HANDBOOKS to the FLORA OF SOUTH AUSTRALIA

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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 II.

Casuarinaceae - Euphorbiaceae.

By J. M. BLACK.

WITH ILLUSTRATIONS BY THE AUTHOR.

Price: FIVE SHILLINGS.

ADELAIDE:
PRINTED BY R. E. E. ROGERS, GOVERNMENT PRINTER, NORTH TERRACE.
1924.

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CLASS 2.—DICOTYLEDONS.

Embryo usually with 2, exceptionally with more cotyledons or seed-leaves; the radicle growing downwards as the primary root; stem with a ring of open vascular bundles; leaves usually pinnately nerved; floral whorls usually of 4 or 5 parts each. This great class includes the remainder of the flowering plants.

FAMILY 33.—CASUARINACEAE.

Male flowers in whorls enclosed within a sheath of whorled bracts, each flower consisting of 1 stamen and 2 deciduous perianth-segments, free or united, and having at the base 2 deciduous or persistant bracteoles, the whole of the male flowers forming a cylindrical terminal spike; female flowers in short heads, terminating lateral branches, the ovary 1-celled and 2-ovuled, the style with 2 long usually red stigmatic branches, perianth none; each female flower contained in the axil of a bract and 2 bracteoles; the female head becoming in fruit a compact woody cone, the enlarged bracteoles forming 2 lateral valves, which open when the seed-like compressed winged nut is ripe; seed solitary, with 2 large cotyledons and a superior radicle; no albumen. Shrubs or trees with slender wiry articulate branchlets, the leaves represented by whorled teeth united into sheaths surrounding the summit of each article or internode of the branchlet.

1. CASUARINA, (Rumph.) L.

(From the resemblance of the drooping branches to the feathers of the cassowary, Latin *Casuarius*.)

A. Sheathing teeth 9-13; cone-valves prominent; trees.
  B. Valves with very small dorsal protuberance.
    Branchlets drooping, prominently ribbed..... *C. stricta* 1.
    Branchlets ascending, faintly ribbed or striate .... *C. lepidophloia* 2.
  B. Valves with conspicuous transverse dorsal protuberance.
    Valves with long acute protuberance ..... *C. bicuspidata* 3.
    Valves with short blunt protuberance; cones short, depressed ..... *C. Luehmannii* 4.
A. Sheathing-teeth 4-8; shrubs.
    Teeth 6-8..... *C. distyla* 5.
    Teeth 4-6..... *C. humilis* 6.

1. **C. stricta,** Ait. (1789). *Drooping Sheoak.* Tree 5-7 m. high, with dark-green drooping ribbed branchlets, 1½ mm. diam.; sheathing-teeth 9-12; flowers dioecious; male spikes 4-7 cm. long; anthers yellow, 3 mm. long; bracteoles hooded, coherent at the summit by their cilia, deciduous; perianth-segments flat, united; cone globular or ovoid, 2½-5cm. long; valves prominent, acute, pubescent inside. —*C. quadrivalvis,* Labill. (1806).

PLATE 5.—5, two whorls of the male spike; 6, whorl of 8 male flowers; 7, inner (posterior) face of the stamen; 8, side view of the same; 9, outer (anterior) face of stamen; 10, the 2 connate perianth-segments. *ax*, axis; *anth*, anther; *br*, bracteole; *per. s*, perianth-segment (page 88).

South-East to Flinders Range; Eyre Peninsula. Summer.

2. **C. lepidophloia,** F. v. M. *Black Oak.* A small tree 4-6 m. high, with ascending hoary striate branchlets 1-1½ mm., rarely 2 mm. diam., the articles separating easily; sheathing-teeth 9-13, rarely more, ciliolate, the points soon breaking off; flowers dioecious; male spikes about 3 cm. long; anthers yellow, 1½ mm. long; bracteoles persistant, ovate-lanceolate, with a few long cilia; perianth-segments hooded; cone subglobular or oblong, 1½-3 cm. long, pubescent when young, with protruding valves.

From about Hawker northwards to beyond Oodnadatta; eastward to the New South Wales border; and westward to Eyre Peninsula, Ooldea, and the Musgrave Range. Summer.

C. glauca, Sieb., has been recorded for South Australia, but, although a tree near Hawker had 14-16 sheathing-teeth, all our specimens seem to agree better with a small dry-country tree such as *C. lepidophloia,* than with a tall tree inhabiting chiefly swampy places and tidal creeks such as *C. glauca,* which is known in New South Wales as the "Swamp Oak." Further experience may show that *C. lepidophloia* is only a desert form, in which case Bentham would be right in including it with *C. glauca.*

3. **C. bicuspidata,** Benth. Small tree, with ascending greyish striate branchlets, 2 mm. diam.; sheathing-teeth 10-11; flowers (at least in some cases) monoecious; male spikes 2½-5 cm. long; cone ovoid, 2½-4 cm. long, the valves prominent and acuminate, with an acute dorsal protuberance as long as the valve.

Only known in South Australia by the type specimen collected on Flinders Island by Robt. Brown, but probably exists on the mainland; also found in Tasmania and West Australia. Spring and summer.

4. **C. Luehmannii,** R. T. Baker. *Bull Oak.* A tree 5-15 m. high, with ascending hoary striate branchlets, 2 mm. diam.; sheathing teeth 10-13, brittle; flowers dioecious; male spikes about 2½ cm. long; cone depressed, 12-15 mm. broad, and broader than long, with only 2-3 rows of prominent, pubescent valves, each bearing an obtuse dorsal protuberance about ½ as long as the valve.

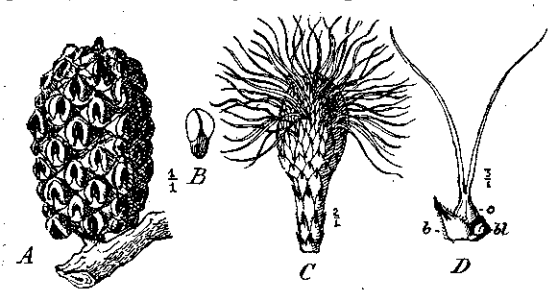

FIG. 35.—**Casuarina distyla.**

A, cone; B, winged nut; C, female flowerhead, or young cone; D, female flower; *o*, ovary; *b*, bract; *bl*, bracteole.

From Lameroo to Bordertown and Frances, often growing in swampy country. The branchlets are tough and very bitter to the taste, so that cattle are said to refuse this species, although they eat the branchlets of other Casuarinas eagerly.

5. **C. distyla,** Vent. *Scrub Sheoak.* A shrub 75 cm. to 3 m. high, with ascending dark-green furrowed branchlets, 1-1½ mm. diam.; sheathing-teeth 6-8; flowers dioecious; male spikes 1-4 cm. long; anthers red, 1½ mm. long; bracteoles persistant, ovate, ciliate, usually protruding from the sheath; perianth-segments hooded; cone oblong, 1-3½ cm. long, the valves obtuse and scarcely protruding, with a dorsal protuberance about as long as the valve. The shorter cones are sometimes beaked owing to abortion of the upper flowers.

PLATE 5.—11, two whorls of the male spike; 12 and 13, the bracteoles in 2 stages; 14, a still later stage, showing the bracteoles and perianth segments enclosing the stamen; 15, the stamen after the perianth-segments have fallen (page 88).

Mount Lofty Range to Flinders Range; Kangaroo Island; Murray lands to South-East. Spring and summer.

I have seen no specimens from South Australia of *C. suberosa,* Otto et Dietr., which is distinguished from *C. distyla* by being usually a large and monoecious tree; it grows in the Eastern States. It may be found in the Mount Lofty or Barossa Ranges.

C. paludosa, Sieb., a low shrub with a monoecious flowers and cones 1-2 cm. long, has been recorded from near Encounter Bay and the 90-Mile Desert, but I have seen no specimens.—*C. distyla,* Vent. var., *paludosa,* Benth.

6. **C. humilis,** Otto et Dietr. Dioecious shrub, 1-3 m. high; sheathing-teeth 5-6, sometimes 4; cone oblong, 2-2½ cm long, 15-18 mm. broad, minutely hoary, rugulose owing to the 2 or 3 short dorsal protuberances behind each valve; wing of the nut truncate.

Everard Range; also in West Australia.

C. Decaisneana. F. v. M. (*Desert Oak*), is a tree with very long articles to the branchlets, 4 long acute bristly teeth and large ovoid or oblong greyish cones (about 6 cm. long), the valves not protruding beyond the thick wrinkled dorsal protuberances. It grows in the MacDonnell Ranges, N.T., and will probably be found in the ranges of our Far North-West.

FAMILY 34.—MORACEAE.

Only 1 genus of this family in South Australia.

1. FICUS, (Tournef.) L.

(Latin name of the fig-tree and its fruit.)

1. **F. platypoda,** A. Cunn. *Native Fig.* A small tree, often growing among rocks, with spreading branches; leaves glabrous lanceolate or ovate, 6-10 cm. long, thick and rigid, on broad petioles; flowers unisexual, minute, enclosed in almost sessile axillary receptacles (*figs*), which are globular and 6-12 mm. diam.; male flowers usually of 1 or 2 stamens and 3 perianth-segments; female flower a 1-celled 1-ovuled ovary with lateral style and 4-6 perianth-segments; fruit a small seed-like nut with 1 albuminous seed; radicle superior.

North-West: Arkaringa Creek to Birksgate Range. Most of the year.

The Moreton Bay Fig, so popular as a shade-tree, is *F. macrophylla,* Desf., a native of Queensland, and New South Wales.

FAMILY 35.—**URTICACEAE.**

Flowers unisexual or polygamous; perianth 4-partite; stamens 4, opposite the lobes, the filaments springing backwards elastically; ovary superior, 1-celled, with 1 basal orthotropous ovule; style 1; seed albuminous, radicle superior.

Leaves alternate, entire, without stinging hairs ..... PARIETARIA 1.
Leaves opposite, toothed, with stinging hairs ..... URTICA 2.

1. PARIETARIA (Tournef.), L.

(Latin *paries*, a wall: some species grow on old walls).

1. P. debilis, G. Forst. Diffuse more or less pubescent annual; leaves thin, flat, ovate, 3-nerved from base, 1-3½ cm. long, on slender petiolcs; flowers small, polygamous, in twin usually 3-flowered axillary cymes, the central flower usually sessile, fertile, and deciduous, with 1 oblong lateral bract, the other 2 pedicellate, fertile, or sterile, surrounded by 3 free ciliate bracts, which are herbaceous and oblanceolate-obtuse; perianth of fertile flowers finally enlarged, cylindrical and scarious, 2-3 mm. long; stigma penicillate at summit of ovary; nut compressed, brown, glossy, 1½ mm. long; testa membranous; embryo straight.

Most parts of the State. Spring and summer.

Var. *australis.* Bracts of the lateral pedicellate flowers broadly ovate or ovate-cordate, acute.—*Freirea australis,* Nees.

Far North and North-West; also in West Australia.

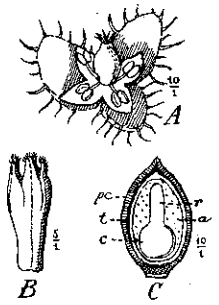

FIG. 36.—**Parietaria debilis.**

A, flower within 3 bracts; B, fruiting perianth; C, vertical section of nut; *pc*, pericarp; *t*, testa; *a*, albumen; *r*, radicle; *c*, cotyledons.

2. URTICA, (Tournef.) L.

(Latin for the Nettle).

Flowers unisexual, small, green; male perianth of 4 equal divisions, the female with the 2 outer divisions smaller than the 2 inner; stigma penicillate, almost sessile; nut enclosed in perianth. Herbs covered by rigid stinging hairs which contain an irritating fluid; leaves opposite, petiolate, stipulate.

Annual; leaves broad-ovate ..... *U. urens* 1.
Perennial; leaves lanceolate ..... *U. incisa* 2.

1. U. urens, L. *Small Nettle.* Erect annual; leaves deeply toothed, 2½-5 cm. long, broadly ovate; flowers monoecious, in short axillary racemes; outer divisions of the female perianth each with 1 long dorsal stinging hair.

Waste and cultivated land. July-Dec. An almost cosmopolitan weed.

2. U. incisa, Poir. Coarse ascending perennial; leaves lanceolate or linear-lanceolate, but sometimes cordate at base, deeply toothed, 2½-10 cm. long; flowers usually dioecious, and where monoecious the male and female flowers are in separate clusters and not mixed, as in *U. urens.*

Damp places in the Southern districts and along the Murray; South-East. Most of the year. Seems scarcely distinguishable from the almost cosmopolitan *U. dioica,* L., except that the stems are glabrous between the stinging hairs.

FAMILY 36.—**PROTEACEAE.**

Flowers bisexual, regular or irregular; perianth deciduous, petaloid, of 4 more or less united segments, the lower portion tubular; stamens 4, opposite the perianth-segments and inserted on them; carpel 1, superior, the ovary 1-celled, with 1 or several ovules; style undivided; fruit various; seeds exalbuminous, often winged; embryo straight, with inferior radicle. Shrubs or undershrubs, with alternate exstipulate leaves. All the South Australian genera except *Persoonia* and *Grevillea* are limited to Australia.

A. Fruit an indehiscent 1-seeded nut or drupe; flowers solitary in the axil of each bract; seeds wingless.
B. Leaves narrow, pinnately divided.
C. Flowers in dense cone-like heads.
Cone-scales adhering to the rhachis ..... PETROPHILA 1.
Cone-scales deciduous ..... ISOPOGON 2.
C. Flowers solitary within an involucre of bracts ..... ADENANTHOS 3.

B. Leaves undivided.
Fruit a hair-tufted nut ..... CONOSPERMUM 4.
Fruit a drupe ..... PERSOONIA 5.

A. Fruit dehiscing by 1 or both sutures, 2-seeded; flowers usually in pairs in the axil of each bract.

D. Fruit a woody capsule; seeds with a terminal wing.
Flowers in short racemes or clusters; bracts deciduous ..... HAKEA 6.
Flowers in thick terminal spikes; bracts persistant.. BANKSIA 7.

D. Fruit a coriaceous or woody follicle; seeds wingless or winged all round ..... GREVILLEA 8.

1. PETROPHILA, R. Br.

(Greek *petra*, rock; *philos*, loving.)

1. **P. multisecta,** F. v. M. Branching shrub; leaves 4-6 cm. long, trichotomously divided into rigid terete pungent-pointed segments; flowers yellow, in dense oblong axillary spikes or heads, each one sessile within a lanceolate silky bract or scale, which is persistant and hardened after flowering; perianth silky, about 15 mm. long; nut hairy.

Eleanor River, Kangaroo Island. Summer.

2. ISOPOGON, R. Br.

(Greek *isos*, equal; *pōgōn*, beard; alluding to the tufts of hair at the tips of the perianth-segments.)

1. **I. ceratophyllus,** R. Br. Low shrub, 7-50 cm. high; leaves rigid, flat, 5-10 cm. long, ternately divided into lanceolate pungent segments; flowers yellow, in terminal globular heads or cones, the broad acuminate woolly bracts or scales deciduous before fruiting, the outer empty bracts more persistant; perianth glabrous, 15 mm. long, the tube slender and persistant for some time, the laminae hair-tipped; style papillose below the summit; nut villous.

Mount Lofty Range; Kangaroo Island; South-East. Sept.-Nov.—Eastern States.

3. ADENANTHOS, Labill.

(Greek *adēn*, a gland; *anthos*, flower: alluding to the glands at the base of the ovary.)

Each flower subsessile and clasped at the base by an involucre of 5-6 unequal ovate-acuminate imbricate bracts; 4 oblong glands or scales surrounding the ovary; style articulate on the ovary, much longer than the perianth, clavate at summit; flowers light yellow, solitary or twin, terminal; nut almost drupaceous, surrounded by the persistant involucre.

Laminae of the perianth densely bearded inside behind the anthers; style glabrous ..... *A. sericea* 1.

Laminae almost glabrous inside; style hairy ..... *A. terminalis* 2.

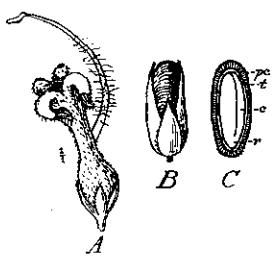

FIG. 37.—**Adenanthos terminalis.**

A, open flower; B, fruit within bracts; C, vertical section of fruit; *pc*, somewhat succulent pericarp; *t*, testa; *c*, cotyledons; *r*, radicle.

1. **A. sericea,** Labill. var. *brevifolia*, Benth. Shrub with grey silky branches and foliage; leaves crowded, 1-2 cm. long, ternately cut into 7-9 subulate divisions; perianth 20-25 mm. long, villous outside and also inside behind the anthers; style glabrous.

Western end of Kangaroo Island. Oct.-Nov.—The type is West Australian.

2. **A. terminalis,** R. Br. Shrub with ascending branches, ½-1 m. high, very near the preceding, but the leaves rather shorter, with only 3-5 divisions; the perianth about 15 mm. long and more swollen at base, with very few hairs behind the anther; style with spreading hairs.

Mount Lofty Range; Encounter Bay; Kangaroo Island; 90-Mile Desert; South-East. Sept.-May.—Victoria.

4. CONOSPERMUM, Sm.

(Greek *kōnos*, a cone; *sperma*, seed: referring to the shape of the nut.)

1. **C. patens,** Schlecht. A small erect shrub about 50 cm. high; leaves at first pubescent, finally glabrous, crowded, spreading horizontally, linear-lanceolate to broad-lanceolate, 8-20 mm. long; flowers lilac, in short dense spikes, corymbosely arranged at the summit of usually long common peduncles rising from the upper axils; perianth sesssile within a broad persistant bract, 2-lipped, 7 mm. long, the upper lip of 1 broad lobe, the lower of 3 narrow lobes, the tube a little longer than the lips; 1 anther 2-celled, 2 1-celled, the fourth abortive; nut small, turbinate, hair-tufted.

Mount Lofty and Barossa Ranges; Kangaroo Island; 90-Mile Desert; South-East; Eyre Peninsula. Aug.-Nov.—Eastern States.

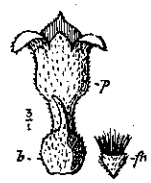

FIG. 38.—**Conosper mum patens.**
p, perianth; *b*, bract; *r*, nut.

C. Mitchellii, Meisn., with erect linear leaves 5-7½ cm. long, compact inflorescence and lips of the perianth as long as the tube, occurs in the Wimmera and on the Glenelg River in Victoria, and may be found in South Australia.

5. PERSOONIA, Sm.

(After Christian Henry Persoon, a Dutch botanist, 1755-1837.)

1. **P. juniperina,** Labill. Shrub 30 cm.-1 m. high; leaves spreading, linear, plano-convex or channelled above, pungent-pointed, 15-25 mm. long; flowers yellow, solitary, axillary; perianth sparsely pubescent, 10 mm. long, the segments almost free and recurved in upper part; 4 small glands surrounding the base of the ovary-stalk; ovules, 2; drupe ovoid, 10 mm. long, 1-seeded.

Mount Lofty Range; 90-Mile Desert. Summer. Known as *Prickly Geebung* in Victoria and New South Wales.

6. HAKEA, Schrad.

(After a German patron of botany named Hake.)

Flowers in axillary clusters or racemes; perianth almost straight near the base, usually curved backwards in the upper part, so that the globular limb is pressed against one side of the tube; the segments usually becoming free; anthers sessile in the cavities on the inner side of the laminae; a rather large semicircular or horseshoe-shaped reddish gland resting on the receptacle on one side of the ovary-stalk (gynophore); style usually longer than perianth, curved and protruding from a slit in the perianth before the stigmatic part is released from the limb; style dilated at summit into a disk or cone, bearing the stigma in the centre; capsule woody, opening in 2 solid valves, which are flat on the inner surface; seeds 2, compressed, terminating in a broad wing. Shrubs or trees; tomentum consisting of appressed hairs centrally attached to the surface by very short stalks. The species with terete prickly leaves are often called *Needle-bushes.*

A. Flowers spreading, in rather long cylindrical racemes, without an involucre of bracts; perianth reflexed near the summit; stigmatic disk broadly conical; receptacle oblique with large gland; leaves terete.

B. Leaves usually simple, 15-40 cm. long..... *H. lorea* 1.
B. Leaves forked.

Leaves 6-10 cm. long ..... *H. intermedia* 2.
Leaves 4-5 cm. long ..... *H. Ednieana* 3.

A. Flowers usually erect and clustered, more rarely racemose, enclosed before expansion in imbricate deciduous bracts; perianth reflexed near the summit.

C. Stigmatic disk oblique, flat, or slightly convex.

D. Leaves fan-shaped, sharply toothed ..... *H. Baxteri* 4.

D. Leaves terete.

E. Perianth pubescent.

Flowers in umbels; fruit 2-horned ..... *H. vittata* 5.
Flowers in short racemes; fruit acute ..... *H. leucoptera* var.

E. Perianth glabrous.

F. Pedicels pubescent leaves 2-3 cm. long ... *H. nodosa* 6.

F. Pedicels glabrous; leaves 3-15 cm. long.
Flowers in short racemes ..... *H. leucoptera* 7.
Flowers in sessile clusters ..... *H. cycloptera* 8.

C. Stigmatic disk bearing in its centre an erect cone.

G. Fruit rugose, with an inflexed beak.
Fruit 30 mm. long, 20 mm. broad ..... *H. rostrata* 9.
Fruit smaller ..... *H. rugosa* 10.

G. Fruit almost smooth, with a straight acute summit.
Leaves flat and 1-3-nerved, or trigonous; flowers in short clusters ..... *H. ulicina* 11.

Leaves long, many-nerved; flowers in large racemes ..... *H. multilineata* 12.

1. **H. lorea,** R. Br. *Corkbark Tree.* Tree 6-7 m. high, with corky bark; leaves 15-40 cm. long, terete, 2½ mm. diam., rigid, pungent, hoary, finally glabrous; racemes axillary, dense, 10-15 cm. long; perianth golden-tomentose, the tube 10-12 mm. long, about as long as the stout deflexed pedicels; gland oblique; ovary shortly stalked; style long, with an oblique depressed-conical disk; fruit 35 mm. long, 25 mm. broad, ovoid, curved towards the summit.—*H. suberea,* S. Moore.

North-West: from Arkaringa Creek to West Australia. Spring and summer.

2. **H. intermedia,** Ew. et Davies. Tree 4-5 m. high, with corky bark; leaves glabrous, terete, 6-10 cm. long, 1½ mm. diam., irregularly forked or branched; racemes tomentose, axillary or paniculate; flowers as in the preceding, but more slender; fruit about the same length, but not curved at summit, ovate-lanceolate in outline and only about 15 mm. diam.

North of Cooper Creek; also in the MacDonnell Range, N.T. Very closely allied to the following.

3. **H. Ednieana,** Tate. Small tree with furrowed bark; leaves terete, 2-5 cm. long, 1 mm. diam., hoary, bifid or trifid and then forked, pungent; racemes axillary, 4-5 cm. long; perianth yellow, tomentose, the tube 4 mm. long; style not much exceeding perianth, with a short straight conical disk; fruit 25-30 mm. long, 8-10 mm. broad, almost straight, ovate-lanceolate in outline.

Flinders Range: Blinman to Mount Lyndhurst. Spring. These three species, together with *H. lorea,* R. Br. var. *fissifolia,* F. v. M. and *H. Ivoryi,* Bailey are all "cork-trees" inhabiting dry northern regions, and require examination in the field. *H. intermedia* and *H. Ivoryi,* have a very oblique horse-shoe shaped gland, but the latter has smaller flowers and leaves, only 1 mm. diam; *H. lorea* and *H. Ednieana* have larger and straighter glands. All have the flowers and pedicels more or less covered with forked hairs. *H. Ivoryi* belongs to Queensland and northern New South Wales, and is a tall tree.

4. **H. Baxteri,** R. Br. Shrub about 2 m. high; leaves broadly fan-shaped, glabrous, rounded and prickly-toothed at summit, rigid, 5-8 cm. broad, tapering into a rigid petiole; flowers in sessile axillary clusters; perianth reddish-tomentose, the tube 6-7 mm. long; gland and stigmatic disk oblique; fruit about 35 mm. long, 25 mm. broad, rugose and shortly beaked.

Near Eucla.—West Australia.

5. **H. vittata,** R, Br. Shrub about 30 cm. high; leaves terete, pungent, 4-6 cm. long; flowers few in short axillary umbels or clusters; perianth reddish-tomentose, the tube 6 mm. long; gland and stigmatic disk oblique; fruit ovoid, 17-20 mm. long, with a short spreading horn near the summit of each valve.

Port Lincoln and Dutton Bay, Eyre Peninsula; Robe and Beachport, South-East. Oct.-Dec.

6. **H. nodosa,** R. Br. Shrub 60 cm. to 2 m. high; leaves linear-compressed, pungent, 2-3 cm. long; flowers minute, in axillary clusters; perianth yellow, glabrous, the tube 2 mm. long; pedicel scarcely 2 mm. long, silky; style short, with a large oblique disk; fruit 20-25 mm. long, 12 mm. broad, scarcely beaked.

Near Mount McIntyre, South-East.—Victoria.

7. **H. leucoptera,** R. Br. Shrub 2-3 m. high; leaves terete, pungent, 3-9 cm. long, hoary, finally glabrous; flowers white, in short axillary racemes; rhachis white-tomentose; perianth and pedicel glabrous, the tube 5-6 mm. long; gland and stigmatic disk oblique; ovary distinctly stalked; fruit ovate-lanceolate in outline, swollen in lower part, mucronate, 20-25 mm. long; seedwing yellowish-white (in most other species it is blackish).

Murray lands; Flinders Range to Far North. Sept.-Jan.—Eastern States.

Var. *Kippistiana,* F. v. M. Perianth and pedicel more or less tomentose.—*H. Kippistiana,* Meisn.

Flinders Range; Far North; Minnipa, Eyre Peninsula.

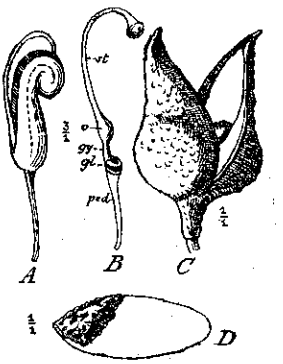

FIG. 39.—**Hakea leucoptera.**

A, flower not fully open; B, carpel after removal of perianth; *st*, style; *o*, ovary; *gy*, gynophore; *gl*, gland; *ped*, pedicel; C, fruit; D, seed.

8. **H. cycloptera,** R. Br. Shrub, with terete pungent leaves, finally glabrous, 5-15 cm. long; flowers glabrous, in axillary clusters; perianth-tube scarcely 4 mm. long; ovary distinctly stalked; style with an oblique stigmatic disk; fruit large, rugose, 35-40 mm. long, 30 mm. broad, each valve with a short erect horn near the summit; seedwing broad, not only terminal, as in other species, but extended all round the nucleus.

Southern part of Eyre Peninsula. Nov.-Feb.

H. purpurea, Hook., with terete leaves once or twice bifid or trifid, purple glabrous flowers in axillary umbels, and straight ovoid fruit with the seedwing of *H. cycloptera,* has been recorded from the Murray district, but on insufficient evidence.

9. **H. rostrata,** F. v. M. Shrub 1-2 m. high; leaves terete, pungent, glabrous, 4-15 cm. long, rather slender; flowers in axillary clusters; perianth and pedicel white-tomentose, the tube about 5 mm. long; stigmatic disk oblique, with a prominent cone in the centre; fruit large, 30-35 mm. long, 20-25 mm. broad, rugose, reflexed at base, incurved from the middle, with an inflexed conical beak.

Mount Lofty Range; Kangaroo Island; Flinders Range, near Quorn; South-East. Aug.-Oct.—Victoria.

10. **H. rugosa,** R. Br. Low spreading shrub about 70 cm. high; leaves terete, spreading, pungent, mostly 2-3 cm. long, a few sometimes 5-6 cm.; flowers as in the preceding, but rather smaller and the disk and cone almost straight; fruit similarly shaped but smaller. 15-20 mm. long, 7-10 mm. broad, usually very rugose.

Southern districts; 90-Mile Desert; South-East; Flinders Range; Eyre Peninsula. Aug.-Oct.—Victoria.

11. **H. ulicina,** R. Br. Erect shrub 1-2 m. high; leaves broad- or narrow-lanceolate, 1-3-nerved below, 4-10 cm. long, rigid and pungent; flowers in axillary clusters; perianth and pedicel glabrous, the tube 2 mm. long; stigmatic disk and cone straight; fruit 15-20 mm. long, ending in a straight beak.

Southern districts; 90-Mile Desert. Sept.-Nov.—Eastern States.

Var. *flexilis,* F. v. M. Leaves linear-trigonous, spreading, pungent, 3-7 cm. long; fruit rather more ovoid than in the type.—*H. flexilis,* F. v. M.

Same localities, with Murray scrub and southern part of Flinders Range.

12. **H. multilineata,** Meisn. Tall shrub; leaves linear-lanceolate, 15-20 cm. long, 5-8 mm. broad, rigid, hoary, striate with several parallel nerves; flowers pink, glabrous, spreading, in dense racemes 6-8 cm. long; perianth-tube about 5 mm. long; style long, with a long stigmatic cone; fruit ovoid, 20 mm. long.

Gawler Ranges and westward to Ooldea. Sept.-Oct.—West Australia.

H. nitida, R. Br., with oblong, often prickly-toothed leaves, small glabrous flowers in axillary racemes, straight perianth and ovoid fruit with horned valves, has been recorded for the far western district, but apparently on insufficient evidence. It is a West Australian species.

7. BANKSIA, L.f.

(After Sir Joseph Banks, 1743-1820, a great patron of science, who accompanied Cook on the voyage during which New South Wales was discovered.)

Flowers sessile in pairs round the thick rhachis of a dense terminal spike, each flower subtended by one villous bract and 2 bracteoles; perianth-tube slender, the laminae of the almost erect limb cohering for a long time; anthers sessile in the concave laminae; hypogynous scales 4, membranous; ovary sessile; style long and protruding from the slit in the perianth-tube until the stigmatic end is set free; fruit a compressed capsule opening in 2 hard valves; seeds 2, flat, with a broad terminal wing and separated by a spurious dissepiment; the bracts and bracteoles becoming consolidated with the rhachis and fruits into a thick woody cone, to which the withered barren flowers adhere for a long time.—*Banksia, Honeysuckle, Bottlebrush.*

Leaves almost entire ..... *B. marginata* 1.
Leaves regularly serrate ..... *B. ornata* 2.

1. **B. marginata,** Cav. Shrub or straggling tree 1-7 m. high; leaves oblong-lanceolate, truncate, 2-6 cm. long, green above, white below, with recurved margins, entire or with a few small teeth mostly near the summit; spikes oblong-cylindrical, 5-8 cm.long, the rhachis with a plush-like covering after the barren flowers have fallen; perianth yellowish, pubescent, 15 mm. long; style with a slender cylindrical stigmatic end; fruiting cone cylindrical.

Southern districts and northward to Quorn; 90-Mile Desert; South-East. Sept.-Jan. —Eastern States.

2. **B. ornata,** F. v. M. Shrub 1-2 m. high; leaves oblong-cuneate, subtruncate 5-10 cm. long, regularly serrate, the oblique lateral nerves prominent below; spikes ovoid, 5-10 cm. long; perianth villous, about 25 mm. long stigmatic end cylindrical, furrowed; fruiting cone ovoid or globular.

Mount Lofty Range; Kangaroo Island; 90-Mile Desert; South-East; Marble Range, Eyre Peninsula. Sept.-Jan.—Victoria.

8. GREVILLEA, R. Br.

(After Charles Francis Greville, a vice-president of the Royal Society.)

Differs from *Hakea* chiefly in the 2 flat seeds, which are either wingless or bordered all round by a rather narrow membranous wing; fruit a coriaceous or woody follicle oblique and opening more or less completely in 2 valves, which are concave inside; perianth petaloid, usually ribbed longitudinally, more or less curved near the summit (in all our species), often adnate near its base to the lower part of the gynophore; racemes usually terminal, sometimes very short and umbel-like. Shrubs or rarely trees.

A. Leaves divided or lobed.
  B. Leaves pinnatisect, doubly grooved below by the revolute margins and midrib.
    Leaf-segments linear; racemes short; ovary glabrous *G. Huegelii* 1.
    Leaf-segments subterete; racemes rather long; ovary pubescent ..... *G. Treueriana* 2.
  B. Leaves lobed, with sharp teeth ..... *G. ilicifolia* 3.
A. Leaves usually entire.
  C. Leaves narrow-linear, doubly grooved below; sometimes divided.
    D. Ovary villous.
      Leaves 6-15 cm. long; pedicels short ..... *G. pterosperma* 4.
      Leaves 12-25 cm. long; pedicels long ..... *G. juncifolia* 5.
    D. Ovary glabrous; flowers very small; leaves undivided.
      E. Leaves 6-25 cm. long; racemes long.
        Leaves linear; ovary short-stalked; stigmatic disk convex ..... *G. stenobotrya* 6.
        Leaves terete; ovary long-stalked; stigmatic disk conical ..... *G. nematophylla* 7.
      E. Leaves 2-3 cm. long; racemes short ..... *G. parviflora* 8.
  C. Leaves broad-linear or lanceolate.
    F. Ovary glabrous.
      G. Leaves 15-45 cm. long, multistriate; tree ..... *G. striata* 9.
      G. Leaves 1½-8 cm. long, with recurved margins, silky beneath; shrubs.

H. Racemes very short.
Leaves without prominent nerves ..... *G. pauciflora* 10.
Leaves with 3-5 longitudinal nerves ..... *G. quinquenervis* 11.
H. Racemes rather long ..... *G. aspera* 12.
F. Ovary villous.
Leaves alternate, 10-30 mm. long ..... *G. lavandulacea* 13.
Leaves almost clustered, 4-5 mm. long, muricate above ..... *G. Rogersii* 14.

1. **G. Huegelii,** Meisn. Shrub 1-2 m. high; leaves rigid, 1½-3 cm. long, pinnatisect with usually 2-5 short linear divergent pungent segments, doubly grooved beneath; racemes short; perianth pink, pubescent, the tube 18 mm. long, almost straight up to the slightly curved limb; gland oblique; ovary glabrous, on a long stalk; stigmatic disk oblique, convex.
Yorke Peninsula northward to Flinders Range; Murray lands; Eyre Peninsula. Sept.-Jan.—Eastern States; West Australia.

2. **G. Treueriana,** F. v. M. Shrub with rigid pinnatisect leaves 3-6 cm. long, the segments about 5 in number, subterete, doubly grooved below, pungent and forked or trisect towards the summit; racemes rather long (5-8 cm.) and many-flowered; perianth appressed-silky, the tube swollen and 10 mm. long up to the recurved limb; gland thin; ovary subsessile, pubescent; style long, with oblique convex stigmatic disk.
East of Ooldea; also in the Victoria desert, West Australia. Sept.-Oct.

3. **G. ilicifolia,** R. Br. (*Holly-leaved Grevillea, Holly-bush*). Shrub sometimes 1-2 m. high, sometimes with procumbent branches; leaves rigid, 3-6 cm. long, ovate-lanceolate, cuneate towards base, undulate-sinuate with shallow or deep prickly-pointed lobes, prominently nerved and more or less pubescent above, appressed-silky below; racemes short, unilateral; perianth silky-pubescent, the tube 8-10 mm. long; ovary pubescent on a stalk longer than it; stigmatic disk oblique, convex; fruit ovoid, acuminate, 15 mm. long.
All the southern districts from the coast to the Trans-Murray scrub and northwards to the Flinders Range; Eyre Peninsula. Sept.-Oct.—Victoria.

4. **G. pterosperma,** F. v. M. Shrub with rigid linear pungent leaves, 1-2 mm. broad, 6-15 cm. long, entire, or (in Central Australian specimens) longer and divided into opposite segments, all hoary and doubly grooved beneath; racemes 5-10 cm. long, many-flowered, the rhachis tomentose; pedicels 2 mm. long; perianth villous, the tube about 5 mm. long; ovary villous, stalked; gland oblique; fruit woody, ovoid-oblong, finally tomentose, 15-20 mm. long; seedwing rather broad.
Murray scrub; Flinders Range; Cooper Creek; Ooldea. Sept.-Jan.—Temperate Australia.

5. **G. juncifolia,** Hook. Tall shrub; leaves linear, rigid, 12-25 cm. long, 1½-2 mm. broad, entire or cut into 2 or 3 similar segments, hoary or becoming glabrous, doubly grooved beneath, pungent; racemes 8-16 cm. long, usually paniculate; pedicels 12-18 mm. long, viscid-pubescent, as is also the rhachis; perianth pubescent, the tube 10 mm. long and swollen at base, the laminae ending in a horn-like appendage; gland oblique; ovary subsessile, villous; style long, puberulent, with an oblique convex stigmatic disk; fruit acuminate, tomentose, 25 mm. long, hard.
Ranges of the Far North-West and southward to Ooldea and near Fowler's Bay. Spring.—New South Wales; Queensland; Central Australia.

6. **G. stenobotrya,** F. v. M. Shrub about 4 m. high; leaves linear, scarcely rigid or pungent, 9-25 cm. long, 1½-2 mm. broad, undivided, hoary, doubly grooved below; racemes dense, paniculate, 5-14 cm. long; pedicels 3-4 mm. long, pubescent; perianth whitish, puberulent, small, the tube 3 mm. long, slender; style short, glabrous as well as the ovary, which is shortly stalked; gland horizontal, almost annular round the gynophore; fruit hard, ovoid-compressed, 12-15 mm. long, with a short recurved beak.
Far North, from the Macumba to Cooper Creek; Ooldea. Spring.

7. **G. nematophylla,** F. v. M. Shrub about 2 m. high; leaves terete or slightly compressed, rather rigid, 6-20 cm. long, 1-2 mm. broad, hoary; racemes dense, paniculate, 4-7 cm. long, the rhachis glabrous or pubescent; pedicel 1 mm. long; perianth small, glabrous or pubescent, the tube 5 mm. long, slender; gland prominent, semiannular; ovary glabrous, long-stalked; style ending in an almost straight stigmatic cone; fruit hard, ovoid-compressed, obtuse, 15 mm. long.
West of Oodnadatta to the ranges; Ooldea. Spring and summer.—New South Wales; West Australia.

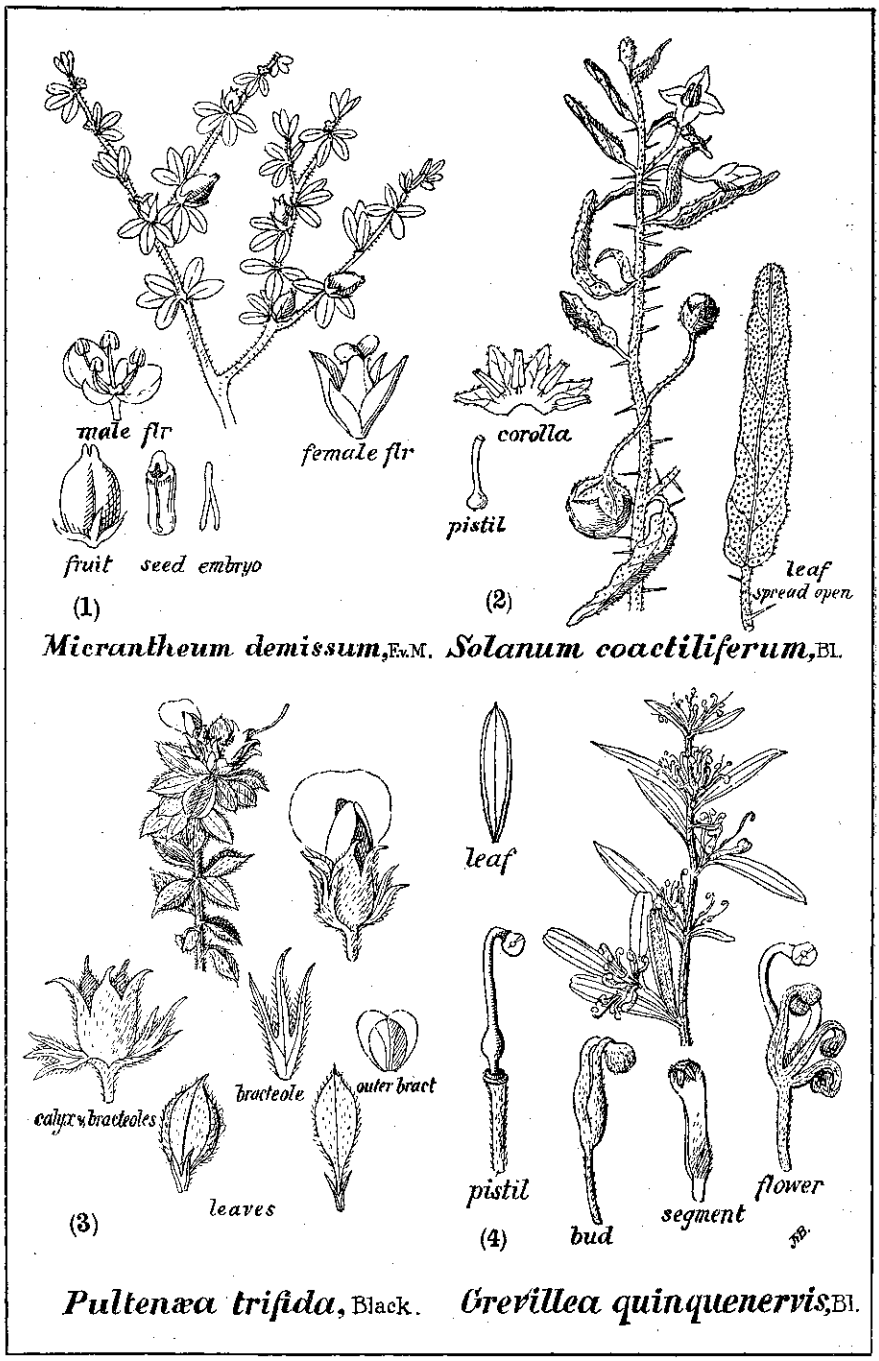

PLATE 10.—(1) **Micrantheum demissum ; (2) Solanum coactiliferum ; (3) Pultenaea trifida ; (4) Grevillea quinquenervis.**

8. **G. parviflora,** R. Br. Shrub 1-2 m. high; leaves linear, scarcely rigid, spreading, pungent, 2-4 cm. long, 1 mm. broad, doubly grooved below; racemes short, umbel-like; perianth pubescent outside and shortly bearded inside about the middle, the tube slender, 3-4 mm. long; pedicels pubescent; gland small, oblique; ovary glabrous, stalked; style with oblique stigmatic disk; fruit about 12 mm. long.

Southern part of Eyre Peninsula; Kangaroo Island; near Mount Gambier, South-East. Sept.-Nov.—Eastern States.

Var. *acuaria,* F. v. M. Leaves shorter (1-1½ cm. long), thicker, and rather more rigid. —*G. halmaturina,* Tate.

Kangaroo Island.

9. **G. striata,** R. Br. Tree, sometimes tall, with rough brown bark; leaves broad-linear, 15-45 cm. long, 4-7 mm. broad, about 10-striate, at first silky-hoary; racemes erect, 5-8 cm. long, paniculate; perianth silky-pubescent, the tube about 4 mm. long; gland prominent; ovary glabrous, stalked; stigmatic cone straight; fruit obliquely ovoid, thin but hard, about 15 mm. long, with an erect beak.

North-East towards Cooper Creek. Spring.—New South Wales; Queensland.

10. **G. pauciflora,** R. Br. Low shrub with spreading branches; leaves oblanceolate or narrow-oblong, mucronate, rigid, 1½-3 cm. long, thickened and recurved on the margins, silky-hoary beneath; flowers scarlet, usually solitary or twin, on pedicels nearly as long as they; perianth swollen in lower part, almost glabrous outside, bearded inside with reflexed hairs at summit of tube, which is 6 mm. long, gland oblique; ovary glabrous, very shortly stalked; stigmatic disk lateral; fruit erect, 12-15 mm. long, surmounted by the persistent style.

Kangaroo Island; near Port Lincoln, Eyre Peninsula. Oct.-Nov.—West Australia.

11. **G. quinquenervis,** J. M. Black. Erect shrub; leaves rigid, oblong or oblanceolate, mucronate, 2-5 cm. long, with 3-5 parallel nerves above and recurved margins, silky-hoary beneath; racemes umbel-like, 4-12-flowered; perianth pubescent outside, the tube slender, about 5 mm. long, covered with erect hairs inside on the lower part; gland almost annular; ovary glabrous, stalked; stigmatic disk oblique; fruit straight, about 15 mm. long, style persistant. (Pl. 10, No. 4.)

Snug Cove, and near Cape Borda, Kangaroo Island. Oct.

12. **G. aspera,** R. Br. Tall shrub; leaves narrow-oblong, 3-8 cm. long, mucronate, rough with prominent pinnate nerves and tubercles above, appressed-silky below, the margins recurved; racemes axillary and terminal, stalked, curved, 3-4 cm. long; rhachis, pedicels and flowers reddish-tomentose; perianth tube 8 mm. long, swollen in the middle part, bearded inside on the throat; gland oblique; ovary glabrous, stalked; style thick, puberulent, not exceeding the perianth, with a large lateral disk; fruit resembling that of the preceding species.

Near Port Lincoln and Marble Range, Eyre Peninsula; Gawler Range; Mount Lyndhurst and Mount Patawurta (Flinders Range). Sept.-Oct.

13. **G. lavandulacea,** Schlecht. Low shrub, often under 50 cm. high, the stems sometimes procumbent; leaves varying from broadly oblanceolate to narrow-lanceolate, 1-3 cm. long, rigid, mucronate, more or less pubescent and scabrous above, silky-tomentose beneath, the margins recurved or sometimes revolute, so as to hide the undersurface; racemes short, terminal, several-flowered; perianth bright-red, pink or almost white, pubescent outside, bearded inside with reflexed hairs at the base of the segments, the tube 10-15 mm. long, swollen and oblique towards the base; gland oblique; ovary hairy, stalked; style long, puberulent, slender, with an oblique disk; fruit straight, pubescent, 15 mm. long.

Southern districts; Murray scrub; 90-Mile Desert; Flinders Range. July-Dec.—Eastern States.

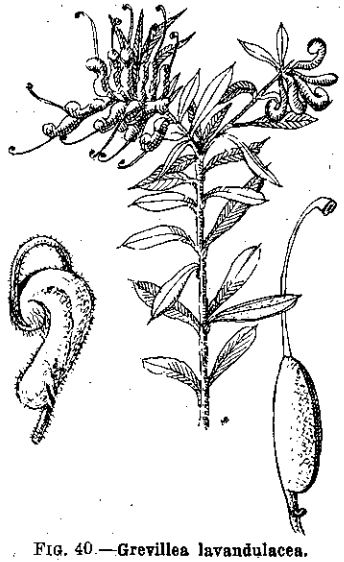

FIG. 40.—**Grevillea lavandulacea.**

14. **G. Rogersii,** Maiden. Low branching shrub, 50-80-cm. high; leaves small, crowded and often clustered, lanceolate, mucronate, 3-8 mm. long, rigid, muricate above and revolute on the margins so as almost to hide the woolly undersurface; flowers solitary

or twin, at the end of short lateral branchlets; perianth scarlet or pink, puberulent outside, the tube 10-14 mm. long, swollen near the base, bearded inside below the middle with reflexed hairs; gland oblique; ovary and gynophore hairy; style long, puberulent, with a lateral disk; fruit becoming glabrous, about 13 mm. long.

Near Cape Borda, Kangaroo Island. Oct.-Nov

Family 37.—SANTALACEAE.

Flowers small, bisexual or unisexual, regular; perianth simple, petaloid, with 4-5 valvate divisions; stamens as many as the segments or lobes and opposite to them; ovary usually inferior, with 1-5 ovules hanging from a free central placenta, the ovules without an outer covering and sometimes obscure; style simple or sometimes wanting; fruit indehiscent, 1-seeded; embryo small or nearly as long as the albumen, with a superior radicle; seed coats absent. Shrubs or trees, glabrous and usually parasitic on the roots of other plants; leaves entire, without stipules, often reduced to scales. *Sandalwood Family.*

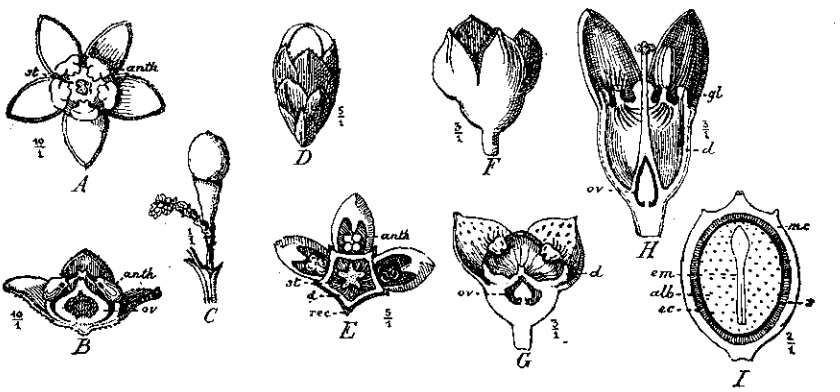

Fig. 41.—**Santalaceae.** A-C, *Exocarpus cupressiformis;* A, open flower; B, vertical section of same; C, fruit with withered spike near base of pedicel; *st*, style; *anth*, anther; *ov*, ovary. D-E, *Choretrum spicatum;* D, flower with subtending bracts; E, open flower (2 perianth-segments removed); *d*, disk; *rec*, 5-toothed rim of receptacle. F-G, *Fusanus spicatus;* F, flower; G, vertical section of same. H-I, *Santalum lanceolatum;* H, vertical section of flower; *gl*, glands at summit of disk (*d*); I, fruit; *mc*, mesocarp; *ec*, endocarp; *s*, seed; *alb*, albumen; *em*, embryo.

A. Ovary superior; leaves usually minute; flowers more or less unisexual.
- Flowers unisexual, the females solitary..... Anthobolus 1.
- Flowers bisexual, or unisexual by abortion, in small spikes or clusters..... Exocarpus 2.

A. Ovary inferior or nearly so; flowers bisexual.

B. Leaves minute, caducous or absent, alternate.
- Flowers in short spikes, each flower with 1 bract.... Leptomeria 3.
- Flowers clustered or in rather long spikes, each flower with several bracts..... Choretrum 4.

B. Leaves large, persistant, usually opposite.
- Disk shortly lobed between the incurved stamens; perianth-tube short; ovary inferior..... Fusanus 5.
- Disk produced into glands between the erect stamens; perianth-tube long; ovary half-inferior ..... Santalum 6.

1. ANTHOBOLUS, R. Br.

(Greek *anthos*, flower; *bolos*, casting off: the perianth is caducous.)

1. **A. exocarpoides,** F. v. M. Shrub 1-2 m. high, with furrowed leafless branches; flowers dioecious; females solitary, with 4 small perianth segments, on pedicels of about 3 mm., lengthening until they are much longer than the ovoid drupe, which is about 5 mm. long; ovary superior, with a sessile stigma; cotyledons rather shorter than the radicle; bracts at base of pedicel minute and caducous.

Tomkinson Range, near West Australian border. July.—Central Australia.

2. EXOCARPUS, Labill.

(Greek *exo*, outside; *karpos*, fruit: the succulent pedicel resembles a pericarp below the nut.)

Flowers minute, sessile, bisexual, or male by the abortion of the ovary, in small axillary spikes or clusters; perianth divided to the broad base into 4-5 segments; ovary conical, superior, fleshy; stigma sessile; fruit a drupe or nut, resting on the enlarged succulent pedicel; anthers broad, inflexed; adult leaves small; young leaves often lanceolate and conspicuous.

A. Flowers in cylindrical pedunculate spikes; branchlets slender.
- Leaves reduced to scales ..... *E. cupressiformis* 1.
- Leaves linear ..... *E. spartea* 2.

A. Flowers in clusters or very short subsessile spikes.
- Branchlets stout ..... *E. aphylla* 3.
- Branchlets slender ..... *E. stricta* 4.

1. **E. cupressiformis,** Labill. *Native Cherry.* Dense shrub or tree 3-8 m. high, with spreading or erect branches and slender green pendulous furrowed branchlets, on which the leaves are reduced to minute spreading persistant scales; flowers sessile in short pedunculate spikes; perianth-segments 5; many flowers barren, usually 1 in the spike fertile and developing an obconical often red pedicel about 5 mm. long, and about the same length as the almost globular fruit. (Fig. 41, A-C.)

Southern districts; Eyre Peninsula; South-East. Aug.-Feb.—Temperate Australia.

2. **E. spartea,** R. Br. Broom-like shrub, 2-4 m. high, with angular slightly furrowed slender usually pendulous branchlets; leaves linear-subulate, 5-6 mm. long, caducous, those on young shoots lanceolate and much longer; flower-spikes as in the preceding, sometimes 2 spikes rising from the same axil; perianth-segments 4, sometimes 5; fruit ovoid, orange, finally brown, 4-5 mm. long; pedicel usually very succulent, cylindrical to ovoid, white or yellowish.

Southern districts; Murray scrub; 90-Mile Desert; Eyre Peninsula. Most of the year.—Throughout Australia.

3. **E. aphylla,** R. Br. Much-branched shrub or small tree, with stout rigid striate branchlets; leaves reduced to minute caducous scales; flowers in short sessile spikes or clusters (2-4 mm. long), the rhachis pubescent; perianth 5-sect; fruit ovoid, 4-5 mm. long, resting on a succulent red pedicel, broader and shorter than the fruit.

Southern districts; Murray scrub; Yorke Peninsula; Flinders Range; Eyre Peninsula and along the Great Bight. July-Dec.—Temperate Australia.

4. **E. stricta,** R. Br. Shrub with slender angular striate leafless branches; leaves on the very young shoots subulate, 2-3 mm. long; flowers in small few-flowered axillary clusters; fruit ovoid, the pedicel succulent, usually whitish.

Murray scrub; Port Lincoln, E. P. Summer.—Temperate Australia.

3. LEPTOMERIA, R. Br.

(Greek *leptos*, slender; *meros*, a part: alluding to the slender branchlets.)

1. **L. aphylla,** R. Br. Shrub about 1 m. high, with rigid terete leafless branches and slender branchlets spinescent at the ends; flowers minute, purplish, in short lateral spikes, the bract enclosing each flower obovate and toothed near the summit; perianth-segments usually 5; ovary inferior, crowned by a small disk; style very short, the stigma minutely 5-lobed; drupe succulent, ovoid, crowned by the persistant perianth.

Barossa Range; Kangaroo Island; Murray scrub; near Robe, S.E.; Port Lincoln, E.P. Summer.—Victoria.

4. CHORETRUM, R. Br.

(Greek *khoris*, separate; *etron*, abdomen: the extended receptacle is separated from the perianth by a faintly toothed rim at its summit.)

Flowers minute, subsessile, each one subtended by 3-10 bracts; perianth cut to the epigynous 5-lobed disk into 5 thick fleshy segments which are abruptly inflexed in the upper part; filaments very short; anthers 4-lobed, opening in 4 valves round the summit of the connective, the cells finally confluent; style short, with a 5-lobed stigma; ovary inferior, the enclosing receptacle cup-shaped, green, and obscurely 5-toothed at summit; fruit a drupe crowned by the persistant perianth; leaves reduced to minute caducous scales.

- Flowers in clusters ..... *Ch. glomeratum* 1.
- Flowers in spikes ..... *Ch. spicatum* 2.

1. **Ch. glomeratum,** R. Br. Broom-like shrub, usually 1-2 m. high, with many erect slender flexible angular branches; flowers clustered, 2-5, each cluster on a short common lateral peduncle; 3 whitish bracts enclosing the base of each flower; perianth white; drupe almost globular, about 5 mm. long.

Scrub on both sides of River Murray; Square Waterhole (Mt. Lofty Range); Yorke Peninsula; Kangaroo Island; Eyre Peninsula. Spring and summer.—Temperate Australia.

Var. *chrysanthum*, Benth. Perianth yellow.—*Ch. chrysanthum*, F. v. M.

2. **Ch. spicatum,** F. v. M. Erect shrub with terete rigid branches; leaves reduced to minute lanceolate scales on the branchlets, the points of the scales spreading and then falling off; flowers white, solitary along the approximate branchlets, but rather crowded, so as to form spikes or racemes 2-5 cm. long; each flower shortly pedunculate and subtended by 8-10 brown ciliate bracts; drupe globular, small. (Fig. 41, D-E.)

Murray scrub; 90-Mile Desert; Kangaroo Island. Oct.-Dec.—Eastern States.

5. FUSANUS, R. Br.

(A name published in 1774 by J. A. Murray for a South African genus in *Santalaceae*, which had been previously named *Colpoon* by Bergius. The name *Fusanus* was utilised by Robert Brown in 1810 for the Australian genus. It was originally given to the South African plant because the foliage resembled that of the spindle-tree (*Evonymus europaeus*, L.), which in medieval Latin was known as *Fusago*, and in French as *Fusain*, from the Latin *fusus*, a spindle.)

Flowers small, paniculate; perianth with a very short tube and 4 fleshy lobes, each lobe bearing a tuft of hairs behind the stamen, the tube lined by the short thick concave epigynous disk, which protrudes within the perianth in 4 short broad erect lobes; filaments short, incurved over the notches of the disk; ovary inferior; drupe globular, with a hard endocarp; leaves mostly opposite, flat, rather thick, shortly petiolate.

A. Leaves acute.
- Fruit edible; endocarp deeply pitted ..... *F. acuminatus* 1.
- Fruit inedible; endocarp slightly pitted ..... *F. persicarius* 2.

A. Leaves obtuse; endocarp smooth ..... *F. spicatus* 3.

1. **F. acuminatus,** R. Br. *Native Peach, Quandong.* Shrub or small tree; leaves lanceolate, 5-10 cm. long, the young ones acuminate with a curved point; flowers in a terminal pyramidal panicle; disk red; style very short; fruit edible, red, 2-3 cm. diam., the mesocarp succulent, the endocarp ("stone") deeply pitted, the perianth persistant on the summit of the ripe fruit.—*Santalum acuminatum*, A. DC.

From Cape Jervis northward to Lake Eyre and westward to Ooldea and the Everard Range; Kangaroo Island; Murray Lands; Yorke and Eyre Peninsulas. Spring and summer. The succulent part of the fruit is eaten by the natives and is stewed or preserved by white people; the kernel is also a native food.—Temperate Australia.

2. **F. persicarius,** F. v. M. *Bitter Quandong.* Resembles the preceding; leaves linear-lanceolate or lanceolate; panicles mostly axillary; fruit about 2 cm. diameter, brownish red, the mesocarp bitter and scarcely succulent, the endocarp very slightly pitted; perianth caducous.—*Santalum persicarium*, F. v. M.

Same localities and season as the preceding.

3. **F. spicatus,** R. Br. *Fragrant Sandalwood.* A shrub or tree varying from 3 to 8 m. high; leaves coriaceous, dark-green, 3-6 cm. long, usually obtuse, lanceolate or obovate, tapering into a thick broad petiole; flowers fragrant, in small axillary or terminal panicles; fruit yellowish, 2-2½ cm. diam., mesocarp not succulent, endocarp almost smooth; perianth and disk persistant till the fruit is nearly ripe and surrounding a broad circular area at the summit of the fruit (Fig. 41, F-G).—*Santalum spicatum*, A.DC.

Flinders Range, near Leigh's Creek and Mount Serle, and westward to Tarcoola and Ooldea. May-June. Yields sandalwood oil on distillation.—West Australia.

6. SANTALUM, L.

(Greek *santalon*, from Arabic *sandal*, the Indian Sandalwood.)

1. **S. lanceolatum,** R. Br. Shrub or small tree, with spreading branches; leaves opposite, lanceolate-acuminate, sometimes very narrow, 3-7 cm. long, tapering into a short slender petiole; flowers larger than in *Fusanus*, in short opposite axillary and terminal trichotomous panicles; perianth 8 mm. long, the tube campanulate and as long as the 4 fleshy lobes; disk lining the perianth-tube and protruding at its summit in 4 conspicuous obovate lobes or glands; stamens erect, alternate with the glands, the filaments with hair tufts behind and in front, the anthers oblong; ovary half-inferior; style long, with a 3-4-lobed stigma; fruit inferior, ovoid, 12-15 mm. long, purple or black, the mesocarp succulent, the endocarp hard but thin; perianth deciduous and leaving a circular scar a little below the summit of the fruit (Fig. 41, H-I).

From near Lake Torrens to the Far North. May-June.—New South Wales; Queensland.

Family 38.—**OLACACEAE.**

1. OLAX, L.

(Medieval Latin *olax*, ill-smelling; the wood of some Asiatic species has an unpleasant odor.)

1. O. Benthamiana, Miq. Low glaucous shrub, with thick alternate obcordate keeled leaves 5-10 mm. long; flowers solitary, axillary, 6-7 mm. long, shortly pedicellate; calyx cup-shaped, shortly 5-toothed, much shorter than the 5 (sometimes 6) valvate petals, which are united in the lower part by the flat adnate portion of the filaments; stamens 3, alternate with petals; staminodia 3, opposite the petals, linear, bifid, bearded in the lower part; ovary superior, 1-celled above, 3-celled near the base; ovules 3, naked, anatropous, hanging from a free central placenta; style 1, stigma 3-lobed; drupe globular, about 10 mm. diam., enclosed in the enlarged calyx, but free from it; seed 1, albuminous.

Kangaroo Island; near Port Lincoln. October-November.—Also in West Australia.

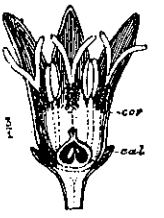

Fig. 42.
Olax Benthamiana.
Vertical section of flower; *cor*, corolla; *cal*, calyx.

Family 39.—**LORANTHACEAE.**

Flowers regular, bisexual or unisexual; perianth-segments usually 4-6, in 1 whorl, free or united, valvate, petaloid; stamens as many as perianth-segments, opposite to and inserted on them; ovary inferior, adnate to the cup-shaped receptacle, which has usually a small scarious extension or rim at the summit (*calycle*), encircling the base of the perianth; ovule in the 1-celled ovary obscure until after flowering; style simple or absent; fruit berry-like, 1-seeded, the inner layer of the receptacle forming a very sticky pulp; embryo within the fleshy albumen; radicle superior; leaves almost always opposite, thick. Parasites, usually on the branches of trees or shrubs, to which the sticky berries are carried by birds. On the germination of the embryo, the radicle emerges and bends over towards the branch, to which it attaches itself by a terminal disk; it then sends suckers down into the wood.

Flowers large, bisexual; calycle present ..... Loranthus 1.
Flowers small, unisexual; calycle absent ..... Viscum 2.

1. LORANTHUS, L.

(Greek *loron*, a thong; *anthos*, a flower: the perianth-segments are strap-shaped.)

Flowers bi-sexual, large, often brightly coloured, cylindrical-clavate in bud, each subtended by a small persistant bract; anthers basifixed, with parallel cells, opening longitudinally; style filiform; berry usually crowned by the persistant calycle. Mistletoe.

The leaves of the parasite often simulate those of the host, *e.g.*, *L. Miquelii* and *L. pendulus* on Eucalypts, *L. gibberulus* on *Hakea lorea*, but in other cases, *e.g.*, *Loranthi* growing on *Casuarina*, there is no similarity. Species of *Loranthus* are also found parasitic on exotic trees growing in Australia.

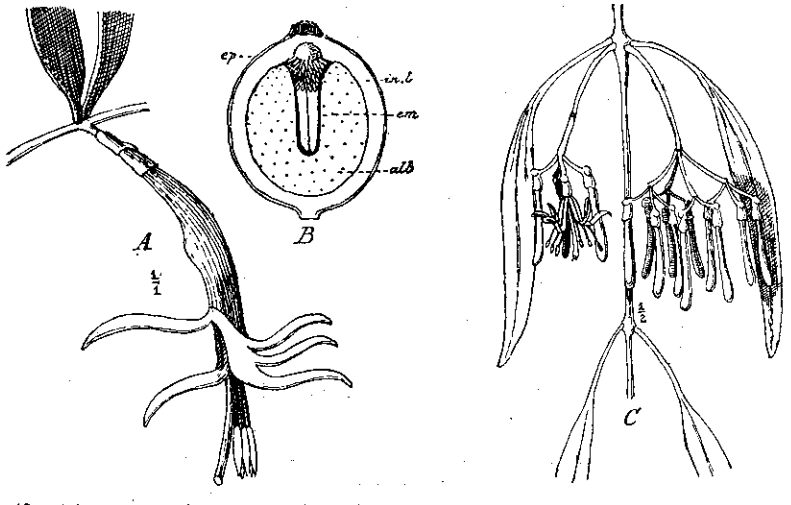

Fig. 43.—A-B, *Loranthus Exocarpi*. *A*, flower; *B*, vertical section of fruit; *ep*, epidermis of receptacle *in. l*, inner sticky layer of receptacle; *alb*, albumen; *em*, embryo; *C*, inflorescence of *L. Miquelii*.

A. Perianth-segments united to the middle or higher up; flowers solitary or in pairs.
  B. Leaves flat, mostly opposite ..... *L. Exocarpi* 1.
  B. Leaves almost terete.
    Leaves mostly alternate ..... *L. Murrayi* 2.
    Leaves mostly opposite ..... *L. linearifolius* 3.
A. Perianth-segments finally free.
  C. Flowers in 2-5-rayed umbels, each umbel supported on a conspicuous axillary peduncle, and each ray bearing 2-3 flowers.
    D. Leaves terete.
      Umbel-rays 2-3, each 3-flowered; leaves glabrous ..... *L. Preissii* 4.
      Umbel-rays 2, each 2-flowered; leaves tomentose ..... *L. gibberulus* 5.
    D. Leaves flat; rays usually 3-flowered.
      E. Glabrous plants; lateral flowers of each ray pedicellate.
        F. Leaves lanceolate, long; flowers $2\frac{1}{2}$-3 cm.
          All 3 flowers pedicellate ..... *L. Miquelii* 6.
          Central flower sessile ..... *L. pendulus* 7.
        F. Leaves oblanceolate, short; flowers $1\frac{1}{2}$-2 cm., central one sessile ..... *L. miraculosus* 8.
      E. Hoary plant; leaves broad; all 3 flowers sessile *L. quandang* 9.
  C. Flowers sessile on peduncle (capitate).
    Glabrous plant; flowers between 2 large leafy bracts *L. grandibracteus* 10.
    Hoary plant; flowers in 2 opposite sessile clusters, without large bracts ..... *L. Maidenii* 11.

1. **L. Exocarpi,** Behr. (1848). Glabrous; leaves mostly opposite, linear or oblong, flat but thick, obtuse, 3-10 cm. long; flowers axillary, pedicellate, solitary or twin, on a very short thick common peduncle (not exceeding 2 mm.); perianth $3\frac{1}{2}$-4 cm. long, the tubular portion red or sometimes yellow, the spreading limb green; berry globular or ovoid, pink or orange, finally dark-red or purple. (Fig. 43, A-B.)—*L. angustifolius* R. Br. (1866). All over the State, except the South-East. March-June. On *Eucalyptus rostrata, Acacia salicina, A. sentis, A. aneura, Eremophila glabra, E. Freelingii, Exocarpus aphylla, E. cupressiformis, Myoporum platycarpum, Casuarina stricta, Cassia Sturtii, Santalum lanceolatum.* Has been found parasitic on another species of *Loranthus.*—Most parts of Australia.

2. **L. Murrayi,** F. v. M. et Tate. Glabrous; leaves alternate, but arranged in pairs and often nearly opposite, narrow-linear, plano-convex in transverse section, so as to appear almost terete or filiform, 2-4 cm. long; flowers axillary, solitary or in pairs on pedicels 10-15 mm. long, without any peduncle; perianth about 2 cm. long, the tube pale yellow, the limb pink at summit; bract nearly as long as the receptacle; berry globular.
Flinders Range, near Leigh's Creek; from Oodnadatta westward to Birksgate Range; Tarcoola. June-Sept. On *Acacia aneura* and other mulgas.—Also in West Australia.

3. **L. linearifolius,** Hook. Resembles the preceding, but the leaves mostly opposite, terete and sometimes longer; flowers axillary, pedicellate in pairs on a very short peduncle; perianth about $2\frac{1}{2}$ cm. long, the tube red, the limb greenish.
Far North. Summer.—Queensland; West Australia.

4. **L. Preissii,** Miq. Glabrous; leaves mostly opposite, terete and slender, 3-7 cm. long; flowers in axillary umbels, the common peduncle with 2-3 diverging rays or branches, each ray bearing 3 flowers (or 1-2 by abortion), the 2 lateral flowers on divaricate pedicels, the central one sessile; perianth about 2 cm. long, red, the segments free and dilated towards base; berry globular, whitish.—*L. linophyllus,* Benth. partly; *L. linophyllus, Fenzl,* var. *Preissii,* Ostenf.
From Adelaide to the Far North and West; Murray lands. Most of the year. On *Acacia melanoxylon, A. brachystachya, Heterodendron oleifolium.*—Also in West Australia, Victoria, and New South Wales.

5. **L. gibberulus,** Tate. Leaves and branches hoary-tomentose; leaves terete, 2 mm. diam., alternate or nearly opposite, 4-10 cm. long; common peduncle short, bearing 2 pedicellate flowers, or an umbel of usually 2 rays, each ray 2-flowered; perianth about 3 cm. long, almost woolly outside, the segments free and dark-red inside; calyce very

prominent; bract adnate and forming a gibbous base to the receptacle; berry globular, tomentose.

Far North and North-West; 80 miles N. of Renmark. Most of the year. On *Hakea lorea, H. leucoptera, Grevillea nematophylla, G. striata, Casuarina lepidophloia.*—Also in MacDonnell Range and West Australia.

6. **L. Miquelii,** Lehm (1844-5). Glabrous; leaves mostly opposite, ovate-lanceolate, oblong or narrow-lanceolate, 5-15 cm. long, petiolate, 3-5-nerved when dry; flowers arranged like a candelabrum in axillary compound umbels, the common peduncle long, with 3-5 rays, each bearing a partial cyme of 3, rarely 2, pedicellate flowers; perianth 2½-3 cm. long, orange outside, red inside, the segments free; fruit oblong or ovoid, whitish. (Fig. 43, C).—*L. aurantiacus,* A. Cunn. (1848); *L. pendulus,* Benth. partly.

All parts of the State, except perhaps the South-East. Summer. Usually on species of *Eucalyptus,* rarely on *Acacia* or *Casuarina.*—Throughout Australia.

7. **L. pendulus,** Sieb. Like the preceding, but the leaves narrow-lanceolate, 8-20 cm. long and the central flower of the cyme sessile; fruit oblong-ovoid, reddish-brown.—*L. pendulus,* Benth. partly.

Blackwood (Mt. Lofty Range); Dismal Swamp (South-East); north of Broken Hill Railway. Summer. Chiefly on Eucalypts.—Eastern Australia.

8. **L. miraculosus,** Miq. var. *Melaleucae,* Tate. Small plant; leaves opposite, narrowly cuneate or oblanceolate, thick, obtuse, 1-4 cm. long, 3-5 mm. broad, umbel-rays 2-3, each bearing 3 slender flowers, the central flower sessile; perianth 1½-2 cm. long, red, the segments free; receptacle tapering towards base; fruit ovoid, yellowish.—*L. Melaleucae,* Lehm.; *L. pendulus,* Sieb. var. *parviflorus,* Benth. partly.

Southern districts, chiefly near the cost; Eyre Peninsula and west to Fowler's Bay; Murray lands; South-East. Summer. On *Melaleuca pauperiflora, M. parviflora.*

Var. *Boormanii,* Blakely. Leaves oblong or broadly oblanceolate, 3-8 cm. long, 5-10 mm. broad, thick; perianth 2 cm. long, red; fruit 10-12 mm. long. Very close to type.

Northern part of Flinders Range and westward to Ooldea; north of Renmark to Cockburn. On *Fusanus spicatus, Myoporum platycarpum.*

9. **L. quandang,** Lindl. *Grey Mistletoe.* Hoary, with a minute stellate tomentum; leaves opposite, oblong-lanceolate, obtuse, thick, 4-8 cm. long, 8-10 mm. broad, obscurely 3-nerved; umbel usually of 2 rays, each ray bearing 3 flowers, the central one sessile; the common peduncle short; perianth 2½-3 cm. long, hoary outside, red inside, the segments free; receptacle swollen into a ring below the short calycle; fruit obovoid, hoary.—*L. pendulus,* Sieb. var. *canescens,* F. v. M. et Tate.

Port Augusta to Far North; Gawler Range. Most of the year.—Throughout Australia.

Var. *Bancroftii,* Blakely. Leaves ovate or ovate-lanceolate, 2-5 cm. long, 15-25 mm. broad, 3-5-nerved.

North-East and towards Broken Hill. Chiefly on *Acacia.*—Also in New South Wales and Queensland.

10. **L. grandibracteus,** F. v. M. Glabrous; leaves oblong or oblanceolate, opposite, obtuse, 3-10 cm. long; flowers 4-6, sessile between 2 obovate leafy bracts, 3-4 cm. long and sessile at the summit of a broad flattened peduncle; perianth about 2½ cm. long, the segments free.

Oodnadatta to Stevenson River; Cooper's Creek. On *Eucalyptus microtheca.*—New South Wales; Queensland; Northern Territory.

11. **L. Maidenii,** Blakely. Hoary-tomentose like *L. quandang;* leaves opposite, broadly oblanceolate or almost obovate, 2-5 cm. long, 3-5-nerved on the upper face; peduncle 1-3 cm. long, the 2 partial cymes reduced to 2 opposite clusters of 3 sessile flowers each, so that the inflorescence appears capitate; perianth 2-3 cm. long, the segment hoary outside, green inside, free; tubular receptacle tapering towards base; fruit ovoid, hoary.—*L. quandang,* Tate, non Lindl.

Flinders Range to Far North; westward to Everard Range and Tarcoola; eastward to Broken Hill, N.S.W. Spring and summer. On *Acacia aneura, A. tetragonophylla, Myoporum platycarpum.*

2. VISCUM, L.

(Latin for Mistletoe and for the birdlime made from its sticky berries.)

1. **V. articulatum,** Burm. *Jointed Mistletoe.* Glabrous shrub, with opposite leafless articulate flattened branches; flowers monoecious, minute, sessile, clustered at the nodes and surrounded by a cup-shaped bract; perianth-segments usually 3, persistant on the globular berry.

The Dome (northern end of Flinders Range and about 12 miles S.W. of Marree); Ooldea. On *Acacia linophylla.*—Also in New South Wales and Queensland.

FAMILY 40.—POLYGONACEAE.

Flowers small, regular, bisexual or unisexual, usually clustered in the axils; perianth herbaceous, sometimes colored, of 5 or 6 imbricate segments or lobes; stamens 4-8; ovary superior, 1-celled, with 1 orthotropous erect ovule; styles 2-3; fruit a small angular seed-like nut, enclosed in the persistant perianth; seed 1, erect, albuminous; testa membranous; radicle superior. Herbs or shrubs with alternate simple leaves, and membranous stipules forming a sheath round the branch.

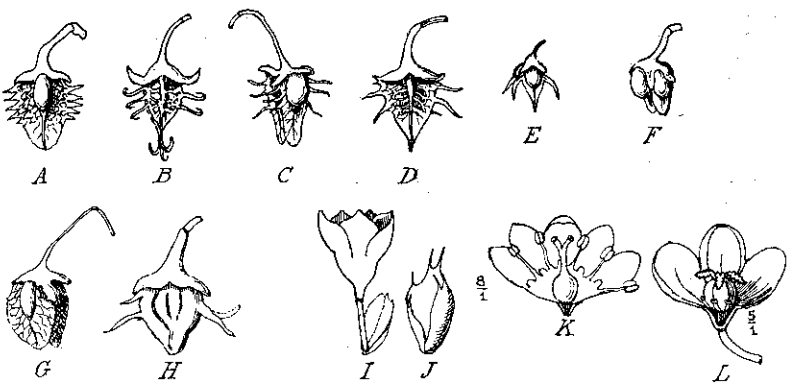

FIG. 44.—**Polygonaceae.** A-H, *Rumex*. A, *R. pulcher*. B, *R. Brownii*. C, *R. obtusifolius*. D, *R. dumosus*. E, *R. crystallinus*. F, *R. conglomeratus*. G, *R. crispus*. H, *R. bidens*. Fruiting perianths twice the natural size. **I-K**, *Polygonum prostratum*: I, flower with bracteole at base of pedicel; J, scarious bract enclosing the flower-cluster; K, flower spread open. L, vertical section of female flower of *Muehlenbeckia diclina*, with 8 abortive stamens at base of ovary.

A. Perianth-segments or lobes 6, unequal.
  Three outer segments small, 3 inner ones large ..... RUMEX 1.
  Three outer lobes spiny, 3 inner ones smaller ..... EMEX 2.
A. Perianth-segments or lobes 5, almost equal.
  Flowers mostly bisexual ..... POLYGONUM 3.
  Flowers unisexual ..... MUEHLENBECKIA 4.

1. RUMEX, L.

(Latin for the Sorrel; probably from the shape of the leaf, *rumex* meaning also a dart or javelin.)

Perianth-segments 6, the 3 inner ones enlarged and closing over the fruit; stamens 6; styles 3, with large penicillate stigmas; nut triquetrous, enclosed in the 3 inner segments or valves. Flowers small, often turning red on jointed pedicels, in whorl-like clusters, forming long racemes and panicles; herbaceous perennials.

A. Flowers bisexual, rarely polygamous.
  B. Fruiting valves with long teeth.
    C. Flower-clusters without floral leaves except to the lowest ones.
      D. Clusters distant, several-flowered.
        Valves tuberculate; teeth straight ..... *R. pulcher* 1.
        Valves naked; teeth hooked ..... *R. Brownii* 2.
      D. Clusters approximate, many-flowered ..... *R. obtusifolius* 3.
    C. Flower-clusters with leaves longer than the flowers.
      Clusters few-flowered; valves naked ..... *R. dumosus* 4.
      Clusters many-flowered; valves tuberculate.... *R. crystallinus* 5.
  B. Fruiting valves entire, tuberculate.
    Valves oblong; panicle loose ..... *R. conglomeratus* 6.
    Valves suborbicular; panicle dense ..... *R. crispus* 7.
A. Flowers unisexual.
  Flowers monoecious; leaves rounded at base ..... *R. bidens* 8.
  Flowers dioecious; leaves hastate..... *R. Acetosella* 9.

*1. **R. pulcher**, L. *Fiddle Dock*. Stem erect, with stiff spreading branches; radical leaves oblong-cordate and often contracted in the centre; clusters 6-12-flowered, distant, in racemes leafy towards the base only; valves ovate-triangular, about 5 mm. long, all 3 bearing an oblong tubercle, or 2 with undeveloped tubercles, reticulate and bordered on each side by 3-5, rarely more, rigid teeth. (Fig. 44, A.)

Settled districts. Oct.-Dec.—Europe; Asia.

2. **R. Brownii,** Campd. Sometimes 1 m. high; radical leaves oblong-cordate or almost hastate; clusters 5-16-flowered, distant, forming long racemes leafless except at the base; valves 4 mm. long, with a long hooked point and 2-3 long hooked bristles on each side, reticulate, the midrib thickened but without a tubercle (Fig. 44, B).

Southern districts to Flinders Range; Eyre Peninsula; South-East. Sept.-Dec.—Also in the eastern States.

*3. **R. obtusifolius,** L. *Broad Dock.* Stem stout; radical leaves large, sometimes 30 cm. long and 14 cm. broad, crenulate, cordate at base; clusters many-flowered, near together, naked or only leafy near the base of the long racemes; valves 4-5 mm. long, ovate-triangular, obtuse, with about 3 teeth on each side below the middle, only 1 valve bearing a large tubercle (Fig. 44, C).

Southern districts, usually in damp situations. Nov.-Jan.—Europe; Asia.

4. **R. dumosus,** A. Cunn. Branches numerous and intricate; lower leaves lanceolate; clusters distant, 1-4-flowered, all with linear-lanceolate leaves longer than the flowers; valves 4-5 mm. long, triangular, acuminate, reticulate without tubercles, bordered on each side by 2, rarely 3, straight rigid teeth; pedicels often spreading (Fig. 44, D.)

Southern districts to Flinders Range; South-East. Sept.-Nov.—Also in Victoria, New South Wales, and Tasmania.

Mueller and others have united this species with the New Zealand *R. flexuosus,* Soland., but Cheeseman (Fl. N.Z. 591) says that the latter has the clusters 4-12-flowered, the lower ones leafy, the valves only 2½ mm. long, the "margins entire or more usually with 1-4 hooked spines on each side," and approximates the plant to *R. Brownii.*

5. **R. crystallinus,** Lange (1861). Erect, sometimes only 6 cm. high in northern specimens, but a rather tall branching plant along the Murray; leaves lanceolate or linear-lanceolate, cordate or with 2 small auricles at base, rarely tapering into the petiole, sometimes 15 cm. long and very narrow on large specimens; stipules membranous, conspicuous; clusters many-flowered, distant, or approximate and finally confluent, with crisped leaves much longer than the clusters; valves small, 1¾-2½ mm. long, acuminate, with 1-2 teeth on each side and a conspicuous tubercle on the midrib; pedicels 1½ mm. long. (Fig. 44, E.) *R. halophilus,* F. v. M. (1863).

River Murray; Far North from the Alberga River to Strzelecki Creek. Most of the year.—Also in the eastern States.

*6. **R. conglomeratus,** Murray. *Clustered Dock.* Erect, with stiff ascending branches; lower leaves oblong-lanceolate, crisped; clusters many-flowered, rather distant, leafy except at the summit, forming a loose panicle; valves 2-3 mm. long, entire, oblong, obtuse, each usually with a large oblong, tubercle (Fig. 44, F.)

Moist places in settled districts. Oct.-Dec.—Almost cosmopolitan.

*7. **R. crispus,** L. *Curled Dock.* Stem short, erect, with short erect branches; lower leaves oblong-lanceolate, crisped on edges; clusters many-flowered, approximate, leafy only near the base of the raceme, and forming a long dense panicle; valves 3-6 mm. long, broad-ovate, entire, cordate at base, reticulate, often only 1 of the 3 bearing a well-developed ovoid tubercle (Fig. 44, G).

Settled districts. Nov.-Jan.—All temperate regions.

8. **R. bidens,** R. Br. Growing in water, with swollen, almost bladdery stems; leaves long, lanceolate; clusters many-flowered, the upper ones male, the lower chiefly female, all or nearly all with floral leaves decreasing in size upwards; valves 5-6 mm. long, light-yellow, broad, obtuse, with 1-2 rigid teeth on each side and a more or less defined oblong tubercle. (Fig. 44, H.)

Reedbeds, near Adelaide; River Murray; lakes and drains in South-East. Summer.—Also in the eastern States.

*9. **R. Acetosella,** L. *Sheep-sorrel.* Erect, slender, acid in taste; leaves petiolate, hastate with spreading auricles; stipules silvery-white; flowers small, dioecious, forming slender leafless reddish panicles; valves ovate, entire, without tubercles, scarcely as long as the nut.

A weed in most of the settled districts. Sept.-Dec.—Temperate regions of the globe. *Acetosella* is an old generic name for *Rumex.*

FIG. 45.—**Rumex Acetosella.**

2. EMEX, Necker.

(An artificial name, formed after *Rumex*.)

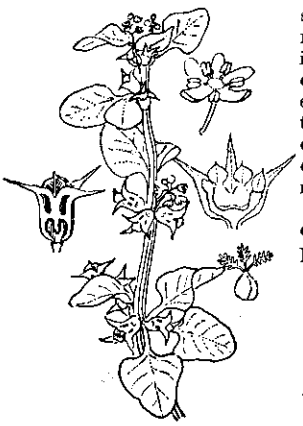

FIG. 46.—**Emex australis.**

*1. **E. australis,** Steinh. Glabrous annual, with long-stalked ovate leaves, truncate or cordate at base; flowers monoecious, in axillary whorl-like clusters, the males in a short raceme, the females subsessile; male perianth of 5-6 segments, with 4-6 stamens; female perianth enlarged and hardened in fruit, 7-9 mm. long, with a triangular tube and 6 lobes, the 3 outer terminating each in a rigid spreading spine, the 3 inner smaller, ovate, closing over the fruit; styles 3, with penicillate stigmas; nut trigonous, brown, glossy.

A weed on roadsides and waste places in most parts of the State. Most of the year. The hard spiny fruiting perianths are called *Prickly Jacks*. South Africa.

3. POLYGONUM, L.

(Greek *polys*, many; *gony*, a knee: the stems have many nodes.)

Flowers usually bisexual; perianth-segments usually 5, almost equal; stamens 5-8; styles 2 or 3, sometimes united towards base, with entire terminal stigmas; nut enclosed in the persistant perianth; embryo lateral, curved. Herbs with small flowers in axillary or bracteate clusters.

A. Flowers in axillary clusters; stems usually prostrate.
  Stems long and wiry; nut tuberculate ..... *P. aviculare* 1.
  Stems short and compact; nut smooth ..... *P. plebejum* 2.

A. Flowers in spikes.
  B. Spikes short, mostly axillary; stems prostrate ..... *P. prostratum* 3.
  B. Spikes long, terminal, often graniculate.
    C. Slender perennial, with ascending stems; stipules ciliate ..... *P. serrulatum* 4.
    C. Tall erect annuals; stipules truncate.
      Nearly glabrous plant; stipules without cilia..... *P. lapathifolium* 5.
      Hairy plant; stipules ciliate ..... *P. attenuatum* 6.

*1. **P. aviculare,** L. *Wireweed, Hogweed.* Glabrous annual, with long stiff wiry stems, prostrate in open ground; leaves oblong-lanceolate, 1-4 cm. long; stipules long, lacerate, silvery; flowers white or pink, axillary, 1-4; nut trigonous, reddish-black, dull, minutely granular.

A weed in settled districts. November-May.—Cosmopolitan.

FIG. 47.—**Polygonum aviculare.**

2. **P. plebejum,** R. Br. Like the preceding, but the stems shorter, the small linear-oblong leaves (6-15 mm. long) and the 2-5-flowered axillary clusters closer together; nut trigonous, brown, smooth and shining.

Mount Lofty Range; Murray district; Far North, at least from the Alberga River to Cooper's Creek. Most of the year. Also in the eastern States.

* *P. Convolvulus*, L. Called in England *Black Bindweed*, has occurred now and then in cultivated land. It is an annual, with slender climbing stems, stalked broadly sagittate leaves, clustered and racemose flowers, and a dull-black trigonous nut. Most temperate regions.

3. **P. prostratum,** R. Br. An appressed-hairy perennial with prostrate woody stems, with lanceolate leaves 2-4 cm. long; stipules ciliate and hairy; spikelike racemes pedunculate, axillary and terminal, 1½-2 cm. long, the bract at the base of each 2-4-flowered cluster ovate and ciliate; stamens 5-6; styles 2; nut reddish-brown, shining, biconvex. (Fig. 44, I-K.)

River Murray; Flinders Range; South-East. Summer. Throughout Australia and New Zealand.

4. **P. serrulatum,** Lag. Almost glabrous ascending perennial, the slender stems rooting at the nodes; leaves lanceolate, 5-10 cm. long, 10-20 mm. broad, ciliolate with small stiff appressed hairs; stipular sheaths with long cilia; flowers reddish, in pedunculate spikes which are usually twin and 3-5 cm. long, slender and interrupted, the bracts ciliate; stamens 5-6; styles 2 or 3; nut black, shining, 2-2½ mm. long, trigonous or biconvex.—*P. minus*, Benth. partly.

In or near water, Reedbeds, near Adelaide; Mt. Lofty Range; Murray River; South-East. Summer.—Throughout Australia, and common in the Old World.

P. Hydropiper, L. (*Waterpepper*), with leaves of a peppery taste, spikes usually solitary and interrupted, and the perianth covered with glandular dots, has been recorded, I do not know on what authority, from the Mt. Gambier district.—Eastern States; Europe and Asia.

5. **P. lapathifolium,** L. Rather tall branching annual; leaves lanceolate or broad-lanceolate, petiolate, 7-15 cm. long, acuminate, glandular-dotted below, scabrous with appressed hairs on midrib and margins; stipular sheaths truncate, ribbed, without cilia; flowers pink, in dense rather thick spikes 2-6 cm. long, forming terminal panicles, the perianths, pedicels and peduncles more or less glandular; bracts small, truncate; styles 2; nut compressed, smooth, flat or concave on both faces, the edges obtuse, 2 mm. long.

Reedbeds; Mt. Lofty Range; South-East. Summer.—Temperate regions of the globe.

6. **P. attenuatum,** R. Br. Resembles the preceding, but differs in the leaves sprinkled with appressed hairs on both faces, and the stipular sheath and bracts ciliate; nut compressed, shining, 2½ mm. long. The embryonic character on which Meisner founded his section *Amblygonon*, in which *P. attenuatum* is placed, does not appear to hold good, because both in this species and *P. lapathifolium* embryos can be found where, by a twisting of the axis, the cotyledons may turn either their edges (accumbent) or their backs (incumbent) towards the radicle.

Near Cooper's Creek.—Also in New South Wales and the Northern Territory.

4. MUEHLENBECKIA, Meisn.

(After Gustav Mühlenbeck, 1798-1845, an Alsatian botanist.)

Flowers mostly dioecious; segments or lobes of perianth 5; stamens usually 8; styles 3, more or less fringed; nut trigonous, enclosed in the enlarged persistant membranous or fleshy perianth. Shrubs, with small green or yellowish flowers arranged in whorl-like bracteate clusters.

A. Leaves rather large and broad; twining plant..... *M. adpressa* 1.
A. Leaves narrow and usually small, often caducous.
  B. Female perianth herbaceous, thin or slightly succulent.
    Rigid, often spinescent shrub; flowers in interrupted spikes; perianth lobed ..... *M. Cunninghamii* 2.
    Slender shrub; flowers in axillary clusters; perianth cut to base ..... *M. diclina* 3.
  B. Female perianth fleshy, ovoid, with minute lobes at summit ..... *M. cocoloboides* 4.

1. **M. adpressa** (Labill.) Meisn. Stems woody, procumbent or usually twining over other plants; leaves petiolate, orbicular or ovate, minutely crisped on edges, cordate at base, 1½-6 cm. long; spikes interrupted towards the base, usually forming leafy panicles; nut ovoid, 3-furrowed and bluntly trigonous, smooth; seed 3-furrowed.—*M. adpressa*, Meisn, var. *rotundifolia*, Benth; *Polygonum adpressum*. Labill.

Along our coats from Beachport to Fowler's Bay and inland in such places as the Murray lands and on Eyre Peninsula towards the Gawler Range. Sept.-Dec.—Temperate Australia.

Var. *hastifolia*, Meisn. Leaves broadly lanceolate-hastate, obtuse or shortly acuminate; perianth somewhat succulent in fruit; nut transversely rugulose; sometimes monoecious.

Along the sea-coast, usually on sandhills. Aug.-Feb.—Eastern States.

2. **M. Cunninghamii** (Meisn.) F. v. M. *Lignum*. Shrub with many intricate striate branches, usually 1-2 m. high, the rigid branchlets often ending in a spine; leaves linear or lanceolate, caducous and usually absent from the older branches; flower-clusters in interrupted spikes, which are sometimes paniculate; fruiting perianth 5 mm. long, with a tube which is nearly as long as the lobes; nut ovoid-conical, trigonous, shining.

Southern districts to Far North; Murray lands; Eyre Peninsula. Usually in swampy or flooded ground. Most of the year.—Throughout Australia. The popular name "lignum" is a corruption of *Polygonum*, in which genus the plant was originally placed by A. Cunningham. His name of *P. junceum*, published in 1848, was, however, pre-occupied by a Siberian plant previously described by Ledebour.

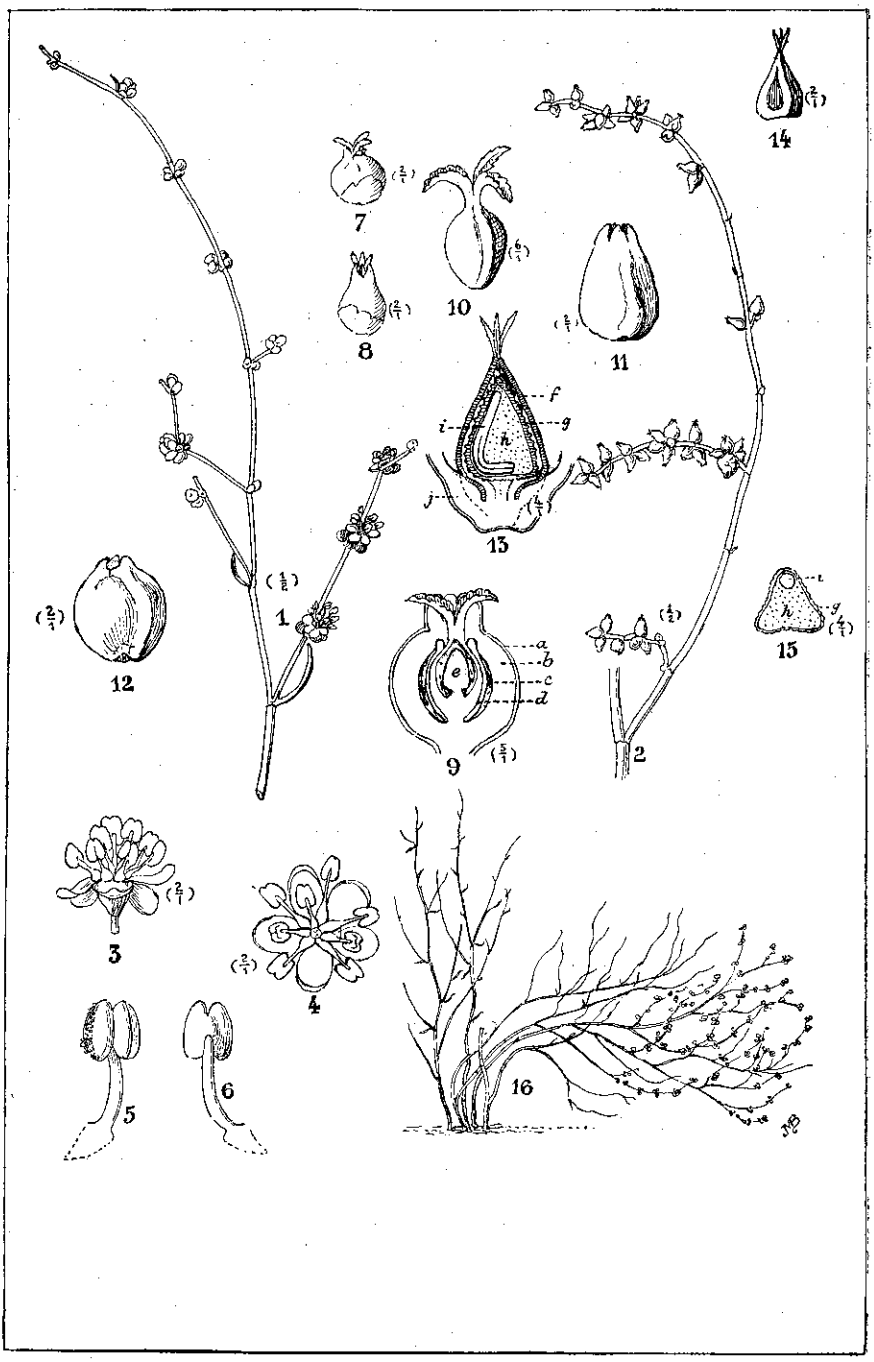

PLATE 11.—**Muehlenbeckia coccoloboides.**

PLATE 11.—1, male plant. 2, female plant. 3, 4, male flower. 5, 6, stamen (front and back views). 7, 8, female flowers. 9, vertical section of female flower: *a*, epidermis of perianth; *b*, fleshy layer of perianth; *c*, connate abortive stamens surrounding the ovary; *d*, wall of ovary; *e*, erect ovule. 10, pistil. 11, 12, fruiting perianths. 13, vertical section of nut and seed: *f*, pericarp; *g*, testa; *h*, albumen; *i*, embryo; *j*, base of fruiting perianth. 14, nut. 15, transverse section of seed. 16, plant 2 years old.

