tube, and the ovary has 8-10 ovules in each cell.

5. DATURA, L.

(From *dhatúra*, the Hindî name of *D. fastuosa* and *D. metel.*)

Calyx tubular, 5-angled and acutely 5-toothed, circumsciss a little above the base after flowering; corolla funnel-shaped, the tube long, the limb folded in bud, very shortly 5-lobed, each lobe ending in a slender point; stamens enclosed, with linear anthers opening lengthwise; ovary 2-celled; capsule large, prickly, 4-celled by secondary dissepiments, opening septifragally at the summit by 4 valves, subtended by the stiff persistent base of calyx; seeds reniform, compressed, thickened on margin, usually somewhat wrinkled. Mostly robust annuals; hairs when present, simple not stellate; leaves alternate, petiolate, the uppermost in pairs; flowers solitary, interpetiolar. *Thorn Apple.*

D. arborea, L. (*Brugmansia arborea*, Steud.) Angel's Trumpet, is a favorite garden shrub from South America, with fragrant drooping white flowers, the calyx inflated, without teeth.

A. Capsule deflexed.
- Corolla about 5 cm. long; leaves sinuate-toothed.. *D. Leichhardtii* 1.
- Corolla about 15cm. long; leaves almost entire ... *D. metel* 2.

A. Capsule erect; leaves sinuate-toothed.
- Corolla white ..... *D. Stramonium* 3.
- Corolla violet ..... *D. tatula* 4.

1. **D. Leichhardtii,** F. v. M. Green erect annual, pubescent on the young parts, to 1 m. high, but flowering when quite small; leaves ovate, irregularly and coarsely sinuate-toothed, 3-10 cm. long; flowers erect, the short peduncles deflexed in fruit; calyx about 3 cm. long; corolla white, about 5 cm. long; capsule globular, pubescent, densely prickly, about 25 mm. diam., drooping.

Flinders Range to Far North and westward to Everard Range; Lake Frome to Warburton River.—Central Australia; Queensland. The specific name commemorates Dr. Ludwig Leichhardt who perished in his endeavor to cross Australia from east to west in 1848.

*2. **D. metel,** L. Stout annual, 40 cm. to 1 m. high, with a greyish pubescence on branches and calyx; leaves ovate, 5-10 cm. long, entire or slightly sinuate, obliquely cordate at base, densely pubescent beneath, less so above; flowers erect, on short peduncles deflexed in fruit; calyx 7-10 cm. long; corolla white, 15-18 cm. long; capsule globular, pubescent, densely prickly, about 4 cm. diam., drooping.

Here and there in settled districts from Adelaide to Flinders Range. Dec.-April.—Mediterranean region and India. The specific name is from *máthíl*, the Arabic name of this plant.

FIG. 212.—**Datura metel.**

*3. **D. Stramonium,** L. Green and almost glabrous annual 30 cm. to over 1 m. high; leaves ovate-acuminate, 5-15 cm. long, distantly sinuate-toothed; flowers on short peduncles, which remain erect in fruit; calyx 4-5 cm. long; corolla white, 7-10 cm. long; capsule erect, ovoid, about 4 cm. long, covered with prickles which are rather shorter towards its base.

Here and there in settled districts; a rather poisonous weed. Most of the year.—Of European or Asiatic origin, now naturalised in most countries.

*4. **D. tatula,** L. Only differs from the preceding in the stems and corollas purplish and the capsules with nearly equal spines.—*D. Stramonium*, L. var. *tatula*, DC.

Same localities.

6. NICOTIANA (Tourn.) L.

(After Jean Nicot, French ambassador at Lisbon, who sent to France seeds of the tobacco plant in 1560.)

Calyx narrowly campanulate, persistent, acutely 5-toothed; corolla funnel-shaped, with 5 very short folded lobes; stamens 5, enclosed, the anthers opening lengthwise; ovary 2-celled; stigma capitate; capsule enclosed in calyx, opening septicidally in 2 bifid valves; seeds oblong, honey-combed. Herbs with alternate leaves; flowers pedicellate, in racemes or panicles, often fragrant, especially at night.

The tobacco of commerce is produced chiefly from 2 species—*N. Tabacum*, L., Virginia tobacco, and *N. rustica*, L., from which cigarette tobacco and lighter kinds such as Latakia are made; both are natives of South America.

A. Green herbs with whitish flowers; corolla about twice as long as calyx.
  Plant 20-60 cm. high; stem-leaves petiolate; corolla-tube 15-30 mm. long ..... *N. suaveolens* 1.
  Plant 1-2 m. high; stem-leaves decurrent; corolla-tube 50 mm. long ..... *N. excelsior* 2.
A. Glaucous shrub with pale-yellow flowers; corolla 3-4 times as long as calyx ..... *N. glauca* 3.

1. N. suaveolens, Lehm. (1818). *Tobacco Bush, Native Tobacco.* Very variable erect herb, 20-60 cm. high, viscid-pubescent or almost glabrous, sometimes flowering when very small; leaves rather thick and succulent, ovate or ovate-lanceolate, entire, undulate, mostly 3-10 cm. long, the radical ones petiolate and often rosulate, those of the stem tapering into a petiole which is frequently half-clasping, the uppermost narrower and sessile; flowers in loose terminal racemes, often paniculate; calyx 8-18 mm. long, the lobes narrow and nearly as long as the tube; corolla greenish-white, the tube usually about twice as long as the calyx (15-30 mm. long), the limb spreading, 5-10 mm. long, with broad obtuse lobes; capsule ovoid, shorter than calyx, usually not much exceeding the tube.—*N. undulata,* Vent. (1803) non Ruiz et Pavon (1798); *N. Australasiae,* R. Br. (1866).

Throughout the State. Most of the year.—All Australia but not Tasmania. Some very tomentose specimens from Curnamona (north of the Broken Hill railway) have the lower leaves unusually large (to fully 25 cm. long). Our plant is certainly very near the Chilean *N. angustifolia,* Ruiz et Pav., but the latter is described as having the capsule longer than calyx and the leaves lanceolate.

2. N. excelsior, J. M. Black. *Giant Tobacco.* Erect almost glabrous herb, 1-2 m. high; leaves ovate-lanceolate or lanceolate, sometimes minutely sinuate-toothed, 5-25 cm. long, the lower ones tapering towards base, but all the stem-leaves sessile and decurrent by 2 long broad wings; flowers chiefly racemose; calyx 25 mm. long, with scattered glandular hairs, the lobes linear-subulate, ciliate, channelled inside; corolla whitish, the tube about 50 mm. long, the limb spreading, about 10 mm. long, with rounded lobes; capsule oblong, about as long as the calyx-tube.—*N. suaveolens,* Lehm. var *excelsior,* J. M. Black (1915).

Everard Range to Birksgate Range. Chewed by the aboriginals as a narcotic.

PLATE 44 (8-9).—8, calyx spread open and capsule; 9, seed.

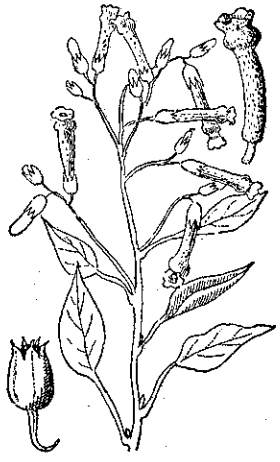

FIG. 213.—**Nicotiana glauca.**

* **3. N. glauca,** Grah. *Tobacco Tree.* Glabrous glaucous shrub 2-4 m. high; leaves ovate or ovate-lanceolate, 4-10 cm. long, on long slender petioles; flowers in a loose panicle; calyx about 10 mm. long, with short lanceolate teeth; corolla pale-yellow, pubescent outside, 30-40 mm. long, swollen below the short limb, then tubular and finally abruptly narrowed near base; capsule ovoid, equalling the calyx.