3. **M. diclina** (F. v. M.) comb. nov. Erect shrub with numerous slender wiry branches; leaves lanceolate or rarely hastate on young shoots, linear on the stems and usually plano-convex or trigonous; clusters 1-3-flowered, axillary; perianth divided to the base into segments, 3 mm. long in fruit; nut almost globular, obtuse, black, smooth or rugulose. Fig. 44, L.—*M. stenophylla*, F. v. M. (1859); *M. polygonoides*, F. v. M. (1865); *Polygonum diclinum*, F. v. M. (1856).

Murray lands and north thereof. Spring and summer.—Also in Victoria and New South Wales.

4. **M. coccoloboides**, J. M. Black. Stems woody at base, procumbent or usually twining over other plants; branches intricate, flexible, smooth and glaucous; leaves linear, caducous; flower-clusters usually far apart, sometimes in the axil of a small leaf; male perianth with a tube rather shorter than the lobes; female perianth ovoid or globose, fleshy, crowned by the 5 minute lobes, reddish and 6-7 mm. long in fruit; nut trigonous, acute, black and shining; seed trigonous, reddish, granular (Plate 11).

Near Lake Blanche. May-Aug.

FAMILY 41.—CHENOPODIACEAE.

Flowers small, mostly regular, bisexual or unisexual, usually sessile and clustered; perianth herbaceous or somewhat scarious, with 5 or fewer lobes arranged in 1 whorl but imbricate in bud; stamens usually 5, opposite the perianth-segments; ovary superior or rarely half-inferior, 1-celled, with 1 basal campylotropous ovule; styles or style-branches 2-3; fruit with an indehiscent membranous or succulent pericarp, enclosed in or resting on the persistant perianth; seed biconvex; embryo curved round the albumen, or the albumen absent. Leaves mostly alternate, exstipulate, sometimes wanting; herbs or undershrubs, frequently hoary with a mealy tomentum composed of hyaline cup-shaped or angular scales, or silky-villous.

Most of the Saltbushes, Cotton-bushes, and Bluebushes, (chiefly species of *Rhagodia*, *Chenopodium*, *Atriplex* and *Kochia*) are valuable fodder-plants, especially in country too dry for grasses.

A. Branches not articulate or fleshy; leafy plants.
  B. Leaves flat, usually broad; testa crustaceous.
    C. Fruiting perianth herbaceous, of 4-5 segments.
      Fruit a berry ..... RHAGODIA 1.
      Fruit dry ..... CHENOPODIUM 2.
    C. Fruiting perianth membranous, of 1-3 segments ... DYSPHANIA 3.
    C. Fruiting perianth hardened and furrowed ..... BETA 4.
    C. Fruiting perianth absent, replaced by 2 broad bracteoles ..... ATRIPLEX 5.
  B. Leaves narrow, entire.
    D. Fruiting perianth with dorsal appendages; testa membranous.
      E. Appendages usually consisting of spines ..... BASSIA 6.
      E. Appendages broad, membranous, wing-like.
        F. Wings of fruiting perianth nearly vertical .... BABBAGIA 7.
        F. Wings of fruiting perianth horizontal.
          Embryo curved round albumen ..... KOCHIA 8.
          Embryo spirally coiled, without albumen ... SALSOLA 9.
    D. Fruiting perianth without dorsal appendages.
      G. Fruiting perianth scarcely enlarged; testa crustaceous; embryo spirally coiled; without albumen SUAEDA 10.
      G. Fruiting perianth enlarged; testa membranous; embryo curved round albumen.
        Perianth-tube not hardened, succulent, or the lobes thickened ..... ENCHYLAENA 11.
        Perianth-tube hardened, sometimes gibbous THRELKELDIA 12.
A. Branches articulate, fleshy; leafless plants, with embedded flowers.
  H. Seed with copious albumen.
    Seed falling off, usually with the perianth..... ARTHROCNEMUM 13.
    Seed embedded in the enlarged bony axis of the spike..... PACHYCORNIA 14.
  H. Seed without albumen ..... SALICORNIA 15.

1. RHAGODIA, R. Br.

(Greek *rhagodēs*, bearing berries.)

Flowers polygamous or almost dioecious, sessile in small clusters; perianth 5-partite, the lobes or segments obtuse; stamens 5 or fewer; style-branches 2, rarely 3; fruit a small depressed globular berry; seed horizontal, with a crustaceous testa; embryo almost annular round the albumen. Herbs or shrubs, mostly affording good fodder.

A. Flowers in rather large, branched panicles.
  B. Perianth mealy; flowers polygamous.
    C. Perianth small, not or scarcely exceeding the fruit.
      Leaves almost all alternate, narrow, short-petiolate — *Rh. baccata* 1.
      Leaves alternate or opposite, broad, long-petiolate — *Rh. parabolica* 2.
    C. Perianth rather large, much exceeding the fruit; leaves alternate ..... *Rh. Gaudichaudiana* 4.
  B. Perianth glabrous; flowers dioecious; leaves opposite — *Rh. Preissii* 3.
A. Flowers in spikes or small, slightly branched panicles.
  D. Branches rigid; leaves mostly alternate.
    Leaves broad, not fleshy ..... *Rh. spinescens* 5.
    Leaves narrow, fleshy ..... *Rh. crassifolia* 6.
  D. Branches flexible and slender; leaves mostly opposite, green ..... *Rh. nutans* 7.

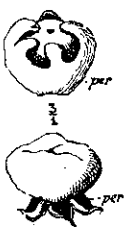

FIG. 48. **Rhagodia baccata.**

1. **Rh. baccata** (Labill.) Moq. *Coastal Saltbush.* Straggling shrub with white-mealy inflorescence; leaves mostly alternate, oblanceolate or obovate-oblong, rarely narrow-lanceolate, dark-green above and usually whitish and concave beneath, 1½-3 cm. long, contracted into a short petiole; flowers polygamous, in a terminal panicle with spreading branches; berry red, 4 mm. diam.—*Rh. Billardieri*, R. Br.

Along the coast, or a short distance inland, as at Mt. Gambier and on the lower Murray. Dec.-Apl.—Temperate Australia.

2. **Rh. parabolica,** R. Br. *Oldman Saltbush.* Erect shrub, 1-3 m. high; leaves grey-mealy, or green on upper face, alternate or opposite, broadly ovate or rhomboid, sometimes obtusely hastate at base, 1½-3 cm. long, on rather long petioles; flowers mealy-tomentose, polygamous, in a terminal panicle 4-10 cm. long, with spreading branches; berry red.

Southern districts to Flinders Range; Murray scrub; Eyre Peninsula; Gawler Range; usually in moist places. Most of the year.—Eastern States.

3. **Rh. Preissii,** Moq. Shrub 1-2 m. high, glabrous except for mealiness on young leaves and panicle-branches; leaves often opposite, oblanceolate, green, 2-4 cm. long, tapering into a petiole; flowers dioecious or almost so, in a rather loose terminal panicle, 2-4 cm. long; perianth small, glabrous, cleft almost to base; berry red.

Ardrossan, Y.P.; Ooldea; also in the Victoria Desert and Fraser Range, West Australia. Aug.-Oct. Diels, on the strength of West Australian specimens, altered the name to *Chenopodium Preissii*, stating that he found the pericarp non-succulent. In our specimens the pericarp varies in its degree of succulence and many female flowers appear abortive.

4. **Rh. Gaudichaudiana,** Moq. Straggling shrub, sometimes rather tall; leaves mostly alternate, broadly ovate or lanceolate, frequently truncate or hastate at base, more or less covered with a soft grey-mealy tomentum, 1-2 cm. long, on a petiole 5-10 mm. long; flowers polygamous, at first spike-like, but forming later a more or less dense panicle, sometimes 10 cm. long; perianth larger than in other species, 5-8 mm. wide when spread open below the fruit and densely mealy; fruit bright red and much narrower than the perianth.

Murray lands; Flinders Range; Far North and North-West; from Port Augusta westward to Ooldea. Most of the year.—Eastern States and West Australia.

5. **Rh. spinescens,** R. Br. A shrub varying in height, sometimes quite low; the branchlets on old plants sometimes ending in a spine; leaves mostly alternate, oblong, ovate or almost orbicular, tapering into the conspicuous petiole, sometimes truncate or even hastate at base, white-tomentose all over, or thinly beset with scales and greenish, 5-10 mm. long, rarely more; flowers polygamous, in interrupted spikes or short panicles; perianth mealy, 3-4 mm. wide when expanded and not exceeding the red fruit.

Murray lands; Flinders Range to Far North; from Gawler Range westward. Most of the year.—Eastern States.

Var. *deltophylla*, F. v. M. Leaves deltoid, mealy-white or rust-colored on both faces or at least below, often opposite or nearly so, rather thick.

Murray lands; Port Pirie; Lake Torrens; Far North; Ooldea.

6. **Rh. crassifolia,** R. Br. Low branching shrub; leaves mostly alternate, linear or oblanceolate, often falcate, thick and fleshy, 8-20 mm. long, somewhat mealy or almost glabrous; flowers in terminal spikes or short slightly branched panicles; perianth mealy, not extending beyond the red berry.

Yorke Peninsula and northward to Flinders Range; Kangaroo Island; Murray scrub; coasts of Eyre Peninsula and along the Great Bright to the Nullarbor Plain. Summer.—Eastern States and West Australia.

7. **Rh. nutans,** R. Br. Small herb, with weak procumbent stems; leaves green, flaccid, usually opposite, lanceolate, acute, usually but not always hastate at base, 5-35 mm. long, on slender petioles; flowers polygamous, mealy, in short terminal spikes or small leafy panicles; fruit red, 2-3 mm. diameter, scarcely exceeded by the extended perianth, which also becomes red and falls off with the fruit.

Southern districts, often near the sea, and up to the Far North; Murray lands; Eyre Peninsula and westward to Everard Range. Most of the year.—Eastern States and Tasmania.

2. CHENOPODIUM (Tourn.) L.

(Neo-latin form of the Greek *khēnopous*, from *khen*, a goose; *pous*, a foot; shape of the leaf of some species.)

Flowers mostly bisexual, small, sessile in clusters; perianth usually 5-lobed or 5-partite, the segments usually hooded at summit; stamens 5 or fewer; style-branches 2 or 3; fruit dry, enclosed in the persistent perianth, with a membranous pericarp free from or adnate to the seed, which is depressed or subglobular, with a crustaceous testa and the embryo coiled in a circle round the albumen. Herbs or shrubs with alternate leaves.

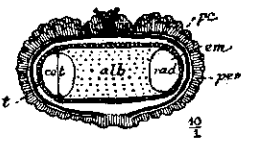

FIG. 49.—Vertical section of perianth and fruit of *Chenopodium microphyllum*. *per*, perianth; *pc.* pericarp with remains of 2 style-branches; *t*, testa; *em.* embryo; *rad.* radicle; *cot*, cotyledons; *alb*, albumen (perisperm.)

A. Shrub with spinescent branchlets	*Ch. nitrariaceum* 1.
A. Herbs.	
B. Plants more or less glandular-pubescent, often sweet-scented.	
C. Leaves lanceolate, sinuate-toothed	*Ch. ambrosioides* 2.
C. Leaves narrow, pinnatisect	*Ch. multifidum* 3.
C. Leaves ovate, toothed or lobed on margins.	
D. Perianth-segments 4, hooded	*Ch. rhadinostachyum* 4.
D. Perianth-segments 5.	
Segments incurved at summit, rounded on back	*Ch. carinatum* 5.
Segments pointed, vertically crested on back	*Ch. cristatum* 6.
C. Leaves lanceolate, entire or lobed at base only	*Ch. atriplicinum* 7.
B. Plants mealy or glabrous, not glandular or pubescent; seed horizontal.	
E. Leaves entire, or hastate, more or less mealy.	
F. Tall erect perennial	*Ch. auricomum* 8.
Prostrate fetid annual	*Ch. Vulvaria* 9.
F. Lowly plants, procumbent or erect.	
G. Stems short; leaves more or less mealy, all broad.	
Spikes shorter than leaves	*Ch. microphyllum* 10.
Spikes longer than leaves	*Ch. desertorum* 11.
G. Stems long and weak; upper leaves narrow	*Ch. triangulare* 12.
E. Leaves toothed.	
H. Erect plants.	
Leaves and flower-clusters mealy-white	*Ch. album* 13.
Leaves and flower-clusters green	*Ch. murale* 14.
H. Prostrate plant; leaves thick, green above, white below	*Ch. glaucum* 15.

1. **Ch. nitrariaceum,** F. v. M. Shrub 1-3 m. high, the rigid slender branches and branchlets hoary, striate, divaricate or reflexed; branchlets often spinescent; leaves alternate or clustered at the base of the branches, green or sometimes hoary, oblong, very obtuse, 5-25 mm. long, tapering into a short petiole; flowers in rather dense spikes, either terminating the branchlets or forming a terminal panicle; seed vertical.

Yorke Peninsula; River Murray; Far North and North-West. Usually in swampy or inundated country. Most of the year.—Eastern States and West Australia.

*2. **Ch. ambrosioides,** L. *Mexican Tea.* Annual or perennial, 30-80 cm. high, erect, aromatic, glandular-pubescent or almost glabrous; leaves lanceolate, sinuate-toothed or almost entire; flowers in short axillary spikes, forming a long narrow leafy panicle; seed minute, horizontal, with an obtuse edge.
Southern districts. Summer.—Almost cosmopolitan.

*3. **Ch. multifidum** L. Aromatic perennial, glandular-pubescent, with prostrate branched stems; leaves small, pinnatisect, with short spreading narrow lobes; flowers in axillary clusters, forming a long leafy panicle; fruiting perianth obovoid, pubescent ribbed and reticulate; seed vertical, subglobular.
Southern districts. Summer.—South America; naturalised in southern Europe.

4. **Ch. rhadinostachyum,** F. v. M. Glandular pubescent annual, 10-30 cm. high; stems erect or ascending; leaves ovate, sinuate-lobed, 1-2½ cm. long, petiolate; flowers minute, the globular clusters arranged in slender axillary and terminal spikes, which are simple or branched, dense or interrupted, quite short or 3-10 cm. long; perianth pubescent, 4-partite, the segments concave, 1 mm. long; stamen 1; styles 2, capillary; seed vertical, reddish-brown, shining, with a sharp edge.
Blyth Range; also on the Finke River, N.T., and in the Victoria Desert, W.A. July-Sept. The form with short interrupted axillary spikes resembles the following.

FIG. 50. **Chenopodium carinatum.**

5. **Ch. carinatum,** R. Br. *Keeled Goosefoot.* Aromatic glandular-pubescent and rather scabrous annual, with prostrate or ascending stems, 10-80 cm. long; leaves oblong or ovate, sinuate-toothed or lobed, petiolate, 1-2 cm. long; flowers small, in sessile axillary globular clusters; perianth pubescent, the 5 segments boatshaped, bluntly keeled, 1½ mm. long, white when ripe and showing the reddish-black vertical fruit between their interstices; stamen 1.
Southern districts to Far North; Murray lands. Most of the year. Sometimes a weed in gardens.—Throughout Australia and New Zealand.
Var. *melanocarpum*, J. M. Black. Fruiting perianth turning black when ripe, the segments more hairy, contiguous on margins, so that the seed is quite concealed, the keels of the segments prominent and subacute. This variety marks a transition towards the following species.
Flinders Range; Far North and North-West.—Also in West Australia and at Broken Hill, N.S.W.

FIG. 51. **Chenopodium cristatum.**

6. **Ch. cristatum,** F. v. M. *Crested Goosefoot.* Like the preceding, but the keel of the perianth-segments is extended in acute ciliate often toothed lobes, forming a broad fringed vertical wing or crest, and each perianth-segment ends in an erect bristle; perianth 2 mm. long.
Flinders Range to Far North and West; Murray lands. June-Oct.—Victoria and New South Wales.

7. **Ch. atriplicinum,** F. v. M. Slightly glandular-pubescent or almost glabrous; stems prostrate or ascending; leaves lanceolate or lanceolate-hastate, 1-3 cm. long, the cuneate base tapering into the petiole; flowers in globular axillary clusters; perianth-segments 4, pointed, in fruit white, 3 mm. long, hardened at base and showing the vertical granular seed, with its membranous adherent pericarp; stamen 1.
Flinders Range and eastward thereof. July-Sept.—Victoria and New South Wales.

8. **Ch. auricomum** Lindl. *Golden Goosefoot.* Glaucous mealy perennial, usually over 1 m. high; leaves oblong or ovate, obtuse, often bluntly hastate, 2-5 cm. long, petiolate; flowers in dense globular golden clusters, distant or crowded into spikes, forming a long terminal panicle; perianth 5-lobed, mealy-tomentose; stamens 5, exserted; pericarp almost free from the small depressed horizontal seed.
Far North. June-Oct.

*9. **Ch. Vulvaria,** L. *Stinking Goosefoot.* Procumbent mealy annual, recognizable by its strong smell of stale fish; leaves ovate-rhomboidal, petiolate; flower-clusters in short axillary and terminal spikes; seed horizontal, dotted.
South-East, mostly in cultivated land. Nov.-Jan.—Europe and Asia.

10. **Ch. microphyllum.** F. v. M. *Small-leaved Goosefoot.* Small plant, woody at base, with procumbent or ascending stems; leaves ovate or broad-lanceolate, 3-8 mm. long, flat, petiolate, mealy on both faces or almost green above; flower-clusters sometimes

forming small spikes in the upper axils, shorter than the leaves; perianth mealy, 5-lobed; tamens 3-5; seed depressed, horizontal, black, with obtuse edge. (Fig. 49.)

Southern districts to Flinders Range; Murray lands. July-Oct.—Victoria and New South Wales.

11. **Ch. desertorum,** J. M. Black. Erect densely mealy plant, 15-30 cm. high; leaves thick, ovate or rhomboidal, 5-15 mm. long, petiolate, usually concave above; flowers in terminal usually interrupted or slightly branched spikes, 1-3 cm. long, and longer than the leaves; stamens 5; seed as in the preceding.—*Ch. microphyllum,* F. v. M. var. *desertorum,* J. M. Black.

Murray lands; Port Augusta westward to Ooldea. Also in Victoria Desert, West Australia. Spring and summer. The prominent mealy scales make this plant appear almost papillose.

12. **Ch. triangulare,** R. Br. Plant with weak procumbent stems, green or mealy on young shoots and lower face of leaves, of which the inferior ones are ovate or lanceolate, often hastate, and the upper ones lanceolate, all distant and 1-2 cm. long; flower-clusters distant, in a terminal spike or very narrow panicle; perianth-segments 5, when ripe much contracted towards the base, so as to expose the horizontal fruit; stamen 1.

Arno Bay, Eyre Peninsula. Summer.—New South Wales, Queensland.

*13. **Ch. album,** L. *White Goosefoot.* Annual, 1-2 m. high, with an erect angular stem; leaves mealy, especially below, ovate-rhomboidal, sinuate-toothed, 3-6 cm. long, uppermost lanceolate, entire; flower-clusters in long narrow or loose panicles; perianth-lobes 5, keeled, mealy; stamens 5; seed horizontal, smooth, black and shining after the adherent pericarp is removed.

Waste places and cultivated land. Nov.-Aug.—Almost cosmopolitan. Some of our specimens, with obtuse leaves scarcely longer than broad, and sometimes slightly 3 lobed, appear to be *Ch. opulifolium,* Schrad., or hybrids thereof. It has been proved in Europe that the closely allied species, *Ch. album, Ch. opulifolium, Ch. ficifolium,* Sm. and *Ch. striatum,* Murr, hybridise readily with each other, producing a multitude of forms.

*14. **Ch. murale,** L. *Nettle-leaved Goosefoot.* Annual, unpleasantly scented, with erect or ascending branched angular reddish stems; leaves green, or sometimes slightly mealy below, ovate-rhomboidal, coarsely toothed; flower-clusters green, finally red, in rather short loose axillary and terminal panicles; perianth-segments and stamens 5; seed horizontal, dull-black, punctulate, with a sharply keeled edge.

Roadsides and waste places. Aug.-Apl.—Almost cosmopolitan.

FIG. 52.
Chenopodium murale.

15. **Ch. glaucum,** L. Prostrate or ascending annual, with striate reddish stems; leaves succulent, green above, mealy-white below, ovate-oblong, sinuate-toothed, obtuse, ½-3 cm. long; flowers green, in axillary spikes shorter than the leaves, and also in short terminal spikes; perianth-lobes 3-5; stamen 1; seed horizontal, rarely vertical, smooth, black and shining.

Salt lands near the sea and in moist places inland. Nov.-Apl.—Temperate Australia; Europe and Asia.

3. DYSPHANIA, R. Br.

(Greek *dysphanēs,* scarcely visible: referring to the very small flowers.)

Flowers polygamous, minute, clustered; segments usually 3, perhaps sometimes 2, on short claws, hooded, membranous and whitish in fruit; stamen usually 1; styles 1 or 2; fruit ovoid, with a hyaline pericarp; seed vertical, reddish-brown, shining, with a crustaceous testa; embryo circular, enclosing the albumen. Small annuals, with alternate leaves.

A genus closely allied to *Chenopodium,* especially to *Ch. rhadinostachyum.* It was transferred to *Caryophyllaceae* by F. Pax, but the alternate leaves do not agree with that family.

A. Flower-clusters in dense terminal spikes.
  Perianth-segments simply hooded ..... *D. plantaginella* 1.
  Perianth segments with a hyaline appendage to the hood ..... *D. simulans* 2.
A. Flower-clusters axillary ..... *D. littoralis* 3.

1. **D. plantaginella,** F. v. M. Small glandular-hairy annual, with erect or spreading branched stems; leaves petiolate, obovate or oblong, entire, 5-20 mm. long; flowers in dense terminal cylindrical spikes of 3-10 cm. and occupying most of the plant; perianth-segments very concave, united by the claws, scarcely more than ½ mm. long; style 1.

Mount Lyndhurst (Flinders Range); Far North. Most of the year.—Northern Territory.

2. **D. simulans,** F. v. M. et Tate. Resembles the preceding, but the hairs are scaly rather than glandular, leaves oblong-cuneate, sinuate-lobed, tapering into the petiole; spikes erect, 5-12 cm. long, occupying most of the small plant; perianth-segments 1¼ mm. long, separating when ripe, hooded above the broad claw and with a hyaline dorsal appendage; styles 2, united towards base.—*Chenopodium simulans,* F. v. M, et Tate.

West side of Lake Eyre, near the Neales River. Only the type specimen has been found.

3. **D. littoralis,** R. Br. Small almost glabrous annual, with prostrate stems; leaves petiolate, ovate or oblong, 3-8 mm. long; clusters many-flowered, globular, axillary small and approximate; segments separating when ripe, under 1 mm. long, and often appearing as only 1 to each fruit, but probably always 3 or 2; no appendage to the hood; styles 2.—*D. myriocephala,* Benth.

River Murray; Far North and North-West.—Northern Territory.

4. BETA, L.

(Latin for the beet.)

*1. **B. vulgaris,** L. *Common Beet.* Biennial, with erect or ascending stems and branches; lower leaves large, alternate, rather fleshy, ovate-cordate; flowers green, sessile, the clusters in the axils of small leaves, arranged in long spikes interrupted towards base and sometimes paniculate; perianth-lobes and stamens 5; ovary half-inferior, united with the succulent base of the perianth, which becomes hardened when ripe, the lobes closing over the horizontal fruit.

Reedbeds, near Adelaide. Summer.—Europe and Western Asia.

5. ATRIPLEX, L.

(Latin name of the Garden Orach (*A. hortensis,* L.), from the older form of the word, *Atriplexum.*)

Flowers unisexual, clustered; male perianth small, 5-partite; female flowers without perianth, which is replaced by 2 broad accrescent bracteoles; styles or style-branches 2; fruit enclosed within the bracteoles, with a membranous pericarp; seed compressed, vertical, with a coricaceous testa and embryo surrounding the albumen; radicle superior or lateral in all the species except *A. halimoides,* in which it is inferior. Herbs or shrubs, often mealy or scaly-tomentose; leaves flat, usually alternate.

There is doubt as to whether some of the lowly species are perennial or annual; most of them certainly flower in the first year. All the species provide good feed for sheep and cattle in dry saline and subsaline country. *Saltbush.*

A. Fruiting bracteoles united only near the base.
  B. Bracteoles without dorsal appendages.
    C. Dioecious shrubs.
      Bracteoles sessile or almost so.
        Leaves broad ..... *A. nummularium* 1.
        Leaves narrow ..... *A. paludosum* 2.
      Bracteoles stalked ..... *A. stipitatum* 3.
    C. Monoecious shrubs or herbs.
    D. Grey-tomentose plants.
      E. Bracteoles conspicuously stalked.
        Bracteoles reniform; pedicel slender; leaves oblong ..... *A. stipitatum* 3
        Bracteoles fanshaped; pedicel rather stout; leaves ovate ..... *A. angulatum* 4.
      E. Bracteoles subsessile, triangular-lanceolate.... *A. velutinellum* 5.
    D. Green erect annual ..... *A. patulum* 6.
  B. Bracteoles with dorsal appendages.
    F. Appendages bladdery.
      G. Bracteoles sessile or subsessile; flowers dioecious.
        H. Base of bracteoles not hardened.
          I. Leaves broad.
            Bracteoles suborbicular, equal to or longer than the appendages ..... *A. vesicarium* 7.
            Bracteoles broader than long, much shorter than the appendages ..... *A. Kochianum* 8.

I. Leaves narrow ..... *A. paludosum*, var.
H. Base of bracteoles hardened ..... *A. cinereum* 9.
G. Bracteoles stalked, reniform; flowers monoecious *A. Quinii* 10.
F. Appendages membranous, flat; bracteoles incised-toothed ..... *A. fissivalve* 11.
A. Fruiting bracteoles united to near middle.
J. Bracteoles without appendages.
K. Bracteoles entire, hard; flowers dioecious.
Bracteoles 3-6 mm. long ..... *A. rhagodioides* 12.
Bracteoles 10-12 mm. long ..... *A. incrassatum* 13.
K. Bracteoles more or less toothed, not hard; flowers monoecious.
L. Prostrate plants.
Bracteoles red, succulent, 4-6 mm. long..... *A. semibaccatum* 14.
Bracteoles not succulent, 1½ mm. long ..... *A. prostratum* 15.
L. Ascending plants.
Bracteoles sessile; leaves 2-4 cm. long ..... *A. Muelleri* 16.
Bracteoles shortly stalked; leaves under 1 cm. long ..... *A. elachophyllum* 17.
J. Anterior bracteole with 2 small bladdery appendages; bracteoles stalked ..... *A. campanulatum* 18.
A. Fruiting bracteoles united almost to the summit, so that the orifice is more or less closed by the small free tips.
M. United bracteoles forming a solid subcylindrical tube.
Appendages absent or of 2 tubercles ..... *A. leptocarpum* 19.
Appendages broad, flat ..... *A. limbatum* 20.
M. United bracteoles subglobular, spongy.
Bracteoles almost flat at summit, horizontally winged ..... *A. halimoides* 21.
Bracteoles rounded at summit, wingless ..... *A. spongiosum* 22.

1. **A. nummularium,** Lindl. *Giant Saltbush.* Shrub 2-3 m. high, grey with a scaly tomentum; leaves orbicular or ovate, shortly sinuate-toothed or almost entire, often truncate at base, 1-2½ cm. long, petiolate; flowers dioecious, paniculate; fruiting bracteoles sessile, suborbicular, nerved, united only near the hardened base, 5-8 mm. long, sinuate-toothed or entire.


FIG. 53.
Atriplex nummularium.

Flinders Range; Far North; Murray lands. Most of the year.—Eastern States.

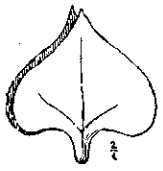
FIG. 54.
Atriplex paludosum.

2. **A. paludosum,** R. Br. *Marsh Saltbush.* Erect shrub, 30 cm. to 1½ m. high, silver-grey with a scaly tomentum; leaves lanceolate or oblong, mostly 1-2 cm. long, obtuse, concave above, entire; flowers dioecious, or rarely a few females among the males, the males in globular contiguous or distant clusters, forming slender paniculate spikes, the females in axillary clusters; fruiting bracteoles subsessile, flat, entire, usually acute or acuminate, ovate-triangular and often cordate at base, sometimes with a small tooth on each margin, free almost to the base, about 8 mm. long and broad.

Saltmarshes near the sea and salty soil inland; also on coastal sandhills or cliffs. Summer.

Var. *appendiculatum,* Benth. Fruiting bracteoles larger (10-12 mm. long and broad) distinctly cordate, often with a small spongy appendage on back; leaves rather broader.

From Port Pirie, at places along the coast as far west as the Great Bight. A form connecting this species with *A. vesicarium.*

3. **A. stipatum,** Benth. Small grey shrub, with slender branchlets; leaves obovate or oblong, usually narrow, obtuse, entire, concave above, ½-2 cm. long; flowers monoecious or dioecious, the males in small clusters or spikes, the females few or solitary in the axils; fruiting bracteoles flat, 6 mm. long by 10 mm. broad, entire, reniform, free down to the short tube, on a slender pedicel of 4-6 mm.

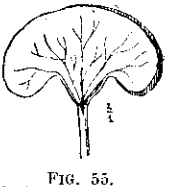
FIG. 55.
Atriplex stipitatum.

Near Pt. Wakefield; Murray lands and northward to Lake Frome; Flinders Range; Gawler Range. Nov.-March.—Eastern States.

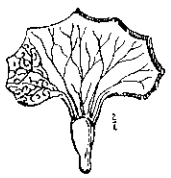

FIG. 56.
Atriplex angulatum.

4. **A. anguiatum,** Benth. Low grey-mealy perennial; leaves ovate, obicular or rhomboid, angular or sinuate, contracted into wings on the petiole, 1½-3 cm. long; flowers monoecious, the male clusters rather large, in an interrupted spike with a few females; the female clusters axillary; or the male clusters small and axillary; fruiting bracteoles fanshaped, free almost to the short tube, about 8 mm. long and 8-12 mm. broad, sinuate toothed, nerved, on a rather thick pedicel of 2-4 mm., rarely almost sessile.

Murray lands; Flinders Range; Far North. Most of the year.—New South Wales. The fruiting bracteoles often resemble those of the preceding, but the pedicel is stouter and the leaves different.

5. **A. velutinellum,** F. v. M. Low grey-tomentose perennial; leaves ovate or rhomboid, coarsely sinuate-toothed, 2-3 cm. long, the upper ones sessile, the lower sometimes shortly petiolate; flowers monoecious, in globular clusters, the upper ones sometimes spicate and male or androgynous; fruiting bracteoles triangular-lanceolate, subsessile, 6-8 mm. long, free almost to the irregularly toothed hardened base, very scaly-tomentose, sometimes with a minute toothed appendage at base.

FIG. 57.
Atriplex velutinellum.

Murray lands; Flinders Range and westward of Lake Torrens; Far North. Most of the year.—New South Wales.

FIG. 58.
Atriplex patulum.

6. **A. patulum,** L. Stout, usually erect annual, often over 1 m. high; leaves lanceolate, green, petiolate, 3-10 cm. long, the lower ones often sub-hastate; flowers monoecious, scaly-tomentose, the clusters in slender spikes, which are sometimes all male, forming panicles leafy at base; fruiting bracteoles rhomboidal, about 5 mm. long, free to near the base or only to the middle, entire or with 1-3 teeth on each side, smooth, or more or less swollen and muricate on the back.

Sea-coast near Adelaide; near River Murray.—Throughout Australia. Perhaps introduced from Europe or Asia.

7. **A. vesicarium,** Heward. *Bladder Saltbush.* Erect shrub, about 50 cm. high, almost white with a scaly-tomentum; leaves obovate, orbicular, or oblong, rather thick, very shortly petiolate, entire, or very rarely the upper ones irregularly sinuate-toothed, 1-2½ cm. long; flowers dioecious, the females solitary or very few in the axils; fruiting bracteoles suborbicular, membranous, reticulate, subsessile, entire or sometimes toothed, free almost to the base, or sometimes only to the middle, 8-15 mm. long, and about as broad, in the typical form almost concealed by the large membranous spongy dorsal appendages, but these vary so that they are sometimes only small excrescences at the base of the bracteoles, or even disappear altogether on some of the flowers.

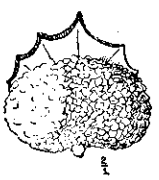

FIG. 59.
Atriplex vesicarium.

Murray lands; Northern areas; Flinders Range and plains east and west thereof; Eyre Peninsula; Far North and West; Nullarbor Plain. Most of the year.—Eastern States.

FIG. 60.
Atriplex Kochianum.

8. **A. Kochianum,** Maiden. Differs from the foregoing in the leaves almost always sinuate-toothed, the female flowers more numerous in the clusters, the bracteoles subtruncate and much broader than long (about 4 mm. long by 9 mm. broad), the appendages sometimes twice as long as the bracteoles, and the radicle superior instead of lateral.

Mount Lyndhurst (Flinders Range). Most of the year.

9. **A. cinereum,** Poir. *Grey Saltbush.* Shrub about 1 m. high, grey or almost white with scaly tomentum; leaves large, lanceolate or oblong, obtuse, shortly petiolate, 2-6 cm. long, entire; flowers dioecious, the males in globular clusters on 1 long thick spike or paniculately arranged in shorter spikes, the females in axillary clusters; fruiting bracteoles on a short thick base or pedicel, triangular or rhomboidal, entire, free almost to the hardened base, 5-10 mm. long, with a spongy rugose appendage or tubercle on the lower part of each bracteole and sometimes covering the pedicel also.

FIG. 61.
Atriplex cinereum.

Along the sea-coats. Aug.-Jan.—Throughout Australia. The type, which has not been found in South Australia, except on the Pearson Islands, has a hard swollen base to the bracteoles, but no appendages. The male plants grow nearest to the sea.

10. **A. Quinii,** F. v. M. Small grey-tomentose perennial; leaves ovate-cuneate, coarsely-toothed near the summit, or the upper ones lanceolate; flowers monoecious, the males in short terminal spikes, the females in few-flowered axillary clusters; fruiting bracteoles reniform, about 5 mm. long by 10 mm. broad with a small reniform appendage at base, on a stout pedicel of about 5 mm. long.

East of Flinders Range; Far North. Most of the year.—New South Wales.

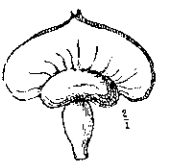

FIG. 62.
Atriplex Quinii.

FIG. 63.
Atriplex fissivalve.

11. **A. fissivalve,** F. v. M. Low herb, with rigid ascending branched stems; leaves obovate, angular-toothed, grey with scaly tomentum, 1-2 cm. long; flowers monoecious, in axillary clusters; fruiting bracteoles membranous, bristly in appearance, 5-6 mm. long, subrhomboid, reticulate, free almost from base, with 1 long terminal and several similar lateral teeth, also a 3-toothed flat appendage on the back of each bracteole.

Flinders Range; round Lake Torrens; Far North. Most of the year.—New South Wales.

12. **A. rhagodioides,** F. v. M. *Silver Saltbush.* Shrub from 50 cm. to over 1 m. high, with a silvery-white tomentum; leaves ovate, rhomboid or almost triangular, sometimes truncate or subhastate at base, petiolate, 1-3 cm. long, entire; flowers mainly dioecious, the globular male clusters in a terminal leafy panicle, with sometimes a few females in the lower axils, the female plants with the flowers densely clustered on the spreading branches of the panicle; fruiting bracteoles sessile, small, silvery-white, somewhat rhomboid, 3-6 mm. long and sometimes broader than long, entire, united around the hard swollen base, which is about the same length as the free portion.

FIG. 64.
Atriplex rhagodioides.

Murray lands; Far North; Lake Torrens and country west thereof. Most of the year.—Victoria, New South Wales, West Australia.

FIG. 65.
Atriplex incrassatum.

13. **A. incrassatum,** F. v. M. Near the preceding, but the larger leaves are slightly sinuate-toothed and the fruiting bracteoles larger, being 10-12 mm. long when ripe, the 2 coriaceous lobes 12-14 mm. broad; the base, or united portion, is about 5 mm. long, turbinate and hard.

Between Lake Torrens and Lake Gairdner, westward to Lake Frome and northwards to the MacDonnell Range. Most of the year.

14. **A. semibaccatum,** R. Br. *Berry Saltbush.* Perennial with prostrate stems; leaves greenish above, mealy-white below, sometimes clustered, oblong or lanceolate, often sinuate-toothed, usually about 1 cm. long; flowers monoecious, the small upper clusters androgynous, the lower ones female; fruiting bracteoles subsessile, subrhomboid, 4-6 mm. long, red, succulent and smooth when fresh, strongly 3-nerved and resembling those of *A. Muelleri* when dry, united and globular in the basal or tubular half, free and entire or toothed in the upper part.

FIG. 66.—**Atriplex semibaccatum.**

Southern districts to Flinders Range; Murray lands; Eyre Peninsula. Summer.—Throughout Australia.

A. varium, Ewart et Davies, has the leaves of *A. semibaccatum* and the fruiting bracteoles of *A. Muelleri,* but with about 3 spreading bristles on each face of the swollen tubular part. The bracteoles are sometimes pedicellate as in *A. elachophyllum.* This species occurs along the Finke River, N.T., and may be found in our State.

15. **A. prostratum,** R. Br. Stems prostrate; leaves ovate or lanceolate, toothed or almost entire, grey-tomentose, 4-8 mm. long; flowers monoecious, in small axillary clusters; fruiting bracteoles rhomboid, very scaly, about 1½ mm. long and broad, united in the lower two-thirds; the free lobes entire.—*A. pumilio,* R. Br.

Yorke Peninsula; Kangaroo Island; Eyre Peninsula. Summer.

16. **A. Muelleri,** Benth. Low herb, with rigid ascending stems; leaves oblong or obovate, green and concave above, more or less mealy-white below, usually coarsely toothed, with a cuneate entire base, 2-4 cm. long; flowers monoecious, the males

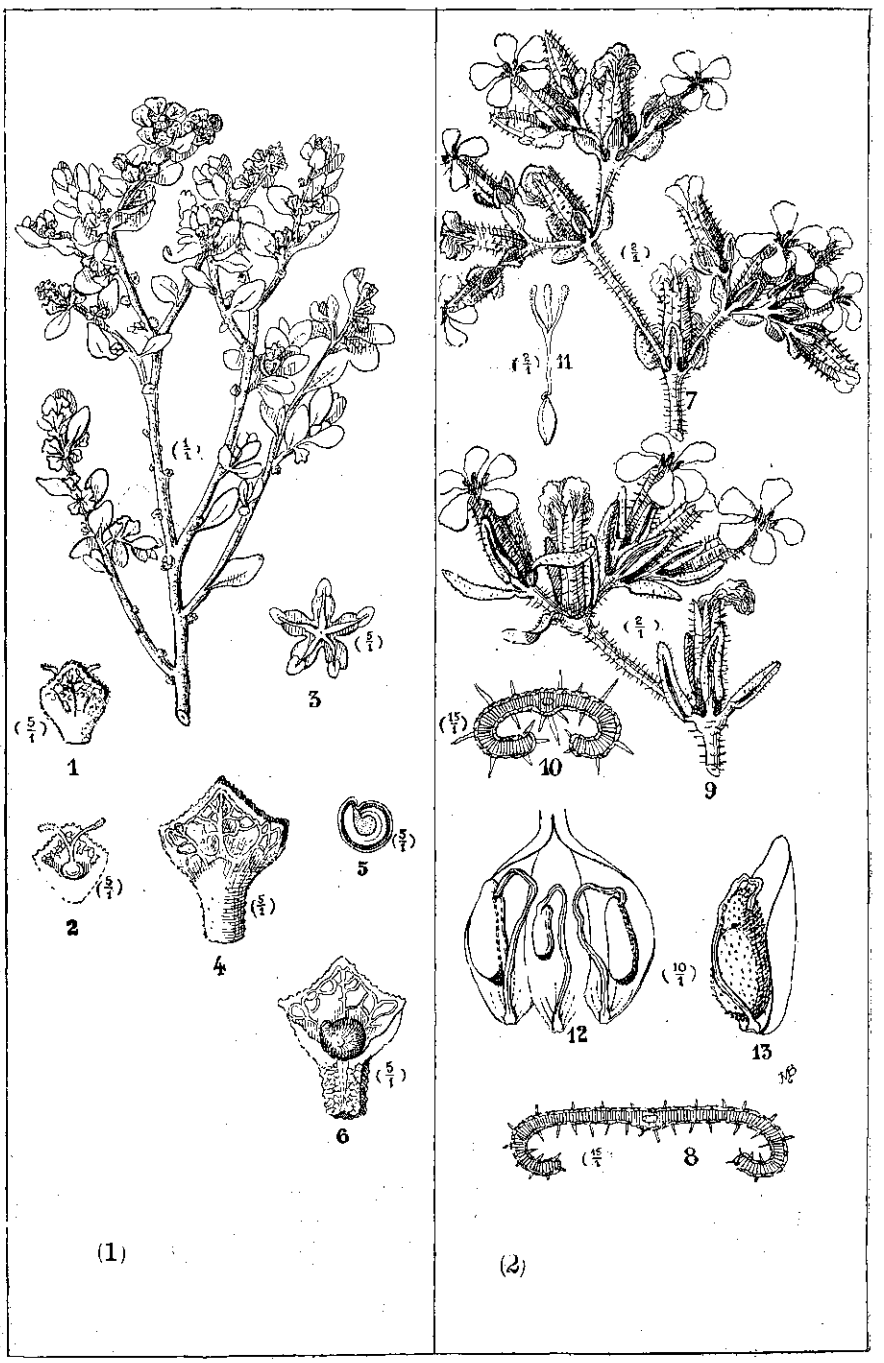

PLATE 12.—(1) **Atriplex elachophyllum**; (2) **Frankenia serpyllifolia.**

in little globular heads in the upper axils, the females rather numerously clustered in the lower axils or sometimes spicate; fruiting bracteoles sessile or nearly so, mealy, subrhomboid, 3-4 mm. long, united in the lower swollen part, sinuately 3- or 5-toothed in the upper free part.

Southern districts to Far North and West; Murray lands. Most of the year.—Eastern States.

FIG. 67. **Atriplex Muelleri.**

17. **A. elachophyllum,** F. v. M. Small scaly-whitish plant; leaves crowded, small (4-8 mm. long), ovate or lanceolate, mostly entire, very shortly petiolate; flowers monoecious, axillary, the upper clusters androgynous, the lower female and few-flowered; fruiting bracteoles rhomboid, about 2 mm. long and 3 mm. broad, united half way to the 3-lobed summit, on a short thick pedicel of 1-2 mm.—*A. crassipes*, J. M. Black.

Near Lake Torrens; Far North and westward to Birksgate Range. Most of the year.—Northern Territory.

PLATE 12 (1).—1, female flower; 2, vertical section of same; 3, male flower; 4, fruiting bracteoles and pedicel; 5, vertical section of seed; 6, vertical section of No. 4.

18. **A. campanulatum,** Benth. A small plant, with rigid prostrate or ascending stems; leaves obovate, mealy-white, 5-20 mm. long, entire or angular-toothed; flowers monoecious, in small axillary clusters; fruiting bracteoles about 3 mm. long, united round the campanulate tube, the upper portion 4-5 mm. broad and green-reticulate, 3-5-toothed, the posterior bracteole longer than the anterior one, at the base of which are 2 small inflated appendages, rarely in some flowers reduced to 1, or absent, the bracteoles on a pedicel of 2-5 mm. long.

FIG. 68.—**Atriplex campanulatum.**

Murray lands; Northern areas and eastward towards Broken Hill; Flinders Range; Far North. Most of the year.—New South Wales.

Var. *adnatum*, J. M. Black. Appendages adnate to the anterior bracteole; bracteoles narrower.

Far North; Ooldea.

19. **A. leptocarpum,** F. v. M. *Slender-fruited Saltbush.* Stems rigid, procumbent; leaves oblong or obovate, entire or sinuate-toothed, scaly-white, 1-2 cm. long; flowers monoecious, in axillary clusters; fruiting bracteoles subsessile, 4-6 mm. long, the lower ¾ tubular and hardened, the upper portion green-reticulate scarcely wider than the tube, somewhat compressed and closed up to the minute triangular lobes at the summit.

FIG. 69.—**Atriplex leptocarpum.**

Murray lands to Far North. Most of the year.—Eastern States.

Var. *acuminatum*, J. M. Black. Leaves obovate, sinuate-toothed; fruiting bracteoles 5-8 mm. long, the lobes acuminate and nearly as long as the tube; sometimes with a minute tooth on each margin and often furnished at their base with 2 small hard dorsal tubercles.

Tarcoola; Ooldea.

20. **A. limbatum,** Benth. Stems rigid, procumbent, sometimes nearly 1 m. long; leaves obovate, entire or sinuate-toothed, more or less scaly-white, 1-3 cm. long; flowers monoecious in axillary clusters, or the males sometimes in terminal interrupted spikes; fruiting bracteoles subsessile, tomentose, 5-10 mm. long, sometimes distinctly stalked, hard, tubular, and united up to the small orifice, which is concealed by the herbacious limb; limb either dilated horizontally or small and erect, bearing at its base 2 opposite broad spreading toothed green-reticulate appendages.

FIG. 70. **Atriplex limbatum.**

Murray lands; Port Augusta to the Far North. Most of the year. Eastern States.

Var. *sexifidum*, J. M. Black. Leaves obovate, sometimes faintly sinuate-toothed; lobes and appendages of equal length and the latter often cleft to the base, so that there is the appearance of a tubular perianth crowned by 4 or 6 small lobes.

Far North.

FIG. 71. **Atriplex halimoides.**

21. **A. halimoides,** Lindl. Low plant with stiff spreading branches; leaves rather thick, soft and mealy-white, obovate or ovate-lanceolate with a cuneate base, angular-toothed, 1-2 cm. long, the upper ones oblanceolate; flowers monoecious, in axillary clusters or the males in very short terminal spikes; fruiting bracteoles turbinate or subglobular, spongy, 6-8 mm. long, encircled by 2 appendages which are united so as to

form a broad horizontal green-reticulate more or less lobed and undulate wing about 10 mm. diam. near the summit of the bracteoles, the orifice very small and closed by the 2 small erect entire lobes or free portions of the bracteoles, which occupy the centre of the wing; radicle inferior.

Murray lands; near Port Pirie; east and west of Lake Torrens; Far North and West. Most of the year.—Eastern States. The fruiting bracteoles resemble the fruiting perianth of some *Kochias*.

Var. *conduplicatum*, F. v. M. et Tate. The bracteoles often larger, the wing tending to form 2 opposite large semicircular conduplicate lobes, the real (interior) lobes small and bluntly 3-toothed.—*A. conduplicatum*, F. v. M.

Far North and West.—New South Wales.

FIG. 72. **Atriplex spongiosum.**

22. **A. spongiosum,** F. v. M. (1857). *Pop Saltbush.* Resembles the preceding, but the leaves are sometimes rhomboidal and coarsely sinuate-toothed; fruiting bracteoles united, except at the very summit, without appendages, globular, ovoid or obovoid, 7-12 mm. long, membranous and inflated, reticulate; male clusters small, in the upper axils.—*A. holocarpum*, F. v. M. (1858).

Murray lands to the Far North; from Port Pirie to Lake Torrens and west thereof. Most of the year.—New South Wales; Northern Territory; West Australia.

A. Billardieri (Moq.), Hook, f., a prostrate herb, covered with papillose glands; flowers monoecious; fruiting bracteoles united to near the summit, obovoid, compressed at right angles with, and not parallel to the lobes (as in the other species), occurs on the coasts of the eastern States, but does not appear to have been found as yet in South Australia.

6. BASSIA, All. (1766).

(After Ferdinando Bassi, an Italian naturalist; born at Bologna in 1710, died in 1774.)

Flowers bisexual, axillary; stamens usually 5; styles 2 or 3; fruiting perianth with 5 lobes or teeth, or the limb lengthened and subentire, the tubular portion hardened, closely sessile by a more or less hollow and oblique base, and bearing near the summit 2-12 spines or teeth, sometimes minute or almost obsolete, rarely united in a very narrow-toothed wing, or, in 1 species, the perianth terminates in 3 soft horns; fruit enclosed in the more or less hardened perianth-tube; pericarp and testa membranous; embryo almost annular, surrounding the albumen. Small shrubs or undershrubs, with narrow thick alternate leaves, usually inhabiting dry country.

A. Seed horizontal (*i.e.*, parallel to summit of perianth).
  B. Flowers solitary in the axils.
    C. Perianth not winged but with dorsal spines.
      D. Spines 2, opposite.
        E. Hairy plants.
          F. Perianth-limb shorter than tube; basal area of attachment oblique.
            G. Perianth and spines small (3-8 mm. long in all); tubercle present.
              Spines almost glabrous; base of perianth circular ..... *B. uniflora* 1.
              Spines villous; base oblong ..... *B. eriacantha* 2.
            G. Perianth and spines large (15-20 mm. long in all); tubercle often absent..... *B. bicornis* 3.
          F. Perianth-limb as long as tube; perianth white-tomentose, with a tubercle ..... *B. limbata* 4.
        E. Glabrous plant; perianth-limb as long as tube; tubercle present ..... *B. bicuspis* 5.
      D. Spines 4, divergent; perianth ovoid, rather woolly; base oblong ..... *B. ventricosa* 6.
      D. Spines 5.
        Spines radiating; perianth almost glabrous, flat-topped ..... *B. costata* 7.
        Spines small, suberect, with 5 dorsal appendages, all almost hidden in the dense wool of the perianth..... *B. sclerolaenoides* 8.
      D. Spines 5-6; hairy plants.
        H. Spines broad, unequally toothed, united towards base ..... *B. Luehmannii* 9.

H. Spines slender.
I. Two of the spines shorter and united towards base; base of perianth circular; leaves subterete.
Spines 5-6, 1-3 mm. long; perianth convex at summit, 2½ mm. broad ..... *B. convexula* 10.
Spines 6, about 1 mm. long; perianth almost flat at summit, 1½ mm. broad.. *B. parviflora* 11.
I. Two of the spines shorter but not united; spines radiating; perianth flat-topped, villous, 4-5 mm. broad; leaves flat, oblanceolate ..... *B. Birchii* 12.
C. Perianth without spines, but with 3 soft radiating horns ..... *B. tricornis* 13.
C. Perianth small, glabrous, flat-topped, with a narrow horizontal toothed wing and central base; woolly plants.
Perianth bowl-shaped, the wing with about 12 radiating teeth ..... *B. stelligera* 14.
Perianth obconical, the wing 5-toothed..... *B. brachyptera* 15.
B. Flowers 2-10 together; fruiting perianths united in a hard mass, woolly on the outside.
Flowers 6-10; spines 2-5, usually rigid..... *B. paradoxa* 16.
Flowers 2-7; spines absent or minute ..... *B. biflora* 17.
A. Seed vertical (*i.e.*, perpendicular to the summit of the perianth); flowers solitary.
J. Tomentose plants.
K. Spines 2, with a tubercle or 3rd very short spine.
L. Perianth hairy.
M. Spines divergent; base of perianth oblique, hollow.
N. Spines diverging obliquely, 5-8 mm. long; perianth-base gibbous..... *B. obliquicuspis* 18.
N. Spines diverging in a straight line, almost glabrous, 5-8 mm. long; perianth narrow, with small ovate base ..... *B. patenticuspis* 19.
M. Spines erect, parallel, very short; perianth with long erect limb and large oblique hollow base.
Perianth 5-6 mm. long, ribbed, becoming glabrous, gibbous at base ..... *B. Tatei* 20.
Perianth 3 mm. long, densely white-tomentose, slightly gibbous at base..... *B. parallelicuspis* 21.
L. Perianth glabrous; spines divergent, 1 of them decurrent into 3 tubercles..... *B. decurrens* 22.
K. Spines 3-4; perianth and spines villous, the base small, circular ..... *B. lanicuspis* 23.
K. Spines 5.
Spines all free, often recurved; leaves subterete *B. intricata*, var.
Two shorter spines united near base; leaves flat *B. quinquecuspis*, var.
J. Glabrous plants.
O. Leaves subterete.
P. Perianth-limb erect.
Q. Spines 5-15 mm. long.
Spines 3; base of perianth broad, swollen *B. tricuspis* 24.
Spines 5, often recurved; base of perianth not swollen, almost lateral ..... *B. intricata* 25.
Q. Spines 15-35 mm. long, 3-4; base of perianth swollen ..... *B. longicuspis* 26.
P. Perianth-limb recurved, with 4 slender divaricate spines, the perianth-base not swollen, almost lateral..... *B. divaricata* 27.
O. Leaves flat; perianth with 5 slender spines, 2 united near base ..... *B. quinquecuspis* 28.

1. **B. uniflora** (R. Br.), F. v. M. Dwarf diffuse shrub, with prostrate or ascending stems, densely clothed with a grey whitish or tawny appressed tomentum; leaves linear-clavate, 5-30 mm. long, crowded, sometimes purplish towards the summit; flowers solitary in the axils; fruiting perianth shortly tomentose, 2-4 mm. long and about as broad, with an almost circular oblique hollow base, and 2 divergent opposite spines at the summit of the perianth-tube, 2-8 mm. long, shortly tomentose near their bases or for the greater part of their length, or 1 or both spines minute or obsolete, also with a small tubercle on the inner face at the base of one of the spines, the limb inconspicuous; seed horizontal, with ascending radicle.—*Sclerolaena uniflora*, R. Br.; *Anisacantha diacantha*, Nees: *Sclerolaena diacantha*, Benth.: *Bassia diacantha*, F. v. M.

FIG. 73.
Bassia uniflora.

Near seacoasts and inland in the Murray lands and Flinders Range; Yorke and Eyre Peninsulas and westward to Tarcoola and Ooldea; Far North. Most of the year.—All the States except Tasmania.

The type was collected by Robt. Brown at Fowler's Bay. The coastal and some of the inland forms have minute or obsolete spines, but inland specimens have usually 2 conspicuous spines, varying much in length; the length and color of the clothing is also variable.

2. **B. eriacantha** (F. v. M.), R. H. Anders. Small shrub with white-tomatose branches; leaves silky, linear-compressed, 15-20 mm. long; flowers solitary; fruiting perianth about 4 mm. long, but hidden beneath the long dense white or tawny hairs, with 2 divergent spines about 4 mm. long, villous for half their length, and a tubercle, the base very oblique, large, oblong, hollowed; seed obliquely horizontal.—*Kentropsis eriacantha*, F. v. M.; *Bassia lanicuspis*, F. v. M. partly.

Far North; westward to Kingoonya, eastward towards Broken Hill. Most of the year.—New South Wales.

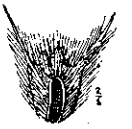

FIG. 74.
Bassia eriacantha.

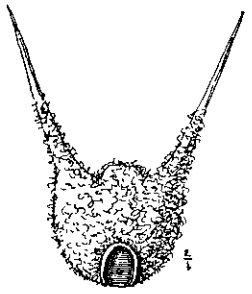

FIG. 75.—**Bassia bicornis.**

3. **B. bicornis** (Lindl.), F. v. M. Small shrub; branches densely tomentose; leaves crowded, linear, 10-25 mm. long, at first softly woolly, later subglabrous; flowers solitary; fruiting perianth large, woody, almost globular, enveloped in white wool, 7-8 mm. diam., with 2 stout rigid divergent spines, 10-15 mm. long, woolly-tomentose for the greater part of their length; base ovate, oblique, scarcely hollowed; seed horizontal.—*Sclerolaena bicornis*, Lindl.

Far North. Most of the year.—New South Wales, Queensland.

4. **B. limbata,** J. M. Black. Small shrub covered with a dense whitish tomentum; leaves linear-clavate, 10-20 mm. long; flowers solitary; tube of fruiting perianth 3 mm. long, 4 mm. broad at the summit, the base oblong and scarcely hollowed, the limb as long and both white-tomentose; spines 2, divergent, rather thick, 8-12 mm. long, tomentose more than half-way, the third spine or tubercle minute; seed horizontal.

Leigh's Creek; Parachilna; Mt. Parry, and east of the Flinders Range. Most of the year.—Western New South Wales.

FIG. 76.—**Bassia limbata.**

5. **B. bicuspis,** F. v. M. Dwarf undershrub, glabrous except for the woolly axils of the leaves, which are subterete, crowded, about 10 mm. long; perianth-tube 2-3 mm. long, hard, glabrous, the base slightly oblique and almost orbicular, the limb rather longer and tomentose; spines 2, opposite, divergent, dilated towards base, rigid, usually 5-15 mm. long, sometimes more, with a third very short spine or tubercle on the inner face; seed horizontal, although appearing oblique owing to the base and summit of the perianth being both oblique.

Lake Torrens to Far North.—New South Wales. It appears to be rare.

6. **B. ventricosa,** J. M. Black. Dwarf shrub; branchlets white tomentose; leaves linear-clavate, silky, becoming glabrous 5-15 mm. long; flowers solitary; fruiting perianth sparingly tomentose, ovoid or almost globular, 3 mm. diam., the base oblong and scarcely hollowed; spines 4, of which 2 are 3-5 mm. long and the other 2 much shorter, or one of the shorter may be united to one of the longer or almost obsolete, all spines slightly divergent and more or less hairy; seed obliquely horizontal.

FIG. 77.
Bassia ventricosa.

Port Augusta and Lake Torrens to the Far North, and eastward to Broken Hill, N.S.W. Most of the year.

7. **B. costata,** R. H. Anders. Dwarf shrub, with villous subterete leaves, 4-10 mm. long; flowers solitary; fruiting perianth almost glabrous, the tube obconical, ribbed, 2 mm. long, flat at summit, the base central, orbicular, slightly hollowed; spines 5, radiating, the 3 longest 2-3 mm. long, the 2 others shorter, united near base and with a raised line or rib between them; seed horizontal.—*B. echinopsila,* F. v. M. partly.

Musgrave and Birksgate Ranges; also in the Great Victoria Desert, W.A. Winter and spring.

8. **B. sclerolaenoides,** F. v. M. Small woolly undershrub, with ascending branches, often under 10 cm. high; leaves linear or lanceolate, 5 to rarely 10 mm. long; flowers solitary; fruiting perianth depressed, forming with its dense woolly covering a globular mass of 5-7 mm. diam., hardened at base, with 5 ovate lobes closing over the fruit, 5 dorsal erect green bifid or trifid appendages and a third row lower down of 5 short spreading subulate spine-like or soft appendages, all more or less concealed within the wool; seed horizontal.—*Chenolea sclerolaenoides,* F. v. M.; *Bassia Eriochiton,* Tate.

Murray lands; Flinders Range to Far North; Gawler Range to Nullarbor Plain. Most of the year.—Victoria, New South Wales, West Australia.

B. Dallachyana, F. v. M. (*Chenolea Dallachyana,* Benth.), appears to have been described from a young specimen of *B. sclerolaenoides,* F. v. M., in which the dorsal spines were not yet developed.

9. **B. Luehmannii,** F. v. M. Dwarf woolly-tomentose shrub; leaves obovate, narrowed towards base, flattish, 5-8 mm. long; flowers solitary; fruiting perianth depressed, slightly woolly, with a very short tube and 5 or 6 rather broad bifid or trifid rigid spines erect or spreading, and all shortly united at the base; seed horizontal.

Dalhousie Springs (North of Oodnadatta).

FIG. 78.
Bassia convexula.

10. **B. convexula,** R. H. Anders. Small shrub with tomentose branches; leaves linear, silky, acute, 5-10 mm. long; flowers solitary; fruiting perianth almost globular, 2-3 mm. long, convex at summit, more or less tomentose, with 5 unequal radiating glabrous spines, the longest 3-4 mm. long, the 2 shortest united near the base by a conspicuous ridge; base and perianth circular, scarcely oblique and not hollowed; seed horizontal.—*B. echinopsila,* F. v. M., partly.

Far North and westward to Birksgate Range; also near Broken Hill, New South Wales. Most of the year.

11. **B. parviflora,** R. H. Anders. Dwarf shrub sparsely beset with short stiff hairs; leaves subterete, acute, distant, deciduous, only 3-5 mm. long; flowers solitary; fruiting perianth about 1½ mm. long and broad, almost flat or slightly convex at summit, beset with short hairs; spines 6, very short, radiating, about 1 mm. long, the 2 shortest ones united towards their base, and with a ridge between them running to the summit and base of the perianth; base circular, not oblique, slightly hollowed; seed horizontal.—*B. echinopsila,* F. v. M. partly.

FIG. 79.
Bassia parviflora.

Murray lands; Eyre Peninsula and westward to Ooldea; also in the Great Victoria Desert, West Australia. Most of the year.

12. **B. Birchii,** F. v. M. Small tomentose shrub; leaves lanceolate, flat, narrowed towards base, 6-12 mm. long; flowers solitary; fruiting perianth densely tomentose, depressed at summit and about 4 mm. diameter at that point, the tube obconical, about 3 mm. long; spines 5-6, radiating, unequal, the largest 3-5 mm. long, 2 shorter but scarcely united towards base; seed horizontal.—*B. Cornishiana,* F. v. M.

Finke River, Northern Territory, and probably occurs in our Far North or North-West. Most of the year.—Queensland.

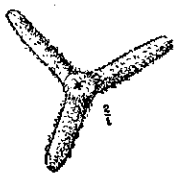

FIG. 80.
Bassia tricornis.

13. **B. tricornis** (Benth.), F. v. M. Small shrub with white-tomentose branches; leaves linear, silky-villous, 5-15 mm. long; fruiting perianth small and depressed, with 3 soft cylindrical densely tomentose horns radiating from the tube and 4-8 mm. long, so that the whole resembles a miniature star-fish; seed horizontal.—*Chenolea tricornis*, Benth.

Murray lands to the Far North. Most of the year.—Victoria, New South Wales.

14. **B. stelligera,** F. v. M. Low woolly undershrub; leaves linear, 3-10 mm. long, becoming glabrous; flowers solitary, fruiting perianth depressed-globular, almost glabrous, the summit flat, surrounded by a narrow rigid wing bearing about 12 very short radiating teeth; the wing and teeth together about 3 mm. in diameter; seed horizontal.—*Kochia stelligera*, F. v. M.

Murray lands. Spring and summer.—Victoria, New South Wales.

15. **B. brachyptera** (F. v. M.), R. H. Anders. Habit of the preceding, densely clothed with long soft spreading hairs; leaves linear, compressed, crowded, acute, 8-15 mm. long; fruiting perianth glabrous, 3-4 mm. diam., including the narrow 5-angled horizontal entire wing at its flat summit, the tube about 2 mm. long and contracted towards the hollow base, with 5 narrow vertical wings forming at the summit 5 small teeth on the horizontal wing; seed horizontal.—*Kochia brachyptera*, F. v. M.

Murray lands to the Far North; west of Lake Torrens. Most of the year.—Victoria, New South Wales. This and the preceding species are on the border-line between *Bassia* and *Kochia*.

16. **B. paradoxa** (R. Br.), F. v. M. Low densely woolly shrub; leaves narrow-linear, 5-15 mm. long, soft; flowers 6-10 together, united in a dense axillary cluster, the fruiting perianths hardened and connate into a globular white-woolly mass about 10 mm. in diam., each perianth with 2-5 rigid dorsal spines protruding from the wool, the spines sometimes shorter or almost obsolete; seed obliquely horizontal; pericarp with the upper half hardened, the lower hyaline.

Murray lands and northward thereof; Port Pirie to the Far North; Far West. Most of the year.—Eastern States.

Var. *latifolia*, J. M. Black. Leaves 15-25 mm. long, 5-8 mm. broad, densely tomentose; heads 15 mm. diam.; spines (in our specimens) reduced to 5 short obtuse horns.

Strzelecki Creek, near Innamincka.

17. **B. biflora** (R. Br.), F. v. M. Low shrub; leaves linear, 5-10 mm. long, more or less woolly; flowers 2-7, united in axillary heads or clusters; fruiting perianths woody, connate in the lower part and radiating, as in the preceding, the whole head densely woolly and 5-8 mm. diam., without, or rarely with, minute dorsal spines; seed horizontal; pericarp hardened at summit.—*Sclerolaena biflora*, R. Br.

FIG. 81.
Bassia biflora.

Seacoast near Adelaide to the Far North; Murray lands; along the Great Bight. Most of the year.—Victoria; New South Wales. When the fruiting head is more than 4-flowered, it resembles that of *Bassia paradoxa* before the protrusion of the spines. I have not been able to discover any dorsal spines, but other observers mention very minute spines or tubercles as being sometimes present.

FIG. 82.
Bassia obliquicuspis.

18. **B. obliquicuspis,** R. H. Anders. Dwarf erect grey-tomentose shrub; leaves silky, subterete, 7-12 mm. long; flowers solitary; fruiting perianth white-tomentose, the limb short, the tube about 3 mm. long, gibbous, oblique, oblong and hollowed at base; spines 2, 4-7 mm. long, often red, tomentose for half their length, diverging obliquely (*i.e.*, not in the same vertical plane), with a decurrent tubercle at the base of one spine; seed vertical.

Flinders Range; westward to Tarcoola and eastward to Broken Hill, N.S.W. Most of the year.

19. **B. patenticuspis,** R. H. Anders. Dwarf erect or procumbent shrub, with grey-silky subterete leaves, 5-10 mm. long; flowers solitary; fruiting perianth sparsely tomentose, the tube 2-3 mm. long, rather slender, the limb conspicuous, the base oblique, ovate, hollowed; spines 2, slender, divergent, often red, 5-8 mm. long, almost glabrous, with a conspicuous tubercle or 3rd short decurrent spine on the inner face; seed vertical.—*Sclerolaena diacantha*, var. *longispina*, Benth. partly.

Port Pirie to Far North; westward to Birksgate Range and Nullarbor Plain and eastward to Broken Hill, N.S.W. Most of the year.

FIG. 83. **Bassia patenticuspis.**

FIG. 84. **Bassia Tatei.**

20. **B. Tatei,** F. v. M. Grey silky-tomentose shrub, with upright branches; leaves broad-linear or lanceolate, 5-15 mm. long, the floral ones rather broader and crowded; flowers solitary; fruiting perianth-tube becoming glabrous, 5-6 mm. long and broad, ribbed, sessile by an oblique hollow base which is much dilated on the inner or posterior face of the perianth; spines short, suberect, 1 on each side of the summit of the tube, with a small tubercle or third spine; seed obliquely vertical.

Mt. Lyndhurst, Murnpeowie Station (Flinders Range). Most of the year.

21. **B. parallelicuspis,** R. H. Anders. Small shrub with tomentose branches; leaves linear, silky, 10-25 mm. long; flowers solitary; fruiting perianth 3 mm. long and broad, tomentose, with 2 short erect and therefore parallel tomentose spines, 2 mm. long and 1 tubercle, the base of the perianth dilated on the inner face, very oblique and hollowed; seed vertical.

Flinders Range; Far North and on the Finke River, N.T. Most of the year.

FIG. 85.—**Bassia parallelicuspis.**

FIG. 86. **Bassia decurrens.**

22. **B. decurrens,** J. M. Black. Dwarf rather erect shrub; branches woolly, finally almost glabrous; leaves subterete, sparsely hairy, 10-15 mm. long; flowers solitary; tube of fruiting-perianth glabrous, smooth, ribbed, about 3 mm. long and broad, the base ovate or almost orbicular, slightly hollowed; spines 2, glabrous, divergent, 6-8 mm. long, dilated towards base and one of them decurrent into 3 very short spines or tubercles, the limb as long as the tube, truncate and ciliate at summit; seed vertical.

Murray lands; west of Port Augusta and probably east of the Flinders Range, as it occurs in western New South Wales. Most of the year.

23. **B. lanicuspis,** F. v. M. Dwarf shrub with numerous pubescent branches; leaves linear, crowded, 5-10 mm. long, silky with whitish or tawny hairs; flowers solitary; fruiting perianth-tube 2-3 mm. long, almost concealed beneath the long straight hairs; limb erect, not as long as the tube; spines usually 3, sometimes 4, divergent, slender, villous almost to the summit, the 2 longest 4-6 mm. long, 2 of the spines sometimes united in lower half; base small, circular, not oblique, slightly, if at all hollowed; seed vertical.—*Anisacantha lanicuspis*, F. v. M.

Near Lake Torrens; Far North; westward to Tarcoola; eastward to Broken Hill, New South Wales. Most of the year.

FIG. 87. **Bassia lanicuspis.**

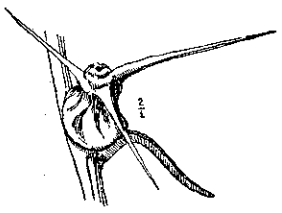

FIG. 88.—**Bassia tricuspis.**

24. **B. tricuspis,** F. v. M. Near *B. divaricata*, but the fruiting perianth is attached by a broad ovate usually expanded base, the spines are 3 (with very rarely a short 4th one) and spread outwards almost parallel to the branch, while the limb is erect; seed vertical.

Murray lands and country north thereof. Most of the year.—Eastern States.

25. **B. intricata,** R. H. Anders. An intricately branched compact glabrous shrub, 30-60 cm. high; branches and spines often reddish; leaves and perianth-tube as in the preceding, but the spines are normally 5 (rarely 3, 4, or 6), sometimes red, often reflexed, the 5th one usually small, the limb erect, ciliate; seed vertical.

Near Lake Torrens and Eyre, and eastward towards Cockburn. Most of the year.—New South Wales.

Var. *hirsuta*, J. M. Black. Branches and leaves tomentose.

Everard Range.

26. **B. longicuspis,** F. v. M. Glabrous undershrub sometimes only 10-30 cm. high; leaves subterete, not contracted towards base, glaucous, 25-30 mm. long; flowers solitary; fruiting perianth-tube glabrous, 4-5 mm. long and about as broad, sessile by a very broad oblique base; limb truncate, ciliate, much shorter than tube; spines 4, rarely 3 by abortion; divergent or divaricate, subulate, 2 15-35 mm. long, the other 2 shorter; seed vertical.

Murray lands; Flinders Range; Lake Torrens; Far North. Most of the year.—New South Wales, Central Australia. This and *B. bicornis*, as well as the two following species, all of which have rather long penetrating spines, are known in the North as "Bindy-eye," which is said to be a corruption of some native name.

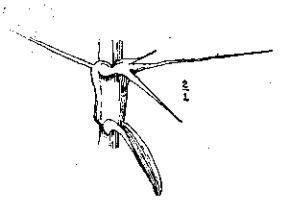

FIG. 89.—**Bassia divaricata,**

27. **B. divaricata** (R. Br.) F. v. M. Small glabrous branching shrub, about 1 m. high; leaves linear, plano-convex, with a broad flattened base, 8-15 mm. long, often woolly in the axils; flowers solitary; fruiting perianths crowded, glabrous, sessile by a long broad-linear base, so oblique as to appear lateral, the tube about 4 mm. long; spines 4, slender, divaricate, 3 of them 5-15 mm. long, the 4th short or reduced to a tubercle; perianth-limb recurved, not erect; seed vertical.—*Anisacantha divaricata*, R. Br.; *A. erinacea*, Moq.

Murray lands to Far North; Flinders Range. Most of the year.—Eastern States.

28. **B. quinquecuspis,** F. v. M. Shrub under 1 m. high, almost glabrous; leaves flat, linear, tapering at both ends, 6-15 mm. long; flowers solitary; fruiting perianth-tube 2-3 mm. long, glabrous or pubescent, attached by a broad oblique base; spines 5, slender, glabrous, spreading, 3 of them 5-12 mm. long, the other 2 shorter and united towards base; perianth-limb minute; seed vertical.—*Anisacantha muricata*, Moq.

This species, common in the dryer parts of New South Wales and Queensland, has been found close to our eastern border at Milparinka and elsewhere, so that it must almost certainly occur in this State.

Var. *villosa*, Benth. Branches, leaves, and perianth-tube villous.

7. BABBAGIA, F. v. M.

(After B. Herschel Babbage, President of the Adelaide Philosophical Society in 1855, and leader of a South Australian exploring expedition in 1858.)

Flowers bisexual, solitary, sessile, axillary; styles 2, united at base; perianth-tube hardened in fruit, sessile by a hollow base and surmounted by 2-5 more or less vertical stipitate wings; pericarp and testa membranous; seed horizontal; embryo annular, enclosing the albumen. Dwarf shrubs or undershrubs with alternate succulent subcylindrical leaves, glabrous except for a slight woolliness in the axils of the leaves.

A. Wings 2 or 3.
- Wings 2-3, subequal, semicircular, cordate at base... *B. dipterocarpa* 1.
- Wings 2, unequal, obovate, not cordate ..... *B. acroptera* 2.

A. Wings 5, truncate-denticulate, on 5 spreading extensions of the perianth ..... *B. pentaptera* 3.

1. **B. dipterocarpa,** F. v. M. Small shrub; leaves clavate, compressed towards base, 4-6 mm. long, crowded; fruiting perianth 2½ mm. long, the lower half hollow, the upper depressed-globular, striate and containing the fruit; wings usually 2, sometimes 3, membranous, equal or subequal, semicircular, subcordate, 4-6 mm. long.

FIG. 90. **Babbagia dipterocarpa.**

Near Lake Torrens; Far North; near Cockburn and Mutooroo. Most of the year.—New South Wales, Central Australia.

2. **B. acroptera,** F. v. M. et Tate. Like the preceding, but the wings of the fruiting perianth are 2, terminal, unequal, membranous, obovate, the larger one tapering towards the base, about 3 mm. long, not cordate, and the 2nd one rather smaller; the perianth proper is about 2 mm. long.

Flinders Range; Lake Torrens; Lake Frome; Far North. Most of the year.—New South Wales.

Var. *deminuta,* J. M. Black. The larger wing thick, reddish, oblong-curved, scarcely 2 mm. long, the 2nd one very small or almost obsolete.

West of Port Augusta.

3. **B. pentaptera,** F. v. M. et Tate. Leaves as in the preceding; fruiting perianth-tube depressed-globular, 1 mm. long and 2 mm. broad, striate, with a very shallow hollow base; wings 5, equal, membranous, truncate-denticulate, each wing vertical on stiff linear spreading extensions of the tube, 3 mm. long

Mt. Parry; Mt. Lyndhurst (Flinders Range). Apparently rare.

B. scleroptera, F. v. M., with 5 thick hard unequal somewhat rhomboid wings, grows in the northern interior of New South Wales and may be found in our Far North-East.

8. KOCHIA, Roth.

(After Dr. W. D. J. Koch, a German botanist, 1771-1849.)

Flowers bisexual or polygamous, sessile, axillary, almost always solitary; styles 2 or 3, united near base; fruiting perianth usually flat at the summit, the limb with 5 short or long lobes closing over the fruit, and 5 (or rarely fewer) horizontal wings spreading outward from the base of the lobes and often united into an annular entire or once-cleft wing, and sometimes also with vertical wings below the horizontal ones; fruit enclosed in the more or less hardened tube; pericarp coriaceous; seed horizontal, except in *K. eriantha;* testa membranous; embryo horseshoe-shaped, enclosing a scanty albumen. Shrubs or undershrubs, with thick narrow leaves, providing valuable fodder in dry districts.

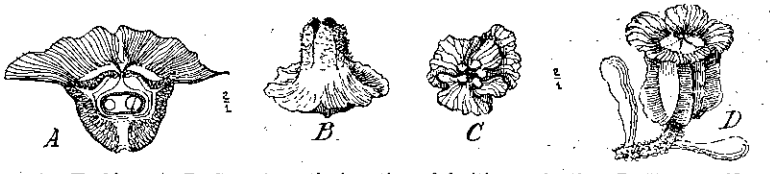

FIG. 91.—**Kochia.** A, *K. Georgei,* vertical section of fruiting perianth. B, *K. pyramidata.* C, *K. oppositifolia,* fruiting perianth viewed from above. D, *K. triptera,* var. *erioclada.*

A. Fruiting perianth bordered by 5 more or less distinct horizontal wings.
  B. Perianth with 5 narrow erect appendages alternating with the horizontal wings; woolly plants.
    Perianth-tube very short, convex, with minute base.
      Wings distinct down to the tube ..... *K. lobiflora* 1.
      Wings almost united into one ..... *K. lanosa* 2.
    Perianth-tube cylindrical, with large hollow base .... *K. fimbriolata* 3.
  B. Perianth without any appendages except the horizontal wings.
    C. Wings membranous, conspicuous; leaves 2-5 mm. long.
      Leaves mostly opposite; wings unequal ..... *K. oppositifolia* 4.
      Leaves alternate; wings equal ..... *K. brevifolia* 5.
    C. Wings coriaceous, rigid, hidden under dense tomentum; leaves 6-12 mm. long ..... *K. scleroptera* 6.
A. Fruiting perianth with horizontal wings united into a flattish disk-shaped wing usually divided by one slit and sometimes slightly lobed.
  D. Perianth without vertical wings.
    E. Perianth-limb erect above the wings; leaves small.. *K. pyramidata* 7.
    E. Perianth-limb almost flat.
      F. Seed vertical; perianth enveloped in very long woolly hairs ..... *K. eriantha* 8.
      F. Seed horizontal.
        G. Leaves alternate.
          H. Perianth-tube small and crustaceous, convex.
            Leaves linear or terete, silky, tomentose or glabrous ..... *K. tomentosa* 9.
            Leaves clavate, tomentose ..... *K. sedifolia* 10.
          H. Perianth-tube rather large, solid, obconical.

I. Tube stellate-hairy ; leaves flattish, petiolate — *K. planifolia* 11.
I. Tube glabrous ; leaves subterete.
Tube not ribbed ; leaves 6-12 mm. long ; branchlets unarmed — *K. Georgei* 12.
Tube ribbed ; leaves minute ; branchlets spinescent — *K. aphylla* 13.
H. Perianth-tube herbaceous, with broad hollow base — *K. excavata* 14.
G. Leaves mostly opposite, trigonous — *K. Cannonii* 15.
D. Perianth with vertical wings as well as the horizontal wing.
Tube subcylindrical, with 3-5 vertical wings — *K. triptera* 16.
Tube ovoid-truncate, spongy, with 1 vertical wing — *K. spongiocarpa* 17.
A. Fruiting perianth densely villous, with a narrow rigid horizontal almost continuous border or wing surrounding the broad flat base.
Perianth without appendages — *K. ciliata* 18.
Perianth with an erect crown-shaped appendage — *K. coronata* 19.

1. **K. lobiflora,** F. v. M. Small shrub with procumbent ascending or almost erect stems ; leaves linear or linear-lanceolate, acute, flattish, silky-villous, 8-15 mm. long ; fruiting perianth much depressed, more or less woolly-tomentose, the lobes broad and closing over the fruit ; the 5 horizontal wings scarious, broadly cuneate and distinct, about 10 mm. diameter, with 5 notched or entire and obtuse subrigid woolly appendages, 2-3 mm. long, rising erect from behind the perianth-lobes and alternate with each wing, the appendages sometimes cleft to the base, so that there appear to be 10 or fewer ; tube very short, convex.

Flinders Range and east thereof ; Far North ; Lake Torrens ; Pidinga (between Ooldea and Fowler's Bay). May-Dec.—New South Wales.

2. **K. lanosa,** Lindl. Near the preceding, with the same silky branches and foliage, the horizontal wing of the fruiting perianth membranous, hairy but not so densely tomentose as in the preceding, 8-10 mm. diam., once-cleft to the base, with 5 short lobes or the margin quite entire, and 5 scarious erect linear appendages, subacute or obtuse, rising from the perianth as in the preceding species, the tube short and convex.

Murray lands ; near Lake Torrens ; Far North and westward to Birksgate Range. May-Dec.—Eastern States, West Australia.

3. **K. fimbriolata,** F. v. M. Like the preceding in foliage, but differs in the fruiting perianth, which is densely hairy, about 6 mm. in diam., the 5 horizontal wings appearing fringed, the 5 appendages rather thick and erect, the tube cylindrical, pubescent, about 1 mm. long, with a circular hollow base.

North of Fowler's Bay. Has not been re-discovered since the type was collected in 1875.

4. **K. oppositifolia,** F. v. M. A rigid erect much-branched almost dioecious shrub 30 cm. to 1 m. high ; leaves mostly opposite, divergent, fleshy, plano-convex, acute, 3-4 mm. long, hoary ; fruiting perianth almost glabrous, depressed, 6-8 mm. diam., including the 5 pink membranous unequal wings, the 3 larger ones somewhat deflexed, the 2 smaller ones spreading. (Fig. 91, C.)

Saltmarshes along the coast from the Coorong to the Great Bight. Summer.—Eastern States, West Australia.

5. **K. brevifolia,** R. Br. Much branched shrub, 50 cm. to 1½ m. high, with hoary branches ; leaves alternate, succulent, plano-convex, or about cylindrical, 2-5 mm. long, obtuse, green, glabrous or almost so ; fruiting perianth depressed, almost glabrous, 6-8 mm. diam., including the 5 broad membranous whitish, brown, or pale-pink wings, narrowed towards their bases and equal in size ; perianth-lobes green, convex and closing over the fruit.

Salt ground near the sea and also inland in the southern districts, the Murray lands and northward to the Flinders Range and Lake Torrens. Summer.—Temperate Australia.

6. **K. scleroptera,** J. M. Black. Dwarf rather erect shrub, the branches white-tomentose ; leaves linear, acute, silky-villous, but the midrib often conspicuous below, 6-12 mm. long, the floral ones often caducous ; flowers crowded in long spikes ; fruiting perianth concealed under a dense woolly tomentum, much depressed, 4-5 mm. diam., including the 5 short obtuse rather thick and hard horizontal wings ; tube very shortly convex, under 1 mm. long, 2 mm. broad below the wings.

Alberga and Arkaringa Creeks (west of Lake Eyre) ; Nilpena (east of Lake Torrens). Spring.

7. **K. pyramidata,** Benth. Grey-tomentose much-branched shrub, 1-2 m. high; branchlets sometimes rigid and spinescent; leaves fleshy, almost obovoid, 2-4 mm. long; fruiting perianth drying almost black, 8-15 mm. diam., including the glabrous membranous entire horizontal almost basal wing; tube very short; the 5 lobes erect, pubescent, obtuse, 5 mm. long and supposed to resemble a pyramid. (Fig. 91, B.)

From Port Pirie northwards to the Far North and West; Murray lands and north thereof. Most of the year.—Victoria, New South Wales.

8. **K. eriantha,** F. v. M. Small shrub, with stout tomentose branches; leaves thick, linear, crowded, not contracted towards base, silky with appressed hairs, 10-20 mm. long; flowers in dense leafy spikes, which are 15-18 mm. diam. and 3-5 cm. long; fruiting perianth 10 mm. diam., including the 5-lobed delicately membranous wing, but almost concealed beneath the long woolly hairs; tube turbinate, 3-4 mm. long; seed vertical, rather large, with broad cotyledons and inferior radicle; pericarp hairy.

East and west of Lake Torrens; Far North and westward to Musgrave Range. Most of the year.—New South Wales.

9. **K. tomentosa** (Moq.), F. v. M. (1859). Small shrub with grey-tomentose branches; leaves subterete, 6-12 mm. long, more or less spreading, tomentose, but sometimes becoming almost glabrous; fruiting perianth almost flat at summit, 8-12 mm. diam., the wing glabrous or almost so, usually golden or reddish; tube small, hemispherical, 1-2 mm. long, crustaceous, with a very small base.—*K. villosa,* Lindl. (1848); *Maireana tomentosa,* Moq. (1841).

Most parts of the State except the South-East. Most of the year.—All the States except Tasmania.

Var. *tenuifolia,* F. v. M. Stem and branches glabrous or hoary; leaves glabrous, spreading, distant, 4-10 mm. long; fruiting perianth glabrous, 8-15 mm. diam., the wing thin and undulate.—Yorke Peninsula to Port Augusta; Spalding; Murray lands; Far North.

Var. *appressa* (Benth.), comb. nov. Stems woolly; leaves usually appressed, thick, tomentose, 2-5 mm. long; perianth 6-10 mm. diam., the wing hyaline or striate, with dark radiating nerves, glabrous; tube conical or hemispherical, ribbed, 2-3 mm. long.—*K. appressa,* Benth.—Dublin scrub; Murray lands to Far North; westward to Ooldea.

Var. *humilis,* Benth. Stems short and procumbent; leaves silky, rather flat; wing often tomentose.—Murray lands; Far North. This is probably the same as *K. humillima,* F. v. M.

Var. *enchylaenoides,* J. M. Black. Stem and branches woolly-tomentose; leaves tomentose, 5-10 mm. long; fruiting perianths depressed-globular, drying black, 3-4 mm. diam., resembling those of *Enchylaena tomentosa,* but always with a narrow rim round the summit of the tube, often expanded into a wing, 1 mm. broad; perianth-lobes very short and ciliate.—Far North, near Charlotte Waters.

10. **K. sedifolia,** F. v. M. *Bluebush.* Branching shrub about 1 m. high; stems thick and woody; branches and foliage covered with a dense short greyish-white tomentum, which in the mass has a pale bluish effect; leaves spreading, soft and thick, subclavate but slightly compressed, sessile, 3-10 mm. long, rarely almost glabrous, thicker than in the 2 preceding species; fruiting perianth 8-10 mm. diam., including the entire or once-cleft wing, which is reddish or light-brown, glabrous or slightly hairy, the flat lobes and short turbinate crustaceous tube tomentose.

Murray lands; Port Pirie northwards along the Flinders Range; eastward towards Broken Hill, and westward to the Nullarbor Plain. Summer.—Eastern States.

11. **K. planifolia,** F. v. M. Habit of the preceding, but the leaves, although thick, are flatter, the lower ones 15 mm. long and 3-4 mm. broad, the upper ones much smaller, all with a close greyish tomentum and contracted into a distinct petiole; fruiting perianth 6-15 mm. diam., including the wing, the lobes prominent, and, like the hard obconical tube (3-5 mm. long), covered with small stellate hairs.

Flinders Range to Far North; Far West; west of Lake Torrens. Most of the year.—New South Wales, West Australia.

12. **K. Georgei,** Diels. Shrub with stout stems and white-tomentose branchlets; leaves subterete, silky-villous, 6-12 mm. long; fruiting perianth glabrous except the flat pubescent lobes, usually 15-20 mm. diam., including the broad brownish entire wing, which is often undulate on the margin; tube hard and solid, 4-5 mm. long, obconical, and 4-5 mm. diam. under the wing. (Fig. 91A).

Murray lands to Far North and North-West; Gawler Range to Nullarbor Plain. Most of the year. The wing is sometimes narrow, but the tube large and hard as in the type.—Temperate Australia.

13. **K. aphylla,** R. Br. *Cotton Bush.* Shrub about 1 m. high, with slender stiff spreading branches, which are striate and woolly, or become glabrous with age ; barren branchlets rigid and pungent-pointed ; leaves minute, crowded, caducous, thick, tomentose, 1-2 mm. long, or sometimes subterete and 4-5 mm. long ; flowers mostly unisexual ; fruiting perianth 8-12 mm. diam., the wing glabrous, the tube 10-ribbed, hard, obconical, about 2½ mm. long.

From Port Adelaide to Far North ; Murray scrub ; Gawler Range. Most of the year.—Eastern States.

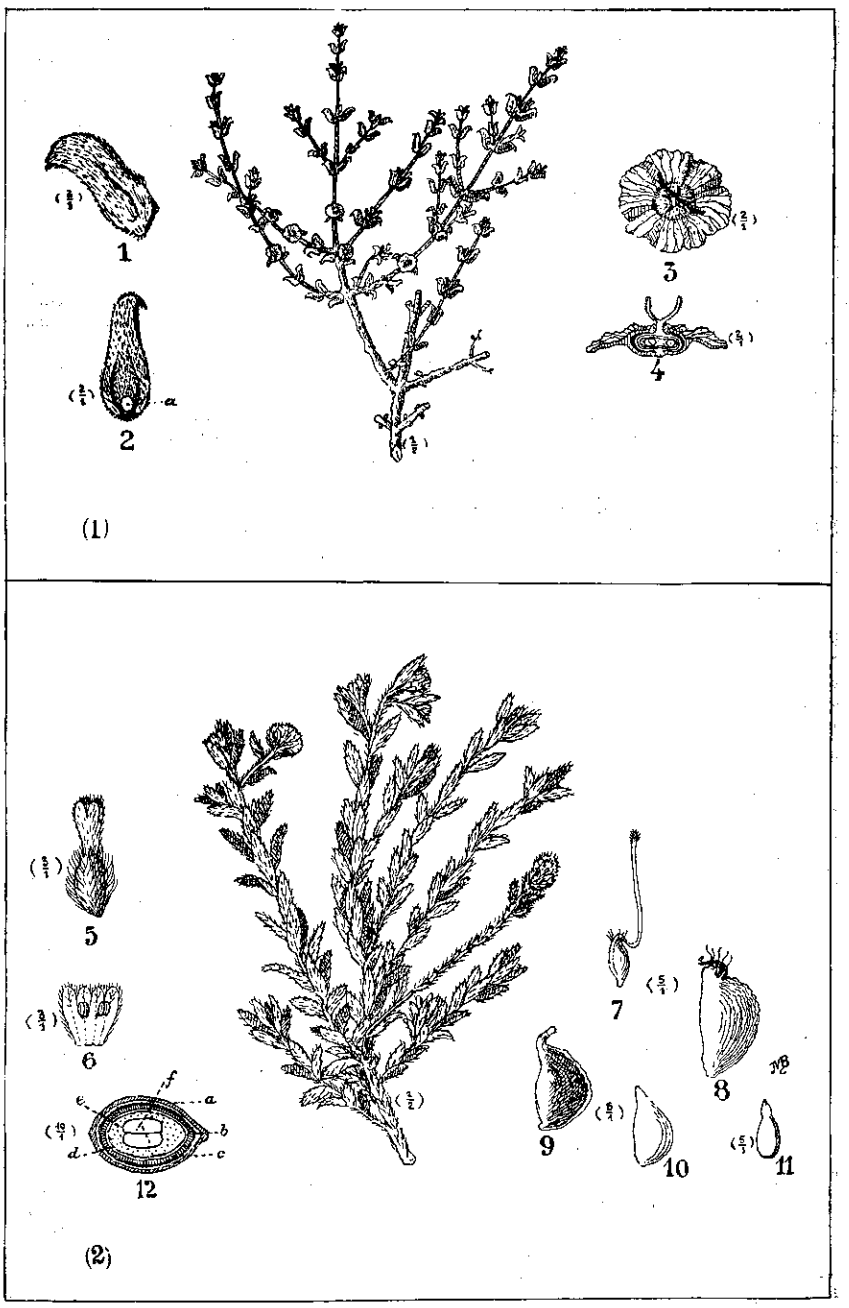

PLATE 13.—(1) **Kochia Cannonii ;** (2) **Pimelea Williamsonii.**

14. **K. excavata,** J. M. Black. Small procumbent perennial; leaves silky-villous, linear, 8-10 mm. long; fruiting perianth 10-12 mm. diam., including the horizontal often reddish wing, which, with the tube, may be glabrous or slightly tomentose; tube 3-4 mm. long, herbaceous, constricted about the middle and then expanding into a broad hollow base.

Port Willunga northward to Flinders Range; Murray lands. Most of the year.—North-western Victoria.

Var. *trichoptera*, J. M. Black. Stems and branches usually longer than in the type; flowers in long dense spikes almost concealing the floral leaves; fruiting perianth 5-10 mm. diam., including the white-tomentose wing; tube tomentose, about 2 mm. long.—Dublin scrub northward to Flinders Range; Musgrave Range; Gawler Range; Murray lands and towards Broken Hill.—New South Wales.

15. **K. Cannonii,** J. M. Black. Small shrub; leaves opposite or almost so, divergent, thick, oblong, plano-convex, recurved at summit, appressed-pubescent, 5-8 mm. long; fruiting perianth glabrous except the lobes, 5-6 mm. diam., including the entire horizontal wing; tube depressed.

Telowie; Port Augusta; Leigh's Creek. Most of the year.

PLATE 13 (1)—1, leaf (side view); 2, leaf (seen from above); 3, fruiting perianth (from above); 4, vertical section of same.