Waste places and pasture, extending to the Far North. Aug.-Apl.—Argentina; acclimatised in the Mediterranean region.

7. DUBOISIA, R. Br.

(After Charles Dubois, 1656-1740, London merchant and patron of botany; maintained a private botanical garden and compiled a large herbarium, which is now at Oxford.)

1. D. Hopwoodii, F. v. M. *Pituri.* Straggling glabrous shrub about 2 m. high, with the aspect of a *Myoporum:* leaves alternate, linear-lanceolate, acuminate, 5-10 cm. long, 4-8 mm. broad; flowers in a somewhat leafy pyramidal panicle; calyx cup-shaped, 1½ mm. long, with 5 short broad lobes; corolla campanulate, white, streaked with purple inside, about 10 mm. long, the 5 broad rounded lobes shorter than tube and valvate-induplicate in bud; only 4 stamens fertile, in pairs, the 5th sometimes represented by a staminode, the anthers reniform, 1-celled by confluence; ovary 2-celled, with 6-8 ovules in each cell; berry globular, about 5 mm. diameter; seeds blackish, rugulose. (Fig. 208, G-H.)

Murray lands to Far North; westward to Birksgate Range and Ooldea. Aug.-Jan.—Western New South Wales; West Australia. The leaves, which contain nicotine, are called by the natives pituri or pitcheri, and are chewed by them to overcome thirst and fatigue. The genus, of which 3 species are known, is purely Australian.

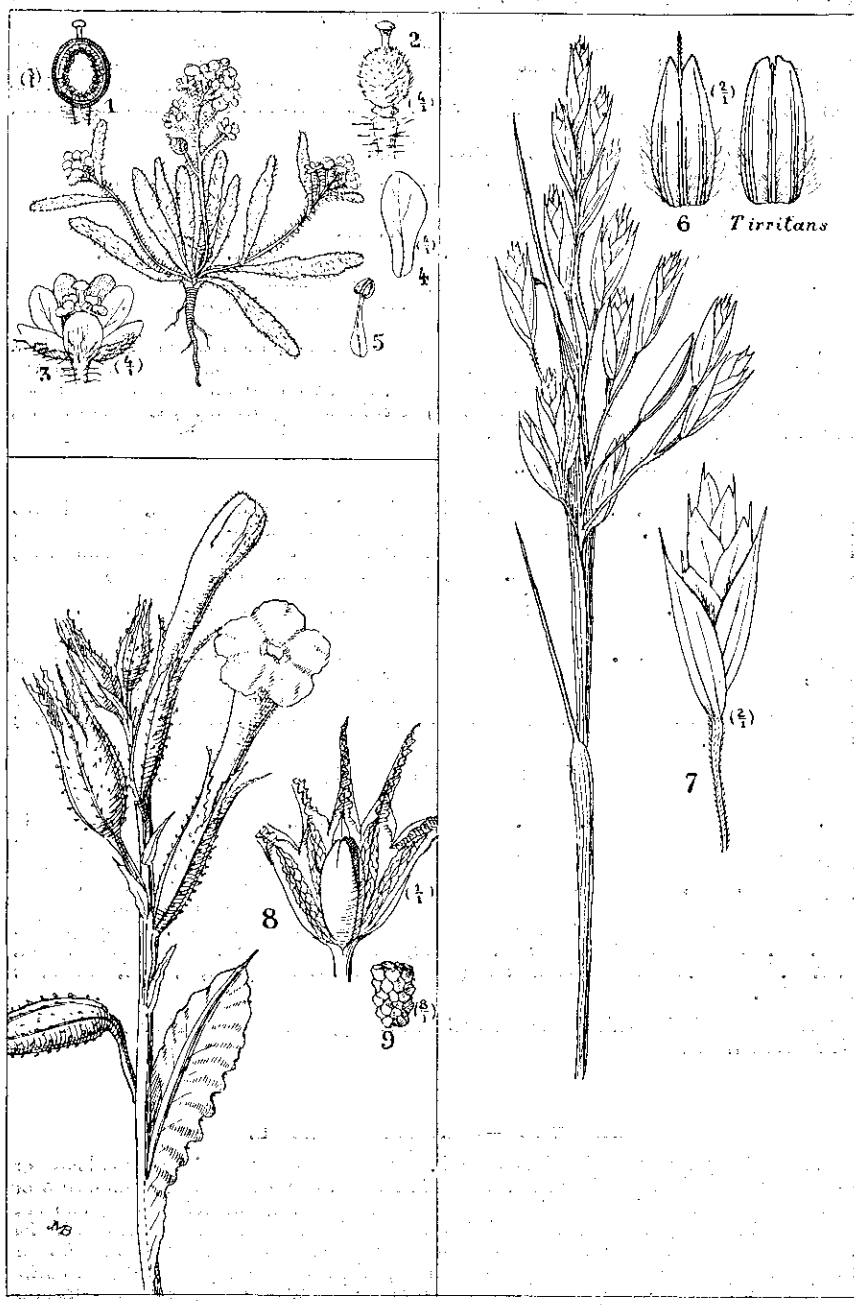

PLATE 44.—1-5, **Menkea villosula**; 6-7, **Triodia aristata**; 8-9, **Nicotiana excelsior.**

8. ANTHOCERCIS, Labill.

(From Greek *anthos*, a flower; *kerkis*, a ray: alluding to the usually narrow corolla-lobes, spreading horizontally.)

Calyx 5-toothed; corolla campanulate, with 5 spreading somewhat unequal lobes induplicate-valvate in bud; fertile stamens 4, in pairs, enclosed, with occasionally the rudiment of a 5th one; capsule ovoid or globular, opening in 2 bifid valves; seeds striate-reticulate, not compressed. Shrubs; flowers stalked; leaves entire, sessile or subsessile.

A. Leaves glandular-pubescent; flowers solitary.
  B. Branchlets rigid, spiny ..... *A. anisantha* 1.
  B. Branchlets not spiny.
    Leaves linear; flowers large ..... *A. angustifolia* 2.
    Leaves oblong; flowers small ..... *A. myosotidea* 3.
A. Leaves glabrous, lanceolate or oblong, large; flowers cymose-paniculate ..... *A. frondosa* 4.

1. **A. anisantha,** Endl. Rigid glandular-pubescent shrub, the branchlets ending in a spine; leaves oblong-cuneate, 2-10 mm. long, distant; flowers usually solitary at the nodes, often in the axils of spines; calyx 2-3 mm. long, the teeth almost as long as tube; corolla whitish, streaked inside, the tube about twice as long as calyx, the lobes linear, acute, 7-8 mm. long; anthers 2-celled.

Eyre Peninsula.—West Australia.

2. **A. angustifolia,** F. v. M. Aromatic glandular-hairy shrub about 1 m. high; leaves linear-cuneate, 1-4 cm. long; flowers solitary, terminal or leaf-opposed; calyx 5-7 mm. long, the linear lobes longer than tube; corolla white, the tube rather longer than calyx, the linear-lanceolate lobes 15-25 mm. long; anthers 2-celled. (Fig. 208, E-F.)

Gullies of the Mt. Lofty Range; Wilpena Pound (Flinders Range). Aug.-Dec.