16. **K. triptera,** Benth. Low glabrous shrub; leaves linear, subterete, rather crowded, 10-20 mm. long, acute, fleshy; fruiting perianth almost glabrous, sometimes reddish, 8-12 mm. diam. at the summit, including the membranous entire or slightly 3-5-lobed horizontal wing; tube almost cylindrical, solid in the lower half, 6-8 mm. long, surrounded by 3 decurrent conspicuous vertical wings, rarely a 4th or 5th more or less rudimentary.

Murray lands to the Far North and westward to Tarcoola and the Everard Range. Most of the year.—Eastern States, West Australia.

Var. *pentaptera*, J. M. Black. Vertical wings 5, rarely 4.—*K. decaptera*, F. v. M.—Same localities.

Var. *erioclada*, Benth. Branches covered by a dense white or tawny tomentum; leaves glabrous, sometimes clavate. (Fig. 91, D.)—*K. pentatropis*, Tate.—Dublin northwards to Lake Torrens; Murray lands; westward to Fowler's Bay and Ooldea.—West Australia.

17. **K. spongiocarpa,** F. v. M. Resembles the preceding variety, the branches white-tomentose and the leaves glabrous; the perianth about the same diameter at the summit, but the horizontal wing narrower, because the tube is broader, almost hemispherical, 7-10 mm. long, spongy except the hard portion immediately surrounding the seed, and usually with 1 narrow vertical wing.

Flinders Range to the Far North. Most of the year.—New South Wales, Central Australia.

18. **K. ciliata,** F. v. M. Dwarf shrub, with procumbent or ascending stems, tomentose branches, and silky-villous linear-lanceolate leaves, 5-15 mm. long; flowers crowded; fruiting perianth much depressed, without any erect appendage, 4-5 mm. diam. at the flat base, the narrow basal horizontal wing sometimes obscurely 5-angled, the lobes deltoid and extending inwards from the wing.

Murray lands to the Far North; west of Lakes Torrens and Eyre. Most of the year.—Western New South Wales.

PLATE 14 (1)—1, stem and branches; 2 and 3, fruiting perianths; 4, flowering perianth; 5, fruiting perianth with the hairs removed, seen from above; 6, vertical section of fruiting perianth; 7, flowering branch.

19. **K. coronata,** J. M. Black. Like the preceding in size and clothing; leaves linear; fruiting perianth conical, densely silky-villous, flat, and 4-5 mm. diam. at the base, including the very narrow horizontal basal wing, the perianth 2½ mm. long, including the erect crown-shaped appendage rising from the depressed tube and outside the minute perianth-lobes.

Mount Lyndhurst to the Far North, and west of Lake Eyre. Most of the year.—Western New South Wales. In this and the preceding species the long hairs extending beyond the wing give it a ciliate appearance.

PLATE 14 (2).—8, stem and branches; 9, flowering perianth; 10, fruiting perianth; 11, verticle section of same; 12, the same from above, with the crown cut away and the hairs removed.

9. SALSOLA, L.

(From Latin *salsus*, salted; these plants grow in salty ground and contain alkaline salts.)

1. **S. Kali,** L. *Prickly Saltwort, Rolly Poly, Buckbush.* Glabrous or slightly pubescent spreading annual, 30 cm. to 1 m. high, variable, with rigid stem and branches; lower leaves terete, 1-3 cm. long, ending in a prickly point, the floral leaves or bracts and the

2 similar opposite bracteoles broadly lanceolate, thick, rigid, pungent-pointed and not much exceeding the perianth ; flowers bisexual, sessile, solitary, axillary ; fruiting perianth 4-7 mm. broad, including the 5 scarious obovate horizontal dorsal wings, 3 of the wings usually broader than the others, or sometimes most of them reduced to tubercles ; tube very short ; fruit depressed, enclosed in the perianth ; pericarp and testa membranous ; seed horizontal, the embryo slightly conical, more or less spirally coiled, without albumen, and with the cotyledons in the centre.

All over the State. Sept.-Feb.—Almost cosmopolitan.

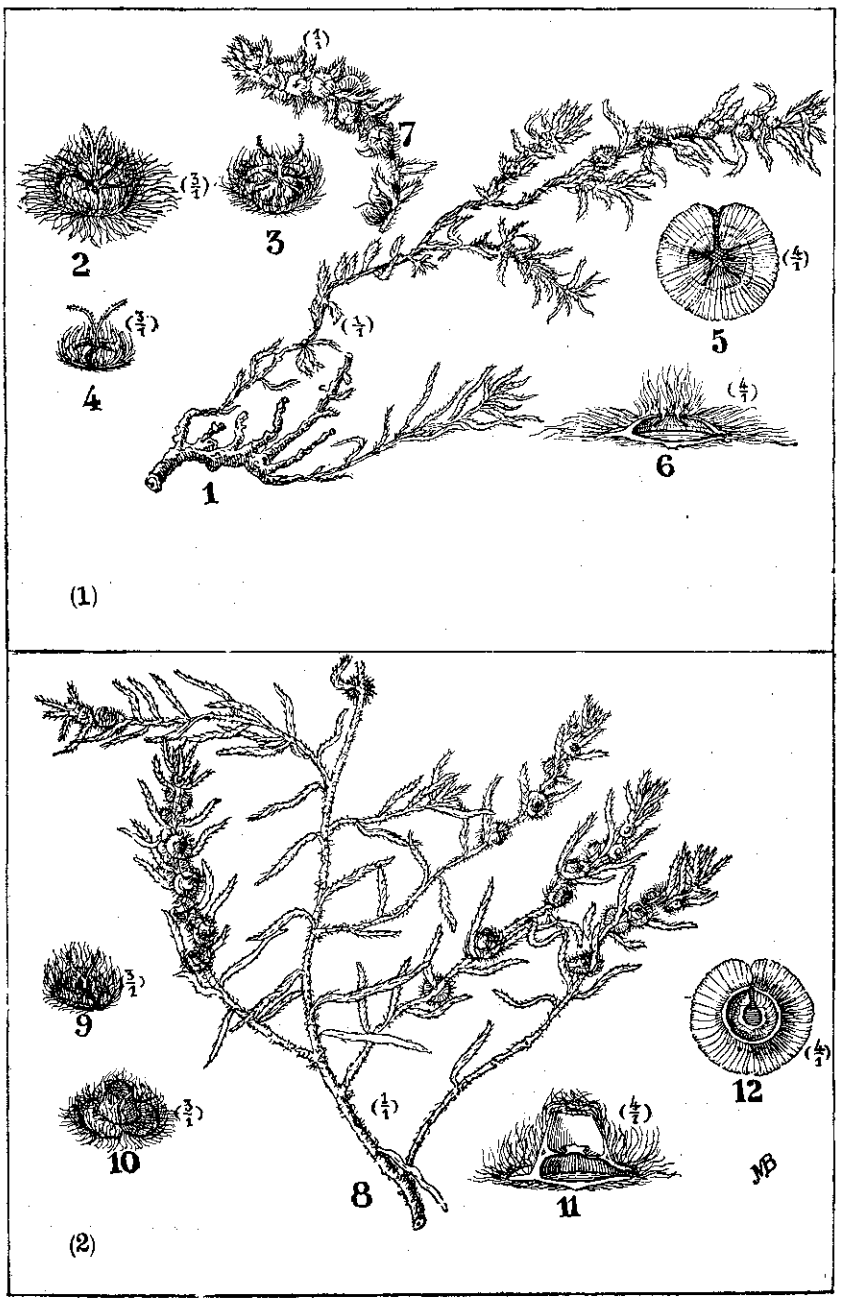

PLATE 14.—(1) **Kochia ciliata** ; (2) **K. coronata.**

Var. *strobilifera*, Benth. Flowers densely clustered in globular or ovoid heads.—Far North and westward to Musgrave Range and Nullarbor Plain.

Var. *leptophylla*, Benth. Leaves and bracts shorter and more slender.—Various parts of the State as far west as Ooldea.

10. SUAEDA, Forsk.

(From *suwaidâ*, "blackish," the Arabic name of *S. vera*.)

Flowers mostly bisexual, sessile, axillary; perianth with 5 succulent lobes closing over the fruit; pericarp membranous; seed horizontal or vertical; testa crustaceous, black, shining; endopleura membranous; embryo flat, spirally coiled, without albumen. Glabrous undershrubs, with alternate succulent leaves. *Seablite.*

Ovary superior; flowers in distinct clusters or leafy spikes of 3-4 mm. diam. ..... *S. australis* 1.
Ovary half-inferior; flowers in long leafless spikes of 10-15mm. diam. ..... *S. crassispicea* 2.

1. **S. australis** (R. Br.), Moq. Branching undershrub, 50-80 cm. high; leaves light-green, linear, plano-convex, 1-4 cm. long; flowers in distinct clusters of 3-5, or in continuous clusters of 4-9 flowers (a slender dense leafy spike); flowers and branches often turning purplish-red; fruiting perianth 1½-2 mm. long, depressed-globular; seed horizontal or rarely vertical.—*S. maritima*, Benth. non Dumort.

Sandhills and saltmarshes along the coast and sometimes inland. Summer.—Coasts of temperate Australia.

*2. **S. baccata,** Forskâl. Undershrub usually over 1 m. high, with woody stem and branches; leaves linear, mostly under 1 cm. long, almost all the flowering ones reduced to bracts; flowers in continuous clusters forming long thick almost leafless sometimes branched spikes; fruiting perianth 4 mm. long, turbinate, with a conspicuous spongy tube, which is adherent to the lower part of the pericarp, the upper and free part of the pericarp forming a solid conical column which supports the 2 styles; seed vertical.

Saltmarshes at Port Pirie. Summer. Egypt, Arabia. Determined by Kew as a form, but much more robust than the Egyptian specimens. It belongs to section *Schanginia.*

11. ENCHYLAENA, R. Br.

(Greek *enkhylos*, succulent; *laina or khlaina*, cloak; alluding to the perianth.)

Flowers bisexual, sessile, solitary in the axils; styles 2 or 3, united near the base; fruiting perianth depressed, enlarged, succulent or the lobes much thickened, the tube not hardened; fruit enclosed in the perianth, the pericarp and testa membranous; seed horizontal; embryo annular, enclosing a scanty albumen.

Fruiting perianth succulent and colored ..... *E. tomentosa* 1.
Fruiting perianth with thickened lobes ..... *E. villosa* 2.

1. **E. tomentosa,** R. Br. *Ruby Saltbush.* Low shrub with rather long procumbent tomentose stems; leaves subterete, tomentose or villous, 6-15 mm. long; fruiting perianth depressed-globular, succulent, red or yellow, drying black, 5-8 mm. diam., slightly beaked laterally, glabrous except for the short ciliate lobes, the limb cleft to the base on one side, the tube convex.

FIG. 92.—**Enchylaena tomentosa.**

Almost all over the State and known by its small berry-like brightly-colored perianths. Most of the year.—Throughout Australia, except Tasmania.

Var. *glabra*, Benth. Branches and leaves glabrous.—Far North; New South Wales, Queensland.

2. **E. villosa,** F. v. M. Dwarf undershrub, with prostrate or ascending tomentose stems; leaves tomentose, villous or almost glabrous, linear or linear-lanceolate, 6-15 mm. long; fruiting perianth green, depressed-globular, 5-6 mm. diam., pubescent, the 5 perianth-lobes thickened, truncate and curved near the summit, closing over the fruit, the tube convex, with 5 prominent ribs.—*Bassia enchylaenoides*, F. v. M.

Southern districts and northward to the Flinders Range. Summer.—Eastern States.

12. THRELKELDIA, R. Br.

(After Dr. Caleb Threlkeld, 1676-1728, an English botanist who settled in Dublin).

Flowers bisexual, solitary in the axils; fruiting perianth sessile, hardened in its inner layer, ovoid or cylindrical, enlarged, with 4-5 small lobes; styles 2 or 3, united towards base; fruit enclosed in the perianth; pericarp and testa membranous; seed vertical or nearly so; embryo almost annular, surrounding the albumen, with a superior radicle.

A. Fruiting perianth not gibbous at summit.
Perianth ovoid, 3-4 mm. long ..... *Th. diffusa* 1.
Perianth cylindrical, 8-10 mm. long ..... *Th. proceriflora* 2.
A. Fruiting perianth gibbous at summit.
Perianth sub-globular, 1½ mm. long ; leaves 4-6 mm. long ..... *Th. salsuginosa* 3.
Perianth ovoid, 3-4 mm. long ; leaves 12-20 mm. long ..... *Th. inchoata* 4.

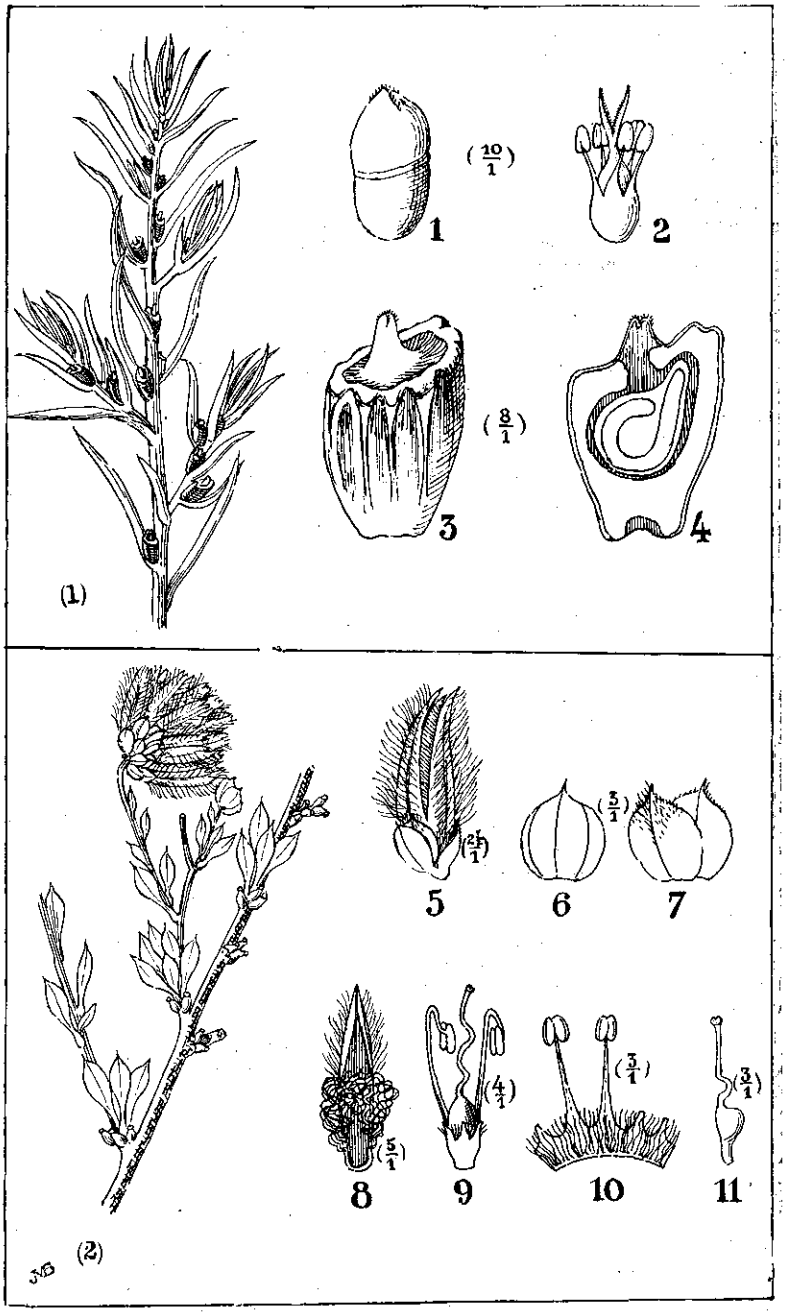

PLATE 15.—(1) **Threlkeldia inchoata ;** (2) **Trichinium parvifolium.**

1. **Th. diffusa,** R. Br. Prostrate or ascending glabrous undershrub; leaves subterete, succulent, usually acute, 5-20 mm. long, often purplish; fruiting perianth ovoid or oblong, 3-4 mm. long, oblique at summit, succulent and often reddish externally, hardened internally, especially towards the base; limb inconspicuous, closing the triangular orifice; seed almost vertical.

Near the sea-coast, at least from Cape Jervis northwards and round to the Great Bight. Summer.—Temperate Australia.

2. **Th. proceriflora,** F. v. M. Erect branching undershrub, about 50 cm. high; leaves linear, succulent, 10-20 mm. long, rather sparsely beset with long spreading hairs; fruiting perianth sub-cylindrical, 6-10 mm. long, oblique at base, with 5 erect lobes, each terminating in a short tooth, the outer layer of the perianth perhaps succulent when fresh, the inner layer hardened; seed vertical.

Mount Lyndhurst (Flinders Range); waterholes on Adminga Creek (north of Oodnadatta), Summer. Mueller describes the type from the Paroo River, New South Wales, as "glabrous," but all our specimens are hairy.

3. **Th. salsuginosa,** F. v. M. Small glabrous undershrub with the habit of *Babbagia;* leaves subterete, acute, 4-6 mm. long; perianth-lobes 4, small; fruiting perianth brownish, hard, subglobular, about 1½ mm. long, keeled and gibbous on one side by an obtuse hollow protuberance; seed obliquely vertical.—*Osteocarpum salsuginosum,* F. v. M.; *Bassia salsuginosa,* F. v. M.

River Murray; Port Pirie northward to Lake Torrens. Summer.—Victoria, New South Wales.

4. **Th. inchoata,** J. M. Black. Small glabrous undershrub with the habit of *Th. diffusa;* leaves subterete, acute, 12-20 mm. long; fruiting perianth-tube 3-4 mm. long, ovoid, hard, obliquely truncate and gibbous at the summit, ribbed when dry; limb erect, with 5 short unequal ciliate lobes; seed obliquely vertical. *Bassia inchoata,* J. M. Black.

Alberga and Adminga Creeks and other places north of Oodnadatta. Most of the year.

PLATE 15 (1).—1, bud; 2, stamens and pistil; 3, fruiting perianth; 4, vertical section of same.

13. ARTHROCNEMUM, Moq.

(Greek *arthron,* joint; *knēmē,* tibia, lower leg: the stems are jointed.)

Flowers bisexual or unisexual, usually immersed horizontally in 3's on each side of the base of the fertile articles; perianth opening irregularly or in lobes at the summit; stamen 1; styles 2, united towards the base; fruit free from but enclosed in the enlarged usually spongy perianth; pericarp membranous or horny; seed compressed, vertical, with a crustaceous or membranous testa and copious albumen; embryo curved along one side of the seed; radicle inferior. Low shrubs composed of numerous superposed cylindrical articles, usually 2-keeled at summit, green and succulent during the first year, the barren ones uniting to form the stem and branches and the fertile ones forming the terminal and lateral flowering spikes; each article is supposed to consist of 2 opposite rudimentary leaves, united by a sheath and combined with a succulent base. *Samphire.*

A. Pericarp membranous; seed-coat crustaceous and granular ..... *A. halocnemoides* 1.

A. Pericarp horny; seed-coat smooth, membranous.....

Branchlets and spikes stout; spikes several-flowered.. *A. leiostachyum* 2.

Branchlets slender; spikes few-flowered ..... *A. arbuscula* 3.

1. **A. halocnemoides,** Nees. Shrub 20 cm. to over 1 m. high; barren articles slender or stout (2-5 mm. thick); fruiting spikes 10-50 mm. long, 3-6 mm. thick, often red, with 6-40 fertile articles; flowers in 3's, all bisexual; fruiting perianth white, spongy, truncate and dilated at summit; pericarp hyaline, inconspicuous; testa crustaceous, granular on back, smooth in front; endopleura membranous.—*Salicornia arbuscula,* Benth. partly, not of R. Br.; *S. tenuis,* Benth. partly.

Saltmarshes round the seacoast, and in similar places inland, as in the neighborhood of Lake Torrens and Ooldea. Usually in summer.—Victoria, Central and West Australia.

PLATE 16 (2).—6, 3 fruiting perianths, seen from above; 7 and 10, seeds; 8, embryo; 9, perianth with seed; 11, pistil and stamen.

Var. *pergranulatum,* J. M. Black. Usually a lower shrub; seed reddish-brown, conspicuously granular all over.—Similar situations, both coastal and inland.—Queensland and probably other States.

PLATE 16 (1).—1, vertical section of an article in fruit; 2 and 3, fruiting perianth and seed; 4, transverse section of perianth and fruit; 5, seed. *a,* article; *alb,* albumen; *anth,* anther; *ax,* axis; *cot,* cotyledons; *e,* embryo; *epl,* endopleura; *fil,* filament; *p,* perianth; *pc,* pericarp; *ps,* pistil; *rad,* radicle; *t,* testa.

2. **A. leiostachyum** (Benth.) Paulsen. Erect shrub, 40 cm. to 1 m. high; barren articles 4-7 mm. thick, shortly 2-lobed; fruiting spikes 10-30 mm. long, with 6-16 short brown fertile articles 4-7 mm. thick and overlapping closely, so as to make the spike appear almost continuous; flowers in 3's, all bisexual; fruiting perianth spongy or fleshy, dilated towards summit and adherent to the horny pericarp; seed smooth, whitish.—*Salicornia leiostachya*, Benth.

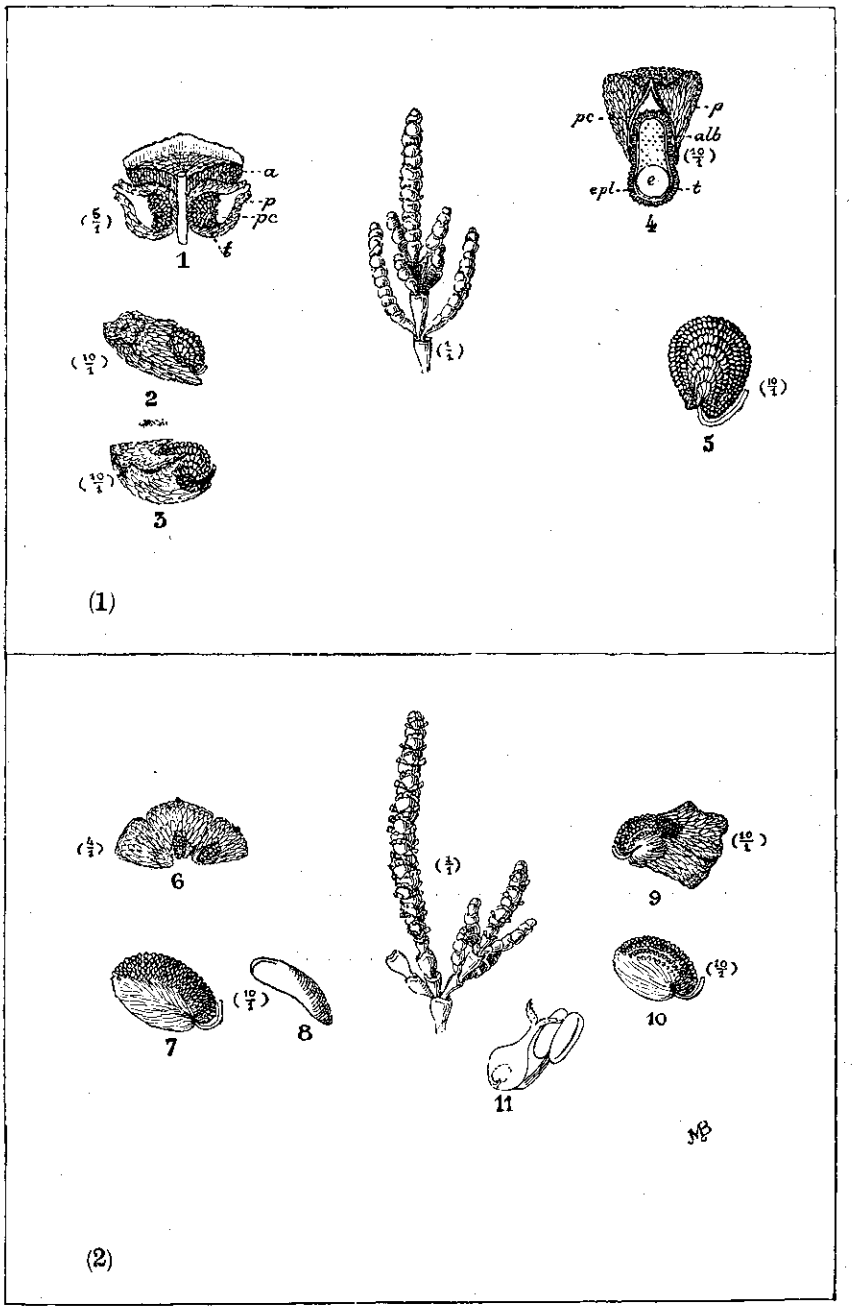

PLATE 16.—(1) **Arthrocnemum halocnemoides var. pergranulatum**; (2) **A. halocnemoides.**

Same localities and season as the preceding species.—Victoria, Central and West Australia.

PLATE 17 (2).—8, 3 fruiting articles, the lowest one showing the cavity from which 3 fruiting perianths have been taken ; 9, vertical section of fruiting perianth ; 11 transverse section of same ; 10, seed ; 12, vertical section of same.

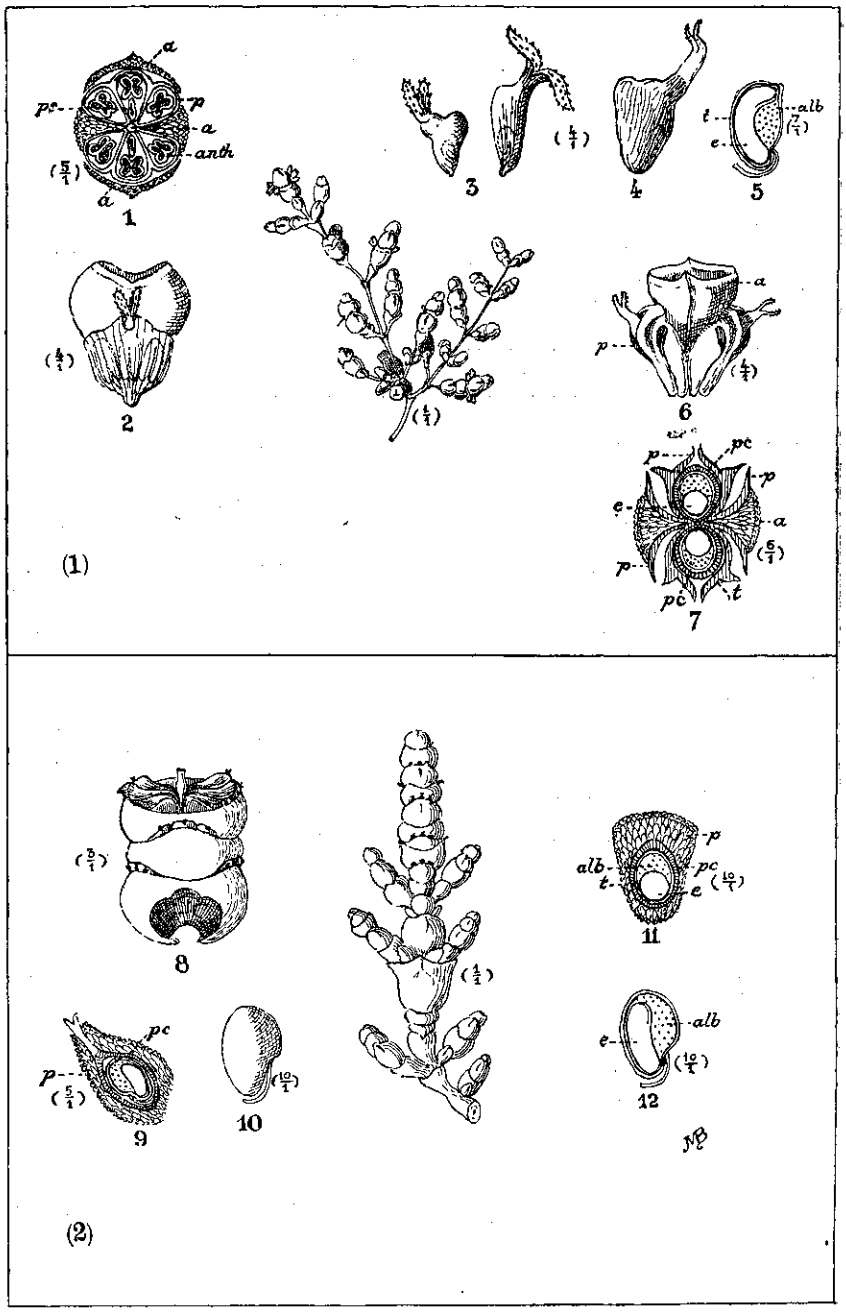

PLATE 17.—(1) **Arthrocnemum arbuscula ;** (2) **A. leiostachyum.**

3. **A. arbuscula** (R. Br.) Moq. Shrub 30-80 cm. high; branches slender; barren articles dark-green, 3-4 mm. thick; spikes 6-10 mm. long, 3-4 mm. thick, often reddish and spreading, with 2-6 subglobular fertile articles; flowers in 3's, the central one bisexual, the 2 lateral male; fruiting perianth rather fleshy, persistant, contracted towards the summit; pericarp horny, triangular in outline, adherent to perianth; seed obovoid, smooth.

Same localities and season as the preceding. All our species of *Arthrocnemum* are found along the Port Adelaide River.—Victoria, Tasmania.

PLATE 17 (1).—1, transverse section of a flowering article; 2, flowering article, from the front; 3, pistils in various stages; 4, pericarp (fruit); 5, vertical section of seed; 6, fruiting article, from the side; 7, transverse section of same.

14. PACHYCORNIA, Hook. f.

(Greek *pakhys*, thick, and the termination *cornia* in *Salicornia*.)

Like *Arthrocnemum*, except that the pericarp soon hardens and adheres to the enlarged bony axis of the fruiting spike, along with the greater portion of the membranous persistant perianth, so that the seed remains enclosed in the solid axis, whereas in *Arthrocnemum* the seed or fruit escapes easily from the perianth; flowers in 3's, the central one bisexual, the 2 lateral male. *Samphire.*

Branches stout; articles with long acute lobes; embryo almost annular ..... *P. triandra* 1.

Branches slender; articles with short lobes; embryo almost straight ..... *P. tenuis* 2.

1. **P. triandra** (F. v. M.), comb. nov. Low shrub with stout branches; articles with 2 prominent acute spreading keeled lobes, about 10 mm. broad at summit, the sterile ones 10-20 mm. long, the fertile ones about 5 mm. long; spikes short and thick (10-20 mm. long), with 4-6 fertile articles; perianth irregularly 2-4-lobed at summit, where it is slightly contracted; seed often solitary in the hardened axis, suborbicular and almost inverted, so that the radicle points upwards; embryo almost annualar round the central albumen.—*P. robusta* (F. v. M.), Hook. f. (1883); *Arthrocnemum triandrum*, F. v. M. (1859); *Salicornia robusta*, F. v. M. (1868).

Along the River Murray. Summer.—Victoria, New South Wales, Central Australia. Mueller's name of *Arthrocnemum triandrum* was given in the belief that the flower was solitary and had 3 stamens; his later specific name was more appropriate, but cannot be maintained under article 50 of the international rules, which does not allow a published name to be changed on the ground that it is "badly chosen."

PLATE 18 (1).—1, 3 perianths after the anthers have fallen; 2, vertical section of pistil; 3, transverse section of fruiting article; 4, seed; 5, vertical section of seed.

2. **P. tenuis** (Benth.), J. M. Black. Small erect shrub with slender branches; articles with rather obtuse lobes and a scarious rim, the barren ones 5-15 mm. long by 2-3 mm. thick; spikes 8-16 mm. long, with 4-6 fertile articles; seed sub-cylindrical, 4 mm. long, with an almost straight embryo and lateral albumen; radicle inferior.—*Salicornia tenuis*, Benth., partly.

Flinders Range and Far North. Summer.—Central and West Australia, Queensland.

PLATE 18 (2).—6, flowering branch; 7, fruiting spike; 8, 3 perianths; 9, pericarp and young seed; 10, fruiting article; 11, transverse section of fruiting article and axis; 12, vertical section of same, showing 2 cavities from which seeds have been removed; 13, vertical section of seed.

15. SALICORNIA, L.

(Neo-latin, from *salicorne*, the French name of this genus, from Latin *sal*, salt; *cornu*, a horn: the branches are hornshaped and taste of salt.)

Differs from the 2 previous genera by the seed devoid of albumen, and (in the Australian species) by the number of flowers in the horizontal row, which is 3-9, instead of 3 only; fruiting perianth thickened and rather hard, dilated and truncate at summit, deciduous, opening by 2 lobes so short and broad that the aperture through which the stamens and styles emerge appears as a slit down the centre of the summit; stamens usually 2, sometimes 1; pericarp hyaline; seed suborbicular, compressed; testa chartaceous; endopleura membranous; embryo curved so that the radicle and cotyledons are folded on one another. Low shrubs with procumbent rooting stems and ascending or erect branches.—*Samphire, Glasswort.*

Spikes usually long and slender, with 10-20 articles; seed villous ..... *S. australis* 1.

Spikes shorter and thicker, with 4-10 articles; seed papillose *S. pachystachya* 2.

1. **S. australis,** Banks et Sol. Articles with inconspicuous lobes; fruiting spikes 15-60 mm. long, 4-5 mm. thick, with 10-20 fertile articles; flowers usually in 7's, often in 5's or 3's in the upper articles, rarely in 9's in the lower ones, and very rarely almost all in 5's; testa more or less covered with long hooked hairs.

In salt ground along the seacoast, and in similar situations at Lake Ormerod, near Naracoorte and near Lakes Torrens and Eyre. Nov.-March.—Temperate Australia, New Zealand.

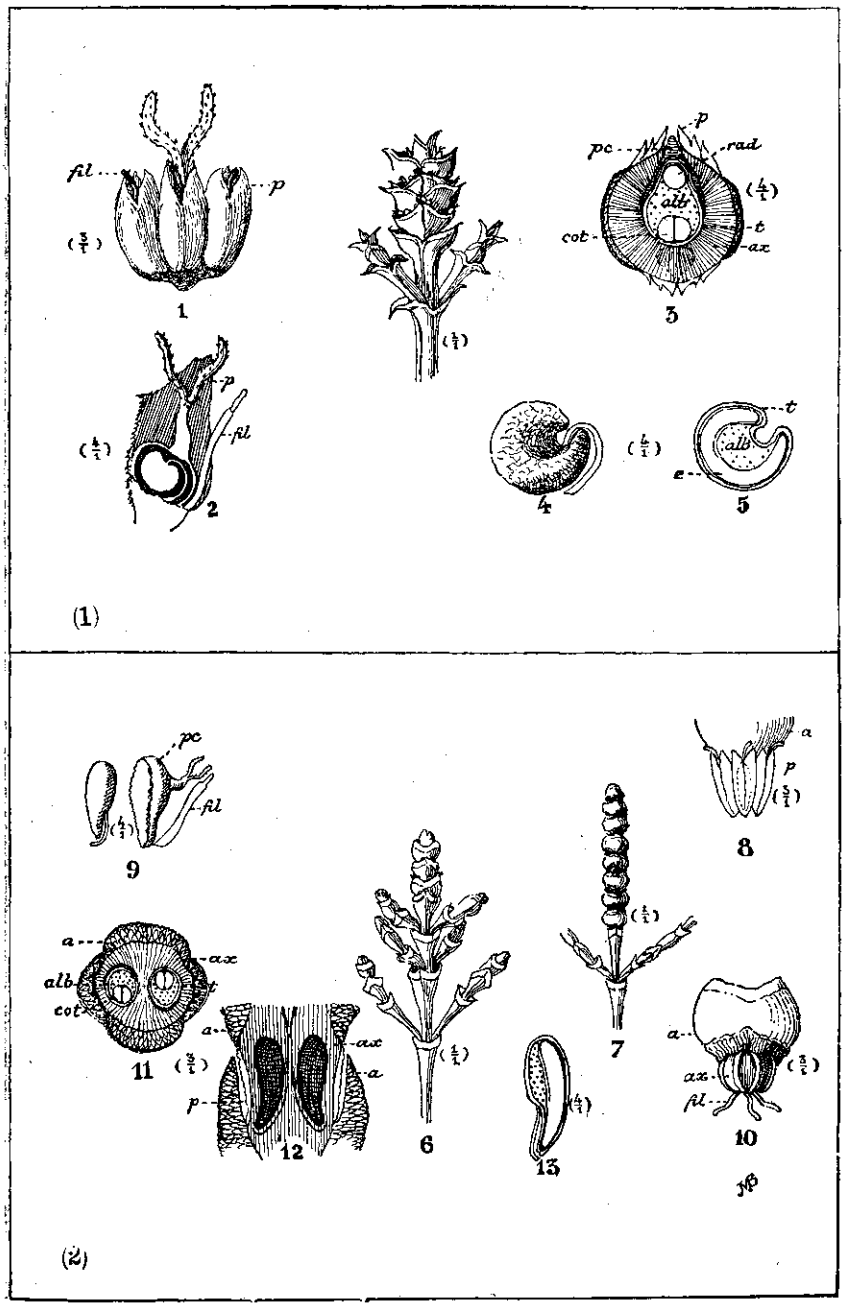

PLATE 18.—(1) **Pachycornia triandra;** (2) **P. tenuis.**

2. **S. pachystachya,** J. M. Black. Articles with inconspicuous lobes; fruiting spikes 12-25 mm. long, 7-8 mm. thick, with 4-10 fertile articles; flowers usually in 5's, often in 3's in the upper articles, very rarely in 7's in the lower ones; testa papillose.

In salt ground near the seacoast, Glenelg, Port Elliot. Aug.-Nov.—Victoria (Lake Tyrrell) and probably West Australia.

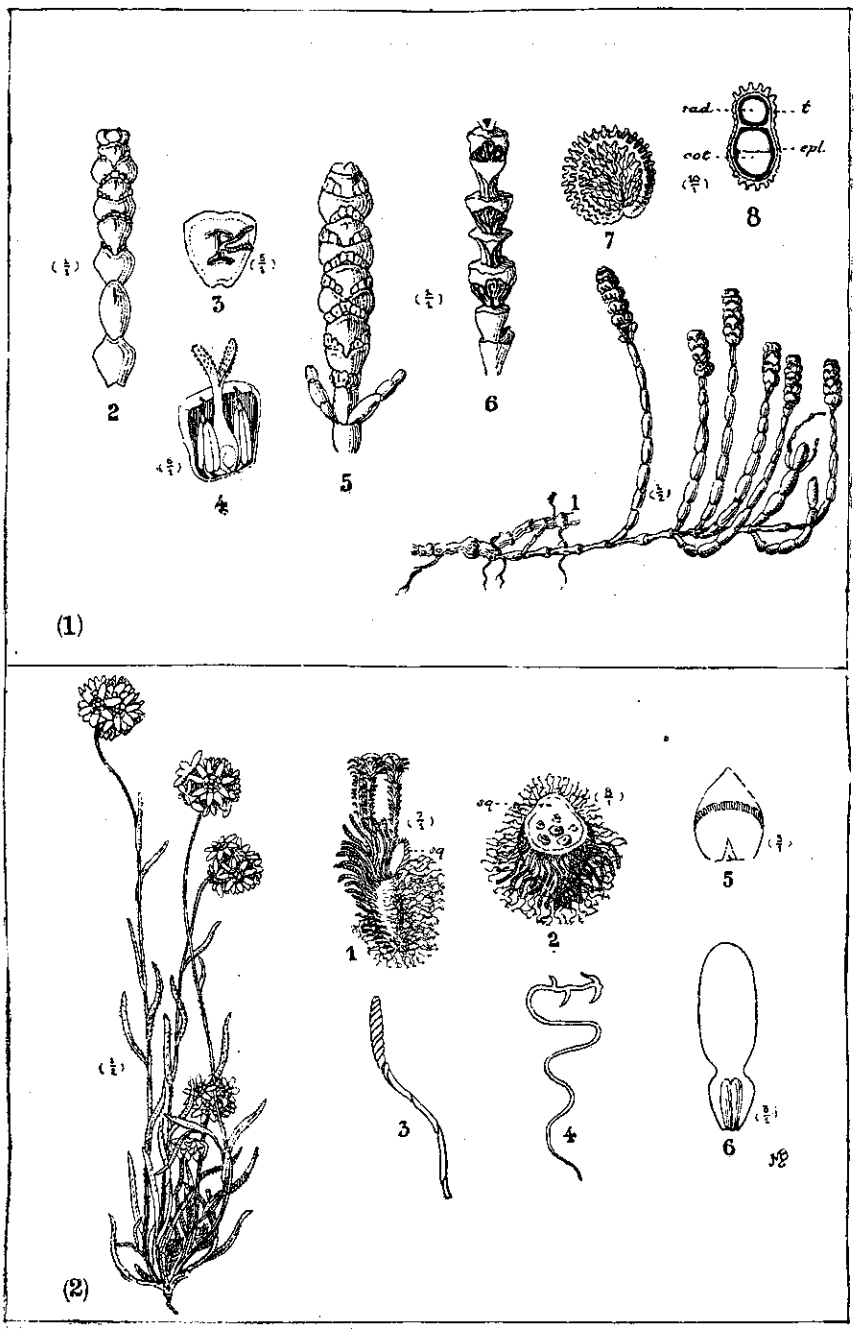

PLATE 19.—(1) **Salicornia pachystachya;** (2) **Cephalipterum Drummondii.**

PLATE 19 (1).—1, stem and fruiting branches; 2, budding spike; 3, summit of flowering perianth; 4, vertical section of perianth; 5, fruiting spike; 6, spike after fruits have fallen; 7, seed; 8, transverse section of seed.

FAMILY 42.—AMARANTACEAE.

Flowers bisexual or unisexual, regular, usually sessile within 2 scarious bracteoles and a scarious bract or floral leaf; perianth scarious or colored, of 5 imbricate segments; stamens 2-5, opposite the segments; ovary 1-celled, superior, usually with 1 ovule on a filiform erect basal funicle; style simple or 2-3-fid; fruit membranous, indehiscent or circumsciss, enclosed in the persistant perianth; seed biconvex, with a crustaccous testa and annular embryo enclosing the albumen. Herbs or shrubs; leaves entire, without stipules.

A family containing several ornamental foreign plants, such as *Amarantus caudatus*, L. (Love-lies-bleeding), *A. tricolor*, L. (Joseph's coat), *Celosia cristata*, L. (Cockscomb), and *Gomphrena globosa*, L. (Globe Amaranth).

A. Leaves alternate (except in *Hemichroa mesembrianthema*); anthers 2-celled.
  B. Stamens shortly united at base.
    C. Flowers small, solitary, axillary, glabrous ..... HEMICHROA 1.
    C. Flowers conspicuous, hairy, in terminal spikes.
      Perianth-segments hairy except at the summit . TRICHINIUM 2.
      Perianth-segments hairy only in lower half..... PTILOTUS 3.
  B. Stamens free; flowers small, glabrous, in cymes or clusters, often paniculate ..... AMARANTUS 4.
A. Leaves opposite; anthers 1-celled.
    Flowers in axillary clusters; stigma capitate ..... ALTERNANTHERA 5.
    Flowers in terminal clusters ..... GOMPHRENA 6.

1. HEMICHROA, R. Br.

(Greek *hēmi*, half; *khroa*, color: the perianth of *H. pentandra* is sometimes pink inside, whitish outside.)

Flowers bisexual, sessile, solitary, axillary, between 2 scarious bracteoles resembling the 5 free white rigid persistant rather unequal perianth-segments; stamens 2 or 5; ovary with 1 ovule; fruit membranous indehiscent; seed vertical. Low shrubs or undershrubs with prostrate or procumbent stems covering a considerable space, growing near the sea or beside saltmarshes; leaves thick, fleshy, linear or lanceolate, plano-convex, mucronate, sessile, the floral leaves conical.

Stamens 5, surrounding the ovary ..... *H. pentandra* 1.
Stamens, 2, unilateral.
  Leaves alternate; flowers solitary ..... *H. diandra* 2.
  Leaves opposite; flowers twin ..... *H. mesembrianthema* 3.

1. **H. pentandra,** R. Br. Branches ascending, pubescent in upper part, otherwise a glabrous plant; leaves 8-12 mm. long; bracteoles acute, about half as long as the lanceolate-ovate 3-nerved perianth-segments, which are about 4 mm. long; stamens 5, much shorter than the perianth, united in a cup at the base; style notched or bifid; testa black, crustaceous, shining.—*Polycnemon pentandrum*, F. v. M.

Lefevre Peninsula; Kangaroo Island; Yorke Peninsula; South-East. Oct.-Dec.—Victoria, New South Wales, Tasmania, West Australia.

2. **H. diandra,** R. Br. Resembles the preceding, but has longer stems and the branches glabrous; bracteoles nearly as long as the 1-nerved perianth-segments; stamens 2, longer than in the preceding, the filaments much dilated below the middle, and united on one side of the ovary; style notched.

From Fowler's Bay round Eyre Peninsula to near Port Augusta. Nov.-Jan.—Temperate Australia.

3. **H. mesembrianthema,** F. v. M. Branches and leaves opposite, the floral leaves up to 25 mm. long, connate at base; flowers in pairs; bracteoles much shorter than the 1-nerved perianth-segments, which are 6-8 mm. long; stamens as in *H. diandra*; style notched.

Near Lake Eyre. Does not appear to have been re-discovered since it was collected by E. Giles and published by Mueller in 1873.

2. TRICHINIUM, R. Br.

(Greek *trikhinos*, hairy.)

Flowers bisexual, in dense terminal spikes; perianth of 5 linear rigid segments, scarious near the summit and villous outside with jointed hairs, except at the tips; stamens 5, often unequal, some usually without anthers, united at the base in a membranous cup, which is free or adnate to the short tubes of the perianth; style undivided, rigid, persistant, slender, usually excentric (*i.e.*, the style rises from one side of the summit of the ovary); ovule 1; bract and 2 bracteoles scarious and shining; seed vertical, usually shining. Herbs or undershrubs, constituting a genus purely Australian.

A. Leaves covered with stellate hairs.
  Leaves short-haired; spikes oblong ..... *T. obovatum* 1.
  Leaves long-haired; spikes subglobular ..... *T. incanum* 2.
A. Leaves glabrous or silky.
  B. Perianth-segments pink or red in upper part.
    C. Leaves glabrous or almost so.
      D. Segments straight.
        E. Spikes cylindrical, about 4½ cm. diam.
          Spikes to 15 cm. long; bracts hairy ..... *T. exaltatum* 3.
          Spikes to 7 cm. long; bracts glabrous ..... *T. Beckerianum* 4.
        E. Spikes cylindrical, long, 2½-3 cm. diam. ..... *T. alopecuroideum*, var.
        E. Spikes globular or ovoid.
          F. Spikes about 1 cm. diam.
            Leaves narrow-linear; perennial herb .. *T. Schwartzii* 5.
            Leaves lanceolate, sometimes minute; small shrub ..... *T. parvifolium* 6.
          F. Spikes 2-3½ cm. diam. ..... *T. semilanatum* 7.
      D. Segments curved upwards; leaves linear; spikes globular ..... *T. erubescens* 8.
    C. Leaves silky-woolly, lanceolate; spikes ovoid or cylindrical, short ..... *T. helipteroides* 9.
  B. Perianth-segments usually yellowish or greenish.
    G. Segments glabrous in lower half; spikes ovoid .. *T. seminudum* 10.
    G. Segments hairy up to the glabrous tip.
      H. Spikes long, cylindrical.
        I. Stems erect or ascending.
          Spikes 2½-3 cm. diam. ..... *T. alopecuroideum* 11.
          Spikes 4-5 cm. diam. ..... *T. nobile* 12.
          Spikes 5-6 cm. diam. ..... *T. macrocephalum* 13.
        I. Stems prostrate; spikes cylindrical, about 2 cm. diam. ..... *T. spathulatum* 14.
      H. Spikes globular or ovoid.
        Spikes about 2 cm. diam.; perianth 8-12 mm. long ..... *T. corymbosum* 15.
        Spikes 1 cm. diam.; perianth 5-6 mm. long.... *T. leucocoma* 16.

1. **T. obovatum,** Gaudich. Undershrub 30 cm. to 1 m. high, clothed with a dense short whitish tomentum of simple or articulate stellate hairs; leaves ovate, petiolate, 1-4 cm. long; spikes hemispherical or shortly cylindrical, 1-2 cm. long, in terminal corymbose panicles; bract and bracteoles light or dark-brown, acuminate, 4 mm. long, more or less hairy, especially towards the base; perianth 7-10 mm. long, the segments with long white hairs on the back, glabrous inside, the tips pink; anthers about 3; ovary hairy at summit; style excentric, glabrous.—*Ptilotus obovatus*, F. v. M.

Flinders Range to Far North; eastward to Broken Hill and westward to the Great Bight and the Everard Range. Most of the year.—Throughout Australia.

Var. *grandiflorum*, Benth. Perianth 12-15 mm. long, purplish in upper part, the inner segments woolly inside by long hairs from the margins; bracts and bracteoles pale-colored; ovary more conspicuously stalked, glabrous.

Far North and westward to the Musgrave Range.

2. **T. incanum,** R. Br. Near the preceding, but the hairs of the branches and leaves longer and softer; bract and bracteoles pale-colored and hairy; perianth about 6 mm. long; ovary glabrous; style excentric.

Has only been found on the Ferdinand River in South Australia; belongs chiefly to the Northern Territory and tropical West Australia.

3. **T. exaltatum** (Nees), Benth. Erect stout almost glabrous perennial with branched or single stems; leaves rather thick, rigid, obovate or oblong-lanceolate, mucronate, 2-8 cm. long, the lower ones tapering into a petiole; spikes on long peduncles, at first conical, afterwards cylindrical and up to 15 cm. long, 4½ cm. diam.; bract and bracteoles

9-10 mm. long, the bract brownish, hairy, the bracteoles white with brown midrib; perianth purplish, rigid, about 20 mm. long, with long hairs outside, the 3 inner segments densely woolly inside with long marginal hairs curved inward; ovary stalked, hairy near top.—*Ptilotus exaltatus*, Nees.

Murray lands; Flinders Range; Far North and West; Eyre Peninsula. July-Dec.—Throughout Australia.

4. **T. Beckerianum,** F. v. M. Glabrous perennial, with short erect simple stems; leaves chiefly basal, obovate or oblanceolate, petiolate, 2-4 cm. long, the stem leaves narrower or almost reduced to scales; spikes ovoid or oblong, 3-7 cm. long, about 4 cm. diam.; bracts and bracteoles scarious, glabrous, 8-10 mm. long, with prominent midribs; perianth about 20 mm. long, the segments with pink tips and very long hairs on the outside; ovary glabrous; style long, villous, excentric.—*Ptilotus Beckeri*, F. v. M.

Near Eleanor River, Kangaroo Island. Summer. The type came from "scrub near Spencer's Gulf," so that the plant may also occur on the mainland.

T. gomphrenoides, Moq., with simple stems, spikes globular or ovoid, about 2½ cm. diam., brown bracts, perianth pink, 12 mm. long, and hairy ovary, is a doubtful species as regards South Australia. Bentham gives the locality as "S. Australia. S. coast, *Strutt*," but Moquin says: "on the south coast of New Holland, *Drummond*." If the collector's name is correctly recorded by Moquin, it points to West Australia as the habitat. There is no specimen in the Melbourne or Adelaide herbaria.

5. **T. Schwartzii** (Tate), Farmar. A plant with the habit of *T. leucocoma*, but evidently taller (about 50 cm. high), with stiff erect slender branching stems; leaves linear, glabrous, distant, 5-15 mm. long; spikes globular, about 12 mm. diam.; finally lengthening to about 15 mm.; bract and bracteoles ovate-acuminate, hyaline, hairy, 3 mm. long; perianth 5-6 mm. long, the segments almost acute, villous outside, apparently pink, the 3 inner ones woolly with long marginal hairs in the lower part; filaments all bearing anthers and with delicate fringed scales between them; ovary hairy at summit; style central.—*T. Fraseri*, Cunn. var. *Schwartzii*, F. v. M.; *Ptilotus Schwartzii*, Tate.

MacDonnell Range, N.T., and will therefore probably be found in our Far North or North-West. Winter and spring.

6. **T. parvifolium,** F. v. M. Small glabrous branching shrub; leaves lanceolate, often clustered, 2-10 mm. long, tapering into a short petiole with a hard persistant base; spikes terminating the branchlets, globular, ovoid, or finally cylindrical, 1½-2 cm. diam.; perianth 8-12 mm. long, pink, the 3 inner segments densely woolly inside in the lower half; staminal cup hairy; 3 of the filaments short and without anthers; bract and bracteoles hyaline, 3-4 mm. long, the latter hairy; ovary glabrous, stalked.—*T. Whitei*, J. M. Black; *Ptilotus parvifolius*, F. v. M.

West of Lake Eyre; Flinders Range; Far North. May-Dec.—Finke River, N.T.

PLATE 15 (2).—5, unexpanded flower; 6, bract; 7, bracteoles; 8, one of the inner perianth-segments; 9, stamens and pistil; 10, staminal cup spread open, inner view; 11, pistil. Page 202.

7. **T. semilanatum,** Lindl. Perennial herb with erect branched stems 30-50 cm. high; radical leaves oblong-lanceolate, glabrous, 2-6 cm. long, decurrent, on petioles 2-4 cm. long, the stem-leaves oblong or lanceolate, smaller, undulate on the margins; spikes globular, 2-3½ cm. diam., on long peduncles, which are at first woolly; bracts and bracteoles brownish, villous, about 8 mm. long, including the long mucro or point; perianth bright red in upper part, 15-18 mm. long, the segments with conspicuous obtuse glabrous tips, all glabrous inside; filaments dilated towards base, but not united above the perianth-tube, usually 3 shorter and without anthers; ovary stalked, with a few jointed hairs near the summit; style excentric, glabrous.

Arkaringa Creek; Blood's Creek; Dalhousie Springs (all in the Far North). Winter and spring.—New South Wales, Queensland.

8. **T. erubescens,** Moq. Stems simple, ascending; leaves linear, 1-3 cm. long, acute, glabrous, the radical ones petiolate; spike globular or ovoid, 2-3 cm. diam.; bract and bracteoles shining, 8-15 mm. long; perianth purplish, curved upwards, 15-20 mm. long, the 3 inner segments densely woolly inside below the middle.—*Ptilotus erubescens*, Schlecht.

Mount Lofty Range and foothills near Adelaide. Oct.-Dec.—Victoria, New South Wales.

9. **T. helipteroides,** F. v. M. A small neat annual, clothed with silky hairs, the stems simple or slightly branched, 10-30 cm. long; leaves lanceolate, 1-4 cm. long; spikes usually on long stiff peduncles, at first globular, later ovoid or cylindrical, 1½-2 cm. diam.; bract and bracteoles hyaline, glabrous, the bract about as long as the perianth, the bracteoles about half as long; perianth pink, 7-8 mm. long, the segments glabrous inside except at the very base; fringed scales on the cup alternating with the stamens, 2 of them

adnate laterally to one of the filaments; ovary pubescent; style central; anthers usually 4.

From Oodnadatta westward to the Musgrave Ranges. Winter and spring.—Central and West Australia.

Var. *minor*, J. M. Black. Smaller in all its parts; leaves broad-lanceolate, about 1 cm. long; spikes globular, on short peduncles; bracteoles nearly as long as the bract; perianth 5 mm. long.

Blood's Creek (Far North).

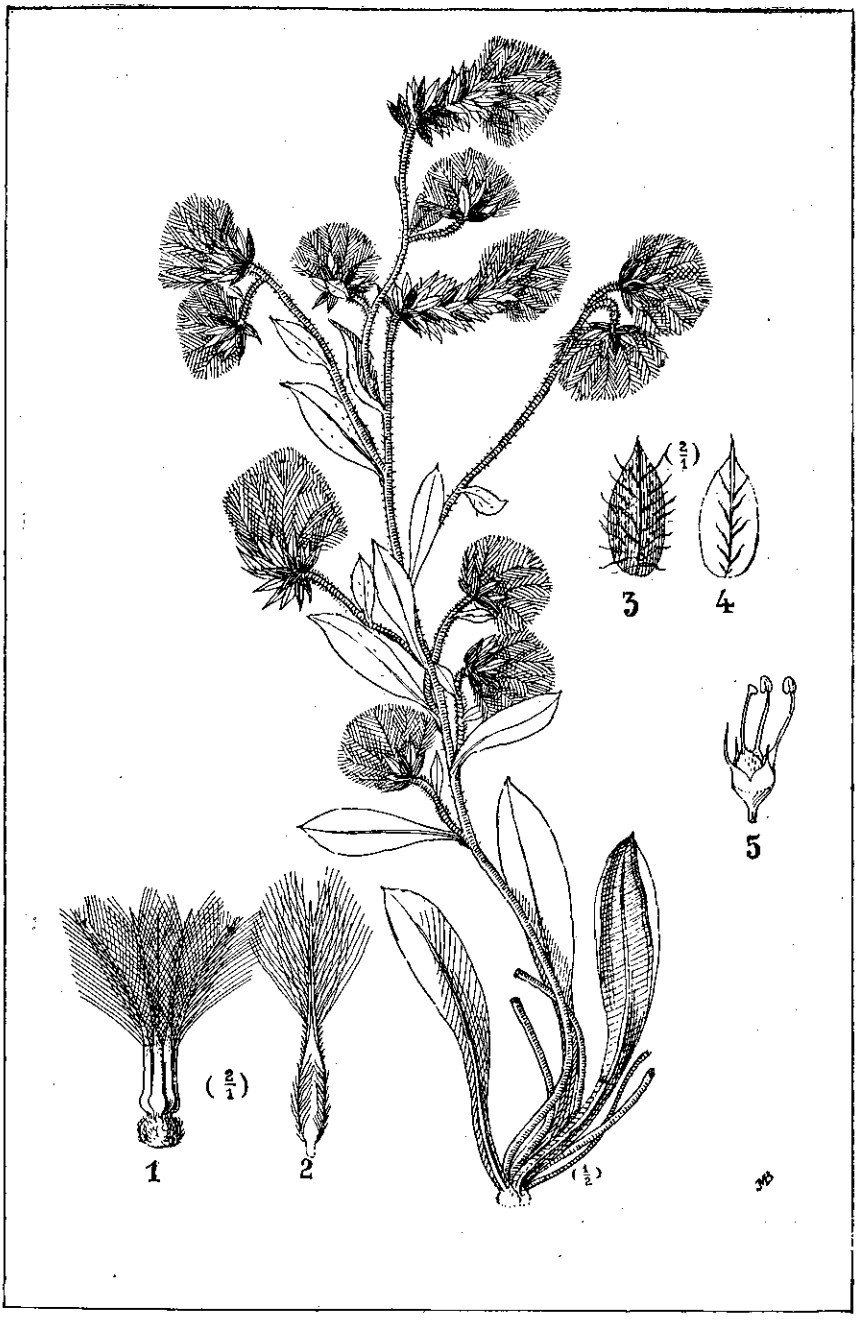

PLATE 20.—**Trichinium seminudum.**

10. **T. seminudum,** J. M. Black. Perennial herb with ascending tomentose simple or branched stems, 20-30 cm. long; radical leaves broad-lanceolate, 2-5 cm. long, tapering into a winged petiole, stem-leaves smaller; spikes globular or ovoid, about 3 cm. diam.; bracts brownish, bracteoles hyaline, both 8-9 mm. long, somewhat hairy; perianth 12-15 mm. long, the short globular tube pubescent, the segments narrow, rigid, and glabrous in the lower half except for the ciliate margins, densely villous in the greenish upper half; 3 filaments antherless; ovary pubescent at summit.

Minnipa, E.P.; Berri (River Murray). Oct.-Dec.

PLATE 20.—1, perianth; 2, inner segmen;; 3, bract; 4, bracteole; 5, pistil and stamens.

11. **T. alopecuroideum,** Lindl. Perennial herb with simple or branched stems 20 cm. to 1 m. high, at first shortly hairy, becoming glabrous; leaves linear or lanceolate, undulate on margins, 1-10 cm. long or more; spikes on long peduncles, finally cylindrical and 4-15 cm. long, 2½-3 cm. diam.; bract and bracteoles broad-ovate, hyaline, glabrous, shining, 4-8 mm. long, the bracteoles obtuse or shortly mucronate; perianth yellowish-green, 12-16 mm. long, glabrous towards the summit and inside; style excentric, with long unilateral hairs in lower half; ovary glabrous.—*Ptilotus alopecuroideus* (Lindl). F. v. M.

Most parts of the State except the South-East; on the Adelaide Plains it is sometimes found near the coast. June-Dec.—Throughout Australia.

Var. *rubriflorum,* J. M. Black. Perianth red.

Far North and westward to Birksgate Range; also towards Broken Hill.

12. **T. nobile,** Lindl. Erect herb; stems usually simple; leaves glabrous, oblong-lanceolate, undulate on margins, mucronate, 2-5 cm. long, petiolate; spikes oblong, 5-12 cm. long, 4-5 cm. diam. on stiff pubescent peduncles; bracts and bracteoles 10-12 mm. long, hairy, the bracts brown and the bracteoles whitish; perianth yellowish-green, 25 mm. long, glabrous inside except for some long hairs rising from the base; style and ovary glabrous, the latter stalked.—*Ptilotus nobilis* (Lindl.), F. v. M.

Adelaide Plains and Mount Lofty Range to the Flinders Range and westward to Gawler Range; Murray lands. Sept.-Jan.—Victoria, New South Wales.

13. **T. macrocephalum,** R. Br. Near the preceding, but the leaves are linear or lanceolate, the spikes 5-6 cm. in diam., the bract and bracteoles whitish, shining and glabrous; the perianth 25-30 mm. long, greenish with yellow glabrous tips, ovary pubescent and style with long unilateral hairs for at least half its length.—*Ptilotus macrocephalus,* Poir.

South-East, from Bordertown southwards. Oct.—Feb.—Eastern States.

14. **T. spathulatum,** R. Br. Perennial with a thick woody rootstock and prostrate stems 5-20 cm. long; radical leaves ovate-cuneate or lanceolate, petiolate, glabrous, 2-3 cm. long, the stem leaves smaller; spikes finally cylindrical, 3-7 cm. long, about 2 cm. diam.; bract and bracteoles 6-8 mm. long, the bract brown, the bracteoles hyaline; perianth 10-14 mm. long, the segments greenish, the tips yellow or sometimes pink; all glabrous inside; ovary stalked, usually hairy at summit; style excentric.—*Ptilotus spathulatus,* Poir.

All over the State, except the Far North and the South-East. Sept.-Dec.—Temperate Australia and Tasmania.

15. **T. corymbosum,** Gaudich. Probably annual, with ascending or erect stiff simple or branched stems, 10-50 cm. long or more; leaves linear-lanceolate, mucronate, almost glabrous, 1-3 cm. long; spikes globular or ovoid, about 2 cm. diam., pedunculate; bracts and bracteoles yellowish, glabrous, not half as long as the perianth, which is 8-12 mm. long, the segments with a green centre and white margins, the green centre covered with much shorter hairs than those of any other species, all segments glabrous inside except at the very base; anthers usually 4; ovary with a few hairs at summit; style long, excentric.—*Ptilotus hemisteirus,* F. v. M.

Port Augusta westward to Tarcoola; Far North and westward to Everard Range. Most of the year.—New South Wales, West Australia.

16. **T. leucocoma,** Moq. Small erect glabrous herb, leaves linear-lanceolate, distant, 1-3 cm. long; spikes finally cylindrical, 2-2½ cm. long, 1 cm. diam.; bract and bracteoles hyaline, glabrous, about 3 mm. long, broadly ovate; perianth 5-6 mm. long, the segments sparsely villous outside, glabrous inside, obtuse, with broad scarious margins and perhaps pink down the centre; anthers often 5; ovary glabrous.—*Ptilotus leucocoma.* (Moq.), F. v. M.

Given by Bentham for "S. Australia. Great marsh of the interior, *Strutt,*" probably a mistake for Capt. Charles Sturt. It has not since been found in our State, but occurs in north-western New South Wales. Winter and spring.

3. PTILOTUS, R. Br.

(Greek *ptilōtos*, winged, feathered.)

Differs from *Trichinium* in having only the lower part of the perianth-segments villous, the upper part being quite glabrous. The flowers are smaller than in most *Trichinia*. I have followed Robert Brown, Bentham, Diels, and Ostenfeld in maintaining these two genera distinct.

A. Spikes cylindrical; leaves oblong ..... *P. Murrayi* 1.
A. Spikes globular or ovoid; leaves ovate.
Spikes yellowish, 8 mm. diam..... *P. Hoodii* 2.
Spikes silvery-shining, 12-14 mm. diam. ..... *P. latifolius* 3.

1. **P. Murrayi,** F. v. M. A small branching herb; leaves oblong, obtuse, 5-8 mm. long, contracted into a petiole, glabrous as well as the branches; spikes axillary and terminal, sessile, finally oblong or cylindrical, 8-15 mm. long and 5-6 mm. diam.; bracts and bracteoles ovate, hyaline, glabrous, scarcely exceeding 2 mm.; perianth about 2½ mm. long, the segments scarious with a red centre, glabrous in the upper half, the lower half covered with long wool; anthers 5; ovary glabrous; style very short, almost central.

Cooper's Creek. Winter and spring.

Var. *major*, J. M. Black. Stems 30-40 cm. long; leaves rather ovate than oblong, 8-15 mm. long; spikes cylindrical, 8-30 mm. long; bract and bracteoles 2 mm. long, perianth 3-4 mm. long, the obtuse segments with a green or yellowish centre.

Collected in the Far North-East in 1916, but exact locality not recorded.

2. **P. Hoodii,** F. v. M. Small branching herb; branches covered with short curly hairs; leaves similarly clothed, finally almost glabrous, ovate, mucronate, petiolate, 5-25 mm. long; spikes axillary and terminal, sessile, ovoid, 8-12 mm. long, about 8 mm. broad; bract and bracteoles lanceolate, glabrous, yellowish, very acute, equalling or exceeding the perianth, which is 4 mm. long; segments lanceolate, acute, villous in lower half; anthers about 3; ovary glabrous; style short, central.

Mt. Lyndhurst (Flinders Range); Far North. Winter and summer.—Central Australia.

3. **P. latifolius,** R. Br. Herb with erect branching stems, 20-60 cm. high; stems and branches shortly woolly; leaves soon glabrous, obovate, petiolate, 1-3 cm. long; spikes silvery-white, globular or ovoid, 1-2 cm. long, 12-14 mm. diam., sessile and axillary, or terminal and apparently on a long peduncle, but usually subtended by a small leaf; bract and bracteoles shining, glabrous, ovate, shortly exceeding the perianth, which is 4-5 mm. long; segments lanceolate, acute, narrowed towards base, and densely woolly in lower half; anthers 5; ovary glabrous; style central.

Far North-East and westward to the boundary of West Australia. Winter and spring.

4. AMARANTUS, L.

(Latin, from Greek *amarantos*, the name of some kind of everlasting flower, from *a*, not, and *marainō*, to wither.)

Flowers usually monoecious, small, with a bract and 2 bracteoles at base, arranged in axillary or terminal clusters; perianth of 3-5 green or scarious segments; stamens 3-5, free; styles 2-3; fruit membranous, with a separable pericarp, circumsciss or indehiscent, enclosed in the perianth; seed solitary, vertical, biconvex, black and shining. Scentless herbs, with alternate petiolate leaves.

A. Fruit circumsciss; stamens 5; pubescent plants.
Perianth-segments obtuse when ripe ..... *A. retroflexus* 1.
Perianth-segments acute..... *A. patulus* 2.
A. Fruit indehiscent or bursting irregularly; almost glabrous plants.
B. Perianth-segments 5.
Segments broad-spathulate, the lamina finally spreading ..... *A. Mitchellii* 3.
Segments narrow-spathulate, erect ..... *A. interruptus* 4.
B. Perianth-segments and stamens 3; spikes slender .. *A. viridis* 5.

*1. **A. retroflexus,** L. Erect stout pubescent annual, to 1 m. high; leaves ovate-lanceolate, 4-7 cm. long, petiolate, often reddish; flowers greenish in thick axillary spikes and also forming a dense bristly terminal panicle; bracts spinescent, about 6 mm. long and twice as long as the 5 perianth-segments, which become obtuse and notched in fruit; stamens 5; fruit circumsciss, nearly as long as the perianth.

Roadsides and cultivation in moister districts. Dec.-March. Most temperate regions.

*2. **A. patulus,** Bertol. Resembles the preceding, slightly pubescent, but the stems are not so stout, the terminal spike of the panicle is more slender and usually longer, the bracts (4 mm. long) are only one-third longer than the perianth-segments, which are lanceolate and acute even when ripe.

Same situations and season.—Mediterranean region.

3. **A. Mitchellii,** Benth. Herb with erect or ascending branches; leaves ovate, lanceolate or oblong, 2-4 cm. long, on long petioles; flowers whitish-green, in axillary globular clusters or sometimes in short terminal spikes, with a few small leaves; bracts shorter than perianth, which is about 2 mm. long, the 5 segments broadly spathulate, with narrow claws, so that the ripe fruit is visible between them, and broad scarious spreading mucronate laminas; fruit not circumsciss, longitudinally wrinkled so as to appear ribbed, with a thick smooth summit and 3 thick styles slightly surpassing the perianth.—*Euxolus Mitchellii* (Benth.), F. v. M.

Flinders Range and the Far North; westward to Birksgate Range. Most of the year.—New South Wales, Queensland.

Var. *grandiflora,* J. M. Black. Perianth-segments 5-6 mm. long, the claw is not so narrow and the outer segments almost obovate; fruit and seed correspondingly larger. May be a distinct species.

Only known by one specimen in the Tate Herbarium, from Mt. Parry, near Lake Torrens.

4. **A. interruptus,** R. Br. Near the preceding, but the terminal spike is long and leafless with a few shorter ones at the base; the 5 perianth-segments have a narrower lamina so that they are oblanceolate in shape: fruit similar but the wrinkles are not longitudinal.

Mt. Lyndhurst (Flinders Range). Also from the Finke River, N.T., and may therefore occur in our Far North.—New South Wales, Queensland.

* 5. **A. viridis,** L. Annual, with erect branching stem often striped with purple; leaves pale-green, ovate-oblong, obtuse or notched at summit, 5-10 cm. long, on long petioles; flowers greenish, in slender spikes, interrupted towards base, the upper ones forming a loose panicle, the terminal one 4-7 cm. long; perianth-segments 3, twice as long as the bract; fruit wrinkled, indehiscent, slightly exceeding the perianth.—*A. gracilis,* Desf.

A weed in waste and cultivated land. Jan.-March. Warm parts of the globe, but probably introduced into Australia.

FIG. 93.—**Amarantus viridis.**

5. ALTERNANTHERA. Forsk.

(Latin *alternus,* alternate; *anthĕra,* anther: filaments without anthers often alternate with fertile stamens).

Flowers small, bisexual, in axillary spikes; perianth-segments 5, scarious and white; stamens 5, united in a short cup at base, 2 or 3 often without anthers; anthers small, 1-celled; style very short or none; fruit obovate, compressed; pericarp membranous; seed vertical. Herbs with prostrate or ascending stems and opposite leaves.

A. Perianth-segments glabrous.
  B. Glabrous plants; leaves narrow.
    Segments 4-5 mm. long, with long points ..... *A. nodiflora* 1.
    Segments 2 mm. long, shortly pointed ..... *A. denticulata* 2.
  B. Hairy plant; leaves rather broad ..... *A. nana* 3.
A. Perianth-segments woolly in lower half ..... *A. angustifolia* 4.

1. **A. nodiflora,** R. Br. Almost glabrous; leaves linear-lanceolate, 2-8 cm. long; flowers-spikes globular, whitish, several often united in a dense globular cluster, often 2 cm. or more in diameter; perianth-segments lanceolate 4-5 mm. long, with acute points; bract and bracteoles similar, but shorter; fruit not half as long as the perianth, notched.

Murray lands; near Lake Torrens; Far North. Most of the year.—Throughout Australia.

FIG. 94.
Alternanthera denticulata.

2. **A. denticulata,** R. Br. Near the preceding, but the spikes and clusters of spikes are much smaller, the perianth-segments about 2 mm. long, without conspicuous points, and the fruit not much shorter than they, notched.

Usually near water in southern districts; Murray lands; Flinders Range and at least as far west as Wynbring. Most of the year.—Eastern States, Tasmania.

This species appears to differ from the Asiatic and African *A. sessilis* (L.), R. Br., (*A. triandra,* Lamk.), chiefly in the fruit, which in the latter species is slightly longer than the perianth and finely rugose, while the leaves are much broader than in the Australian plant.

3. **A. nana,** R. Br. Stems and foliage pubescent; leaves oblong-lanceolate, 15-25 mm. long; spikes white, finally ovoid or cylindrical, 5-10 mm. long; perianth-segments about 3 mm. long, oblong-lanceolate, hardened in fruit; bract and bracteoles much shorter, shining; fruit about half as long as the perianth, truncate at summit.

Near Oodnadatta (Far North). Most of the year.—New South Wales, Queensland, Northern Territory.

4. **A. angustifolia,** R. Br. Branches glabrous or pubescent; leaves glabrous, lanceolate, sometimes narrow, 1-2 cm. long; spikes globular or ovoid, woolly, sometimes clustered; perianth-segments lanceolate, acute, 3-4 mm. long, densely woolly in the lower half (as in *Ptilotus*); fruit about half as long as the perianth, with thickened margins, the stigma quite sessile in the deep notch.

Near Oodnadatta and in the Far North-East; also in tropical Australia. Most of the year.

6. GOMPHRENA, L.

(Name altered by Linnaeus from *gromphaena*, the Latin name of some ornamental plant.)

1. **G. Brownii,** Moq. Erect branching woolly annual; leaves opposite, linear or linear-lanceolate, 1-3 cm. long; flowers bisexual, mostly in terminal silvery-shining globular spikes, sessile among the uppermost leaves; bract and bracteoles hyaline, the latter boatshaped, 6 mm. long and exceeding the perianth, the bract about half as long; perianth-segments 4 mm. long, lanceolate, with a green centre, and densely woolly outside for most of their length; staminal tube hyaline, more than half as long as the ovary, a lanceolate tooth rising between each filament and as long as the 5 oblong 1-celled anthers; ovary contracted at summit into a very short style with 2 short stigmatic lobes; fruit indehiscent, membranous; seed vertical.

Near Oodnadatta. Winter and spring.—MacDonnell Range, Northern Territory, and tropical Australia.

FAMILY 43.—NYCTAGINACEAE.

The perianth consists of an upper petaloid almost undivided deciduous part, and a lower part which is persistant, becoming hardened and falling off with the superior fruit, so as to resemble a pericarp, the real pericarp being thin and membranous. The family includes several ornamental plants, such as the *Mirabilis jalapa*, L. (Marvel of Peru), and *Bougainvillea spectabilis*, Willd., both from tropical America.

1. BOERHAVIA (Vaill.), L.

(After Hermann Boerhaave, 1668-1738, professor of medicine, botany, and chemistry at the University of Leyden.)

Flowers bisexual, small, in few-flowered umbels on simple or branched axillary peduncles; upper part of perianth deciduous, plaited, and shortly 5-lobed; stamens usually 2 or 3, rarely 4, attached near base of perianth; anthers 2-celled; ovary superior, erect and stipitate within the lower part of the perianth, resembling an ovule and containing 1 anatropous ovule; style simple, with a dilated stigma; fruit enclosed in the persistant enlarged and thickened 5-ribbed pearshaped basal half of the perianth but free from it, the membranous pericarp adherent to the seed, which is albuminous; radicle inferior.

Upper part of perianth 3 mm. long ..... *B. diffusa* 1.
Upper part of perianth 10 mm. long ..... *B. repanda* 2.

1. **B. diffusa,** L. Glabrous or somewhat hairy perennial herb, with prostrate or ascending stems; leaves opposite, petiolate, ovate, oblong or lanceolate, 1-4 cm. long, undulate on margin, paler beneath; flowers sessile or pedicellate, solitary or 2-4 in umbels on filiform simple or branched axillary peduncles; perianth about 5 mm. long, the lower part oblong, with 5 rows of glandular hairs, the upper part campanulate, pink or lilac, 3 mm. long.

In almost all parts of the State except the South-East, but not common. Summer.—Also throughout Australia, but not in Tasmania, and in Asia and Africa. The root is eaten by the Australian aborigines.

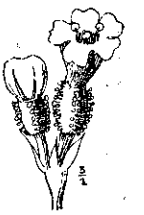

FIG. 95.
Boerhavia diffusa.

2. **B. repanda,** Willd. Near the preceding, but the leaves are often cordate at base, acute or acuminate, the flowers all pedicellate; lower part of perianth 2-3 mm. long, upper part funnel-shaped, 10 mm. long, spreading at the summit to a diameter of about 10 mm.

Northern part of Flinders Range and between Lakes Torrens and Frome. Winter and spring.—Also in Queensland, West Australia, and tropical Asia.

FAMILY 44.—PHYTOLACCACEAE.

Flowers unisexual in the Australian genera, small, axillary, solitary or in racemes; perianth 4-5-lobed; stamens usually exceeding the perianth-lobes in number and (in South Australian genera) the anthers oblong and nearly sessile; ovary superior, of 2 or more carpels, often united in a ring, each carpel containing 1 ovule; styles as many as carpels, free or united at the base; fruit usually dry; embryo curved round the albumen; radicle inferior. Glabrous herbs, shrubs, or trees, with alternate entire leaves.

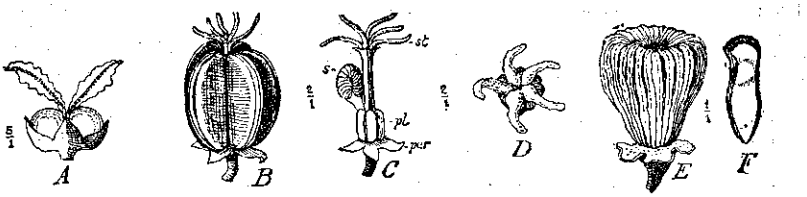

FIG. 96.—**Phytolaccaceae.** A, female flower of *Didymotheca thesioides.* B-D, *Gyrostemon australasicus.* B, fruit. C, fruit after the valves of the carpels have been removed: *st*, styles; *s*, seed; *pl*, placenta; *per*, perianth. D, female flower. E-F, *Codonocarpus pyramidalis*, fruit and single carpel.

A. Carpels 2, opposite ..... DIDYMOTHECA 1.
A. Carpels several or many, united round a central column.
Flowers solitary in axils; carpels bursting along the outer edge ..... GYROSTEMON 2.
Flowers in racemes; carpels bursting along the inner edge ..... CODONOCARPUS 3.

* *Phytolacca octandra,* L., a herbaceous perennial, with subsessile bisexual flowers in pedunculate racemes, perianth of 5 ovate whitish segments, with 8 stamens and 8 carpels, which in fruit are united in a depressed purplish-black berry, and ovate-lanceolate leaves, has been found in the Mount Lofty Range, but has not established itself here, as in Victoria, New South Wales, and Queensland. It is a weed from tropical America, and is sometimes called "Red Ink Plant," from the juice of the berries.

1. DIDYMOTHECA, Hook. f.

(Greek *didymos,* twin; *thēkē,* capsule: alluding to the 2 carpels.)

1. **D. thesioides,** Hook. f. Erect slender branching perennial; leaves linear, 1-5 cm. long; flowers dioecious, solitary in the axils, on very short peduncles; perianth rather deeply 4-lobed; stamens in the male flowers usually 8, the anthers almost sessile in a ring; ovary of 2 orbicular compressed opposite carpels united along the inner edge to a central column; styles lanceolate, divergent; fruiting carpels opening along the outer margin, each about 2 mm. broad; seed orbicular, reddish, radially rugose, with a small arillus (Fig. 96, A).

Kangaroo Island; Yorke and Eyre Peninsulas; South-East. Sept.-Feb.—Also in Tasmania and West Australia.

2. GYROSTEMON, Desf.

(Greek *gyros*, a circle; *stemōn*, a stamen: alluding to the position of the stamens.)

Flowers dioecious, axillary, solitary; perianth shortly 5-lobed, spreading under the fruit; stamens about 8-60; fruiting carpels 4-30, separating from the central column and opening along the outer and inner edges; seed reddish, rugose, arillate.

Stamens about 12, in 1 whorl ..... *G. australasicus* 1.
Stamens numerous, in several whorls ..... *G. ramulosus* 2.

1. **G. australasicus** (Moq.), Heimerl. Erect shrub, about 1 m. high; leaves linear, 5-35 mm. long, and often curved near the summit; flowers subsessile; perianth 2 mm. diam., with deltoid lobes; stamens 8-14, in a single circle around a central disk; carpels 4-8, forming a nearly globular fruit, 4-8 mm. diam.; column dilated in lower part (Fig. 96, B-D.).—*G. cyclotheca*, Benth.; *Didymotheca pleiococca*, F. v. M.

Near Victor Harbor; Kangaroo Island; Murray lands; Eyre Peninsula. Sometimes known as *Buckbush*. Summer.—Also in Western Victoria and West Australia.

2. **G. ramulosus**, Desf. Shrub or small tree, 2-4 m. high, with corky bark and spreading branches, the dry wood remarkably light in weight; leaves terete, slender, dark-green, 3-6 cm. long; flowers on short recurved peduncles of 5-8 mm.; perianth with shallow lobes; stamens 40-60, crowded in several circles on the convex receptacle; carpels 15-30, in fruit somewhat pear-shaped, about 8 mm. long; column dilated towards summit.

Far North; sandhills at Ooldea. Spring.—Also on the Finke River, N.T., and in West Australia.

3. CODONOCARPUS, A. Cunn.

(Greek *kōdōn*, a bell; *karpos*, fruit: alluding to its shape.)

Flowers usually dioecious, in terminal or axillary racemes; perianth shortly and obtusely 5-lobed, spreading under the fruit; stamens 15-20, arranged in a single row round a central disk; carpels about 30-40, connate round a central column; fruit campanulate or pear-shaped in outline, depressed in the centre of the summit, the carpels becoming scarious, finally separating from the column and from each other and opening along the inner or vertical edge; column much dilated towards the summit; seed reddish, slightly rugose, arillate.

Leaves obovate ..... *G. cotinifolius* 1.
Leaves linear ..... *G. pyramidalis* 2.

1. **C. cotinifolius** (Desf.), F. v. M. *Native Poplar.* A tall shrub or moderate-sized tree; leaves glaucous, obovate or broad-lanceolate, petiolate, 2-5 cm. long; carpels forming an obovoid fruit about 10 mm. long.

Murray lands; Flinders Range, from Crystal Brook; near Lake Torrens and westward to Denial Bay; Far North. Usually in sandy soil. Spring and summer.—Also in the eastern States and West Australia.

2. **C. pyramidalis**, F. v. M. Small tree with horizontal branches; leaves linear, acute, 5-12 cm. long; carpels forming a campanulate fruit about 15 mm. long. (Fig. 96, E-F.)

Northern part of Flinders Range; north of River Murray. Spring.—Endemic in South Australia.

FAMILY 45.—AIZOACEAE.

Flowers bisexual; perianth herbaceous or scarious, 4-5-lobed or 4-5-partite; stamens 4-5 or more, sometimes numerous and the outer ones changed into petaloid staminodia; ovary superior or inferior, with 2-5 or more cells, rarely reduced to a single carpel; ovules 1 or more in each cell; placentas usually axile; styles as many as cells; fruit a capsule, sometimes circumsciss; seed usually compressed and crustaceous, with the embryo curved round the albumen. Herbs or shrubs, with alternate or opposite, entire, sometimes fleshy leaves; stipules none or minute.

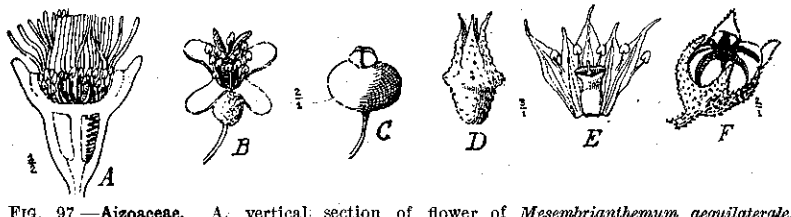

FIG. 97.—**Aizoaceae.** A, vertical section of flower of *Mesembrianthemum aequilaterale*. B-C, *Tetragonia implexicoma*; B, flower; C, fruit. D-E, *Trianthema crystallina*; D, flower; E, the same spread open. F, fruit and perianth of *Gunniopsis quadrifida*.

A. Perianth tubular in lower part, 4-5-lobed above.
  B. Ovary adnate to the perianth-tube and inferior, stamens epigynous.
    Petaloid staminodia present ..... MESEMBRIANTHEMUM 1.
    Petaloid staminodia wanting ..... TETRAGONIA 2.
  B. Ovary free from perianth-tube and superior; stamens perigynous or hypogynous, none petaloid.
    C. Capsule opening in valves.
      Stamens 4, solitary ..... GUNNIA 3.
      Stamens numerous, in 4 clusters ..... GUNNIOPSIS 4.
    C. Capsule circumsciss; stamens 5-20 ..... TRIANTHEMA 5.
A. Perianth divided into 5 segments almost to the base; ovary superior; stamens hypogynous.
  D. Seeds with caruncle ..... GLINUS 6.
  D. Seeds without caruncle.
    Each ovary-cell with several ovules; leaves apparently whorled ..... MOLLUGO 7.
    Each ovary-cell with 1 ovule, leaves distinctly alternate ..... GALENIA 8.

1. MESEMBRIANTHEMUM (Breyne), L.

(Greek *mesêmbria,* midday; *anthemon,* flower; the flowers open fully in the sun.)

Perianth-lobes mostly 5, imbricate, the 2 or 3 inner ones usually shorter; stamens and staminodia numerous, united towards base, arranged in several rows, the outer rows forming petaloid staminodia ("petals"); ovary inferior, with 5 or more cells and as many styles, each cell containing 1, 2, or many ovules; capsule surrounded by the persistant succulent perianth, opening loculicidally at the depressed summit; seeds minute. Succulent herbs, with usually opposite fleshy leaves and solitary flowers. The capsule opens under moisture in a stellate shape; the placentas are at first axile, but tend to become parietal in fruit.

A. Plants covered with glistening papillae.
  B. Stem-leaves alternate.
    C. Leaves flat and broad, persistant.
      Petals much longer than perianth ..... *M. crystallinum* 1.
      Petals scarcely as long as perianth ..... *M. angulatum* 2.
    C. Leaves terete, caducous ..... *M. caducum* 3.
  B. All leaves opposite, cylindrical; branches bristly.... *M. floribundum* 4.
A. Plants smooth, without papillae.
  D. Leaves triquetrous; styles 8-11.
    Flowers 4-6 cm. diam. when open ..... *M. aequilaterale* 5.
    Flowers about 9 cm. diam. ..... *M. edule* 6.
  D. Leaves subcylindrical; styles 5 ..... *M. australe* 7.

*1. **M. crystallinum,** L. *Ice-plant.* Prostrate annual or biennial, covered with large glistening papillae; stem-leaves alternate, thick, flat, obovate, 2-4 cm. long, undulate, half-clasping at base; flowers white, on short terminal or leaf-opposed peduncles; petaloid staminodia much longer than perianth-lobes; styles 5.

A garden escape, now established along the coast as far as Murat Bay, and sometimes inland, as in the Murray lands and at Ooldea. Oct.-Dec.—South Africa; Mediterranean region.

*2. **M. angulatum,** Thunb. Differs from the preceding in the smaller, less conspicuous papillae; stems longer, stiffer, angular; flowers numerous, white or pale yellow; perianth tube 5-angled; petaloid staminodia white, about as long as the perianth-lobes; styles 5

Port Lincoln; Port Augusta. Sept.-Oct.—South Africa.

*3. **M. caducum,** Ait. Densely papillose annual with procumbent stems; leaves subterete, channelled above, dilated and half-clasping at base, withering and falling early, 8-15 mm. long, 1 mm. broad, the lower ones opposite, the upper alternate; flowers sessile, white, axillary or terminal; petaloid staminodia scarcely longer than the narrow perianth-lobes, which in fruit become swollen and protruding at the base, the tube subcylindrical; styles 5, short.

Coast near Port Germein, and also inland in somewhat salt country. Sept.-Dec.—South Africa.

*4. **M. floribundum,** Haw. Perennial with slender prostrate stems, often rather long; branches and peduncles covered with short, spreading bristles; leaves papillose, opposite or clustered, cylindrical-clavate, 10-15 mm. long, 3 mm. broad; flowers pink, on axillary peduncles usually much longer than the leaves; perianth papillose, the tube turbinate; petaloid staminodia twice as long as the lanceolate subequal perianth-lobes; styles 5, exserted

On railway embankments and other places in the southern districts. Summer.—South Africa.

5. **M. aequilaterale,** Haw. *Angular Pigface.* Perennial with stout prostrate stems; leaves opposite, acute, connate at base, smooth, fleshy, triquetrous, 4-8 cm. long, each of the 3 sides about 10 mm. broad at base; flowers large, purplish-red, pedunculate or subsessile within the small terminal pair of leaves; perianth-tube obconical, nearly 2 cm. long, 2-keeled, lobes unequal, the 2 longer ones (about 3 cm. long) equalled or exceeded by the petaloid staminodia; styles 8-10; fruit obovoid, juicy, 4-5 cm. long, usually red, edible; seeds smooth, reddish-brown (Fig. 97A).

Along the seacoast and in somewhat salt country inland in most parts of the State. Oct.-Jan.—Also throughout Australia.

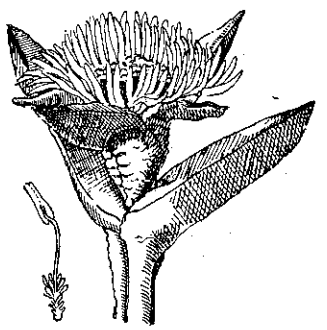

FIG. 98.—**Mesembrianthemum edule.**

*6. **M. edule,** L. Very near the preceding, but differs in the leaves thicker (each side about 15 mm. broad) and darker green; flowers larger (about 9 cm. across when fully open), yellow or pink, or a mixture of both, rarely light-purple; styles 9-11 in our specimens; fruit edible, called in South Africa the "Hottentot fig."

Sandhills near Grange Road and along coast near Adelaide. Sept.-Nov.—South Africa. Erroneously recorded in Nat. Fl. S.A. 67 as *M. acinaciforme*, L., another showy South African species, with the leaves sub-compressed, the flowers purple, the 2 uppermost leaves reduced to large connate bracts at the base of the peduncle, and 14 styles.

7. **M. australe,** Soland. *Round-leaved Pigface.* Stems prostrate and rooting; leaves opposite, often clustered, smooth, juicy, obtusely plano-convex or almost cylindrical, usually purplish, obtuse at summit, 1½-5 cm. long; flowers purple or pink, about 3 cm. diam. when open, on slender erect peduncles of 2-8 cm. long, axillary or terminating the short flowering branches; perianth-tube turbinate, 5 mm. long; styles 5; seeds smooth, whitish.

Common along the sea-coast; Murray lands. Oct.-Feb.—Temperate Australia.

2. TETRAGONIA, L.

(Greek *tetra*, four; *gônia*, angle: alluding to the 4-angled fruit of some species.)

Flowers small, axillary, solitary or twin; perianth-tube adnate to ovary, with 4-5 rarely 3 valvate lobes; stamens 4-25, inserted at the summit of the perianth-tube, free; no petaloid staminodia; ovary half-inferior, 2-8-celled, with 1 pendulous ovule in each cell; fruit more or less succulent, indehiscent, with a bony endocarp. Herbs or undershrubs, with alternate leaves.

A. Prostrate herbs; fruit becoming hard
  Fruit subglobular, angular or horned ..... *T. expansa* 1.
  Fruit compressed, 4-winged ..... *T. eremaea* 2.
A. Climbing undershrub; fruit berry-like ..... *T. implexicoma* 3.

1. **T. expansa,** Murr. *New Zealand Spinach; Warrigal Cabbage.* Robust prostrate perennial herb, perhaps annual in dry districts, somewhat papillose and scaly; leaves thick, gradually petiolate, triangular-ovate or lanceolate, 2-8 cm. long; flowers subsessile, greenish; free summit of ovary depressed-hemispherical; stamens about 8-16; styles and cells 5-11; fruit green, but becoming hard, very variable even on the same plant, subglobular to turbinate, 5-15 mm. long and broad, sometimes merely 3-4-angled, or the angles produced upwards into 3-4 short hard erect or spreading horns.

Sea-coasts from Adelaide northwards; Flinders Range and westward to Tarcoola and Nullarbor Plain; Far North and towards Broken Hill; Murray lands. Sept.-Jan.—Also eastern Australia, New Zealand, Japan, Polynesia, and South America. Often cultivated.

2. **T. eremaea,** Ostenf. Prostrate and papillose or slightly hairy, inhabiting dry country and probably always annual, closely resembling the preceding, but usually smaller; perianth-lobes 4, with 4 alternate stamens; fruit compressed, 4 mm. long, including the erect lobes, by 6-8 mm. broad, including the 2 obtuse hard lateral vertical wings, with 2 narrower wings at right angles to the lateral ones and usually 4 intermediate ribs; styles and cells 3-6; ovary when in flower with as many angles at the summit as cells, the angles extended upwards in fruit into hard obtuse teeth, not so long as the perianth-lobes, within which they stand erect.

Flinders Range; Far North; Tarcoola; Lake Torrens. Most of the year.—Also at Broken Hill, N.S.W., and in West Australia. Differs from *T. diptera* F. v. M. in the 2 lateral wings not expanded upwards beyond the perianth-lobes.

3. **T. implexicoma** (Miq.), Hook. f. Prostrate undershrub, or the stems climbing on adjoining shrubs; leaves petiolate, thick, papillose, ovate or lanceolate, 2-4 cm. long; flowers on slender peduncles which are 1-2 cm. long and often hairy; perianth-lobes yellow inside, glabrous or hairy outside; free summit of ovary conical; stamens 12-25; styles and cells 2, rarely 3; fruit a depressed-globular blackish drupe, 5 mm. diam.; crowned by the persistant perianth-lobes. (Fig. 97, B-C.)