3. **A. myosotidea,** F. v. M. Small glandular-pubescent shrub; leaves sessile, oblong, thick, 2-8 mm. long, the margins recurved; flowers solitary, terminal or leaf-opposed; peduncles deflexed in fruit; calyx 3-4 mm. long, the linear teeth about as long as tube; corolla white, the tube rather longer than calyx, the lobes ovate, about as long as tube; anthers 1-celled.

Kangaroo Island; Murray lands and 90-Mile Desert; Eyre Peninsula.

4. **A. frondosa** (Miers) nov. comb. Erect shrub over 1 m. high, the branches minutely pubescent; leaves glabrous, lanceolate or oblong, obtuse, subsessile, 2-10 cm. long; flowers in loose pedunculate cymes in the upper axils, forming long leafy panicles; calyx about 3 mm. long, the lanceolate teeth scarcely as long as tube; corolla white, streaked inside, the tube about twice as long as calyx, the oblong rather acute lobes a little shorter than the tube; anthers 1-celled.—*Cyphanthera frondosa,* Miers in Ann. and Mag. Nat. Hist. ser. 2, vol. 11: 376 (1853); *C. cuneata,* Miers, l. c. 378; *Eadesia anthocercidea,* F. v. M. in Trans. Phil. Inst. Vict. 2: 72 (1858); *Anthocercis Eadesii,* F. v. M. Fragm. 2: 139 (1861).

Recorded by Tenison-Woods for our Tatiara country, south of Bordertown.—Victoria; New South Wales.

FAMILY 100.—SCROPHULARIACEAE.

Flowers irregular or rarely almost regular, bisexual; calyx persistent, 4-5-lobed or 4-5-sect, rarely 3-lobed (reduced to 2 sepals in *Dischisma*); corolla with a limb of 5 or rarely 4 unequal lobes, imbricate in bud, flat or arranged in 2 lips when in flower; stamens usually 4, in pairs (2 long and 2 short), inserted in tube of corolla and alternate with its lower lobes, rarely 5 or 2; anthers 2- or 1-celled; ovary superior, 2-celled, with few or many anatropous or amphitropous ovules on septal placentas; style 1; stigma entire or 2-lobed; fruit a 2-celled capsule, usually opening by valves; seeds few or numerous (only 1 in each cell in *Dischisma*), with a straight or slightly curved embryo in the albumen. Herbs or rarely shrubs with alternate, opposite or whorled exstipulate leaves; flowers usually in racemes.

The family derives its name from the genus *Scrophularia,* so called in the middle ages because some European species were supposed to cure scrofula or king's evil (tuberculous glands).

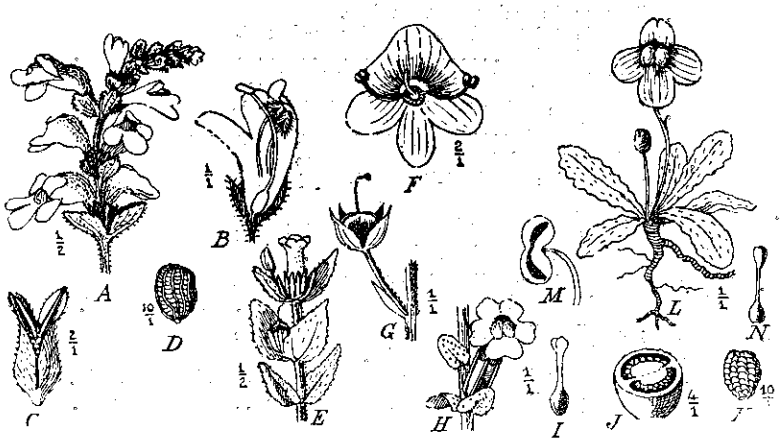

FIG. 214.—**Scrophulariaceae.** A D, *Euphrasia collina:* A, flowering spike; B, vertical section of flower; C, capsule; D, seed. E, flowering branch of *Gratiola peruviana.* F-G, *Veronica decorosa:* F, corolla; G, fruit. H-K, *Mimulus repens:* H, flower; I, pistil; J, cross-section of ovary; K, seed. L-N, *Mazus pumilio:* L, plant; M, anther; N, pistil.

A. The upper lip or 2 posterior (upper) lobes of corolla covering the lateral lobes in bud (Subfamily *Pseudosolanoideae*).

B. All leaves alternate; calyx 5-partite; corolla rotate, large; style long.

Stamens 5 ..... VERBASCUM 1.

Stamens 4 ..... CELSIA 2.

B. Leaves, at least some of them, opposite.

C. Corolla 2-lipped, the tube spurred or pouched at base, the throat closed by the projecting palate; stamens 4.

Corolla slightly pouched ..... ANTIRRHINUM 3.

Corolla spurred ..... LINARIA 4.

C. Corolla not spurred or pouched.

D. Flowers fairly large.

E. Stamens 4, with anthers all equal and fertile; corolla 2-lipped.

F. Capsule 2-valved; anther-cells finally confluent.

Calyx tubular, 5-toothed ..... MIMULUS 5.

Calyx campanulate, 5-lobed ..... MAZUS 6.

F. Capsule 4-valved; calyx 5-sect; anthers 2-celled.

Placentas remaining united at maturity; glabrous or almost glabrous herbs ..... MORGANIA 7.

Placentas separating at maturity; glandular-hairy herbs ..... STEMODIA 8.

E. Stamens with unequal anthers, 2 fertile and 2 small or barren.

2 upper stamens small or barren; calyx 5-toothed; corolla with 5 spreading lobes; capsule 2-valved.... ZALUZIANSKIA 9.

2 lower stamens reduced to staminodes; calyx 5-sect; corolla 2-lipped; capsule 4-valved..... GRATIOLA 10.

D. Flowers minute; anthers 1-celled.

G. Capsule many-seeded; corolla with 5 equal lobes; small creeping or prostrate herbs.

H. Stamens 4; calyx campanulate.
Style thickened at summit; calyx 5-toothed ..... LIMOSELLA 11.
Style spathulate; calyx 3-4-lobed.... GLOSSOSTIGMA 12.

H. Stamens 2; calyx tubular, 5-toothed; style spathulate ..... PEPLIDIUM 13.

G. Capsule splitting into 2 1-seeded nutlets; calyx of 2 sepals; corolla 1-lipped, 4-lobed..... DISCHISMA 14.

A. The upper lip or 1-2 posterior (upper) lobes of corolla covered in the bud by 1 or both lateral lobes; anthers 2-celled. (Subfamily *Rhinanthoideae.*)

I. Stamens 2, exserted; corolla 4-lobed, rotate; stem-leaves opposite, floral leaves or bracts alternate... VERONICA 15.

I. Stamens 4; corolla 2-lipped; anther-cells mucronate; leaves and floral bracts all opposite.
Lobes of upper lip recurved or spreading ..... EUPHRASIA 16.
Lobes of upper lip not recurved or spreading .. BARTSCHIA 17.

1. VERBASCUM, L.

(Latin name of the mullein.)

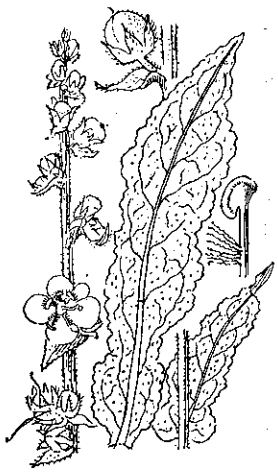

FIG. 215.—**Verbascum virgatum.**

*1. **V. virgatum,** With. Stiff erect biennial, 1-3m. high, pubescent with simple and glandular hairs; leaves oblong-lanceolate, irregularly toothed or crenate, the basal one to 30 cm. long, on very short broad petioles, the upper ones becoming smaller and stem-clasping; flowers in clusters of 2-4, or the upper ones solitary in the axils, or sometimes all solitary, forming a long loose bracteate raceme or sometimes shorter lateral ones: peduncles 1-2 mm. long in flower, 3-4 mm. long in fruit, shorter than the bracts and calyxes; calyx 6-8 mm. long, 5-partite; corolla yellow, rotate, 30-40 mm. diam., with 5 unequal rounded lobes; stamens 5, the 3 upper with reniform anthers, the 2 lower with connate decurrent anthers affixed obliquely on the filaments; all anthers 1-celled; filaments villous with violet and white hairs; capsule globular, septicidal, slightly exceeding the calyx; seeds numerous, minute, thimble-shaped, pitted.

Adelaide Plains and Mt. Lofty Range. Oct.-May. Our plant differs from the typical *V. virgatum* in its greater height, more hairy leaves, and more frequent solitary flowers; from *V. Blattaria,* L. (Moth Mullein), in its taller growth, non-glabrous leaves, much shorter peduncles and frequently clustered flowers. It is perhaps a hybrid with some other species, as *Verbasca* hybridise readily in Europe. It is nearest, however, to *V. virgatum.* The same form is said to be domiciled in Victoria.—Western Europe.

* *V. Thapsus,* L. (Great Mullein), is said to exist as a garden escape in the Mt. Lofty Range. It is a stout biennial, 1-2 m. high, velvety with a dense white tomentum; the flowers yellow, clustered, subsessile, forming a compact woolly spike; the capsule ovoid, the leaves decurrent.—Europe; Asia; established in eastern Australia and in America.

2. CELSIA, L.

After Olaus Celsius, 1670-1756, orientalist and botanist, professor at the University of Upsala.)

* 1. **C. cretica,** L. f. Stout erect grey-pubescent biennial, 50 cm. to over 1 m. high; lower leaves lyrate-pinnatifid, the upper ovate-lanceolate, serrate, stem-clasping; flowers subsessile, solitary in the axils of leafy bracts, forming a long compact raceme; calyx of 5 broad acuminate serrate segments; corolla rotate, about 45 mm. diam., yellow with purple centre; the lobes 5, rounded, unequal; stamens 4, the 2 lower ones longer and with oblique decurrent anthers; filaments villous with yellow and purple hairs; anthers 1-celled; capsule ovoid, about as long as calyx, septicidal.

Mount Lofty Range; Kangaroo Island; probably a garden escape. Oct.-Dec.—Mediterranean region.

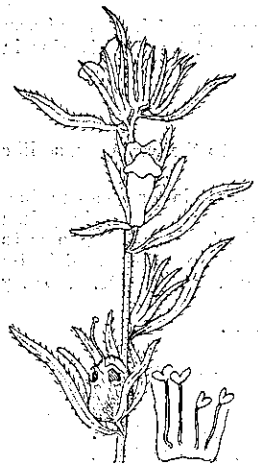

FIG. 216.—**Antirrhinum Orontium.**

3. ANTIRRHINUM, L.

(Greco-Latin *antirrhinon*, from Greek *anti*, opposite, counterfeiting; *rhis, rhinos*, nose: appearance of the corolla.)

*1. **A. Orontium,** L. *Lesser Snapdragon.* Slender erect annual, 20-50 cm. high, glandular-hairy in upper part; leaves lanceolate or linear, 2½-5 cm. long, the lower opposite, the upper alternate; flowers subsessile, solitary, axillary; calyx villous, of 5 linear segments about as long as the corolla, which is pink, 10-15 mm. long, with a wide villous tube, swollen at base, and 2 unequal lips, the upper one erect, the lower one with a raised palate closing the throat; stamens 4, in pairs; anthers with 2 divergent cells opening lengthwise; capsule obliquely ovoid, hairy, shorter than calyx, opening at summit in 2 or 3 pores; seeds numerous, wrinkled.

A weed in settled districts. Most of the year.—Europe; Western Asia.

The Garden Snapdragon (*A. majus*, L.) has larger flowers varying from purple to white, in bracteate racemes, the calyx much shorter, with ovate lobes.

4. LINARIA (Tourn.) Juss.

(Because of a resemblance of the leaves of some species to those of *Linum*, the flax-plant.)

Scarcely differs from *Antirrhinum* except in the corolla, which, instead of being merely swollen or slightly pouched on the lower side of the base, is extended downwards in an obconical spur; calyx 5-partite. Herbs with opposite or alternate leaves; flowers solitary, axillary or forming terminal bracteate racemes.

A. Upper leaves hastate.
  Corolla 8-10 mm. long ..... *L. Elatine* 1.
  Corolla 12-15 mm. long ..... *L. commutata* 2.
A. All leaves entire ..... *L. spuria* 3.

FIG. 217.—**Linaria Elatine var. lasiopoda.**

*1. **L. Elatine** (L.) Mill. *Pointed Toadflax.* Prostrate villous annual; leaves mostly alternate, shortly petiolate, the lower ones broad-ovate, usually with a few coarse teeth at base, the middle and upper ones mostly ovate-hastate, becoming smaller upwards; peduncles slender, spreading, glabrous all over or villous just below the calyx, which is 3-4 mm. long, the lobes lanceolate; corolla 8-10 mm. long, including the spur, the upper lip purple, the lower yellow; capsule globular, a little shorter than calyx, opening by 2 almost lateral hemispherical caps; seeds pitted.

Settled districts. Dec.-May.—Europe, western Asia.

Var. *lasiopoda*, Vis. (1847). Usually more woolly; peduncles villous in their whole length; spur much curved. More common here than the type, but sometimes difficult to distinguish from it.—Var. *villosa*, Boiss. (1879); *L. Sieberi*, Reichb.—Mediterranean region.

*2. **L. commutata**, Bernh. (1830). Prostrate villous annual or perennial, with wiry stems; lower leaves opposite, ovate, the upper ones ovate-hastate, with rather short hairs; peduncles capillary, glabrous, from rather longer than to 5 or 6 times as long as the small floral leaves; calyx with linear-lanceolate lobes; corolla 12-15 mm. long, including the spur, violet except the white palate, which is dotted with purple; capsule small, globular, about as long as calyx, opening by 2 caps; seeds strongly tuberculate.—*L. graeca*, Chav. (1833); *Antirrhinum graecum*, Chaub. (1832).

Belair and Adelaide plains. Nov.-May.—Mediterranean region.

*3. **L. spuria** (L.) Mill. *Round-leaved Toadflax.* Prostrate villous annual; leaves mostly alternate, very shortly petiolate, orbicular or ovate, entire or almost so, slightly cordate at base; peduncles villous; calyx-lobes ovate; corolla 10-12 mm. long, including spur, the upper lip purple, the lower yellow; capsular globular, shorter than calyx, opening by 2 caps; seeds tuberculate.

Near Adelaide. Dec.-March.—Europe; western Asia.

* *L. Cymbalaria* (L.) Mill. (Kenilworth Ivy), a trailing glabrous perennial, with reniform 5-7-lobed leaves and lilac flowers with a yellow palate, has escaped from cultivation in places.—Southern Europe.

5. MIMULUS, L.

(Latin *mimulus*, diminutive of *mimus*, a mimic actor: alluding to the gaping mask like flowers.)