Along the coast from the South-East to Fowler's Bay. Oct.-May.—Throughout Australia. The flowers are often barren.

3. GUNNIA, F. v. M.

(After the Tasmanian botanist, R. C. Gunn, 1808-1881.)

1. **G. septifraga,** F. v. M. Small annual herb; leaves opposite, broadly linear, fleshy; flowers subsessile in the forks or terminal; perianth 4 mm. long, with 4 valvate lobes; stamens 4, inserted on the perianth-tube, alternate with the acute lobes; ovary superior, 4-celled, each cell containing several ovules; styles 4; capsule membranous, enclosed in the persistant perianth, opening loculicidally in 4 valves, which then split septicidally into 2 segments; seeds minute, shining.

Stuart Creek (south-west of Lake Eyre). Apparently rare.—Also in north-west New South Wales.

4. GUNNIOPSIS, Pax.

(From *Gunnia* and Greek *opsis,* resemblance: "like Gunnia.")

Flowers cymose; perianth divided more than half way into 4 lobes, valvate in bud; stamens numerous, in 4 clusters, alternate with the lobes, rising from a disk adherent to the lower part of the perianth-tube and therefore perigymous; ovary superior, 4-celled, with several ovules in each cell; styles as many as cells; capsule enclosed in the persistant perianth, 4-angled, the scarious pericarp opening almost at the same time both septicidally and loculicidally for some distance from the summit, so that it appears to split into 8 partial valves, the central column bearing the fringe-like placentas and funicles on its upper half; seeds dark-colored, granular. Small undershrubs with a scaly-papillose tomentum, branching dichotomously, and with opposite fleshy leaves.

Leaves linear ..... *G. quadrifida* 1.
Leaves ovate ..... *G. zygophylloides* 2.

1. **G. quadrifida** (F. v. M.), Pax. Plant whitish-grey; leaves linear but thick, 1-4 cm. long; flowers on short or long peduncles, solitary, terminal or in the forks of the branches; perianth 12-15 mm. long, the lobes lanceolate-acuminate, white inside; capsule turbinate-truncate, umbilicate, 5-7 mm. diam. (Fig. 97, F.).—*Aizoon quadrifidum,* F. v. M.

North-west of Port Augusta as far as Barton; Flinders Range; Lake Eyre; Far North. Spring and Summer.—Also in western New South Wales.

2. **G. zygophylloides** (F. v. M.), Maid. et Betche. Smaller and greener than the preceding, some flowering specimens being only 3-5 cm. high; leaves obovate or oblanceolate, mostly obtuse; perianth about 8 mm. long, the lobes lanceolate, yellow (rarely pink) inside; capsule subglobular, umbilicate, 4-5 mm. diam., papillose.—*Aizoon zygophylloides,* F. v. M.

Northern part of Flinders Range; Far North. The form with pink flowers, found near Petermorra Creek, has been described by R. Wagner as *Aizoon Kochii.* Spring and summer.—Also in New South Wales and the MacDonnell Range, N.T.

5. TRIANTHEMA (Sauv.), L.

(Greek *treis,* three; *anthemon,* flower: the flowers sometimes grow in 3's in the axils of the leaves.)

Flowers small clustered or solitary in the axils, each with a membranous bract and 1 or 2 bracteoles at base; perianth usually cut about halfway into 5 imbricate lobes; stamens 5-20, inserted near the summit of the perianth-tube; ovary superior, 1-2-celled, with usually 2 ovules in each cell; capsule circumsciss, coriaceous in the upper half.

Prostrate or procumbent herbs; leaves opposite, with dilated scarious bases resembling stipules.

A. Stems 10-60 cm. long, with many flowers; seeds 2 to about 5.
  B. Flowers clustered, subsessile; capsule truncate or concave at summit.
    C. Ovary 2-celled, with 2 styles ..... *T. decandra* 1.
    C. Ovary 1-celled, with 1 style.
      Almost glabrous plant; stamens 5 ..... *T. crystallina* 2.
      Villous plant; stamens about 20 ..... *T. pilosa* 3.
  B. Flowers solitary, pedunculate; capsule ovoid..... *T. turgidifolia* 4.
A. Stems 1-3 mm. long, with 1-3 flowers; seeds numerous.. *T. humillima* 5.

1. **T. decandra,** L. Glabrous plant, with dichotomous branches; leaves obovate or oblong, 1-3 cm. long, narrowed into a rather long petiole; flowers clustered; perianth about 2 mm. long, the lobes mucronulate and scarious on the margin; stamens mostly 10-12; ovary 2-celled, with 2 ovules in each cell; capsule about 4 mm. long, cylindrical, truncate, the upper part 3 mm. long, exserted, splitting septicidally into 2 hard valves; seeds 4, black, wrinkled, superposed in each cell.—*Zaleya decandra,* Burm.

Northern part of Flinders Range; Far North. Winter and spring.—Also in New South Wales, Queensland, Central Australia, India, Burma, and Timor.

2. **T. crystallina,** Vahl. Sparsely beset with papillae or almost glabrous; leaves oblong or linear, 1-2 cm. long; flowers clustered; perianth about 4 mm. long, ribbed, the lobes mucronulate and scarious on the margin; stamens 5, alternate with the lobes; ovary 1-celled, with 2 ovules; capsule 2 mm. long, enclosed in the perianth, thickened and cup-shaped at summit, with the style in the middle of the depression; seeds 2, flat, wrinkled, obliquely superposed. (Fig. 97, D-E.)

Far North. Most of the year.—Also in New South Wales, Queensland, and tropical Africa and Asia.

Var. *clavata,* J. M. Black. Leaves succulent, clavate, 6-10 mm. long.

Far North and westward to Musgrave Range.

3. **T. pilosa,** F. v. M. Villous plant, the hairs on the leaves and flowers longer than those on the stems; leaves obovate or oblanceolate, 1-2 cm. long, narrowed into a petiole; flowers clustered; perianth villous outside, 6-7 mm. long, the lobes lanceolate; stamens about 20; ovary 1-celled, 2-ovuled, the style as long as the ovary; capsule cylindrical in the upper part, truncate and hollowed at summit, enclosed in the perianth.

Far North. Most of the year.—Also in the Northern Territory and tropical West Australia.

4. **T. turgidifolia,** F. v. M. Glabrous; leaves fleshy, obovoid-clavate, 12-16 mm. long, 4-6 mm. thick, flowers solitary on long peduncles; stamens 10: style 1, terminal; capsule ovoid, with several wrinkled seeds.

A doubtful species for South Australia, the only record being "towards Lake Eyre, *E. Giles,* 1872." The type came from Nichol Bay, W.A.

5. **T. humillima,** F. v. M. One of the smallest of flowering plants, glabrous, the stems only 1-3 mm. long, bearing 2 or 3 fleshy leaves and usually 2-3 almost terminal flowers; perianth 2 mm. long, divided to the base into 5 unequal hyaline acuminate segments; capsule obovoid, 1½ mm. long, opening by a small convex lid; placenta attached to a central column; seeds minute, 60-80 in the lower part of the capsule.

Near Maitland, Y.P. The type of this moss-like plant came from between the Lachlan and Darling Rivers, N.S.W. The Maitland specimens are in fruit, and it is impossible to discover the number or positions of the stamens. The type-specimens appear to have been in the same condition. Until these and other points are settled, the generic position of the plant must remain somewhat uncertain.

6. GLINUS, Locfl.

(Greek *glinos,* a plant with sweet sap, probably a maple.)

Flowers axillary, apparently clustered, on short peduncles; perianth 5-partite, the segments imbricate; stamens 3-20, usually with a few staminodia outside them; ovary superior, 3-5-celled, with several ovules in each cell; styles as many as cells; capsule membranous, opening locubicidally; seeds with a small white caruncle and a filiform appendage more or less encircling the seed. Herbs with rosulate caducous radical leaves, and stem-leaves alternate, but usually clustered so as to appear whorled.

A. Flowers chiefly in axillary clusters.
    Styles 5; stems stout, tomentose ..... *G. lotoides* 1.
    Styles 3; stems slender, almost glabrous ..... *G. Spergula* 2.
A. Flowers chiefly in terminal clusters; styles 3-4; stems rigid, glabrous ..... *G. orygioides* 3.

1. **G. lotoides,** Loefl. Stems prostrate or ascending, stout, 10-30 cm. long, the whole plant softly stellate-tomentose; leaves petiolate, orbicular-cuneate to oblong-spathulate, 1-2 cm. long; flowers in axillary clusters of about 4; perianth 6-8 mm. long, the lanceolate segments white inside; stamens 8-18, usually with about 5 bifid staminodia; styles 5; capsule enclosed in the perianth, 5-valved, seeds numerous, granular.—*Mollugo hirta.* Thunb.

Murray lands and northward to Far North; Flinders Range. Most of the year.—Also in Central Australia, the eastern states, Asia, Africa, and America.

2. **G. Spergula** (L.) Pax. Almost glabrous procumbent annual; stems slender, branched; leaves oblanceolate, 5-20 mm. long, shortly petiolate; flowers in axillary clusters; perianth about 3 mm. long, the segments obtuse; stamens 3-4, rarely more; styles 3; capsule opening in 3 valves; seeds numerous, shining.—*Mollugo Spergula,* L.

Murray lands; Far North. Most of the year.—Also in the other States, Asia, and Africa.

3. **G. orygioides,** F. v. M. Almost glabrous, probably perennial plant, with procumbent rigid stems; leaves rather thick, obovate, tapering into a short petiole; flower-clusters mostly terminal, or 1 or 2 in the axils; perianth 6-7 mm. long, the inner segments obtuse, with broad scarious margins; stamens 15-20, with a few subulate staminodia; styles 3-4; seeds not numerous, larger than in the 2 preceding species and the filiform appendage shorter.—*Mollugo orygioides,* F. v. M.

Cooper's Creek.—Also in Central Australia and western New South Wales.

7. MOLLUGO, L.

(Latin name of a plant believed to be *Galium mollugo,* L., a European herb with whorled leaves, and applied to the present genus because the leaves appear verticillate.)

1. **M. Cerviana** (L.) Ser. A delicate little glabrous annual, resembling a *Sagina,* 4-8 cm. high; stems, branches, and leaves all apparently whorled, the stems and branches capillary, the leaves linear, 5-10 mm. long; stipules small, scarious, caducous; flowers axillary, on long capillary peduncles; perianth-segments 5, 2-3 mm. long, obtuse, imbricate; stamens 5, without staminodia; styles 3; capsule ovoid, enclosed in the perianth, opening in 3 valves; seeds minute, numerous, without caruncle or filiform appendage.

Flinders Range; Far North, Lake Gillies, E.P. Winter and spring.—Also in Central Australia and western New South Wales.

8. GALENIA, L.

(After Galen (Claudius Galenus), the Roman physician and writer on medicine, about 130-200 A.D.)

*1. **G. secunda** (L. f.), Sond. Grey-pubescent herb, with ascending stems and alternate obovate-spathulate leaves, 5-20 mm. long, often recurved at summit; flowers small, sessile and solitary in the axils; perianth pubescent, 3 mm. long, deeply divided into 5 obtuse imbricate segments; stamens 10, in pairs at base of and alternate with segments; ovary superior, 5-celled, with 1 pendulous ovule in each cell; styles 5; capsule coriaceous, about as long as perianth, ovoid-truncate, opening loculicidally in 5 valves, leaving the thick central column, with the 5 long recurved funicles, attached to its summit; seeds dark, finely ribbed.

Port Germein; Gladstone. Aug.-Jan.—South Africa.

FAMILY 46.—PORTULACACEAE.

Flowers bisexual, regular; sepals 2, imbricate, free or united towards the base; petals 4-5, imbricate, caducous; stamens 3-many; ovary superior or half-inferior, 1-celled, with few or many amphitropous ovules on a basal or free central placenta; styles usually 3, free or partly united, stigmatic along the inner side; fruit a capsule; seeds more or less reniform, with a crustaceous testa and the embryo curved round the albumen. Herbs usually succulent, with entire opposite or alternate leaves.

A. Ovary half-inferior; capsule circumsciss ..... PORTULACA 1.
A. Ovary superior; capsule 3-4-valved, usually splitting between the valves.
  B. Leaves without stipules; capsule with united epicarp and endocarp.
    Stamens 5, opposite the petals ..... CLAYTONIA 2.
    Stamens 3-many, not regularly opposite the petals CALANDRINIA 3.
  B. Leaves with stipular hairs; capsule separating into epicarp and endocarp, with 3 free bristle-like nerves alternate with the valves of the endocarp ..... ANACAMPSEROS 4.

1. PORTULACA (Tournef.), L.

(Latin name for Purslane.)

Flowers solitary or clustered, axillary or terminal; sepals united towards the base in a tube adnate to the lower part of ovary, the tube circumsciss below the summit of the ovary, and the upper part of the sepals finally falling off; petals 4-6, perigynous; stamens usually numerous; ovary half inferior, with many ovules; capsule membranous, circumsciss; seeds numerous, minute. Succulent glabrous herbs; stipules often reduced to a tuft of hairs.

Leaves flat, oblong-cuneate; stipular hairs minute or absent ..... *P. oleracea* 1.
Leaves terete; stipular hairs long ..... *P. filifolia* 2.

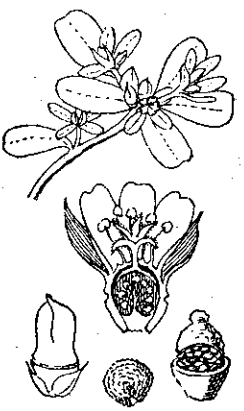

FIG. 99.—**Portulaca oleracea.**

1. **P. oleracea,** L. *Purslane.* Succulent prostrate annual; leaves mostly alternate, oblong-cuneate, obtuse, 1-2 cm. long, the stipular hairs minute or absent; flowers axillary, sessile, solitary or clustered; sepals 5 mm. long; petals 4-6, yellow, shortly united at base, scarcely exceeding the sepals; stamens 8-15; styles 4-6, united in lower half; seeds black, tuberculate.

Near Lakes Torrens and Eyre; Far North; also a common weed in cultivated land, and as such probably introduced with other seeds. Summer.—Eastern States; warmer parts of the globe.

Var. *grandiflora,* Benth. Sepals 8-10 mm. long; the yellow petals exceed them, being about 15 mm. long; stamens about 30; style rather long and slender, with 3-5 branches; leaves sometimes more distinctly oblong, with or without minute stipular hairs.

East of Lake Torrens; Far North-East. Summer.

2. **P. filifolia,** F. v. M. Annual; leaves terete, 1½ cm. long, with numerous long stipular hairs in the axil; flowers in axillary and terminal few-flowered leafy clusters, which, owing to the long hairs, have the appearance of woolly flowerheads; sepals about 5 mm. long, pointed in fruit; petals yellow, twice as long; stamens numerous; styles usually 4, rather long, partly united; seeds black, tuberculate.

Near Charlotte Waters.—New South Wales, Queensland, Central Australia.

2. CLAYTONIA, L.

(After John Clayton, 1693-1773, an English doctor and botanist who collected plants in Virginia.)

1. **C. australasica,** Hook. f. Creeping perennial, with weak stems and alternate linear or oblanceolate leaves, 2-9 cm. long, scarious and sheathing at base; flowers mostly terminal, on rather long peduncles; petals 5, white, 5-8 mm. long, united towards base, much exceeding the 2 rounded persistant sepals; stamens 5 opposite the petals and united in a short tube which is adnate to the base of the petals; ovary superior, with usually 3 ovules; styles 3, united to near summit; capsule 3-valved; seeds black, smooth.

Growing in or near swamps in southern districts; River Murray; South-East. Spring and summer.—Temperate Australia and New Zealand.

3. CALANDRINIA, H. B. et K.

(After Jean-Louis Calandrini, Genevan botanist, 1703-1758.)

Flowers usually in terminal racemes, with 1 or 2 small bracts at base of each pedicel; sepals 2, usually persistant; petals 5, rarely more, usually withering into a calyptra or hood over the ovary; stamens 3-many; ovary superior, with 2-many ovules; styles 3-4; capsule 3-4-valved; seeds biconvex and reniform or orbicular, or pear shaped, the funicle often terminating in a small arillus at the base of the seed. Herbs with fleshy alternate or radical exstipulate leaves.

The genus was united to *Claytonia* by Mueller in his later writings.

A. Flowers comparatively large and showy, purple to white.
  B. Sepals 4-5 mm. long; stamens 30-100; pedicels long, reflexed.
    C. Seeds finely wrinkled.
      Seeds ½ mm. diam. ..... *C. polyandra* 1.
      Seeds 1 mm. diam. ..... *C. balonnensis* 2.
    C. Seeds smooth, shining ..... *C. remota* 3.
  B. Sepals 7-10 mm. long; stamens 10-12; pedicels short, suberect ..... *C. caulescens* 4.

A. Flowers small.
D. Pedicels spreading or reflexed in fruit.
Seeds finely wrinkled, ½ mm. diam. ..... *C. volubilis* 5.
Seeds smooth and shining, ¾ mm. diam. ..... *C. calyptrata* 6.
D. Pedicels more or less erect, not reflexed in fruit.
E. Capsule conical; seeds numerous, concentrically striate, reniform ..... *C. ptychosperma* 7.
E. Capsule clavate; seeds about 6, smooth and shining, orbicular ..... *C. brevipedata* 8.
E. Capsule globular; small annuals; seeds numerous.
Capsule membranous, opening in 3 valves; seeds smooth, shining ..... *C. pumila* 9.
Capsule hard, black, shining, only opening at summit; seeds granular ..... *C. pygmaea* 10.
E. Capsule cylindrical; seeds 1 or 2.
Seed usually 1, orbicular, smooth; pedicels straight, 1-2 mm. long ..... *C. corrigioloides*, 11.
Seeds 2, pear shaped, granular towards base; pedicels curved upwards, 6-7 mm. long ..... *C. disperma* 12.

1. **C. polyandra** (Hook.) Benth. *Parakeelya.* Glabrous annual, 10-30 cm. high; stems short, procumbent; leaves succulent, thick, linear-spathulate, obtuse, 1½-4 cm. long, often channeled above, radical and at the base of the long peduncles; flowers showy, distant, in terminal racemes, on pedicels which in fruit are 2-3 cm. long, and usually horizontal or reflexed; 2 small scarious bracts at the base of each pedicel; sepals broad, 5 mm. long, very shortly mucronate; petals 5, rarely 6, obovate, purple, or sometimes white, 15-20 mm. long; stamens 30-60, in 2 or 3 rows, united at base; anthers oblong or ovoid; styles 3, free or very shortly united at base; capsule longer than sepals; seeds numerous, ½ mm. diam., reniform, dark-red, concentrically rugulose.
Between Tarcoola and Ooldea. Winter and spring.—West Australia.

2. **C. balonnensis,** Lindl. *Parakeelya.* Near the preceding, although perhaps sometimes biennial or perennial. Differs in the leaves, sometimes broader, the sepals more obtuse, almost orbicular, with scarious margins and scarcely any mucro; stamens to 100; anthers narrow-oblong; styles 3, thick, shortly united at base; seeds dark-red, reniform, concentrically rugulose, 1 mm. diam.
Finke River, Central Australia, and therefore probably occurs in our Far North.—New South Wales, Queensland. The type came from the Balonne River.

3. **C. remota,** J. M. Black. *Parakeelya.* Like *C. polyandra* in habit and flowers; but the 3 styles are thicker and very shortly united at base, the stamens oblong, and the seeds are numerous, quite smooth, shining, suborbicular, amber-colored, ½-¾ mm. diam.
Gawler Range; northern part of Flinders Range to Cooper's Creek. Winter and spring. This is probably the plant mentioned by Mueller as having been collected between Ooldea and Charlotte Waters and near Will's Creek (a branch of Cooper's Creek), and as being a species or variety very similar to his *C. pleiopetala*, but with only 5 petals. The latter species differs in possessing 8-9 narrow petals, 4 slender styles and ovoid anthers.

* 4. **C. caulescens,** H. B. et K. var. *Menziesii*, Gray. Glabrous annual with rather long prostrate or ascending stems; leaves lanceolate, 1-2½ cm. long, tapering into a long petiole; flowers axillary, or if considered as a raceme, the bracts are leafy, with pedicels 4-angled, shorter than the bract; sepals about 7 mm. long in flower, 10 mm. in fruit, acute, keeled and usually ciliate on keel; petals 5, purple, obovate, 10-12 mm. long; stamens 10-12; styles 3, united for half their length; capsule acuminate, about as long as sepals; seeds about 20, compressed, almost obicular, 1½ mm. diam., black, shining, punctulate, with a sharply keeled margin.—*C. Menziesii*, Torr. et Gray.
Murray lands, in scrub; Mount Gambier, South-East, in cultivated land. Sept.-Nov.—California to British Columbia. Apparently of old standing, as it is recorded by Bentham in 1863 as having "established itself in waste places about Adelaide and other parts of South Australia."

5. **C. volubilis,** Benth. Annual, with procumbent stems and long or short racemes of flowers: leaves very succulent, almost cylindrical, 1-4 cm. long, with a stem-clasping base; flowers on pedicels, which are horizontal or reflexed in fruit and 1-2 cm. long; sepals 3-4 mm. long, obtuse; petals 5, slightly exceeding them, white, pink, or purple; stamens 6-20, anthers ovoid; styles 3, short, broad, finally spreading, shortly united at base; capsule conical, exceeding the sepals; seeds numerous (about 50), reniform, ½ mm. diam., concentrically rugulose, shining with a coppery lustre or becoming almost black.

Southern districts; Murray lands; Flinders Range; Eyre Peninsula and westward to Ooldea and the Nullarbor Plain. Sept.-Oct.—Temperate Australia.

I am unable to distinguish *C. pusilla*, Lindl. (1848), from *C. volubilis*, Benth. (1863), as the plants, even on the same patch of ground, vary much in size. The former name cannot be maintained, as it is preoccupied by *C. pusilla*, Barneoud (1846), a Chilian species.

6. **C. calyptrata,** Hook. f. Like the preceding in habit, but the leaves usually shorter and not so thick, tapering at both ends; racemes long or short; pedicels slender, about 1 cm. long in fruit; sepals 3 mm. long, acuminate; petals 5, pink, about as long as the sepals; stamens 5-12, anthers ovoid; styles 3, almost free; capsule slightly longer than sepals; seeds 12-25, reddish-black, suborbicular, smooth and shining, ¾ mm. diam.

Southern districts, including Kangaroo Island, and at least as far north as Beetaloo; Murray lands. Sept.-Oct.—Temperate Australia, including Tasmania.

7. **C. ptychosperma,** F. v. M. Annual, with almost prostrate stems; leaves oblanceolate acute, 1-3 cm. long; racemes few-or many-flowered; pedicels spreading-erect, 4-15 mm. long; sepals 4-5 mm. long, acuminate, thin, especially in fruit; petals 5-6, pink, 8-10 mm. long; stamens about 8; styles 4, free; capsule conical, exceeding sepals, opening at summit in 4 valves; seeds numerous, reniform, almost black, ¾ mm. diam., showing under the lens 3-4 concentric raised lines or ridges on each face, the surface smooth between them.

Near Lake Torrens; Far North and westward to Musgrave Range. Winter and spring.—New South Wales, Queensland, Central and West Australia.

8. **C. brevipedata,** F. v. M. Small almost prostrate annual; leaves oblanceolate, 1-1½ cm. long; racemes few-flowered, the bracts leafy, the pedicels 1-4 mm. long; sepals 3 mm. long; petals 5, slightly exceeding sepals; stamens 4, opposite 4 of the petals; styles 3, united in lower part; capsule clavate, shortly surpassing sepals; seeds about 6, black, suborbicular, smooth, shining, 1¼ mm. diam.

Eyre Peninsula to Fowler's Bay, and perhaps on the eastern side of the Gulf. Aug.-Sept.—Victoria, West Australia.

9. **C. pumila,** F. v. M. Very small annual, 1½-3 cm. high, with a rather stout taproot; leaves radical, ovate or oblong, about 5 mm. long, tapering into a long petiole; scapes few flowered, the flowers on long erect pedicels, with scarious or somewhat leafy bracts at base; sepals orbicular, about 2 mm. long; petals 5, obovate, slightly exceeding sepals; stamens 4-6; styles 3, very short; capsule globular, membranous, about as long as sepals; seeds numerous (about 70), reddish-brown, obovoid, smooth, shining, scarcely ½ mm. long.

Mount Lyndhurst (Flinders Range). Spring.—New South Wales, Queensland, Central Australia.

10. **C. pygmaea,** F. v. M. Minute annual, 1-2 cm. high, with slender root; stems ascending, finally rigid; leaves succulent, ovate or oblong, about 5 mm. long; racemes dense, few-flowered, the bracts leafy; the pedicels very short; sepals succulent, almost orbicular, 3 mm. long, closing over the ovary, but falling off before it ripens; petals rather longer, 5-7, white, lanceolate; stamens 5-8; styles 3, rather long; capsule globular-trigonous, finally black, hard, smooth and shining, the 3 valves opening only at the summit seeds almost black, numerous, finely granular, scarcely ½ mm. diam.

Southern districts; Murray lands. Aug.-Sept.—Temperate Australia and Tasmania.

11. **C. corrigioloides,** F. v. M. Annual with prostrate branching stems up to 30 cm. long; leaves fleshy, oblong-cuneate, 1-1½ cm. long; flowers in short dense racemes, on very short erect pedicels; sepals almost orbicular, 1 mm. long in flower, 2 mm. long in fruit; petals 5, white, a little longer; stamens 3; styles 3, united in lower part; capsule cylindrical, 3-6 mm. long, with 1-2 seeds in the base; seed orbicular, black, shining, ¾ mm. diam.—*Claytonia corrigiolacea*, F. v. M.

Murray lands; Yorke Peninsula; Eyre Peninsula. Sept.-Oct.—Victoria, New South Wales, West Australia.

12. **C. disperma,** J. M. Black. Annual, with procumbent stems sometimes 1 m. long; leaves fleshy, subclavate, ½-4 cm. long; racemes numerous, few-flowered, paniculate; fruiting pedicels spreading, then curved upwards and thickened under the fruit, 6-7 mm. long; sepals broad, 1 mm. long; petals 4-5, pink, a little longer; stamens 4-5, but not opposite the petals; styles 3, united at base; capsule cylindrical, about 5 mm. long, abruptly swollen at base, dehiscing at the summit by a pore-like opening (not splitting into valves, as in almost all the other species); seeds 2, pear shaped, superposed, black and shining, granular towards base.

Ooldea. Sept.-Oct.

PLATE 21.—1, flowering and fruiting branchlet; 2, sepals spread open; 3, petals and stamens; 4, pistil; 5, ovary opened; 6, vertical section of capsule; 7, embryo and albumen within the membranous endopleura (crustaceous testa removed); 8, embryo, *rad* radicle, *cot* cotyledons.

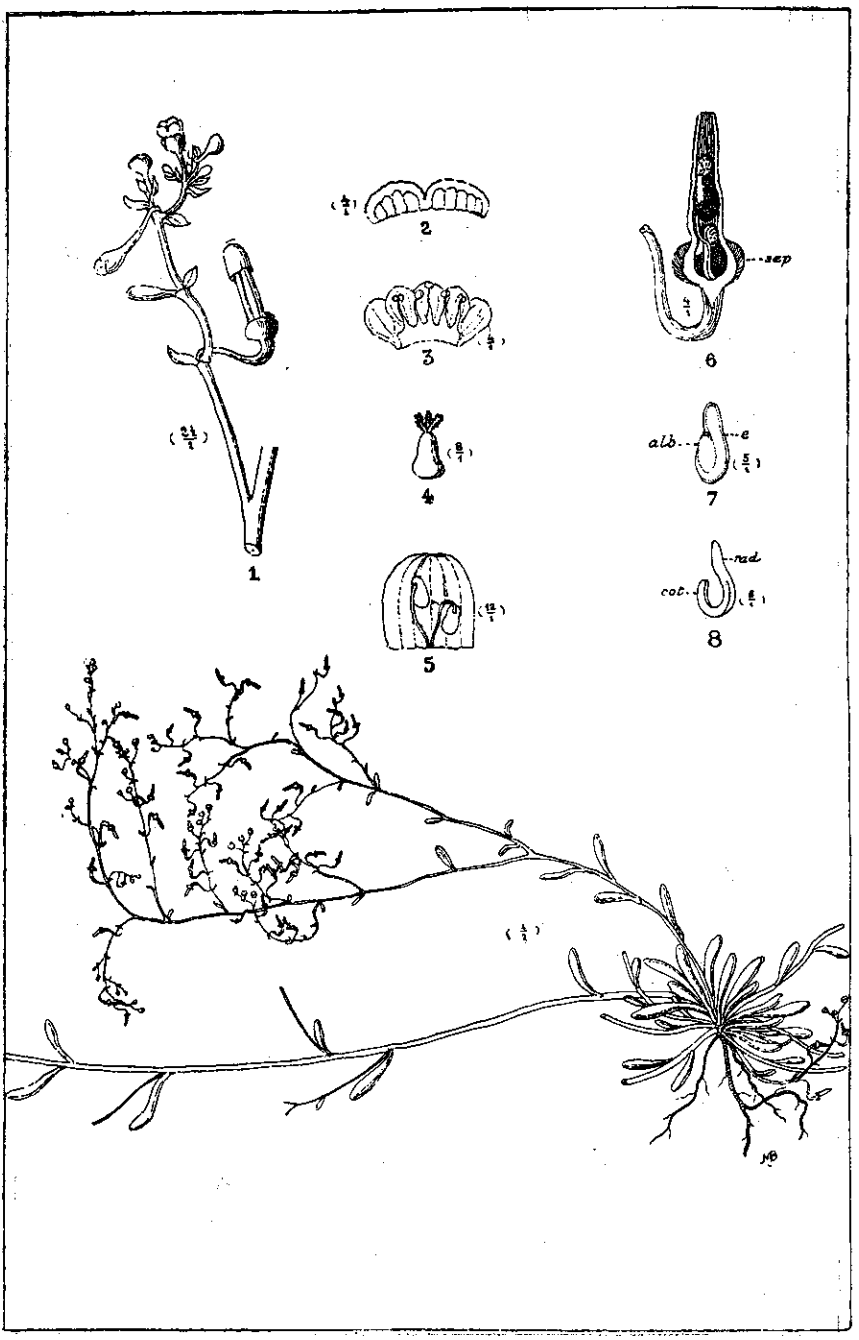

PLATE 21.—**Calandrinia disperma.**

4. ANACAMPSEROS, L.

(Greek name of some plant said to have the power of restoring love; **from** *anakamptó*, to restore; *erós*, love.)

1. **A. australiana,** J. M. Black. Succulent procumbent undershrub with tuber-bearing rootstock; leaves crowded, thick, ovate-lanceolate, 15-25 mm. long, with short stipular hairs; flowers few, on long pedicels with 2 bracts at base; sepals 2, fleshy, oblong,

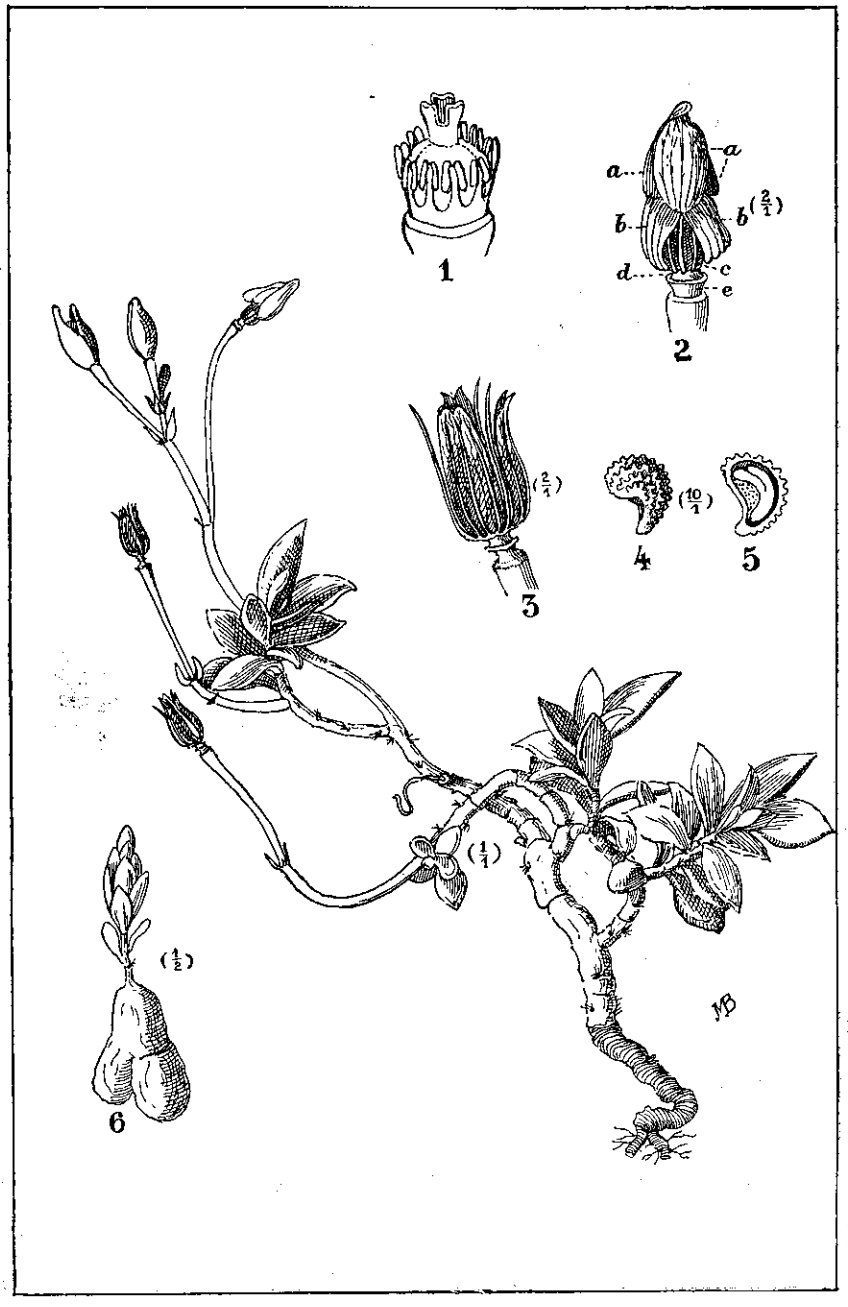

PLATE 22.—**Anacampseros australiana.**

deciduous, about 10 mm. long, enclosing the 5 pink petals, which are usually shorter and never longer; stamens 8-10, united in a ring at base; ovary superior, with 3 truncate styles united for half their length; capsule oblong, 8-9 mm. long, the epicarp thin, deciduous from the base in 3 valves, the endocarp membranous, persistant, 3-valved, each valve with 3-4 adherent bristle-like branching nerves (hardened mesocarp ?), the valves alternating with 3 free simple nerves; seeds numerous, rounded and tuberculate on the back.

Flinders Range from near Quorn northward to Blinman; apparently rare. Most of the year.—The only known Australian species, the others being South African.

PLATE 22.—1, stamens and pistil from bud; 2, ripening fruit after the sepals have fallen; *a a*, petals twisted and forming a hood round upper half of capsule; *b b*, 2 of the 3 valves of the epicarp, separating from the base upwards; *c*, part of the endocarp with the 3 bristly nerves; *c d e*, places of attachment of the endocarp, epicarp, and petals and sepals respectively; 3, open capsule after petals and epicarp have fallen; 4, seed; 5, longitudinal section of seed; 6, tuber and young shoot.

FAMILY 47.—CARYOPHYLLACEAE.

Flowers bisexual, regular; calyx 4-5-lobed or divided to the base into 4-5 sepals; petals 4-5, rarely none, imbricate; stamens 10 or fewer; ovary superior, 1-celled, with 1-many campylotropous ovules inserted on funicles rising from the base of the ovary and free or consolidated into a central column; styles 2-5, usually stigmatic along the inner side; fruit a 1-celled usually membranous capsule, opening at the summit by teeth or valves, or indehiscent; seeds 1-many, the embryo more or less curved round the albumen; cotyledons incumbent, except in *Polycarpaea*. Herbs usually thickened at the nodes, leaves opposite or apparently whorled, or rarely the upper ones alternate, rarely with stipules, the pair of leaves usually united by a short sheath.

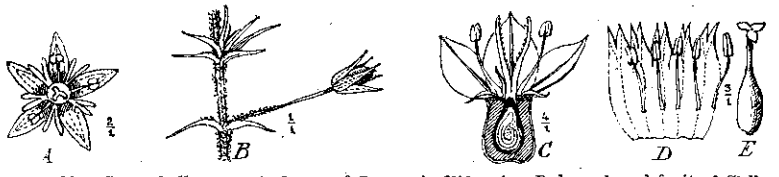

FIG. 100.—**Caryophyllaceae.** A, flower of *Drymaria filiformis*. B, branch and fruit of *Stellaria pungens*. C, fruiting perianth of *Scleranthus pungens* in vertical section. D, corolla of *Polycarpaea synandra* spread open. E, pistil of same.

A. Fruit a capsule opening by teeth or valves: seeds several or numerous.
  B. Sepals free or almost so.
    C. Styles free.
      D. Leaves without stipules.
        E. Styles, sepals, and petals 4; petals entire.
          Capsule opening to base in 4 valves..... SAGINA 1.
          Capsule opening in 8 teeth ..... MOENCHIA 2.
        E. Styles usually 5; petals bifid; capsule usually 10-valved..... CERASTIUM 3.
        E. Styles 3; capsule opening in 3-6 valves or teeth.
          F. Petals bipartite or absent; capsule 6-valved. STELLARIA 4.
          F. Petals entire.
            Capsule 3-valved ..... MINUARTIA 5.
            Capsule 6-toothed ..... ARENARIA 6.
      D. Leaves stipulate, often appearing whorled.
        Styles 5; capsule 5-valved ..... SPERGULA 7.
        Styles 3; capsule 3-valved ..... SPERGULARIA 8.
    C. Styles 3, united towards base; petals minute.
      G. Stipules absent ..... DRYMARIA 9.
      G. Stipules conspicuous.
        Sepals keeled, with scarious margins ..... POLYCARPON 10.
        Sepals not keeled, almost entirely scarious... POLYCARPAEA 11.
  B. Sepals united in a 5-lobed or 5-toothed calyx; styles free; petals conspicuous; no stipules.

H. Styles 2; capsule 4-toothed.
Calyx not scarious between the 5 nerves or wings — SAPONARIA 12.
Calyx scarious between the 5 nerves ..... — GYPSOPHILA 13.
H. Styles 3; capsule 6-toothed; calyx 10-30-nerved, sometimes inflated ..... — SILENE 14
A Fruit a membraneous achene; seed 1; petals absent; styles 2.
Sepals united about halfway in a hardened tube; no stipules ..... — SCLERANTHUS 15.
Sepals almost free; stipules minute ..... — HERNIARIA 16.

1. SAGINA, L.

(Latin for "fattening, nourishment": a word applied by Linnaeus to this genus.)

Flowers solitary on terminal or axillary peduncles; sepals, petals and styles 4, the petals white, often absent; stamens 4, opposite the sepals; capsule about as long as calyx, opening to the base into 4 valves; seeds numerous, obovoid, minute. *Pearlwort.*

Procumbent perennial ..... *S. procumbens* 1.
Erect annual ..... *S. apetala* 2.

1. **S. procumbens,** L. Small glabrous perennial, with stems springing from a radical rosette of leaves; leaves linear; peduncles rather short, curved after flowering; petals entire, ovate, half the length of the sepals, or absent.

Kangaroo Island; Murray lands; Eyre Peninsula. Sept.-Oct.—Eastern States and temperate regions of the globe.

2. **S. apetala,** Arduino. Slender tufted annual; leaves subulate; peduncles long, filiform, erect; petals usually wanting, or minute.

Southern districts; Murray lands; southern part of Flinders Range; Eyre Peninsula; South-East. Sometimes a weed on garden paths. Aug.-Nov.—Temperate Australia and Europe.

Colobanthus apetalus (Labill.), comb. nov., a small perennial with linear-subulate leaves in dense tufts, flowers resembling those of the preceding, but the sepals 5, and the 5 stamens alternate with them, no petals, has been found as near our border as Warrnambool, and may exist in the South-East.—*C. Billardieri*, Fenzl.

2. MOENCHIA, Ehrh.

(After Konrad Moench (1744-1805), German botanist and professor at the University of Marburg.)

* 1. **M. erecta** (L.), Gaertn. Mey. et Scherb. Slender erect glabrous annual, 3-12 cm. high; leaves few, lanceolate-linear, 5-15 mm. long; flowers cymose, on long erect pedicels; sepals 4, with broad scarious margins, 5-6 mm. long, lanceolate; petals 4, entire, shorter than sepals; stamens 4 or 8; styles 4, opposite the sepals; capsule oblong, not longer than calyx, opening at summit in 8 obtuse teeth; seeds numerous, minute, tuberculate.—*Cerastium quaternellum*, Fenzl.

Mount Lofty Range; South-East. Aug.-Oct.—Central Europe and Mediterranean region.

3. CERASTIUM, L.

(A name formed from the Greek *kerastês*, horned: alluding to the shape of the capsule.)

Flowers in terminal dichotomous cymes; sepals 5; petals 5, bifid; stamens 10, sometimes fewer; styles 5, opposite the sepals, rarely 3 or 4; capsule cylindrical, opening at the summit in twice as many teeth as styles (6-10); seeds numerous, ovoid, tuberculate, very minute. Herbs.

Petals ciliate at base, as long as sepals; stamens 10..... *C. glomeratum* 1.
Petal glabrous, shorter than sepals; stamens 5 ..... *C. semidecandrum* 2.

FIG. 101.—**Cerastium glomeratum.**

* 1. **C. glomeratum,** Thuill. *Mouse-ear Chickweed.* Pubescent annual; leaves broadly oval; flowers in compact cymes; pedicels not longer than the sepals; petals (rarely absent) equalling or slightly exceeding the sepals and ciliate near base; capsule straight, shining, nearly twice as long as calyx.—*C. viscosum*, L. partly; *C. vulgatum*, L. partly.

Gardens and cultivation throughout the settled districts. July-Jan.—Almost cosmopolitan.

*2. **C. semidecandrum,** L. Usually a smaller plant than the preceding, with smaller leaves; cymes loose, the fruiting pedicels longer than the sepals; petals glabrous, shorter than the sepals; stamens 5; capsule one-half longer than calyx.

South-East. Aug.-Jan.—Europe.

4. STELLARIA, L.

(Latin *stella,* a star: alluding to the 5 radiating petals.)

Sepals 5, with scarious margins; petals 5, usually white, bipartite, rarely absent; stamens 10 or fewer; styles 3; capsule opening from the summit almost to the base in 6 entire valves; seeds several, granular. Herbs with angular stems. *Starwort.*

A. Perennials; petals present; leaves linear-lanceolate.
Leaves and sepals rigid, pungent-pointed ..... *S. pungens.* 1.
Leaves not pungent ..... *S. palustris* 2.

A. Annuals.
Petals present; leaves ovate, the lower ones petiolate *S. media* 3.
Petals absent; leaves linear-lanceolate, all sessile .. *S. multiflora,* 4.

1. **S. pungens,** Brongn. *Prickly Starwort.* Ascending branched perennial, more or less clothed with curly hairs; leaves rigid, pungent, linear-lanceolate, complicate, 5-10 mm. long, spreading, often clustered; peduncles solitary, axillary, rather long; sepals rigid, 3-nerved, 5-8 mm. long; petals white or pink, about as long; styles and valves 3, rarely 4; seeds about 8, suborbicular, brown, 1½ mm. diam. (Fig. 100, B.)

Near Mount Gambier, South-East. Oct.-Dec.—Eastern States.

2. **S. palustris,** Retz. (1795). *Swamp Starwort.* Glabrous perennial, with long weak branching stems; leaves linear-lanceolate, 1-4 cm. long, the upper ones rather rigid; peduncles long, slender; sepals lanceolate, acute, 3-nerved, 6-8 mm. long; petals about as long; capsule shorter than calyx; seeds about 12, shaped as in the preceding—*S. glauca,* With. (1796).

In shady places and near water, Mount Lofty Range; Kangaroo Island. Sept.-Dec.—Eastern States, Europe, Western Asia.

Var. *caespitosa,* Benth. Leaves and stems shorter, the former 5-10 mm. long; sepals broad, obtuse, about 3 mm. long; petals longer than sepals.—*S. caespitosa,* Hook. f.

Dismal Swamp, South-East. Probably also on the Murray.

Var. *tenella,* Benth. Near the preceding, with similar flowers, the blunt sepals only 2½ mm. long, the leaves shorter (3-4 mm. long) and crowded.

River Murray.

*3. **S. media** (L.) Vill. *Chickweed.* Annual; stems weak, ascending, with a line of white hairs on one side leading down from the junction of the leaves and alternating at each node; leaves ovate, the lower petiolate, the upper sessile; flowers in leafy terminal cymes; sepals 4-5 mm. long, hairy; petals shorter; stamens usually 3-5; seeds several, 1¼ mm. diam.

A weed in settled districts. July-Dec.—Almost cosmopolitan.

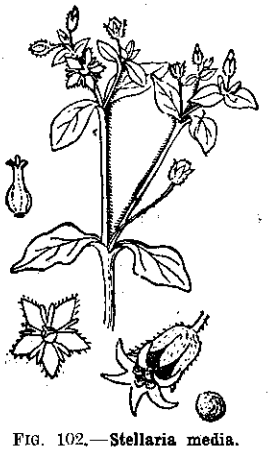

FIG. 102.—**Stellaria media.**

4. **S. multiflora,** Hook. Small glabrous annual, with several ascending stems; leaves linear-lanceolate, about 5 mm. long; flowers many on stout axillary peduncles usually shorter than the calyx; sepals lanceolate, 4-5 mm. long, 3-nerved; petals wanting; stamens 5-10, short; capsule as long as or rather longer than calyx; seeds 8-20, reddish-brown, 1 mm. diam., strongly granular.

Murray lands; near Hallett; South-East. Aug.-Oct.—Temperate Australia.

5. MINUARTIA, L.

(After Juan Minuart, 1693-1768, Spanish botanist and chemist, born in Barcelona.)

*1. **M. tenuifolia** (L.) Hiern. *Slender-leaved Sandwort.* Slender almost glabrous branching annual, 5-10 cm. high; leaves subulate, about 5 mm. long; flowers panicled, on pedicels sometimes longer than calyx; sepals 5, linear-lanceolate, 3 mm. long, minutely

glandular-hairy, with narrow scarious margins and 3 nerves; petals 5, shorter than sepals or none; stamens 3-5, or sometimes 10; styles 3; capsule oblong-conical, about as long as calyx, opening to the base in 3 valves; seeds about 15, minute, granular under lens.—*Arenaria tenuifolia*, L.; *Alsine tenuifolia* (L.) Crantz.

FIG. 103.—**Arenaria serpyllifolia.**

Eyre Peninsula; South-East. Aug.-Oct.—Europe.

6. ARENARIA, L.

(Latin *arena*, sand: alluding to the habitat.)

* 1. **A. serpyllifolia,** L. *Thyme-leaved Sandwort.* Minutely pubescent branching slender annual, 5-20 cm. high; leaves sessile, ovate-acute, about 5 mm. long; flowers cymose, the pedicels sometimes twice as long as calyx; sepals 5, lanceolate-acuminate, 3 mm. long; petals much shorter, entire; stamens 10; styles 3; capsule about as long as the calyx, opening by 6 erect teeth; seeds numerous, granular, very minute.

Sandhills near Brighton. Sept.-Nov.—Almost cosmopolitan.

7. SPERGULA, L.

(De l'Obel gave the name of *Sagina spergula* to the plant now known as *Spergula arvensis*, probably as a Latinization of *Spergel*, the German name of the plant.)

* 1. **S. arvensis,** L. *Corn Spurry.* Glandular-pubescent or almost glabrous annual; stems 20-40 cm. high; leaves narrow-linear, with a longitudinal furrow beneath, apparently whorled at the nodes, with minute broad scarious stipules; flowers in irregular cymes, on long pedicels, spreading or reflexed in fruit; sepals 5, ovate; petals 5, white, ovate, entire, nearly as long as the sepals; stamens usually 10; styles 5; capsules a little longer than calyx, ovoid, opening in 5 valves opposite the sepals; seeds numerous, biconvex, orbicular, black, fully 1 mm. diam., papillose, surrounded by a narrow wing or border.

Cultivated land in settled districts. Sept.-Jan.—Almost cosmopolitan.

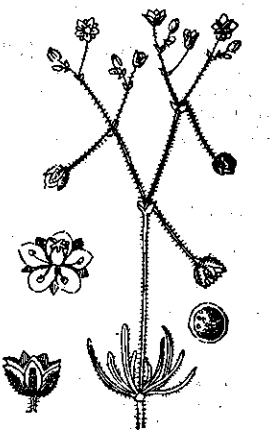

FIG. 104.—**Spergula arvensis.**

8. SPERGULARIA, Pers.

(From *Spergula*.)

Sepals 5, with scarious margins; petals 5, entire; stamens 10 or fewer; styles 3; capsule opening to the base in 3 valves alternate with the sepals; seeds numerous. Herbs with leaves often appearing whorled, and small scarious stipules.—*Sandspurry.*

A. Seeds without wings.

Sepals 3-5 mm. long; stamens 5-10; capsule equalling or exceeding calyx	*S. rubra* 1.
Sepals 2-3 mm. long; stamens 2-3; capsule shorter than calyx	*S. diandra* 2.

A. Seeds all winged; stamens 10; sepals 5-6 mm. long — *S. marginata* 3.

1. **S. rubra** (L.), J. et C. Presl. Annual or perhaps sometimes biennial, more or less glanular-hairy on the upper part; stems several, springing from base, procumbent or suberect; leaves narrow-linear, about 1-2 cm. long, plano-convex; stipules lanceolate-acuminate; flowers with short leaves at base of most of the pedicels, in cymes which in the typical form are short, but are sometimes long and racemose; fruiting pedicels 3-8 mm. long, erect or spreading; sepals about 3 mm. long; petals pink, shorter or rather longer; stamens usually 7-8, rarely 3 or 5; capsule as long as calyx; seeds wingless, minute, light or dark-brown, swollen along the back and tuberculate.—*S. campestris*, Aschers.

Most parts of the State. Spring and summer.—Other States and temperate regions of the globe. The small forms, with none of the pedicels longer than the calyx, found near the sea and in cultivated land, are probably introduced.

Var. *pinguis*, Fenzl. Internodes of stem longer; leaves more fleshy, 1½-5 cm. long; cymes racemose; sepals 4-5 mm. long; stamens 5-10; fruiting pedicels 5-25 mm. long, sometimes reflexed; capsule slightly longer than calyx; seeds black or brown, tuberculate.—*S. pinguis*, Rouy.

Southern districts; Murray lands; Flinders Range; Eyre Peninsula. Sept.-Dec.—Mediterranean region; temperate Asia. In the length of the lower pedicels our specimens come near to var. *longipes*, Willk. et Lange, but the flowers are too large.

2. **S. diandra** (Guss.), Heldr. et Sart. A more slender and usually smaller plant than the preceding; annual; leaves filiform; cymes leafless; flowers globular; sepals 2-3 mm. long; petals pink, narrow, scarcely as long as sepals; stamens 2-3; fruiting pedicels 4-10 mm. long, capillary; capsule slightly shorter than calyx; seeds black, almost smooth.

Peterborough; Yunta; Carrieton; Hawker. Perhaps introduced. Sept.-Oct.—Mediterranean region.

3. **S. marginata** (DC.), Kitt. Perennial, almost glabrous except the inflorescence, with a stout taproot and stiff angular stems; leaves linear, fleshy, biconvex; stipules long, acuminate, shining; cymes leafy only towards base; sepals 5-6 mm. long; petals about as long, white or violet; stamens 10; fruiting pedicels 8-15 mm. long, often reflexed; capsule longer than calyx by half; seeds orbicular, black, granular, all surrounded by a striate membranous wing.

Coasts of southern districts, including Kangaroo Island and Yorke Peninsula, and sometimes inland in somewhat salty soil. Most of the year.—Almost cosmopolitan.

9. DRYMARIA, Willd.

(From Greek *drymos*, a forest: alluding to the habitat.)

1. **D. filiformis,** Benth. Glabrous annual, with filiform shining stems, 5-12 cm. long; leaves mostly basal, subterete; stipules absent, flowers in racemose cymes, with minute bracts at the base of the capillary pedicels; sepals 5, about 3 mm. long, 3-nerved; petals less than half as long, hyaline, bipartite; stamens 3-5; styles 3, united towards base; capsule conical-cylindrical, often twice as long as the calyx, opening in 6 blunt teeth; seeds about 12, light-colored, ½ mm. diam., minutely papillose. (Fig. 100, A.)

Murray lands; Yorke Peninsula. Sept.-Oct.—Eastern States; West Australia.

10. POLYCARPON (Loefl.), L.

(Greek *polykarpos*, the name of some plant; from *polys*, many; *karpos*, fruit.)

1. **P. tetraphyllum,** Loefl. Small glabrous usually prostrate annual; leaves obovate-spathulate, 5-12 mm. long, with scarious stipules, opposite or in apparent whorls of 4; flowers in loose or dense leafless dichotomous cymes; sepals 5, keeled, hooded, mucronate, 2½ mm. long, with scarious margins; petals not half as long, white, entire; stamens 3; styles 3, united in lower part; capsule shorter than calyx, opening in 3 valves; seeds about 15, almost triangular, ½ mm. long, tuberculate.

Southern districts and as far north as Moolooloo (Flinders Range); Eyre Peninsula. Often a weed on lawns and garden paths. Probably introduced. Spring and summer.—Temperate Australia; Europe, and now domiciled in most temperate countries.

11. POLYCARPAEA, Lamk.

(Same derivation as *Polycarpon*.)

Sepals 5, silvery, not keeled; petals and stamens 5; styles 3, united for most of their length; capsule 3-valved; seeds whitish, with a brown stripe along the back; cotyledons accumbent, *i.e.*, with their edges, instead of their backs, turned toward the radicle. Herbs with conspicuous scarious silvery stipules and floral bracts.

Sepals with colored midrib; petals bifid; stamens perigynous ..... *P. synandra* 1.
Sepals without midrib; petals entire; stamens hypogynous *P. corymbosa* 2.

1. **P. synandra,** F. v. M. Annual, glabrous except for some long hairs in the axils; stems stiff, branching, 10-15 cm. long; radical leaves spathulate, stem-leaves linear, 1-2 cm. long; flowers pedicellate, in bracteate corymbose cymes; sepals 4-5 mm. long, white and scarious except for the prominent midrib; petals slightly shorter, pink and bifid at summit, united towards their base; stamens inserted on the tubular part of the petals and alternate with them; united styles nearly as long as ovary; capsules tapering at summit, shorter than sepals; seeds few to about 40, oblong, ½ mm. long, minutely granular. (Fig. 100, D, E.)

West of Lake Torrens; Far North and North-East. Most of the year.—Central and tropical Australia.

2. **P. corymbosa** (L.), Lamk. Annual; stems short and procumbent, or more erect and 30 cm. long, minutely tomentose; radical leaves obovate, the others linear, often clustered, glabrous; flowers in numerous dense cymes, leafy at base, the floral bracts mostly longer than the short pedicels; sepals 3-4 mm. long, white and without midrib; petals much smaller, free, obovate; united part of styles very short; capsule ovoid, much shorter than sepals; seeds 15-20, subreniform, ½ mm. long, rugulose.

Far North and North-East. Most of the year.—New South Wales; Queensland; Northern Territory; tropical Asia and Africa.

12. SAPONARIA, L.

(From Latin *sapo*, soap: alluding to the soapy juice of *S. officinalis*, L.)

FIG. 105.—**Saponaria Vaccaria.**

* 1. **S. Vaccaria,** L. *Nancy.* Handsome erect glaucous annual, 30-80 cm. high; leaves oblong-lanceolate, sessile, 3-9 cm. long; flowers in loose corymbose cymes; calyx about 12 mm. long, ovoid, contracted towards the summit, with 5 green winged angles terminating in 5 pink teeth; petals longer, with long claw and pink notched lamina; stamens 10; styles 2, long; capsule ovoid, enclosed in calyx, opening in 4 blunt teeth; seeds globular, black, minutely granular, over 2 mm. diam.

A weed in cultivated land. Nov.-Jan.—Central and southern Europe.

13. GYPSOPHILA, L.

(Greek *gypsos*, plaster of Paris, gypsum; *philos*, lover: some species prefer limy soils.)

1. **G. tubulosa,** L. Small erect annual with sticky glandular hairs; leaves linear, 5-15 mm. long; flowers solitary in the forks of the stems, on peduncles longer than the leaves; calyx campanulate-tubular, 4-5 mm. long, with 5 green ribs terminating in short teeth; petals rather longer, pink and notched at summit; stamens 10; styles 2; capsule ovoid-oblong, about as long as calyx, opening in 4 valves; seeds minute, black, granular, with prominent radicle.—*Saponaria tubulosa* (L.), F. v. M.

Barossa range; Yorke Peninsula; Murray lands; Naracoorte; Flinders Range. Aug.-Nov.—Temperate Australia; East Mediterranean region.

14. SILENE, L.

(From Silenus, the corpulent companion of Bacchus, perhaps in allusion to the paunchy calyx of some species.)

Calyx 10-30-nerved, sometimes inflated, 5-toothed; petals 5, exceeding the calyx, with a long narrow claw and usually 2 small scales at summit of claw; stamens 10; styles 3; capsule usually enclosed in the calyx, opening at the summit in 6 teeth; seeds numerous, reniform, concentrically granular, thickened along the back.

A. Fruiting calyx bladdery, 20-30-nerved.
- Calyx globular, glabrous ..... *S. vulgaris* 1.
- Calyx conical, hairy ..... *S. conica* 2.

A. Fruiting calyx not bladdery, 10-nerved.
- Calyx cylindrical ..... *S. nocturna* 3.
- Calyx ovoid ..... *S. gallica* 4.

*1. **S. vulgaris** (Moench) Garcke. *Bladder Campion.* Glaucous usually glabrous perennial; leaves broadly lanceolate; flowers on rather long pedicels, often drooping in forked cymes; bracts scarious; fruiting calyx subglobular, inflated, umbilicate at base, about 15 mm. diam., with 20 logitudinal nerves branching reticulately; teeth triangular; petals white, bifid to claw; capsule ovoid, about 3 times longer than the glabrous carpophore which supports it.—*Behen vulgaris*, Moench (1794); *Silene Cucubalus*, Wibel (1799); *S. inflata*, Sm. (1800).

In the moister parts of the settled districts. Sept.-Dec.—Europe, western Asia.

*2. **S. conica,** L. Greyish pubescent annual; leaves linear-lanceolate; flowers erect, in forked cymes; fruiting calyx swollen, ovoid-conical, 30-nerved, umbilicate, about 14 mm. long, with long subulate teeth; bracts herbaceous; petals pink, notched; capsule ovoid-conical, sessile.

South-East. Oct.-Dec.—Europe, western Asia.

*3. **S. nocturna,** L. Erect pubescent annual; lower leaves oblong-spathulate, the upper lanceolate, ciliate with long hairs towards the base; flowers erect, in 1-sided racemes; bracts herbaceous; fruiting calyx cylindrical, about 10 mm. long, 10-nerved, not umbilicate, with short lanceolate teeth; petals pink, bifid; capsule cylindrical, on a very short carpophore.

Southern districts to at least as far north as Melrose; Murray lands. Sept.-Nov.—Mediterranean region.

* 4. **S. gallica,** L. *French Catchfly.* Glandular-villous annual, often very sticky; lower leaves oblong-spathulate, the upper lanceolate; flowers erect, in 1-sided racemes; bracts herbaceous, much longer than the short pedicels; fruiting calyx ovoid, contracted at summit, about 8 mm. long, 10-nerved, with linear teeth; petals entire or notched, pink, white, or with a dark-red blotch on each lamina; capsule ovoid, with very short carpophore.

Common in settled districts. Aug.-Dec.—Probably of Mediterranean origin, now almost cosmopolitan.

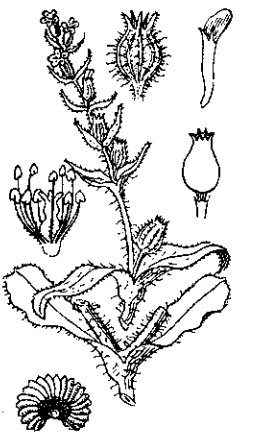

FIG. 106.—**Silene gallica.**

15. SCLERANTHUS, L.

(Greek *sklêros*, hard; *anthos*, flower: alluding to the hardened fruiting calyx.)

Sepals 5, rarely 4, united for about half their length so as to form a lobed calyx, the tube of which becomes hardened at maturity; petals none; stamens perigynous, 1, 2, or 5, in the latter case alternating with 5 staminodia; styles 2, long and slender; capsule membranous, indehiscent, enclosed in the calyx-tube; seed 1. Small densely branched herbs, with linear leaves dilated and connate at the base, sometimes clustered, usually ciliolate.

Flowers sessile; stamens 5 ..... *S. pungens* 1.
Flowers pedicellate; stamens 2 ..... *S. minusculus* 2.

1. **S. pungens,** R. Br. Rigid perennial, 4-15 cm. high, with many ascending stems; leaves linear-lanceolate, rigid, pungent-pointed, spreading, 5-15 mm. long; flowers sessile, in clusters sessile between the terminal leaves and each flower sheltered by a broad bract; calyx 5 mm. long in fruit, the lobes ovate, white, spreading, longer than the tube; stamens 5, opposite the lobes and alternating with as many antherless filaments; capsule and seed conical. (Fig. 100, C.)

Southern districts and northwards to Flinders Range; Eyre Peninsula and Gawler Range; Murray lands. July-Nov.—Eastern States.

2. **S. minusculus,** F. v. M. Probably annual, 3-5 cm. high; leaves linear, rigid and slightly pungent, 3-10 mm. long; flowers on short but distinct pedicels, few in sessile axillary and terminal clusters; fruiting calyx 3 mm. long, the lobes lanceolate, green, and longer than the tube; stamens 2; bracts linear; capsule conical.

Murray lands. Aug.-Oct.—Dry parts of Victoria and New South Wales.

S. diander, R. Br., a perennial resembling the preceding, but with leaves not pungent, has been recorded from the Mount Gambier district, but I have seen no specimens. It is a native of the Australian Alps and of Tasmania. *S. biflorus* (Forst.) Hook. f., a perennial with non-pungent leaves, flowers in pairs, calyx-lobes usually 4, shorter than the tube, and 1 stamen, has also been recorded from near Mount Gambier, but in the Eastern States it is an alpine plant.

16. HERNIARIA (Tournef.) L.

(From Latin *hernia*, because these plants were formerly supposed to cure ruptures.)

*1. **H. hirsuta,** L. Small prostrate greyish-green annual, covered with short bristly hairs; leaves lanceolate, ciliate, 3-10 mm. long, the upper ones alternate, with minute scarious stipules: flowers sessile, about 6-12 in globular axillary clusters; sepals 5, green, somewhat concave, 1½ mm. long, with rather long bristles, which are continued to the very summit; petals none; stamens usually 2; styles 2, short; capsule membranous, indehiscent, enclosed in the calyx and containing 1 reddish-brown shining seed.—*H. incana*, Tate, non Lamk.

Southern districts; Murray lands; Flinders Range. Sept.-Nov.—Mediterranean region. Bears some resemblance to *Chenopodium carinatum.*

Family 48.—CERATOPHYLLACEAE.

This family contains only 1 genus.

1. CERATOPHYLLUM, L.

(Greek *keras*, horn ; *phyllon*, leaf : alluding to the hornlike divisions of the leaves.)

1. **C. demersum,** L. *Hornwort.* Submerged aquatic perennial; leaves whorled, divided dichotomously 2 or 3 times into slender linear denticulate segments; flowers monoecious, sessile, axillary, within a perianth of 9-12 linear segments, the males of 12-16 almost sessile anthers, the females of a superior 1-celled ovary with 1 pendulous ovule and 1 style ; fruit an ovoid nut, surmounted by the spine-like persistant style, tuberculate with 2-4 reflexed spines near the base.

River Murray at Mannum and probably in other waters. Winter and spring.—Eastern States and many parts of the Old World.

Family 49.—RANUNCULACEAE.

Flowers bisexual or unisexual, usually regular, solitary, in racemes or panicles ; sepals and petals mostly 5, sometimes more or less, the petals sometimes absent ; stamens numerous, free, hypogynous ; gynoecium of several or many superior carpels, each with a 1-celled ovary containing 1 anatropous pendulous ovule ; fruit consisting of the indehiscent carpels (superior achenes or nuts) ; embryo small, near the base of the copious albumen. Herbs with radical or alternate leaves, or climbing shrubs with opposite leaves.

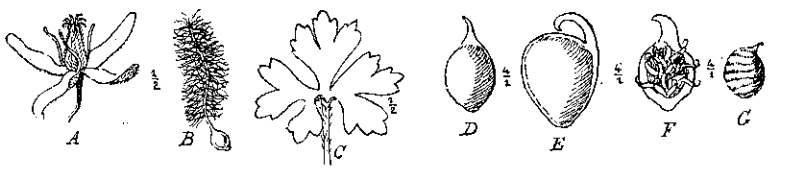

Fig. 107.—**Ranunculaceae.** A-B. *Clematis microphylla.* A, female flower. B, achene and awn. C, leaf of *Ranunculus rivularis.* D-G, achenes of *Ranunculus.* D, *R. rivularis.* E. *R. lappaceus.* F, *R. parviflorus* (one form). G, *R. trichophyllus.*

A family comprising the ornamental plants, Columbine (*Aquilegia*) and Larkspur (*Delphinium*), in which the fruits are follicles containing several seeds.

A. Leaves opposite ; stem woody, climbing ; style becoming a long plumose awn	Clematis 1.
A. Leaves alternate or radical ; stem herbaceous ; style becoming a short beak.	
Carpels in a globular head	Ranunculus 2.
Carpels crowded in a long spike	Myosurus 3.

1. CLEMATIS, L.

(*Klématis*, Greek name of the plant, from *klêma*, shoot.)

1. **C. microphylla,** DC. Woody climber ; leaves on long petioles, divided once or usually twice into ternate lanceolate oblong or broad-linear leaflets ; flowers mostly dioecious, in short panicles ; female flowers of 4 cream-colored oblong sepals, 15-25 mm. long, pubescent outside, 4 alternate staminodia, with long filaments and abortive anthers, and many carpels in the centre, each with a long plumose style ; male flowers with similar sepals and about 20-30 stamens, with shorter filaments and oblong anthers without terminal appendages, petals none ; achenes compressed, ovate, with plumose awns 2½-4½ cm. long (Fig. 107, A-B.)

Southern districts to Flinders Range ; Murray lands ; Eyre Peninsula ; South-East. July-Dec. Sometimes called "Old man's Beard."—Temperate Australia.

C. aristata, R. Br., with broader leaflets usually once ternate, stamens linear, tipped by a subulate appendage, and shorter awns, has been recorded for the Mount Gambier district, but does not apparently grow nearer to our boundary than the Grampian Range, in Victoria.

2. RANUNCULUS (Tournef.), L.

(Latin for " tadpole," diminutive of *rana*, a frog: also the name of the genus, perhaps in allusion to the aquatic species.)

Sepals 5, imbricate, caducous; petals usually 5, sometimes more or less, usually with a nectar-bearing pit near the base; achenes in a globular or oblong head, beaked by the persistant style. Herbs with alternate or radical leaves, the petioles dilated at base into scarious sheaths, but not really stipulate; flowers solitary or axillary on leaf-opposed peduncles.

A. Petals white; achenes transversely wrinkled; leaves with capillary segments ..... *R. trichophyllus* 1.
A. Petals yellow, leaves with broad lobes.
B. Achenes smooth; perennials.
Almost glabrous water-plant ..... *R. rivularis* 2.
Villous land plant ..... *R. lappaceus* 3.
B. Achenes rough; annuals.
C. Achenes tuberculate.
Slender plant with small flowers; receptacle glabrous ..... *R. parviflorus* 4.
Stouter plant with larger flowers; receptacle hairy ..... *R. trachycarpus* 5.
C. Achenes muricate, with stout beak ..... *R. muricatus* 6.

1. **R. trichophyllus,** Chaix. *Water Buttercup.* Stems perennial, hollow, creeping and rooting at the nodes; leaves 1½-2½ cm. long, petiolate, glabrous or almost so, trichotomously divided into many spreading capillary segments; sheathing base large, adnate to the petiole except at the summit; petals white, without any scale; achene ovoid, about 1½ mm. long, transversely wrinkled, at least when dry, with a short beak.—*R. aquatilis*, L. var. *trichophyllus*, A. Gray (Fig. 107, G.)

Marshes and streams in the southern districts and northward to the Flinders Range; River Murray. Sept.-Dec.—Eastern States; temperate part of northern hemisphere.

2. **R. rivularis,** Banks et Sol. Almost glabrous perennial: stems creeping or stoloniferous; leaves 1-4 cm. long, on long petioles, palmately divided into 3-5 obovate or cuneate or sometimes linear segments, which are usually obtusely or acutely 3-lobed; petals 5-12, yellow, oblong-cuneate, with a nectar-pit; achenes ovoid, almost smooth, 1½-3 mm. long, with a prominent straight or recurved slender beak; receptacle ovoid, very shortly hairy (Fig. 107, C-D.)

In or near water in the southern districts, and as far north as the Flinders Range; South-East. Most of the year.—Eastern States and New Zealand.

3. **R. lappaceus,** Sm. *Buttercup.* Usually erect perennial, 8-50 cm. high, villous with spreading hairs: radical leaves 1½-8 cm. long, on long petioles, ovate in outline, divided into 3-toothed lobes or pinnatisect with 3 stalked segments, which are again lobed and toothed, stem-leaves few, narrower and less divided; sepals hairy, spreading; petals bright yellow, obovate, 10-25 mm. long, with nectar-pit at base; achenes smooth, compressed, obovate, about 3 mm. long, with a rather long recurved beak; receptacle hairy, oblong (Fig. 107, E.)

Southern districts to Far North; Eyre Peninsula; South-East. July-Dec.—Temperate Australia. Closely resembles *R. repens*, L., one of the European Buttercups, but the latter has numerous stolens shooting from its base, which are absent in the Australian species.

4. **R. parviflorus,** L. Slender villous annual; leaves 5-20 mm. long, orbicular-cordate, 3-lobed or 3-partite, the lobes or segments usually again lobed or toothed; peduncles slender, leaf-opposed, or the flower almost sessile; sepals 2 mm. long, reflexed; petals 5 or fewer, pale yellow, oblong, 2-3 mm.long; achenes 6-20, compressed, brown, about 2 mm. long, tuberculate with a short almost straight beak, or with hooked bristles and a stouter curved beak; receptacle glabrous, globular. (Fig. 107, F.)

Southern districts to Flinders Range; Murray lands; Eyre Peninsula; South-East. Aug.-Nov.—Temperate Australia; New Zealand; Europe, chiefly Mediterranean region.

Var. *glabrescens*, J. M. Black. Almost glabrous; the 3 leaf-segments petiolulate, with lanceolate lobes; petals sometimes 6; achene tuberculate, with short beak.

Reedbeds, near Adelaide; River Murray; Flinders Range.

*5. **R. trachycarpus,** Fisch. et Mey. Annual, glabrous or with few appressed hairs; stems rather stout, procumbent; leaves 2-6 cm. long, mostly pinnatisect with 3 3-lobed segments, the lobes bluntly toothed, or some of the radical leaves only 3-lobed and

orbicular in outline, the upper ones narrower and less divided; sepals finally reflexed, about 5 mm. long; petals 5, yellow, about ½ longer than sepals; achenes numerous, 3 mm. long, almost orbicular, keeled on margin, the brown faces beset with small blunt tubercles, the beak short, straight or slightly curved; receptacle conical, hairy.

FIG. 108.—**Ranunculus muricatus.**

In or near water, Mount Lofty Range; River Murray. Sept.-Dec.—Eastern Mediterranean region. Differs from *R. sardous*, Crantz, in the comparative lack of hairs and more deeply divided leaves.

*6. **R. muricatus,** L. Almost glabrous annual, with stout stems; leaves orbicular-cordate, 1½-5 cm. long, with 3-5 obovate crenate lobes, the lowest leaves often broader than long, the uppermost with lanceolate lobes; petioles with conspicuous sheathing bases; petals small, yellow, slightly exceeding the reflexed sepals; achenes 8-16, 4-5 mm. long, ovate, keeled on margin, the brown faces covered with spiny tubercles, the beak broad, curved, and half as long as the achene; receptacle almost glabrous.

Moist places in settled districts. Sept.-Nov.—Mediterranean region.

3. MYOSURUS (Dill.), L.

(Greek *myos*, genitive of *mys*, a mouse; *oura*, tail: alluding to the long slender spike.)

1. **M. minimus,** L. *Mouse-tail.* Glabrous annual, 3-10 cm. high; leaves linear, all radical, 1-7 cm. long, including the petiole with a scarious sheathing base; scapes several, each ending in a single flower with very numerous (usually 200-300) carpels, the receptacle and carpels lengthening in fruit into a dense slender spike, 3-5 cm. long; sepals 5, petaloid, spurred at base; petals 5, narrow; stamens 5-10; achenes with 1 nerve on back, terminating in a short erect beak.

Murray lands; Flinders Range; Gawler Range. July-Sept.—Europe; Western Asia; introduced in America and perhaps in Australia.

FAMILY 50.—LAURACEAE.

This family, which includes the Laurel or Sweet Bay (*Laurus nobilis*, L.), the Cinnamon tree (*Cinnamomum zeylanicum*, Breyn) and the Camphor tree (*Cinnamomum camphora*, Nees et Eberm.) is only represented in South Australia by one genus of leafless parasites.

1. CASSYTHA, L.

(Formed by Linnaeus from *kasytas* or *kadytas*, the Greek name of a parasite supposed to be Dodder (*Cuscuta*) to which these plants bear a strong resemblance.)

Flowers small, bisexual, regular, each subtended by a minute bract and 2 bracteoles; perianth-segments 6, in 2 rows, persistant, the outer 3 smaller; fertile stamens perigynous, 9, in 3 rows of 3 stamens each, those of the 1st row opposite the small outer segments, with anthers opening inwards, those of the 2nd row opposite the inner segments, with similar anthers, those of the 3rd row opposite the outer segments, with anthers opening outwards; gland-like staminodia 9, 2 near the base of each stamen of the 3rd row, and 1 opposite each stamen of the 2nd row; anthers 2-celled, opening upwards by valves; carpel solitary, superior, with 1 pendulous anatropous ovule; style with a capitate stigma;

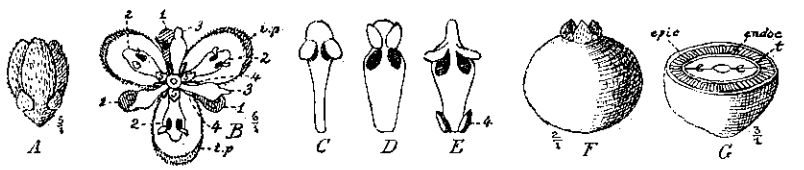

FIG. 109.—**Cassytha.** A-E, *C. pubescens.* A, unopened flower; B, flower spread open: *i.p*, 3 inner perianth-segments (the 3 outer ones hidden by the stamens); 1, 2, 3, the 1st, 2nd and 3rd rows of stamens; 4, the 9 glandular staminodia behind 3rd rows of stamens; 5, the 3 staminodia opposite the stamens of the 2nd row. C, D, E, one stamen from each row much enlarged. F-G, *C. melantha.* F, drupe (fruit enclosed in the succulent receptacle). G, transverse section of fruit after the receptacle is removed: *epic*, herbaceous epicarp; *endoc*, bony endocarp; *t*, testa; *e*, embryo.

fruit drupaceous, indehiscent, enclosed in the enlarged receptacle (sometimes called the "perianth-tube"), which is crowned by the perianth-segments; seed with a membranous testa, exalbuminous, the cotyledons large and hard. Twining parasites attached to other plants (usually trees and shrubs) by adventitious roots or suckers (*haustoria*) arising from the stem: leaves reduced to minute scales.

A. Stems filiform; plant glabrous ..... *C. glabella* 1.
A. Stems stouter; plant more or less pubescent.
Perianth white-haired; fruiting receptacle pubescent, 5-6 mm. diam. ..... *C. pubescens* 2.
Perianth black-haired; fruiting receptacle glabrous, 7-10 mm. diam. ..... *C. melantha* 3.

1. **C. glabella,** R. Br. Stems filiform, glabrous; flowers usually 5-8, in a globular head on a short peduncle; perianth 2 mm. long, white, glabrous; fruiting receptacle ellipsoid, 5-6 mm. long, smooth, reddish or yellowish, thin, 6-ribbed; fruit ovoid, with a hardened endocarp.

Southern districts; Eyre Peninsula; South-East. Summer.—Throughout Australia.

2. **C. pubescens,** R. Br. Stems thicker, pubescent when young; flowers in heads or very short spikes, on peduncles pubescent and shorter than in the preceding; perianth 3 mm. long, pubescent with whitish hairs; ovary pubescent at summit; fruiting receptacle globular or ovoid, succulent, pubescent, 5-6 mm. diam., greenish when fresh; fruit globular, with a bony endocarp (Fig. 109, A-E.).

Southern districts, including Kangaroo Island (with tuberculate stems); Murray lands; Eyre Peninsula; South-East. Summer.—Throughout Australia.

3. **C. melantha,** R. Br. Stems still more robust; flowers somewhat distant, in short spikes on pubescent peduncles which are 5-15 mm. long, the spikes lengthening to 15-20 mm.; perianth about 4 mm. long, pubescent with short blackish hairs; fruiting receptacle glabrous, globular, 7-10 mm. diam., succulent, drying black, like the rest of the plant; fruit globular, with bony endocarp (Fig. 109, F-G.)

Mount Lofty Range; Kangaroo Island; Murray lands; Yorke and Eyre Peninsulas; Fowler's Bay; Flinders Range; South-East. Summer.—Temperate Australia.

FAMILY 51.—**PAPAVERACEAE.**

Flowers bisexual; sepals 2, rarely 3, caducous; petals 4, imbricate; stamens many, free, or 6 in 2 bundles; ovary superior, with 2-12 parietal placentas and few to many ovules; fruit a capsule opening by pores or valves or nutlike and indehiscent; seeds 1-many, albuminous, with a small embryo. Herbs with alternate divided exstipulate leaves.

A. Flowers regular; petals spreading, without spurs; stamens and seeds numerous.
Capsule ovoid or oblong, opening at summit..... PAPAVER 1.
Capsule linear, opening lengthwise ..... GLAUCIUM 2.
A. Flowers irregular; petals connivent, the upper one spurred; stamens 6, in 2 bundles; fruit small, 1-seeded, indehiscent or 2-valved ..... FUMARIA 3.

1. PAPAVER (Tournef.), L.

(Latin name of Poppy.)

Petals crumpled in bud; sepals 2; stamens numerous; placentas many-ovuled, projecting more or less into the centre of the ovary; stigmas in as many rows which radiate from the centre of a convex disk crowning the ovary; seeds numerous, minute, reticulate, escaping by pores which open at the summit of the capsule-tube and just below the stigmatic disk. Bristly herbs with milky juice, the flowers solitary on long peduncles; leaves once or more pinnatipartite or pinnatifid. All our species are annual.

A. Capsule glabrous.
B. Plant with long bristly hairs; capsule contracted at both ends ..... *P. aculeatum* 1.
B. Plants with comparatively short hairs.
Capsule oblong ..... *P. dubium* 2.
Capsule subglobular ..... *P. Rhoeas* 3.
A. Capsule bristly, ovoid ..... *P. hybridum* 4.

1. **P. aculeatum,** Thunb. (1813). Erect, beset with rather long spreading bristly hairs; leaves pinnatifid, the lobes with broad teeth each ending in a conspicuous bristle; petals red or brick-colored; capsule ovoid-oblong, glabrous, with 4-8 stigmatic rays.—*P. horridum,* DC. (1818).

Southern districts; Murray lands; Eyre Peninsula; South-East. Apparently rare everywhere and becoming rarer. Sept.-Nov.—Temperate Australia; South Africa.

* 2. **P. dubium,** L. *Long-headed Poppy.* Leaves pinnatipartite, with oblong incised segments; hairs of the long peduncles usually appressed; petals large, brick-red; anthers violet; capsule glabrous, cylindrical-oblong, sometimes 2 cm. long, with 6-10 stigmatic rays. (Fig. 110.)

Common in settled districts. Sept.-Nov.—Europe; Asia.

* 3. **P. Rhoeas,** L. *Corn Poppy.* Hairs stiff and spreading; leaves pinnatipartite with lanceolate sharply toothed segments; petals large, scarlet; filaments filiform; capsule almost globular, with 8-12 stigmatic rays, the lobes at the edge of the disk slightly overlapping. (Fig. 110).

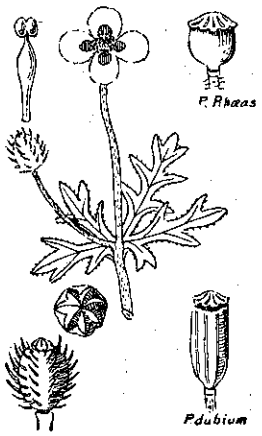

FIG. 110.—**Papaver hybridum.**

Much rarer here than the other 2 introduced species. Sept.-Nov.—Europe; Western Asia.

* 4. **P. hybridum,** L. *Rough Poppy.* Leaves twice or thrice pinnatipartite, with narrow segments and lobes; petals red, usually with a purple spot at base; filaments thickened upwards; peduncles usually with appressed hairs; capsule ovoid, studded with stiff curved bristles; disk small, with 6-8 broad stigmatic rays. (Fig. 110).

Settled districts. Sept.-Nov.—Europe; Western Asia.

* *Argemone mexicana,* L., *Prickly Poppy,* a robust annual, with glaucous sessile sinuate-pinnatifid leaves, blotched with white, the acute teeth ending in spines, large yellow, sessile flowers and an oblong spiny capsule, is a weed in the eastern States and common near Broken Hill, but has not yet been recorded for South Australia. The Australian form appears to be chiefly var. *ochroleuca,* Lindl. with very pale yellow petals.—Mexico.

The genus differs from Papaver in having often 3 sepals, a very short style supporting 3-6 radiating stigmas, and a capsule opening by 3-6 valves at the summit.

2. GLAUCIUM (Tournef.), Crantz.

(Greco-latin *glaucion:* alluding to the glaucous bloom covering these plants.)

Petals regularly rolled in bud; sepals 2; stamens numerous; ovary narrowed at summit into 2 connivent stigmas; capsule linear-cylindrical, pod-like, opening from the summit in 2 valves and leaving the 2 free linear placentas, which form a spongy partition crowned by the 2 persistant horn-like stigmas; seeds numerous, reticulate. Herbs with yellow sap and solitary flowers on short thick peduncles. *Horned Poppy.*

Capsule glabrous ..... *G. flavum* 1.
Capsule hairy ..... *G. corniculatum* 2.

* 1. **G. flavum,** Crantz (1763). Rigid biennial; leaves thick, greyish-green, the radical ones lyrate-pinnatipartite, rough with short hairs, the upper ones ovate, sinuate-toothed, stem-clasping; peduncles and capsules glabrous, the latter 10 to over 20 cm. long; petals large (about 25 mm. long), golden-yellow.—*G. luteum,* Scop. (1772).

Coast near Port Vincent, Yorke Peninsula. Summer.

* 2. **G. corniculatum** (L.), Curt. var. *flaviflorum,* DC. Annual; leaves all pinnatipartite, bristly, with incised lobes, the upper leaves clasping; petals smaller, yellow; peduncles and capsule hairy.

Yongala; Parnaroo. Summer.—Mediterranean region.

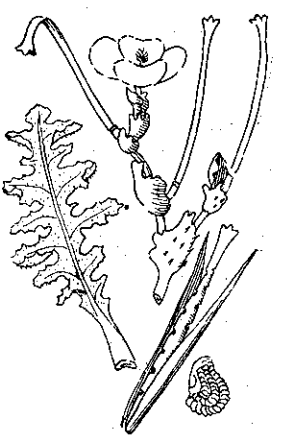

FIG. 111.—**Glaucium flavum.**

3. FUMARIA, L.

(*Fumaria* is the Spanish and Medieval Latin name of these plants; another Medieval Latin name is *fumus terrae,* "smoke of the earth" perhaps from the French *fumeterre,* which is also the origin of our *fumitory:* said to allude to the smoky smell of some species.)

Flowers irregular, arranged in many-flowered bracteate leaf-opposed racemes; sepals 2, small, flat, scale-like, denticulate; petals connivent, in 2 pairs, an inner and an outer,

the uppermost one spurred or pouched; stamens 6, united by their filaments into 2 bundles, each bearing 3 anthers, the middle anther 2-celled, the 2 lateral 1-celled; ovary with 2 placentas, a filiform style and 2 stigmas; fruit a nut-like achene or capsule, containing 1 seed. Delicate glabrous annuals, with weak angular stems and leaves twice or thrice pinnatisect.—*Fumitory.*

A. Flowers in dense spike-like racemes; fruit 2-valved..... *F. spicata* 1.

A. Flowers in loose racemes; fruit indehiscent.

B. Flowers about 10 mm. long.

Fruiting pedicels recurved; flowers whitish ..... *F. capreolata* 2.

Fruiting pedicels straight; flowers reddish ..... *F. muralis* 3.

B. Flowers 3-5 mm. long.

Sepals minute; flowers whitish ..... *F. parviflora* 4.

Sepals broader than corolla; flowers pink ..... *F. densiflora* 5.

* 1. **F. spicata,** L. Leaves with almost filiform segments; flowers crowded in ovoid spike-like racemes; sepals not half as long as corolla, which is pink, 4-5 mm. long; upper petal green and yellow at summit; fruit a compressed, ovate capsule, opening in 2 valves.

Near Owen. Aug.-Oct.—Mediterranean region.

* 2. **F. capreolata,** L. Climbing plant; leaf-segments obovate-cuneate, usually 3-lobed; bracts nearly as long as pedicels; sepals broader than corolla and more than half as long; corolla 10-12 mm. long, usually white, with purple tip; fruiting pedicels recurved; nut globular.

Usually in cultivated land in settled districts. Aug.-Nov.—Europe; western Asia.

* 3. **F. muralis,** Sond. Leaves like the preceding; bracts shorter than pedicels; sepals as broad or nearly as broad as corolla and about $\frac{1}{2}$ as long; corolla red, narrow, 6-11 mm. long; fruiting pedicels erect or spreading; nut globular, often with 2 small pits at summit.

Same localities and season.

* 4. **F. parviflora,** Lamk. Diffuse; leaf-segments narrow-linear, slightly channelled; bracts lanceolate, equalling pedicels; sepals minute, much narrower and 5-6 times shorter than the corolla, which is 3-4 mm. long, white, with a green and purple tip; fruiting pedicel short, obconical; nut globular, wrinkled when ripe, with 2 inconspicuous pits at summit (Fig. 112).

Especially in fallow and cultivation.—Sept.-Nov.—Central and southern Europe to India.

FIG. 112.—**Fumaria muralis.**

*5. **F. densiflora,** DC. (1813). Leaves almost as in the preceding, but the ultimate segments a little broader; bracts oblong, equalling or exceeding the pedicels; sepals broader than the corolla and half as long; corolla pink, about 5 mm. long; nut globular, with 2 conspicuous pits at the summit.—*F. micrantha,* Lag. (1816).

Settled districts. Aug.-Oct.—Widely spread throughout the world.

FAMILY 52.—CAPPARIDACEAE.

Flowers regular, bisexual; sepals and petals usually 4, the petals imbricate; stamens several or many, free; ovary superior, 1-celled, with 2 or more parietal placentas sometimes protruding into the cavity; ovules many, campylotropous; fruit a linear capsule, opening by valves, or a berry; seeds reniform, without albumen. Herbs or shrubs, with alternate leaves.

Herb; fruit a pod-like capsule; leaves 3-5-foliolate ..... POLANISIA 1.

Shrubs or trees; fruit a berry; leaves undivided ..... CAPPARIS 2.

1. POLANISIA, Rafin.

(Greek *polys,* many; *anisos,* unequal: the stamens are many and unequal in size.)

1. **P. viscosa** (L.) DC. Erect annual, more or less glandular-hairy; leaves petiolate, with 3-5 digitate oblanceolate leaflets; flowers in terminal racemes; sepals 4, oblong-lanceolate, 6-8 mm. long; petals 4, yellow, oblanceolate, 2-3 times as long; ovary sessile, with 2 placentas, a short style and capitate stigma; stamens 16-32, unequal; capsule

5-8 cm. long, subcylindrical, striate, without gynophore, opening by 2 valves and resembling the siliqua of *Cruciferae*, except that the valves open from the summit downwards and that the persistant replum, or seed-bearing rim, has no membranous partition attached to it; seeds numerous, black, transversely rugose.—*Cleome viscosa*, L.

Northern part of Flinders Range to Far North.—Northern Territory; New South Wales, Queensland; also tropical parts of the globe. The stamens in the Australian plant seem unusually numerous; the maximum which I have found in any other description is 24.

2. CAPPARIS (Tournef.), L.

(Greco-latin name of the Caper-bush, *C. spinosa*, L., from the Perso-arabic *kabar*.)

Sepals 4, rarely 5, free or the 2 outer ones united in the bud; petals usually 4; stamens about 12 to 100, inserted on the receptacle at the base of the gynophore; ovary (and fruit) raised on a long gynophore, with 2 or more placentas and many ovules; stigma sessile; berry globular; seeds several, immersed in the pulp, with a hard testa and coiled embryo. Shrubs and trees, with axillary flowers, entire, coriaceous leaves and often prickly stipules.

A. Sepals 4, imbricate in 2 rows.
- Flowers small, hairy; stamens about 12 ..... *C. lasiantha* 1.
- Flowers large, glabrous; stamens numerous ..... *C. spinosa* 2.

A. Two outer sepals united in bud into an entire outer calyx, splitting as the flower expands.
- Leaves ovate or oblanceolate ..... *C. Mitchellii* 3.
- Leaves oblong-linear ..... *C. loranthifolia* 4.

1. **C. lasiantha,** R. Br. Tomentose shrubs; leaves ovate-lanceolate, 2-5 cm long, shortly petiolate; flowers solitary or twin on short peduncles; outer sepals unequal; the larger one about 6 mm. long; inner sepals and petals 8-10 mm. long, very tomentose, stamens about 12; berry ovoid, glabrous, about 3 cm. long, edible.

Cooper's Creek.—New South Wales; Queensland; tropical Australia.

2. **C. spinosa,** L. *Caper-bush.* Trailing shrub, pubescent on the young branches, otherwise glabrous; leaves ovate or almost orbicular, 2-4 cm. long, usually with a small recurved spiny mucro and a short petiole with 2 small recurved stipular spines at its base; flowers solitary, glabrous, on a thick peduncle 3-4 cm. long; outer sepals unequal, concave, the larger one hooded and 2-4 cm. long; petals white, obovate, about 5 cm. long; stamens 70-100, with long purple filaments; berry ovoid, 4 cm. long.—*C. nummularia*, DC.

At Henbury Station on the Finke River, N.T., and will therefore probably be found in our Far North. Winter and Spring.—Tropical Australia; Mediterranean region.

3. **C. Mitchellii,** Lindl. *Native Orange.* Shrub or small tree, the branches, leaves, and flowers more or less clothed with a short dense tomentum; leaves ovate or broadly oblanceolate, 2-6 cm. long, rigid, shortly petiolate; stipules as in the preceding, or absent on the flowering branches; flowers solitary, on peduncles 3-4 cm. long and thickened upwards; bud globular-acuminate; outer sepals about 2 cm. long, hoodlike until they separate; petals rather longer, obovate; stamens long, about 50; ovary shortly tomentose; gynophore about 4-6 cm. long; berry globular, smooth or warted, about 5 cm. diameter, with thick pericarp; seeds 10 mm. long.

Far North, principally near Cooper's Creek and Lake Frome. Most of the year.—Eastern States; Central Australia.

4. **C. loranthifolia,** Lindl. Shrub; differs from the preceding in the leaves oblong-linear, 1-5 cm. long, peduncles about 2½ cm. long, outer sepals thinner and ovary glabrous.

Recorded from between the Darling River and Cooper's Creek, and therefore probably exists in our North-East.

FAMILY 53.—CRUCIFERAE.

Flowers regular, bisexual, in terminal almost always bractless racemes; sepals 4, free, imbricate, usually caducous; petals 4, alternate with the sepals, spreading in the form of a cross; stamens usually 6, 4 longer and 2 (sometimes wanting) shorter, rarely 2 only; ovary superior, usually divided into 2 cells by a membranous partition connecting the 2 parietal placentas; ovules 1-many, anatropous; style short or absent; stigmas 2, or united into 1 capitate stigma; fruit a pod, sometimes long (*siliqua*), sometimes short (*silicule*), opening from the base by 2 valves, leaving the 2 persistant nerve-like placentas, which form a rim or *replum* usually united by the membranous partition or *septum*; or the fruit may be indehiscent and separate transversely into 2 or more articles; seeds several, rarely solitary, without albumen; testa membranous or crustaceous, often

exuding mucous when moistened; embryo curved; the radicle may be bent along the edges of the 2 cotyledons, when the latter are called *accumbent* (often indicated by the sign, o =), or the radicle may lie against the back of one of the cotyledons, which are then called *incumbent* (indicated by o ||), or if the cotyledons do not present a nearly flat back to the radicle, but are folded so as to almost surround it, they are called *conduplicate* (o >>). Herbs with alternate exstipulate leaves.

The relative position of the cotyledons and radicle is also expressed by stating that the embryo is *pleurorhizal* (radicle opposite the edges of the accumbent cotyledons); *notorhizal* (radicle opposite the backs of the incumbent cotyledons); *orthoplocal* (cotyledons conduplicate).