Calyx tubular, slightly 2-lipped, the upper lip shorter, 2-lobed, the lower lip spreading, with 3 rounded lobes and 2 hairy protuberances in the throat; stamens 4, in pairs; anthers with 2 finally confluent cells; style ending in 2 broad stigmatic lobes, so as to appear spathulate; capsule ovoid, enclosed in calyx, many-seeded, opening loculicidally in 2 valves. Herbs with opposite leaves; flowers solitary, axillary, pedunculate. *Monkey Flower.*

M. luteus, L. is the well-known Monkey Flower of the gardens.

A. Glabrous plants.
- Erect land plant; leaves narrow, distant ..... *M. gracilis* 1.
- Creeping marsh plant; leaves small, broad, crowded *M. repens* 2.

A. Hairy plants.
- Leaves narrow, 3-6 mm. long..... *M. prostratus* 3.
- Leaves broad, about 30 mm. long ..... *M. moschatus* 4.

1. **M. gracilis**, R. Br. Slender erect glabrous perennial, 10-25 cm. high; leaves oblong, 1-2 cm. long, those on the stem sessile; peduncles filiform, much longer than the reduced floral leaves; calyx 5 mm. long, the teeth minute; corolla 12-15 mm. long, purple with yellowish protuberances, the lobes ciliolate; capsule oblong.

Near Penola, S.E.; Far North-East up to Queensland border. June-Dec.—Central and eastern Australia; Asia and Africa.

2. **M. repens**, R. Br. Small creeping and rooting glabrous prostrate perennial; leaves crowded, fleshy, black-dotted, ovate or oblong, 2-6 mm. long, sessile; peduncles usually shorter but sometimes longer than leaves; calyx about 5 mm. long; corolla more than twice as long, the limb spreading, violet with yellowish sometimes purple-dotted protuberances; capsule subglobular. (Fig. 214, H-K.)

Beside marshes or creeks, in most parts of the State. All the year.—Temperate Australia; New Zealand.

3. **M. prostratus**, Benth. Slender prostrate or ascending perennial 2-7 cm. long, the stems and peduncles pubescent; leaves sessile, oblong-lanceolate, 3-6 mm. long, often slightly pubescent; peduncles filiform, becoming 4-6 times as long as leaves; calyx about 4 mm. long; corolla about 4 times as long, the tube slender, twice as long as calyx.

Country near Strzelecki and Cooper's Creeks.—Western Victoria, New South Wales, and Queensland.

FIG. 218.—**Mimulus moschatus.**

* 4. **M. moschatus**, Douglas. *Musk Mimulus.* Villous sticky procumbent musk-scented perennial; leaves shortly petiolate, ovate-acute, 3-4 cm. long, with small distant teeth; peduncles longer or shorter than leaves; calyx 10 mm. long; corolla nearly twice as long, the limb spreading, pale-yellow, with 2 orange lines in the throat.

In moist parts of Mt. Lofty Range. Nov.-Jan.—North America.

6. MAZUS, Lour.

(From Greek *mazos*, a breast: alluding to the 2 protuberances in the throat of the corolla.)

1. **M. pumilio**, R. Br. Small perennial; leaves all radical, oblanceolate or oblong, 1½-3 cm. long, slightly sinuate, sprinkled with a few hairs above; scapes erect, 1-4-flowered, longer than leaves; pedicels long; calyx 4 mm. long, with 5 lanceolate lobes about as long as tube; corolla with tube as long as calyx, an erect notched upper lip, a much broader 3-lobed lower lip, all purple except the 2 small white protuberances which almost close the throat; stamens 4, in pairs; anther-cells finally divaricate and confluent; style with 2 broad stigmatic lobes; capsule within calyx, opening loculicidally in 2 valves. (Fig. 214, L-N.)

South-East; usually near water. Nov.-Dec.—Victoria; New South Wales; Tasmania; New Zealand.

7. MORGANIA, R. Br.

(After Hugh Morgan, apothecary to Queen Elizabeth; he established a private botanical garden and introduced several new plants into England during the latter half of the 16th century.)

1. **M. glabra,** R. Br. Erect perennial herb, 20-100 cm. high, glabrous or sprinkled with minute glandular hairs; leaves opposite or in whorls of 3 or 4, linear or linear-lanceolate, 1-5 cm. long, 2-6 mm. broad, entire or with few minute distant teeth; flowers solitary, axillary, often appearing clustered, on peduncles 2-6 mm. long in flower, lengthening to 5-12 mm. in fruit; calyx 5 mm. long, with 5 lanceolate segments; corolla about twice as long, purple with dark streaks, or blue, the upper lip broad, erect, notched, the lower spreading, broadly 3-lobed; stamens 4, in pairs; anthers 2-celled, the cells separate and shortly stipitate; style turned aside at summit, with 2 short broad stigmatic lobes; capsule acuminate, about as long as calyx, opening loculicidally and septicidally, the 2 valves soon splitting into 4, the 2 erect placentas remaining coherent in a column at least for a long time; seeds numerous, minute, striate.—*M. floribunda*, Benth.; *Stemodia Morgania*, F. v. M.

Almost all parts of the State except the South-East. All the year. Sometimes called "Bluetop" or "Blueflower."—Temperate Australia. In specimens with short floral leaves the inflorescence has often the appearance of a long leafy spike.

8. STEMODIA, L.

(From Greek *stêmôn*, stamen; *dis*, double: alluding to the separate anther-cells.)

1. **S. viscosa,** Roxb. Viscid perennial herb, 20-40 cm. high, covered with short spreading glandular hairs; leaves opposite, lanceolate, tapering into a short petiole, 1½-5 cm. long, serrate; flowers solitary, axillary, on peduncles longer than calyx and sometimes exceeding the floral leaves; calyx 4-5 mm. long, with 5 narrow segments; corolla 3 times as long, with a broad upper lip and a 3-lobed lower lip; stamens, style and capsule as in *Morgania*, but the two placentas separating or rarely cohering at maturity. Like *Morgania* it has also 2 linear-lanceolate bracteoles attached close under the calyx.

Near Birksgate Range (Far North-West).—West Australia; Northern Territory; India.

9. ZALUZIANSKIA, F. W. Schmidt.

(After Dr. Adam Zaluzianski.)

* 1. **Z. divaricata** (Thunb.) Walp. Pubescent annual, 5-25 cm. high; leaves lanceolate-ovate, toothed, 1-2 cm. long, the lower petiolate, opposite, the upper ones alternate, subsessile; flowers subsessile, solitary, axillary; calyx tubular, about 6 mm. long, adnate to base of floral leaf, with 5 lanceolate lobes; corolla yellow, the tube slender, 15-20 mm. long, the limb spreading, about 3 mm. long, with 5 obtuse lobes; stamens 4, in pairs, the 2 upper with small or barren anthers, the 2 lower with larger anthers, all 1-celled; style long, filiform, gradually thickened towards summit; capsule conical, exceeding calyx, opening septicidally by 2 bifid valves; seeds numerous, minute.

Glen Osmond (Mt. Lofty Range) Sept.-Oct.—South Africa.

10. GRATIOLA (Rupp.) L.

(From *gratia Dei*, the grace of God, a name given in the middle ages to *G. officinalis*, L., on account of its medicinal properties.)

1. **G. peruviana,** L. Perennial herb, glabrous or sprinkled with minute glandular hairs, the stems rising 5-30 cm. high from a creeping rootstock; leaves opposite, sessile and stem-clasping, ovate or broad-lanceolate, slightly serrate, 1-3 cm. long; flowers solitary, axillary, on peduncles 1-2 mm. long; calyx 6 mm. long, with 5 linear-lanceolate segments and 2 linear bractoles at base; corolla about 15 mm. long, tubular, with a short pale-pink or purplish limb, the upper lip of which is notched, the lower broadly 3-lobed and spreading; 2 upper stamens fertile, with 2-celled anthers, the 2 lower reduced to slender staminodes; style turned aside at summit, with a broad usually entire stigma; capsule 4-valved, sub-globular, nearly as long as calyx; seeds numerous, minute, reticulate. (Fig. 214, E).

In wet places: Mt. Lofty Range; Kangaroo Island; Murray lands; South-East. Summer.—Temperate Australia; New Zealand; temperate South America.

G. pedunculata, R. Br., which only differs in the peduncles often longer than the leaves and the absence of staminodes, has been recorded from the Murray region, I do not know on what authority.

11. LIMOSELLA (Lindern) L.

(Diminutive of Latin *limosus*, muddy; alluding to the habitat).

Calyx campanulate, shortly 5-lobed; corolla rotate, with a short tube and 5 almost equal lobes; stamens 4; anthers 1-celled; ovary 2-celled at base; style short, with capitate stigma; capsule globular, membranous, 2-valved, septicidal; seeds numerous, minute, reticulate. Small annual creeping herbs growing near water, with petiolate mostly radical leaves.

Flowers pedunculate ..... *L. aquatica* 1.
Flowers sessile ..... *L. Curdieana* 2.

1. **L. aquatica,** L. *Mudwort.* Glabrous, usually stoloniferous; leaves 1½-4 cm. long, including the slender petiole, which is longer than the linear-oblong blade, or reduced to the linear-terete petiole, in radical tufts; flowers in the tufts, on peduncles 6-12 mm. long, shorter than the leaves; calyx about 2 mm. long; corolla rather longer, purple, pink, or whitish; capsule slightly exceeding calyx.

Most parts of the State, near swamps, lakes, or creeks. Summer.—Temperate Australia; most temperate countries.

2. **L. Curdieana,** F. v. M. Like the preceding, but the leaves are oblong-ovate or oblong-lanceolate, 1-2½ cm. long, 4-10 mm. broad, on slender petioles 2-6 cm. long; flowers sessile in the dilated bases of the petioles; calyx about 3 mm. long; corolla scarcely as long, whitish; capsule about equal to calyx.

Murray River; Flinders Range; Minnipa, E.P.; Fowler's Bay. Most of the year.—Western Victoria and New South Wales.

12. GLOSSOSTIGMA, Wight et Arn.

(From Greek *glôssa*, tongue; *stigma*, stigma: alluding to its shape).

Calyx campanulate, shortly and obtusely 3- or 4-lobed; corolla with a short tube and 5 subequal spreading lobes; stamens 2 or 4; anthers 1-celled; style dilated upwards into an oblong stigma usually longer than the style proper and curved at summit; capsule enclosed in calyx, 2-valved, loculicidal; seeds numerous, minute, reticulate. Dwarf glabrous swamp herbs, creeping and rooting at nodes; leaves opposite or often clustered at nodes; flowers minute, on axillary peduncles.

A. Stamens 2 ..... *G. spathulatum* 1.
A. Stamens 4
Calyx 3-lobed ..... *G. Drummondii* 2.
Calyx 4-lobed ..... *G. elatinoides* 3.

1. **G. spathulatum,** Wight et Arn. Leaves narrow-oblong or ovate-oblong, 7-12 mm. including the petiole, which is longer than the blade; peduncles usually shorter than leaves; calyx 1½ mm. long in flower, 3 mm. in fruit, unequally 3-lobed; corolla blue, slightly exceeding calyx; stamens 2.

Creeks and swamps, Kangaroo Island; dry watercourses on Cordillo Downs (Far North-East), with peduncles only 2-4 mm. long; Eyre Peninsula.—New South Wales; Queensland.

2. **G. Drummondii,** Benth. Like the preceding, but peduncles mostly longer than leaves; calyx unequally 3-lobed; stamens 4, as long as corolla.

Only collected at Minnipa, E.P., but probably overlooked in many other places.—North-western Victoria; New South Wales; West Australia.

3. **G. elatinoides,** Benth. Like the preceding, but peduncles rather shorter than leaves; calyx with 4 often unequal lobes; stamens 4, shorter than corolla.

River Murray.—Victoria; New South Wales; Tasmania.

13. PEPLIDIUM, Delile.

(From *peplis*, the Greek name of *Euphorbia Peplis*, L., which this plant somewhat resembles.)

1. **P. Muelleri,** Benth. Procumbent herb, glabrous or sprinkled with minute hairs; leaves opposite, ovate, 6-12 mm. long, narrowed into a short broad petiole; flowers 1-2 in each axil, on peduncles 2-4 mm. long, often accompanied by smaller leaves; calyx tubular, 3 mm. long, 5-angled, almost truncate, with 5 very obtuse shallow lobes; corolla about twice as long, the 5 orbicular lobes nearly as long as tube, with 2 small reddish protuberances in the throat behind the 2 enclosed stamens; anthers 1-celled; stigma oblong, curved at summit, as long as or longer than the style proper; capsule ovoid, enclosed in the membranous swollen calyx, opening loculicidally in 2, and often later in 4 valves; seeds numerous, minute, angular, obconical.

Stevenson and Macumba Rivers (Far North).—Northern Territory.
Var. *longipes*, J. M. Black. Peduncles 4-12 mm. long; calyx 4 mm. long; protuberances in corolla less prominent.—Oodnadatta westward to Birksgate Range.

14. DISCHISMA, Choisy.

(From Greek *di-*, twice; *skhisma*, separation, cutting: alluding to the 2 sepals.)

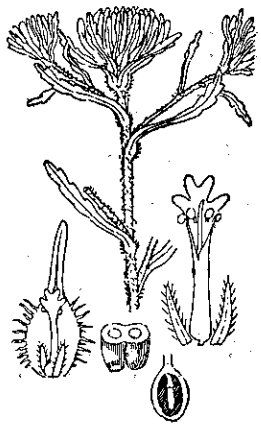

FIG. 219.—**Dischisma capitatum.**

*1. **D. capitatum** (Thunb.) Choisy. Small ascending annual, white-woolly on the young parts; leaves oblanceolate, with a few blunt teeth near summit, ciliate at base, 1-2 cm. long, the lower opposite, the upper alternate; flowers in a dense ovoid or oblong terminal spike, each flower sessile in the axil of a floral leaf or bract with a broad membranous ciliate base; calyx reduced to 2 small lanceolate ciliate sepals resembling bracteoles; corolla more than twice as long (6 mm.), white, the tube slender, deeply slit on one side so that the limb consists of 1 4-lobed lip; stamens 4, in pairs; anthers 1-celled; ovary 2-celled, with 1 pendulous ovule in each cell; style slender, undivided; fruit small, separating into 2 1-seeded nutlets.

Chiefly in sandy soil near sea, Lefevre's Peninsula to Reedbeds. Aug.-Oct.—South Africa. This genus was formerly considered part of a separate family, the *Selaginaceae*.

15. VERONICA (Tourn.) L.

(Name first given to some species of this genus by the Italian botanist Mattioli in 1554, probably in honor of Saint Veronica, a nun who died in Milan in 1497.)