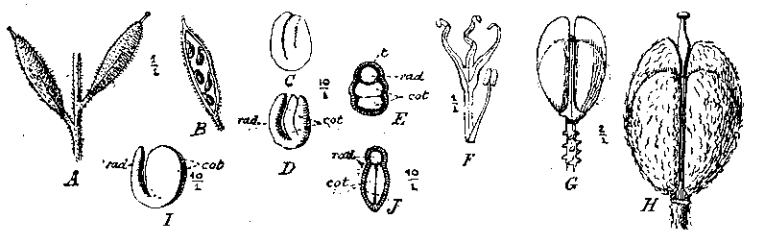

FIG. 113.—**Cruciferae.** A-E, *Blennodia brevipes*. A, fruiting branch and 2 pods. B, pod with one valve removed. C, seed. D, imbryo after removal of testa. E, transverse section of seed: *t*, testa; *rad.* radicle; *cot*, incumbent cotyledons. F, petal and stamen of *Stenopetalum trisectum*. G, pod of *Lepidium papillosum*. H-J, *Hutchinsia cochlearina*. H, pod. I, embryo. J, transverse section of seed, showing accumbent cotyledons.

A. Pod (siliqua) dehiscent, at least 3 times as long as broad (*Siliquosae*).
  B. Cotyledons accumbent (o =); valves nerveless or with 1 inconspicuous nerve.
    C. Pod terete, horned; petals large ..... MATTHIOLA 1.
    C. Pod somewhat compressed, not horned; petals small.
      Seeds in 1 row in each cell; petals white or purplish ..... CARDAMINE 2.
      Seeds in 2 rows; petals white or yellow ..... NASTURTIUM 3.
  B. Cotyledons incumbent (o ||); pod more or less cylindrical or terete.
    D. Pod usually 3-nerved; seeds 1-rowed ..... SISYMBRIUM 4.
    D. Pod 1-nerved or nerveless; seeds more or less 2-rowed.
      Pods ripening in the air ..... BLENNODIA 5.
      Pods turned down into the ground ..... GEOCOCCUS 6.
  B. Cotyledons conduplicate (o >>).
    E. Pod subcylindrical, with a long beak.
      Seeds in 1 row; petals yellow; beak conical... BRASSICA 7.
      Seeds in 2 rows; petals violet-veined; beak compressed ..... ERUCA 8.
    E. Pod linear-compressed, with a short beak; seeds in 2 rows; petals yellow ..... DIPLOTAXIS 9.
A. Pod (silicule) dehiscent, rarely 3 times as long as broad (*Siliculosae*).
  F. Pod broad, compressed.
    G. Valves flattened or convex, parallel to the broad septum or to each other; pod subovoid or globular.
      H. Style slender, short.
        Cotyledons accumbent; septum present; cells 1-6-seeded ..... ALYSSUM 10.
        Cotyledons incumbent; septum absent; cells many-seeded ..... MENKEA 11.
      H. Style as broad and long as pod; cotyledons conduplicate ..... CARRICHTERA 12.
    G. Valves folded and keeled, at right angles to the narrow septum; pod compressed laterally.
      I. Cells 1-seeded; pod usually ovate; hairs simple or absent; cotyledons incumbent..... LEPIDIUM 13.

I. Cells 2-several-seeded; hairs branched or absent.
Pod truncate-cuneate; cotyledons incumbent ..... CAPSELLA 14.
Pod ovate or oblong, rounded at summit; cotyledons incumbent, accumbent, or oblique ..... HUTCHINSIA 15.
F. Pod narrow, subcompressed dorsally, cylindrical or fusiform.
K. Cotyledons accumbent ..... NASTURTIUM 3.
K. Cotyledons incumbent.
Petals tapering into a long linear point ..... STENOPETALUM 16.
Petals obtuse ..... BLENNODIA 5.
A. Pod indehiscent.
L. Pod broader than long, reniform or bilobed; cells 1-seeded ..... CORONOPUS 17.
L. Pod longer than broad, cylindrical or conical, usually splitting transversely into indehiscent articles (*Lomentosae*).
M. Pod of 2 superposed 1-seeded articles.
Upper article with a short blunt beak; cotyledons accumbent ..... CAKILE 18.
Upper article with a short subulate beak; cotyledons conduplicate ..... RAPISTRUM 19.
M. Pod long, moniliform, with a long conical beak and several articles: cotyledons conduplicate ..... RAPHANUS 20.

1. MATTHIOLA, R. Br.

(After Pietro Andrea Mattioli, an Italian physican and author, 1500-1577.)

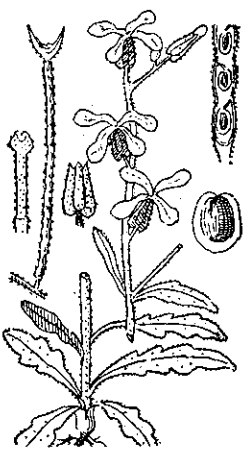

FIG. 114.—**Matthiola bicornis.**

* 1. **M. bicornis** (L.), DC. Annual or biennial, stellately tomentose; lower leaves pinnatipartite or pinnatifid, upper ones often narrow and entire; flowers almost sessile, rather large, fragrant at night; lateral sepals pouched at base, 10-12 mm. long: petals twice as long, violet; pod terete, 6-9 cm. long, scarcely 2 mm. broad, terminating in a short notched stigma and 2 straight or incurved lateral horns, the latter 6-8 mm. long; seeds in 1 row, compressed, winged; cotyledons accumbent.

Near Gladstone; Yorke Peninsula; a garden escape. Most of the year.—Eastern Mediterranean region.

* *Barbarea praecox*, R. Br., with lower leaves lyrate, the upper pinnatifid, flowers yellow, stigma entire, pod almost quadrangular, 4-6 cm. long, 2½ mm. diam., erect, valves 1-nerved, seeds in 1 row and accumbent cotyledons, is found near market gardens in the Mount Lofty Range. It is an edible form of Wintercress, belonging to Western Europe.

2. CARDAMINE (Tournef.), L.

(*Kardaminê*, Greek name of some cress-like herb.)

Sepals equal at base; stigma entire; pod linear, compressed; valves nerveless; seeds compressed, smooth (in all our species), apparently in 1 row; cotyledons accumbent. Almost glabrous herbs, with white or lilac flowers.

A. Petals longer than sepals.
B. Petals much exceeding calyx: leaf-segments narrow-linear ..... *C. tenuifolia* 1.
B. Petals slightly exceeding calyx.
Leaves toothed or with broad linear lobes ..... *C. laciniata* 2.
Leaves with ovate stalked almost entire segments *C. hirsuta* 3.
A Petals much shorter than sepals; leaf segments coarsely toothed ..... *C. eustylis* 4.

1. **C. tenuifolia,** Hook. Glabrous, with long weak stems: leaves pinnatipartite, with narrow-linear segments, or the lower ones with an ovate terminal segment; sepals 3-4 mm. long; petals white or lilac, obovate, 8-12 mm. long; stamens 6; fruiting pedicels spreading-erect, 15-18 mm. long; pods erect, 15-30 mm. long, 1-1½ mm. broad, with a slender style about 2 mm. long.

South-East, in marshy places. Summer.—Eastern States.

2. **C. laciniata,** F. v. M. Glabrous perennial: leaves chiefly radical, pinnatifid with linear lobes and a longer terminal lobe, or the whole leaf linear-lanceolate with a few sharp teeth, or entire: petals white, slightly exceeding the sepals; stamens 4; fruiting pedicels erect-spreading; pods 25-45 mm. long, 1½ mm. broad, with a short thick style.

Marshy plains in southern districts and along River Murray. Most of the year.—Eastern States.

3. **C. hirsuta,** L. Annual, glabrous or with a few hairs near the base: leaves pinnatisect, with 3-7 petiolulate, entire or almost entire segments which vary from orbicular to oblanceolate, sometimes reduced to the terminal segment; sepals 2-3 mm. long; petals about twice as long, white; stamens usually 6; pods erect, 15-25 mm. long, 1-1½ mm. broad, the stigma sessile or almost so.

Southern districts to Flinders Range: River Murray; South-East. Most of the year.—Temperate Australia; almost cosmopolitan.

Var. *reniformis,* J. M. Black. Leaf-segments thin, 1-3, the terminal one reniform flowers very small; style 2 mm. long.
Glencoe, South-East.

4. **C. eustylis,** F. v. M. Glabrous annual; leaves pinnatisect, with 3-9 coarsely and irregularly toothed segments, the lateral ones ovate or lanceolate, the terminal one larger and in the lower leaves broadly ovate; sepals 3 mm. long: petals white, scarcely 2 mm. long, oblong; stamens 4; pods spreading or erect 15-30 mm. long; 1½ mm. broad, with a style or beak 1-2 mm. long; valves more convex than in other species.

Flats and swamps along the River Murray. Most of the year.—Victoria; New South Wales; Gulf of Carpentaria. In the typical specimens from tropical Australia the seeds are small and almost form 2 rows in each cell, but in our specimens they are larger and appear 1-rowed, as in other *Cardamineæ.*

3. NASTURTIUM, R. Br.

(Latin name of a plant, probably Garden Cress, *Lepidium sativum,* L., from *nasus,* nose, *tortus,* twisted; on account of its aromatic-peppery flavor.)

The name Nasturtium is colloquially applied to 2 South American plants, *Tropaeolum majus,* L. and T. *minus,* L., belonging to quite another family. *T. minus* was introduced into English gardens in 1596, and, on account of the biting taste of the leaves, was at first called *Nasturtium indicum,* or Indian Cress.

Sepals equal at base; stigma entire; pod almost cylindrical, with convex valves which are with or without a midnerve; seeds ovoid, in 2 irregular rows; style short; cotyledons accumbent. Glabrous or almost glabrous herbs.

Leaf-lobes toothed; flowers yellow ..... *N. palustre* 1.
Leaf-segments undulate; flowers white ..... *N. officinale* 2.

1. **N. palustre** (Leyss.), DC. Biennial, with ascending furrowed stems; leaves with clasping bases, the lower ones lyrate, the upper pinnatifid, all with toothed lobes; sepals 1½ mm. long; petals yellow, about as long; pedicels spreading; pods spreading, oblong, 4-14 mm. long, 2 mm. broad, nerveless; seeds yellowish, punctulate.—*N. terrestre,* R. Br.
Swamps near River Murray and probably in other moist places in southern districts. Most of the year.—Eastern States: almost cosmopolitan.

* 2. **N. officinale,** R. Br. *Watercress.* Perennial, with biting taste; stem hollow, creeping and rooting at base; leaves pinnatisect, with oblong ovate or orbicular segments; petals white, twice as long as the sepals; pods and pedicels spreading, the pods slightly curved upwards, 10-15 mm. long, 2-2½ mm. broad, the valves with 1 inconspicuous nerve; seeds brown, honeycombed.
Along creeks in moist districts. Sept.-April.—Temperate parts of the globe.

FIG. 115.—**Nasturtium officinale.**

4. SISYMBRIUM (Tournef.), L.

(*Sisymbrion*, Greek name of some fragrant herb.)

Sepals equal at base; petals rather longer; stigma entire, sessile; pod subcylindrical the valves 3-nerved; seeds in 1 row, numerous, oblong, not compressed; cotyledons incumbent. Herbs, with petiolate leaves.

A. Pods short, appressed ..... *S. officinale* 1.

A. Pods long, spreading.
Pods 2½-5 cm. long ..... *S. erysimoides* 2.
Pods 6-10 cm. long ..... *S. orientale* 3.

* 1. **S. officinale,** L *Hedge Mustard.* Pubescent erect annual, with rigid spreading branches; lower leaves runcinate, the upper hastate; petals pale-yellow; pods subulate, almost sessile, 1-1½ cm. long, 2 mm. diam. at base, closely appressed against the axis of the raceme: seeds brown, obliquely truncate.

Roadsides and cultivated land. Sept.—Dec.—Temperate parts of the globe.

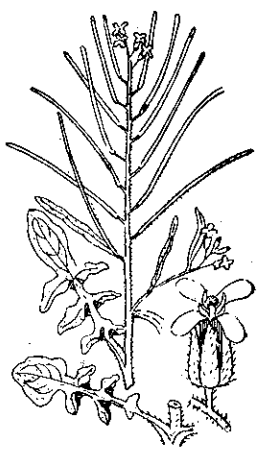

FIG. 116.—**Sisymbrium orientale.**

* 2. **S. erysimoides,** Desf Almost glabrous erect annual; leaves lyrate-runcinate, with acutely-toothed lobes; petals yellow; pods slender, spreading. 2½-5 cm. long, 1 mm. broad, on thick pedicels, 2-3 mm. long; seeds light-yellow.

Quorn to Hawker (Flinders Range); Port Augusta. Sept.-Nov.—Spain, North Africa, Arabia.

* 3. **S. orientale,** L. (1759). *Wild Mustard.* Erect grey-pubescent or almost villous annual or biennial; leaves runcinate, the middle ones with a long terminal hastate lobe, all the lobes with small spreading or erect auricles, the uppermost leaves lanceolate; petals pale-yellow; pods slender, rigid, curved, 6-10 cm. long, 1½ mm. diam., on thick pedicels 3-4 mm. long; seeds brown.—*S. Columnae,* Jacq. (1776.)

Throughout the State. Sept.-Dec.—Mediterranean region.

5. BLENNODIA, R. Br.

(Greek *blennôdês*, slimy: alluding to the fibrous mucus which exudes from the testa of the seeds of some species when soaked.)

Sepals equal at base or almost so; pod linear or fusiform, the valves convex, 1-nerved or the nerve almost obsolete; stigma entire or slightly notched; seeds few or many in each cell, in 2 irregular rows or almost in 1 row, in 1 species winged; cotyledons incumbent. Herbs or undershrubs with petiolate leaves.

A. Glabrous undershrubs; leaves filiform.
Leaves usually simple; pod almost fusiform..... *B. filifolia* 1.
Leaves 3-cleft; pod linear, slender ..... *B. trisecta* 2.

A. Annuals.
B. Glabrous plants; flowers yellow.
Leaves with linear segments ..... *B. nasturtioides* 3.
Leaves with ovate lobes ..... *B. procumbens* 4.
B. Plants with stellate or forked pubescence.
C. Pod fusiform, rather short; seeds few in each cell.
D. Petals yellow; slender annual; pod with short style ..... *B. curvipes* 5.
D. Petals white.
Pedicels much shorter than pod ..... *B. brevipes* 6.
Pedicels about as long as pod ..... *B. lasiocarpa* 7.
C. Pod linear; seeds numerous.
E. Pod short, slender, almost glabrous; flowers small, white ..... *B. cardaminoides* 8.
E. Pod long, stellate-hairy; flowers large, white or pink.
Style conspicuous; seeds ovoid, not winged.. *B. canescens* 9.
Style almost absent; seeds flattened, winged *B. pterosperma* 10.

1. **B. filifolia** (F. v. M.), Benth. Glabrous undershrub; leaves linear, compressed, solitary or clustered, 2-3 cm. long, simple or rarely divided into 2 or 3 linear segments; petals white, longer than calyx; fruiting pedicels spreading, 7-10 mm. long; pods terete-fusiform, 15-20 mm. long, 2 mm. diam., very shortly stipitate; valves 1-nerved; beak or style 1 mm. long; seeds brown, 1½ mm long almost without mucus.—*Sisymbrium filifolium*, F. v. M.

Hills east of Farrell's Flat; near Crystal Brook; near Leigh's Creek (Flinders Range); Arkaringa Creek. June-Oct.—Interior of New South Wales.

2. **B. trisecta** (F. v. M.), Benth. Glabrous undershrub; differs from the preceding in the leaves all divided into 3 linear segments, 2 of which are sometimes again forked; flowers white or yellowish; fruiting pedicels more erect, 6-10 mm. long; pods sessile above calyx, linear, 10-28 mm. long, 1-1½ mm. broad; stigma almost sessile; seeds smaller, almost without mucus.—*Sisymbrium trisectum*, F. v. M.

Murray lands to Flinders Range and Far North; westward to Nullarbor Plain. June-Nov.—Eastern States.

3. **B. nasturtioides** (F. v. M.), Benth. Glabrous annual; leaves pinnatisect, usually with 3 linear segments, rarely more or less; petals bright yellow, 3 mm. long, slightly exceeding the yellow sepals; fruiting pedicels spreading-erect, 7-10 mm. long; pods linear, 10-15 mm. long, about 1 mm. broad; valves 1-nerved; stigma sessile or almost so; seeds numerous, oblong, light-yellow, ¾ mm. long, exuding mucus.—*Sisymbrium nasturtioides*, F. v. M.

Murray lands northwards to Flinders Range and Far North. May-Nov.—Eastern States.

4. **B. procumbens** (Tate), comb. nov. Small glabrous, prostrate or ascending annual; leaves lyrate-pinnatifid, usually with 5 obtuse lobes or teeth; a few flowers rising from the radical rosette of leaves as well as those on the usual terminal racemes; petals yellow, shorter than sepals; fruiting pedicels 6-10 mm. long; pods spreading, linear, 10-13 mm. long, 1-1½ mm. broad, with 1-nerved valves and sessile stigma; seeds as in the preceding—*Sisymbrium procumbens*, Tate.

Claypans at Idyaka (east of Lake Torrens); Mount Lyndhurst (Flinders Range). Sept.

5. **B. curvipes**, F. v. M. Small stellate-pubescent annual; leaves mostly radical lanceolate with a few acute teeth, rarely lyrate; sepals 3-4 mm. long; petals 6 mm. long, yellow; fruiting pedicels curved, 10-18 mm. long; pods pubescent, fusiform-curved, 8-15 mm. long, 3 mm. diam. in the middle, with a short style; valves convex, with prominent midnerve; seeds about 6 in each cell, brown, 1 mm. long, mucous.—*Erysimum curvipes*, F. v. M.

From the Barunga Range to Flinders Range and Far North, westward to Tarcoola. June-Oct.—Eastern States.

B. Richardsii, F. v. M. (*Erysimum Richardsii*, F. v. M. *Sisymbrium Richardsii*, F. v. M.), was described by Mueller from flowering specimens collected in 1877 between Fowler's Bay and Eucla, but the specimen preserved in the Tate Herbarium appears to belong to the South Australian form of *Hutchinsia Drummondii*.

6. **B. brevipes**, F. v. M. Rigid stellate-pubescent annual; radical leaves lyrate, stem-leaves obovate-oblong, with a few coarse teeth; sepals 2 mm. long; petals rather longer, white; fruiting pedicels spreading-erect, stout, only 2-3 mm. long; pods fusiform, sometimes slightly curved, pubescent, 10-15 mm. long, 3 mm. diam. in middle, with a very short style, valves with a faint midnerve; seeds brown, ovoid, 1½ mm. long, usually 4-6 in each cell, mucous (Fig. 113, A-E.).—*Erysimum brevipes*. F. v. M.

From Ardrossan and Balaklava northwards to the Far North and North-East; Gawler Range. May-Sept.—Eastern States; West Australia.

7. **B. lasiocarpa**, F. v. M. Stellate-pubescent annual; radical leaves pinnatifid, the upper ones lanceolate or oblong, with a few acute distant teeth; sepals 3 mm. long; petals white, 6-8 mm. long; fruiting pedicels spreading, 5-10 mm. long; pods fusiform, curved, covered with spreading mostly simple hairs, 6-12 mm. long, 3 mm. diam. in middle, with a short slender style; valves convex, the midnerve inconspicuous; seeds ovoid, brown, 1½ mm. long, about 4-5 in each cell, mucous.—*Erysimum blennodioides*, F. v. M.

Yorke Peninsula; Murray lands to Far North. July-Oct.—Western districts of Victoria and New South Wales.

8. **B. cardaminoides**, F. v. M. Ascending annual; peduncles and pedicels stellate-pubescent; radical leaves runcinate-pinnatipartite, with several lateral oblong or triangular lobes, glabrous or hairy, the stem-leaves with narrower lobes, which sometimes bear 1 or 2 teeth; sepals 3-4 mm. long; petals white, 6-8 mm. long; fruiting pedicels

spreading, 5-14 mm. long; pods spreading, terete, 10-15 mm. long, 1½ mm. diam., glabrous or with a few scattered hairs.; valves convex and faintly 1-nerved; seeds like those of *B. nasturtioides.—Sisymbrium cardaminoides*, F. v. M.

From Yorke Peninsula and Murray lands to the Far North; South-East. June-Oct.—Eastern States.

9. **B. canescens,** R. Br. Stellate-pubescent annual; leaves mostly radical, oblong-lanceolate, pinnatifid with a few acute lobes or teeth, upper leaves narrower, sometimes entire; sepals 5-7 mm. long; petals 10-15 mm. long, white or pink, with long claws; fruiting pedicels spreading, 5-10 mm. long; pods linear, pubescent, 2½-4 cm. long, 2 mm. broad, the style obconical, 2-4 mm. long, nearly as broad as the pod, and bearing the broad stigma; valves 1-nerved; seeds numerous, almost in 1 row, ovoid, light-brown, 1½ mm. long, mucous.—*Erysimum Blennodia*, F. v. M.

Lake Torrens to the Far North; Gawler Range and westward to Tarcoola. Most of the year.—New South Wales; Central Australia.

10. **B. pterosperma,** J. M. Black. Stellate-pubescent annual; leaves less lobed or toothed than in the preceding, the upper ones often entire and linear-lanceolate; flowers as in the preceding; fruiting pedicels 5-8 mm. long, finally reflexed: pods linear-compressed, 3-6 cm. long, 2-2½ mm. broad, pubescent; stigma almost sessile; valves 1-nerved; seeds numerous, ovate-compressed, 1½-2 mm. long, surrounded by a narrow membranous wing, almost in 1 row, not exuding mucus.—*B. canescens*. R. Br. var. *pterosperma*, J. M. Black.

Northern part of Flinders Range to Lake Blanche. Aug.-Oct.—North-west corner of New South Wales.

6. GEOCOCCUS, J. Drumm.

(Greek *gê*, earth; *kokkos*, fruit: alluding to the pod.)

1. **G. pusillus,** J. Drumm. Usually stemless annual, leaves usually radical, 3-8 cm. long, with scattered stellate hairs, pinnatipartite with triangular lobes which become small and distant towards the base; flowers on short radical peduncles; sepals 1½ mm. long; petals white, ovate, half as long; fruiting peduncles 1-2 cm. long, recurved so as to bury the pods, which are oblong, 5-12 mm. long, 2-3 mm. broad, stellate-hairy, becoming glabrous; valves horny, with a prominent midnerve; stigma sessile; seeds 3-5 in each cell, somewhat 2-rowed, ovate-oblong, brown, 1½-2 mm. long; cotyledons incumbent.

Yorke Peninsula northwards to Flinders Range; probably Murray lands. An insignificant prostrate plant, which has probably been overlooked in many places. Aug.-Oct.—Dry parts of temperate Australia. Our specimens are stemless, with radical leaves, as in the original description, but specimens from near Hay, N.S.W., have stout radiating dichotomous stems, with flowers and leaves radical and also in the forks. Mueller considered *G. pusillus* to be a form of *Blennodia cardaminoides*, which it resembles only in the leaves.

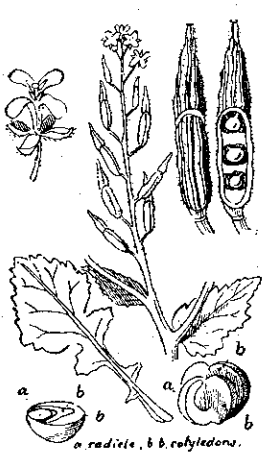

FIG. 117.—**Brassica Sinapistrum.**

7. BRASSICA (Tournef.) L.

(Latin name for the cabbage.)

Sepals equal at base: pod subcylindrical, terminating in a long conical beak, which is cylindrical or angular but not flattened; valves convex, 1- or 3-nerved: seeds in 1 row, globular or somewhat compressed; cotyledons conduplicate. A genus containing many important plants. *B. oleracea*, L. var *capitata*, DC. is the cabbage; var. *botrytis*, DC., the cauliflower, *B. rapa*, L., the rape; *B. napus*, L., the turnip; *B. nigra* (L.) Koch, black mustard.

Pods diverging from the axis,
3-nerved ..... *B. Sinapistrum* 1.
Pods pressed against the axis,
1-nerved ..... *B. adpressa* 2.

*1. **B. Sinapistrum,** Boiss. *Charlock.* Stout annual, with short scattered bristly hairs; leaves coarsely toothed, the lower ones lyrate, the upper sessile, ovate or lanceolate; flowers bright yellow; fruiting pedicels thick, much shorter than the pods; pods spreading-erect, 2-4 cm. long, 2-2½ mm. diam., one-third consisting of the beak, which usually contains 1 seed in its base; valves prominently 3-nerved; seeds 3-8 in each cell, reddish-brown.—*Sinapis arvensis*, L.

Cultivated land, but not common. Aug.-Dec.—Europe: Western Asia.

*2. **B. adpressa,** Boiss. Stout biennial, with spreading branches; leaves all petiolate, crenulate, hoary with stiff appressed hairs, the lower ones lyrate; flowers pale yellow; fruiting pedicels short and thick; pods closely appressed, 7-15 mm. long, including the thick beak, which occupies about one-third and is swollen towards summit; valves 1 nerved; seeds ovoid, brown, few in each cell and 1 in the middle of the beak.—*Sinapis incana*, L.

Roadsides and fields in settled districts. Sept.-Feb. Called "Buchan weed" in the South-East.—Mediterranean region; Channel Islands.

8. ERUCA, DC.

(Latin name of this plant.)

* 1. **E. sativa,** Lamk. *Rocket.* Erect annual, with a few scattered hairs near the base; leaves thick, lyrate-pinnatipartite, the lobes broad or narrow, irregularly toothed; 2 of the sepals pouched at base; petals large, yellow, with dark-brown or violet veins; fruiting pedicels erect, shorter than the pod, which is about 25 mm. long, nearly one half consisting of the broad flattened 2-edged seedless beak; valves convex, 1-nerved, nearly ⅓ as broad as long; seeds subglobular, in 2 rows; cotyledons conduplicate.

Usually in cultivated lands. Sept.-Dec.—Mediterranean region. Leaves used for salad.

9. DIPLOTAXIS, DC.

(Greek *diplos*, double; *taxis*, row: alluding to the arrangement of the seeds.)

Sepals equal at base; pod linear-compressed, with a very short beak; valves 1-nerved; seeds numerous, ovoid-compressed, light-yellow, in 2 rows; cotyledons conduplicate. Herbs, with leaves which smell unpleasantly when crushed.

Stems glabrous; perennial plant ..... *D. tenuifolia* 1.
Stems with bristly hairs; typical form annual ..... *D. muralis* 2.

* 1. **D. tenuifolia** (L.), DC. Glabrous perennial, with erect leafy stem; lower leaves pinnatifid, with linear lateral lobes, the upper ones narrow, entire or toothed; sepals spreading; petals yellow; fruiting pedicels spreading, usually about ½ as long as the pod, but sometimes nearly as long; pods 3-4 cm. long, 2-2½ mm. broad.—*Brassica tenuifolia*, Boiss.

Waste places, preferring sandy soil. Most of the year.—Europe; western Asia.

* 2. **D. muralis** (L.), DC. Annual, the stems hairy in the lower part; leaves chiefly radical, pinnatifid or sinuate-toothed; sepals erect; petals pale-yellow; fruiting pedicels usually about ½ as long as the pod, spreading; pods 2-4 cm. long.—*Brassica muralis*, Boiss.

Waste places. Most of the year.—Europe.

Var. *Babingtonii*, Syme. Biennial or perennial, larger, more leafy and resembling *D. tenuifolia*, but the stems are always more or less hairy and the style broader and shorter.

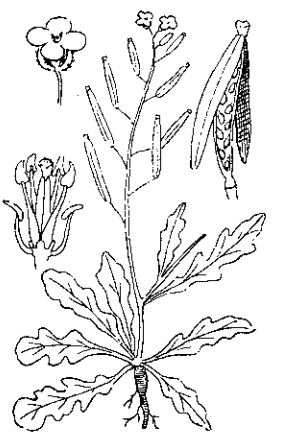

FIG. 118.—**Diplotaxis muralis.**

10. ALYSSUM (Tournef.), L

(*Alysson*, Greek name of some plant supposed to cure rabies; from *a*, not; *lyssa*, madness.)

Sepals equal at base; pod short, orbicular or ovate, compressed parallel to the broad septum, the valves finely nerved under the lens; seeds compressed, narrowly winged, 1-6 in each cell; cotyledons accumbent. Herbs with a whitish tomentum, narrow undivided leaves and long fruiting racemes.

Annual; pod 5-6 mm. long; style almost obsolete; seeds few in each cell ..... *A. linifolium* 1.
Perennial; pod 3 mm. long; style ½-1 mm. long; seed 1 in each cell ..... *A. maritimum* 2.

1. **A. linifolium,** Steph. Small erect wiry stellate-hoary annual, 4-15 cm. high; leaves oblanceolate, 5-25 mm. long; flowers white, small; filaments with 1 lateral tooth; pods ovate, 5-6 mm. long, with 4-6 seeds in each cell; valves almost flat.—*A. minimum*, Pallas (1776), non L. (1753), nec Willd. (1801).

Yorke Peninsula to Flinders Range and Far North; eastward to Broken Hill; Murray lands; Eyre Peninsula; Fowler's Bay. May-Oct.—Temperate Australia; Spain; eastern Mediterranean region.

* 2. **A. maritimum** (L.), Lamk. *Sweet Alyssum.* Small perennial, hoary with appressed forked hairs; stems woody at base, ascending; leaves narrow-lanceolate, 1-4 cm. long; flowers small, white, fragrant; filaments entire; pods orbicular or ovate, 3 mm. long; valves convex; seed 1 in each cell.—*A. minimum*, L. (1753); *Clypeola maritima*, L. (1753); *Koniga maritima* (L.), R. Br.

Robe, Millicent (South-East); an escape from gardens. Sept.-Dec. Mediterranean region.

11. MENKEA, Lehm.

(Named in 1843 after Dr. Carl Theodor Menke, of Pyrmont, Prussia.)

Sepals equal at base; pod short, subovoid, more or less compressed; valves more or less convex, 1-nerved, arranged as in *Alyssum*, but the septum is almost absent, being only represented by a narrow membranous border to the slender replum or hoop-like frame which separates the 2 valves; seeds numerous, minute, hanging in 2 rows from the replum; cotyledons incumbent. Small annuals.

A. Glabrous or almost glabrous plants; flowers white or violet.
  Pod ovate; stigma sessile ..... *M. australis* 1.
  Pod subglobular; stigma on a short style ..... *M. sphaerocarpa* 2.
A. Hairy plant; flowers yellow ..... *M. villosula* 3.

1. **M. australis,** Lehm. Small almost glabrous annual, with slender procumbent stems; leaves small, oblanceolate, the radical ones sometimes with a few teeth; sepals 2 mm. long; petals white, obovate-oblong, about the same length; fruiting pedicels spreading, rather distant, filiform, 5-8 mm. long; pod ovoid-oblong, 4-6 mm. long; stigma sessile.

Flinders Range to Far North, westward to Gawler Ranges. May-Sept.—Dry districts of temperate Australia.

2. **M. sphaerocarpa,** F. v. M. Small glabrous annual; stems ascending, less slender and more rigid than in the preceeding; leaves obovate-cuneate, often with a few blunt teeth, the radical ones petiolate; sepals often purplish, 2 mm. long; petals twice as long, white or violet, with an orbicular lamina; fruiting pedicels approximate, almost erect, 5-10 mm long; pods ovoid or almost globular, about 4 mm. long; style very short, about ½ mm. long.

Far North. June Aug.—Central Australia.

3. **M. villosula** (F. v. M. et Tate) J. M. Black. A very small annual, rough with simple spreading hairs; leaves oblanceolate mostly radical, sometimes with 1 or 2 blunt teeth near the summit; sepals 2 mm. long; petals yellow, obovate-oblong, twice as long; fruiting pedicels erect-spreading, about 6 mm. long; pod ovoid, hairy, about 3 mm. long; style short.—*Capsella villosula*, F. v. M. et Tate (1892). *Menkea hispidula*, J. M. Black (1915).

From Arkaringa Creek to Musgrave Ranges. May-Aug.

12. CARRICHTERA, Adans.

(Probably fanciful and without meaning, as are many of Adanson's names.)

*1. **C. annua** (L.), Prantl. Erect annual, beset with short bristly hairs; leaves bipinnatisect, with linear segments; sepals 4 mm. long; petals nearly twice as long, long-clawed, yellowish with purple nerves; pods in long bracteate racemes, on recurved pedicels 3 mm. long; pod subglobular, 4-5 mm. long; valves concave, each with 3 hairy nerves; style leafy, about as broad and long as the pod, the stigma sessile; seeds 4 in each cell; cotyledons conduplicate.—*C. Vellae*, DC.

Near Port Pirie. June July.—Spain; eastern Mediterranean region.

13. LEPIDIUM (Tournef.), L.

(Greek for a "small scale," from *lepis*; also the name of a plant used against scurvy.)

Sepals equal at base; petals short, sometimes absent; pod short, compressed laterally, usually ovate and notched at the summit; valves boatshaped, keeled or winged, compressed at right angles to the narrow septum: seed 1 in each cell, pendulous; cotyledons incumbent. Herbs or undershrubs, with flowers in corymbose racemes, which usually lengthen in fruit.

A. Leaves all entire; pod more or less winged; style longer or shorter than notch.
  B. Pod with 2 obtuse lobes at summit.
    Pod ovate; petals acute ..... *L. leptopetalum* 1.
    Pod suborbicular; petals obtuse ..... *L. rotundum* 2

B Pod with 2 acute lobes at summit; petals absent; stamens 4 ..... *L. monoplocoides* 3.
A. Leaves mostly toothed or lobed.
C. Pod subovate, notched or lobed at summit; style obsolete or very short.
D. Notch deep, formed by 2 obtuse lobes; pod winged; petals absent.
Notch narrow; hairs obtuse ..... *L. papillosum* 4.
Notch broad; hairs acute ..... *L. oxytrichum* 5.
D. Notch minute; pod wingless.
E. Pod 4-6 mm. long.
F. Plant glabrous; petals present; stamens 6 ... *L. foliosum* 6.
F. Plant more or less hairy; stamens 2.
Pod 4-6 mm. long, twice as long as pedicel.. *L. Muelleri-Ferdinandi* 7.
Pod 4 mm. long, equalling pedicel ..... *L. ambiguum* 8.
E. Pod 2-3½ mm. long; stamens 2.
G. Racemes becoming long and loose in fruit.
H. Branches without spines.
Leaves undivided, lanceolate, serrate..... *L. hyssopifolium* 9.
Lower leaves deeply divided ..... *L. pseudo-ruderale* 10.
H. Branchlets ending in spines ..... *L. dubium* 11.
G. Racemes remaining short and dense in fruit.... *L. fasciculatum* 12.
C Pod cordate, entire at summit; style prominent; stem-leaves toothed, auricled..... *L. Draba* 13.

1. **L. leptopetalum,** F. v. M. Glabrous undershrub: leaves narrow-linear, plano-convex, 1-3 cm. long; sepals 4-5 mm. long; petals rather longer, white, tapering to a point almost as in *Stenopetalum;* fruiting pedicels spreading, 6-9 mm. long; pod ovate, 6-8 mm. long, the wings extending half-way down the valves and forming at the summit a rather deep narrow notch, which is exceeded by the style; seed 3½ mm. long, wingless.
Murray lands and north thereof; near Lake Torrens. July-Nov.—Dry part of eastern States.

2. **L. rotundum** DC. Erect, apparently annual, almost glabrous or minutely papillose; leaves linear or narrowly oblanceolate, 1-3 cm. long; sepals 3 mm. long; petals white or pale violet, oblong above the short claw, rather longer; fruiting pedicels spreading, 3-5 mm. long; pod almost orbicular, winged almost or quite to the base, 6-8 mm. long, the notch deep, closed or open, *i.e.*, the 2 obtuse lobes parallel or more or less divergent: style shorter or longer than the notch; seed 2½ 3 mm. long, usually with a narrow wing.—*L. phlebopetalum,* F. v. M.: *L. eremaeum,* Domin.
Yorke Peninsula to Flinders Range and the Far North; westward to Everard Range and Nullarbor Plain; Murray lands. Most of the year.—Eastern States; Central and West Australia.
It has been usual to consider the pods with open notch as belonging to *L. phlebopetalum,* but both the closed and open notch may sometimes be found on the same plant, and the depth of the notch and length of style are also variable.

3. **L. monoplocoides,** F. v. M. Small erect minutely papillose annual; leaves narrow-linear, mostly 1½-3 cm. long; sepals 1 mm. long; petals absent; stamens only 4; fruiting pedicels spreading, 2-3 mm. long; pods orbicular acuminate, 5 mm. long, winged all round, swollen over the seeds, the 2 terminal lobes acute, connivent, at first connate with the style, but usually free at last, so that the narrow notch occupies ⅓ of the pod; style shorter than notch; seed 2 mm. long, narrowly winged.
Murray lands. Aug. Oct.—Dry districts of Victoria and New South Wales.

4. **L. papillosum,** F. v. M. Erect annual, the stem and branches covered with very short white blunt almost papillose hairs; radical leaves petiolate, pinnatifid with linear lobes, the upper ones toothed or lobed, sessile and stem-clasping, all glabrous or nearly so; sepals under 1 mm. long; petals none; stames 4; fruiting pedicels spreading, 2-3 mm. long; pods ovate, 4-6 mm. long, usually purple when ripe, winged only in upper half, glabrous, the margins of the 2 obtuse lobes parallel, so that the deep notch is narrow, with the sessile stigma at its base. (Fig. 113. G).
Murray lands and Northern Areas to Flinders Range; westward to Gawler Range. June-Aug.—Dry districts of Victoria and New South Wales.

5. **L. oxytrichum,** Sprague. Differs from the preceding in the hairy covering of the stems and branches, which consists of short spreading acute bristles; pods glabrous or bristly, the inner margins of the 2 lobes divergent, so that the deep notch widens upwards.—*L. papillosum,* Thell. non F. v. M.
Flinders Range; Far North; westward to Musgrave Range and Nullarbor Plain. July-Sept.—Near Broken Hill, New South Wales; Central and West Australia.

6. **L. foliosum,** Desv. Glabrous perennial; leaves thick, oblong-cuneate, 1½-4 cm. long, toothed or almost lobed in the upper part, broad and half-clasping at base; sepals and petals 1½ mm. long, the petals white, obovate; stamens 6; fruiting pedicels spreading, 4-6 mm. long; pods elliptic, about 4-5 mm long, wingless, with a very short notch about as long as the style.

Kangaroo Island; Southern Yorke Peninsula; Althorpe and Franklin Islands and probably on Eyre Peninsula; South-East. Summer.—Coasts of temperate Australia.

7. **L. Muelieri-Ferdinandi,** Thell. Erect annual, with the same short spreading hairs on the stem and branches as *L. papillosum*; leaves narrowly oblanceolate or pinnatisect, with a few linear segments, almost glabrous; sepals 1½ mm. long; petals minute or none; stamens 2; fruiting pedicels spreading-erect, 2-3 mm. long; pods elliptic, 4-6 mm. long, wingless, the notch shallow, with the sessile stigma at its base.

Northern part of Flinders Range to Far North. July-Oct.—Central Australia.

8. **L. ambiguum,** F. v. M. (1855). Somewhat scabrous perennial; upper leaves linear, entire or toothed at summit, sessile by a broad base; petals present; stamens 2; fruiting pedicels 4 mm. long; pod of same length, ovate-oblong, with a very short notch and subsessile stigma.

River Murray. No type remains in the Victorian National Herbarium. The Tate Herbarium contains 3 specimens from Blanchetown and Mannum answering this description, except that the plant is almost glabrous; the upper leaves (often linear-lanceolate) are either contracted towards the base and sessile or taper into a rather broad petiole; the pods are 3-4 mm. long. Thellung says *L. ambiguum* may be the same as his *L. Desvauxii* (1906), which is recorded from the eastern States and West Australia. One of our specimens shows a pinnatisect radical leaf.

9. **L. hyssopifolium** Desv. Erect annual or biennial, almost glabrous; lower leaves broadly lanceolate, serrate, the uppermost narrower, entire or acutely toothed near the summit, all petiolate; sepals ¾ mm. long; petals white, half as long, or wanting; stamens 2; racemes long, slender: fruiting pedicels spreading-erect, about 2½ mm. long; pods 2½-3 mm. long, ovate, with a minute notch at summit and sessile stigma.—*L. ruderale,* F. v. M. partly, not of L.

Southern districts to Flinders Range; Murray lands. Most of the year.—Eastern States.

10. **L. pseudo-ruderale,** Thell. Erect annual, more or less pubescent with very short scattered hairs; lowest leaves pinnatipartite, with obovate slightly toothed lobes, the stem leaves broadly oblanceolate in outline, with a few obtuse lobes or teeth near the summit, uppermost sometimes entire, all petiolate; sepals ¾ mm. long; petals none; stamens 2; fruiting pedicels spreading-erect, 3-4 mm. long; pods ovate, 2-2½ mm. long, wingless, slightly notched; stigma subsessile.—*L. ruderale,* F. v. M. partly, not of L.

Mount Parry Gap; Mount Lyndhurst (northern Flinders Range). June-Nov.—Western New South Wales; West Australia.

11. **L. dubium,** Thell. Erect annual, with minutely papillose stem and branches; upper leaves small, oblanceolate, toothed; branchlets ending in slender spines; racemes short; stamens 2; fruiting pedicels 3 mm long; pods ovate 2½ mm. long, with a minute notch.—*L. ruderale,* L. var *spinescens,* Benth.

Murray lands. Spring.—Western New South Wales; Victoria.

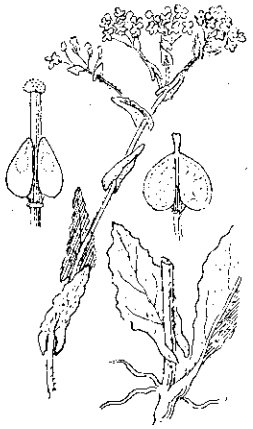

FIG. 119.—**Lepidium Draba.**

12. **L. fasciculatum,** Thell. Erect glabrous annual; radical leaves pinnatisect, with linear toothed segments; stem-leaves linear-lanceolate, sessile, entire or with 1 or 2 acute teeth; sepals 1 mm. long; petals white, ½ as long; stamens 2; fruiting racemes corymbose, so that the pods appear whorled or clustered in a head; fruiting pedicels erect, about 2 mm. long; pods obovate, contracted towards base, about 3½ mm. long, scarcely notched; stigma sessile.—*L. ruderale,* F. v. M. partly, not of L.

From Kadina northwards to Flinders Range; Murray lands and north thereof. May-Oct.—Western New South Wales.

*13. **L. Draba,** L. *Hoary Cress; White Weed.* Erect hoary perennial, with rigid stems; stem-leaves oblong-lanceolate or oblong-ovate, sinuate-toothed, clasping the stem with acute auricles; flowers numerous, in a corymbose panicle; sepals 2½ mm. long; petals pure white, twice as long; stamens 6; fruiting pedicels 8-15 mm. long; pods cordate, about 4 mm. long, neither winged nor notched, indehiscent; style prominent.

Roadsides and cultivation, in most parts of the State. Aug.-Dec.—Europe; western Asia.

14. CAPSELLA, Medicus.

(Latin for a little box: alluding to the fruit.)

Sepals equal at base; pod truncate-cuneate, compressed laterally, with a broad notch or sinus at summit; septum narrow; valves boatshaped, wingless, keeled; seeds 4-15 in each cell, exuding mucus; cotyledons incumbent.

Pod 4 mm. long, 2 mm. broad; racemes bracteate ..... *C. pilosula* 1.
Pod 6-7 mm. long and equally broad at summit; racemes without bracts ..... *C. Bursa-pastoris* 2.

1. **C. pilosula,** F. v. M. Small slender annual, the stems pubescent with stellate forked and simple hairs; leaves oblanceolate, entire or with a few blunt teeth; petals small, white; fruiting pedicels spreading, 1-2 mm. long, much shorter than the pod, each with a leafy bract at base; pod narrow-cuneate, with 2 rounded lobes at summit and a broad deep notch between them; stigma sessile; seeds 4-6 in each cell, ovate, light yellow, ½ mm. long.

Murray lands; Eyre Peninsula; Fowler's Bay. Aug.-Oct.—Victoria; New South Wales.

*2. **C. Bursa-pastoris** (L.) Moench. *Shepherd's Purse.* Taller annual, more or less pubescent all over (except the pods) with stellate and simple hairs; radical leaves pinnatipartite or oblong and entire; upper leaves lanceolate, auriculate-clasping, petals white, exceeding the sepals; fruiting pedicels spreading, 8-10 mm. long, longer than the pods, which are triangular, with a broad shallow notch; style very short; seeds 10-15 in each cell, oblong, orange, ¾ mm. long.

Roadsides and waste places. Aug.-Oct.—Throughout the globe, the tropics excepted.

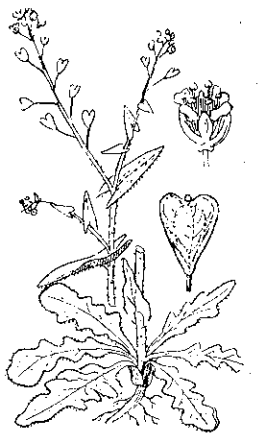

FIG. 120.—**Capsella Bursa-pastoris.**

15. HUTCHINSIA, R. Br.

(After Miss Hutchins, of Belfast, who contributed submarine plants for the English Botany of Sir James Smith, published 1790-1814.)

Sepals equal at base; pod ovate or oblong, compressed laterally, rounded or acute at summit, wingless or with a narrow wing; septum narrow; seeds 2-12 in each cell, exuding mucus; cotyledons incumbent, accumbent, or obliquely placed towards the radicle, so that they cannot be definitely classed as incumbent or accumbent, but often occupy an intermediate position. Annuals, with branched hairs or rarely glabrous; leaves petiolate.

Some of our species approach the European and American *Thlaspi*, but have not the strictly accumbent cotyledons nor the auricled and clasping stem-leaves of that genus and the hairs, when present, are forked, not simple. The tops of the valves in the species 2, 3, 4 and 5, here included, are adnate to the style or to its lower portion, and only when the ripe valves begin to separate from the style and septum is there the appearance of a very short notch. They only differ from the hitherto accepted *Hutchinsias* by having the pod more or less winged at summit.

A. Glabrous very slender little plant; pedicels longer than pods ..... *H. procumbens* 1.
A. Pubescent stouter plants; pedicels about as long as pods.
  B. Pod winged and notched at summit; cotyledons accumbent ..... *H. cochlearina* 2.
  B. Pod scarcely winged or notched at summit.
    C. Petals yellow, conspicuous; erect plants.
      Pod contracted at summit; hairs appressed; cotyledons incumbent ..... *H. ochrantha* 3.
      Pod almost truncate at summit; hairs spreading; cotyledons accumbent ..... *H. Drummondii* 4.
    C. Petals white, small; procumbent plant; cotyledons incumbent ..... *H. eremaea* 5.

1. **H. procumbens** (L.) Desv. Small slender glabrous annual; leaves pinnatifid or pinnatipartite with a few lobes, or entire; petals white, scarcely 1 mm. long, equalling the sepals; fruiting pedicels spreading, filiform, 3-7 mm. long; pods ovate-oblong, 2-4 mm. long, stigma sessile; seeds 6-12 in each cell, ovate, light-yellow, ½ mm. long;

cotyledons incumbent.—*Lepidium procumbens*, L. (1753); *Capsella procumbens*, Fries (1823); *C. elliptica*, C. A. Mey. (1831).

Almost all coastal districts. May-Jan.—Temperate Australia and other temperate parts of the globe.

2. **H. cochlearina** (F. v. M.), comb. nov. Erect annual, pubescent with forked (centrally attached) appressed hairs; leaves lanceolate or oblanceolate, almost entire or with a few coarse teeth or lobes; sepals 3-4 mm. long; petals white, twice as long, with a claw and suborbicular lamina; pod ovate or oblong, pubescent, 8-12 mm. long, rounded and winged at summit, notched when ripe, with the slender style surpassing the notch by 2 mm.; fruiting pedicels spreading-erect, 10-15 mm. long; seeds 2-4 in each cell, ovate or orbicular, 1½-2 mm. long; cotyledons accumbent or almost so (Fig. 113, H-J.).—*Thlaspi cochlearinum*, F. v. M.; *Capsella cochlearina*, F. v. M.

Between Broughton and Rocky Rivers; Hawker to Murnpeowie (Flinders Range). June-Nov.—Western New South Wales.

3. **H. ochrantha** (F. v. M.), comb. nov. Erect annual, pubescent with forked appressed hairs; leaves lanceolate or oblong, with a few distant teeth or lobes; sepals 3 mm. long; petals apparently yellow, twice as long or rather more, with an orbicular lamina; fruiting pedicels spreading-erect, 9-12 mm. long; pods 10-12 mm. long, ovate-oblong, contracted and slightly notched at summit, pubescent; style shortly exserted; seeds 3-6 in each cell, brown, ovoid. 2½ mm. long; cotyledons completely or somewhat obliquely incumbent.—*Thlaspi ochranthum*, F. v. M.; *Capsella ochrantha*, F. v. M.

Northern part of Flinders Range; Far North. May-Sept.—Western New South Wales.

4. **H. Drummondii** (Benth), comb. nov. Erect annual, pubescent with forked spreading hairs; leaves oblong-lanceolate, with a few distant teeth; sepals 2-3 mm. long; petals about twice as long, with orbicular laminas, apparently yellow; fruiting pedicels spreading-erect, 5-9 mm. long; pods ovate-oblong, 7-10 mm. long, pubescent, obtuse and slightly notched at summit, but not winged; style exceeding the pod by about 1 mm.; seeds 2-4 in each cell, brown, ovate, nearly 2 mm. long; cotyledons accumbent or almost so. *Thlaspi Drummondii*, Benth; *Capsella Drummondii* F. v. M.

From Fowler's Bay westward along the Great Bight. Aug.-Sept.—Differs from the West Australian type in the clothing, which in the latter consists of spreading stellate hairs, with very few forked ones; also in pedicels rather longer than those of the type. Our specimens have not yet ripened their seeds, but those of the West Australian plant have accumbent cotyledons.

5. **H. eremaea**, J. M. Black. Procumbent annual, pubescent with forked appressed hairs; radical leaves lyrate-pinnatifid, with a few obtuse lobes, upper ones oblanceolate, with a few distant teeth; sepals 2 mm. long; petals rather longer, apparently white, with an orbicular lamina; fruiting pedicels spreading-erect, 5-8 mm. long; pods ovate or ovate-oblong, 6-8 mm. long, more or less pubescent, very slightly winged and notched at summit; style shortly or scarcely at all exserted; seeds ovoid, brown, 2 mm. long, 3-6 in each cell; cotyledons incumbent.

Murray lands; Nullarbor Plain. June-Sept.—Grey Range, N.S.W.

H. humistrata, comb. nov. (Capsella humistrata, F. v. M.), a procumbent glabrous annual, the pod almost orbicular, acuminate, or obtuse, with a very short style, reticulate, 3-4 mm. diam., with a pedicel of the same length or rather longer, 3-4 seeds in each cell, cotyledons incumbent, and minute yellow petals, belongs to western New South Wales, but has not yet been found in South Australia.

16. STENOPETALUM, R. Br.

(Greek *stenos*, narrow; *petalon*, leaf, petal.)

Differs from *Blennodia* in the usually shorter pods, with the seeds always in 2 rows; sepals cohering about the middle; petals tapering to a long point and usually twisted after flowering; stigma sessile or almost so. The cotyledons, as in *Blennodia*, are incumbent.

A. Petals undivided.

B. Pods on erect pedicels, 2 to 5 times as long as broad.

Pedicels as long as pod ..... *S. velutinum* 1.

Pedicels shorter than pod ..... *S. lineare* 2.

B. Pods on spreading or recurved pedicels, short, globular or ovoid.

Hairy plant; fruiting pedicels 10-15 mm. long . *S. nutans* 3.

Glabrous plant; fruiting pedicels 3-6 mm. long *S. sphaerocarpum* 4.

A. Petals divided into 3 segments; pod ovoid ..... *S. trisectum* 5.

1. **S. velutinum,** F. v. M. Erect annual, covered with a whitish stellate tomentum, which often wears off in age; lower leaves broad-linear, the upper ones narrow-linear; sepals about 4 mm. long; petals yellowish, 3 times as long as the calyx; fruiting pedicels erect, as long as or rather longer than the pod, which is oblong-ovoid, glabrous, about 6 mm. long and 2½ mm. diam.; valves very convex, almost nerveless; seeds 5-7 in each cell, ovate, 2 mm. long.

Near Cooper's Creek; Ooldea; probably also near the Murray. Most of the year.—Central Australia; New South Wales; Queensland.

2. **S. lineare,** R. Br. Slender erect glabrous annual; leaves linear or lanceolate, the lower ones often pinnatipartite, with few linear segments; sepals 3 mm. long; petals whitish or pink, about twice as long; fruiting pedicels erect, 1-2 mm. long; pods cylindrical-ovoid, 4-6 mm. long, 2-3 mm. diam.; valves boatshaped, with a faint midnerve; seeds 8-12 in each cell, ovoid, 1 mm. long.

Almost all over the State, although not common. July-Sept.—Temperate Australia. A specimen in the Tate herbarium, from near Fowler's Bay, with lyrate-pinnatifid lower leaves, the large terminal lobe ovate-oblong, may be an undescribed species. It is only in flower.

Var. *canescens,* Benth. Stellately pubescent, especially towards the base; pod glabrous, ovoid.—Murray lands; Far North.

3. **S. nutans,** F. v. M. Erect annual, hoary with appressed forked hairs; leaves linear-lanceolate, 2-5 cm. long, sometimes remotely toothed; sepals 4-5 mm. long; petals yellow, 3 times as long; fruiting pedicels horizontal or reflexed, 10-15 mm. long; pod obovoid, glabrous, about 8 mm. long; valves 1-nerved; seeds 5-6 in each cell, compressed, orbicular, 2 mm. diam., with a narrow scarious wing.

Near Cooper's Creek; Musgrave Range. July-Sept.—Central Australia; New South Wales; Queensland.

4. **S. sphaerocarpum,** F. v. M. Slender glabrous annual; leaves small, fleshy, linear, plano-convex, entire or narrowly 3-cleft; sepals 2 mm. long; petals twice as long, white, dilated into an orbicular lamina between the claw and the long linear part; fruiting pedicels recurved, 3-6 mm. long; pod almost globular, 3-4 mm. long; valves nerveless; seeds 5-6 in each cell, ovoid, light-brown, 1½ mm. long.

Southern districts to Flinders Range; Eyre Peninsula. July-Sept.—Dry parts of Victoria, New South Wales, and West Australia.

5. **S. trisectum,** Tate. Small glabrous annual; leaves linear, entire, or pinnatisect with a few linear segments; sepals 5 mm. long, on pedicels shorter than they; petals yellow, 3-cleft in upper half, more than twice as long as calyx; pod ovoid, not ripe. (Fig. 113, F.)

Only known by the specimen collected at Cooper's Creek in July, 1884, and preserved in the National Herbarium of Victoria.

17. CORONOPUS (Rupp.), Gaertn. (1791).

(Greco-latin name of some cress-like plant; from Greek *korónê,* crow; *pous,* foot.)

Pod compressed laterally, reniform or 2-lobed, broader than long, wrinkled, with 2 1-seeded indehiscent cells; cotyledons incumbent. Prostrate annuals; flowers white, small in short leaf-opposed racemes.—*Senebiera,* DC. (1798.)

Fruiting raceme longer than leaf; pod bilobed ..... *C. didymus* 1.
Fruiting raceme shorter than leaf; pod reniform, rounded at summit *C. verrucarius* 2.

* 1. **C. didymus** (L.), Sm. Ill-smelling, with villous stems; leaves pinnatisect, with narrow entire or incised segments; petals shorter than sepals, sometimes absent; fruiting raceme longer than the leaf, with pedicels longer than the pods, which are 2 mm. broad, notched at summit and base, separating at maturity into 2 ovoid nutlets.—*Senebiera didyma* (L.), Pers.; *S. pinnatifida,* DC.

Waste places. Sept.-Jan.—Temperate South America; naturalised in Europe.

* 2. **C. verrucarius** (Gars.), Muschler et Thellung. Glabrous, light-green; leaves resembling those of the preceding; petals longer than the persistant sepals; fruiting raceme shorter than leaf; pedicels not longer than pod, which is 4 mm. broad, reniform, notched at base and rounded at summit, deeply wrinkled, usually not separating into nutlets.—*C. procumbens,* Gilib.

FIG. 121.—**Coronopus didymus.**

(1782); *C. Ruellii*. All. (1785); *Lepidium squamatum*, Forsk. (1775); *Senebiera Coronopus*, Poir; *Nasturtium verrucarium*, Garsault (1764-7).

Hitherto only found in the South-East. Oct.-Feb.—Temperate parts of the globe.

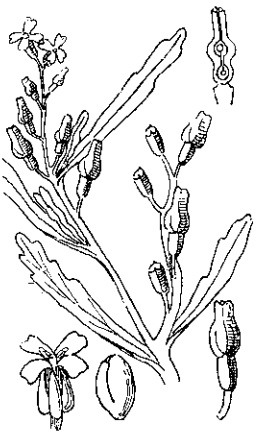

FIG. 122.—**Cakile maritima.**

18. CAKILE (Tournef.), Gaertn.

(From *qâqulleh*, the Arabic name of the plant.)

* 1. **C. maritima,** Scop. *Sea Rocket.* Glabrous procumbent annual; leaves fleshy, oblanceolate, with a few distant blunt teeth; sepals 4 mm. long, the outer 2 pouched at base; petals pink, about twice as long; fruiting pedicels thick, shorter than the pod, which is about 15 mm. long, hardened, consisting of 2 indehiscent articles, the upper one swollen in the lower portion, 3-nerved on each face, caducous, with 1 erect seed, the lower article oblong, persistant, with or without 1 pendulous seed; cotyledons accumbent.

This is var. *edentula*. Jord., sometimes considered a separate species (*C. edentula*, Hook.), and is the form commonly found on our coasts. Of the other form (var. *pinnatifida*, Paoletti), with pinnatipartite leaves and the lower article with 2 short spreading horns, I have only seen 1 specimen from Kybybolite.

Seacoasts from South-East to Adelaide; also Kangaroo Island. Oct.-April.—Europe; Western Asia; America.

19. RAPISTRUM (Tournef.), Medicus.

(Latin name of some plant of this family; from *rapum* or *rapa*, turnip.)

* 1. **R. rugosum,** All. *Wild Turnip, Turnip-weed.* Erect branching annual, often over 1 m. high, more or less beset with short stiff hairs; lower leaves large, lyrate, the upper ones usually sessile, lanceolate, toothed; sepals 5 mm. long, the 2 outer ones pouched at base; petals pale-yellow, twice as long; fruiting racemes long, the pedicels almost erect, shorter than the pods, which are 6-7 mm. long (without the beak), consisting of 2 small hard indehiscent articles, the upper globular, wrinkled, with 1 erect seed, the lower article cylindrical, with or without 1 pendulous seed; style forming a conspicuous beak; cotyledons conduplicate.

A bad weed, chiefly in wheat-fields, especially north of Adelaide; also roadsides. Oct.-Dec.—Central and Southern Europe.

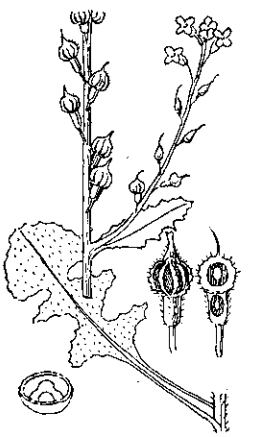

FIG. 123.—**Rapistrum rugosum.**

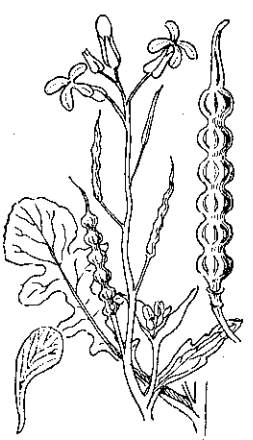

FIG. 124.
Raphanus Raphanistrum.

20. RAPHANUS (Tournef.), L.

(Latin for the radish; from Greek *rhaphanos*.)

* 1. **R. Raphanistrum,** L. *Wild Radish, White Charlock.* Almost glabrous annual or biennial, with a tough slender taproot; lower leaves lyrate, the uppermost narrow and often entire; sepals about 10 mm. long, the outer 2 pouched at base; petals twice as long, white, or pale-yellow, with violet veins; fruiting pedicels spreading-erect, about 1½ cm. long; pods 2-5 cm. long, 3-9 seeded, cylindrical, long-beaked, more or less moniliform, indehiscent, but breaking transversely when ripe into bony furrowed 1-seeded subglobular articles; seeds globular; cotyledons conduplicate.

In cultivated land, but not common. Oct.-Dec.—Most temperate countries. The Radish (*R. sativus*, L.) is perhaps derived from this species by long cultivation.

Family 54.—**RESEDACEAE.**

1. RESEDA, L.

(Latin name for some species of this genus.)

Flowers irregular, bisexual, small, bracteolate, in long terminal spikelike racemes; sepals 4-5; petals as many, unequal, the larger ones with a scale-like claw and a 3-5-cleft limb; stamens about 10-20, inserted with the ovary on a fleshy excentric disk (a short gynophore); ovary superior, of 3-6 more or less united carpels, 1-celled, open at summit, with 3-4 very short styles and as many parietal placentas; fruit a capsule with 3-4 teeth round the open summit; seeds numerous, reniform, without albumen; embryo curved. Herbs with alternate leaves.

The scented mignonette grown in gardens is *R. odorata*, L., a native of North Africa.

Leaves simple, entire; sepals and petals 4 ..... *R. luteola* 1.
Leaves divided: sepals and petals 5 ..... *R. alba* 2.

* 1. **R. luteola,** L. *Weld.* Glabrous erect biennial; leaves oblong-lanceolate, the lower ones undulate; sepals 4, oblong, obtuse; petals 4, rather longer, yellowish-green, the uppermost 3-5-cleft, the others entire or bifid: stamens 10-20; capsule subglobular, 3-4 mm. long, with 3 acuminate teeth; seeds smooth, shining.

South-East. Summer.—Europe; western Asia. Formerly cultivated to produce a yellow dye.

* 2. **R. alba,** L. *White Mignonette.* Glabrous biennial; leaves pinnatisect, with decurrent lanceolate segments; sepals 5, lanceolate; petals longer, white, 5, 3-toothed; stamens usually about 10; capsule ovoid, erect, about 10 mm. long, usually with 4 short teeth.

Robe, Beachport, South-East. Summer.—A coastal Mediterranean plant.

Family 55.—**DROSERACEAE.**

1. DROSERA, L.

(Name formed by Linnaeus, from Greek *droseros*, dewy: alluding to the glandular hairs.)

Flowers bisexual, regular; sepals and petals usually 5, rarely 4, imbricate; stamens as many; ovary superior, 1-celled, with 2-5 parietal placentas and styles; capsule opening between the placentas in as many valves as there are placentas; seeds numerous, minute, with a reticulate testa and small embryo at the base of the albumen. Perennial rarely annual herbs, usually growing in moist places; leaves simple, petiolate, the upper surface of the blade covered with glandular hairs which close over and digest any small animal alighting upon them. *Sundew.*

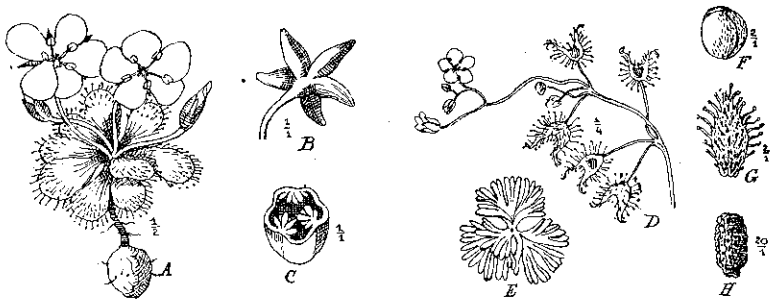

Fig. 125.—**Drosera.** A-C, *D. Whittakeri.* A, flowering plant. B, calyx. C, transverse section of ovary. E-F, *D. auriculata.* D, flowering branch. E, styles (much enlarged). F, capsule. G-H, *D. peltata.* G, sepal. H, seed.

A. Leaves all radical.
  B. Leaves of 2 linear segments on long petioles; stipules present; root fibrous ..... *D. binata* 1.
  B. Leaves undivided, more or less ovate.
    C. Stipules absent.
      Root fibrous; flowers small, red, racemose .... *D. glanduligera* 2.
      Root bulbous; flowers white, large, solitary ... *D. Whittakeri* 3.
    C. Stipules present; root fibrous; scape capillary, 1-flowered ..... *D. pygmaea* 4.

A. Leaves along the stem, sometimes also radical; stipules absent; stems slender, weak.
  D. Leaves linear, long; root fibrous ..... *D. indica* 5.
  D. Leaves suborbicular, peltate; root bulbous.
    E. Leaves orbicular; sepals hairy; stem trailing ..... *D. Planchonii* 6.
    E. Leaves lunate; stem usually erect
      Sepals glabrous ..... *D. auriculata* 7.
      Sepals hairy ..... *D. peltata* 8.

1. **D. binata,** Labill. Leaves few, radical, on long petioles, the lamina divided into 2 linear glandular-hairy segments, 2-8 cm. long; scape usually about 30 cm. high, bearing 2-3 terminal racemes; sepals glabrous, 6-7 mm. long; petals white, twice as long; styles usually 3, much branched.
Southern districts; South-East. Chiefly in summer.—Eastern States.

2. **D. glanduligera,** Lehm. Dwarf; leaves in a radical rosette, the lamina almost orbicular; scape pubescent, 1-6 cm. high, including the raceme with 2-several pedicels recurved in fruit; sepals about 3 mm. long, hairy; petals pink or red, rather longer; styles 3, once or twice forked.
Southern districts; Eyre Peninsula; South-East. Aug.-Oct.—Temperate Australia.

3. **D. Whittakeri,** Planch. Rootstock bulbous; leaves spathulate, in a radical rosette; scapes slender, glabrous, 1-flowered, 2-4 cm. long, not much exceeding the leaves; sepals glabrous, acute, 6-10 mm. long; petals white, 12-15 mm. long; styles 3, cut into very numerous segments. (Fig. 125, A-C.)
Southern districts; South-East. July-Sept.—Victoria.

Var. *praefolia* (Tepper) comb. nov. Flowers appearing before the leaves from April to May.—*D. praefolia*, Tepper.—Mt. Lofty Range.

4. **D. pygmaea,** DC. Dwarf, the glabrous capillary 1-flowered scapes only 1-2 cm. long; leaves very small, orbicular; sepals 4, glabrous, about 2 mm. long; petals white, rather longer; styles 4, undivided.
Southern districts; Eyre Peninsula; South-East. Sept.-Nov.—Eastern States; New Zealand.

5. **D. indica,** L. Leaves alternate along the weak trailing stem, linear, 4-10 cm. long or more; racemes few-flowered, more or less glandular-hairy; pedicels spreading, rather long; sepals lanceolate, 3-4 mm. long; petals white or pink, nearly twice as long; styles 3, bipartite.
Banks of River Stevenson (Far North). Winter and spring.—All States except Tasmania; tropical Asia and Africa.

6. **D. Planchonii,** Hook. f. Stems weak, slender, trailing or twining, glandular-hairy in the upper part; rootstock bulbous at base; leaves peltate, orbicular, cup-shaped, in 2's or 3's, on rather long filiform petioles, the lowest reduced to short scales; racemes terminal, few-flowered; sepals brown, 6-8 mm. long, villous, fringed, and ciliate; petals longer, white or pale pink; styles 3, dichotomously branched several times; seeds 2-3 mm. long, black, dumbbell-shaped owing to the testa dilated at both ends.—*D. Menziesii*, R.Br. var. *albiflora*, Benth.
Southern districts to Flinders Range; Murray lands, Eyre Peninsula; South-East. Aug. Dec.—Eastern States.

7. **D. auriculata,** Backh. Resembles the preceding, but the stems are quite glabrous and usually erect; leaves lunate at base, the 2 angles being produced into glandular-ciliate appendages, the lowest leaves reduced to linear scales or forming a small rosette; sepals glabrous, acute, 4-6 mm. long; petals longer, white or pink; styles 3, fanshaped, with many clavate segments. (Fig 125, E-F.)
Southern districts to Flinders Range; South-East. Sept.-Dec.—Eastern States.

8. **D. peltata,** Sm. Near the 2 preceding; radical leaves in a rosette, the stem and stem-leaves as in *D auriculata*; bulb red; sepals dark, villous, ciliate-toothed at summit, about 5 mm. long; petals white or pink; styles 3, dichotomously branched; seed smaller than in the 2 preceding, under ½ mm. long, oblong, black, with a minute extension of the testa at only one end. (Fig. 125, G-H.)
Southern districts to Flinders Range; Eyre Peninsula; South-East. Sept.-Dec.—Eastern States.

Family 56.—CRASSULACEAE.

1. CRASSULA, L.

(Feminine diminutive of Latin *crassus*, thick: alluding to the fleshy leaves and branches.)

Flowers bisexual, regular; sepals, petals, stamens, and carpels 4-5; carpels superior, with few to several ovules, and each with a small flat scale at the base of its anterior face; ripe carpels (follicles) opening along the inner (ventral) suture; seeds small, with very scanty albumen and straight embryo. Small herbs, often turning red, with opposite succulent exstipulate leaves. All the Australian species belong to the section *Tillaea*.

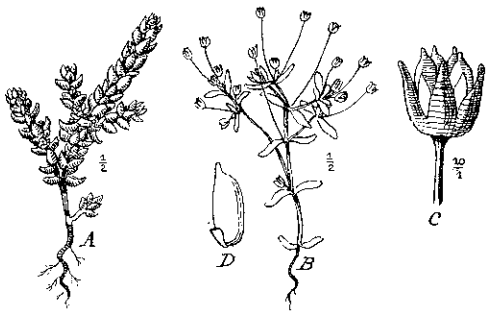

Fig. 126.—**Crassula.** A, *C. colorata*. B-D, *C. pedicellosa* B, plant. C, flower in fruit. D, ripe carpel and scale.

A. Flower-parts 5; flowers spicate; seeds 2 in each carpel.. *C. colorata* 1.
A. Flower-parts 4; seeds several in each carpel.
B. Flowers subspicate ..... *C. Sieberiana* 2.
B. Flowers solitary in the axils.
Pedicels longer than leaves ..... *C. bonariensis* 3.
Pedicels shorter than leaves ..... *C. recurva* 4.
B. Flowers paniculate ..... *C. macrantha* 5.
B. Flowers subumbellate ..... *C. pedicellosa* 6.

1. **C. colorata** (Nees), Ostenf. Erect succulent annual, 1½-10 cm. high; leaves plano-convex, subacute, 2-3 mm. long; flowers sessile or nearly so, in dense axillary clusters, the whole forming a dense or interrupted spike; sepals 5, ovate-acuminate, striate, 1½ mm. long; petals 5, about the same length, lanceolate-acuminate, pink-tipped; ripe carpels 5, longer, usually tuberculate in lower half, with a conspicuous beak, 2-seeded; hypogynous scale linear. (Plate 23 (3) and Fig. 126, A.)—*Tillaea colorata*, Nees (1844); *T. verticillaris*, Benth. partly (1864); *T. acuminata*, Reader (1898).

Most parts of the State. Summer.—Victoria, West Australia.

C. exserta (Reader), Ostenf., was collected in the county of Lowan, Victoria, alongside our border, and will probably be found in our Tatiara country. In character it is close to *C. colorata*, but the 5 carpels are truncate and do not taper into the very short beak. The carpels themselves, and not merely their beaks, surpass the acuminate sepals and petals, and are finally spreading or almost stellate in appearance. They are 2-seeded and tuberculate towards base.

2. **C. Sieberiana** (Schultes), Ostenf. Like the preceding, but frequently 1 flower in the cluster is raised on a rather long pedicel, and the spike is usually looser; sepals 4, nearly 2 mm. long and nearly twice as long as the acute petals; carpels 4, obtuse with a very short beak and about as long as the petals, 2-seeded. (Plate 23 (3)).—*Tillaea Sieberiana*, Schultes (1827): *T. verticillaris*, DC. (1828).

Most parts of the State. Summer.—Eastern States; South America.

3. **C. bonariensis** (DC.), Cambess. Stems weak, ascending, 2-3 cm. long; leaves plano-convex, 2-3 mm. long; flowers on filiform solitary pedicels, which are at first short, but lengthen in fruit to 6-15 mm.; sepals 4, united in lower half, 1 mm. long; petals rather longer; carpels 4, shorter than petals, obtuse, when open truncate and slightly notched, each containing about 10-12 seeds.—*Bulliarda bonariensis*, DC. (1801); *Tillaea purpurata*, Hook. f. (1847).

Moist places as far north as the Flinders Range, but doubtless often overlooked on account of its small size. Summer.—Temperate Australia; New Zealand; temperate South America.

4. **C. recurva** (Hook. f.), Ostenf. Stems weak, usually growing in mud or water, rooting at nodes, and sometimes extending to 30 cm.; leaves plano-convex, 4-12 mm long; flowers solitary in the axils on pedicels rather shorter than the leaf; sepals 4, green

united below the middle, nearly 2 mm. long, acute ; petals rather longer, white ; carpels 4, shorter than petals, tapering or almost truncate, ending in short recurved beaks ; hypogynous scale obovate-oblong ; seeds 4-6.—*Tillaea recurva*, Hook. f.

Southern districts ; South-East ; always in moist spots. Summer.—Temperate Australia.

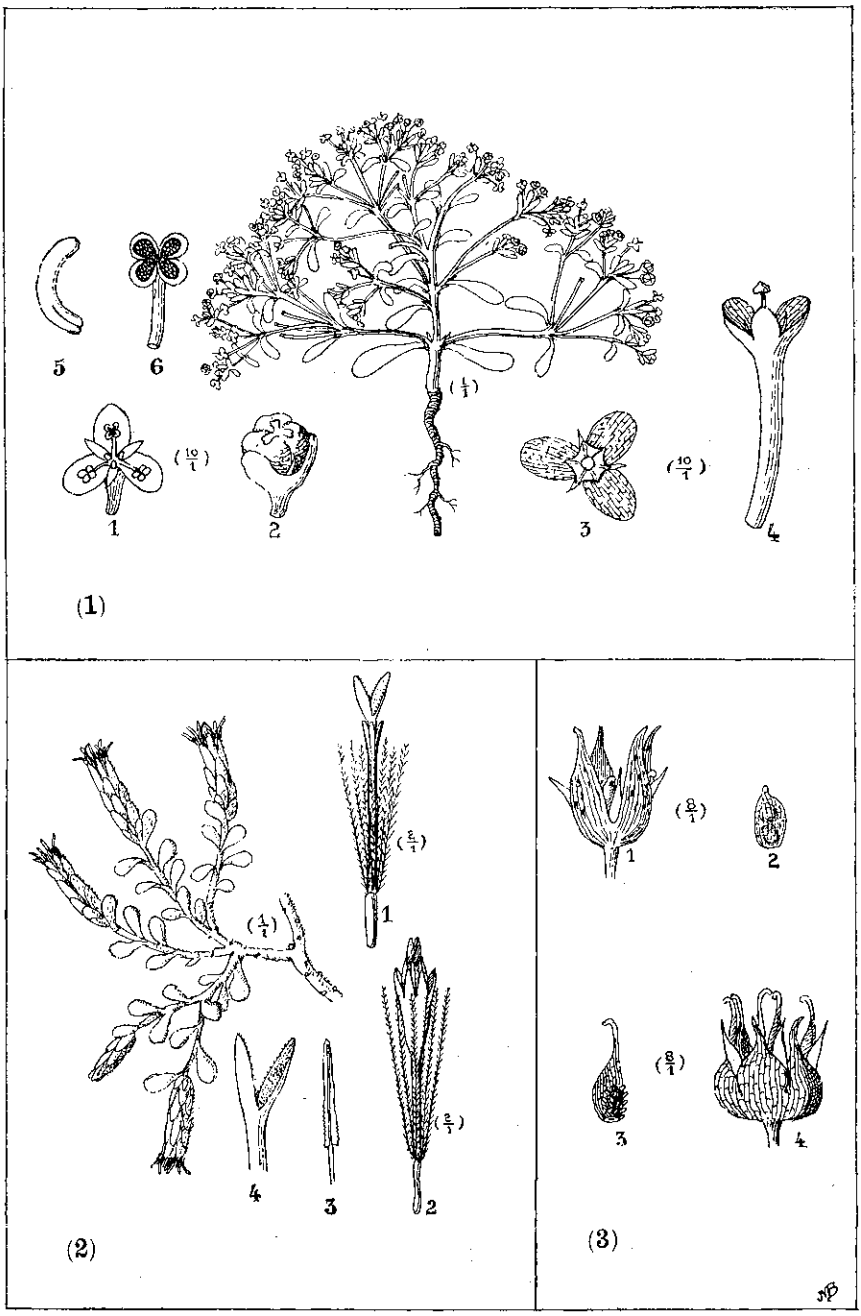

PLATE 23.—(1) **Poranthera triandra ;** (2) **Cratystylis conocephala ;** (3) **Crassula :** 1-2, **C. Sieberiana ;** 3-4, **C. colorata.**

5. **C. macrantha,** (Hook. f.), Diels et Pritzel. Stem branching dichotomously, 2-6 cm. long, suberect or prostrate; leaves subterete, 3-5 mm. long; flowers in cymes forming a broad corymbose panicle, which occupies the greater part of the plant, the pedicels in the forks 10-15 mm. long; sepals 4, green, fleshy, usually ciliate at tip, 2-3 mm. long; petals about same length, pink, lanceolate; carpels 4, about as long, oblong-ovoid, each with a short beak and a crimson spathulate scale at base; seeds 6-12 in each carpel.—*Tillaea macrantha*, Hook. f.

Southern districts to Flinders Range; South-East. Sept.-Dec.—Temperate Australia.

6. **C. pedicellosa** (F. v. M.), Ostenf. Near the preceding, but the plant smaller and more erect, the flowers occupying the upper part and arranged in umbel-like cymes, some on very short pedicels and others on pedicels 5-15 mm. long; sepals acuminate, longer than the petals; carpels equalling or slightly exceeding the sepals. (Fig. 126, B-D.).—*Tillaea macrantha*, Hook. f. var. *pedicellosa*, F. v. M.; *T. pedicellosa*, F. v. M.

Southern districts; Eyre Peninsula. Sept.-Dec.—Victoria; West Australia.

FAMILY 57.—SAXIFRAGACEAE.

1. BAUERA, Banks.

(After Ferdinand Bauer, 1760-1826, who accompanied Robert Brown to Australia, and his brother Francis Bauer, 1758-1840, both botanical artists of Austrian birth.)

1. **B. rubioides,** Andr. Small hairy shrub; leaves opposite, each of 3 leaflets and resembling a whorl of 6 leaves; leaflets lanceolate, 5-10 mm. long, sometimes serrate with a few teeth; flowers regular, bisexual, solitary, axillary, on slender peduncles, mostly longer than the leaves; sepals lanceolate, usually 5-7, about 5 mm. long; petals as many, pink or white, longer, obtuse, stamens about 20-40; ovary superior, 2-celled, with several ovules on parietal placentas; styles 2, free, filiform, capsule shorter than sepals, opening loculicidally in 2 valves; seeds granular, albuminous, with a small embryo.

West end of Kangaroo Island, perhaps also on the mainland. Summer.—Eastern States.

FIG. 127.
Bauera rubioides.

FAMILY 58.—PITTOSPORACEAE.

Flowers regular, bisexual; sepals 5, imbricate; petals 5, imbricate, sometimes cohering in the lower part; stamens 5, free; ovary superior, 1-celled, with 2 parietal placentas each bearing several ovules in 2 rows, or 2-celled by intrusion of the placentas; style simple or minutely lobed at summit; fruit a capsule or berry; seeds with a thin testa, hard albumen and small embryo. Trees, shrubs or twiners, with alternate exstipulate leaves.

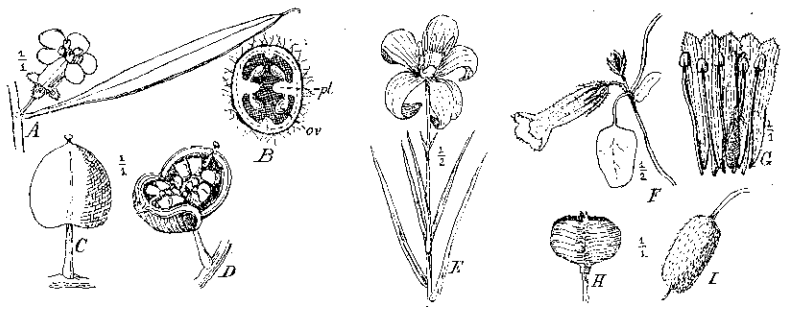

FIG. 128.—**Pittosporaceae.** A-D, *Pittosporum phillyreoides*. A, flower and leaf. B, transverse section of ovary. C, fruit. D, the same open. E, *Cheiranthera linearis*. F-G, *Marianthus bignoniaceus*. G, corolla spread open. H, capsule of *Bursaria spinosa*. I, berry of *Billardiera scandens*.

A. Fruit a capsule.
  B. Anthers ovate or oblong, opening by longitudinal slits.
    C. Capsule thick, hard; shrub or tree ..... PITTOSPORUM 1.
    C. Capsule of thin texture.
      Erect shrub; seeds 1 or 2 ..... BURSARIA 2.
      Twiner; seeds several ..... MARIANTHUS 3.
  B. Anthers linear, opening by terminal pores; shrub or twiner ..... CHEIRANTHERA 4.
A. Fruit a berry; shrubs usually with twining branches.. BILLARDIERA 5.

1. PITTOSPORUM, Banks.

(Greek *pitta*, pitch; *sporos*, seed: alluding to the sticky pulp enveloping the seeds.)

1. **P. phillyreoides,** DC. Shrub or small tree, glabrous except on the young shoots; branches usually drooping; leaves flat, linear-lanceolate, 3-10 cm. long, 3-10 mm. broad, shortly petiolate and terminating in a hooked mucro; flowers pedicellate, solitary or clustered in the axils; sepals 5, 2-3 mm. long; petals pale yellow, 2 or 3 times as long, united in the lower half; ovary pubescent, 1-celled, with 6-10 ovules on each placenta; style short, thick; capsule bony, ovoid-compressed, sometimes cordate, 10-20 mm. long, bright orange, opening in 2 rarely 3 valves, with the placentas along the centre; seeds angular, red, 2-7 to each valve, immersed in sticky pulp. (Fig. 128, A-D.)

Southern districts and Murray scrub to Flinders Range and Far North; westward to Musgrave Range and Ooldea; Eyre Peninsula and along the Great Bight. July-Oct.—Throughout Australia, except Tasmania. Locally known as "Native Willow," "Poison-berry Tree." and "Apricot-tree." The leaves are eaten by cattle and the seeds by natives. The specific name is derived from a resemblance to *Phillyrea angustifolia*, L., a Mediterranean shrub belonging to the Olive family.

P. undulatum, Vent., with ovate-lanceolate undulate leaves and flowers in termina. clusters, is used in South Australia as a hedge-plant. It is a native of the Eastern States The fruit is almost pear-shaped, orange, with many seeds.

2. BURSARIA, Cav.

(From Latin *bursa*, a pouch: alluding to the fruit.)

1. **B. spinosa,** Cav. *Native Box.* Small glabrous tree or shrub, the branchlets often; shortened into spines; leaves often clustered, obovate or oblanceolate, ½-5 cm. long, flowers fragrant, in racemes forming a terminal pyramidal panicle; sepals 5, small-caducous; petals white, spreading, 5 mm. long; capsule flat, thin, brown, truncate; notched, 5-10 mm. long, and rather broader than long, 2-celled, opening along the summit, with 1-3 flat reniform seeds in each cell; style very short. (Fig. 128, H.)

Almost all parts of the State. It occurs as a tree in the South-East and Far North; nearer Adelaide it is usually a shrub. Chiefly in summer.—Throughout Australia.

3. MARIANTHUS, Hueg.

(Greek *Maria*, Mary; *anthos*, flower: flower of the Virgin Mary.)

1. **M. bignoniaceus,** F. v. M. Stems long, slender, twining, becoming glabrous; leaves petiolate, lanceolate or ovate-lanceolate, cordate, usually 1-4 cm. long, slightly hairy below; flowers drooping, 1-3 in the axils, on short slender pedicels; sepals lanceolate, pubescent, 3-4 mm. long; petals cuneate, separating towards base, cohering cylindrically to near the summit, where they form 5 spreading lobes, orange in upper part, greenish below, pubescent outside, 18-25 mm. long; ovary silky, with a long filiform style; capsule narrow-oblong, pubescent, about 20 mm. long, the pericarp rather thin, 2-celled, with several seeds in each cell. (Fig. 128, F-G.)

Mount Lofty Range; Kangaroo Island. Chiefly in summer.—Victoria.

4. CHEIRANTHERA, A. Cunn.

(Greek *kheir*, hand; *anthera*, flowery: the 5 stamens stand up like the fingers of a hand.)

Petals distinct, spreading; stamens turned to one side of the pistil; anthers linear, as long as or longer than the filaments, opening at the summit in 2 pores; ovary 2-celled with a subulate curved style; pod subcylindrical, hard, splitting loculicidally into 2 valves, which later split septicidally also; seeds numerous.

Flowers usually several in a corymb; small shrub ..... *Ch. linearis* 1.
Flowers solitary; twining plant ..... *Ch. volubilis* 2.

1. **Ch. linearis,** A. Cunn. Small graceful glabrous shrub; leaves linear, acute, channelled, 1½-5 cm. long; flowers on erect pedicels, 2-5 in terminal corymbs or umbels, or rarely solitary on the peduncle; sepals lanceolate, 4-6 mm. long; petals violet or blue, 15-20 mm. long; capsule 12-18 mm. long. (Fig. 128, E.)
Southern districts; Murray lands: Eyre Peninsula. Oct.-Nov.—Eastern States.

2. **Ch. volubilis,** Benth. Slender glabrous twiner: leaves as in the preceding, but shorter and more deeply channelled, so as to appear almost terete: flowers blue, solitary, terminal, on a slender peduncle, the petals shorter than in the preceding.
Kangaroo Island. Oct.-Nov.

5. BILLARDIERA, Sm.

(After the French botanist, Jacques-Julien Houton de la Billardière, 1755-1834, who visited West Australia and Tasmania in 1792-93, and described many new species.)

Petals connivent in a tube to about the middle, then spreading; anthers oblong, opening by longitudinal slits; ovary 2-celled; style short; fruit a berry; seeds numerous, imbedded in pulp.

Flowers several in a corymb ..... *B. cymosa* 1.
Flowers solitary ..... *B. scandens* 2.

1. **B. cymosa,** F. v. M. A low shrub usually with twining branches; young branches and leaves more or less pubescent or silky; leaves lanceolate or linear-lanceolate, 2-5 cm. long, silky or becoming glabrous; flowers few or several in terminal corymbs; sepals 3-6 mm. long, ciliate or silky; petals pale or greenish-yellow or violet, 10-20 mm. long; berry cylindrical-oblong, obtuse, pubescent, red, 10-20 mm. long.—*B. sericophora,* F. v. M.
Southern districts; Murray lands; Eyre Peninsula; South-East. Sept.-Nov.—Eastern States, without Tasmania. In the Mount Lofty Range winter-flowers are sometimes found, the petals greenish, very little longer than the sepals

2. **B. scandens,** Sm. Near the preceding, but the adult leaves are always glabrous above and often undulate on the margins; flowers solitary on slender curved terminal peduncles; sepals lanceolate, 6-8 mm. long; berry pubescent. (Fig. 128, I.)
Kangaroo Island; near Port Lincoln; recorded by Mueller from Mount Gambier. Sept.-Dec.—Eastern States, including Tasmania.

FAMILY 59.—ROSACEAE.

Flowers usually bisexual and regular; sepals usually 4-5, sometimes with an "outer calyx" of 4-5 alternate bracteoles; petals 4-5, caducous, sometimes absent; stamens 2-numerous, perigynous or epigynous; gynoecium of 1 or more 1-celled carpels, superior or sometimes becoming inferior through union with the hollow receptacle, each carpel usually with 1 style and 1-2 anatropous ovules; the fruits or fruitlets consist of the ripe indehiscent carpels, which may be dry or succulent, either raised on the extended and convex receptacle (gynophore) or sunk in the hollow receptacle, which may be succulent and form a false berry (*Rosa*), or fleshy and united to the carpels, forming a sort of false drupe sometimes called a *pome* (*Crataegus*), or may be hard and dry, forming a false nut (*Alchemilla* and *Acaena*); seeds with a straight embryo, broad fleshy cotyledons and

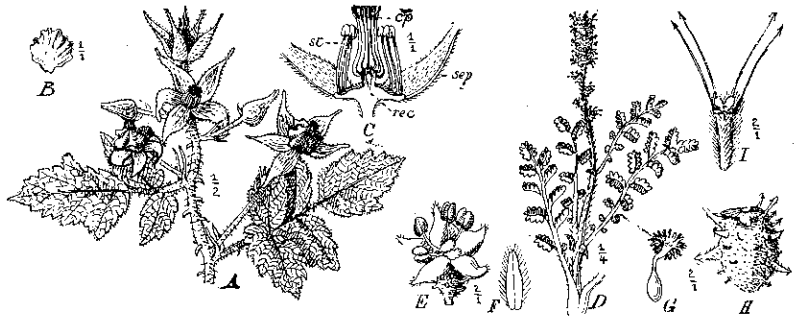

FIG. 129.—**Rosaceae.** A-C, *Rubus parvifolius.* A, flowering branch; B, petal; C, vertical section of flower (petals and 3 sepals removed); *rec,* receptacle; *cp,* carpels; *st,* stamen; *sep,* sepals; D-H, *Acaena ovina*; D, plant; E, flower; F, bract; G, carpel; H, fruit; I, fruit of *A. Sanguisorbae.*

little or no albumen. Trees, shrubs, or herbs, with alternate leaves, the stipules sometimes adnate to the petiole.

An important family, comprising the apple (*Pirus malus*, L.), the pear (*P. communis*, L.), the quince (*Cydonia vulgaris*, Pers.), the loquat (*Eriobotrya japonica*, Lindl.), the plum (*Prunus domestica*, L.), the apricot (*P. armeniaca*, L.), the almond (*P. Amygdalus*, Stokes), the peach (*P. persica*, Sieb. et Zucc.), and other fruit-trees.

A. Woody plants; petals present.
  B. Prickly shrubs.
    Carpels becoming little drupes united in a juicy head on the convex receptacle ..... RUBUS 1.
    Carpels becoming achenes free within the hollow succulent receptacle ..... ROSA 2.
  B. Spiny shrub: carpel becoming a stone united with the fleshy hollow receptacle ..... CRATAEGUS 3.
A. Herbs.
  C. Petals and outer calyx present; carpels numerous on a dry convex receptacle ..... POTENTILLA 4.
  C. Petals absent; carpels 1-2, enclosed in the dry hollow receptacle, but not united with it.
    Outer calyx present; receptacle smooth ..... ALCHEMILLA 5.
    Outer calyx absent; receptacle prickly ..... ACAENA 6.

1. RUBUS (Tourn.), L.

(Latin name for the blackberry.)

Sepals 5, imbricate; petals 5, obovate; stamens numerous; carpels numerous, superior each with 2 pendulous ovules, 1 of them abortive; styles terminal, caducous; ripe carpels (drupes) succulent, united on the dry convex or conical receptacle into an aggregate fruit resembling a berry. Trailing prickly shrubs with usually compound leaves.

A. Leaves imparipinnate, 3-5-foliolate; petals and fruit red ..... *R. parvifolius* 1.
A. Leaves of 3 leaflets, or, when 5, the 4 lower ones digitate, *i.e.*, proceeding from the same point on the petiole; petals pink or white; fruit black.
  Leaflets toothed ..... *R. fruticosus* 2.
  Leaflets deeply divided ..... *R. laciniatus* 3.

1. **R. parvifolius,** L. *Native Raspberry.* Branches pubescent; prickles hooked, 1-2 mm. long; leaflets 3, rarely 5, ovate, acute, incised-toothed, green and wrinkled above, white-tomentose beneath, the terminal one 2-4 cm. long, the others smaller; flowers in short terminal panicles or solitary in the axils; sepals acuminate, pubescent, 8-10 mm. long; petals shorter, almost orbicular, red; fruit globular, red, of rather few large drupes. (Fig. 129, A-C.)

Mount Lofty Range; Kangaroo Island; South-East. Summer.—Eastern States China. The cultivated Raspberry, with white lanceolate petals and fruit of many small red drupes, is *R. idaeus*, L.

* 2. **R. fruticosus,** L. *Blackberry, Bramble.* Stems long, with hooked or straight prickles, 3-8 mm. long, pubescent or with glandular hairs; leaflets 3-5, ovate-acuminate, lighter-colored and often white-tomentose below, serrate, 4-9 cm. long; flowers in terminal panicles; sepals pubescent, acuminate, 8-10 mm. long; petals white or pink, longer than the sepals: fruit globular, black or rarely reddish, formed of numerous drupes.

Mount Lofty Range. Nov.-Dec.—This well-known plant, a native of Europe, temperate Asia, and North Africa, has been divided by some European botanists into many species, the distinctions being based to a large extent on the shape and clothing of the shoot (sometimes called a *turio*) which rises from the perennial rootstock and becomes a new stem.

* 3. **R. laciniatus,** Willd. Near *R. fruticosus*, but the leaflets are deeply cut into broad mucronate teeth or into narrow-toothed lobes, which sometimes reach the petiolule; the lower leaves may have 5 leaflets; sepals 15 mm. long or more, leaflike in the upper part petals white or pink, shorter, 3-lobed; fruit black.

Mount Lofty Range. Oct.-Nov.—Country of origin uncertain.