Calyx 4-lobed or 4-sect; corolla irregularly rotate with a short tube and 4 unequal lobes, the upper one usually the largest and the lower one smaller than the 2 lateral; stamens 2, exserted; anthers 2-celled; style filiform, with a very small capitate stigma; capsule usually compressed laterally, and dehiscent in 2 valves; seeds few to numerous. Herbs or shrubs; leaves all opposite or rarely the upper ones alternate and bearing solitary flowers in their axils; more usually the upper leaves are reduced to alternate bracts and the inflorescence becomes a long or short raceme. *Speedwell.*

A. Shrubs or undershrubs; leaves all opposite; racemes pedunculate, many flowered, in the upper axils, with small bracts; capsule swollen, septicidal.
  Racemes short; leaves linear, usually entire .... *V. decorosa* 1.
  Racemes long; leaves lanceolate, serrate ..... *V. Derwentia* 2.

A. Herbs.
  B. Flowers in axillary not terminal racemes, with small bracts; leaves all opposite; style conspicuous at summit of capsule, which is loculicidal; root-stock perennial.
    C. Marsh-plant, with thick hollow stems; racemes many-flowered ..... *V. Anagallis* 3.
    C. Land-plants with slender stems; raceme few-or several-flowered.
      D. Leaves sessile or subsessile, contracted at base.
        E. Racemes few, short, 2-8-flowered.
          Leaves linear-lanceolate, usually entire ... *V. gracilis* 4.
          Leaves ovate, serrate ..... *V. distans* 5.
        E. Racemes numerous, rather long, 8-20-flowered; leaves oblong ..... *V. parnkalliana* 6.
      D. Leaves petiolate, ovate-cordate, broadly toothed; racemes few-flowered.
        Stems villous ..... *V. calycina* 7.
        Stems pubescent ..... *V. plebeja* 8.
  B. Flowers distant, solitary in the axils of the upper alternate leaves, on peduncles as long as or longer than leaves; style conspicuous; capsule loculicidal; hairy annuals.

Leaves on long petioles, palmately 3-5-lobed; capsule 4-lobed ..... *V. hederifolia* 9.
Leaves shortly petiolate, ovate, toothed; capsule 2-lobed ..... *V. persica* 10.

B. Flowers in terminal racemes, the pedicels much shorter than the leafy bracts; style not rising above notch of capsule, which is loculicidal, compressed, and about as broad as long; slender annuals.
Leaves ovate-cordate, crenate ..... *V. arvensis* 11.
Leaves oblong, entire or almost so ..... *V. peregrina* 12.

1. **V. decorosa,** F. v. M. Erect shrub, pubescent on flowering rhachis and pedicels and with alternate lines of curly hairs decurrent from base of leaves; leaves sessile, linear, acute, 2-4 cm. long, grooved above, glabrous; flowers in axillary corymbose racemes on pedicels longer than calyx, the lanceolate segments of which are 4 mm. long; upper lobe of the corolla very broad, purple-streaked, the lower ones paler and narrower; capsule shorter than calyx, truncate, rather broader than long. (Fig. 214, F-G.)
Flinders Range, at least as far north as Mooloolloo. Sept.-Oct.

2. **V. Derwentia,** Andr. (1808). Small erect undershrub, the hairs as in the preceding, but more caducous; leaves sessile, broad-lanceolate, stem-clasping, acuminate, serrate, 4-12 cm. long, glabrous; flowers in long axillary corymbose racemes on pedicels about as long as calyx, which is 3 mm. long; corolla bluish or white, the lobes acute, not very unequal; capsule ovoid, rather longer than calyx, subacute.—*V. labiata,* R. Br. (1810).
Usually near water: Mt. Lofty Range; Kangaroo Island; South-East. Nov.-Jan.—Victoria; New South Wales; Tasmania.

* 3. **V. Anagallis,** L. *Water Speedwell.* Glabrous perennial with creeping rootstock and thick erect hollow stems; leaves rather broadly lanceolate, sessile and stem-clasping, 3-7 cm. long, slightly toothed; flowers numerous in opposite axillary racemes; calyx about 2½ mm. long, with oblong acute lobes; corolla lilac; capsule compressed, notched at summit, about as long as calyx.
Swamps in South-East. Oct.-Jan.—Europe; Asia; North America.

4. **V. gracilis,** R. Br. Stems slender, 3-25 cm. long, rising from a perennial creeping rootstalk, usually with alternate decurrent pubescent lines; leaves linear-lanceolate, sessile or subsessile, 1-2½ cm. long, entire, or few-toothed; racemes loose, subcorymbose, usually 2-4-flowered, in the upper axils; calyx about 6 mm. long, with lanceolate segments; corolla bluish, very slightly exceeding the calyx, the lobes broadly ovate; capsule shorter than calyx, compressed, slightly notched.
Mt. Lofty Range; South-East. Nov.-Dec.—Victoria; New South Wales; Tasmania.

5. **V. distans,** R. Br. Stems procumbent, 3-25 cm. long, pubescent or with decurrent pubescent lines, from a creeping rootstock; leaves subsessile, thick and rather rigid, oblong or ovate-lanceolate, 5-30 mm. long, distantly serrate; racemes loose, subterminal, 2-8-flowered, the pedicels sometimes 25 mm. long in fruit; calyx 6-8 mm. long, the segments ovate-oblong; corolla lilac, 10-12 mm. long, the upper lobe orbicular, the others narrower; capsule compressed, broader than long, bluntly notched, rather shorter than calyx.
Mt. Lofty Range; Kangaroo Island; Yorke and Eyre Peninsulas; Monarto South to the Coorong. Oct.-Nov.—Victoria; West Australia.

6. **V. parnkalliana,** J. M. Black. Stems 20-40 cm long, erect or ascending, with alternate pubescent lines decurrent from the base of the stem-leaves, which are linear-oblong or oblong-cuneate, obtuse, with a few conspicuous teeth or the upper ones entire, 1-3 cm. long, all sessile; racemes in the upper axils, loose, 8-20-flowered, forming terminal corymbs; fruiting pedicels 8-12 mm. long, the bracts very small; calyx about 4 mm. long, the segments lanceolate; corolla about twice as long, the rounded lobes almost equal; capsule compressed, bluntly notched, broader than long and about as long as calyx.
Near Pt. Lincoln. Sept.-Nov. Parnkalla was the name of the principal native tribe on Eyre Peninsula.

7. **V. calycina,** R. Br. Stems 8-20 cm. long, villous with spreading hairs: rootstock creeping; leaves ovate, coarsely crenate-toothed, rounded or subcordate at base, 1-2½ cm. long, the lower ones on petioles 3-8 mm. long; flowers usually 2-4, in short loose axillary racemes with oblong bracts or sometimes almost clustered; calyx about 5 mm. long in flower, with ovate lobes more or less ciliate; corolla violet, rather longer than calyx; capsule compressed, truncate, shorter than the enlarged calyx.
Kangaroo Island; South-East. Oct.-Dec.—Temperate Australia.

8. **V. plebeja,** R. Br. Differs from the preceding in the minutely pubescent stems, the leaves more flaccid and on longer petioles, the upper stem-leaves as well as the lower usually petiolate, the capsule rounded rather than truncate at summit; racemes 2-8-flowered.

Yorke Peninsula. Oct.-Nov.—Eastern States.

FIG. 220.—**Veronica hederifolia.**

*9. **V. hederifolia,** L. *Ivy-leaved Speedwell.* Sparsely villous weak prostrate annual; leaves petiolate, sub-orbicular, 1-2 cm. diam., 3-5-lobed, the middle lobe the largest, the lowest leaves opposite, all the others alternate and bearing 1 flower in the axil on a peduncle about as long as the leaf; calyx quadrangular, 3 mm. long, the segments triangular, ciliate, longer than the pale-blue corolla; capsule sub-globular, 4-lobed, 2-4-seeded.