2. ROSA. L.

(Latin name of the rose.)

Sepals and petals 5, imbricate; stamens numerous; carpels numerous, superior, hairy, bony and 1-seeded when ripe, enclosed within but free from the fleshy, berry-like red or black receptacle ("hip."). Prickly shrubs with imparipinnate leaves and leafy stipules, adherent to the petioles; flowers solitary or in terminal corymbs.

Leaflets glandular beneath..... *R. rubiginosa* 1.
Leaflets glabrous, or glandular only on the teeth..... *R. canina* 2.

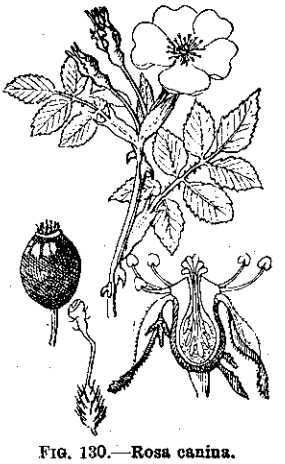

FIG. 130.—**Rosa canina.**

* 1. **R. rubiginosa,** L. *Sweetbriar.* Leaflets 5-7, glandular beneath and on the teeth, the glands fragrant when rubbed; pedicels with prickles or stiff glandular hairs; the 3 outer sepals pinnately lobed; petals pink; fruiting receptacle ovoid or oblong, often prickly.

Mount Lofty Range. Oct.-Dec.—Europe.

* 2. **R. canina,** L. *Dog Rose.* Like the preceding, but without scented glands on the leaves; pedicels glabrous; sepals long, pinnately lobed, reflexed after flowering; petals pink or white; fruiting receptacle almost globular, smooth.

Adelaide plains and Mount Lofty Range. Oct.-Dec.—Europe; temperate Asia.

3. CRATAEGUS (Tournef.), L.

(Latin *crataegus* or *crataegon*, from Greek *krataigón*, some plant of this family.)

FIG. 131.
Crataegus monogyna.

* 1. **C. monogyna,** Jacq. *Hawthorn, May.* Spiny shrub or small tree; leaves petiolate, ovate-cuneate, pinnatipartite with 3-7 divergent lobes; stipules large, leafy; flowers fragrant, in corymbs; sepals 5, short-spreading; petals longer, suborbicular, white or pink; stamens numerous; carpel with 1 style, developing a bony endocarp, 1-seeded and becoming united with the fleshy hollow receptacle, which becomes in fruit a small ovoid red pome, 8-10 mm. long.—*C. oxyacantha,* L. partly; *Mespilus monogyna,* Willd.

Mount Lofty Range. Sept.-Nov.—Europe; western Asia.

4. POTENTILLA. L.

(Name formed from the Latin *potens*, powerful: supposed tonic and astringent qualities of some species.)

1. **P. anserina,** L. *Silver-weed.* Perennial herb, with creeping and rooting stems; leaves imparipinnate, with numberous oblong serrate leaflets, green above or silvery-villous on both faces; peduncles long, solitary, axillary, 1-flowered; sepals 5, rarely 4, valvate, with an outer calyx of as many alternate bracteoles; petals large, yellow; carpels superior, numerous on a convex receptacle, 1-ovuled; style short, caducous; fruiting carpels becoming seed-like nuts or achenes, seated on the dry hairy receptacle and surrounded by the persistant sepals.

Moist places in Mount Lofty Range and South-East. Summer.—Victoria; Tasmania; New Zealand; Europe; western Asia; North America. Perhaps introduced.

5. ALCHEMILLA, L.

(Said to be named on account of its supposed uses in alchemy.)

* 1. **A. arvensis,** Scop. Small villous annual; leaves suborbicular, 3-partite, tapering into the broad, leafy incised stipules, which are adnate to the petiole; leaf-lobes broadly toothed; flowers small, in axillary clusters enclosed within the stipules; sepals 4, valvate,

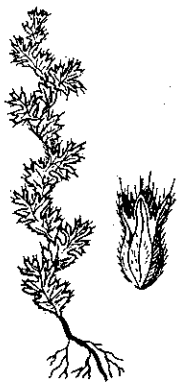

FIG. 132.—**Alchemilla arvensis.**

with an outer calyx of 4 minute bracteoles; petals wanting; fertile stamens 1-2; carpels 1-2, with a basal style and capitate stigma, in fruit nut-like and firmly enclosed in the dry ovoid hollow receptacle.

Southern districts; South-East. Sept.-Nov.—Europe; western Asia.

6. ACAENA, L.

(Greek *akaina*, a thorn: alluding to the prickles on the fruit.)

Sepals usually 4-5, valvate, persistant; petals none; stamens 2-10; carpels 1, rarely 2, each with a terminal style dilated into an oblique fringed stigma; fruit a 1-seeded coriaceous achene firmly enclosed in the hollow hardened receptacle, which is almost closed at the summit, and is furnished with prickles or awns barbed with reflexed hairs. Perennial herbs with imparipinnate leaves and adnate stipules.

Flowers in a long spike; prickles several, shorter than the fruiting receptacle ..... *A. ovina* 1.
Flowers in a dense globular head; prickles 4, longer than the fruiting receptacle ..... *A. Sanguisorbae* 2.

1. **A. ovina,** A. Cunn. Stems 10-50 cm. high; leaflets ovate-oblong or oblong, deeply crenate, glabrous above, villous all over the undersurface or only on the nerves; flowers in a long interrupted bracteate spike; sepals usually 5; anthers purple; fruiting receptacle about 5 mm. long, ovoid, pubescent, with numerous short unequal prickles. (Fig. 129, D-H.)

Southern districts: Eyre Peninsula; South-East. Sept.-Nov.—Temperate Australia; New Zealand; temperate South America.

2. **A. Sanguisorbae** (L. f.), Vahl. Stems often procumbent and rooting; leaves as in the preceding; flowers in globular heads on long terminal peduncles; sepals usually 4; stamens 2; fruiting receptacle obconical, narrow, 4-ribbed, villous, 5-6 mm. long, with 4 slender subequal prickles, 6-10 mm. long. (Fig. 129, I.)

Southern districts; South-East. Oct.-Dec.—Eastern States; New Zealand. The fruiting receptacles or false fruits of both these species are troublesome burs.

FAMILY 60.—LEGUMINOSAE.

Flowers usually bisexual, regular or irregular; calyx 5-lobed or 5-toothed, or rarely the sepals distinct; petals 5; stamens 10 or numerous; ovary superior, 1-celled (consisting of a single carpel); ovules 1 or more, attached to the ventral suture of the carpel, usually in 2 rows, anatropous or amphitropous; style simple; fruit a pod (legume), usually opening in 2 valves; seeds with 2 large cotyledons, a small ventral radicle and usually no albumen, sometimes provided with a caruncle (strophiole), or the funicle dilated into a fleshy aril clasping the base of the seed. Trees, shrubs, or herbs, the leaves mostly alternate, compound, and stipulate.

A large family comprising many ornamental and useful plants, such as the Carob Tree or St. John's Bean (*Ceratonia siliqua*, L.), the Locust Tree or False Acacia (*Robinia pseudacacia*, L.), the Wistaria (*Wistaria sinensis*, DC.), the Peanut (*Arachis hypogaea*, L.), the French Bean (*Phaseolus vulgaris*, L.), the Lima Bean (*Phaseolus lunatus*, L.), the Garden Pea (*Pisum sativum*, L.), the Field Pea (*P. arvense*, L.), and the Broad Bean (*Vicia faba*, L.).

The family is divided into 3 subfamilies as follows:—

Flowers regular (actinomorphic), stamens usually numerous; petals valvate ..... MIMOSOIDEAE 1.
Flowers irregular (zygomorphic); stamens 10 or fewer; petals imbricate.
  Flowers slightly irregular; stamens 10 or fewer, free; petals subequal, free, the upper one inside the others in bud ..... CAESALPINOIDEAE 2.
  Flowers very irregular; stamens 10, often united; petals unequal, more or less united, the upper one (standard) outside the others in bud ..... PAPILIONATAE 3.

Subfamily 1.—**MIMOSOIDEAE.**

Stamens numerous; shrubs or trees ..... Acacia 1.
Stamens 5; aquatic perennials..... Neptunia 2.

Subfamily 2.—**CAESALPINOIDEAE.**

A. Leaves once pinnate; sepals free or almost so; shrubs.
  Stamens 10, anthers usually unequal; style small, terete ..... Cassia 3.
  Stamens 5, 2 of them barren; style large, petal-like.... Petalostylis 4.
A. Leaves 2-lobed or 2-foliolate; stamens 10; sepals united towards base; small trees ..... Bauhinia 5.

Subfamily 3.—**PAPILIONATAE.**

A. All 10 stamens free; shrubs; leaves simple or (in our species) of 3 leaflets, usually entire, rarely absent. (Tribe *Podalirieae.*)
  B. Ovules 4 or more.
    C. Standard narrow; leaves simple..... Brachysema 6.
    C. Standard broad.
      Leaves simple ..... Isotropis 7.
      Leaves 3-foliolate ..... Gompholobium 8.
  B. Ovules 2; standard broad.
    D. Leaves undeveloped or rare.
      Upper calyx-lobes larger, united ..... Sphaerolobium 9.
      Calyx-lobes subequal, free ..... Viminaria 10.
    D. Leaves developed, simple, sessile or shortly petiolate.
      E. Pod triangular; bracteoles and stipules absent; seeds carunculate ..... Daviesia 11.
      E. Pod ovoid or oblong.
        F. Leaves opposite or the upper ones alternate; seeds carunculate.
          Stipules absent; bracteoles persistant ..... Eutaxia 12
          Stipules present; bracteoles caducous..... Gastrolobium 13.
        F. Leaves alternate or sometimes whorled.
          G. Stipules present; bracteoles usually brown and scarious, on or close to calyx; seeds carunculate ..... Pultenaea 14.
          G. Stipules absent.
            H. Bracteoles small, at base of calyx; filaments slightly united near base: seed without caruncle ..... Phyllota 15.
            H. Bracteoles absent or distant from calyx; filaments free; calyx 2-lipped.
              Leaf-margins revolute; seeds without caruncle ..... Aotus 16.
              Leaf-margins involute, so that the leaf is channelled above; seeds carunculate. Dillwynia 17.
A. All stamens united by their filaments in a tube round the ovary; leaves or leaflets entire. (Tribe *Genisteae.*)
  I. Staminal tube open on the upper side, the filaments alternately long and short in bud; Australian shrubs or rarely herbs, with leaves simple or of 1-3 entire leaflets (imparipinnate in one *Ptychosema.*)
    J. Leaves simple or absent; flowers axillary; seeds carunculate.
      K. Anthers equal and dorsifixed; pod flat.
        Pod winged along upper suture and opening along lower suture; leaves opposite ..... Platylobium 18.
        Pod not winged, opening along both sutures; leaves alternate, opposite or absent..... Bossiaea 19.
      K. Anthers alternately longer and shorter, the 5 longer ones basifixed and the 5 shorter dorsifixed; pod more or less swollen.
        Pod longer than broad; flowers red, yellow, or purplish ..... Templetonia 20.
        Pod scarcely longer than broad; flowers blue.. Hovea 21.

J. Leaves 1-3 foliolate.
L. Flowers racemose.
Seeds carunculate; pod flat; anthers equal..... GOODIA 22.
Seeds without caruncle; pod swollen; anthers alternately long and short..... CROTALARIA 23.
L. Flowers solitary on long peduncles or racemose; anthers equal; leaflets 3 or several..... PTYCHOSEMA 24.
I. Staminal tube completely closed round the ovary; European herbs or shrubs with leaves simple, digitate or 3-foliolate, the leaflets entire.
M. Seeds without caruncle.
Calyx deeply cut into 2 lips; leaves digitate with several leaflets..... LUPINUS 25.
Calyx 1-lipped; leaves simple, few..... SPARTIUM 26.
M. Seeds carunculate.
Calyx scarious, 2-lipped to base; branchlets and leaves spiny..... ULEX 27.
Calyx green, shortly 2-lipped; leaves 3-foliolate... CYTISUS 28.
A. Upper stamen free, the other 9 united in an open tube, or sometimes all united.
N. Pod 2-valved, dehiscent or rarely indehiscent, not breaking transversely into articles.
O. Chiefly introduced herbs with leaves of 3 denticulate leaflets; upper stamen free. (Tribe *Trifolieae.*)
P. Pod enclosed in the calyx; flowers usually in heads TRIFOLIUM 29.
P. Pod exceeding the calyx.
Pod linear, curved; flowers clustered..... TRIGONELLA 30.
Pod ovoid, straight; flowers in long racemes.... MELILOTUS 31.
Pod curved or spirally twisted; flowers in short head-like racemes..... MEDICAGO 32.
O. Herbs with imparipinnate leaves of 5 entire leaflets, the 3 uppermost digitate at the summit of the rachis and the other 2 at its base, thus resembling leafy stipules; 5 alternate stamens with filaments dilated towards summit. (Tribe *Loteae.*)..... LOTUS 33.
O. Herbs or rarely shrubs, chiefly Australian; leaves imparipinnate (except in *Sesbania*), with leaflets which are sometimes reduced to 3 or 1, entire (except in some *Psoraleæ*), filaments all filiform. (Tribe *Galegeae.*)
Q. Anthers tipped by a small gland; tomentum usually of forked hairs..... INDIGOFERA 34.
Q. Anthers without glands.
R. Ovule 1; leaflets 1-3, with glandular dots ... PSORALEA 35.
R. Ovules 2 or more; flowers racemose.
S. Pod flattish; style not bearded
Pod linear; valves thin or coriaceous; leaves imparipinnate..... TEPHROSIA 36.
Pod long, linear, with thickened margins; leaves paripinnate..... SESBANIA 37.
S. Pod swollen.
T. Style bearded in upper part.
Petals acuminate; flowers large ..... CLIANTHUS 38.
Petals obtuse; flowers of medium size.. SWAINSONA 39.
T. Style glabrous.
Anther-cells distinct ..... ASTRAGALUS 40.
Anther-cells confluent at summit ..... GLYCYRRHIZA 41.
O. Weak introduced often climbing herbs; leaves paripinnate, ending in a tendril or fine point; pod compressed. (Tribe *Vicieae.*)
Staminal tube oblique at summit; style filiform, bearded in upper part..... VICIA 42.
Staminal tube truncate; style flattened dorsally towards summit and bearded only on the inner face..... LATHYRUS 43.
O. Erect or twining herbs, shrubs or rarely trees; leaves without tendrils, imparipinnate, with 3 entire or sometimes lobed leaflets, rarely 5 or 1, all of which have stipellae at base. (Tribe *Phaseoleae.*)

U. Rhachis of the raceme not nodose at base of pedicels; trailing or twining herbs or shrubs.
V. Seeds carunculate.
Flowers rather large; keel nearly as long as wings ..... KENNEDYA 44.
Flowers small; keel much shorter than wings HARDENBERGIA 45.
V. Seeds not carunculate; flowers in a loose raceme GLYCINE 46.
U. Rhachis of the raceme thickened and nodose at base of pedicels.
W. Style beardless.
X. Trees with prickly branches; flowers large, red, racemose ..... ERYTHRINA 47.
X. Trailing or twining herbs.
Calyx 5-lobed; flowers racemose, yellow ..... RHYNCHOSIA 48.
Calyx 4-lobed; flowers clustered on peduncle, not yellow ..... GALACTIA 49.
W. Style bearded; flowers yellowish: slender herb ..... VIGNA 50.
N. Pod flat, splitting transversely into 1-seeded articles, or 1-seeded and indehiscent: herbs or undershrubs. (Tribe *Hedysareae.*)
Pod of 2 or more articles; leaves imparipinnate: stamens more or less split into 2 bundles of 5 each AESCHYNOMENE 51.

1. ACACIA, (Tournef.) Willd.

(Latin, from Greek *akakia*, name of some prickly species growing in Egypt.)
Flowers small, regular; sepals and petals 4-5, free or united; stamens numerous, free or almost so; ovary with 2-several ovules; pod linear or oblong, usually opening in 2 valves; seeds longitudinal or transverse in the pod; funicle usually thickened into a fleshy aril under the seed. Trees or shrubs; leaves bipinnate, or after the seedling stage

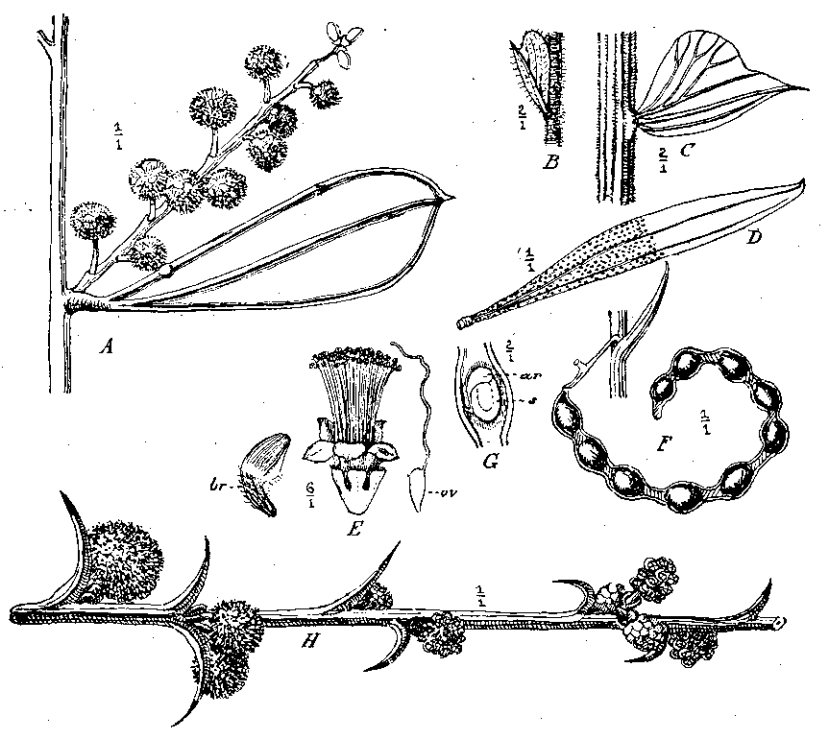

FIG. 133. **Acacia.** A, *A. myrtifolia;* B, phyllodium of *A. acanthoclada;* C, phyllodium of *A. sublanata;* D, phyllodium of *A. verniciflua;* E-H, *A. continua;* E, flower; *br*, bracteole; *ov*, ovary; F, pod; G, seed in pod; *s*, seed; *ar*, aril; H, flowering branch.

often losing the leaflets and reduced to the petiole, which simulates a leaf and is called a *phyllodium ;* stipules small, absent, or sometimes represented by 2 spines ; flowers bright or pale yellow, in globular heads or dense cylindrical spikes, each flower subtended by a small generally inconspicuous bracteole, usually consisting of a stipes and lamina, more or less ciliate. *Wattle, Acacia, Mulga, Myall.*

A large genus totalling over 500 species, of which Australia possesses more than 300; none native in Europe or New Zealand. Several species produce valuable tanning bark and gum.

KEY TO THE SUBSECTIONS.

A. Adult leaves reduced to phyllodia or rarely wanting. (Section *Phyllodineae.*)
  B. Flowers in globular heads.
    Phyllodia absent ..... APHYLLAE 1.
    Phyllodia 1-nerved on each face, or tetragonous and apparently with 4 nerves in all, very rarely 2-nerved on each face, vertically flattened or subterete, usually with a harmless or pungent point ..... UNINERVES 2.
    Phyllodia 3- to many-nerved, vertically flattened or subterete, usually with a harmless or pungent point ..... PLURINERVES 3.
  B. Flowers in cylindrical or oblong spikes ; phyllodia often subterete, sometimes pungent ..... JULIFLORAE 4.
A. Adult leaves remaining bipinnate ; flowers in globular heads. (Section *Bipinnatae.*)
  Stipules small or none ..... BOTRYOCEPHALAE 5.
  Stipules spiny ..... GUMMIFERAE 6.

Subsection 1. APHYLLAE.

Phyllodia absent ; branchlets short, spinescent ; flower heads globular, solitary, or twin.

A. Branchlets continuous with stem, resembling phyllodia.
  Pod narrow, curved ..... *A. continua* 1.
  Pod broad, flat ..... *A. peuce* 2.
A. Branchlets articulate on stem ..... *A. spinescens* 12.

Subsection 2. UNINERVES.

Phyllodia flat or subterete, 1-nerved on each face, rarely 2-nerved ; flower heads globular on simple peduncles or more or less racemose.

A. Phyllodia flat, not pungent ; heads on solitary twin or clustered peduncles.
  B. Phyllodia about 1 cm., rarely 2 cm. long, 1-nerved.
    C. Stipules spiny ; phyllodia obliquely oblong, 1-2 cm. *A. armata* 3.
    C. Stipules minute or wanting.
      D. Seeds longitudinal ; flower-parts 5 ; midnerve situated nearer one margin of phyllodium than the other.
        E. Branchlets spiny ; phyllodia hairy, cuneate, notched, 4-5 mm. long ..... *A. acanthoclada* 4.
        E. Branchlets not spiny ; phyllodia glabrous, sometimes resinous.
          F. Phyllodia 5-15 mm. long.
            Phyllodia oblong ..... *A. acinacea* 5.
            Phyllodia linear ..... *A. lineata* 6.
            Phyllodia ovate or orbicular ..... *A. obliqua* 7.
          F. Phyllodia 2-4 mm. long, resinous, obovate *A. rhetinocarpa* 8.
      D. Seeds oblique ; flower-parts 4 ; phyllodia lanceolate, 5-10 mm. long ; branchlets spiny ..... *A. erinacea* 9.
  B. Phyllodia 2-10 cm. long.
    G. Peduncles short, rarely absent or above 6 mm. long.
      H. Phyllodia 1-nerved.
        I. Phyllodia oblong or lanceolate.
          Phyllodia 2-5 cm. long ; sepals free..... *A. microcarpa* 10.
          Phyllodia 3-10 cm. long ; calyx truncate ..... *A. ligulata* 25.

I. Phyllodia linear, often wanting; heads sessile; branchlets spiny ..... *A. spinescens* 11.
H. Phyllodia 2-nerved, oblong or lanceolate; viscid shrubs.
Phyllodia 1-3 cm. long, obtuse ..... *A. montana* 12.
Phyllodia 4-8 cm. long, acute ..... *A. verniciflua* 13.
G. Peduncles about 8-12 mm. long.
J. Seeds longitudinal; stipules small or absent.
K. Phyllodia lanceolate, 4-10 cm. long; viscid shrub ..... *A. dodonaeifolia* 14.
K. Phyllodia obovate or oblong, 1-3 cm. long.
L. Peduncles shorter than phyllodia.
Phyllodia pubescent or becoming glabrous *A. brachybotrya* 15.
Phyllodia silvery or golden-silky ..... *A. argyrophylla* 16.
L. Peduncles mostly longer than phyllodia .... *A. Spilleriana* 17.
J. Seeds transverse; phyllodia 2-5 cm. long.
Stipules absent; phyllodia ovate, with rigid nerve-like margins ..... *A. anceps* 18.
Stipules often spiny; phyllodia oblong..... *A. Victoriae* 19.
A. Phyllodia flat, 1-nerved, not pungent; flower heads in axillary racemes.
M. Young heads enclosed in large concave bracts; phyllodia broad-linear, 5-10 cm. long. ..... *A. iteaphylla* 20.
M. Young heads not enclosed in large bracts.
N. Phyllodia linear or linear-lanceolate.
O. Calyx 5-lobed; funicle encircling the longitudinal seed.
Petals glabrous; pod straight-edged; phyllodia 8-20 cm. long ..... *A. rhetinodes* 21.
Petals hairy; pod moniliform; phyllodia 4-7 cm. long ..... *A. rivalis* 22.
O. Sepals 5; funicle short; seeds transverse; phyllodia obtuse, 8-20 cm. long ..... *A. Murrayana* 23.
O. Calyx truncate, minutely 5-toothed; phyllodia 3-12 cm. long; funicle much folded below the longitudinal seeds.
Tree with drooping branches; pod thick, hard *A. salicina* 24.
Shrub with spreading branches; pod brittle, moniliform ..... *A. ligulata* 25.
N. Phyllodia oblong, 2-5 cm. long; stipules often spiny; seeds transverse ..... *A. Victoriae* 19.
N. Phyllodia oblanceolate, obtuse; seeds longitudinal.
Phyllodia 3-6 cm. long; pod scarcely constricted; funicle encircling seed ..... *A. Wattsiana* 26.
Phyllodia 4-12 cm. long; pod moniliform; funicle short ..... *A. hakeoides* 27.
N. Phyllodia obovate, acuminate, 4-6 cm. long; heads few-flowered; funicle short ..... *A. myrtifolia* 28.
N. Phyllodia broad-lanceolate, usually obtuse and curved, rigid, with nerve-like margins, 8-20 cm. long; pod straight-edged.
P. Seeds longitudinal.
Funicle short ..... *A. pycnantha* 29.
Funicle encircling seed ..... *A. gladiiformis* 30.
P. Seeds transverse; funicle encircling seed ..... *A. notabilis* 31.
A. Phyllodia terete or slightly compressed, not or scarcely pungent.
Q. Phyllodia 1-nerved.
Phyllodia terete, slender, 3-10 cm. long; heads often racemose ..... *A. calamifolia* 32.
Phyllodia bluntly tetragonous, 1½-3 cm. long; heads solitary or twin ..... *A. gonophylla* 33.
Q. Phyllodia 2-nerved, compressed-terete, 1½-2½ cm. long *A. Bynoeana* 34.
A. Phyllodia 1-nerved, flat or subterete, rigid, pungent.
R. Phyllodia scattered.
S. Flowerheads solitary or twin.

T. Seeds longitudinal; phyllodia ½-2 cm. long.
U. Phyllodia linear-lanceolate.
Phyllodia narrowed at base ..... *A. patens* 35.
Phyllodia broad-based ..... *A. rupicola* 36.
U. Phyllodia obovate ..... *A. Merrallii* 37.
U. Phyllodia subtriangular, small ..... *A. vomeriformis* 38.
T. Seeds transverse.
Phyllodia tetragonous, 4-5 cm. long ..... *A. Carnei* 39.
Phyllodia rhomboid-orbicular, 1-2 cm. long... *A. strongylophylla* 40.
S. Flowerheads racemose; phyllodia subtetragonous, 3-9 cm. long ..... *A. Prainii* 41.
R. Phyllodia clustered, subtetragonous, 1-2½ cm. long .. *A. tetragonophylla* 42.

Subsection 3.—PLURINERVES.

Phyllodia 3-many-nerved, vertically flattened or subterete; flower-heads globular on axillary peduncles or shortly racemose.

A. Phyllodia flat, 3-5-nerved, not pungent.
B. Seeds longitudinal.
C. Flowerheads solitary, twin, or clustered.
Phyllodia linear, 4-10 cm. long..... *A. estrophiolata.* 43.
Phyllodia oblanceolate 1-2 cm. long; branchlets spiny ..... *A. Basedowii* 44.
C. Flowerheads racemose.
Shrub; phyllodia narrow-oblong..... *A. cyclopis* 45.
Tree; phyllodia oblong or lanceolate..... *A. melanoxylon* 46.
B. Seeds transverse; phyllodia broadly oblanceolate, reticulate, 2-4 cm. long ..... *A. dictyophleba* 47.
A. Phyllodia streaked with several longitudinal nerves, flat, not or scarcely pungent; flowerheads solitary, twin, or clustered.
D. Heads pedunculate.
E. Phyllodia narrow-linear.
F. Pod moniliform.
Phyllodia 20-30 cm. long, at first hoary ..... *A. coriacea* 48.
Phyllodia 15-40 cm. long, glabrous ..... *A. stenophylla* 49.
Phyllodia 7-11 cm. long, hoary ..... *A. Loderi* 50.
F. Pod scarcely constricted; phyllodia 4-8 cm. long, silvery ..... *A. Sowdenii* 51.
E. Phyllodia broadly linear-cuneate, obtuse, rigid, 2-4 cm. long.
Hoary shrub ..... *A. farinosa* 52.
Glabrous shrub..... *A. sclerophylla* 53.
E. Phyllodia lanceolate, grey-mealy, 3-14 cm. long.... *A. Cambagei* 54.
D. Heads sessile or almost so; phyllodia lanceolate, almost pungent, 2-6 cm. long..... *A. Oswaldii* 55.
A. Phyllodia streaked with several longitudinal nerves, terete or slightly compressed, not or scarcely pungent; flowerheads globular.
G. Heads solitary, twin, or clustered.
H. Heads pedunculate.
I. Phyllodia 2-7 cm. long; pod membranous, not constricted ..... *A. papyrocarpa* 56.
I. Phyllodia about 14 cm. long ..... *A. tenuior* 57.
I. Phyllodia 2-12 cm. long; pod moniliform..... *A. rigens* 58.
I. Phyllodia 1½-3 cm. long, about 6-nerved in all; viscid shrubs; pod not constricted.
Phyllodia terete, slender, obtuse ..... *A. Menzelii* 59.
Phyllodia compressed, with a hooked point.. *A. Bynoeana* 34.
H. Heads sessile, twin; phyllodia 4-10 cm. long, almost pungent ..... *A. sessiliceps* 60.
G. Heads shortly racemose; phyllodia terete, rigid, 5-10 cm. long ..... *A. Gilesiana* 61.
A. Phyllodia flat or subterete, rigid, with pungent points, 3-several-nerved; flowerheads globular, solitary, twin, or clustered.

J. Phyllodia 3-5-nerved.
Phyllodia terete, 2-12 cm. long ..... *A. rigens* 58.
Phyllodia flat, subtriangular, mostly under 1 cm. long *A. sublanata* 62.
J. Phyllodia striate with several nerves.
K. Sepals 5, linear-spathulate.
Phyllodia lanceolate, 3-5 cm. long ..... *A. Oswaldii* 55.
Phyllodia terete, 2-3½ cm. long..... *A. colletioides* 63.
K. Calyx 4-lobed; phyllodia linear-lanceolate, 1-2 cm. long ..... *A. rhigiophylla* 64.

Subsection 4.—JULIFLORAE.

Flowers in cylindrical or oblong spikes, on 1-3 *axillary peduncles; phyllodia usually rigid,* 1-*many-nerved, flat or subterete, pungent or not.*

A. Phyllodia pungent-pointed, rigid, 1-4-nerved, seeds longitudinal; flower-parts 4.
B. Phyllodia whorled, 1-nerved, subulate, 1-1½ cm. long.. *A. verticillata* 65.
B. Phyllodia scattered, linear-lanceolate, 3-4-nerved.
Spikes subsessile; phyllodia 1-2 cm. long ..... *A. rhigiophylla* 64.
Spikes pedunculate; phyllodia 2-3 cm. long; stipules spiny ..... *A. oxycedrus* 66.
A. Phyllodia not pungent-pointed, many-nerved (except *A. longifolia.*)
C. Phyllodia flat, oblong.
D. Seeds transverse; phyllodia oblong, about 5 cm. long ..... *A. Kempeana* 67.
D. Seeds longitudinal.
Phyllodia 6-12 cm. long, 2-5-nerved, reticulate *A. longifolia* 68.
Phyllodia 2½-5 cm. long, resinous on margin.. *A. tarculensis* 69.
C. Phyllodia flat, linear-lanceolate, 10-14 cm. long..... *A. signata* 70.
C. Phyllodia narrow-linear or sometimes lanceolate, usually hoary (*Mulga*).
Pod flat, glabrous; seeds oblique ..... *A. aneura* 71.
Pod biconvex, tomentose; seeds longitudinal..... *A. brachystachya* 72.
C. Phyllodia subterete, usually hoary; seed longitudinal (*Mulga.*)
E. Phyllodia compressed and ciliolate towards summit, 6-16 cm. long; pod moniliform; calyx 4-lobed.
Seeds and swollen parts of pod ovoid ..... *A. Burkittii* 73.
Seeds and swollen parts of pod globular ..... *A. Randelliana* 74.
E. Phyllodia not compressed or ciliolate towards summit; pod with almost straight edges.
F. Pod coriaceous, without partitions, flattish; phyllodia 8-20 cm. long; calyx 5-lobed..... *A. cyperophylla* 75.
F. Pod cylindrical, with raised partitions between seeds; sepals 5; phyllodia 8-18 cm. long.
Pod woody ..... *A. linophylla* 76.
Pod coriaceous, with pithy partitions ..... *A. ramulosa* 77.

Subsection 5.—BOTRYOCEPHALAE.

Leaves bipinnate; stipules small or none; flowerheads globular, in axillary racemes.
Pinnae in 2 to 3 pairs; leaflets in 3-6 pairs ..... *A. Mitchellii* 78.
Pinnae in 8 to 20 pairs; leaflets numerous ..... *A. decurrens* 79.

Subsection 6.—GUMMIFERAE.

Leaves bipinnate; stipules spiny; flowerheads globular, on clustered peduncles.
Pinnae in 4-6 pairs; leaflets in 10-20 pairs ..... *A. farnesiana* 80.

1. **A. continua,** Benth. Rigid intricate shrub usually under 1 m.; branchlets (phyllodia ?) subulate, striate, pungent, decurrent into and continuous with the branches, the lower ones 2-4 cm. long, the upper ones shorter and often recurved; heads 15-30-flowered, solitary or twin, almost sessile, the bracts and bracteoles rather large, brown and concave; calyx 5-lobed halfway, the lobes obtuse and ciliate; corolla twice as long, glabrous; ovary glabrous; pod much curved, moniliform, 4-7 cm. long, 3-4 mm. broad; seeds longitudinal, with a short almost straight funicle, thickening into a lateral aril. (Fig. 133, E-H.)

Murray lands; southern districts to Flinders Range; Eyre Peninsula. Aug.-Oct.—Broken Hill, New South Wales; Western Victoria.

2. **A. peuce,** F. v. M. Small pine-like tree; branchlets (phyllodia ?) subulate, decurrent, pungent, 5-8 cm. long; flowers unknown; pod flat, 8-10 cm. long, 30 mm. broad; funicle filiform, without aril.

North of Cooper's Creek. Imperfectly known; apparently not re-discovered since Howitt's expedition.

3. **A. armata,** R. Br. *Kangaroo Thorn.* Intricate shrub 2-4 m. high, with hairy or rarely glabrous branches; phyllodia obliquely oblong, usually undulate, 1-nerved and mucronate, 1-2 cm. long, 3-7 mm. broad; stipules spiny, straight, 5-8 mm. long; heads about 40-flowered, on solitary peduncles about as long as phyllodia; calyx 5-lobed; pod more or less hairy, cylindrical, 4-6 cm. long, 4-5 mm. broad; seeds longitudinal, the funicle with 2-3 folds under the seed and thickened into an aril.

Southern districts to Flinders Range; Eyre Peninsula; South-East. Often planted as a hedge. Sept.-Oct.—Temperate Australia.

4. **A. acanthoclada,** F. v. M. Rigid shrub, with white-pubescent branches and spiny branchlets; phyllodia 4-5 mm. long, 2 mm. broad at summit, cuneate, obtuse or gibbous at summit, hairy, the principal nerve near the lower straight margin and ending in a small point, with 2 or 3 short lateral veins; heads about 30-flowered, on solitary peduncles usually longer than phyllodia; calyx usually 5-lobed; pod linear, coiled spirally, 3 mm. broad; seeds longitudinal; funicle short, thickened into a small lateral aril. (Fig. 133, B.)

Near Renmark, on River Murray; north of Fowler's Bay. Aug.-Oct.—Victoria; Victoria Desert, West Australia.

5. **A. acinacea,** Lindl. Near the following species; glabrous; phyllodia oblong, 5-15 mm. long, 2-4 mm. broad, the midnerve almost central, obtuse or with a straight or curved mucro, often with a gland at summit and one below the middle of the upper margin; heads 12-20-flowered, on peduncles solitary or 2-4, about as long as the phyllodia; sepals 5, linear-spathulate, ciliate; pod curved, often coiled and twisted, 2-4 cm. long, 3-5 mm. broad; seeds longitudinal; funicle short, dilated almost from base into a boatshaped aril.

Near the Burra; Yorke Peninsula; Kangaroo Island; near Bordertown; Eyre Peninsula. Sept.-Oct.—Eastern States.

6. **A. lineata,** A. Cunn. Glabrous shrub; phyllodia linear, somewhat viscid, about 1 cm. long, 1½ mm. broad, obtuse, the nerve nearer to one margin and ending in a small mucro; heads about 10-flowered, on solitary or twin peduncles, about as long as phyllodia; calyx 5-partite, ciliate; petals glabrous, nearly 3 times as long; pods linear, 3-4 mm. broad, hairy; seeds longitudinal, arillate; funicle short.—*A. imbricata,* F. v. M.

Karoonda, in Trans-Murray scrub; Eyre Peninsula. Aug.-Sept.—Eastern States.

FIG. 134.—**Acacia obliqua.**

7. **A. obliqua,** A. Cunn. Straggling shrub, 1-2 m. high, with pubescent branchlets; phyllodia obliquely obovate or orbicular, 6-14 mm. long, mucronulate, 1-nerved; heads 8-15-flowered, on solitary or twin peduncles often exceeding the phyllodia; sepals 5, linear, ciliate; pod spirally coiled, 2-3 mm. broad; seeds longitudinal, oblong; funicle very short, thickened almost from the base into a clavate lateral aril. (Fig. 134.)

Southern districts to Flinders Range: Murray lands. July-Sept.—Eastern States.

8. **A. rhetinocarpa,** J. M. Black. Shrub 50 cm. to over 1 m. high, resinous; phyllodia rigid, obliquely obovate, obscurely 1-nerved, 2-4 mm. long, with a blunt deflexed mucro; heads about 12-flowered, on solitary peduncles longer than phyllodia; calyx 5-lobed, ciliate; pod linear, twisted, 4-6 cm. long, 2-2½ mm. broad, glossy-resinous; seeds longitudinal, oblong; funicle short, once folded under the fleshy aril.

Monarto South. August.

PLATE 24.—1, flower; 2, bracteole; 3, carpel; 4, phyllodia; 5, pods; 6, seed.

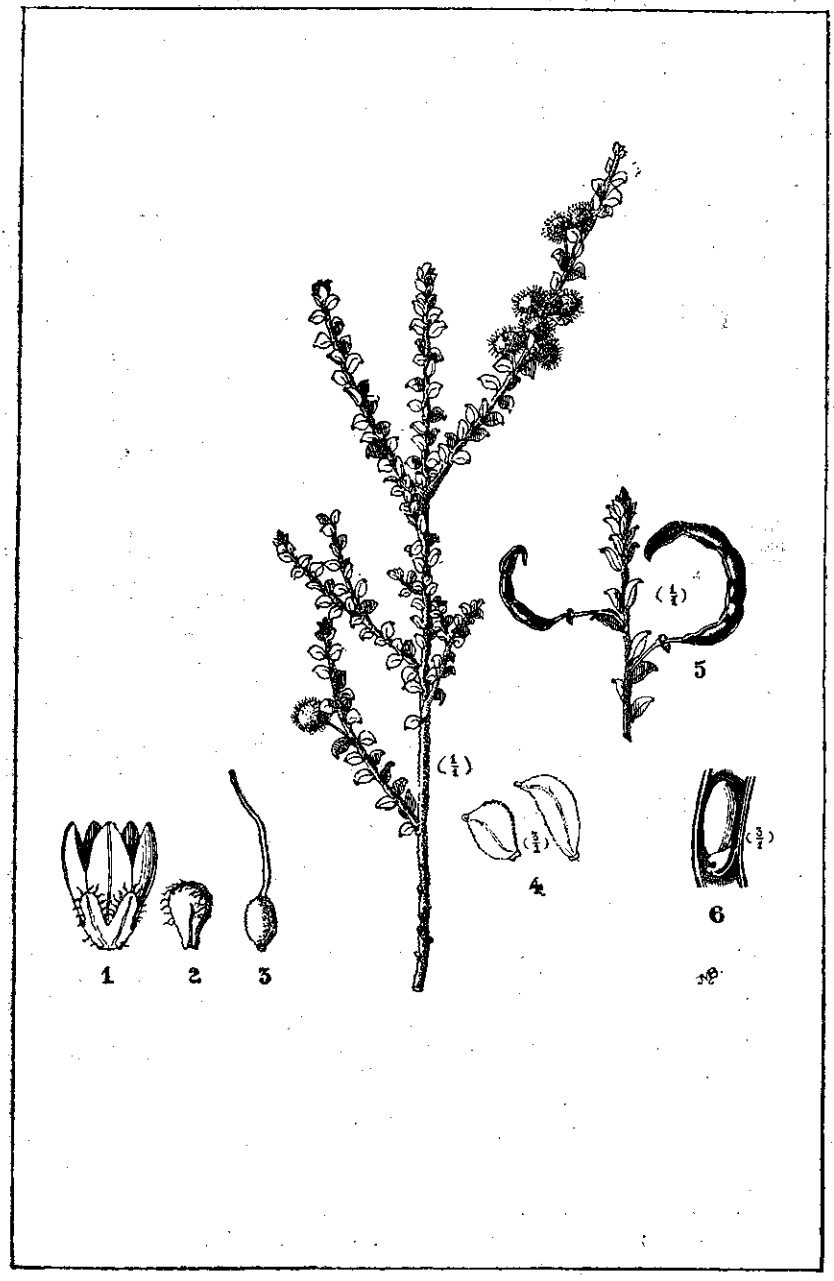

PLATE 24.—**Acacia rhetinocarpa.**

9. **A. erinacea,** Benth. Rigid shrub with spiny branchlets; phyllodia flat, rigid, obliquely and broadly lanceolate, mucronate, 5-10 mm. long, 2-4 mm. broad, obscurely 1-nerved; heads about 15-flowered, on solitary peduncles 5-6 mm. long; calyx obtusely 4-lobed, one-quarter the length of petals; ovary glabrous; pod oblong, obtuse but shortly pointed, 2-3 cm. long, about 10 mm. broad, flattish; funicle with 2 or 3 folds under the aril; seeds oblique, almost transverse.

Recorded from near Eucla.—Victoria Desert and other parts of West Australia.

10. **A. microcarpa,** F. v. M. Small rather diffuse shrub, glabrous except the young shoots, which are golden-pubescent; phyllodia linear-lanceolate, 1-nerved and usually mucronate, 2-5 cm. long, 5-10 mm. broad; heads 20-30-flowered, on 1-4 peduncles 5-10 mm. long; sepals 5, spathulate, ciliate; pod linear, moniliform, twisted, about 3 mm. broad; seeds longitudinal; funicle short, with a small conical aril.

Halbury; Yorke Peninsula; Eyre Peninsula; Murray lands. Sept.-Oct.—Eastern States.

11. **A. spinescens,** Benth. Rigid intricate shrub mostly under 1 m., with short striate spinescent branchlets, usually leafless, but sometimes retaining both pinnate leaves and phyllodia, the latter linear, 1-nerved, tapering towards the base, 1-5 cm. long, 2 mm. broad, with a curved or hooked point; heads sessile along the spine-tipped branchlets, 3-6-flowered; calyx bluntly 5-lobed, about ½ as long as petals; pod curved, moniliform, 2-3 cm. long, about 3 mm. broad; seeds longitudinal; funicle short, not folded.

Southern districts; Murray lands; Eyre Peninsula. Aug.-Oct.—Eastern States.

12. **A. montana,** Benth. Viscid shrub of 1-2 m.; phyllodia oblong, obtuse, 2-nerved, with anastomosing veins, 1½-3 cm. long, 3-6 mm. broad; heads many-flowered on solitary or twin peduncles 4-5 mm. long; calyx 5-lobed; petals free; pod linear densely tomentose, 3-5 cm. long, about 4 mm. broad; seeds longitudinal: funicle twice or thrice folded below the aril.

Murray lands. Sept.-Oct.—Eastern States.

13. **A. verniciflua,** A. Cunn. Viscid shrub of about 2m.; phyllodia lanceolate, 2-nerved, glandular-dotted under lens, acute with a short mucro, 4-8 cm. long, 5-12 mm. broad; heads 50-60-flowered on twin or ternate peduncles 5-6 mm. long; calyx 5-lobed; petals partly united; pod linear, straight, pubescent, 6-8 cm. long, 4-5 mm. broad; seeds longitudinal; funicle with 2 or 3 folds under the small aril. (Fig. 133, D.)

Mount Lofty Range. July-Sept.—Eastern States.

14. **A. dodonaeifolia** (Pers.) Willd. Viscid shrub to 6 m. high; phyllodia lanceolate, 4-10 cm. long, 4-10 mm. broad, 1-nerved, but appearing almost 3-nerved by the 2 fainter intramarginal nerves into which the lateral veins run; heads 30-40-flowered, on twin or solitary peduncles 8-12 mm. long; calyx 5-fid, the lobes clavate; pod linear, 6-10 cm. long, 5-6 mm. broad, swollen above the longitudinal seeds; funicle short, folded under the cup-shaped aril.

Southern districts; Eyre Peninsula. July-Oct.

15. **A. brachybotrya,** Benth. Shrub about ½-2 m. high, with pubescent branches; phyllodia obliquely obovate or oblong, 1-nerved, obtuse or mucronulate, glaucous with a minute pubescence or becoming glabrous with age, 1-3 cm. long, 5-15 mm. broad; heads 20-30-flowered, on pubescent peduncles 4-8 mm. long, solitary or 2-5 on a very short rhachis or common peduncle; sepals 5, ciliate, united half way up, but later splitting almost to base; petals united in the lower half, pubescent in the upper part; ovary pubescent; pod linear, almost straight, 3-4 cm. long, 5-6 mm. broad; seeds longitudinal; funicle short, once folded under the lateral boat-shaped aril.

Kangaroo Island; Yorke Peninsula; Flinders Range; Murray lands. Sept.-Oct.—Eastern States.

16. **A. argyrophylla,** Hook. Near the preceding; phyllodia 2-4 cm. long, obovate or oblanceolate, silky with silvery hairs, the young ones golden; peduncles usually twin, 8-20 mm. long, golden-pubescent; petals silky-pubescent; ovary pubescent; pod 10-12 mm. broad, sometimes contracted between the seeds, umbonate and hardened above them.—*A. brachybotrya,* var. *argyrophylla,* Benth.

North of Kapunda; Peterborough; Far North.—West Australia.

17. **A. Spilleriana,** J. E. Brown. Near *A. brachybotrya,* with similar foliage; peduncles slender, 10-17 mm. long, solitary or 2-3 on a short common rhachis; petals silky-pubescent in upper part; ovary glabrous; seeds usually oblique; pod 8-10 mm. broad.

Near Balaklava, Strathalbyn, Clare, Kapunda; southern part of Flinders Range; Murray lands.—West Australia.

18. **A. anceps,** DC. Glabrous shrub; phyllodia rigid, glaucous, ovate or oblong, 3-5 cm. long, decurrent, 1-nerved, with nerve-like margins; heads about 40-flowered, on stout solitary peduncles about half as long as phyllodia; calyx obtusely 5-lobed;

pod coriaceous, rigid, flat, 3-5 cm. long, about 12 mm. broad; seeds transverse; funicle long, twice folded almost round the seed, with a small aril.

Eyre Peninsula and adjoining islands; southern Yorke Peninsula: Arkaringa Creek. Summer.

Var *angustifolia*, Benth. Phyllodia narrower, like those of *A. notabilis*.—Eyre Peninsula and Denial Bay.

19. **A. Victoriae,** Benth. (1848). *Prickly Acacia.* Neat shrub 1-3m. high, the branches glabrous or pubescent; phyllodia glaucous, lanceolate-oblong or broad-linear, with 1 central nerve, 2-5 cm. long, 3-10 mm., rarely 15 mm. broad, with or without 2 stipular spines about 8 mm. long; heads pale yellow, about 30-flowered, on twin hoary peduncles 6-12 mm. long, usually in racemes through abortion of phyllodia; sepals 5, linear-spathulate: pod flattish, 4-6 cm. long, 10-13 mm. broad: seeds transverse, almost orbicular. *A. sentis*, F. v. M. (1854).

From near Brighton to the Far North; towards Broken Hill. Aug.-Dec.—Eastern States; Central and tropical Australia. The specific name was given because the type was collected on the Victoria River, or Upper Barcoo, in Queensland.

20. **A. iteaphylla,** F. v. M. Glabrous shrub with drooping branches; phyllodia broad-linear, acute, 1-nerved, with a curved mucro, 5-10 cm. long, 4-6 mm. broad; heads (each at first enclosed in a large brown ciliolate ovate bract) about 12-flowered, 8-12 on slender peduncles in a raceme much shorter than the phyllodium; sepals 5, minute, setaceous; petals free; pod linear, flattish, with nerve-like margins, 6-12 cm. long, about 8 mm. broad; seeds longitudinal; funicle with 2 or 3 short folds, arillate.

Flinders Range. July-Sept.

21. **A. rhetinodes,** Schlecht. Glabrous shrub or small tree; phyllodia linear-lanceolate or lanceolate, comparatively thin, 1-nerved, the lateral veins inconspicuous, acute with a straight or curved point, 8-16 cm. long 3-15 mm. broad (or broader and thicker in maritime specimens); heads 20-30 flowered, 6-12 in racemes much shorter than phyllodia; calyx shortly 5-lobed, more than half as long as the glabrous corolla, the lobes tufted-ciliate; pod usually straight and with an almost straight edge, 3-12 cm. long, 6-9 mm. broad, flattish; funicle long, encircling the longitudinal seeds in a double fold.

Southern districts; Eyre Peninsula. Sometimes known as "Swamp Wattle" or "Silver Wattle." Mostly in summer.—Victoria. The specific name is the Greek *rhētinŏdēs*, resinous, and refers to the yield of gum.

Var. *angustifolia* (Benth.), J. M. Black. Branches zigzag; phyllodia incurved, obtuse, 3-5 mm. broad; peduncles often solitary in axil; pod usually curved, 8-20 cm. long; funicle as in the type.—*A. pycnantha* var. *angustifolia*, Benth. (1864); *A. rhetinodes*, Schlecht. var. *Gillii*, Maiden (1908).—Eyre Peninsula. Perhaps a distinct species.

22. **A. rivalis,** J. M. Black. *Silver Wattle.* Shrub of 3-4m., with drooping branches; phyllodia linear lanceolate, curved, glabrous but shining, 1-nerved, with a curved mucro, 4-7 cm. long, about 3 mm. broad: heads about 40-flowered, on hoary peduncles 7-8 mm. long, solitary or 4-10 in a short raceme owing to abortion of phyllodia; calyx with 5 short tufted-ciliate lobes, half as long as the free hairy petals; pod almost straight or curved, moniliform, 7-12 cm. long, 4-6 mm. broad across the longitudinal seeds: funicle rather long, once folded and half encircling the seed.

Flinders Range, from Hawker to Mt. Lyndhurst. Produces valuable gum. Sept.-Oct.

PLATE 25.—5, bud; 6, petals; 7, bracteole; 8, seed.

23. **A. Murrayana,** F. v. M. Small glabrous tree; phyllodia linear, 8-20 cm. long, 2-7 mm. broad, with a hard hooked point and usually a gland below it, 1-nerved with obscure reticulating veins; heads 30-50-flowered, on 2-4 slender peduncles forming racemes 2-3 cm. long; sepals usually 5, linear-spathulate, ciliate, more than half as long as the glabrous petals; ovary glabrous; pod broad-linear, membranous, flat, 5-6 cm. long, about 8 mm. broad; seeds transverse; funicle short, with 2 or 3 folds under the seed.

Gawler Range; country north of Cooper's Creek. Aug.-Oct.—Western New South Wales and Queensland.

24. **A. salicina,** Lindl. *Native Willow, Broughton Willow.* Tree 6-15m. high, with drooping branches and foliage; phyllodia broad-linear or lanceolate, 1-nerved, 4-12 cm. long, 4-20 mm. broad; heads pale yellow, 15-25-flowered, solitary or 2-6 in racemes usually shorter than phyllodia, rather distant and sometimes appearing paniculate by abortion of phyllodia; calyx almost truncate, minutely 5-lobed; pod woody, with thick almost straight edges, 4-12 cm. long, about 10 mm. broad; seeds longitudinal; funicle scarlet, thick, in 3-4 folds below the seed.—*A. salicina*, var. *varians*, Benth.; *A. varians*, Benth.

Growing near water or on alluvial flats and propagating itself chiefly by suckers; Broughton River to Flinders Range and Far North. Most of the year.—New South Wales; Queensland; Central Australia; tropical West Australia.

PLATE 26.—1, branch with pod; 2, phyllodium; 3, lower end of phyllodium; 4, flower; 5, seed and funicle.

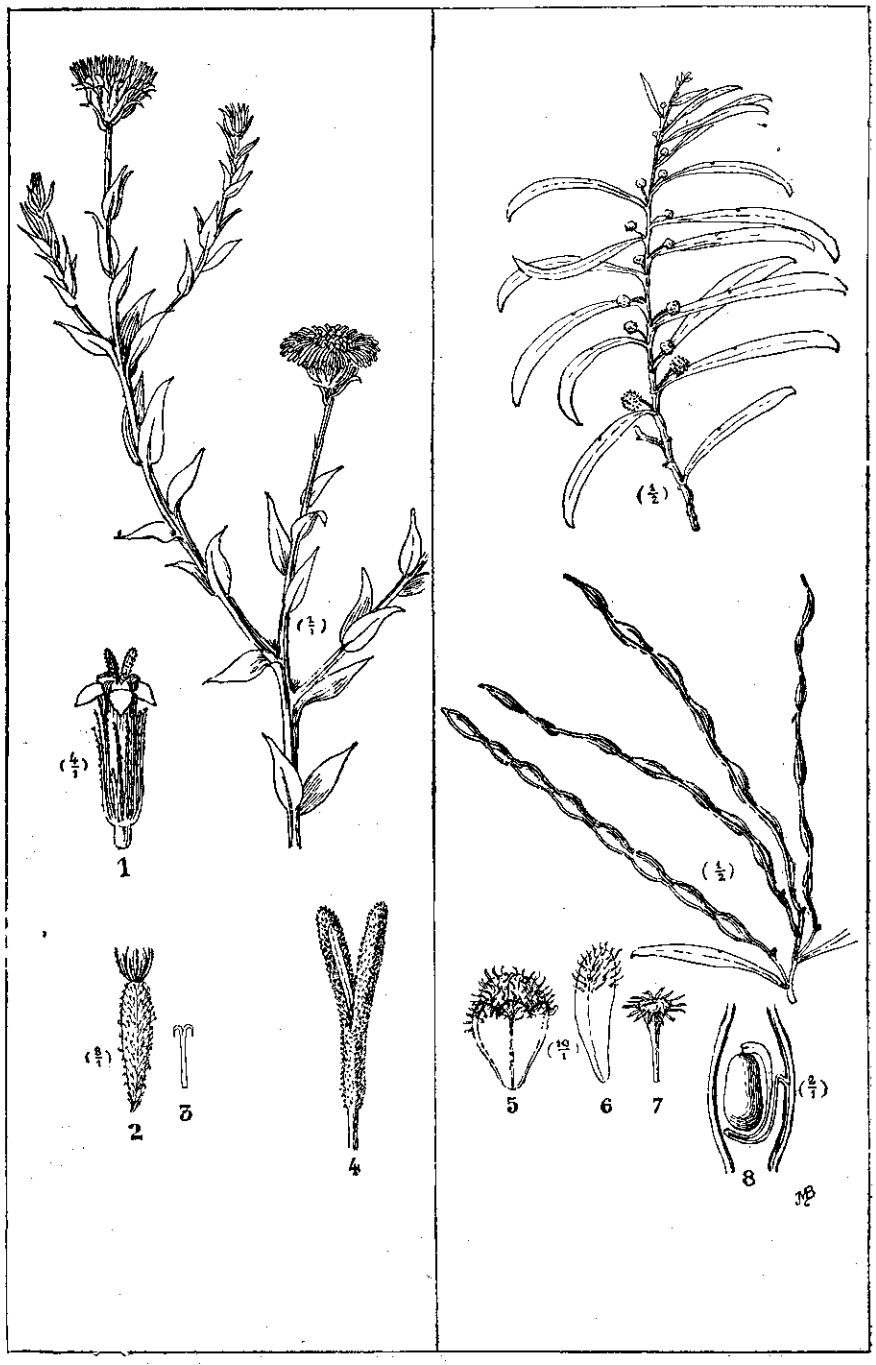

PLATE 25.—(1-4) **Minuria rigida**; (5-8) **Acacia rivalis.**

25. **A. ligulata,** A. Cunn. *Umbrella Bush.* Shrub 1½-5 m. high; phyllodia linear or linear-oblong, rather thick, obtuse, 1-nerved, 3-10 cm. long, 3-8 mm. broad; heads bright yellow, about 20-flowered, solitary or 2-5 in racemes much shorter than phyllodia; calyx almost truncate; pod hard, 5-10 cm. long, more or less constricted and always brittle between the seeds, 5-10 mm. broad over the longitudinal seeds; funicle scarlet or

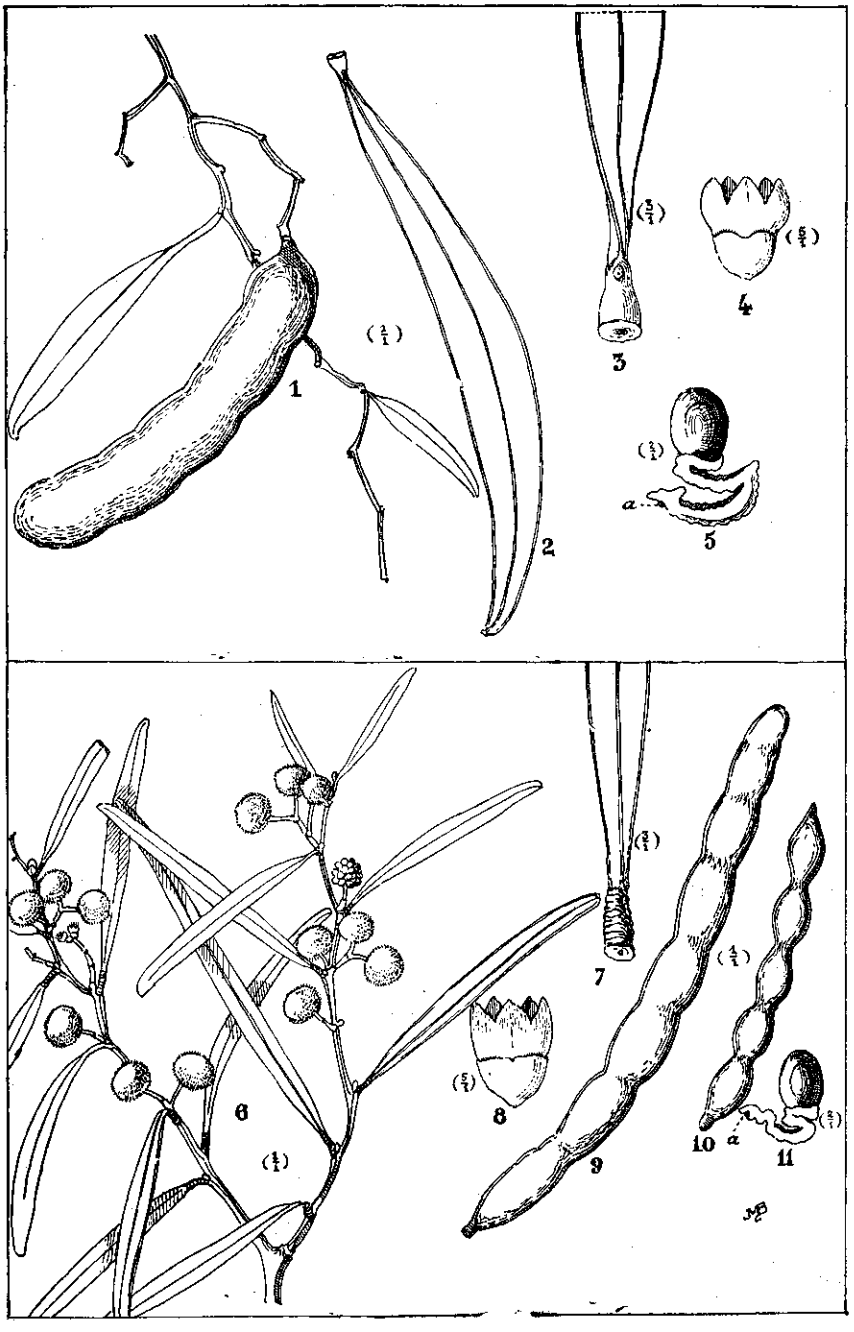

PLATE 26.—(1-5) **Acacia salicina;** (5-11) **A: ligulata.**

yellow, folded as in the preceding.—*A. salicina*, Benth. non Lindl.; *A. salicina* var. *Wayae*, Maiden.

All over the State except the South-East. Aug.-Oct.—Dry parts of Eastern States and of West Australia; Central Australia.

PLATE 26.—6, flowering branch; 7, lower end of phyllodium; 8, flower; 9, 10, pods; 11, seed and funicle.

26. **A. Wattsiana,** F. v. M. Glabrous shrub of 1½ m.; phyllodia oblanceolate, 1-nerved, obtuse, 3-6 cm. long, 4-8 mm. broad; heads 4-6, 15-20-flowered in racemes about half as long as phyllodia; calyx 5-toothed, ciliolate, about ⅓ as long as the glabrous corolla; pod linear, almost straight-edged, 6-12 cm. long, 6-7 mm. broad; seeds longitudinal; funicle long, encircling the seed in a double fold, arillate.

Gladstone to Beetaloo (Flinders Range); Booborowie. Oct.-Dec.

27. **A. hakeoides,** A. Cunn. Tall glabrous shrub; phyllodia oblanceolate, rigid, obtuse, 1-nerved, 4-12 cm. long, 6-12 mm. broad, rigid; heads rarely solitary, usually 6-12, about 25-flowered, on short spreading peduncles forming a raceme sometimes almost as long as the phyllodia; sepals 5, at first united, pubescent at summit, half as long as the free glabrous or pubescent petals; pod curved, 7-10 cm. long, moniliform, 5-6 mm. broad over the longitudinal seeds; funicle short, arillate.

Dublin scrub to Flinders Range and Far North; Peterborough; Yorke and Eyre Peninsulas; Murray lands. June-Sept.—Eastern States.

28. **A. myrtifolia.** (Sm.) Willd. Glabrous shrub 1-2 m. high; phyllodia obliquely obovate or oblong-lanceolate, acuminate, 4-6 cm. long, 10-20 mm. broad, coriaceous, with 1 prominent nerve, nerve-like margins, and a gland below the middle; heads pale yellow, 2-4-flowered, in racemes about as long as, rarely longer, than phyllodia; calyx 4-toothed, much shorter than corolla; pod linear, curved, with thick margins, 4-7 cm. long, 4 mm. broad; seeds longitudinal; funicle short, arillate. (Fig. 133, A.)

Mt. Lofty Range; Eyre Peninsula; South-East. Sept.-Oct.—Temperate Australia.

Var. *angustifolia*, Benth. Phyllodia linear-lanceolate, to 10 cm. long, 4-7 mm. broad.—Kangaroo Island; West Australia.

29. **A. pycnantha,** Benth. *Golden Wattle.* Glabrous shrub or small tree; phyllodia lanceolate, 1-nerved, rather acute, the lateral veins conspicuous, more or less curved, with a rather large gland on the margin near the base or towards the middle, 8-20 cm. long, 8-50 mm. broad; heads large, fragrant, golden, 70-80-flowered, 6-12 in racemes shorter than phyllodia; calyx shortly 5-lobed, tufted-ciliate on lobes, more than half as long as the glabrous corolla; pod almost straight, 5-12 cm. long, 5-7 mm. broad, flattish but convex over the longitudinal seeds; funicle short, once folded and thickened upwards into a fleshy aril.

Southern districts to Flinders Range; Yorke Peninsula; Kangaroo Island; Murray lands; South-East. Sept.-Oct.—Eastern States. Valuable for its tanning bark and gum.

30. **A. gladiiformis,** A. Cunn. Resembles *A. notabilis,* but the rigid phyllodia are mostly narrower (linear-lanceolate) and more curved, usually with 2 or 3 distant glands along the upper margin; the 5 petals silky-pubescent; pod linear, coriaceous, about 5 mm. broad, with longitudinal seeds encircled by the funicle in a double fold.

Has been found in the Barrier Range, N.S.W., close to our border, and therefore probably occurs in our North-East. Summer.

31. **A. notabilis,** F. v. M. Glabrous shrub 1-3 m. high; phyllodia oblong-lanceolate, thick and rigid, obtuse, 5-15 cm. long, 5-25 mm. broad, 1-nerved with nerve-like margins and usually a gland near the base; heads about 50-flowered, 4-15 in racemes shorter than phyllodia; calyx shortly 5-lobed, tufted-ciliate, readily separating into sepals, longer than the papillose or pubescent corolla; pod straight, broad-linear, with nerve-like margins, 3-7 cm. long, about 10 mm. broad; seeds transverse; funicle long, encircling the seeds in a double fold; aril slender.

Southern districts to Flinders Range; Yorke Peninsula; Eyre Peninsula to Gawler Range and Fowler's Bay; South-East. Aug.-Nov.—New South Wales.

32. **A. calamifolia,** Sweet. Shrub of 2-3 m.; phyllodia compressed-terete, with a curved point at summit, obscurely 1-nerved on each face, 3-10 cm. long, about 1 mm. broad, sometimes whitish; flowerheads solitary or twin, rarely 3 or 4, on a very short common rhachis, or sometimes shortly racemose through abortion of the phyllodia, 30-40-flowered; sepals 5, spathulate, ciliolate, at first united; pod moniliform, wrinkled, 8-20 cm. long, 6 mm. broad across seeds, and brittle between them; seeds oblong, longitudinal, half encircled by the funicle in a double fold.

Murray lands to Flinders Range; Eyre Peninsula. July-Nov.—Eastern States. Seems to differ from *A. scirpifolia*, Meisn., only by the length and folds of the funicle.

Var. *euthycarpa*, J. M. Black. Pod almost straight-edged, smooth, 7-11 cm. long, 6-7 mm. broad; funicle completely surrounding the seed in a double fold.—Southern districts; Yorke Peninsula; Kangaroo Island; Eyre Peninsula. The pod resembles those of *A. pycnantha* and *A. rhetinodes*, and that of *A. juncifolia*, which has also terete phyllodia, but the funicle is different.

33. **A. gonophylla,** var. *crassifolia*, Benth. Phyllodia rigid, subtetragonous, curved, 1½-3 cm. long, 3 mm. thick, with a straight almost pungent point; heads about 20-flowered, on solitary or twin peduncles shorter than phyllodia; sepals 5; pod linear, flat; seeds longitudinal.

Eyre Peninsula; Eucla. Sept.-Oct.—West Australia.

34. **A. Bynoeana,** Benth. Viscid shrub nearly 2m. high; phyllodia compressed-linear, more or less 2-nerved on each face, sometimes almost 1 or 3-nerved, 1½-2½ cm. long, 1½-2 mm. broad, obtuse with a curved point, or linear-lanceolate and 3 mm. broad; heads about 20-flowered, solitary or twin on a very short common rhachis, the peduncles pubescent and 2-3 mm. long; calyx 5-toothed, pubescent; pod linear, much curved or twisted, 4-6 cm. long, about 3 mm. broad; seeds longitudinal, oblong; funicle short, twice bent behind the large aril.—*A. Wilhelmiana*, F. v. M.

Murray lands. Aug.-Sept.—North-west Victoria; Central and tropical Australia. These northern (and tropical) specimens have solitary and longer peduncles.

PLATE 28.—7, branchlet; 8, flower; 9, bracteole; 10, summit of phyllodium; 11, pod; 12, transverse section of 2 phyllodia; 13, seed.

35. **A. patens,** F. v. M. Glabrous shrub; phyllodia rigid, lanceolate, pungent-pointed, 1-nerved, 1-2 cm. long, 2½-5 mm. broad; heads 50-60-flowered, on solitary peduncles longer or shorter than phyllodia; sepals 5, ciliate; pod straight, flattish, 2-3 cm. long, 3 mm. broad, moniliform; seeds almost longitudinal.

Oodnadatta to Birksgate Range. July-Sept.—Central Australia; West Australia.

36. **A. rupicola,** F. v. M. Glabrous somewhat viscid shrub, 1-1½ m. high; phyllodia linear-lanceolate, 1-nerved, rigid, pungent-pointed, broad and swollen at base, 6-20 mm. long, 1½-2½ mm. broad; heads about 20-flowered, on solitary peduncles longer or shorter than phyllodia; calyx glabrous, shortly 4-lobed; pod linear, rugose, scarcely contracted between the longitudinal seeds, 5-8 cm. long, about 5 mm. broad; funicle much folded and thickened into a broad aril.

Mount Lofty Range to Flinders Range; Yorke Peninsula; Eyre Peninsula and adjacent islands: Kangaroo Island. Aug.-Nov.—Western Victoria.

37. **A. Merrallii,** F. v. M. Shrub with pubescent branchlets; phyllodia rigid, obliquely ovate or obovate, 8-20 mm. long, at first pubescent, 1-nerved with a curved pungent mucro, the margins thickened and nervelike; heads about 20-flowered, on solitary or twin peduncles longer or shorter than phyllodia; sepals 5, linear; pod curved, slender, moniliform; seeds longitudinal, arillate.

Minnipa, E.P.; near Fowler's Bay. Sept.-Oct.—West Australia.

38. **A. vomeriformis,** A. Cunn. Almost procumbent shrub, with pubescent branches; phyllodia obliquely lanceolate, lobed on the upper margin towards the base or broadly triangular, rigid and pungent-pointed, 4-8 mm. long, the midrib near the lower margin; heads about 20-flowered, on solitary peduncles about as long as the phyllodia; calyx obtusely 4-lobed; pod linear, about 4 mm. broad, constricted between the seeds, which are suborbicular; funicle short without aril.

Mount Lofty Ranges; 90-Mile Desert. Aug.-Sept.—Eastern States.

39. **A. Carnei,** Maiden. Small tree with hoary branches; phyllodia at first pubescent, tetragonous, rigid, pungent-pointed, nerved at each angle, 2-5 cm. long, 1½-2 mm. thick; heads 40-50 flowered, on solitary hoary peduncles, about ½ as long as phyllodia; calyx usually 5-lobed ciliate and pubescent all over; petals twice as long, papillose towards summit; ovary subglobular, pubescent; only pod seen 2 cm. long, 8 mm. broad, hard, narrowed at both ends, with 1 unripe seed, apparently transverse.

From Mingary railway station and Boolcoomatta Range westward to Koonamore Station. Aug.-Sept.—Broken Hill district, N.S.W. No ripe seeds have yet been found, the tree propagating itself chiefly, if not wholly, by suckers.

40. **A. strongylophylla,** F. v. M. Rigid glabrous shrub; phyllodia rhomboid-orbicular, glaucous, 1-2 cm. long, 8-20 mm. broad, midnerve ending in a pungent mucro, lateral nerves prominent; stipular spines 5-10 mm. long; heads about 40-flowered, on solitary or twin peduncles as long as phyllodia; sepals 5, linear-spathulate; pod oblong, flat, about 6 cm. long, 10 mm. broad; seeds transverse.

From near Oodnadatta to Birksgate Range. July-Sept.—Central Australia.

41. **A. Prainii,** Maiden (1917). Glabrous shrub 1½-2 m. high; phyllodia rigid, narrow-linear, with a prominent nerve on each face, so as to appear 4-ribbed and 4-furrowed, pungent-pointed, 3-9 cm. long, 1½-2 mm. broad, somewhat viscid; heads 15-20-flowered, 3-5 in short racemes, the floral axis sometimes extending and bearing phyllodia after flowering; sepals 5, linear-spathulate, glabrous; corolla twice as long; ovary glabrous.—*A. prolifera*, J. M. Black (1920).

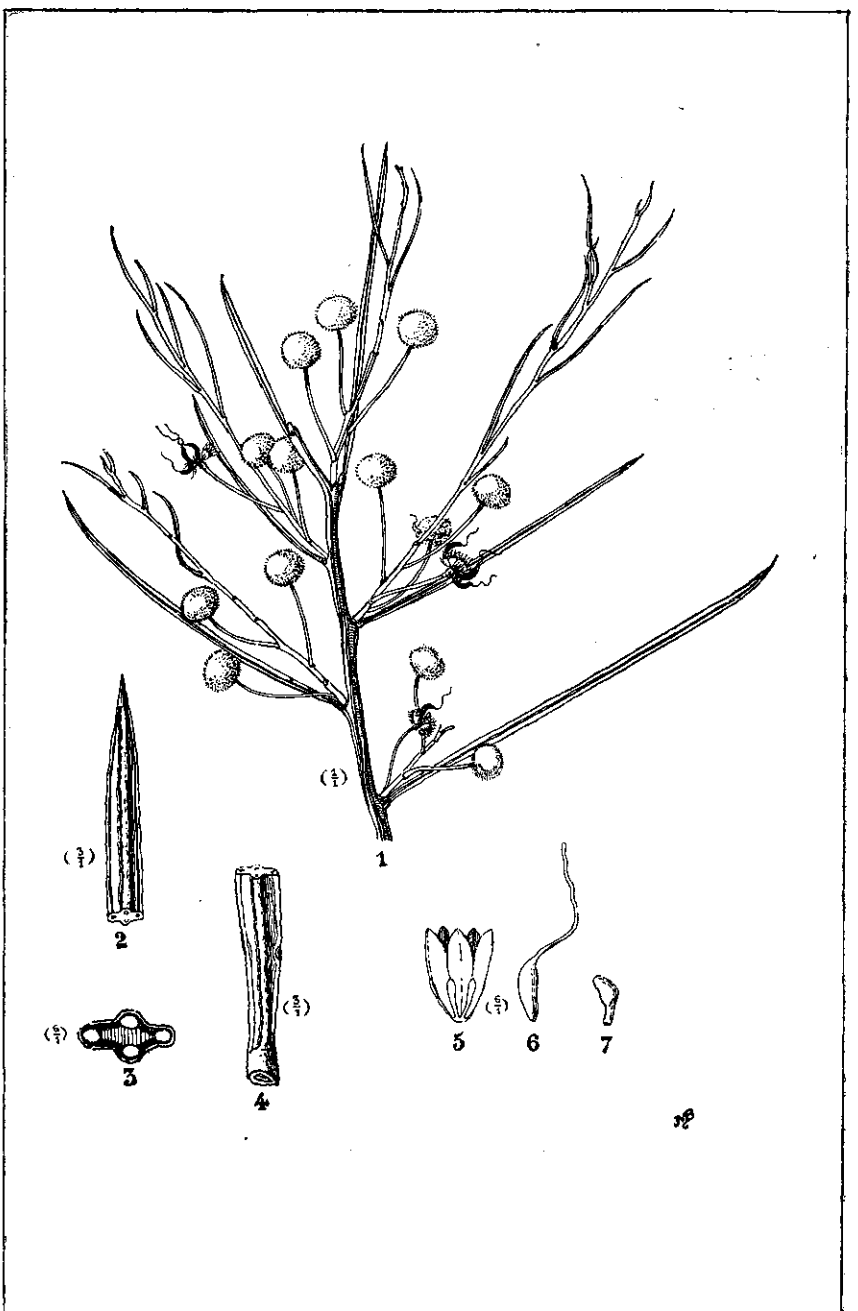

PLATE 27.—**Acacia Prainii.**

Barton (East-West Railway). Sept.—The type of *A. Prainii*, from Southern Cross, W.A., is described as 60 cm. to 1 m. high, with phyllodia about 3 cm. long. Pods have not been found either at Barton or in West Australia. The identification is on the authority of Mr. J. H. Maiden and the drawing on the plate is from the Barton plant (*A. prolifera*).

PLATE 27.—1, flowering branch; 2, summit of phyllodium; 3, transverse section of phyllodium; 4, lower part of same; 5, flower; 6, carpel; 7, bracteole.

42. **A. tetragonophylla,** F. v. M. Tall glabrous shrub; phyllodia usually clustered, angular-subulate, pungent-pointed, 1-3 cm. long, about 1 mm. broad, with 1 or 2 prominent nerves on each face; heads about 50-flowered, on peduncles solitary in axils or appearing as a cluster of 2-4, about as long as phyllodia; sepals 5, linear-spathulate, ciliolate; pod moniliform, much curved or twisted, 7-8 cm. long, 5-6 mm. broad across the longitudinal seeds; funicle thick, yellow, completely encircling the seed once.

Flinders Range to the Far North; eastward to Broken Hill, and westward to Musgrave Range. Ooldea and even the Nullarbor Plain. June-Sept.—New South Wales; Central Australia.

43. **A. estrophiolata,** F. v. M. *Ironwood.* Tree sometimes 12-15 m. high, glabrous; phyllodia linear, acute, with a slightly curved mucro, 3-nerved, 4-10 cm. long, 2-3 mm. broad; heads solitary or twin on very short peduncles; sepals 5, free, spathulate, ciliate; petals free, nearly twice as long; pod flattish, linear: seeds longitudinal, with a filiform funicle and no aril.

Alberga River (west of Oodnadatta). July-Aug.—Central Australia.

Allied to this species is *A. trineura,* F. v. M., with oblong-cuneate obtuse mucronate phyllodia, 4-5 cm. long, 6-8 mm. broad, 3-nerved, with reticulating veins; heads 3-6 in very short racemes; sepals 5, linear-spathulate; pod about 3 cm. long, narrow, scarcely contracted between the longitudinal seeds; funicle folded several times below the oblique aril. It grows in north-western Victoria, and near the River Darling, N.S.W., and may therefore be found in our eastern Murray lands.

44. **A. Basedowii,** Maiden. Shrub with white-mealy branchlets ending in spines; phyllodia linear-cuneate, thick, obscurely 3-5-nerved, sprinkled with short white hairs, becoming glabrous, obtuse, with a straight minute mucro, 1-2 cm. long, 2½ mm. broad; heads about 30-flowered on solitary or twin peduncles about 1 cm. long; calyx obtusely 5-lobed, ciliate; petals with a few hairs; ovary glabrous; pod unknown.

Musgrave and Blyth Ranges. Maiden says this is the same as *A. ulicina,* Meisn, var. *oxyclada* F. v. M. et Tate, from the MacDonnell Range. The two specimens of the plants collected by Tietkens and Helms and preserved in the Tate Herbarium have phyllodia glabrous except for glands only visible under the microscope and the petals are glabrous except for a few short cilia near the summit.

45. **A. cyclopis,** A. Cunn. Glabrous shrub of 2-3 m.; phyllodia oblong-lanceolate, obtuse with a small lateral mucro, 4-7 cm. long, 5-7 mm. broad, 3-5-nerved; heads about 40-flowered, on short peduncles usually 2-3 on a short rhachis; calyx 5-toothed, ⅔ as long as corolla; pod flat, coriaceous, curved or twisted, 4-9 cm. long, 8-12 mm. broad; seeds longitudinal, encircled by the thick red funicle in a double fold.

Fowler's Bay; Eucla. Dec.-Feb.—West Australia.

46. **A. melanoxylon,** R. Br. *Blackwood.* Tree 8-15 m. high, glabrous except the young shoots; phyllodia broadly oblong-lanceolate, obtuse, 6-10 cm. long, 12-20 mm. broad, with usually 4 longitudinal nerves and many reticulating veins; heads pale yellow, 30-50-flowered, on 2-4 peduncles forming a raceme much shorter than phyllodia; calyx shortly 5-lobed, ciliate; pod broad-linear, flattish, 4-12 cm. long, 7-10 mm. broad, twisted; seeds longitudinal; funicle thick, pink, encircling the seed in a double fold.

Mount Lofty and Barossa Ranges; Flinders Range near Wirrabara; South-East. Sept.-Oct. Victoria; New South Wales; Tasmania. The timber is dark and is used for furniture making and other purposes.

47. **A. dictyophleba,** F. v. M. Glabrous very viscid shrub; phyllodia oblanceolate, 2-4 cm. long, 5-10 mm. broad, coriaceous, with 3 longitudinal nerves and a reticulation of connecting lateral veins, sometimes all very prominent; heads about 50-flowered, sticky, on solitary peduncles rather shorter than phyllodia; calyx with 5 thick teeth, ⅔ as long as corolla; pod flattish oblong, 5-9 cm. long, 12-15 mm. broad, varnished, with nerve-like margins, seeds transverse.

Near Cooper's Creek and Arkaringa Creek; Birksgate Range. July-Aug.—Central Australia. In some of the Central Australian specimens the phyllodia are 5-6 cm. long and 15-18 mm. broad.

48. **A. coriacea,** DC. Shrub or small tree; phyllodia narrow-linear, hoary, multistriate with very fine nerves, rather rigid, 20-30 cm. long, about 2 mm. broad; heads 20-25-flowered, usually twin, on hoary peduncles 6-12 mm. long, calyx pubescent, shortly 5-lobed; corolla pubescent; pod 15-23 cm. long, 8-10 mm. broad over the longitudinal seeds, moniliform, twisted; funicle short, dilated into a thick aril.

Far North. Winter and Spring.—Central Australia; West Australia.

49. **A. stenophylla,** A. Cunn. Tree; phyllodia broad-linear, multistriate, 15-40 cm. long, 3-6 mm. broad, more or less hoary; heads 25-30-flowered, on usually 2-6 hoary peduncles 6-10 mm. long, arranged on a very short common rhachis; calyx with 5 short pubescent lobes; petals pubescent; pod 10-15 cm. long, coriaceous, moniliform, 10 mm. broad over the longitudinal seeds; funicle short, scarcely folded.

Murray lands; west of Lake Eyre; Far North. Most of the year.—Eastern States; Central Australia.

50. **A. Loderi,** Maiden. Differs from the following in the phyllodia narrower (1½-2 mm. broad), rather thicker and more rigid, 7-11 cm. long, hoary, and with the same long curved point; peduncles in clusters of 2-6; pod membranous, moniliform, 8-10 cm. long, 5 mm. broad across the longitudinal seeds; funicle in 2 or 3 folds below the aril.

Thackaringa and other parts of the Broken Hill district, N.S.W., close to our border. Sept.-Oct. A form with smaller pods is recorded from Tarcoola and Kingoonya.

51. **A. Sowdenii,** Maiden. *Myall.* Shrub or small tree 2-5 m. high, with drooping branches; phyllodia linear, narrowed at base and tapering into a fine curved point, 4-8 cm. long, 1½-3 mm. broad, at first silvery-pubescent, striate with several fine longitudinal nerves; heads 20-25-flowered, on 2-4 clustered hoary peduncles 2-5 mm. long; sepals 5, linear-spathulate, ciliate; ovary pubescent; pod curved, reticulate, scarcely contracted between the seeds, about 10 cm. long, 6 mm. broad; funicle folded below the longitudinal seed, with a small aril.

Port Augusta to Ooldea. Sept.-Oct.

52. **A. farinosa,** Lindl. Low shrub with hoary branchlets; phyllodia broad-linear, more or less cuneate, thick and rigid, obtuse with a minute point, 1¼-4 cm. long, 2-6 mm. broad near summit, striate with about 7 parallel nerves, which sometimes anastomose, smooth when fresh, appearing wrinkled when dry, usually with a gland near the base; heads 15-20-flowered, mealy before opening, on twin hoary spreading peduncles 2-3 mm. long; sepals 5, linear-spathulate, ciliate; petals mealy; pod curved and twisted, 3-5 cm. long, 2-3 mm. broad; seeds longitudinal; funicle short, folded below the thick aril.—*A. Whanii,* F. v. M.

Kangaroo Island; Murray lands; Eyre Peninsula. Sept.-Oct.—Dry parts of Victoria and New South Wales.

53. **A. sclerophylla,** Lindl. Near the preceding, but glabrous and viscid; phyllodia without any gland, usually sprinkled at first with a mealy clothing which soon wears off, 3 of the nerves prominent on each face; petals not mealy; pod similar, sometimes slightly contracted between the seeds; peduncles glabrous, usually twin, but sometimes 3 or 4 together in the axil.

Dublin scrub to Hummocks Range; Yorke Peninsula; Murray lands; Eyre Peninsula. Aug.-Oct.—Dry parts of Victoria and New South Wales.

Var. *lissophylla,* J. M. Black. Phyllodia very rigid, smooth, glaucous, 1½-2½ cm. long, 3-4 mm. broad in upper part, the nerves so fine as to be visible only under the lens, the mucro usually curved; peduncles twin, 2-4 mm. long.—Yorke Peninsula.

54. **A. Cambagei,** R. T. Baker. *Gidya, Stinking Wattle.* Tree 5-8 m. high; phyllodia lanceolate with a small curved point, grey-mealy, striate with many fine nerves, 1 or 2 more prominent, 3-14 cm. long, 4-10 mm. broad, often curved, smelling offensively in wet weather; heads 12-20-flowered, on 2-10 hoary peduncles about 4 mm. long, often arranged on a very short common rhachis; sepals 5, ciliate; petals twice as long, pubescent; pod flattish, almost straight-edged, about 7 cm. long and 8 mm. broad; seeds longitudinal; funicle short, filiform, not folded.

Far North. May-Sept.—Western New South Wales and Queensland; Central Australia. Formerly confused with *A. homalophylla,* A. Cunn, which has shorter phyllodia, a narrower pod constricted between the seeds, the funicle with several folds below the seed and dilated into a short aril. It belongs to western New South Wales (where it is known as "Yarran") and to western Victoria, but no authentic specimens have yet been found in our State.

55. **A. Oswaldii,** F. v. M. Shrub 2-5 m. high ; phyllodia when young silvery-pubescent, becoming glabrous, green or glaucous, linear or lanceolate, acute or obtuse, multistriate, with a short sometimes pungent central or lateral point, 2-6 cm. long, 2-8 mm. broad ; heads 12-15-flowered, sessile or almost, usually twin in each axil ; sepals 5, spathulate ; petals pubescent or almost glabrous ; ovary pubescent ; pod coriaceous and hard, 6-15 cm. long, 7-10 mm. broad, twisted and coiled, slightly contracted between the longitudinal seeds ; funicle orange, short, with 2 folds below the thick aril.

From the Dublin scrub northwards to the Flinders Range and Far North ; Yorke Peninsula ; Murray lands ; Eyre Peninsula to Fowler's Bay and Ooldea. Summer.—Dry parts of Victoria and New South Wales ; Central Australia.

56. **A. (?) papyrocarpa,** Benth. Tree about 7 m. high ; phyllodia compressed-terete, rigid, striate with many inconspicuous nerves, 2-3 cm. long, 1½ mm. broad, with a straight scarcely pungent point ; heads about 20-flowered, on solitary or twin peduncles about 8 mm. long ; sepals 4, spathulate, ciliolate ; petals free ; ovary pubescent ; pod membranous, flattish, curved, reticulate, not constricted between the seeds, about 10 cm. long, 7 mm. broad ; seed longitudinal.

Trinity Well, on MacDonnell Creek, south-west of Lake Blanche. Also collected in the Cavenagh Range, W.A., just beyond our border. Identification uncertain, because *A. papyrocarpa* was described by Bentham from specimens collected by R. Brown in "South Australia, south coast," without flowers, and the phyllodia are described as "2 to 3 inches long" (5-7½ cm.), with a recurved point.

57. **A. tenuior,** Maiden. Phyllodia compressed-terete, about 14 cm. long, with several prominent nerves and a weak point, sprinkled with short hairs ; heads 25-30-flowered on solitary or twin hairy peduncles, 10-15 mm. long ; sepals 5, spathulate, pubescent ; petals united in lower half ; ovary pubescent ; pod unknown.

Musgrave Ranges.

58. **A. rigens,** A. Cunn. Tall shrub, glabrous or hoary, sometimes viscid ; phyllodia compressed-terete, rigid, 2-12 cm. long, 1-2 mm. broad, striate, with several more or less conspicuous nerves and a straight or curved sometimes pungent point ; heads 12-30-flowered, the peduncles 1-3 in the axils and only 2-4 mm. long, hoary ; calyx sinuately 5-lobed, the lobes thickened and pubescent at summit, soon splitting towards base ; petals papillose and slightly pubescent in upper half ; pod curved and twisted, hoary, 5-7 cm. long, 2-2½ mm. broad, submoniliform ; funicle with 2 or 3 folds below the seed and thickened into a conical aril.

Murray lands on both sides of the river and north thereof ; Yorke and Eyre Peninsulas ; Gawler Range. July-Dec.—Dry parts of Victoria and New South Wales.

59. **A. Menzelii,** J. M. Black. Viscid shrub ; phyllodia terete, 1½-3 cm. long, curved, obtuse, with 6 resinous nerve-like furrows, heads about 25-flowered, on solitary or twin peduncles, 3-5 mm. long, glabrous ; calyx cut halfway into 5 obtuse ciliate lobes ; petals free ; pod linear, 2-4 cm. long, 2-3 mm. broad ; funicle with 3 short folds, thickened into a conical aril below the oblong seed.

Near Monarto South. Aug.-Sept.

PLATE 28.—1, branch ; 2, summit of phyllodium ; 3, valve of pod ; 4, transverse section of phyllodium ; 5, flower ; 6, bracteole.

60. **A. sessiliceps,** F. v. M. Phyllodia compressed-terete, 4-10 cm. long, 1½-2 mm. broad, multistriate, with a straight almost pungent point ; heads twin, sessile or subsessile ; sepals 5, free, ciliolate, oblanceolate ; petals pubescent in upper half ; pod broadly linear, much curved, tomentose ; funicle almost straight, terminating in a large aril.

Finke River, and therefore probably in our Far North or North-West. Spring.

61. **A. Gilesiana,** F. v. M. Shrub, with terete phyllodia 5-10 cm. long, 2 mm. diam., rigid, striate with several obscure nerves ; flowers apparently in heads forming short racemes ; unripe pod about 10 mm. broad, contracted between the seeds.

Mount Eba (north of Kingoonya, on the East-West Railway). The type, lent by the Victorian National Herbarium, consists of a branch with old glabrous phyllodia which have lost their points, without flowers or fruit, and the fragments of an unripe pod. Until fresh material is obtained it is impossible to place this plant satisfactorily.

62. **A. sublanata,** Benth. Small rigid pubescent shrub ; phyllodia lanceolate, obtusely gibbous on the upper margin, so as to be almost triangular, pungent-pointed, 3-5-nerved, 5-12 mm. long, 4-7 mm. broad ; heads 8-12-flowered, on solitary peduncles shorter than

phyllodia, each bud enclosed in a concave orbicular-cordate bracteole; calyx shortly 5-lobed, ciliolate; pod linear, small, spirally coiled. (Fig. 133, C.)—*A. pravifolia*, F. v. M. Flinders Range, north and south of Quorn. Most of the year.

63. **A. colletioides,** A. Cunn. Rigid almost glabrous shrub, 2-3 m. high; phyllodia very rigid, compressed-subulate, pungent-pointed, 1-3 cm. long, scarcely 2 mm. broad, striate with several inconspicuous or prominent nerves, not contracted at base but articulate

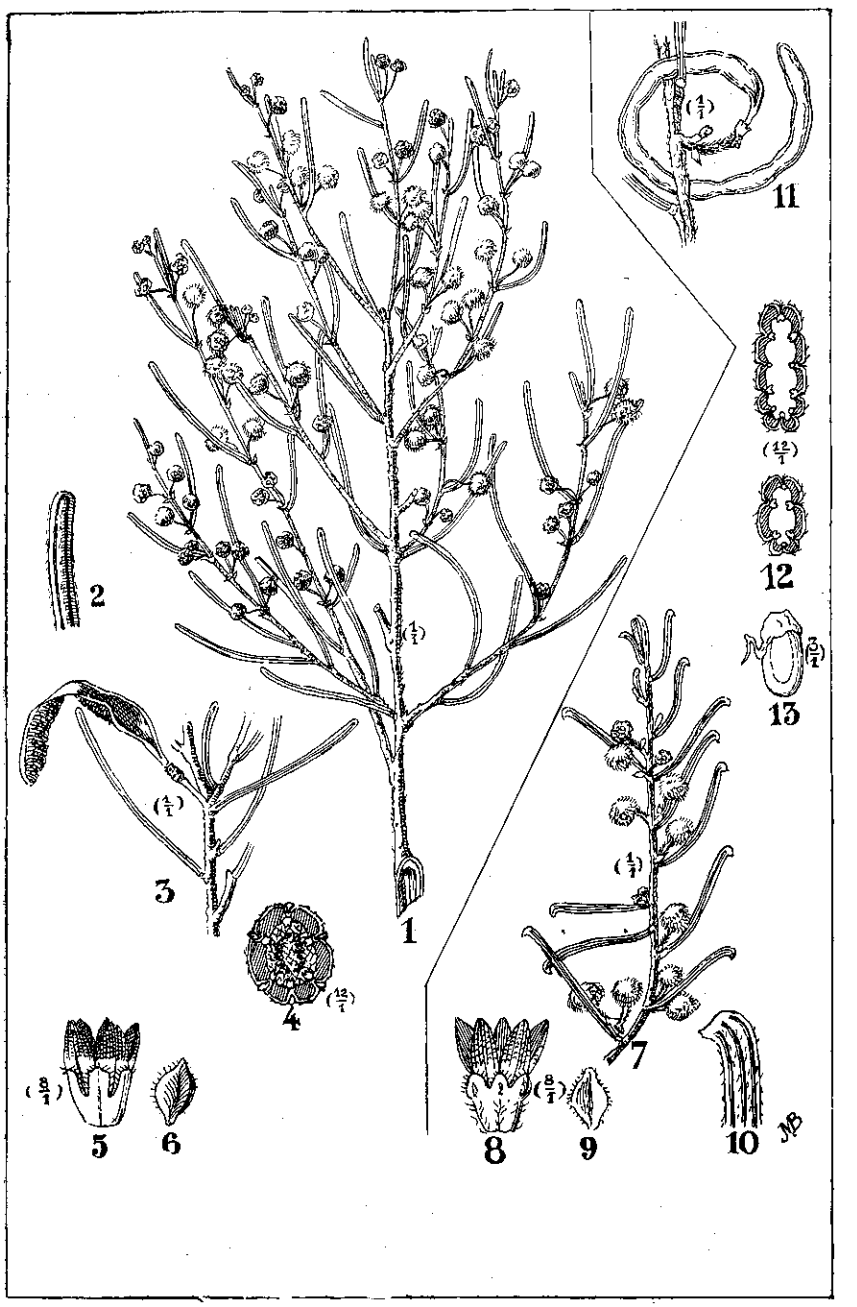

PLATE 28.—(1-6) **Acacia Menzelii;** (7-13) **A. Bynocana.**

on the branch ; heads 12-15-flowered, on peduncles solitary or in a cluster of 2-5, 3-5 mm. long ; sepals 5, linear-spathulate, ciliate ; ovary pubescent ; pod linear, flat, 4-5 mm. broad, curved, slightly contracted between the longitudinal seeds ; funicle with 2 or 3 folds below the thick yellow aril.