Here and there in settled districts. Aug.-Jan.—Europe; western Asia.

*10. **V. persica,** Poir. (1808). Differs from the preceding in the shorter petioles, the leaves ovate, crenate-toothed; peduncles 2-3 times as long as leaves; corolla bright-blue, longer than the calyx, which becomes about 7 mm. long in fruit, the 4 ovate-lanceolate segments divaricate in pairs, the capsule compressed, very broadly notched owing to the 2 divergent lobes and much broader than long; seeds about 12.—*V. Tournefortii,* C. C. Gmel. (1805) non Vill. (1779); *V. Buxbaumii,* Ten. (1811-15).

Here and there in settled districts. Aug.-Jan.—Europe; western Asia.

*11. **V. arvensis,** L. *Wall Speedwell.* Pubescent annual; stems erect or ascending, 5-20 cm. long; leaves opposite, subsessile, ovate, crenate-toothed, 5-15 mm. long; flowers subsessile, in long terminal rather loose racemes; bracts lanceolate, entire, leafy, longer than flowers; flowering calyx 2-3 mm. long, the 4 lanceolate segments very unequal; corolla shorter, blue or almost white; capsule flat, shorter than calyx, ciliate, deeply notched, the style not longer than notch; seeds 12-16.

Adelaide plains and Mt. Lofty Range. Sept.-Jan.—Europe; western Asia.

12. **V. peregrina,** L. Annual sprinkled with minute glandular hairs or glabrous; stems erect or ascending, 5-25 cm. long; stem-leaves opposite, the lowest ovate and petiolate, caducous, the others sessile, oblong, entire or faintly toothed, 6-12 mm. long, passing into the alternate somewhat smaller floral leaves or bracts of the long loose terminal raceme; pedicel shorter than calyx and much shorter than bract; flowering calyx about 2 mm. long, the segments lanceolate; corolla shorter, blue; capsule about as long as calyx, very slightly notched; style minute; seeds about 30, minute.

Moist places: southern districts; Murray River; South-East. Sept.-Dec.—Temperate Australia; temperate America; introduced in Europe.

16. EUPHRASIA (Tourn.) L.

(From Greek *euphrasia,* joy, good cheer; perhaps because *E. officinalis* was formerly considered a remedy for eye troubles).

Calyx 4-lobed; corolla 2-lipped, the tube narrow, the throat open, the upper lip hooded, with 2 lobes whose margins are more or less reflexed, the lower lip spreading, 3-lobed, the middle lobe sometimes notched; stamens 4, in pairs; anthers connivent, more or less hairy, with 2 cells unequally mucronate at base; style filiform, bent near summit, with a capitate stigma; capsule oblong, slightly compressed, opening loculicidally in 2 valves; seeds numerous, minute, oblong, ribbed. Herbs parasitic on the roots of other plants, with opposite toothed leaves; flowers subsessile, solitary in the axils of opposite leafy bracts, forming terminal spikes.—*Eye-bright.*

Flowers white or violet; leaves bluntly toothed; perennial	*E. collina* 1.
Flowers yellow; leaves rather sharply lobed; annual	*E. scabra* 2.

1. **E. collina,** R. Br. (1810). Erect perennial, 12-40 cm. high, often drying black, usually pubescent and often granular-hairy on calyx; leaves sessile, ovate, oblong or linear-cuneate, 5-15 mm. long, with a few blunt teeth on each margin or only 2 near the summit, thick and fleshy in maritime specimens; spikes lengthening in fruit to 10 or even

20 cm., the floral bracts toothed or almost entire; calyx about 5 mm. long, the lobes usually shorter than tube; corolla white, pink, or violet, curved outwards, 12-20 mm. long; anthers hairy; capsule exceeding calyx. (Fig. 214, A-D.)—*E. Brownii*, F. v. M. partly (1865); *E. speciosa*, R. Br.

Southern districts; Murray lands; Yorke and Eyre Peninsulas; South-East. Sept. Dec.—Temperate Australia.

2. **E. scabra,** R. Br. Erect scabrous-pubescent annual, 15-30 cm. high; leaves oblong-lanceolate, with a few rather acute spreading lobes or teeth, 10-15 mm. long; floral bracts narrower, usually with only 2 lateral lobes; calyx about 5 mm. long, the lobes about as long as tube; corolla yellow, 10-15 mm. long; anthers hairy or almost glabrous; capsule exceeding calyx.

Southern districts, apparently rare. Sept.-Dec.—Temperate Australia.

17. BARTSCHIA, L.

(After Johann Bartsch, German botanist and doctor of medicine, born at Königsberg in 1709, died while on a scientific mission in Dutch Guiana in 1738.)

Calyx with 4 equal lobes; corolla 2-lipped, the tube straight, the upper lip hooded, entire or notched, the margins not reflexed, the lower lip spreading, with 3 entire lobes; stamens 4, in pairs; anthers hairy, with 2 cells equally mucronate at base; style filiform, bent near summit, with a capitate stigma; capsule not or scarcely compressed, opening loculicidally in 2 valves; seeds numerous, minute, ovoid. More or less parasitic herbs, with opposite toothed sessile leaves; flowers subsessile, solitary in the axils of opposite leafy bracts, forming terminal spikes.—*Bartsia*, L.

A. Leaves ovate; stems slender; flowers small, purplish..	*B. latifolia* 1.
A. Leaves lanceolate; stem stouter, rigid; flowers large.	
Corolla pink and white; calyx tubular	*B. Trixago* 2.
Corolla yellow; calyx campanulate	*B. viscosa* 3.

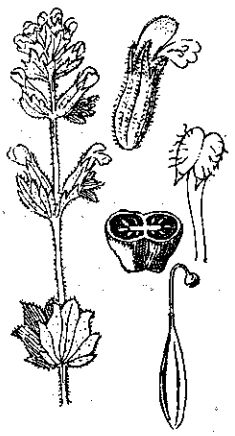

FIG. 221.—**Bartschia latifolia.**

*1. **B. latifolia** (L.) Sibth. et Sm. Erect reddish glandular-hairy annual, 5-30 cm. high; leaves ovate, 6-15 mm. long, with 3-7 coarse teeth or lobes; spikes finally long and interrupted towards base; calyx tubular, about 10 mm. long, with short lanceolate lobes; corolla ½ longer, purplish red; capsule oblong-lanceolate, as long as calyx; seeds smooth.—*Parentucellia latifolia* (L.) Caruel.

Settled districts. Sept.-Nov.—Mediterranean region.

*2. **B. Trixago,** L. Erect glandular-hairy annual, 10-50 cm. high; leaves oblong-lanceolate or linear, 15-50 mm. long, with large distant teeth; spikes short and dense; calyx about 10 mm. long, campanulate, with short ovate lobes; corolla 2-3 times as long, the lower lip white, the upper pink; capsule globular; seeds furrowed.

Mt. Lofty Range, near Greenhill Road. Oct.-Dec.—Mediterranean region.

*3. **B. viscosa,** L. Resembles the preceding, but is viscid-hairy, the leaves more crowded and usually rather broader; spikes looser; calyx about 15 mm. long, the lanceolate lobes as long as tube; corolla yellow, not twice as long; capsule oblong, scarcely exceeding the calyx-tube; seeds smooth.—*Parentucellia viscosa* (L.) Caruel.

Mt. Lofty Range; South-East. Oct.-Jan.—Mediterranean region.

FAMILIES.