Dublin scrub northwards towards Flinders Range ; Yorke Peninsula ; Murray lands and north thereof to the Broken Hill railway ; Gawler Range and westward to Fowler's Bay and Ooldea. Aug.-Oct.—Dry parts of Victoria and New South Wales.

64. **A. rhigiophylla,** F. v. M. Rigid shrub of 1-1½ m. high ; phyllodia resembling those of *A. colletioides*, glabrous, rigid, pungent-pointed, divaricate, linear-lanceolate, 1-2 cm. long, about 2 mm. broad near the broad sessile base, with 3 prominent longitudinal nerves and about 4 less prominent ; heads globular or oblong, almost sessile, 6-10-flowered ; calyx cup-shaped, quite glabrous, with 4 acute lobes, about half as long as the glabrous corolla ; ovary glabrous ; pod linear, 6-8 cm. long, 5-6 mm. broad, slightly constricted between the longitudinal seeds ; funcile with 2 or 3 thick folds below the aril.

Scrub between Mount Barker and River Murray. Oct. It is remarkable that this plant does not appear to have been found here since the types (now in the Victorian National Herbarium) were collected by Mueller in October, 1848. Was recorded in 1902 from West Wyalong, New South Wales.

65. **A. verticillata** (L'Hér.), Willd. Slender glabrous shrub, usually 1-2 m. high ; phyllodia mostly whorled, subulate-tetragonous, pungent-pointed, 1-1½ cm. long, scarcely 1 mm. diam. ; flower-spikes 8-12 mm. long, on solitary peduncles shorter than the phyllodia ; sepals 4, spathulate, ciliate ; pod flat, linear, straight, acute, 2-4 cm. long, 3-4 mm. broad ; seeds longitudinal ; funicle short, twice folded below the small aril.

Mount Lofty Range to Flinders Range ; Kangaroo Island ; South-East. Sept.-Nov.—Eastern States.

66. **A. oxycedrus.** Sieb. Tall shrub with pubescent branches ; phyllodia rigid, lanceolate, pungent-pointed, mostly 2-3 cm. long, 3-5 mm. broad, with 3-4 prominent nerves on each face, rather broad at base ; flowerspikes 2-3 cm. long, on 1-3 short hoary peduncles ; calyx saucer-shaped, obtusely 4-lobed, pubescent ; petals 4, glabrous, much longer ; ovary pubescent ; pod subcylindrical, coriaceous, acute at each end, 6-7 cm. long, 4 mm. diam. ; seeds longitudinal ; funicle short, slender, terminating in a cup-shaped aril.

Mount Gambier to Millicent, South-East. Aug.-Oct.—Eastern States.

67. **A. Kempeana,** F. v. M. Tall glabrous shrub, viscid on the young foliage ; phyllodia oblong-lanceolate, obtuse, slightly curved, rigid, 3-6 cm. long, 4-12 mm. broad, smooth but striate with numerous very fine nerves, of which 3 are often more conspicuous ; flower-spikes 1½-2½ cm. long, on solitary or twin peduncles ; calyx pubescent, shortly 5-lobed ; petals glabrous, more than twice as long ; pod flat, oblong, very obtuse. 3-5 cm. long, about 10 mm. broad ; seeds transverse ; funicle twice folded under the aril.

Ooldea. Most of the year.—Central Australia, as far south as River Goyder ; New South Wales.

68. **A. longifolia** (Andr.), Willd. var. *Sophorae*, F. v. M. Glabrous shrub or small tree ; phyllodia oblong-lanceolate or oblong, obtuse, coriaceous, 6-12 cm. long, 15-30 mm. broad, with 2 to 5 rather prominent longitudinal nerves, reticulate between them ; flower-spikes about 3 cm. long, solitary or twin, subsessile ; calyx 4-lobed, ciliate ; pod curved and twisted, somewhat contracted between the longitudinal seeds, 12-15 cm. long, about 7 mm. broad ; funicle short, thick, once folded below the large cup-shaped aril.—*A. Sophorae*, (Labill.), R. Br.

Chiefly near the coast ; southern districts ; Yorke and Eyre Peninsulas ; South-East. Aug-Sept.—Eastern States.

69. **A. tarculensis,** J. M. Black. *Steel Bush.* Shrub 1-2 m. high ; phyllodia silvery-pubescent when young, becoming glabrous, oblong-lanceolate, coriaceous, obtuse, glaucous, striate with numerous fine nerves, 3 usually more conspicuous, about 3 cm. long, 8-14 mm. broad, resinous along the margin ; flower-spikes about 2 cm. long, solitary or twin, on very short pubescent peduncles ; calyx deeply 5-lobed, pubescent ; pod straight-edged, flattish, curved and twisted, hard, with thickened margins, densely tomentose, 6-9 cm. long, 10-12 mm. broad ; seeds longitudinal ; funicle with several folds below the aril.

Tarcoola.—May-Aug.

Plate 29 (1).—1, flower and bracteoles ; 2, carpel ; 3, calyx spread open.

70. **A. signata,** F. v. M. Shrub to 5 m. high; phyllodia linear-lanceolate, 10-14 cm. long, 4-7 mm. broad, striate with numerous fine nerves, 1 or 2 rather more prominent, the margins reddish and resinous; flower-spikes 1-2 cm. long, pedunculate; sepals 5, linear-truncate, ciliate; petals glabrous, twice as long; ovary pubescent; pod linear,

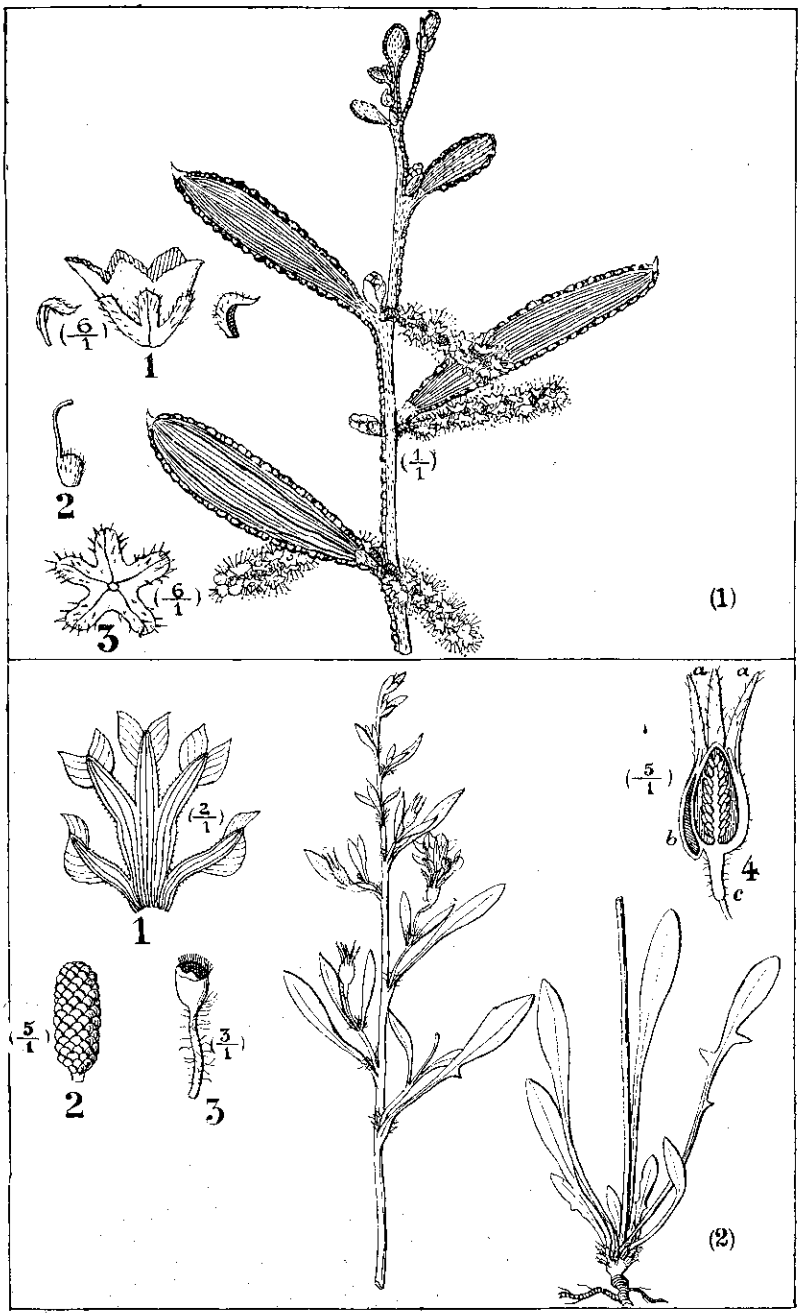

PLATE 29.—(1) **Acacia tarculensis;** (2) **Goodenia modesta.**

about 10 cm. long, 5 mm. broad ; seeds longitudinal ; funicle with 1 or 2 folds below the cup-shaped aril.

Moorilyanna Well, near the Everard Range. July-Aug.—West Australia.

A. doratoxylon, A. Cunn, which has longer phyllodia without reddish margins, the calyx pubescent, almost truncate, shortly and sinuately 5-lobed and the pod rather shorter and narrower, has been found in the MacDonnell Ranges, N. T., and at Ayer's Rock, very near our border, so that it may occur in South Australia. It also inhabits New South Wales (where it is known as "Currawang"), Queensland, and West Australia.

71. **A. aneura,** F. v. M. *Mulga.* Tall shrub or small tree ; phyllodia compressed-terete or narrow-linear, 3-7 cm. long, 1-2½ mm. broad, hoary with a minute pubescence, finely multistriate ; flower-spikes 1½-2 cm. long, pedunculate ; sepals 5, free, linear-spathulate, ciliate ; petals twice as long, united to above the middle, glabrous ; ovary papillose but glabrous ; pod flat, membranous, more or less viscid, 2-3½ cm. long, 10-14 mm. broad, conspicuously reticulate, narrowly winged ; seeds oblique or transverse ; funicle short, with 2 or 3 folds below the aril.

Northern part of Finders Range and throughout the Far North ; eastward to Broken Hill ; north of Eyre Peninsula and westward to Ooldea. At irregular periods.—Dry parts of New South Wales and Queensland ; Central Australia ; West Australia.

Var. *latifolia*, J. M. Black. Phyllodia linear-lanceolate, rather obtuse, rigid, 4-7 mm. broad.—Similar localities. The phyllodia of the broad-leaved variety are often almost indistinguishable from some of those of *A. Kempeana*, except that the latter are quite glabrous.

72. **A. brachystachya,** Benth. *Umbrella Mulga.* Large shrub with drooping branches ; phyllodia narrow-linear, thick, 5-18 cm. long, 1-3 mm. broad, finely multistriate, hoary ; flower-spikes 1½-2½ cm. long, pedunculate ; sepals 5, linear-spathulate, ciliate, united towards base ; petals twice as long, pubescent in upper half or glabrous, united to above the middle ; ovary pubescent ; pod coriaceous, flattish but biconvex when ripe, straight, broad-linear, 2-8 cm. long, 6-8 mm. broad, the valves tomentose with forked hairs and marked with broad brown longitudinal resinous anastomosing nerves which are particularly conspicuous in the young stage ; seeds longitudinal or oblique ; funicle short, folded and thickened below the fleshy aril.—*A. aneura*, F. v. M. var. *stenocarpa*, Benth. ; *A. cibaria*, F. v. M. partly.

Northern Flinders Range to Far North ; westward to Everard Range and Ooldea. At irregular periods.—Western New South Wales ; Central Australia.

73. **A. Burkittii,** F. v. M. Shrub 1-4 m. high ; phyllodia compressed-terete, 6-16 cm. long, about 1 mm. broad, faintly multistriate, more compressed in upper half and ciliolate, on margins up to the summit of the fine curved point ; flower-spikes twin, oblong, sessile, 8-10 mm. long, dense ; calyx pubescent, obtusely 4-lobed, ciliate ; petals twice as long, glabrous ; ovary silky-pubescent ; pod moniliform, pendulous, more or less curved, 5-12 cm. long, 7 mm. broad above the longitudinal ovoid or oblong seeds ; funicle with 3 short folds below the small aril.

Lake Gilles, Iron Knob, E.P. ; 80 miles north of Renmark. July-Oct.—Western New South Wales.

74. **A. Randelliana,** W. V. Fitzg. Near the preceding, of which it should perhaps be considered a variety ; differs chiefly in the pods, which are more curved, 5-8 cm. long, the seeds globular and the swollen parts of the pod above them taking the same shape, while the constrictions are narrower, so that the whole resembles a string of beads.

Near Ooldea. July-Sept.—West Australia.

PLATE 30.—1 flower ; 2, carpel ; 3, seed in pod ; 4, seed ; 5, embryo ; 6, upper part of phyllodium.

75. **A. cyperophylla,** F. v. M. *Red Mulga.* Tall shrub with reddish bark ; phyllodia almost terete, rigid, pungent-pointed, 8-20 cm. long, 1-2 mm. diam., finely multistriate, hoary ; flower spikes 1-2 cm. long, pedunculate ; calyx shortly and sinuately 5-lobed, pubescent ; petals glabrous, united to above the middle ; ovary papillose ; pod broad-linear, flattish, almost straight-edged, viscid on the thickened margins, acute, 5-8 cm. long, 6-7 mm. broad ; funicle short, thickened into 2 folds below the oblong, longitudinal seeds, which are 8-9 mm. long.

Far North.—Western New South Wales ; Central Australia. Usually growing near creeks.

76. **A. linophylla,** W. V. Fitzg. Tall shrub; phyllodia compressed-terete, rigid, hoary, finely multistriate, 8-18 cm. long, 1-1½ mm. broad; flowerspikes 1-2 cm. long on peduncles which are often twin; sepals 5, linear-spathulate, ciliate, united towards base; petals pubescent on upper half, united to above the middle; ovary pubescent; pod pendulous,

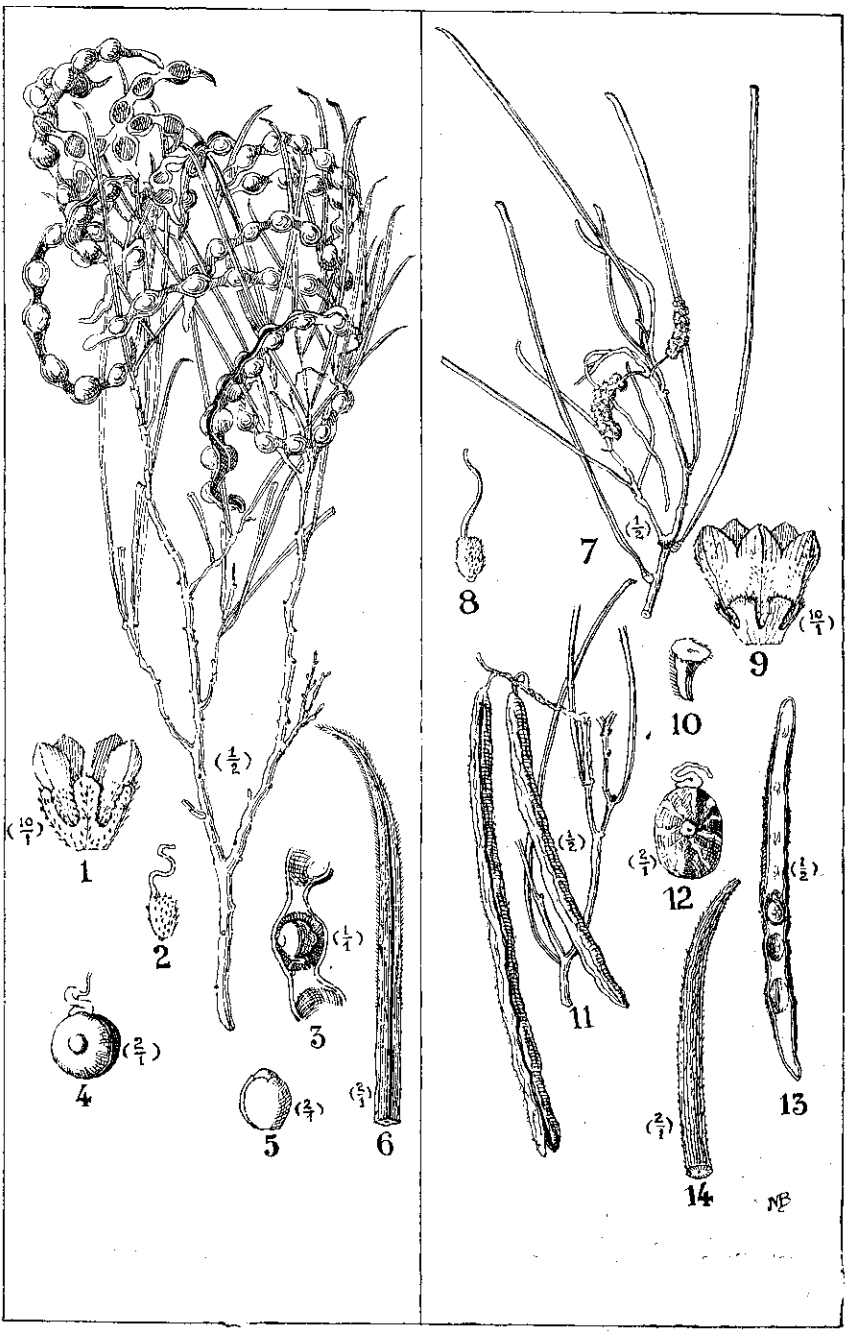

PLATE 30.—(1-6) **Acacia Randelliana;** (7-14) **A. linophylla.**

cylindrical, tapering somewhat at each end, 7-13 cm. long, 5-8 mm. diam., hoary with forked hairs, and marked with broad brown resinous nerves often anastomosing, valves finally woody and wrinkled, the longitudinal seeds (many abortive) embedded in cavities of the hard valves; funicle short, thickened into 2 folds below the small aril.

Mount Gunson westward to Ooldea. At irregular periods.—West Australia.

PLATE 30.—7, flowering branch; 8, carpel; 9, flower; 10, bracteole; 11, pods; 12, seed; 13, one valve of pod; 14, upper part of phyllodium.

78. **A. ramulosa,** W. V. Fitzg. Near the preceding, with similar foliage and flowers, the corolla pubescent all over on the outside; pod with the same tomentum and nerves, cylindrical or slightly compressed, when ripe coriaceous, 6-12 cm. long, 7-8 mm. diam., with pithy partitions between the longitudinal seeds.

Near Tarcoola and Ooldea; near Coward Springs, and similar flowering specimens from between Marree and Kopperamanna.—West Australia.

78. **A. Mitchellii,** Benth. Small shrub, with pubescent branches; leaves bipinnate, the pinnae in 2-3 pairs, the leaflets in 3-6 pairs, oblong, obtuse, 2-4 mm. long, rather thick; heads many-flowered, on slender peduncles as long as the leaves; sepals 5, linear-spathulate, ciliate; pod flat, with nerve-like margins, 2½-5 cm. long, 5-6 mm. broad; seeds longitudinal; funicle short, dilated into a clavate aril.

Recorded by Mueller from the mouth of the Glenelg River, Victoria, and may therefore be found in our South-East.

79. **A. decurrens,** Willd. var. *mollis,* Lindl. *Black Wattle, Silver Wattle.* Tree about 10 m. high, with pubescent branchlets; leaves bipinnate, at first golden-pubescent, with numerous glands along the common petiole or primary rhachis; pinnae in about 12-18 pairs; leaflets in 20-60 pairs, linear, obtuse, pubescent, 2-4 mm. long; heads 20-30-flowered, pale yellow, fragrant, in long axillary racemes, paniculate towards the summit; calyx shortly 5-lobed, ciliate; pod broad-linear, flattish, 5-10 cm. long, about 7 mm. broad, contracted somewhat between the longitudinal seeds; funicle short, folded below the oblique aril.—*A. mollissima,* Willd.

South-East, from Naracoorte southwards. Summer.—Eastern States. Bark valuable for tanning.

80. **A. farnesiana,** Willd. Almost glabrous shrub 3-7 m. high; leaves bipinnate, with 2 thorny stipules 2-23 mm. long; pinnae usually in 1-4 pairs and with a gland between each pair; leaflets glabrous, linear, obtuse, mostly in 5-10 pairs, 4-9 mm. long; heads about 50-flowered, fragrant, on hoary usually twin peduncles 15-20 mm. long; calyx ¼ shorter than corolla, usually with 4 short ciliolate lobes; petals united almost to summit; ovary glabrous; pod thick, indehiscent, the seeds obliquely placed amid a pithy substance.

Dalhousie Springs, Cooper's Creek, Lake Blanche (all in Far North).—Western New South Wales; Central and tropical Australia; tropical parts of Old and New World. First cultivated in the Farnese Garden, at Rome, in 1611; now much used in Mediterranean countries for making perfumes.

2. NEPTUNIA, Lour.

(Latin name of some water-plant, from *Neptunus,* Neptune.)

Flowers small, regular, in globular heads on axillary peduncles; calyx 5-toothed petals 5, valvate; stamens 5, free; pod short and broad, flat, 2-valved; seeds transverse; funicle not dilated. Procumbent perennials, usually growing in or near water; leaves bi-pinnate; stipules membranous, obliquely cordate.

Peduncles 2-7 cm. long; pod oblong ..... *N. gracilis* 1.
Peduncles 1 cm. long; pod orbicular ..... *N. monosperma* 2.

1. **N. gracilis,** var. *villosula,* Benth. Pinnae in 3 to 4 pairs; leaflets in 6-20 pairs, linear, 4-8 mm. long; peduncle with 2 rather distant cordate bracteoles; pod 2 cm. long, 8 mm. broad, with 4-6 seeds; plant pubescent.

Near Cooper's Creek.—Northern New South Wales; tropical Australia.

2. **N. monosperma,** F. v. M. Pinnae in 2-3 pairs, with a large gland below the lowest pair; leaflets in 20-30 pairs, mostly 6-10 mm. long; stipules and bracteoles much smaller than in the preceding; pod almost orbicular, 6-10 mm. diam., 1-seeded.

River Finke, Central Australia, and therefore probably in our neighboring territory.—Northern New South Wales; tropical Australia.

SUB-FAMILY 2.—**CAESALPINIOIDEAE.**

Flowers slightly irregular; petals usually 5, free, imbricate, the upper one inside the others; stamens 10 or fewer; embryo straight.

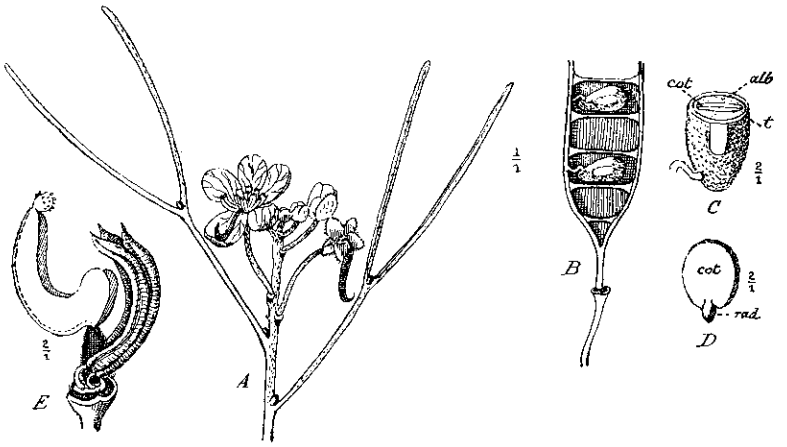

FIG. 135.—**Caesalpinioidae.** A-D, *Cassia eremophila*. A, flowering branch. B, lower part of one valve of pod. C, transverse section of seed: *t*, testa; *alb*, albumen; *cot*, cotyledons. D, embryo: *rad*, radicle, E, style and 3 perfect anthers of *Petalostylis labicheoides*.

3. CASSIA, (Tournef.) L.

(Greco-latin word, from the Hebrew *qasî'ah*, used to denote a sort of cinnamon-bark, and also some fragrant shrub.)

Sepals 5, unequal, imbricate; petals 5, nearly equal; stamens 10, free, often irregularly developed; anthers opening by terminal pores; ovary incurved, with several ovules; style short; pod usually 2-valved, divided by more or less complete transverse partitions; seeds compressed, transverse or slightly oblique, with thick cartilaginous albumen. Trees or shrubs with paripinnate leaves; flowers yellow, racemose or umbellate, the petals usually with conspicuous veins.

A. Perfect stamens 7, of which 2 or 3 lower ones are larger and 3 upper ones reduced to staminodia.
  Racemes short; pod subcylindrical ..... *C. sophera* 1.
  Racemes rather long; pod flat ..... *C. pleurocarpa* 2.
A. Stamens 10, all perfect; pod flat, linear-oblong; seeds parallel to the valves by their flattened faces.
  B. Leaflets flat or concave.
    C. Stipules leafy; glabrous shrub ..... *C. pruinosa* 3.
    C. Stipules subulate or none; glabrous or hoary shrubs.
      Leaflets flat, in 1-3 pairs ..... *C. desolata* 4.
      Leaflets often concave, mostly in 3-5 pairs..... *C. Sturtii* 5.
  B. Leaflets narrow-linear, often channelled above, or terete.
    Leaflets mostly in 1 or 2 pairs, green ..... *C. eremophila* 6.
    Leaflets mostly in 3-8 pairs, hoary ..... *C. artemisioides* 7.
  B. Leaflets absent, the leaf reduced to a phyllodium.... *C. phyllodinea* 8.

1. **C. sophera,** L. Large glabrous shrub; leaflets in 4-10 pairs, usually 6, lanceolate, 2-5 cm. long, with a gland near the base of the petiole; racemes short, few-flowered; 2 anthers larger than the others; filaments all short; pod almost cylindrical, 5-10 cm. long; seeds lying at right angles to the valve and with their flattened faces parallel to the membranous partitions.

Everard Range. Winter and spring.—Central Australia; New South Wales; Queensland; tropical Asia and Africa. The specific name is from the Arabic *sufaira*, "yellowish," denoting this or some similar shrub.

2. **C. pleurocarpa,** F. v. M. Tall glabrous shrub; leaflets in 4-6 pairs, oblong-linear, 2-5 cm. long, 5-8 mm. broad, glands absent; flowers racemose; 2 stamens twice as long as the others and incurved, the 3 posterior ones small and imperfect; pod linear-oblong, flat, obtuse, thin, 5-6 cm. long, about 15 mm. broad; seeds wrinkled, oblong-cuneate, with their flattened faces parallel to the valves and their obtuse margins parallel to the thin partitions, each seed with a raised transverse line, corresponding to a raised line down the centre of the pod.

Far North and westward to Birksgate Range. Winter and spring.—Central Australia; New South Wales; West Australia.

C. venusta, F. v. M. A pubescent shrub or small tree, with 9-15 pairs of mucronate oblong leaflets, 2-4 cm. long, 12-18 mm. broad, and conspicuous cordate acuminate stipules, occurs on the Finke River, Central Australia; also in tropical Australia.

C. notabilis, F. v. M., with leaflets similar in number and shape, but with longer hairs, rather acute, 1½-3 cm. long, about 10 mm. broad, and narrow stipules, has been found in the Barrow Range, W.A., just across our border.

3. **C. pruinosa,** F. v. M. Glabrous glaucous shrub; leaflets in 3-6 pairs, oblong-elliptical, 12-20 mm. long, 5-7 mm. broad, flat; stipules leafy; flowers rather large, 2-5 in umbels on axillary peduncles; 3 or 4 anthers rather longer than the others; pod flat, 8-10 mm. broad.

Northern part of Flinders Range. Winter and spring.—New South Wales; Central and tropical Australia.

C. glutinosa, DC. A very viscid glabrous shrub, with 5-6 pairs of linear-oblong flat leaflets, 1½-3 cm. long, 3-4 mm. broad, flowers in umbels, occurs on the Finke River and in tropical Australia.

4. **C. desolata,** F. v. M. More or less hoary shrub; leaflets in 1-3 pairs, ovate, obovate or oblong-cuneate, hoary or becoming glabrous, 1-3½ cm. long, 4-15 mm. broad, with a gland between each pair; flowers in a short raceme or umbel on short peduncles; anthers all nearly equal; pod flat, thin, obtuse, 4-7 cm. long, 10-18 mm. broad.

Northern Flinders Range to Far North, and westward to Everard Range. Winter and spring.—New South Wales; Central and tropical Australia.

5. **C. Sturtii,** R. Br. Variable shrub, near the preceding; leaflets in 2-7 pairs, varying from broad-linear to obovate, usually more or less concave, hoary or white-tomentose with curly hairs, or becoming glabrous, 5-25 mm. long, 3-6 mm. broad, with glands between all the leaflets or between the lowest 1 or 2 pairs; flowers in short axillary racemes; anthers all nearly equal; pod flat, thin, 4-6 cm. long, 10-12 mm. broad.

From Gawler northwards to Flinders Range and Far North; westward to Everard Range, Ooldea, and Fowler's Bay; Yorke Peninsula; Murray lands. Winter and spring.—Temperate Australia.

Var. *involucrata*, J. M. Black. Densely white tomentose with curly hairs; leaflets in 3-4 pairs, obovate, 1½-2 cm. long, about 10 mm. broad, with a gland between the 2 lowest pairs; flowers 4-6 in umbels. with an involucre of rather large obovate bracts; 1 or 2 anthers longer than the others.—Birksgate Range.

6. **C. eremophila,** A. Cunn. Shrub, glabrous or minutely hoary; leaflets in 1 or 2, rarely 3 pairs, narrow-linear, terete and 1-furrowed above, channelled or flattish, 1½-5 cm. long, 1-2 mm. broad, a gland between each pair, the petiole terete or subcompressed; flowers in a short raceme; 1 or 2 anthers longer and on longer filaments than the others; pod straight or curved, thin, flat, 5-9 cm. long, 7-10 mm. broad. (Fig. 135, A-D.)

Murray lands to Flinders Range and Far North; Yorke and Eyre Peninsulas and westward to Ooldea. Winter and spring.—Temperate Australia.

Var. *platypoda*, Benth. Petiole flat, 3-6 mm. broad, and often reduced to a linear-lanceolate phyllodium, 2-5 cm. long, by the falling off of the 2 linear leaflets, but retaining the gland at its summit.—*C. platypoda*, R. Br.—Same districts.

7. **C. artemisioides,** Gaudich. Shrub, more or less hoary-white with a minute pubescence; leaflets in 3-8 pairs, terete, 1-furrowed or rarely channelled on upper face, sometimes glabrous in age, 6-40 mm. long, 1-1½ mm. diam., with a gland between the lowest pair, the petiole terete and usually spreading; flowers in a short dense raceme; 1-3 anthers rather larger than the others and on longer filaments; pod flat, thin, 4-6 cm. long, 8-10 mm. broad.

Yorke and Eyre Peninsulas to Far North and westward to Blyth Range and Ooldea. Winter and spring.—Eastern States.

Species 4 to 7 show a tendency to run into each other and some forms are difficult to place satisfactorily.

8. **C. phyllodinea,** R. Br. Small shrub, silky-white with a minute appressed pubescence; leaves all reduced to phyllodia, linear-lanceolate or oblong-cuneate, almost acute or truncate, 2-4½ cm. long, 3-6 mm. broad; flowers in a short raceme; 1 or 2 of the anthers on longer filaments; pod flat, sometimes curved, 5-7 cm. long, 10-12 mm. broad.

Flinders Range to Far North. Aug.-Sept.

4. PETALOSTYLIS, R. Br.

(Greek *petalon*, petal; *stylos*, style: alluding to the petaloid style.)

1. **P. labicheoides,** R. Br. Almost glabrous shrub; leaves imparipinnate, usually of 5-11 lanceolate mucronate leaflets, 1½-2 cm. long; flowers on solitary axillary peduncles with 2 deciduous bracteoles; sepals 5, acute, imbricate, minutely pubescent; petals

5, deep yellow, about 2 cm. long; stamens 5, 3 perfect, the anthers opening in longitudinal slits, 2 reduced to staminodia; style yellow, and petal-like, boomerang-shaped, with a broad incurved membranous wing on each side, the wings terminating in 2 erect obtuse lobes towards the base; stigma capitate; pod flat, obliquely oblong, about 2½ cm. long, 8 mm. broad, 2-valved, with 4-6 oblique albuminous arillate seeds. (Fig. 135, E.)

Flinders Range to Far North. June-Dec.—New South Wales; tropical Australia.

Var. *cassioides*, Benth. Leaflets 5-41, oblong, obtuse but mucronate, 4-10 mm. long.—Everard Range.—Central and West Australia.

5. BAUHINIA, (Plum.) L.

(After John Bauhin, a Swiss botanist of French descent, 1541-1613, and his brother Caspar, physician and botanist, 1560-1624, in allusion to the 2 leaflets.)

1. **B. Carronii,** F. v. M. *Queensland Bean, Bean-tree.* Almost glabrous tree; leaves ovate in outline, consisting of 2 oblique obtuse leaflets about 2-3 cm. long, each 3-5-nerved; flowers in short racemes; calyx slightly tomentose, with 5 short valvate lobes, the tubular part turbinate and lined by a disk, at the summit of which rise the 10 free perigynous stamens; petals 5, silky, exceeding the calyx; ovary stipitate; pod compressed, oblong, coriaceous, slightly curved, about 8-10 cm. long and 3 cm. broad, 2-valved; seeds several, large shining, separated by pithy partitions.

Strzelecki and Cooper's Creeks and north thereof. Spring.—New South Wales; Queensland.

Sub-family 3.—PAPILIONATAE.

Flowers very irregular; sepals usually united in a 5-toothed or 2-lipped calyx; petals 5, unequal, clawed, the upper one usually the largest and broadest, called the *standard*

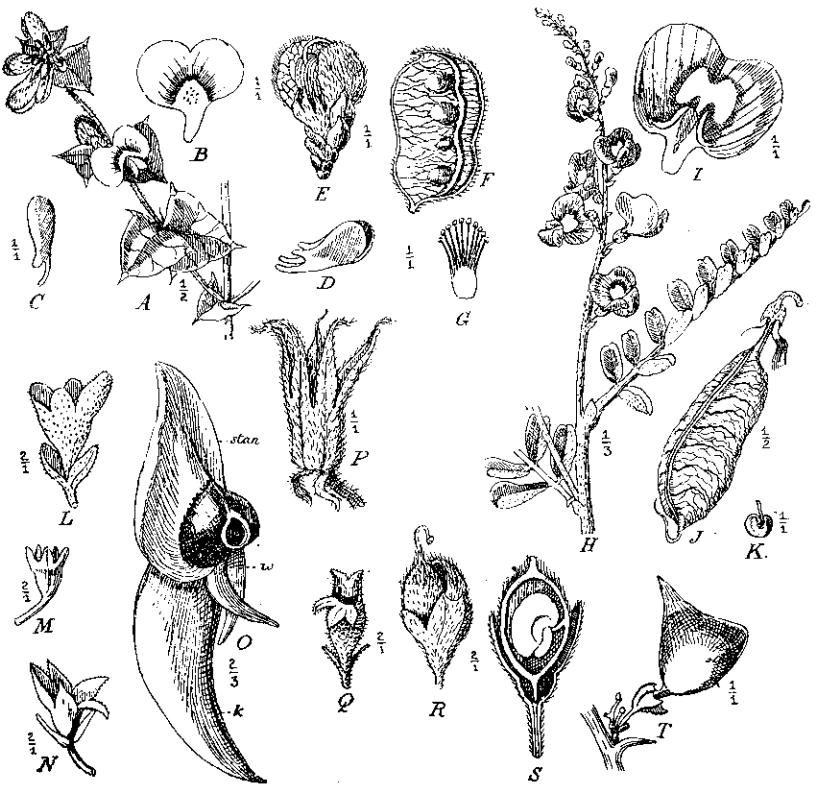

Fig. 136.—**Papilionatae.** A-G, *Platylobium obtusangulum.* A, flowering branch. B, standard. C, wing. D, keel. E, calyx on short peduncle concealed by bracts. F, pod. G, staminal tube spread open. H-K, *Swainsona Greyana.* H, raceme and leaf. I, standard. J, pod. K, seed. L, calyx of *Templetonia aculeata.* M, calyx of *Daviesia ulicina.* N, calyx of *Eutaxia microphylla.* O, petals of *Cliantlus speciosus.* P, calyx of same. Q-S, *Dillwynia hispida.* Q, calyx. R, fruiting calyx with pod. S, calyx and one valve of pod with carunculate seed. T, pod of *Daviesia brevifolia.*

and enclosing the others in bud, the 2 lateral ones called *wings*, the 2 lower ones usually with free claws, but united along their lower margins into a *keel*, which encloses the stamens and ovary ; stamens usually 10, often united in a tube.

6. BRACHYSEMA, R. Br.

(Greek *brakhys*, short ; *sēma*, standard.)

1. **B. Chambersii,** F. v. M. Low shrub with slender erect terete hoary barren stems, branching dichotomously and spinescent at summit ; flowers red, in one-sided racemes on short basal scapes ; calyx golden-pubescent, 3-4 cm. long, cut almost to base into 5 linear-lanceolate lobes ; keel rather longer than calyx ; wings shorter and standard still shorter and lanceolate ; stamens free ; ovary villous ; pod unknown.

Between Stevenson and Finke Rivers ; also in Barrow Range, W.A., close to our border. Winter.—Central Australia.

7. ISOTROPIS, Benth.

(Greek *isos*, equal ; *tropis*, keel : the keel is about as long as the wings.)

1. **I. Wheeleri,** F. v. M. Small slender shrub, with a minute brown tomentum ; leaves distant, narrow-linear, the margins inflexed, so that the leaf appears terete and 1-furrowed on upper face, 1-2 cm. long, with a reflexed point ; flowers few, in short racemes ; calyx about 6 mm. long, 5-partite, lobes imbricate, the 2 upper ones somewhat united ; petals purplish, about 10 mm. long, nearly equal, the standard obicular ; stamens free ; pod oblong, acute, densely tomentose, swollen ; seeds without caruncle.

Near Cooper's Creek.—Central Australia ; New South Wales ; Queensland.

I. atropurpurea, F. v. M., distinguished by a denser tomentum, leaves of 1 suborbicular leaflet on a short petiole, flowers deep-purple and calyx about 8 mm. long, has been found on the Finke River and near Mount Olga.—New South Wales.

8. GOMPHOLOBIUM, Sm.

(Greek *gomphos*, nail, peg ; *lobos*, pod : alluding to the stalked pod.)

1. **G. minus,** Sm. Low shrub, sometimes only 10 cm. high, with pubescent branches ; leaflets 3, almost without a common petiole, linear, with revolute margins, glabrous, 4-12 mm. long ; flowers whitish or yellow, solitary or twin, on bibracteate peduncles about as long as the calyx ; calyx about 10 mm. long, 5-partite, the lobes lanceolate, ciliate ; standard longer, orbicular, pink with a yellow centre ; keel obtuse ; stamens free ; pod ovoid, coriaceous, 12 mm. long, with about 15 non-carunculate seeds.

Mt. Lofty Range ; Kangaroo Island ; South-East. Nov.-Jan.—Victoria ; New South Wales.

9. SPHAEROLOBIUM, Sm.

(Greek *sphaira*, ball, sphere ; *lobos*, pod : alluding to the globular fruit.)

1. **S. vimineum,** Sm. Low glabrous shrub with slender wiry leafless stems, or the barren branches with a few narrow leaves ; flowers yellow, numerous, in terminal racemes ; calyx 4 mm. long, the lobes imbricate and the 2 upper ones longer and broader, forming an upper lip ; standard orbicular, twice as long ; keel obtuse ; stamens free ; ovary glabrous, stipitate, 2-ovulate ; pod globular, about 3 mm. diam. ; seed 1 or 2, without caruncle.

Mount Lofty Ranges ; South-East. Oct.-Dec.—Eastern States.

10. VIMINARIA, Sm.

(Latin *vimen*, a twig : on account of the long twiggy apparently leafless branches.)

1. **V. denudata,** Sm. Glabrous shrub, usually tall, with slender drooping branches ; leaves reduced to long filiform petioles, rarely with 1-3 leaflets ; flowers in long terminal racemes ; calyx 5-toothed, 4-5 mm. long, with a short solid base ; standard twice as long, orbicular, yellow, as long as the yellow wings and blunt red keel ; stamens free ; ovary 2-ovulate ; pod sessile, ovoid, slightly exceeding calyx ; seed 1, reddish, with a small caruncle.

Mount Lofty Range ; Kangaroo Island ; South-East. Nov.-Dec.—Temperate Australia.

11. DAVIESIA, Sm.

(After the Rev. Hugh Davies, Welsh botanist, 1739-1821.)

Calyx with 5 short equal teeth, or 2-lipped by the union of the 2 upper teeth ; standard usually yellow, orbicular, notched, about as long as the wings and curved crimson keel ; stamens free ; ovary glabrous, shortly stipitate, 2-ovulate ; pod more or less compressed, triangular,; seed usually 1, carunculate. Shrubs or under-shrubs with alternate simple

entire leaves, without stipules : flowers few in short axillary racemes with bracts at base of pedicels : bracteoles none.

A. Leaves mostly flat.
  B. Leaves horizontal.
    Leaves not rigid or pungent-pointed, long, broad-linear ..... *D. corymbosa* 1.
    Leaves rigid, pungent-pointed, lanceolate..... *D. ulicina* 2.
  B. Leaves vertical, rigid, pungent-pointed.
    C. Leaves broadly decurrent ..... *D. pectinata* 3.
    C. Leaves not decurrent.
      Leaves flattened or terete ; keel pointed ..... *D. incrassata* 4.
      Leaves lanceolate ; keel subobtuse..... *D. polyphylla* 5.
A. Leaves terete, rigid, pungent-pointed.
    Leaves articulate on branches ; keel obtuse ..... *D. genistifolia* 6.
    Leaves very short, continuous with branches ; keel pointed ..... *D. brevifolia* 7.

1. **D. corymbosa,** Sm. Glabrous shrub of 1-2 m.; leaves broad-linear or oblanceolate, 5-10 cm. long, 5-10 mm. broad ; racemes dense, usually flowering from about the middle or at the summit of the peduncle ; calyx 3 mm. long, 2-lipped ; standard 7 mm. long ; pod about 8 mm. long.

Mt. Lofty and Flinders Ranges ; Kangaroo Island. Sept.-Nov.—Victoria ; New South Wales.

2. **D. ulicina,** Sm. Rigid shrub, glabrous or beset with spreading hairs ; branchlets usually ending in spines ; leaves lanceolate or linear, 1-3 cm. long, rigid, pungent-pointed; flowers 1-5 in the axils, or sometimes umbellate on a short common peduncle ; calyx 3 mm. long, the teeth almost equal ; standard about 9 mm. long ; wings and obtuse keel shorter ; pod 10 mm. long. (Fig. 136, M.)

Southern districts to Flinders Range ; westward to Ooldea ; Murray lands ; South-East. July-Nov.—Eastern States.

Var. *ruscifolia,* Benth. Leaves ovate, 6-10 mm. long ; flowers mostly solitary or twin.—*D. ruscifolia,* A. Cunn.—Southern districts ; Murray lands.

3. **D. pectinata,** Lindl. Rigid glabrous shrub ; leaves flattened vertically, divaricate, pungent-pointed, lanceolate, very rigid, 1-3 cm. long, attached to the stem by a decurrent base, which is 2-6 mm. broad ; flowers small, in axillary clusters or short racemes ; calyx 2½ mm. long, the 2 upper teeth slightly united ; standard more than twice as long, and longer than the wings and keel ; pod 10-12 mm. long.

Near Port Lincoln ; Waitpinga (Encounter Bay). Sept.-Oct.—Temperate Australia.

4. **D. incrassata,** Sm. Rigid glabrous shrub ; leaves rigid, divaricate, pungent, often appearing continuous with the branch, but becoming finally articulate, almost terete, or flattened vertically and cuneate, with the upper margin rounded at summit and the lower one pungent (both forms often present on the same plant), 5-25 mm. long ; flowers usually 2-5, on a very short common peduncle ; calyx 3 mm. long, the 2 upper teeth united almost to summit ; standard more than twice as long ; keel much incurved, beaked ; pod 12-14 mm. long.

Kangaroo Island ; Murray lands ; Flinders Range ; Eyre Peninsula. Oct.-Jan.—Western Victoria ; West Australia. Forms with all the leaves almost subulate, sometimes come very near to *D. brevifolia.*

5. **D. polyphylla,** Benth. Small shrub, with furrowed branchlets ; leaves lanceolate, rigid, slightly decurved, pungent, striate-rugose (at least when dry), vertically flattened, articulate on branch, 1-2 cm. long, 2-4 mm. broad, slightly narrowed towards base ; flowers few, on a very short peduncle ; calyx 3 mm. long, the 2 upper teeth united almost to summit ; keel incurved, but rather obtuse ; pod 12-14 mm. long.

Near Port Lincoln. Aug.-Sept.—West Australia.

6. **D. genistifolia,** A. Cunn. Slender glabrous shrub ; leaves almost subulate, rigid, spreading, pungent, finally articulate at base, 1-3 cm. long, 1-1½ mm. thick ; flowers 3-4 on a very short common peduncle ; calyx 3-4 mm. long, the base narrowing into the pedicel, the 2 upper teeth united almost to summit ; standard twice as long ; keel obtuse ; pod 10-12 mm. long.

Strathalbyn ; Goolwa ; Kangaroo Island ; Yorke Peninsula ; Flinders Range ; Eyre Peninsula. Sept.-Oct.—Eastern States.

Var. *colletioides,* Benth. Leaves mostly 3-8 mm. long, stouter, divaricate ; pedicels rather longer (4-6 mm. long). *D. colletioides,* A. Cunn (1838).—Berri (River Murray).—New South Wales.

7. **D. brevifolia,** Lindl. Broom-like glabrous shrub, about 1 m. high, with rigid spiny branchlets; leaves few, distant, resembling short stout thorns, 2-6 mm. long, continuous with the branches; flowers few on a very short common peduncle, the pedicels shorter than the calyx, which is 4 mm. long and tapering at base, the 2 upper teeth united in an obtuse lip; standard twice as long; keel much incurved, beaked; pod 12 mm. long, much swollen at base. (Fig. 136, T.)

Mount Lofty Range; Kangaroo Island; Eyre Peninsula; South-East. Sept.-Nov.—Victoria; New South Wales.

D. arthropoda, F. v. M., with flat oblanceolate pungent-pointed 1-nerved horizontal leaves, 2-3 cm. long, 2 or 3 flowers in a short umbel and calyx-teeth narrow and conspicuous, has been found as near our border as Mount Olga, in Central Australia.

12. EUTAXIA, R. Br.

(Greek *eu*, good: *taxis*, order, row: referring to the regular arrangement of the leaves.)

1. **E. microphylla,** (R. Br.), comb. nov. Low intricate variable glabrous shrub, often procumbent; branchlets sometimes spiny; leaves decussate, approximate, linear or lanceolate-ovate, 2-7 mm. long; flowers 1-2 in the axils, on short pedicels bearing 2 linear bracteoles close under the calyx; calyx 4-5 mm. long, 2-lipped, teeth about as long as tube, the 2 upper ones partly united; standard 8-10 mm. long, rather broader than long, yellow and red, longer than the yellow wings and obtuse crimson keel, rarely all petals yellow; stamens free; ovary villous, stipitate, 2-ovulate; pod obovoid, 5 mm. long; seed carunculate. (Fig. 136, N.)—*E. empetrifolia*, Schlecht (1847); *Sclerothamnus microphyllus*, B. Br. (1811).

Southern districts to Flinders Range; Murray lands; Eyre Peninsula to beyond Fowler's Bay. Sept.-Nov. Temperate Australia.

Robert Brown's specific name is not disqualified by the existence of *E. parvifolia*, Benth., a West Australian species. We have, for instance, *Fumaria micrantha*, Lag. and *F. parviflora*, Lamk., which are 2 distinct species.

13. GASTROLOBIUM, R. Br.

(Greek *gastĕr*, belly; *lobos*, pod: alluding to the ovoid pod.)

1. **G. elachistum,** F. v. M. Shrub with hoary branches; leaves opposite, ovate, coriacious, 2-3 mm. long, tuberculate and glabrous above, tomentose and concave below owing to the revolute margins; stipules lanceolate; flowers axillary, solitary, on short peduncles; calyx 6 mm. long, tomentose, the lobes longer than tube, the 2 upper ones oblong, the 3 lower ones lanceolate, shorter, all mucronate; bracteoles brown, lanceolate, attached at base of calyx; standard suborbicular, yellow, longer than wings and obtuse crimson keel; stamens free; ovary villous, 2-ovulate, with hooked style; pod not seen.

Inland from Fowler's Bay and near Eucla.

G. grandiflorum, F. v. M., called "Wallflower Poison Bush" in Queensland, occurs in the MacDonnell Range. It has flat obtuse or emarginate leaves, 3-8 cm. long, and large flowers in short racemes, calyx-lobes shorter than the tube. The other species of this genus are West Australian, and have the reputation of being poisonous to livestock.

14. PULTENAEA, Sm.

(After Richard Pulteney, English botanist, 1730-1801.)

Calyx with the 2 upper lobes more or less united into an upper lip; standard clawed, suborbicular, usually about twice as long as calyx, rather longer than the wings and incurved keel; stamens all free; ovary pubescent or villous, usually sessile, 2-ovulate; style subulate, often villous in the lower part; pod small, ovate in outline, beaked by the persistent style, with 1 or 2 carunculate seeds. Shrubs with simple mostly alternate leaves; stipules narrow, scarious; flowers always solitary and axillary, but sometimes crowded at the ends of the branches and appearing as leafy heads or clusters; bracteoles persistant, attached close under the calyx or adnate to some part of the tube. A genus purely Australian.

A. Leaves alternate, flattish, with recurved margins.
  B. Bracteoles adnate to calyx-tube.
    C. Flowers shortly pedunculate, in terminal heads within cuneate glabrous leaves and surrounded in bud by conspicuous bracts.
      Leaves and heads rather large ..... *P. daphnoides* 1.
      Leaves and heads small ..... *P. stricta* 2.
    C. Flowers sessile in small heads or axillary; bracts none or very small; leaves truncate, tomentose below ..... *P. scabra* 3.

B. Bracteoles almost free from base of calyx-tube; flowers on peduncles longer than the lanceolate leaves..... *P. pedunculata* 4.

A. Leaves alternate (or sometimes in 3's in *P. largiflorens*), concave, channelled or 1-furrowed above by the incurved or involute margins; calyx-lobes subequal.

D. Bracteoles adnate to calyx-tube.

E. Bracteoles inserted on base of tube.

F. Leaves terete; flowers subsessile.

Flowers in heads, almost bractless ..... *P. teretifolia* 5.

Flowers solitary, terminal, surrounded by imbricate bracts ..... *P. prostrata* 6.

F. Leaves linear; flowers shortly pedunculate, axillary or clustered.

Leaves 3-6 mm. long ..... *P. graveolens* 7.

Leaves 6-12 mm. long ..... *P. laxiflora* 8.

E. Bracteoles inserted near summit of tube; flowers axillary; leaves oblong-cuneate ..... *P. largiflorens* 9.

D, Bracteoles free from calyx, but inserted close below it.

G. Flowers solitary, terminal, surrounded by imbricate bracts; leaves lanceolate, shortly petiolate ..... *P. involucrata* 10.

G. Flowers in short leafy heads or axillary along the branchlets.

H. Leaves pungent-pointed, rigid.

I. Leaves lanceolate; flowers in upper axils.

Leaves concave, sessile..... *P. rigida* 11.

Leaves almost flat, shortly petiolate..... *P. villifera* 12.

I. Leaves subulate, crowded; flowers in bracteate heads ..... *P. acerosa* 13.

H. Leaves not pungent, 1-furrowed, channelled or concave above by the incurved or involute margins.

J. Leaves obovate, recurved, 2-5 mm. long, 1-nerved; flowers in heads.

Leaves light-green, glabrous; bracteoles simple ..... *P. densifolia* 14.

Leaves dark-green, villous; bracteoles trifid ..... *P. trifida* 15.

J. Leaves lanceolate, 3-nerved and villous below, shortly petiolate.

Leaves broad-lanceolate; flowers axillary *P. trinervis* 16.

Leaves linear-lanceolate; flowers terminal *P. trichophylla* 17.

J. Leaves terete or linear.

K. Flowers in upper axils; leaves 3-5 mm. long ..... *P. pubescens* 18.

K. Flowers mostly in terminal leafy clusters or heads; leaves 5-12 mm. long.

L. Branches concealed by appressed imbricate stipules ..... *P. vestita* 19.

L. Branches not concealed by stipules.

M. Flowers shortly pedunculate; leaves sparsely hairy; calyx pubescent.

Bracteoles green, lanceolate, nearly as long as calyx ..... *P. laxiflora* 8.

Bracteoles brown, ovate, short.... *P. viscidula* 20.

M. Flowers sessile or almost so; calyx villous.

Leaves softly silky; bracteoles lanceolate ..... *P. canaliculata* 21.

Leaves villous or glabrous; bracteoles oblong..... *P. tenuifolia* 22.

A. Leaves opposite, small, ovate, concave below; calyx-lobes very unequal; bracteoles on base of calyx..... *P. cymbifolia* 23.

1. **P. daphnoides,** Wendl. Shrub 1-3 m. high, with pubescent branches; leaves glabrous, oblong-cuneate, obtuse or truncate, mucronate, 1-3 cm. long, pale and with a prominent midrib below; flowers in terminal sessile heads, at first surrounded by brown imbricate deciduous bracts; calyx silky-villous, 5-6 mm. long; bracteoles linear, inserted towards summit of calyx-tube; standard and wings bright yellow; keel scarlet; pod obliquely ovate, slightly exceeding the calyx, pubescent.

Mt. Lofty Range; Kangaroo Island. Aug.-Oct.—Temperate Australia.

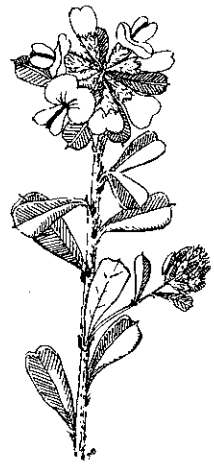

FIG. 137.
Pultenaea daphnoides.

2. **P. stricta,** Sims. Differs from the preceding in the smaller leaves, 4-8 mm. long, usually oblong, rarely cuneate; flowers fewer in head; bracteoles broader and less hairy. A smalleri and more slender shrub.

Near Millicent and Lake George (South-East). Sept.-Oct.—Temperate Australia.

3. **P. scabra,** R. Br. Small erect shrub with pubescent branches; leaves rigid, cuneate, truncate or emarginate, 6-10 mm. long, 5-6 mm. broad at summit, scabrous above, tomentose below, the margins recurved; flowers few at or towards the ends of the branches; calyx silky-pubescent, 5 mm. long; bracteoles linear, on the calyx-tube; keel crimson.

Known by a single specimen, in leaf only, collected in 1886 near Birchman's Lagoon, Kangaroo Island, and therefore uncertain.—Victoria; New South Wales.

4. **P. pedunculata,** Hook. Shrub with prostrate often rooting stems; branches pubescent; leaves crowded, lanceolate, 5-12 mm. long, rigid, mucronate, sprinkled with appressed hairs; stipules lanceolate, brown, appressed; flowers on solitary filiform axillary peduncles which are longer than the leaves and sometimes 20 mm. long; calyx 5 mm. long, the lower lip spreading; bracteoles linear, attached at base of calyx but scarcely adnate; petals all yellow or keel crimson; pod pubescent, about 6 mm. long.

Mt. Lofty Range; Murray lands to Bordertown; Eyre Peninsula. Sept.-Dec.—Eastern States.

5. **P. teretifolia,** H. B. Williamson. Shrub clothed with short spreading hairs, which are soft or somewhat rough; leaves terete, 1-furrowed above, under 1 mm. thick, 7-10 mm. long; flowers subsessile in leafy heads at the ends of the branchlets; calyx straw-colored, 6-7 mm. long, villous, the 3 lower lobes acuminate and quite as long as the tube; bracteoles linear, villous, on base of tube; standard and wings yellow; keel crimson; ovary villous; pod ovate, slightly exceeding calyx.—*P. mollis,* Lindl. var. (?) *canescens,* Benth.

Near Encounter Bay; Eyre Peninsula. Sept.-Oct.

Var. *brachyphylla,* H. B. Williamson. Leaves 4 mm. long; flowers solitary or very few in head; upper petals darker.—Kangaroo Island.

6. **P. prostrata,** Benth. Small shrub with erect or spreading branches, the young parts silky-pubescent; leaves terete, subclavate, 1-furrowed above, 2-6 mm. long, pubescent, or glabrous with age; flowers sessile, solitary, terminal on short branchlets, the calyx hidden by an involucre of silky bracts; calyx 5 mm. long, silky-pubescent all over or only on the lanceolate lobes; the brown bracteoles ovate-oblong, affixed on base of tube; standard yellow and red; wings yellow; keel red; ovary and lower half of style villous; pod about as long as calyx.

Murray lands to Bordertown. Sept.-Oct.—Eastern States.

7. **P. graveolens,** Tate. Aromatic shrub, with an odor sometimes resembling cream-cheese; branches pubescent; leaves linear or linear-lanceolate, 4-6 mm. long, pubescent, incurved on margin; flowers solitary, axillary, on peduncles 2-3 mm. long; calyx 3-4 mm. long, almost villous, the lobes acuminate and the 3 lower ones longer than tube; bracteoles linear, attached to base of tube and scarcely exceeding it; standard yellow; keel usually red; ovary and lower part of style hairy; pod obliquely ovate, pubescent, twice as long as calyx.

Mount Lofty Range. Oct.-Dec.—Meredith, Victoria.

Var. *glabrescens,* J. M. Black. Leaves 3-4 mm. long, glabrous, the margins involute, so that the leaf is terete and 1-furrowed above.

Near Mount Remarkable (Flinders Range).

8. **P. laxiflora,** Benth. Slender procumbent shrub; leaves linear, incurved on margin and channelled, or 1-furrowed above and very narrow, glabrous or minutely pubescent,

6-12 mm. long, usually recurved at summit; flowers in leafy terminal clusters or solitary and axillary, with rather large scarious caducous bracts; peduncles finally spreading or drooping, silky-pubescent, 4-6 mm.long; calyx pubescent or almost villous, 5 mm. long, the lobes acuminate and the 3 lower ones longer than tube; bracteoles on base of calyx or close under it and longer than the tube, linear and leafy, with 2 stipular scarious lobes or teeth at base or merely scarious and dilated towards base; standard yellow; keel red; ovary and lower part of style villous.

Mount Lofty Range: near Millicent, South-East. Oct.-Dec.—Victoria.

9. **P. largiflorens,** F. v. M. Var. *latifolia,* H. B. Williamson. Shrub over 1 m. high, with rigid pubescent branches; leaves oblong-cuneate, obtuse or even notched, with a recurved tip, hoary below, glabrous above, 4-10 mm. long, 3-4 mm. broad, often arranged in 3's; flowers subsessile, twin, axillary and terminal, at first enclosed in brown bracts; calyx densely silky-pubescent, 5-6 mm. long; bracteoles lanceolate, rigid, short, affixed near summit of tube; standard and wings bright yellow; keel crimson; ovary villous; pod scarcely exceeding calyx.

Southern districts and northwards to Flinders Range; Murray lands. Aug.-Oct.—The type, with narrower leaves, occurs in Victoria and New South Wales.

10. **P. involucrata,** Benth. Diffuse or villous shrub; leaves 8-12 mm. long, crowded, rigid, lanceolate, broadly concave and glabrous above, villous below, with a distinct midrib on both faces; flowers sessile, solitary at end of short branchlets and surrounded by the terminal leaves, then by several small brown bracts, and finally by 2 broad brown truncate concave ciliate bracteoles which conceal the calyx; calyx membranous, pink, 3 mm. long, glabrous except for the ciliate broad lobes; standard yellow; keel red; ovary villous.

Mount Lofty Range. Oct.-Dec.

11. **P. rigida,** R. Br. Rigid shrub, with pubescent branches; leaves lanceolate, spreading, rigid, pungent-pointed, concave, glabrous, 6-10 mm. long, quite sessile; stipules conspicuous, with long subulate points; flowers solitary, axillary, on pubescent peduncles 3-5 mm. long; calyx membranous, almost glabrous, 6 mm. long, the lobes with subulate points; bracteoles lanceolate, inserted at the very base; standard red and yellow; keel crimson; ovary pubescent; pod ovoid, about as long as calyx.

Kangaroo Island; Eyre Peninsula. Oct.-Nov.

12. **P. villifera,** Sieb. var. *glabrescens,* J. M. Black. Shrub with pubescent branches; leaves thin but rigid, almost flat, the margins slightly recurved, 15-20 mm. long, 5-7 mm. broad, oblong-lanceolate, glabrous except for cilia near the base, on pubescent petioles ½-1 mm. long, the midrib conspicuous below and ending in a pungent mucro 2 mm. long, the lateral nerves faint; flowers axillary along the branches, without any bracts but the stipules of the upper leaves; calyx 5 mm. long, viscid, the acuminate lobes ciliate; bracteoles lanceolate, inserted just below base of calyx; ovary pubescent.

Western River, Kangaroo Island. Oct.-Dec. Differs from the type, which belongs to New South Wales, in the broader almost glabrous more pungent leaves, with inconspicuous lateral nerves.

13. **P. acerosa,** R. Br. Small rigid shrub; leaves crowded, terete, 1-furrowed above, spreading and often recurved, mostly 5-10 mm. long, rigid and pungent-pointed; flowers subsessile, in leafy heads at ends of branchlets, with stipular bracts; calyx 6mm. long, the lobes villous, with fine pungent points; bracteoles scarious, inserted at base of calyx and almost as long, oblong-acuminate; standard yellow and red; keel crimson; ovary villous; pod ovoid, about as long as calyx.

Near Strathalbyn and Encounter Bay; Kangaroo Island; near Port Lincoln, E.P. Sept.-Dec.

Var. *acicularis,* H. B. Williamson. Leaves more slender, straight and needle-like, subtrigonous, 10-15 mm. long; flowers sometimes distinctly axillary, solitary, on peduncles 2 mm. long; calyx 7-8 mm. long, almost glabrous; standard yellow; keel pink or purple.—Mount Lofty Range; Kangaroo Island.

14. **P. densifolia,** F. v. M. Rigid diffuse shrub; leaves crowded, rigid, obovate or oblong-cuneate, concave above, glabrous, 2-5 mm. long, penniveined below, the upper part and short mucro recurved; stipules ciliate; flowers sessile, axillary, crowded in leafy heads at the ends of the branches, the floral leaves with broad stipules; calyx 5 mm. long, glabrous except on the broad pungent-pointed lobes; bracteoles ovate-lanceolate, villous, attached just below calyx; keel crimson; ovary pubescent; pod obliquely ovate, scarcely exceeding calyx.

Near Victor Harbor; Murray lands; Eyre Peninsula; Kangaroo Island. Sept.-Nov.—Western Victoria.

15. **P. trifida,** J. M. Black. Procumbent shrub ; leaves crowded, dark-green, obovate, 4-5 mm. long, concave and sparsely pubescent above, densely pubescent or villous below, mucronate, recurved in upper part ; flowers axillary, subsessile, crowded in leafy heads at the ends of branchlets ; calyx 4 mm. long, pubescent, the lobes with subulate points ; bracteoles trifid, as long as the calyx and inserted just below it, the 3 erect lobes of the bracteole subulate and ciliate ; standard yellow ; keel crimson ; ovary villous. (Plate 10, 3.)
Kangaroo Island. Oct.-Nov.

16. **P. trinervis,** J. M. Black. Shrub resembling *P. involucrata,* with leaves 8-12 mm. long, concave and glabrous above, villous below, but broader, ovate-lanceolate, 3-nerved on the lower face and almost pungent at summit, on petioles about 2 mm. long ; flowers axillary on the branchlets and enclosed in the broad stipules, but without bracts ; calyx 4 mm. long, pubescent on the acuminate lobes ; bracteoles brown, ovate-oblong, concave, inserted just below calyx and nearly as long ; standard yellow ; keel red ; ovary villous.—*P. villifera.* Sieb. var. (?) *australis,* Benth.
Mt. Lofty Range ; near Port Lincoln. Oct.-Dec.

17. **P. trichophylla,** H. B. Williamson. Dwarf slender shrub ; leaves linear-lanceolate, thin, concave and glabrous above, 3-nerved and softly villous below, 8-10 mm. long ; flowers very small, subsessile, 2-3 at the summit of short branchlets which are naked except for the whorl of leaves terminating the branchlet and surrounding the flowers ; stipules lanceolate ; petioles 2-3 mm. long ; calyx 2-3 mm. long, pubescent on the acuminate lobes ; bracteoles lanceolate, as long as the tube and inserted just below it ; ovary villous.
Near Port Lincoln.

18. **P. pubescens,** H. B. Williamson. Small erect shrub ; branches rusty with short spreading hairs ; leaves linear, 3-5 mm. long, channelled above, more or less pubescent below, rather crowded, spreading and often recurved towards summit ; flowers few, subsessile, axillary towards the ends of the branchlets ; calyx about 4 mm. long, pubescent, the lobes acuminate ; bracteoles just below calyx, subulate, often with 2 membranous lobes at their base ; bracts absent ; standard and wings yellow ; keel crimson ; pod slightly exceeding calyx.
Cape Northumberland to Beachport and Lake Bonney, S.E. Sept.-Dec.

19. **P. vestita,** R. Br. Small shrub ; leaves slender-terete, or linear, 6-10 mm. long, rather rigid, mucronate, furrowed or channelled above by the involute margins, sparsely villous, becoming glabrous, crowded, with large reddish connate imbricate stipules which conceal the branches ; flowers in leafy heads or becoming axillary ; calyx 8 mm. long, the lobes villous, longer than tube and terminating in long subulate points ; bracteoles linear-lanceolate, villous, inserted close under calyx and nearly as long, sometimes with 2 lateral lobes ; petals reddish, scarcely exceeding the calyx ; ovary villous ; pod enclosed in calyx.
Kangaroo Island ; Eyre Peninsula. Oct.-Jan.—West Australia.

20. **P. viscidula,** Tate. Erect shrub about 1 m. high, with pubescent branchlets, which are viscid when young ; leaves narrow-linear, 8-12 mm. long, obtuse, channelled or 1-furrowed above, beset with minute spreading hairs below ; flowers 2-5 in terminal leafy clusters, on erect pubescent peduncles 2-3 mm. long ; calyx pubescent, 4-5 mm. long ; bracteoles brown, ovate, inserted at very base of calyx and only half as long as the tube ; standard yellow ; keel purple ; ovary villous ; pod obliquely ovoid, rather longer than calyx.
Kangaroo Island. Oct.-Nov.

21. **P. canaliculata,** F. v. M. Shrub 1-2 m. high, with a soft silky pubescence ; leaves silky, oblanceolate, obtuse, but with involute margins, so that they appear terete and slightly clavate, 8-10 mm. long, curved inwards in the upper part ; flowers purplish, subsessile, few in leafy clusters towards the ends of the short branches, sometimes distinctly axillary and shortly pedunculate ; calyx villous, 6 mm. long ,the lobes acuminate and the 3 lower ones longer than tube ; bracteoles inserted just below calyx, linear-lanceolate, villous, longer than tube ; pod obliquely ovate, scarcely longer than calyx.
Mt. Lofty Range. Aug.-Dec.—Victoria.
Var. *latifolia,* H. B. Williamson. Leaves broader (about 3 mm. broad), more open on the upper face.—Near Victor Harbor and Port Lincoln.

22. **P. tenuifolia,** R. Br. Slender procumbent shrub, the branches and foliage at first villous or pubescent ; leaves so crowded as to appear clustered, slender-terete, not rigid, channelled above, 4-8 mm. long, sometimes becoming glabrous or rarely glabrous from the first ; flowers sessile, solitary or twin at the end of short branchlets, surrounded by broad stipular bracts ; calyx 4 mm. long, the lobes almost equal, acuminate, villous,

longer than the tube, which is usually glabrous ; bracteoles scarious, oblong, acuminate, attached just below calyx and about as long as the tube ; standard red on back and keel red, or all petals yellow ; ovary and base of style villous ; pod rather longer than calyx.

Murray lands ; Eyre Peninsula ; South-East ; usually near the coast. Sept.-Oct.—Temperate Australia.

23. **P. cymbifolia,** J. M. Black. Small rigid shrub, the branchlets and young leaves tomentose with curly hairs ; leaves decussate, crowded, rigid, oblong-ovate, mucronate, convex and becoming glabrous above, very concave below through the involute margin, 3-4 mm. long ; flowers subsessile, few at the ends of short branchlets ; calyx pubescent, 8 mm. long, the 2 upper lobes obovate and longer than the 3 narrow acuminate lower ones ; bracteoles lanceolate, short, inserted at base of calyx ; petals yellow, scarcely exceeding the calyx, the standard much broader than long, and 2-toothed on lower margin.

Kangaroo Island. May-Sept.

15. PHYLLOTA, DC.

(From Greek *phyllon*, leaf ; *ous, ôtos*, the ear : the bracteoles of some species are leafy.)

1. **Ph. pleurandroides,** F. v. M. Small heath-like shrub with pubescent branches ; leaves narrow-linear, scattered on the branches, crowded towards the summit, 6-10 mm. long, scabrous, with revolute margins ; flowers terminal, solitary or twin, sessile among a tuft of ciliate floral leaves ; calyx pubescent, about 4 mm. long, the 2 upper lobes united almost to summit ; bracteoles ovate, inserted close under tube and shorter than it ; standard red and yellow, twice as long as calyx ; ovary pubescent, 2-ovulate ; stamens slightly united and adnate to petals at base ; pod ovate, rather longer than calyx.

Mount Lofty Range to Victor Harbor ; Kangaroo Island. Summer.—Western Victoria.

16. AOTUS, Sm.

(Greek *a*, not ; *ous, ôtos*, an ear : the bracteoles are wanting.)

1. **A. villosa,** (Andr.) Sm. Shrub with pubescent branches ; leaves narrow-linear, obtuse, 5-10 mm. long, glabrous and shining above, the margins revolute so that only the glabrous or pubescent midrib appears below ; flowers 1-2, axillary on pubescent peduncles 2 mm. long, forming leafy racemes at the ends of the branches ; calyx about 4 mm. long, pubescent, the lobes nearly equal in length and breadth ; bracteoles none ; standard orbicular, red and yellow ; keel crimson ; stamens free ; ovary stipitate, silky-villous, 2-ovulate ; pod small, ovate, exceeding the calyx.

Near Victor Harbor ; Murray lands ; Eyre Peninsula. Aug.-Oct.—Eastern States, where a form is sometimes found with the keel yellow.

17. DILLWYNIA, Sm.

(After L. W. Dillwyn, English botanist, 1778-1855.)

Calyx 5-lobed, the 2 upper lobes broad, divergent and partially united in an upper lip ; standard broader than long, often reniform ; stamens free, perigynous owing to their insertion on the summit of a disk lining the lower part of the calyx-tube ; ovary shortly stipitate, 2-ovulate ; style hooked near summit, short, thick ; pod nearly sessile, swollen, 2-valved ; seed carunculate. Heath-like shrubs with simple alternate leaves, narrow-linear or terete, channelled on the upper face, without stipules ; bracts caducous ; flowers with 2 caducous bracteoles on the short pedicels slightly below the calyx ; standard usually yellow and red, wings and keel crimson.

A. Calyx gradually contracted towards base, the upper lip bifid ; petals deciduous ; standard with a broad claw about as long as the lamina, which is notched and at least twice as broad as long.
  B. Keel acuminate, nearly as long as wings ..... *D. hispida* 1.
  B. Keel blunt, shorter than wings.
    Flowers mostly terminal ..... *D. ericifolia* 2.
    Flowers mostly axillary ..... *D. floribunda* 3.
A. Calyx obtuse at base, the upper lip almost truncate ; petals persistant ; claw of standard shorter than lamina, which is entire and scarcely twice as broad as long.
    Flowers few together ..... *D. uncinata* 4.
    Flowers several together ..... *D. cinerascens* 5.

1. **D. hispida,** Lindl. Slender erect shrub, beset with short hairs or almost glabrous ; leaves crowded, obtuse, 5-12 mm. long ; flowers few in clusters or short racemes on peduncles much longer than the leaves ; calyx glabrous or hairy, 6-8 mm. long, including the tapering base ; standard 12-20 mm. broad, red and yellow ; wings and keel shorter,

crimson, the keel acuminate, recurved at summit; pod ovoid or globular, villous, slightly exceeding calyx. (Fig. 136, Q-S.)

Mount Lofty Range; Murray lands; South-East; Eyre Peninsula. Sept.-Nov.—Victoria; New South Wales.

2. **D. ericifolia,** Sm. var. *pedunculare* Benth. Slender almost glabrous shrub; leaves slender 10-20 mm. long, terminating in a short mucro; flowers 2-4, in clusters or short racemes on terminal rarely axillary peduncles nearly as long as or longer than the last leaf; calyx 7-8 mm. long, glabrous except for the ciliolate lobes, the upper lip longer than the lower; standard with a broad claw; keel about half as long as standard, obtuse; pod ovoid, pubescent, twice as long as calyx.—*D. pedunculare*, Benth.

Mount Gambier to Millicent; near Penola. Oct.-Nov.—Eastern States.

3. **D. floribunda,** Sm. Pubescent shrub, with stiff branches; leaves rather rigid, 5-12 mm. long, obtuse, crowded, rough with small tubercles on which the hairs of the young leaves are seated: flowers as in the preceding, but arranged 1-3 in the axils, each on a peduncle of about 1 mm., and the whole resembling a leafy spike; calyx 5-7 mm. long, hairy; standard twice as long as calyx; wings shorter; keel blunt, only about 5 mm. long; pod scarcely exceeding calyx.

Mount Lofty Range; Kangaroo Island; South-East. Oct.-Dec.—Eastern States.

4. **D. uncinata,** (Turcz.), J. M. Black. Erect shrub, silky on the young parts; leaves obtuse, terete, often recurved, 3-7 mm. long; flowers 2-5, in short corymbose racemes or clusters on very short articulate pedicels or peduncles, terminal or rarely in the upper axils; calyx 5 mm. long, obtuse at base, silky-pubescent, the 2 upper lobes longer than the lower ones and united so far up that they form a slightly notched upper lip; standard with a very short claw; wings rather shorter and the obtuse keel scarcely more than half as long as the standard.—*D. patula*, F. v. M. (1864); *Eutaxia uncinata*, Turcz. (1853); *E. sparsifolia*, F. v. M. (1854); *E. patula*, F. v. M. (1861).

Murray lands on both sides of the river. Aug.-Oct.—Temperate Australia.

5. **D. cinerascens,** R. Br. Near the preceding, but the calyx rather shorter and pubescent with short hairs; the small corymbs of flowers are often axillary as well as terminal, and the leaves are more slender, 5-12 mm. long, often recurved near summit.

Recorded by Mueller from "Forest Creek" (an uncertain locality), and by other collectors from the mouth of the Glenelg River, Victoria, close to our border.—Temperate Australia.

18. PLATYLOBIUM, Sm.

(Greek *platys*, flat; *lobos*, pod: shape of the fruit.)

1. **P. obtusangulum,** Hook. Slender almost glabrous shrub about 1 m. high; leaves opposite, triangular with a more or less cordate base, or lanceolate-hastate, 1½-3 cm. long, reticulate, the 3 angles with fine terminal pungent mucros; flowers solitary, axillary, on short peduncles concealed by several brown imbricate bracts, the uppermost of which resemble the 2 broad brown bracteoles affixed just below the calyx; calyx about 12 mm. long, appressed-pubescent, the 2 upper lobes obovate, much longer than the 3 lanceolate lower ones; petals deciduous, not much exceeding calyx; standard broad, notched, yellow with red zone; keel red; stamens united in lower half; anthers equal; pod flat, sessile, winged along the upper suture, about 20 mm. long and 12 mm. broad, at first hairy, with about 4 carcunculate seeds. (Fig. 136 A-G).

Mount Lofty Range; Kangaroo Island; South-East. Sept.-Nov.—Victoria; Tasmania.

P. triangulare, R. Br., which differs from the preceding in having a longer peduncle, which is bare of bracts except at the base, and a shortly stipitate pod, is recorded from near the mouth of the Glenelg River, in Victoria, and may be found in our South-East.

19. BOSSIAEA, Vent.

(After Bossieu de la Martinière, botanist to the expedition of La Pérouse. The whole expedition perished by shipwreck on the reefs near the island of Vanikoro in 1788).

The 2 upper lobes of calyx broad and more or less united into an upper lip; standard suborbicular, about twice as long as the calyx; keel obtuse; stamens united; anthers equal and dorsifixed; ovary often ciliate, with several ovules; pod flat, linear-oblong; seeds carunculate. Shrubs with simple entire leaves or leafless; stipules small; flowers 1-3, axillary, with imbricate caducous bracts at base of peduncles and caducous bracteoles on the peduncles.

A. Branches terete, pubescent, with alternate leaves; keel not longer than standard.
  Leaves obtuse; petioles conspicuous ..... *B. prostrata* 1.
  Leaves acute; petioles short ..... *B. cinerea* 2.
A. Branches flattened, glabrous, leafless; keel longer than standard ..... *B. Walkeri* 3.

1. **B. prostrata,** R. Br. Small almost glabrous shrub with slender prostrate stems; leaves distichous, ovate or ovate-oblong, 1-2 cm. long, on filiform petioles 2-3 mm. long; flowers on hairy peduncles often longer than leaves; calyx pubescent, 5 mm. long, the 2 broad upper lobes united above the middle; bracteoles near base of peduncle; standard yellow; wings and keel purple; pod oblong, subsessile, glabrous, about 2½ cm. long, with 6-8 seeds.

Mt. Lofty Range; South-East. Sept.-Nov.—Eastern States.

2. **B. cinerea,** R. Br., var. *tenuicaulis* (Grah.) comb. nov. Shrub with slender straggling pubescent branches; leaves alternate, lanceolate, hairy, especially on lower face, slightly recurved on margins, 8-18 mm. long, 3-7 mm. broad at the rounded or almost cordate base, reticulate, terminating in an almost pungent mucro; peduncles mostly shorter than leaf; calyx glabrous, 5 mm. long, the 2 upper lobes very broad and rounded; standard yellow and red; keel red; pod stipitate, about 2 cm. long, glabrous.—*B. tenuicaulis,* Grah.

Penola to Millicent, S.E.—Eastern States. The type, which occurs in the eastern States, is an erect shrub, with shorter more rigid branches and the leaves usually shorter, stiffer and with more recurved edges.

3. **B. Walkeri,** F. v. M. Glabrous leafless shrub; branches flattened, rigid, winged, 4-7 mm. broad, indented at the nodes and often covered with a whitish crust; flowers red, usually solitary at nodes, on peduncles about 5 mm. long; calyx about 10 mm. long, ciliolate, the 2 upper lobes rounded and united to middle; keel considerably longer than standard; ovary with 18-20 ovules; pod glabrous, shortly stipitate, about 6 cm. long, 10 mm. broad.

Gawler Ranges to Ooldea.—Western New South Wales.

B. riparia, A. Cunn., is recorded doubtfully by Bentham on specimens without flowers or fruit, collected near Port Lincoln. It differs from the preceding in smaller flowers and the keel rather shorter than the standard.—Eastern States.

20. TEMPLETONIA, R. Br.

(After John Templeton, Irish botanist, 1766-1825.)

Calyx with 5 short ciliolate lobes or teeth, or 4-lobed owing to the union of the 2 upper lobes, the lowest one the longest; standard suborbicular or ovate, recurved; stamens united; anthers alternately long and short, the long ones basifixed, the short ones dorsifixed; ovary with several ovules; style incurved, glabrous; pod flattish, coriaceous; seeds carunculate. Glabrous shrubs, sometimes leafless; leaves alternate, simple, entire; flowers solitary or twin in axils; bracteoles persistant, at or above the middle of the peduncle.

A. Stipules minute or inconspicuous.
  B. Branches leafy; flowers large; standard ovate, entire.. *T. retusa* 1.
  B. Branches leafless; flowers small; standard orbicular, notched.
    C. Branches terete.
      Branches broomlike, erect; style filiform..... *T. egena* 2.
      Branches rigid, spreading; style flattened..... *T. Battii* 3.
    C. Branches flattened, rigid ..... *T. sulcata* 4.
A. Stipules spiny; branches leafy or leafless ..... *T. aculeata* 5.

1. **T. retusa** (Vent.), R. Br. Glabrous shrub 1-3 m. high; leaves glaucous, oblong-cuneate or obovate 1½-4 cm. long, 7-25 mm. broad, obtuse or notched, rigid; peduncle with obtuse bracteoles about the middle; calyx 6-8 mm. long, the 4 lobes very broad and short; petals red or rarely yellow, all nearly equal, about 3 cm. long; pod stipitate, linear-oblong, coriaceous, 4-5 cm. long, 10-12 mm. broad, with several transverse partitions and seeds.

Kangaroo Island; Flinders Range; Eyre Peninsula to beyond Fowler's Bay; Gawler Range. Aug.-Nov.—West Australia.

T. stenophylla (F. v. M.), comb. nov., has been recorded for the Murray and Wimmera Rivers, in Victoria, but does not appear to have been collected in South Australia. It is a low shrub, with rather long distant linear leaves and small yellowish flowers.—*T. Muelleri,* Benth. (1864); *Bossiaea stenophylla,* F. v. M. (1858.)

2. **T. egena** (F. v. M.), Benth. *Broombush.* Rather tall shrub, with erect flexible furrowed branches on which the leaves are reduced to short broad scales; flowers in long spike-like racemes on very short peduncles, with orbicular bracteoles close under the calyx, which is 3 mm. long, with 5 short rounded teeth, lowest rather longer than the others; petals brownish-yellow, subequal, 6 mm. long; ovary with about 6 ovules;

pod almost sessile, obliquely ovoid-oblong, sub-compressed, black or brown, 12-20 mm. long, usually containing 1 large oblong seed.

Murray lands; Flinders Range and east and west thereof; Eyre Peninsula. Aug.-Feb. —Dry parts of Australia.

3. **T. Battii,** F. v. M. Shrub with the small flowers of the preceding, but with rigid intricate striate leafless branches, the branchlets spiny; calyx and petals almost as in *T. egena*; style broad and flat; ovules about 6; pod unknown.—*Bossiaea Battii*, Tate.

Near Fowler's Bay. Summer.

4. **T. sulcata** (Meisn.), Benth. Shrub with rigid divaricate flattened striate often spiny branches, about 4 mm. broad; calyx 3 mm. long, the lobes 4, rounded, nearly as long as tube; ovary 2-4-ovulate; pod sessile, obliquely ovate, 12-20 mm. long, 1-2-seeded.

Yorke Peninsula and perhaps the Murray lands. Spring.—Temperate Australia.

5. **T. aculeata** (F. v. M.). Benth. Low shrub, with rigid striate zigzag branches; leaves distant, linear-lanceolate, rigid, 1-2 cm. long, pungent-pointed, concave above, sometimes absent; stipules spiny, spreading, 3-6 mm. long; flowers usually twin; calyx 5 mm. long, with 4-obtuse lobes, the conspicuous ovate bracteoles attached about the middle of the short peduncle; standard suborbicular, entire, white and purple, 10 mm. long; wings and keel about same length, the latter dark-purple; pod stipitate, ovate-oblong, about 2 cm. long. (Fig. 136, L.)

From Bundaleer northwards along the Flinders Range. Aug.-Sept.—New South Wales; West Australia.

21. HOVEA, R. Br.

(After A. P. Hove, a Polish collector of plants for the Royal Botanic Gardens at Kew.)

1. **H. longifolia,** R. Br. var. *lanceolata* Benth. Erect shrub with tomentose branches; leaves alternate, coriaceous, oblong-lanceolate or broad-linear, 3-6 cm. long, glabrous above, grey or rusty-tomentose beneath, on short petioles; flowers blue, on short peduncles in axillary clusters; bracteoles linear, at base of the tomentose calyx, which is 5 mm. long, with 3 linear lanceolate teeth, the 2 upper ones united in a notched upper lip; standard twice as long, the lamina suborbicular, notched; wings shorter; keel scarcely longer than calyx, obtuse; stamens all united; anthers as in *Templetonia*: ovary tomentose, with 2 ovules; pod sessile, obliquely globular or ovoid, 8-12 mm. broad, tomentose; seeds carunculate.—*H. lanceolata*, Sims.

Flinders Range near Mount Remarkable; apparently rare.—Eastern and northern Australia.

H. heterophylla, A. Cunn., very near the preceding, but a smaller more slender shrub, less hairy, with the lower leaves almost ovate and the uppermost almost linear, has been found on the Glenelg River and Tatiara country, Victoria.

22. GOODIA, Salisb.

(After Peter Good, botanical collector under Robert Brown on board H.M.S. *Investigator*; died at Sydney in 1803.)

1. **G. lotifolia,** Salisb. Shrub 1-2 m. high, pubescent on branchlets and lower face of leaflets, which are 3, entire, obovate, 1-3 cm. long, the terminal one rather distant from the other 2; flowers numerous, in terminal or leaf-opposed racemes; bracts and bracteoles caducous; calyx 5 mm. long, more or less pubescent, the upper lip notched, the 3 lower teeth lanceolate; standard twice as long, yellow and red, the lamina notched, about twice as long as broad, reflexed; wings and keel red or yellow, shorter; stamens united; anthers all equal, dorsifixed; ovary with 2-4 ovules; styles slender, glabrous; pod on a long stipes, flat, thin, obliquely ovate-oblong, 1½-2 cm. long, thickened and sometimes undulate along the ventral suture; seeds 1-4, carunculate.—*G. medicaginea*, F. v. M.

Mount Lofty Range to Flinders Range; Kangaroo Island; Yorke and Eyre Peninsulas; South-East. Sept.-Oct.—Temperate Australia.

23. CROTALARIA, (Herm.) L.

(From Greco-latin *crotalum*, a rattle, castanet: the seeds rattle in the pod.)

Calyx-lobes nearly equal; standard orbicular or ovate, at least twice as long as calyx; wings shorter; keel incurved, beaked; stamens united; anthers alternately long and basifixed and short and dorsifixed; ovary with several ovules; style incurved, bearded on the inner edge with a longitudinal line of hairs; pod swollen, tapering towards base; seeds without caruncle. Herbs or shrubs, with 1-3 leaflets, the petiole more or less geniculate and articulate near the summit; flowers in terminal bracteate racemes; bracteoles minute, adnate to calyx-tube or inserted just below it. *Rattlepod.*

A. Leaflet 1; flowers yellow.

Leaflet ovate, with short petiole ..... *C. Mitchellii*, 1.
Leaflet oblong, with long petiole ..... *C. Novae-Hollandiae* 2

A. Leaflets 1-3.
Flowers very large, greenish-yellow; standard ovates, raceme dense ..... *C. Cunninghamii* 3.
Flowers smaller, yellow; standard orbicular; raceme loose ..... *C. dissitiflora* 4.

1. **C. Mitchellii,** Benth. Silky-pubescent perennial; leaflet 1, ovate-lanceolate or ovate, obtuse or sometimes slightly notched, softly pubescent on both faces, 1½-4 cm. long, on petioles 2-3 mm. long; flowers yellow, in a dense terminal raceme 6-10 cm. long; calyx 5-6 mm. long, pubescent; ovary glabrous, with about 8 ovules; pod almost bladdery, obovoid, 1½-2cm. long.
From north of Oodnadatta to Cooper's and Strzelecki Creeks. Winter and spring.—Central Australia; New South Wales; Queensland. The typical form is stated to have the leaflet glabrous above.

2. **C. Novae-Hollandiae,** D.C. Erect shrub, with tomentose branches; leaflet 1, ovate-oblong, obtuse, velvety-pubescent, 4-6 cm. long, on geniculate petioles 10-15 mm. long; flowers yellow, the bracts shorter than buds; calyx pubescent, about 8 mm. long, the lobes lanceolate; standard orbicular; ovary pubescent, with 10 12 ovules; pod about 2½ cm. long.
Finke River near our border.—Tropical Australia.

3. **C. Cunninghamii,** R. Br. *Stuart's Pea, Parrot-plant, Bird-flower.* Shrub over 1 m. high, with rather stout tomentose branches; leaflet 1, ovate-oblong or ovate, 3-10 cm. long, 1½-5 cm. broad, softly tomentose on both faces, on velvety petioles 1-2½ cm. long, geniculate or articulate near the summit; raceme dense, the bracts longer than buds; calyx pubescent, 15-20 mm. long, the lobes lanceolate; petals yellowish-green, streaked with purple lines; standard 3-4 cm. long, ovate, acute, the pointed keel rather longer; ovary pubescent, with about 20 ovules; pod clavate, hard, velvety, 4-5 cm. long.
Throughout the Far North. Winter and spring.—Central and tropical Australia.
Var. *trifoliolata,* J. M. Black. Many of the leaves consisting of 3 leaflets.—Strzelecki Creek.

4. **C. dissitiflora,** Benth. Erect perennial to 1 m. high, glabrous, pubescent or hoary with a velvety tomentum; leaflet often 1, linear or oblong, rarely ovate, 2-6 cm. long, 5-10 mm. broad, on a petiole 1-6 cm. long, articulate and slightly geniculate, the 2 lateral leaflets, when present, usually shorter or minute; flowers yellow, in a long loose raceme with short bracts; calyx 7-8 mm. long, pubescent or glabrous; keel ciliolate along the upper edges; ovary shortly stipitate, glabrous or pubescent, 8-10-ovulate; pod stipitate, clavate, about 2 cm. long.
Throughout the Far North. Winter and spring.—New South Wales; Central and tropical Australia.

24. PTYCHOSEMA, Benth.

(Greek *ptykhḗ*, fold, leaf; *sêma*, sign, standard.)

1. **P. trifoliolatum,** F. v. M. Slender procumbent herb, covered with short spreading hairs or almost glabrous; leaves on long filiform petioles, of 3 obovate leaflets, 3-5 mm. long; stipules leafy, ovate, persistant; flowers on solitary axillary peduncles which are longer than leaves, articulate and bracteate near summit; calyx about 4 mm. long, the 2 upper teeth united to near the summit in an upper lip; bracteoles linear, caducous, at base of calyx; standard suborbicular, notched, yellow; keel purple; pod oblong, compressed, sometimes mottled, about 2 cm. long, with 6-8 non-carunculate seeds; stamens all united in a sheath open on the upper side.
North-western New South Wales; Central Australia; Barrow Range, W.A., near our border.
P. anomalum, F. v. M., with imparipinnate leaves of many small penninerved leaflets, linear stipules, flowers pink, few, in terminal racemes, calyx 6-8 mm. long, deeply cut into 2 lips, has been found as near our border as Mt. Olga.

25. LUPINUS, (Tournef.) L.

(Latin name of plants of this genus.)

Calyx deeply divided into 2 divergent lips, the upper one bipartite; standard orbicular, with reflexed sides; wings united at summit; keel incurved and beaked; stamens united, the anthers alternately long and short; ovary sessile with 2 or more ovules; pod oblong, compressed, villous, with 2 coriaceous valves. Herbs, with digitate leaves of several entire leaflets; stipules united to base of petioles; flowers in terminal racemes.
Flowers chiefly verticillate; lower lip of calyx 3-toothed or almost entire ..... *L. pilosus* 1.
Flowers mostly scattered; lower lip of calyx 3-fid ..... *L. hirsutus* 2.

* 1. **L. pilosus,** L. *Blue Lupin.* Erect annual, rarely biennial, the stem velvety with short spreading hairs; leaflets 9-11, oblanceolate, concave, 3-5 cm. long, villous on both faces, half as long as petiole; flowers blue, mostly whorled; bracts lanceolate, caducous; pod 3-5 cm. long, about 15 mm. broad, with 3-4 large compressed tuberculate mottled seeds; lower lip of calyx very shortly 3-toothed, larger than the upper; braceteoles linear.

Planted as a sandbinder and spontaneous in many places. Aug.-Oct.—Mediterranean region.

* 2. **L. hirsutus,** L. Near the preceding, but the leaflets usually 5-7; flowers scattered in the racemes or the upper ones somewhat whorled; bracts persistant; lower lip of calyx 3-fid; pod rather shorter and narrower, with 3-4 smooth mottled seeds.

Same localities. Sept.-Nov.—Mediterranean region.

FIG. 138.—**Lupinus hirsutus.**

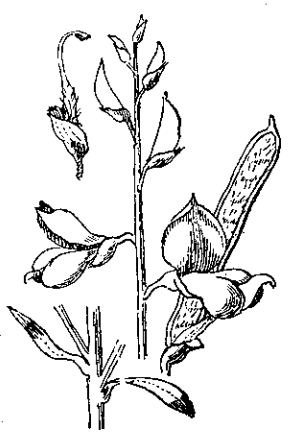

FIG. 139.—**Spartium junceum.**

26. SPARTIUM, L.

(Greek *spartos* and *spartion*, name of some shrub, from whose flexible branches ropes were twisted.)

* 1. **S. junceum,** L. *Spanish Broom.* Tall shrub with slender green striate branches; leaves few, oblong-lanceolate, entire; glabrous above, appressed-pubescent below; flowers large, yellow, scented, in terminal racemes; calyx scarious, about 8 mm. long, oblique at summit and splitting in flower so as to appear 1-lipped and crowned by the 5 short teeth; standard orbicular; keel with a curved beak and longer than the wings; stamens united; anthers alternately long and short; pod broad-linear, compressed, blackish, hairy, 6-8 cm. long, with 12-18 shining seeds.

Roadsides in Mt. Lofty Ranges. Oct.-Dec.—Mediterranean region.

27. ULEX, L.

(Latin name of some shrub.)

* 1. **Ulex europaeus,** L. *Furze.* Rigid more or less hairy shrub, with ribbed branches, the divaricate branchlets ending in spines; leaves linear, spiny; flowers bright-yellow, fragrant, mostly solitary, axillary, the bracts shorter than the peduncle; calyx villous, about 15 mm. long, yellow, divided to the base into 2 lips, the upper with 2 small teeth the lower with 3; bracteoles ovate, small, at base of calyx; petals rather longer than calyx; keel obtuse; stamens united; pod oblong, villous, exceeding the calyx, with 2-6 carunculate seeds.

Planted as a hedge and spontaneous in many parts of the settled districts. Most of the year.—Western Europe.

FIG. 140.—**Ulex europaeus.**

28. CYTISUS, L.

(Greek *kytisos*, name of a fodder-plant believed to be *Medicago arborea*, L.)

Calyx 2-lipped, the upper lip 2-toothed, the lower 3-toothed; standard broad, recurved keel obtuse; stamens united; ovary sessile, with several ovules; pod compressed, oblong

seeds carunculate. Shrubs, usually with leaves of 3 entire leaflets; bracteoles linear, on the pedicel below the calyx.

A. Flowers in loose leafy racemes; calyx-teeth minute.
  Style coiled into a circle; flowers yellow ..... *C. scoparius* 1.
  Style merely incurved; flowers white ..... *C. multiflorus* 2.
A. Flowers in short terminal racemes or umbels; style short, incurved; calyx-teeth conspicuous.
  Flowers yellow, on short pedicels, racemose ..... *C. canariensis* 3.
  Flowers white, on long pedicels, umbellate ..... *C. prolifer* 4.

***1. C. scoparius** (L.), Link. *Common Broom.* Erect shrub, with long dark-green angular branches; lower leaves petiolate, the leaflets obovate or oblanceolate, pubescent; flowers large, yellow, solitary or twin in the axil of small leaves or bracts; calyx broadly campanulate, 5 mm. long, with 2 broad divaricate lips; standard about 2 cm. long and broad; keel deflexed; style long, hairy, curved into a circle; pod flat, black, 4-5 cm. long, 10-12 mm. broad, villous along the sutures, with 6-15 seeds.—*Sarothamnus scoparius* (L.) Koch.

Mount Lofty Range, in gullies and creeks. Aug.-Nov.—Europe.

***2. C. multiflorus** (Ait.) Sweet. Slender erect shrub; leaflets 1-3, small, pubescent; flowers white, 1-3 in the axil; calyx pubescent; pod 2-3 cm. long, pubescent, 1-5-seeded.—*C. albus*, Link (1822) non Hacquet (1790).

Mount Lofty Range. Sept.-Nov.—Spain, North Africa.

FIG. 141.—**Cytisus canariensis.**

* 3. **C. canariensis** (L.) Steud. *Canary Broom.* Shrub with grooved pubescent branches; leaves very shortly petiolate, the leaflets obovate, more or less pubescent or villous; flowers yellow, in a short compact raceme; calyx campanulate, pubescent or villous, about 7 mm. long; standard about 12 mm. long; pod villous, 2-2½ cm. long, 5-6 mm. broad, with 4-6 seeds.

Well established in parts of Mount Lofty Range. Aug.-Feb.—Canary Islands.

* 4. **C. prolifer,** L. f. *Tagasaste, Tree Lucern.* Shrub or small tree, with long drooping hoary branches; leaves on short petioles, the leaflets lanceolate, glabrous above, pubescent below; flowers white, in umbels mostly at the end of short branchlets; calyx tubular, pubescent, 10-12 mm. long; standard about twice as long; pod 4-5 cm. long, about 12 mm. broad, pubescent, about 10-seeded.

Grown as a hedge and spontaneous in parts of the Mount Lofty Range. July-Oct.—Canary Islands, where it is known as "tagasaste."

29. TRIFOLIUM, (Tournef.) L.

(Latin name of clover, from *tres*, three; *folium*, leaf.)

Calyx with 5 equal or unequal teeth; petals narrow, usually united to the staminal tube by their claws, often persistant; keel obtuse, slightly shorter than the wings; pod small, often scarious, scarcely dehiscent, usually enclosed in the persistant calyx, with 1-2, rarely more seeds; stamens 9 and 1. Small herbs; leaves of 3 usually denticulate leaflets; stipules united to the petiole by their base; flowers small, usually numerous, arranged in heads, with small persistant bracts. *Clover.*

A. Flowers yellow; calyx 5-nerved, the throat open and glabrous inside; pod 1-seeded, shortly stipitate; style very short.
  B. Flowers 30-50, in dense ovoid heads; standard furrowed ..... *T. procumbens* 1.
  B. Flowers fewer, in loose globular heads; standard scarcely furrowed.
    Flowers 5-15 in head; pedicels shorter than calyx-tube ..... *T. dubium* 2.
    Flowers 2-6 in head; pedicels longer than calyx-tube ..... *T. filiforme* 3.
A. Flowers red, pink, or white; calyx 10-nerved (except in *T. subterraneum*).
  C. Throat of calyx open and glabrous inside.

D. Calyx bladdery after flowering; fruiting heads globular, hairy; pod 1-seeded, sessile.
E. Creeping perennial ..... *T. fragiferum* 4.
E. Small annuals.
Fruiting calyx with 2 short upper teeth ..... *T. tomentosum* 5.
Fruiting calyx with 2 long upper teeth ..... *T. resupinatum* 6.
D. Calyx not bladdery after flowering; pod 2-4-seeded; calyx and whole plant glabrous.
F. Creeping perennial; heads pedunculate ..... *T. repens* 7.
F. Annuals; heads small.
G. Heads pedunculate ..... *T. cernuum* 8.
G. Heads sessile.
Standard pink, longer than calyx ..... *T. glomeratum* 9.
Standard white, shorter than calyx ..... *T. suffocatum* 10.
C. Throat of calyx with a ring of hairs or a callous ring inside and sometimes constricted or closed (except *T. arvense*); calyx not bladdery, but hairy, or ciliate on teeth; pod with 1, rarely 2 seeds.
H. Fertile flowers few in head; barren ones bristle-like; peduncles recurved in fruit ..... *T. subterraneum* 11
H. Flowers all fertile, numerous in head; peduncles not recurved.
I. Perennial; heads ovoid, very large ..... *T. pratense* 12.
I. Annuals.
J. Heads sessile, ovoid; calyx-teeth rigid.
Teeth spreading in fruit ..... *T. scabrum* 13.
Teeth erect in fruit ..... *T. striatum* 14.
J. Heads pedunculate, finally conical or cylindrical.
K. Standard shorter than calyx; teeth plumose; stems slender, branching ..... *T. arvense* 15.
K. Standard equalling or exceeding the villous calyx; teeth rigid and spreading in fruit; stem usually single and unbranched, rather stout.
Leaflets obovate ..... *T. incarnatum* 16.
Leaflets linear ..... *T. angustifolium* 17

* 1. **T. procumbens,** L. *Hop Clover.* Glabrous or pubescent annual; leaflets obovate-cuneate, denticulate, the middle one on a longer petiolule; stipules shorter than petiole; flowers numerous, golden-yellow, in a dense ovoid head; calyx-teeth unequal; standard broad, furrowed, withering brown and then turned downward over the divergent wings.—*T. campestre*, Schreb.

Settled districts. Sept.-Dec.—Europe; western Asia.

FIG. 142.—**Trifolium procumbens.**

* 2. **T. dubium,** Sibth (1794). Slender pubescent annual; leaflets obovate-cuneate, denticulate, the middle one petiolulate; stipules slightly shorter than petiole; heads small, loose, 5-15-flowered, on peduncles longer than leaf; standard almost smooth, complicate; wings not divergent.—*T. minus*. Sm. (1802).

Settled districts. Sept.-Dec.—Europe.

* 3. **T. filiforme,** L. Near the preceding, but with an even more slender and glabrous stem; stipules longer than petiole; flowers 2-6 in head, on pedicels longer than the calyx-tube.—*T. micranthum*, Viv.

Mt. Lofty Range. Oct.-Dec—Europe.

* 4. **T. fragiferum,** L. *Strawberry Clover.* Somewhat pubescent perennial, with prostrate-rooting stems; leaflets ovate, strongly nerved, denticulate, on long petioles; flowers pink, subsessile, in dense subglobular heads, with an involucre of several united lanceolate bracts at base, on peduncles mostly longer than leaves; calyx villous, the upper lip inflated after flowering into a reticulate membranous bladder, its 2 sharp teeth protruding over those of the lower lip, the whole head bearing some resemblance to a strawberry.

Settled districts. Summer.—Europe; western Asia.

Var. *pulchellum*, Lange. Smaller plant with rigid stems; heads and leaflets smaller and petioles shorter.—Port Elliot.

* 5. **T. tomentosum,** L. *Woolly Clover.* Procumbent or ascending annual, glabrous except the calyx; leaflets obovate, denticulate, finely nerved; flowers very small, pink, resupinate, so that the standard is on the outside, in heads which become enlarged in fruit, dense, globular and tomentose; peduncles axillary shorter than the leaf; upper lip of fruiting calyx swollen into a membranous globular reticulate bladder, the 2 short teeth hidden among the wool which covers it.

Common in settled districts. Sept.-Nov.—Mediterranean region.

* 6. **T. resupinatum,** L. Like the preceding, but the leaflets are more strongly nerved, the lower peduncles are often longer than the leaf, the bladdery upper lip of the fruiting calyx is ovoid-conical, less tomentose and terminates in 2 conspicuous divergent teeth.

South-East. Oct.-Dec.—Mediterranean region.

* 7. **T. repens,** L. *White Clover.* Glabrous perennial with prostrate-rooting stems; leaflets broadly ovate, often marked with a white transverse streak, nerved, denticulate, on long petioles; flowers usually 30-40, white, in bud and when withering pink, shortly pedicellate, reflexed after flowering, in rather loose heads on peduncles longer than leaf; pod oblong, slightly constricted between the 3-4 seeds; standard twice as long as calyx.

Common in pasture and grass plots in settled districts. Oct.-April.—Europe; Asia.

* 8. **T. cernuum,** Brot. Glabrous prostrate annual with hollow stems; leaflets ovate-cuneate, strongly nerved and denticulate; flowers pink, very small, shortly pedicillate, finally reflexed, in rather loose small heads, on slender peduncles much shorter than the leaf; standard notched at summit, scarcely longer than calyx; pod 2-3-seeded.—*T. Perreymondii,* Gren.

South-East. Summer.—Southern France; Spain.

* 9. **T. glomeratum,** L. Glabrous prostrate or ascending annual; leaflets obovate-cuneate, strongly nerved, denticulate; the upper leaves on very short petioles; flowers pink, sessile, in small globular axillary heads, sessile between the uppermost stipules; calyx prominently nerved, the teeth equal, ovate and shortly awned, in fruit stiff and spreading or recurved; pod 1-2-seeded; standard longer than calyx.

Common in settled districts. Oct.-Dec.—Western and southern Europe.

* 10. **T. suffocatum,** L. Near the preceding, but smaller; all the leaves on long petioles; calyx similar, but the recurved teeth less rigid, lanceolate-acuminate; flowers white, fewer in head; standard much shorter than calyx; pod 2-seeded.

Keith. Oct.-Dec.—Western Europe and Mediterranean region.

* 11. **T. subterraneum,** L. Slender prostrate villous annual; leaflets obcordate, faintly denticulate at summit, on long petioles; heads consisting of about 3 white or pinkish fertile outer flowers and several barren inner ones without petals, all reflexed after flowering, so that the fertile ones are surrounded by the enlarged rigid barren calyxes with spreading teeth; peduncles axillary, long, turned down towards the ground after flowering; calyx with glabrous tube, often red towards the summit, many-nerved in fruit, with long subulate teeth; standard twice as long as calyx.

Settled districts. Oct.-Dec.—Western and southern Europe.

* 12. **T. pratense,** L. *Red Clover.* Somewhat villous perennial with ascending stems; leaflets large (mostly 2-4 cm. long), elliptical-oblong, almost entire; adnate part of stipules ovate, scarious, nerved, the free part at first triangular and then abruptly contracted into an awn; flowers purplish in large terminal heads (2-3 cm. long), globular or ovoid, usually sessile between the uppermost stipules; calyx-tube obconical, villous, with 4 erect setaceous teeth about as long as the tube, the 5th and lowest one about twice as long, the throat slightly narrowed internally by a hairy ring; standard exceeding calyx, notched.

Cultivated for fodder and spontaneous here and there in Mt. Lofty Range and South-East. Summer.—Europe; western Asia.

* 13. **T. scabrum,** L. Appressed-pubescent annual; leaflets small, obovate-cuneate, denticulate, with lateral nerves arched towards the margin; flowers small, white, in small ovoid axillary sessile heads contracted towards base; calyx coriaceous, hairy, the throat much constricted by 2 liplike calli, the teeth lanceolate, in fruit rigid and curved outwards, the lowest longer than the tube; standard shorter than calyx.

Settled districts. Oct.-Dec.—Europe; western Asia.

* 14. **T. striatum,** L. Villous annual; leaflets obovate or obovate-oblong; faintly denticulate; flowers small, pink, in ovoid or oblong sessile axillary and terminal heads; calyx villous, in fruit almost globular, with spreading-erect rigid subulate subequal teeth; standard about as long as calyx.

Mt. Lofty Range. Oct.-Dec.—Europe; western Asia.

* 15. **T. arvense,** L. *Hare's-foot Clover.* Erect slender pubescent annual; leaflets linear-oblong, faintly toothed near summit; flowers very small, pink, in globular finally oblong or cylindrical heads of a delicate lavender color, on rather long filiform peduncles;

calyx-tube ovoid, villous, the teeth plumose, setaceous, much longer than tube; petals shorter than calyx.

Settled districts. Oct.-Dec.—Europe; Western Asia.

* 16. **T. incarnatum,** L. *Crimson Clover.* Erect appressed-villous annual; leaflets broadly obovate, denticulate at summit; stipules scarious, broadened upwards, green-nerved, the free part short; flowers red, in ovoid finally cylindrical heads, 4-5 cm. long, on long rather stout terminal peduncles; calyx villous, with slender subequal teeth, longer than tube, stiff and spreading in fruit; petals scarcely longer than calyx.

Cultivated as fodder and spontaneous here and there in Mount Lofty Range and South-East. Summer.—Western and Southern Europe.

* 17. **T. angustifolium,** L. Stiff erect annual with white appressed hairs; leaflets linear or linear-lanceolate, 3-5 cm. long; stipules long, green-nerved, with long slender points; flowers small, pink, in terminal pedunculate finally cylindrical heads, 4-8 cm. long; calyx-tube with spreading hairs seated on tubercles, the ciliate rigid subulate teeth spreading in fruit, the lowest one the longest, the calyx-throat closed in fruit by a 2-lipped callus; standard at first rather longer than calyx, afterwards about as long.

Common in settled districts. Oct.-Dec.—Mediterranean region.

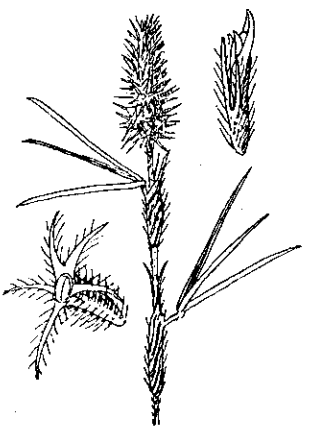

FIG. 143.—**Trifolium angustifolium.**

30. TRIGONELLA, L.

(A diminutive of the Greco-latin *trigonus*, triangular, on account of the appearance of the corolla of *T. Foenum-graecum.*)

1. **T. suavissima.** Lindl. Diffuse fragrant slightly hairy annual; leaves of 3 obovate denticulate leaflets 6-10 mm. long, stipules adnate to petiole at base, with a few coarse teeth; flowers small, pale-yellow, 4-8 in loose sessile or subsessile axillary clusters; calyx about 4 mm. long, with equal lanceolate teeth; standard rather longer, the blunt keel not much shorter; stamens 9 and 1; ovary with several ovules; pod linear, pubescent, reticulate, curved upwards, 8-15 mm. long, 2 mm. broad, opening in 2 valves.

From Broken Hill railway and Lake Torrens to Far North, eastward to the Warburton and Cooper's Creeks, and westward to Musgrave Range. Most of the year.—Temperate Australia.

31. MELILOTUS, (Tournef.) Adans.

(Greco-latin name of these plants, from Greek *meli*, honey; *lótos*, lotus.)

Calyx 5-toothed; petals free, deciduous; keel blunt; stamens 9 and 1; ovary with 2-8 ovules; pod somewhat compressed, coriaceous, drooping, indehiscent, exceeding the calyx, 1-2-seeded. Glabrous herbs, with leaves of 3 leaflets; stipules adnate to petiole; flowers in long axillary pedunculate racemes, often fragrant or scentless in the same species

Annual; flowers yellow ..... *M. indica* 1.
Biennial; flowers white ..... *M. alba* 2.

FIG. 144.—**Melilotus indica.**

* 1. **M. indica,** All. (1785). *King Island Melilot; Californian Lucern.* Almost glabrous erect annual; leaflets obovate-cuneate, the upper ones oblanceolate, denticulate; flowers small, yellow, in dense obtuse racemes; ovary 2-ovulate; pod subglobular, 2-3 mm. long, reticulate-wrinkled, 1-seeded.—*M. parviflora,* Desf. (1800).

Common on cultivated land, roadsides, or sandy soil near sea. Aug.-Nov.—Mediterranean region Southern Asia.

* 2. **M. alba,** Desr. *Bokhara Clover.* Erect almost glabrous biennial; leaflets ovate-oblong, the upper ones oblong, denticulate almost to base; stipules rather long, setaceous; flowers white, in very long rather loose racemes; ovary with 2-4 ovules; pod ovoid, 3-3½ mm. long, reticulate-wrinkled, with 1 rarely 2 seeds.

Cultivated as fodder, and spontaneous here and there in settled districts, especially in moist situations. Nov.-April.—Europe; western Asia.

* *M. officinalis*, (L.) Med., has appeared in cultivated land, probably as an adulterant in seed, but does not seem to have established itself. It is a biennial, much resembling the preceding, but the flowers are yellow and the ovary has 5-6, rarely 7 or 8 ovules.—*M. arvensis*, Wallr.—Summer.—Europe; Western Asia.

32. MEDICAGO, (Tournef.) L.

(Name originally formed by Jacques Dalechamp, 1513-1588, from the Latin *medica*, lucern, so called because lucern was believed to have been introduced into Europe from Media.)

Calyx with 5 almost equal teeth; standard obovate; keel obtuse; stamens 9 and 1; pod short, at first straight, finally much exserted from the calyx and curved or spirally coiled, often with a row of spines or tubercles on each side of the dorsal suture or keel-like outer margin, usually several seeded; seeds mostly reniform. Herbs with leaves of 3 denticulate leaflets; stipules adnate to the petiole by their base and usually toothed; flowers mostly yellow, in short axillary racemes, with small persistant bracts; bracteoles none, the peduncle often ending in an awn or bristle as long as the terminal flower.

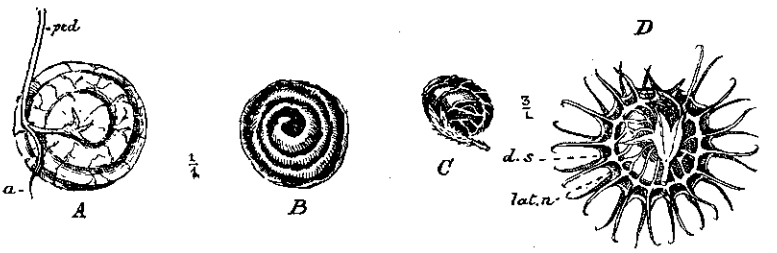

FIG. 145.—**Medicago.** A, pod of *M. orbicularis*: *a*, awn; *ped*, peduncle. B, pod of *M. scutellata*. C, pod of *M. lupulina*. D, lowest coil of pod of *M. denticulata*: *d.s*, dorsal suture; *lat.n*, lateral nerve, from which the spines rise; the furrow lies between the suture and the nerve.

A. Pod without spines or tubercles, the transverse nerves running from the ventral to the dorsal suture without the intervention of any nerves parallel to the dorsal suture.
  B. Pod reniform, 1-seeded ..... *M. lupulina* 1.
  B. Pod spirally coiled, with several seeds.
    C. Flowers violet, numerous: pod with an opening through the centre. perennial ..... *M. sativa* 2.
    C. Flowers yellow, few; pod large, orbicular, without an opening through the centre: annuals.
      Pod convex on both faces ..... *M. orbicularis* 3.
      Pod hemispherical ..... *M. scutellata* 4.

A. Pod with spines or tubercles, the transverse nerves terminating in a nerve parallel to and on each side of the dorsal suture; annuals.
  D. Pod with membranous partitions between the seeds; stipules conspicuously toothed.
    E. Pod cylindrical, pubescent, the coils closely pressed together, the spines stout, spreading or appressed; calyx-teeth hairy, very long..... *M. tribuloides* 5.
    E. Pod discoid or subcylindrical, the coils lying loosely on each other, the spines slender, divergent and hooked or reduced to tubercles: calyx-teeth glabrous or hairy only at base.
      F. Glabrous plants; dorsal suture narrow; parallel furrows conspicuous.
        G. Pod 4-6 mm. diam.; coils 1½-3½; spines slender.
          Spines about as long as half the diameter of pod, often hooked..... *M. denticulata* 6.
          Spines straight, very short ..... *M. apiculata* 7.
          Spines reduced to tubercles ..... *M. confinis* 8.
        G. Pod 7-10 mm. diam.; coils 3½-5; spines stouter, hooked ..... *M. lappacea* 9.
      F. Slightly pubescent plant; dorsal suture broad; parallel furrows inconspicuous ..... *M. praecox* 10.

E. Pod subglobular, glabrous, the spines slender, reflexed and overlapping, but not hooked; calyx-teeth hairy only at base ..... *M. arabica* 11.

D. Pod without partitions between seeds; stipules entire or almost so; pubescent plant with globular pods and spines hooked or reduced to short teeth; calyx-teeth hairy ..... *M. minima* 12.

* 1. **M. lupulina,** L. *Black Medic.* Pubescent procumbent annual or biennial; leaflets obovate, denticulate; flowers very small, yellow, numerous in ovoid heads on slender peduncles longer than the leaf; pod small, renate, black when ripe, the convex faces with concentric nerves; seed 1, 1½-2 mm. long. (Fig. 141, C.)
Settled districts. Sept.-May.—Europe; temperate Asia.

* 2. **M. sativa,** L. *Lucern.* Sparsely pubescent perennial; leaflets oblong-cuneate, denticulate at summit; flowers violet, in oblong racemes on peduncles longer than leaf; pod reticulate, with 2-4 loose coils, open through the centre; seeds 2-6, 2-2½ mm. long.
Cultivated for fodder, and spontaneous in many places. Summer.—Believed to be indigenous in South Russia and parts of Asia.

* 3. **M. orbicularis,** All. *Button Clover.* Almost glabrous prostrate annual; leaflets obovate-cuneate, toothed at summit; flowers small, yellow, 1-3 on awned peduncles shorter than leaf; pod orbicular, flattened, about 15 mm. diam., lenticular, with 3-5 coils and radiating nerves, seeds about 12, subovate, about 2½ mm. long. (Fig. 145, A.)
Near Adelaide. Oct.-Dec.—Mediterranean region.

* 4. **M. scutellata,** All. *Snail Medic.* Glandular-pubescent procumbent annual; leaflets obovate, toothed; flowers yellow, 1-3 on awned peduncles shorter than leaf; pod finally hemispherical or subglobular, 12-15 mm. diam., with 5-6 vertical coils, of which the lower partially enclose the upper; seeds about 10, large, about 6 mm. long. (Fig. 145, B.)
Settled districts. Sept.-Nov.—Mediterranean region.

* 5. **M. tribuloides,** Desr. (1789). Prostrate or ascending pubescent annual; leaflets obovate-cuneate, coarsely toothed at summit; stipules toothed, with a long entire point; flowers 1-3, yellow, on awned peduncles; calyx-teeth subulate, twice as long as tube; wings shorter than keel; pod glabrous or with scattered hairs, sub-cylindrical, with 4-5 closely pressed coils and a furrow between the dorsal suture and the 2 lateral nerves; spines conical, divergent, not hooked, about 4 mm. long; seeds 6-10, 4 mm. long.
Var. *truncatula,* Koch. Flowers sometimes 4; pod cylindrical, often black when ripe; spines shorter (about 2 mm. long) and finally closely appressed to the pod.—*M. truncatula,* Gaertn. (1791); *M. tentaculata,* Willd. (1800).
Common in settled districts and beyond. Sept.-Nov.—Mediterranean region.

* 6. **M. denticulata,** Willd. (1800). *Toothed Medic.* Almost glabrous prostrate or ascending annual; leaflets obovate-cuneate, toothed at summit, always glabrous on upper face; flowers small, yellow, usually 2-5 on an awnless peduncle, mostly shorter than the leaf; calyx-teeth as long as or longer than tube; standard longer than wings, which are longer than keel; pod glabrous, discoid or almost cylindrical, often black when ripe, flat and finely reticulate at both ends, with 1½-3½ coils pressing rather loosely on each other, 4-6 mm. diam. without the spines, which are 2-3½ mm. long, slender, divergent and mostly hooked at summit, the dorsal suture narrow, with a furrow between it and each of the 2 lateral parallel nerves; seeds 3-6, 2½-3½ mm. long (Fig. 145, D).—*M. hispida,* Gaertn. partly; *M. hispida,* Gaertn. var. *denticulata,* Urb.
Very common in settled districts and beyond them; sometimes called "Trefoil." July-Dec.—Western Europe to Mediterranean region.

* 7. **M. apiculata,** Willd. Near the preceding, with the same thickness of pod and number of coils, but the spines very short and not hooked, ½-1 mm. long; flowers 2-4.—*M. hispida,* Gaertn. var. *apiculata,* Urb.
Settled districts. Aug.-Nov.—Western Europe; Mediterranean region.

* 8. **M. confinis,** Koch. Near the preceding; spines reduced to a row of tubercles in the furrow on each side of the dorsal suture.—*M. hispida,* Gaertn. var. *confinis,* Burnat.
Settled districts. Sept.-Dec.—Western Europe; Mediterranean region. This differs from *M. reticulata,* Benth. (*M. hispida,* Gaertn. var. *inermis,* Urb.) only by the latter having 5-6 coils. *M. reticulata* does not appear to have reached South Australia.

* 9. **M. lappacea,** Desr. (1789). *Bur Medic.* Near *M. denticulata,* but the pods are 7-10 mm. diam. without the spines, which are rather stouter, divergent, 2-4 mm. long,

hooked; coils 3½-5; flowers 2-4; pod usually black when ripe; seeds 6-8.—*M. hispida*, Gaertn. (1791) partly; *M. hispida*, Gaertn. var. *longispina*, Urb.

South-East. Aug.-Oct.—Mediterranean region. The form with 4-6 coils is sometimes distinguished as *M. nigra*, Willd.

* 10. **M. praecox,** DC. Slender slightly pubescent annual; leaflets obovate-cuneate, toothed at summit, usually glabrous above; stipules coarsely and deeply toothed; flowers small, yellow, 1-2 on unawned peduncles much shorter than leaf; calyx-teeth not longer than tube; wings shorter than keel; pod discoid, 4-5 mm. diam. flat and reticulate at both ends, with 2-3 loose coils and divergent hooked spines 2-3 mm. long; dorsal suture broad and smooth, so that the parallel furrows are only visible from the faces or ends of the pod; seeds about 5, 3 mm. long.

Settled districts. July-Nov.—Mediterranean region.

* 11. **M. arabica,** (L.) All. (1785). *Spotted Medic.* Prostrate or almost erect annual; with a few spreading articulate hairs on stems and peduncles; leaflets obcordate-cuneate, glabrous above, slightly toothed at summit, usually with a brown spot in the centre; stipules coarsely toothed; flowers 1-5 yellow, on awned peduncles shorter than leaf; wings shorter than keel; pod subglobular, glabrous, 5-6 mm. diam. with 4-6 rather closer coils, dorsal suture narrow between the 2 narrow furrows, spines 3-4 mm. long, slender, curved and reflexed; seeds about 8, 3 mm. long.—*M. maculata*, Sibth. (1794).

Rare near Adelaide; commoner in South-East. Oct.-Nov.—Western and southern Europe; western Asia.

* 12. **M. minima,** (L.) Grufb. Ascending or prostrate whitish-pubescent annual; leaflets small, hairy on both faces, obovate or cuneate, toothed at summit; stipules broad, entire or scarcely toothed near base; flowers small, yellow, usually 1-3, on awned peduncles scarcely as long as the leaf; wings and keel about equal; pod globular, pubescent, 3-4 mm. diam., with slender divergent hooked spines of about the same length, the dorsal suture narrow, the 2 parallel furrows rather deeply sunk below the dorsal suture but almost flat, the coils 3-4; seeds 4-8, 3 mm. long.

Settled districts, and Flinders Range. Sept.-Nov.—Europe; western Asia.

Var. *brachyodon*, Reichb. Spines reduced to broad teeth scarcely exceeding the dorsal sutures; coils usually 2½-3; hairs often glandular.—Near Millicent, S.E.—Europe.

33. LOTUS, (Tournef.) L.

(Greco-latin name of several very different plants, one being some sort of clover-like plant).

Calyx somewhat 2-lipped, of 5 subequal lobes; standard obovate or orbicular; wings connivent, keel incurved, beaked, swollen towards the base on each side; stamens 9 and 1, the filaments alternately dilated near the summit; anthers equal; ovary sessile, with several ovules; style incurved, glabrous; pod rather long, cylindrical, with membranous partitions between the seeds. Herbs with leaves of 5 leaflets, 3 of which are close together at the summit of the flattened petiole and 2 at its base, resembling stipules; flowers subsessile in umbels on long axillary peduncles, with a 3-foliolate bract at the base of the umbel.

Flowers red, pink, or white ..... *L. australis* 1.
Flowers yellow ..... *L. corniculatus* 2.

1. **L. australis,** Andr. Variable perennial with erect or ascending often rather stout stems, more or less pubescent all over; leaflets obovate-cuneate to narrowly oblanceolate, 1-4 cm. long, the stipular ones smaller; flowers usually 3-6 in the umbel, pink or white, 1-2 cm. long, on peduncles exceeding the leaf; calyx pubescent, the lobes acuminate, usually rather longer than tube; keel shorter than standard; pod 3-5 cm. long, 3 mm. diam., straight, the valves twisted spirally at maturity; seeds globular, smooth.

Chiefly along the coast from Beachport northward; also inland in the Mt. Lofty Range, and at least as far north as Melrose in the Flinders Range. The stout coastal form attains a height of 50-80 cm. Sept.-March.—Throughout Australia.

Var. *parviflorus*, Benth. (1864). Almost erect when small, or the stems, when longer, ascending or procumbent; leaflets smaller, sparsely to densely pubescent; flowers only 6-8 mm. long, 1-3 in umbel, calyx-lobes as long as or only slightly exceeding tube; standard red, pink, or white, the keel as long as standard, always dark-red in upper part; pod 1½-3 cm. long, usually curved, valves slightly twisted.—Var. *coccineus*, F. v. M. (1878); var. *Behrianus*, Tate (1890); var. *Behrii*, Moore et Betche (1893); *L. coccineus*, Schlecht. (1848).

Drier parts of the State; from Ardrossan and the Murray lands to the Far North, and westward to the Nullarbor Plain. July-Oct.—Western New South Wales; West Australia.

2. **L. corniculatus,** L. *Bird's-foot Trefoil.* Differs from the preceding chiefly in the yellow flowers, 2-6, rarely more, on very long slender peduncles; leaflets of thinner texture, obovate-cuneate, the stipular ones usually acuminate; pod 2-3 cm. long, the valves spirally twisted after seeding; plant almost glabrous, slender, perennial; calyx lobes about as long as tube.

Mount Lofty Range; South-East. Summer.—Eastern States; Europe: temperate Asia.

A hairy form, with narrower leaflets, the upper ones acuminate, very long peduncles and calyx-lobes much longer than the tube, found near Murray Bridge, is probably var. *Sibthorpii,* Aschers. et Graebn., from the Mediterranean region.

34. INDIGOFERA, L.

(Neo-latin for "indigo-bearing," because two tropical species—*I. tinctoria,* L. and *I. anil,* L.—are the plants from which indigo is chiefly produced.)

Calyx with an oblique tube and nearly equal teeth, or the lowest teeth longer; standard ovate, or orbicular, pubescent on back; keel almost straight, often pubescent along outer margin, spurred on each side; stamens 9 and 1; anthers equal, the connective produced above the cells in a small gland; filaments alternately long and filiform and short and broad; ovary sessile or nearly so, with usually several ovules; style glabrous; pod usually cylindrical, with transverse caducous cellular partitions; seeds without caruncle, truncate at both ends. Herbs or undershrubs, the hairs mostly appressed and centrally attached (forked); leaves imparipinnate, usually of several leaflets; stipules small; flowers red or purplish, in axillary racemes; bracteoles absent; bracts at base of pedicels caducous and usually small.

A. Herb, with spreading glandular hairs on stem ..... *I. viscosa* 1.
A. Slender undershrubs, without glandular hairs.
B. Nearly glabrous plant ..... *I. australis* 2.
B. Ashy or white-tomentose plants.
Calyx-teeth shorter or not longer than tube; bracts shorter than buds ..... *I. brevidens* 3.
Calyx-teeth longer than tube; bracts longer than buds ..... *I. longibractea* 4.

1. **I. viscosa,** L. Small wiry annual or perennial herb; stems with spreading glandular hairs and appressed forked hairs; leaflets 9-15, petiolulate, ovate or oblong, 4-8 mm. long, appressed-hairy; flowers small, few, in slender racemes; calyx hairy, about 2 mm. long, the teeth much longer than the tube; petals twice as long, the standard almost sessile; pod cylindrical, hairy, 1-2 cm. long, 2 mm. diam., with 5-12 truncate seeds.

Stevenson River (Far North).—Central and tropical Australia; tropical Asia and Africa.

2. **I. australis,** Willd. Erect almost glabrous undershrub of 20 cm.-1 m. high; leaflets 9-21, oblong or oblong-cuneate, usually appressed-pubescent below, 5-25 mm. long, obtuse or notched, with small glands at the base of the short petiolules; stipules sometimes becoming short persistant spines; flowers lilac, in racemes usually shorter than the leaves; calyx about 2½ mm. long, brown, pubescent, oblique at summit, the teeth turned towards the anterior face, inconspicuous or linear, but always shorter than tube; standard about 8 mm. long, with a very short claw; pod cylindrical, glabrous, 1½-4 cm. long, 3 mm. thick, with 5-10 truncate seeds

Mount Lofty Range to northern part of Flinders Range; Eyre Peninsula; Birksgate Range; South-East. Aug.-Oct.—Temperate Australia.

3. **I. brevidens,** Benth. Differs from the preceding by the leaflets ashy-pubescent or densely white-tomentose on both faces, oblong or obovate, 5-10 mm. long, very shortly petiolulate or subsessile, the stipules (as in the preceding) sometimes spiny; racemes often longer than leaves; pod usually pubescent or tomentose, at least in the early stages; calyx 2½-3½ mm. long, the 3 lower teeth as long as the tube, the 2 upper shorter.

Lakes Eyre and Callabonna to Far North and westward to Musgrave Range. May-Sept.—Central Australia; New South Wales; Queensland; West Australia.

4. **I. longibractea,** J. M. Black. Undershrub with branches and foliage grey-tomentose, with short appressed hairs; leaflets 5-15, oblong-cuneate, 4-20 mm. long, obtuse; stipules often spiny; flowers numerous in racemes longer than leaves, bracts subulate, longer than the buds; calyx 6 mm. long, dark-hairy; teeth acuminate equal, longer than tube; ovary pubescent, with 6-12 ovules; pod unknown.

Far North; Musgrave Range. Chiefly winter.—Central Australia.

35. PSORALEA, (Royen) L.

(From Greek *psôraleos,* scabby: referring to the glands on the plants).

Calyx with the lowest tooth often the longest; standard ovate or orbicular; wings connivent; keel obtuse, incurved, shorter; stamens 9 and 1, or the tenth sometimes adhering; anthers equal; ovary with 1 ovule; pod small, about as long as the calyx,

ovate, indehiscent, adhering to the single seed. Perennial herbs, sometimes shrubby towards base, dotted with black or transparent glands ; leaves of 3 leaflets (in our species) on long petioles ; stipules broad ; flowers small, subsessile, 1-3 in the axil of a caducous membranous bract, forming axillary cylindrical spikes on long peduncles.

A. Leaflets pinnately 3-foliolate, the leaflets toothed.
  B. Greenish plants.
    Calyx 4-5 mm. long ; raceme dense ..... *P. patens* 1.
    Calyx 2-3 mm. long ; raceme loose ..... *P. cinerea* 2.
  B. Whitish plant ; calyx about 8 mm. long..... *P. eriantha* 3.
A. Leaves digitately 3-foliolate, the leaflets entire.
    Leaflets and spikes about 2-5 cm. long ; pod muricate *P. adscendens* 4.
    Leaflets and spikes much shorter ; pod smooth..... *P. parva* 5.

1. **P. patens,** Lindl. Perennial, 10 cm. to 1 m. high ; leaflets ovate-lanceolate, lanceolate or oblong, minutely pubescent, obtuse, 1½-5 cm. long, with short spreading rigid teeth ; flowers pink or purple, in long racemes, the naked part of the hoary peduncle alone much longer than leaf ; calyx silky-villous with white or black hairs, 4-5 mm. long, the lowest tooth broader, but scarcely longer than the others ; petals about as long again as calyx ; pod tomentose.

Adelaide plains and Mt. Lofty Ranges to Far North ; westward to Birksgate Range. Most of the year.—Throughout Australia.

2. **P. cinerea,** Lindl. Near the preceding, the leaflets often cuneate towards the base ; peduncles as long but more slender, the racemes rather loose and the flowers smaller ; calyx hoary, 2-3 mm. long, the lowest tooth rather broader and longer than the others ; pod slightly pubescent.

Warburton River, near Queensland border.—Central Australia ; New South Wales ; West Australia.

3. **P. eriantha,** Benth. Perennial, softly white-tomentose all over ; leaflets mostly ovate, broadly cuneate at base, mostly 2-3 cm. long, toothed as in the preceding ; flowers purplish, in long rather dense spikes, the naked part of the stout peduncle shorter than the leaf ; calyx white-villous, about 8 mm. long, the lowest tooth considerably longer than the others ; petals slightly exceeding calyx ; pod tomentose.

Murray lands to Flinders Range and Far North. Most of the year.—Temperate Australia.

4. **P. adscendens,** F. v. M. Almost glabrous perennial, with ascending stems ; leaflets close together, lanceolate or ovate-oblong, entire, mostly acute and 2-5 cm. long ; flowers pink or white, in a dense spike about 2-5 cm. long, on peduncles 2 to 3 times as long as the leaves ; bracts ovate-lanceolate ; calyx 4-5 mm. long, pubescent with black or white hairs, the teeth subequal, about as long as tube ; pod blackish, glandular-muricate.

Southern districts ; near Mt. Gambier.—Oct.-Dec.—Eastern States.

5. **P. parva,** F. v. M. Much smaller and more slender than the preceding ; leaflets close together, lanceolate or oblong, entire, 1-2 cm. long ; spikes dense, 1-2 cm. long, on long slender peduncles ; bracts suborbicular ; calyx 4-5 mm. long, white-pubescent, the teeth much shorter than the tube, subequal ; pod pubescent.

Southern districts and northwards to Booborowie, but appears like the preceding species to be rather rare. Oct.-Nov.—Victoria.

36. TEPHROSIA, Pers.

(From Greek *tephros*, ash-colored : most of the species are covered with grey hairs.)

1. **T. purpurea,** Pers. Small perennial herb, usually with hoary branches ; leaflets 5-11, rarely more, oblong or oblanceolate, 1-3 cm. long, glabrous or appressed-pubescent on upper face, hoary below, the lateral nerves parallel and rather conspicuous ; stipules subulate ; flowers purplish, in long loose leaf-opposed racemes ; calyx hoary, the tube about 2 mm. long, the teeth acute, about the same length or longer ; bracteoles none ; standard twice as long as calyx, orbicular, reflexed, pubescent outside ; keel incurved ; upper stamen somewhat united to the others, at least in the early stage ; anthers all equal ; style flat, glabrous, incurved ; pod compressed, usually pubescent, 2-4 cm. long, with 6-10 seeds.

Recorded in 1902 from Melrose Creek (Flinders Range), but I have not seen any specimens from that locality. The species occur in New South Wales, Central and tropical Australia, and in Asia and Africa. The genus differs from *Indigofera* in the anthers without glands and the hairs all simple, not forked.

37. SESBANIA, Scop.

(From *saisabán*, the Arabic name of *S. aegyptiaca*, Poir.)

1. **S. aculeata,** Poir. Tall erect almost glabrous herb; leaves paripinnate, consisting of 20-40 pairs of narrow-oblong obtuse leaflets, 5-15 mm. long, the common petiole sometimes prickly; flowers yellow, in loose erect axillary racemes, the bracts and bracteoles caducous; calyx about 5 mm. long, broad, with 5 short acute teeth; petals about 3 times as long; keel incurved, with a long claw; stamens 9 and 1, bent near the base; style glabrous; pod cylindrical, beaked, about 15-20 cm. long, 3 mm. thick, with transverse partitions between the numerous non-carunculate seeds.

Near Cooper's Creek and Warburton River.—New South Wales; tropical Australia; warm parts of Asia and Africa.

38. CLIANTHUS, Banks et Sol.

(From Greek *kleos*, glory; *anthos*, flower: on account of the splendid appearance of the Sturt Pea.)

1. **C. speciosus,** (G. Don) Aschers. et Graebn. *Sturt Pea.* Silky-villous perennial, with long stout prostrate or ascending stems; leaves imparipinnate, of 9-15 or sometimes more ovate or obovate-cuneate leaflets, 1-3 cm. long; stipules broad, herbaceous; flowers large (about 9 cm. long), red, rarely paler or almost white, shortly pedicellate, 5-6, drooping in an umbel-like raceme on erect axillary peduncles; bracts lanceolate; calyx hairy, 2 cm. long, with lanceolate lobes; bracteoles linear, inserted below it; standard ovate-acuminate, reflexed, about 5 cm. long, swollen and dark-purple towards base; wings much shorter, lanceolate; keel shaped like a long beak, about as long as the standard, and finally almost in the same plane; stamens 9 and 1; anthers equal; ovary stipitate, villous, with many ovules, the style incurved and bearded along the inner side near the summit; pod swollen, oblong, 2-valved. (Fig. 136, O.-P.)—*C. Dampieri*, A. Cunn. (1835); *Donia speciosa*, G. Don. (1832).

Port Augusta northwards to Far North; eastward to Broken Hill and westward to Ooldea. June-Nov.—New South Wales; tropical Australia.

39. SWAINSONA, Salisb.

(After Isaac Swainson, who died in 1806; he maintained a private botanical garden at Twickenham, near London, about the year 1789.)

Calyx-teeth nearly equal, pubescent inside; standard orbicular or reniform, usually purple or red, with a yellow or greenish centre, often with 2 raised calli above the claw; keel broad, incurved, obtuse or more or less beaked, often pouched on each side; stamens 9 and 1; anthers equal; ovary with many ovules; style incurved, bearded along the inner edge; stigma small, terminal; pod membranous and inflated, or coriaceous and hardened, and in the latter case more or less 2-celled by the impressed ventral suture, which intrudes into the pod. Perennial or rarely annual herbs, with imparipinnate stipulate leaves; flowers in axillary bracteate racemes, usually at least twice as long as the leaf, the lower part of the peduncle long and naked; bracteoles affixed on the pedicel just below the calyx, often minute. An Australian genus, except one species in New Zealand.

A. Hairs of the clothing attached by the base (Section 1. *Basitrichae*).
  B. Plants with long soft spreading hairs.
    C. Pod stalked, inflated, glabrous; flowers large; large; calyx densely woolly ..... *S. Greyana* 1.
    C. Pod subsessile, hairy, hard; flowers of medium size.
      D. Racemes many-flowered; calyx-teeth lanceolate.
        Standard without calli; calyx densely woolly *S. canescens* 2.
        Standard with calli; calyx villous ..... *S. Burkittii* 3.
      D. Racemes few-flowered; calyx villous, the teeth acuminate.
        E. Style without any hairs behind the stigma, hooked at summit and bearded all the way *S. Burkei* 4.
        E. Style hair-tufted behind the stigma.
          Style straight at summit, bearded half-way; keel purple ..... *S. villosa* 5.
          Style abruptly inflexed at summit, bearded all the way; keel yellow ..... *S. flavicarinata* 6.
  B. Plants with short appressed hairs.
    F. Upper leaflets as long as or longer than the others.
      G. Flowers large (about 2 cm. long); pod ovoid-oblong, hard; leaflets 15-21.
        Keel acute, twisted spirally ..... *S. procumbens* 7.
        Keel obtuse, twisted laterally ..... *S. oncinotropis* 8.

G. Flowers of medium size (about 12 mm. long).
H. Leaflets broad ; style straight at tip.
Leaflets 9-21 ; flowers 12-25 ; no calli .... *S. lessertiifolia* 9.
Leaflets 5-9 ; flowers 3-7 ; calli present ... *S. oligophylla* 10.
H. Leaflets narrow, 3-11 ; flowers few.
I. Tip of style abruptly inflexed.
Pod ovoid, inflated ; leaflets usually acute ; flowers often umbellate ..... *S. oroboides* 11.
Pod subcylindrical, 2-celled ; leaflets obtuse ; flowers in a short raceme ..... *S. reticulata* 12.
I. Tip of style straight ; pod subcylindrical, 2-celled ..... *S. campestris* 13.
G. Flowers very small (about 5 mm. long), 1-3 ; leaflets 11-13, very small ..... *S. Oliveri* 14.
F. Upper leaflets gradually smaller than the others ; leaflets and flowers numerous and very small .. *S. microphylla* 15.
B. Plants glabrous except for a few hairs, usually on the youngest parts and wearing off later.
J. Leaflets 11-25, obtuse ; flowers numerous ; pod stalked, inflated ; style tufted behind stigma.
Flowers large, purple ; standard with calli .. *S. coluteoides* 16.
Flowers medium, yellow ; standard without calli ..... *S. laxa* 17.
J. Leaflets few ; flowers 4-8, medium.
Wings and keel twisted ; leaflets lanceolate ; bracts and bracteoles narrow, scarious..... *S. campylantha* 18.
Wings and keel straight ; leaflets obovate ; bracts and bracteoles broad, herbaceous .... *S. viridis* 19.
A. Hairs of the clothing attached by the centre or near the centre, appressed, acute at the ends of the 2 branches (Section 2. *Mesotrichae*).
K. Flowers rather large (12-15 mm. long), not numerous ; clothing of dense hairs.
L. Style rigid, flattened towards base, bearded along half its length ; keel twisted sidewise ; flowers red rather than purple ..... *S. stipularis* 20.
L. Style slender, bearded along all its length ; keel straight, flowers purple.
Standard with calli ; keel without pouches.... *S. phacoides* 21.
Standard without calli ; keel with 2 small lateral pouches ..... *S. tephrotricha* 22.
K. Flowers small (about 8 mm. long), rather numerous ; hairs minute, scattered ..... *S. microcalyx* 23.

1. **S. Greyana,** Lindl. *Darling Pea.* Erect perennial, often over 1 m. high, more or less woolly ; leaflets oblong, 11-23, 1-2½ cm. long ; stipules ovate, acuminate ; flowers pink or red, 15-35 in long erect racemes ; calyx and short pedicels densely white-woolly, the calyx 6-8 mm. long, the teeth deltoid ; bracteoles linear, as long as tube ; standard 2 cm. broad, with 2 oblique calli ; keel obtuse ; wings shorter ; ovary glabrous ; style straight at summit, bearded all the way ; pod ovoid-oblong, bladdery, 3-5 cm. long, on a stipes of 10-15 mm. much longer than the calyx. (Fig. 136, H-K).
Along the River Murray. Oct.-Dec.—Victoria ; New South Wales.

S. galegifolia, (Andr.) R. Br., near the preceding, but glabrous, with flowers deep-red, or varying to purplish-pink (var. *coronillifolia,* Moore et Betche), or white (var. *albiflora,* Moore et Betche), has been recorded as far west as the Darling, in New South Wales, and also in South Australia, but apparently in the latter case on insufficient authority.

2. **S. canescens,** (Benth.) F. v. M. Erect rigid tomentose perennial ; leaflets 11-17, elliptical or obovate, 1-2 cm. long, glabrous above or silky on both faces ; stipules broad, acuminate ; flowers purplish, subsessile, in dense racemes twice as long as leaf ; calyx 5 mm. long, white-woolly, the lobes about as long as tube ; bracteoles linear, not half its length ; standard about 12 mm. across, without calli, scarcely longer than wings and keel, the latter obtuse and with a small hardened appendage or pouch at each side of the summit ; ovary pubescent, the style inflexed at summit so as to appear hooked ; pod oblong, woolly, about 12-15 mm. long, impressed along the suture.
Far North and westward to Tarcoola and Musgrave Range. Winter and spring.—West Australia ; Central Australia.
Var. *Horniana,* comb. nov., was found in the MacDonnell Range in 1894. Leaflets broader, sometimes ovate, mucronate ; bracteoles as long as calyx-tube ; pod silky rather than woolly.—*S. Horniana,* Tate herb.

3. **S. Burkittii,** F. v. M. Procumbent perennial, with a dense soft woolly clothing; leaflets 15-25, tomentose on both faces, obovate or oblong, 5-12 mm. long; stipules ovate-acuminate; flowers 30-40, rather small, purplish, in long racemes; calyx villous, 6 mm. long, the teeth scarcely longer than tube; bracts linear, longer than the woolly pedicel; bracteoles filiform, not ½ as long as tube; standard about 10 mm. broad, with 2 small calli; keel nearly as long, much incurved but obtuse, longer than the wings; ovary woolly; style incurved and hooked at the end, bearded all the way; pod sessile, oblong, densely woolly.

East and west of Lake Torrens. Aug.-Oct.—Western New South Wales.

4. **S. Burkei,** F. v. M. Procumbent, the stems villous with soft spreading hairs; leaflets 5-11, obovate-cuneate or oblong-cuneate, faintly notched, 5-15 mm. long, usually glabrous above, pubescent below; stipules broad, acuminate; flowers purple, 4-10 in a short raceme; bract herbaceous, longer than the short pedicel; calyx villous, 8 mm. long, the acuminate teeth longer than tube; bracteoles subulate, half as long as tube; standard 12-15 mm. broad, the narrow claw thickened at summit; keel slightly hardened at the obtuse summit, longer than wings; style inflexed near tip so as to appear hooked, bearded in all its length; pod woolly, hard, ovoid-oblong, 10-15 mm. long, deeply impressed.

Far North and westward to Musgrave and Birksgate Ranges; east of Ooldea. June-Oct.—Central Australia.

5. **S. villosa,** J. M. Black. Slender plant, villous, especially in the younger parts, with long spreading hairs; leaflets 5-7, obovate-cuneate, 1-1½ cm. long, becoming glabrous above; stipules lanceolate; flowers purple, about 5 in the raceme; bracts nearly as long as pedicel; calyx 6 mm. long, with black spreading hairs, the acuminate teeth at least as long as the tube; bracteoles minute; standard about 15 mm. broad, without calli; keel very shortly and bluntly pointed, equalling the wings; ovary villous, the style straight at the summit, bearded halfway, and with a few hairs at the back of the stigma; pod unknown.

Musgrave Range. July-Aug. The specimens are very few and not in good condition.

6. **S. flavicarinata,** J. M. Black. Prostrate; greyish-green, with rather long spreading hairs; leaflets 5-9, obovate-cuneate or oblong-cuneate, 6-15 mm. long, hairy on both faces or becoming glabrous above; stipules narrow-lanceolate; raceme 6-12-flowered; bract longer than the short pedicel; calyx 8 mm. long, the lanceolate-subulate teeth longer than tube; bracteoles as long as tube; standard red, about 12 mm. broad, the claw thickened; the red wing shorter than the yellow incurved keel; style flattened, bearded in all its length, the tip abruptly inflexed almost at a right angle to the rest of the style and bearded all round the stigma; pod ovoid-oblong, compressed, villous, 5-14 mm. long, the suture impressed.

Near Lake Torrens; along Broken Hill railway; Strzelecki Creek; near Great Bight. Aug.-Oct.—Central Australia (MacDonnell Range); western New South Wales; West Australia (Barrow and Fraser Ranges). This appears to be near *S. Incei*, Price, of West Australia, but the latter has the calyx only 5 mm. long, with teeth equalling the tube, more numerous flowers, &c.

7. **S. procumbens,** F. v. M. *The Broughton Pea.* Perennial with rather stout prostrate or ascending stems; leaflets usually 15-21, oblong-elliptical or broad-linear, glabrous above, appressed-hairy below, 1-2½ cm. long; stipules broad, leafy, acuminate; flowers large, purple, turning blue, 8-12 in a loose raceme on a stout erect peduncle; calyx 6-10 mm. long, glabrous outside, the lanceolate teeth at least as long as the tube; bract broad, nearly as long as the pubescent pedicel; bracteoles lanceolate, attached just below the stalk-like base of the calyx; standard much reflexed both in bud and flower, 2-3 cm. broad, notched, with 2 calli; keel much longer than standard and wings, incurved, with a long spirally twisted beak; ovary pubescent or glabrous; style long, coiled within the beak of the keel, minutely hooked at summit; pod 2-3 cm. long, hard, ovoid-oblong, almost sessile, impressed along the suture.

Country near Broughton River and eastward to Broken Hill; Far North. Spring and summer.—Eastern States. The Queensland and New South Wales specimens are said to have no calli. All ours which I have seen have 2 confluent calli above the claw, but in dried flowers they are indistinct.

Var. *parvifolia*, J. M. Black. Leaflets oblong or linear, 3-5 mm. long; flowers about 3 in raceme.—Bordertown.

8. **S. oncinotropis,** F. v. M. Very near the preceding, but the long keel, although twisted to one side, is not spirally coiled at the summit, and is obtuse, not acute.—*S. procumbens*, F. v. M., var. (?) *minor*, Benth.

West of Cockburn to Strzelecki Creek. Spring and summer.—Western New South Wales; Victoria.

9. **S. lessertiifolia,** DC. Stems rather stout, erect or ascending; leaflets 9-21, oblong-elliptical, hoary with appressed hairs below, glabrous above, 1-2 cm. long; stipules broad; flowers purple, 12-25 in raceme, on stiff hairy peduncles; bract equalling or shorter than pedicel; calyx 6 mm. long, black-hairy, the lanceolate teeth about as long as tube; bracteoles minute; standard 12-14 mm. broad, without calli; wings shorter than the obtuse keel; style straight at summit, bearded all the way; pod ovoid-oblong or oblong, inflated, sparsely pubescent, reticulate, 1½-3 cm. long.

South-East to Flinders Range; Murray lands; Eyre Peninsula and Flinders Island; near Tarcoola. June-Dec.—New South Wales; Victoria; Tasmania. The specific name is derived from a resemblance to the South African *Lessertia perennans*, DC.

10. **S. oligophylla,** F. v. M. Hoary with minute appressed hairs, the stems prostrate or ascending; leaflets 5-9, obovate or oblong-cuneate, 6-12 mm. long; stipules deltoid-acuminate; flowers small, purple, 3-7 in a short raceme; calyx 6 mm. long, the linear-lanceolate teeth 3 times longer than the short tube, a hairy nerve running from the summit of each tooth to the base of the calyx; bracts setaceous, longer than the short pedicel; bracteoles linear, as long as the calyx-tube; standard 10 mm. broad, with 2 confluent calli, longer than the wings and keel, the latter obtuse and exceeding the wings; pod pubescent, oblong, about 12 mm. long; style straight at tip, bearded all the way.

Far North and westward to the Musgrave Range. July-Sept.—Western New South Wales; central Australia.

11. **S. oroboides,** F. v. M. Slender, ascending, hoary with appressed pubescence; leaflets 3-7, lanceolate and acute, rarely some of the lower ones oblong-cuneate and obtuse, 1½-5 cm. long, pubescent on lower face glabrous above: stipules subulate; flowers 3-8, in a short raceme or umbel, violet; bracts equalling or shorter than pedicels; calyx 4-7 mm. long, pubescent, the lanceolate lobes at least as long as the tube; bracteoles minute; standard 9-13 mm. broad, the claw narrow and with or without 2 small calli; wings as long as the obtuse keel; style bearded all the way, the tip abruptly inflexed almost at a right angle to the rest of the style; pod ovoid or broadly oblong, 10-15 mm. long, 5-6 mm. broad, inflated, pubescent.

Warburton River and near Cooper's Creek. Spring and summer.—Western New South Wales; Queensland.

Var. *hirsuta*, J. M. Black. Leaflets 5-15, pubescent on both faces, 6-20 mm. long, mostly linear-lanceolate; stipules lanceolate; calyx 4-5 mm. long, mostly with black hairs.

Adelaide Plains and Mount Lofty Range to Flinders Range; Murray lands. Sept.-Nov.—Victoria; New South Wales. Specimens from the southern parts of the State have been confused with forms of *S. tephrotricha*, from which they differ in the shape of the style and the attachment of the hairs, which is sometimes not purely basal, but in such cases the point of attachment is close to the blunt base of the appressed hair; also in the 2 lateral pouches of the keel, which are always present in *S. tephrotricha* and absent in *S. oroboides*.

12. **S. reticulata,** J. M. Black. Near the preceding, with the same style and clothing, but the stems are sometimes stouter and longer; leaflets 5-9, oblong-cuneate or oblong-linear, obtuse or notched; stipules linear-lanceolate; flowers 2-6 in raceme; calyx 5-6 mm. long, the teeth sometimes with subulate points; standard with or without 2 small vertical calli above the claw; pod subcylindrical, 15-20 mm. long, 3-4 mm. broad, reticulate with raised nerves, pubescent, deeply impressed along the suture and 2-celled.

Murray lands; Wynbring; Musgrave Range; between Ooldea and the Great Bight. Aug.-Oct.—New South Wales (Lake Victoria).

13. **S. campestris,** J. M. Black. Rather erect plant, with short scattered appressed hairs; leaflets 5-11, linear or linear-lanceolate, acute, 1-2 cm. long; stipules long, subulate; flowers purplish, 4-8 in racemes, on peduncles which become rigid and spreading in fruit; bract shorter than pedicel; calyx 5 mm. long, with black hairs and lanceolate teeth shorter than tube; bracteoles minute; standard about 10 mm. broad, without calli; keel obtuse, about as long as the wings; style bearded all the way, straight at the tip; pod subcylindrical, villous, 12-20 mm. long, about 4 mm. broad, deeply impressed, 2-celled, often incurved towards summit.

Hughes (Nullarbor Plain). Aug.-Sept.

14. **S. Oliveri,** F. v. M. Small procumbent slender whitish appressed-pubescent apparently annual herb; leaflets 11-13, obovate-cuneate, obtuse or notched, 3-4 mm. long; stipules lanceolate; flowers very small, 1-3 near the summit of awned filiform peduncles; bracts as long as the very short pedicel; bracteoles minute; calyx about 3 mm. long, pubescent, the teeth shorter than tube; standard pale-yellow, slightly exceeding calyx and remaining folded during flowering; keel about same length, white with pink tip; wings shorter; style incurved, with a tuft of hairs behind the stigma,

almost glabrous on the inner side; pod cylindrical-fusiform, hoary, about 2 cm. long, deeply impressed along the suture, with a straight or curved beak.
Gawler Ranges to Ooldea. June-Oct.—Western New South Wales.

15. **S. microphylla,** A. Gray. Perennial with procumbent or ascending stems, hoary with minute hairs or almost glabrous; leaflets 11-41, obcordate or obovate and very obtuse or notched, 1-6 mm. long, rarely oblong-cuneate and 8-10 mm. long, decreasing in size towards summit of leaf; stipules lanceolate; flowers small, purple, 20-50 in erect racemes; calyx 2-3 mm. long, appressed-pubescent, the teeth much shorter than tube; bract as long as or shorter than pedicel; bracteoles minute, caducous; standard about 10 mm. broad, without calli; wings and keel rather shorter, the latter obtuse; style incurved, straight at the end, with a tuft of hairs behind the stigma; ovary glabrous; pod obovoid, sessile, inflated, reticulate, 8-10 mm. long, slightly impressed along the suture, with an incurved beak.
Murray lands; Far North, eastward to Strzelecki Creek and westward to Musgrave Range. Aug.-Oct.—Eastern States; central Australia; West Australia (Barrow Range).

16. **S. coluteoides,** F. v. M. Shrubby, quite glabrous except for a few hairs on the youngest parts; leaflets 11-25, obovate or oblong, obtuse or notched, 1-2 cm. long; stipules leafy, ovate, obtuse, 12-15 mm. long; flowers purplish, 10-20 in shortly pedunculate racemes often not much exceeding the leaf; calyx 5-6 mm. long with 2 minute bracteoles, not $\frac{1}{4}$ the length of the tube; standard 2 cm. across, with calli above claw; keel obtuse, much longer than the wings; style shortly bearded outside just below the stigma, as well as the inner longitudinal beard; pod glabrous, inflated, bladdery, beaked, 3-4 cm. long, on a stipes of about 8 mm.
Gawler Ranges to near Ooldea. June—Sept.—West Australia (Victoria Desert). The specific name is derived from a likeness to the Mediterranean shrub, *Colutea arborescens*, L.

17. **S. laxa,** R. Br. Glabrous perennial; leaflets 11-21, mostly oblong, obtuse or slightly notched, 10-18 mm. long; stipules ovate, obtuse; flowers yellow, about 20 in loose racemes; bracts and bracteoles minute; calyx 3-4 mm. long; standard 1 cm. across, without calli; keel obtuse; style with a dense tuft of hairs behind the stigma and a thin beard along the inner side; pod inflated, $1\frac{1}{2}$ cm. long, glabrous, on a stipes about as long as calyx.
Murray lands; Yorke Peninsula. Summer.—Western Victoria and New South Wales.

18. **S. campylantha,** F. v. M. Nearly glabrous rather rigid perennial; leaflets usually 5, lanceolate or linear, acute, 1-3 cm. long; stipules lanceolate; flowers purple, 4-8 in a loose raceme; calyx 5-6 mm. long, glabrous outside, the teeth ovate-acuminate, spreading, pubescent inside, nearly as long as tube; pedicels pubescent; bracteoles about $\frac{1}{3}$ length of tube; standard much broader than long, about 16 mm. broad, the 2 calli confluent; wings geniculate near base, twisted and longer than the keel, which has a short blunt beak and is slightly turned to one side; style rigid, thickened at base, twisted obliquely, grooved and very shortly incurved at summit; pod oblong, minutely pubescent, nearly 2 cm. long, impressed along the suture.
Flinders Range to Far North. May-Oct.—New South Wales; Queensland.

19. **S. viridis,** J. M. Black. Green, prostrate almost glabrous plant; leaflets 7-11, obovate, sometimes notched and almost obcordate, 5-10 mm. long, glabrous except for a few short hairs on the margin and midrib below; stipules large, leafy, obtuse, half-cordate; flowers purple, 5-8 in raceme; bracts leafy, ovate-lanceolate, ciliolate, longer than the short pedicel; calyx 7 mm. long, glabrous except the ciliolate lanceolate teeth, which equal the tube; standard about 15 mm. broad, without calli; keel obtuse, rather longer than wings; bracteoles lanceolate, nearly as long as calyx-tube; ovary pubescent, the style straight towards the summit, bearded all the way; pod unknown.
Curnamona Station (north of Yunta). Aug.-Sept.

20. **S. stipularis,** F. v. M. (1852). Erect or ascending perennial, hoary or silky with short white appressed hairs; leaflets 7-13, rarely fewer towards the base of the plant, oblong-cuneate, obtuse or notched and mucronate at summit, 5-15 mm. long, varying to linear-lanceolate; stipules broad and conspicuous, sometimes coarsely toothed, or lanceolate when the leaflets are very narrow; flowers 3-16 in raceme, on stiff hoary peduncles; bract from $\frac{1}{2}$ to nearly as long as pedicel; calyx 6-7 mm. long, with black or grey hairs, the deltoid-acuminate teeth scarcely as long as the tube; bracteoles minute; standard about 16 mm. broad, brick-red or orange-red, with a broad claw and usually no calli, but sometimes with 2 very small orbicular ones above the claw; keel red or pink, incurved, twisted somewhat to one side; wings red, as long or slightly longer; style rigid, inflexed, but the tip not hooked or abruptly bent, flattened towards base, bearded

about half-way; pod narrow-oblong, appressed-pubescent, about 2 cm. long.—*S. phacifolia*, F. v. M. (1850, name only).

From Roseworthy northward to Flinders Range and Far North. July-Oct.—Victoria; New South Wales.

21. **S. phacoides,** Benth. An ascending or prostrate perennial with the clothing of *S. stipularis*, but the hairs of the calyx longer and looser; leaflets 9-17, oblong or linear, obtuse or notched, 1-3 cm. long, flat; stipules lanceolate; flowers purple, about 6-8 in raceme, on stout hoary peduncles, in desert country often only 2-5; bract about as long as the very short pedicel; calyx almost woolly, 6-7 mm. long, the lanceolate rarely obtuse teeth about as long as tube; bracteoles minute; standard 16-20 mm, broad, with 2 confluent calli at summit of claw; wings shorter than obtuse keel; style slender, not curved at the end, bearded all the way; pod about 2½ cm. long, narrow-oblong, silky-villous.

Yorke Peninsula to Far North; eastward to Cockburn and westward to Tarcoola, Wynbring, and the Great Bight. July-Oct.—Eastern States.

Var. *argyrophylla*, J. M. Black. Leaflets 7-11, silvery-villous, often smaller; flowers smaller; calyx 8 mm. long, the teeth longer than tube.—Far North; Central Australia.

22. **S. tephrotricha,** F. v. M. Small perennial, covered with a dense silvery or grey appressed pubescence; leaflets 3-15, usually 3-7, obtuse, or acute, oblong, lanceolate or linear, 1-2½ cm. long; stipules lanceolate; flowers purple or rarely pale-pink, 5-16 in raceme; bracts longer or shorter than pedicel; calyx 5-6 mm. long, with grey or black hairs, the teeth slightly shorter than tube; bracteoles minute; standard about 15 mm. broad, with a broad claw and no calli; keel obtuse, about as long as wings; style bearded nearly all its length, the tip sometimes slightly but never abruptly bent; pod broadly oblong, pubescent.—*S. lessertiifolia*, DC. var. *tephrotricha*, Benth. partly.

Flinders Range to Far North and eastward towards Broken Hill. May-Dec.—New South Wales.

This is a difficult species, and when more ripe fruits are available it may become necessary to divide it in some way. The types were collected by Mueller about the year 1852 along the Broughton, Hutt and Hill Rivers, and near the Burra mines, but they are wanting in the Victorian National Herbarium. The nearest approach to the original description are 2 specimens from Beetaloo, at the southern end of the Flinders Range.

23. **S. microcalyx,** J. M. Black. Slender, ascending, sparsely beset with minute appressed hairs; leaflets 3-9, oblong-cuneate or obovate-cuneate, obtuse or notched, sometimes almost obcordate, becoming glabrous above, 5-12 mm. long; stipules linear-lanceolate; flowers small, purplish, 12-20 in racemes on stiff but slender peduncles; bract shorter than pedicel; calyx 3 mm. long, the teeth 1 mm. long; bracteoles minute; standard about 8 mm. broad and long, without calli; wings as long as the obtuse keel; style slender, bearded all the way, straight at the tip; unripe pod minutely pubescent, subcylindrical, 17 mm. long, 3-4 mm. broad, with a thin pericarp.

Tarcoola. Sept.-Oct.

* *Sutherlandia frutescens*, (L.) R. Br., a South African perennial with scarlet flowers, 7-25 rather small leaflets, glabrous above and hoary below, and a large bladdery pod, has established itself as a garden escape in the Flinders Range near Leigh's Creek. *Sutherlandia* is distinguished from *Swainsona* by the longitudinal beard on the outer instead of the inner edge of the style, the keel much longer than the standard and the wings minute.

40. ASTRAGALUS, (Tourn.) L.

(Greco-latin name of the ankle-bone; also of some leguminous plant).

* 1. **A. hamosus,** L. Pubescent prostrate or ascending annual; leaves imparipinnate, of 15-25 oblong, sometimes notched leaflets, 4-10 mm. long; stipules united at base; flowers small, erect, yellowish-white, in a short raceme at the summit of peduncles shorter than leaf; calyx 6 mm. long, with 5 narrow teeth as long as tube; standard oblong, erect, longer than wings, which exceed the blunt keel; stamens 9 and 1; pod cylindrical, curved like a hook, 2-4 cm. long, 3 mm. thick, almost 2-celled; seeds numerous, subquadrangular.

Plains near Hawker. Sept.-Nov.—Mediterranean region.

41. GLYCYRRHIZA, (Tournef.) L.

Greco-latin name of the Mediterranean *G. glabra*, L., whose roots produce the liquorice of commerce: from Greek *glykys*, sweet; *rhiza*, root).

1. **G. acanthocarpa** (Lindl.), J. M. Black (1919). Erect undershrub of 60 cm. to over 1 m., almost glabrous, but more or less beset with glandular dots; leaflets 9-13, oblong-lanceolate or obovate, 1½-2 cm. long, with immersed glands and ciliolate with minute curved hairs; stipules lanceolate, caducous; flowers lilac or yellowish, on very short pedicels in spikelike racemes longer than the leaf; bracts narrow, caducous; bracteoles absent; calyx 3-4 mm. long, the 2 upper teeth shortly united; standard oblong, erect,

7 mm. long ; wings nearly as long ; keel rather shorter ; stamens 9 and 1, or the upper one cohering at base ; anthers alternately large and small, the cells confluent at summit ; ovary sessile, 2-ovulate ; pod ovoid-compressed, not or tardily dehiscent, 5-6 mm. long, covered with hard straight or hooked prickles, and usually containing 1 non-caruncule seed.—*G. psoraleoides*, Benth (1864) ; *Indigofera acanthocarpa*, Lindl. (1839) ; *Clidanthera psoraleoides*, R. Br. (1849).

Murray lands near the river. Summer.—Temperate Australia.

42. VICIA, (Tourn.) L.

(Latin name of some vetch, probably *V. sativa*).

Calyx 5-toothed ; standard obovate or oblong ; wings adherent to the keel and longer than it ; stamens 9 and 1, or the upper one sometimes more or less adnate, the staminal tube obliquely truncate at summit ; style bent, bearded on the outer side under the stigma or more or less pubescent all round the summit ; pod more or less compressed, linear or oblong, with globular or ovoid arillate seeds. Weak sometimes climbing herbs ; leaves paripinnate, stipulate, ending in a simple or branched tendril ; leaflets mucronate ; flowers axillary.—*Vetch*.

A. Flowers subsessile, 1-2 together	V. *sativa* 1.
A. Flowers in racemes on long peduncles.	
B. Flowers large	*V. calcarata* 2.
B. Flowers small.	
Pod ?-seeded	*V. hirsuta* 3.
Pod 4-seeded	*V. tetrasperma* 4.

* 1. **V. sativa,** L. *Common Vetch*. Climbing more or less pubescent annual ; leaflets in 4-7 pairs, mostly ovate-oblong, rounded, truncate or notched at summit ; tendrils branched ; stipules toothed, usually with a colored spot ; flowers 1-2, subsessile, over 2 cm. long ; standard purple, wings and keel red ; calyx teeth about as long as the tube ; pod compressed, pubescent, 4-6 cm. long, 7-10 mm. broad, with cellular partitions ; seeds 8-10, smooth, globular, about 4 mm. thick.

Var. *obovata*, Ser. Leaflets in 4-8 pairs, obovate or obovate-cuneate, truncate and notched at summit ; pod narrower and less compressed, often black ; seeds mottled.

Var. *angustifolia*, Wahlbg. Leaflets rather distant, linear or narrow-oblong,; flower 1, rarely 2, about 1½ cm. long ; pod 3-5 cm. long, 4-6 mm. broad, almost cylindrical, finally glabrous, black or brown ; seeds 3-4 mm. thick.—*V. angustifolia*, L.

Cultivated and grass-land. July-Oct.—Europe ; western Asia. Cultivated as fodder.

* *V. sepium*, L., a slightly pubescent perennial, with 5-6 pairs of ovate-oblong leaflets, 2-5 purple flowers in very short racemes, and a black glabrous 3-6-seeded pod, 2½-3 cm. long, has been found at Mt. Lofty and Crafers.—Europe.

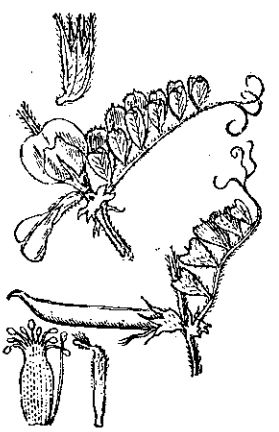

FIG. 146.—**Vicia sativa.**

* 2. **V. calcarata,** Desf. Slightly pubescent annual with quadrangular stem ; leaflets in 5-8 pairs, oblong or linear-oblong ; tendrils branched ; stipules bipartite ; flowers reddish-purple, about 15 mm. long, 1-3 on awned peduncles about half as long as leaf ; calyx-teeth shorter than tube ; pod subcylindrical, 4-5 cm. long, glabrous, light-brown, reticulate ; seeds 5-7, globular, mottled.

Adelaide plains and Mt. Lofty Range. Aug.-Oct.—Spain ; North Africa.

* 3. **V. hirsuta,** (L.) S. F. Gray. Slender more or less hairy annual ; leaflets in 6-10 pairs, linear oblong ; tendrils branched ; stipules toothed ; flowers only 3-4 mm. long, bluish-white, 3-8 near the summit of awned peduncles which are slightly shorter than the leaf ; calyx-teeth equal, erect, about as long as the tube ; pod linear-oblong, 8-10 mm. long, villous, with 2 greenish seeds.

Cultivated land and scrub in the Mt. Lofty Range.—Europe ; western Asia.

* 4. **V. tetrasperma,** (L.) Moench. Slender almost glabrous annual ; leaflets in 2-5 pairs, linear ; tendrils simple or forked ; upper stipules linear, entire ; flowers 5-6 mm. long, lilac, 1-3 on capillary peduncles about as long as the leaf ; calyx half as long as corolla, with unequal teeth ; pod subcylindrical, glabrous, obtuse, 10-14 mm. long, usually 4-seeded.

Mt. Lofty Range. Nov.-Dec.—Europe.

43. LATHYRUS, (Tourn.) L.

(Greek *lathyros*, the name of some leguminous plant, probably *L. sativus*).

Differs from *Vicia* in the style not filiform but flattened from back to front in the upper part and shortly bearded on the inner surface, the staminal tube cut square at summit, and the leaflets usually very few.

Flowers solitary, small; stem angular ..... *L. sphaericus* 1.
Flowers several, large; stem winged ..... *L. latifolius* 2.

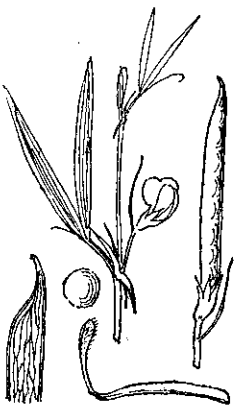

FIG. 147.—**Lathyrus sphaericus.**

* 1. **L. sphaericus,** Retz. Glabrous slender annual; leaflets in 1 pair, linear-lanceolate; upper tendrils simple; stipules half-sagittate, longer than petiole; flower red, 8-10 mm. long, solitary on an awned peduncle scarcely as long as the petiole; style not twisted; pod linear, slightly compressed, about 5 cm. long, longitudinally nerved; seeds globular, smooth.

Waterfall Gully and Mount Lofty Range. Oct.-Nov.—Mediterranean region.

* 2. **L. latifolius,** L. *Perennial* or *Everlasting Pea.* Glabrous perennial with climbing quadrangular broadly-winged stems; leaflets in 1 pair, ovate-elliptic, 3-5-nerved; petiole broadly winged; stipules large; flowers usually 3-12, about 20 mm. long, pink or red, on stout peduncles longer than leaf; style twisted round on its axis; pod subcylindrical, 5-8 cm. long, glabrous, the upper (ventral) suture with 3 longitudinal smooth ribs; seeds about 8, tuberculate.

Usually in moist places, Mount Lofty Ranges to Clare; a garden escape. Oct.-Dec.—Mediterranean region. Closely allied to *L. odoratus*, L. (the Sweet Pea) which is a hairy annual, with 1-3 flowers in the raceme, a shorter hairy pod and smooth globular seeds; a native of southern Italy and Sicily.

44. KENNEDYA, Vent.

(After Lewis Kennedy, 1775-1818, nurseryman at Hammersmith, near London.)

Calyx-teeth about as long as tube, the 2 upper ones united in a 2-toothed lip; standard with 2 inflexed auricles and 2 small calli above the claw; wings adhering to the incurved obtuse keel; stamens 9 and 1; anthers equal; ovary with several ovules; style slender, beardless, with a terminal stigma; pod linear, with pithy partitions; seeds carunculate. Prostrate perennial herbs; leaves usually of 3 leaflets, with stipules and stipellae; flowers bracteate, on axillary peduncles; bracteoles wanting.

Flowers 1-2 on the peduncle ..... *K. prostrata* 1.
Flowers racemose ..... *K. prorepens* 2.

1. **K. prostrata,** R. Br. *Scarlet Runner.* Stems prostrate, hairy; leaflets 3, obovate or orbicular, 1-3 cm. long, sparsely hairy; stipules leafy, cordate; flowers scarlet, 2-2½ cm. long, 1-2 on a peduncle shorter than the leaf, the pedicels long, with conspicuous persistant bracts; calyx brown, pubescent, about 10 mm. long; standard obovate; wings and keel equal; pod subcylindrical, 3-5 cm. long, pubescent.

South-East to Flinders Range. Aug.-Oct.—Temperate Australia.

2. **K. prorepens,** F. v. M. Stems prostrate, pubescent; leaflets 3, obovate, subrugose, 1-3 cm. long, appressed-pubescent and strongly nerved below, less hairy above; stipules deltoid-acuminate, spreading or reflexed; flowers purplish, about 1½ cm. long, 6-12 in a raceme on a peduncle longer than leaf; bracts caducous; calyx dark, 6 mm. long, with spreading grey hairs; standard suborbicular, about 14 mm. broad; wings and dark keel equal; young pod glabrous.

Near Alberga River (Far North). July-Oct.—Central Australia; West Australia. It is possible that this is merely a form or variety of *K. procurrens*, Benth., from Mount Kennedy, on the Maranoa River, Queensland. The only known specimen of the latter plant is preserved at Kew.

K. nigricans, Lindl., a robust twiner from West Australia, with 3 (sometimes 1) broadly ovate leaflets and large blackish-purple flowers in a unilateral raceme, is often planted along fences and is said to have gone wild in some gullies of the Mount Lofty Range.

45. HARDENBERGIA, Benth.

(After the Countess von Hardenberg, a sister of Baron von Hügel. The latter collected plants in West Australia in 1833.)

Differs from *Kennedya* in the calyx-teeth much shorter than the tube, the standard without inflexed auricles or calli, the keel much shorter than the wings, the short thick style, and the smaller flowers. Twining undershrubs.

1. **H. monophylla** (Vent.), Benth. *Native Lilac.* Glabrous, with wiry branches; leaflet solitary, ovate to lanceolate, 5-10 cm. long, 1½-6 cm. broad, obtuse, coriaceous, glaucous below, reticulate; flowers lilac, about 10 mm. long, usually about 30 in the raceme; calyx 4 mm. long; standard 10 mm. broad; pod hard, flattish, glabrous, 4-5 cm. long, 8 mm. broad, linear, with 6-8 transverse seeds and pithy partitions between them.—*Kennedya monophylla,* Vent.

Mount Lofty Range to southern part of Flinders Range; Kangaroo Island; Yorke and Eyre Peninsulas. July-Nov.—Eastern States.

H. Comptoniana (Andr.), Benth. (*Kennedya Comptoniana,* Link), with similar violet flowers in drooping racemes, 3-5 lanceolate leaflets and a cylindrical pod, is a favorite in gardens. It comes from West Australia, and is sometimes called *Kennedya pentaphylla* by seedsmen.

46. GLYCINE, L.

(From Greek *glykys,* sweet.)

Calyx with the 2 upper teeth united in a 2-toothed upper lip; standard suborbicular; wings slightly adherent to keel, which is obtuse and shorter than wings; upper stamen usually becoming free; anthers equal; ovary with several ovules; style short, glabrous; pod linear, with pithy partitions between the seeds, which are without caruncle. Slender twining perennial herbs, pubescent with more or less appressed hairs which are usually turned downwards on the stems, peduncles and petioles, and upwards on the leaflets, which are 3, rarely 5 or 7; stipules and stipellae small; flowers small, purple, racemose, or in the lower axils few and clustered; bracts and bracteoles small, the latter setaceous and affixed just below the calyx.

A. Terminal leaflet close to the 2 lateral ones.
  B. Stems rather long, twining ..... *G. clandestina* 1.
  B. Stems short, not or scarcely twining.
    Leaflets lanceolate; pod falcate ..... *G. falcata* 2.
    Leaflets obovate; pod nearly straight ..... *G. Latrobeana* 3.
A. Terminal leaflet distant from the lateral ones.
  C. Calyx-teeth lanceolate, shorter than tube.
    Leaflets all lanceolate, acute ..... *G. sericea* 4.
    Leaflets of upper leaves lanceolate, of the lower ones broad and obtuse ..... *G. tabacina* 5.
  C. Calyx-teeth subulate, longer than tube; leaflets all ovate or oblong, obtuse ..... *G. tomentosa* 6.

1. **G. clandestina,** Wendl. Stems twining; leaflets of upper leaves lanceolate or linear, acute, 1-3 cm. long, appressed-pubescent below or on both faces; flowers 3-6 near the summit of the slender peduncle, sometimes umbellate; calyx brown-hairy, 4-6 mm. long, the teeth lanceolate, not longer than tube; pod straight, subterete, minutely pubescent, 15-25 mm. long; seeds oblong, with a black punctulate testa or showing only the smooth dark-brown endopleura.

Mount Lofty Range to Far North and westward to Birksgate Range; Murray lands; Yorke and Eyre Peninsulas. Aug.-Oct.—Temperate Australia.

2. **G. falcata,** Benth. Stems short, ascending; leaflets lanceolate or oblong, 2-5 cm. long, villous, on a long hairy petiole; stipules rather large; flowers racemose on long peduncles; calyx silky-villous, about 5 mm. long; pod falcate, villous, 12-20 mm. long.

Cooper's Creek.—Subtropical and tropical Australia.

3. **G. Latrobeana** (Meisn.), Benth. Stems short, scarcely twining; leaflets obovate, obcordate, or the uppermost oblanceolate, 1-2½ cm. long, glabrous above, appressed-pubescent below; stipules broad; flowers and pods like those of *G. clandestina,* but the calyx-teeth broader and rather shorter.

Mount Lofty Range; South-East. Apparently rare. Sept.-Nov.—Eastern States.

4. **G. sericea** (F. v. M.), Benth. Stems slender, twining; leaflets linear or linear-lanceolate, acute, 3-6 cm. long, silky with an appressed pubescence on both faces, the terminal leaflet removed a distance of 5-10 mm. from the 2 lateral ones; flowers 6-12 in the raceme; calyx 5-6 mm. long, brown-hairy; pod straight, subcylindrical, pubescent, 3-4 cm. long; seeds black, subtruncate at both ends, shining or punctulate.

Flinders Range to Far North. Winter and spring.—Western New South Wales and Victoria; Central Australia.

Var. *orthotricha*, J. M. Black. Hairs of the stems and petioles turned upwards (whereas in the type and other species they are reflexed); seeds ovoid-oblong, light-brown, smooth and sometimes mottled.—Far North. Central Australia.

5. **G. tabacina,** (Labill.) Benth. Near *G. sericea*, but the hairs shorter, the leaflets rather shorter and often glabrous above, those of the upper leaves lanceolate, of the lower ones oblong, obtuse and often smaller; seeds black, punctulate or smooth; flowers rather smaller (about 8 mm. long).

Recorded by Mueller from Crystal Brook and Rocky River. I have not seen any South Australian specimens.—Temperate Australia; Pacific Islands.

6. **G. tomentosa,** Benth. Similar, but the clothing much denser and tomentose or villous; leaflets all ovate or oblong, obtuse; calyx villous, the teeth longer than tube; pod 12-20 mm. long; flowers 5-7 in raceme.

Cooper's Creek.—New South Wales; Queensland; southern China.

47. ERYTHRINA, L.

(From Greek *erythros*, red: on account of the red flowers).

1. **E. vespertilio,** Benth. A glabrous tree with stout conical prickles on the branches; leaflets 3, broadly cuneate towards base, with 2 diverging or divaricate obtuse lobes and often a smaller middle lobe, 5-12 cm. broad and usually shorter than broad; stipules small; stipellae gland-like; flowers large, scarlet, numerous in long racemes, on pedicels rather long and thickened at base; calyx obliquely truncate, entire or almost so, about 15 mm. long, splitting on the upper side; standard ovate, 3-4 cm. long; wings and keel less than half as long; stamens 9 and 1, the tenth adnate towards base; anthers equal; pod stipitate, submoniliform, with a few large red ovoid seeds, without caruncle.

Alberga River, near Oodnadatta. Locally called the Bean Tree. Summer.—Tropical and subtropical Australia.

48. RHYNCHOSIA, Lour.

(From Greek *rhynkhos*, snout: alluding to the shape of the keel in some species).

1. **Rh. minima,** (L.) DC. Slender trailing or twining perennial, pubescent or almost glabrous; leaflets 3, ovate-rhomboid, 1-3 cm. long and usually broader than long, the undersurface sprinkled with small superficial resinous glands; stipules linear-lanceolate; flowers small, yellow, 6-12 in racemes longer than the leaf; calyx 5 mm. long, the teeth rather longer than tube, the 2 upper somewhat united; no bracteoles; standard obovate, streaked with purple, glandular-dotted; keel incurved, obtuse; stamens 9 and 1; anthers equal; ovary pubescent, with 2 ovules, rarely 1; style incurved, beardless; pod pubescent, slightly curved, 12-18 mm. long; seeds 1-2, smooth, reniform, compressed, without caruncle.

Flinders Range (Aroona; Mt. Lyndhurst). Spring and summer.—Most tropical and subtropical countries, including Australia.

49. GALACTIA, P. Browne.

From the Greek *gala, galaktos*, milk: the stems of some species are said to contain a milky sap).

1. **G. tenuiflora** (Willd.), Wight et Arn. Slender twining pubescent or almost glabrous perennial; leaflets 3, ovate, lanceolate, oblong or almost orbicular, usually 2-5 cm. long and obtuse, glabrous above; stipules and stipellae small; flowers pink, in a few distant 2-3-flowered clusters, each cluster rising from a gland-like node of the peduncle; bracts caducous, bracteoles minute; calyx about 6 mm. long, the 5 teeth narrow and longer than tube; standard ovate; wings adhering to and about as long as keel; stamens 9 and 1; anthers equal; ovary with several ovules; style slender, beardless; pod linear, compressed, 2½-5 cm. long; seeds smooth, without caruncle.

Near Cooper's Creek.—New South Wales; tropical Australia and other tropical countries.

50. VIGNA, Savi.

(After Domenico Vigna, professor of botany at Pisa, where he died in 1647).

1. **V. lanceolata,** Benth. Slender twining slightly pubescent perennial; leaflets 3, broad-lanceolate, obtuse or somewhat acuminate, 2-6 cm. long, ciliolate, broadly cuneate towards base, and sometimes hastately lobed; stipules and stipellae small; flowers yellowish, in few clusters towards the summit of the peduncle, each cluster rising from a gland-like node; bracts and bracteoles small; calyx about 3 mm. long, glabrous outside, the 2 upper teeth united in a broad triangular upper lip, so that there appear to be 4 teeth,

all pubescent inside and shorter than tube; standard suborbicular, about 12 mm. long and 15 mm. broad, with 2 calli and 2 inflexed auricles at base of the lamina; wings obovate, curved, about as long as the incurved rather acute keel; stamens 9 and 1; anthers equal; ovary with several ovules; style long, slender, bearded halfway on the inner edge, with a broad oblique stigma; pod pubescent, subcylindrical, 2-5 cm. long.

From west side of Lake Eyre to Far North. Various periods.—Western New South Wales; tropical Australia.

Lespedeza lanata, Benth.; is recorded by Bentham for "South Australia; Mt. Strzelecki," but this site is north of Central Mt. Stuart and well within the tropical part of the Northern Territory.

51. AESCHYNOMENE, L.

(Greek *aiskhynomenê*, modest, ashamed: the name given by Pliny to some plant with sensitive leaves.)

1. **A. indica**, L. Erect annual, 30 cm. to 1 m. high, usually with a few scattered hairs on stem and branches; leaves imparipinnate, of 15-35 pairs of linear-oblong leaflets, 4-6 mm. long, and one small terminal leaflet; stipules lanceolate, auricled at base; flowers yellowish, few in axillary racemes, with leafy bracts at base of pedicels; calyx 6 mm. long, deeply cut into 2 lips, the upper 2-toothed, the lower 3-toothed; bracteoles broad-lanceolate, at base of calyx; petals about 9 mm. long, the standard obovate; stamens all united, but the tube more or less split in its upper part into 2 bundles of 5 stamens each; pod stipitate, flat, 2-3½ cm. long, 4-5 mm. broad, breaking transversely into 3-articles, each containing 1 seed.

Northern part of Flinders Range to Far North. Winter and spring.—New South Wales; central and tropical Australia; Asia; Africa.

FAMILY 61.—GERANIACEAE.

Flowers regular or irregular, bisexual; sepals 5, mucronate, imbricate, somewhat enlarged in fruit; petals 5, imbricate; stamens 10, in 2 rows, the 5 outer ones sometimes sterile; anthers with 2 parallel cells; ovary superior, 5-celled and 5-lobed, produced upwards in a beak consisting of the central axis and the 5 adnate styles (awns), which terminate in 5 free stigmas; ovules semi-anatropous, 2 in each cell; fruit of 5 carpels separating elastically, along with the awns, from the slender persistant 5-angled axis (carpophore); seed 1 in each carpel, without albumen; radicle curved downwards (incumbent) over the cotyledons, which are flattish and rolled round each other (convolute). Herbs with petiolate stipulate leaves; flowers umbellate and bracteate on axillary peduncles.

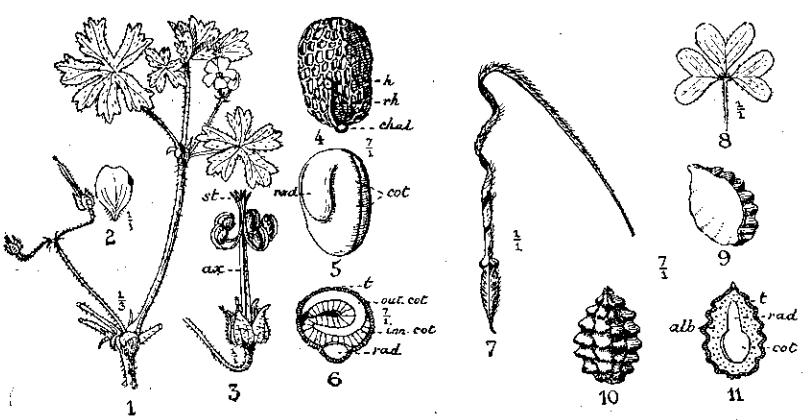

FIG. 148.—1-6, *Geranium pilosum;* 1, flowering and fruiting branch; 2, petal; 3, fruit; *st*, stigmas; *ax*, fruiting axis; 4, seed; *h*, hilum; *rh*, rhaphe; *chal*, chalaza; 5, embryo; *rad*, radicle; *cot*, cotyledons; 6, seed cut across; *t*, testa; *out. cot*, outer cotyledon; *inn. cot*, inner cotyledon; *rad*, radicle. 7, carpel or fruitlet of *Erodium cygnorum*. 8-11, *Oxalis corniculata:* 8, leaf; 9, seed emerging from the fleshy outer coat; 10, seed; 11, vertical section of same; *t*, testa; *alb*, albumen; *rad*, radicle; *cot*, cotyledons.

A. Petals equal; calyx without spur.
  Fertile stamens 10; awns glabrous inside..... GERANIUM 1.
  Fertile stamens 5; awns hairy inside..... ERODIUM 2.
A. Petals unequal; calyx spurred ..... PELARGONIUM 3.

1. GERANIUM, (Tourn.) L.

(Greco-latin name of some plant of this family, from Greek *geranos*, a crane : the fruit resembles a crane's head and bill.)

Petals equal in size, with 5 alternate nectar-glands ; stamens all fertile ; styles or awns of the carpels glabrous inside, curling upwards from the base of the fruiting axis and carrying with them the carpels, which open along the inner suture.

Perennial ; carpels smooth ..... *G. pilosum* 1.
Annual ; carpels wrinkled ..... *G. molle* 2.

1. **G. pilosum,** Forst. Diffuse perennial with a thickened rootstock and spreading hairs on the stems and petioles ; leaves palmatisect into 5-7 cuneate segments, which are again obtusely 3-5-lobed ; peduncles slender, usually 2-flowered ; sepals mucronate, hairy, 4-6 mm. long ; petals entire or slightly notched, pink or white, longer than sepals ; carpels pubescent, smooth ; seeds reticulate ; beak usually 12-15 mm. long. (Fig. 148, 1-6).—*G. dissectum*, L. var. *australe*, Benth.

Var. *australe*, Ostenf. Commoner and usually more slender than the type, with shorter reflexed or appressed hairs.—*G. australe*, Nees.

South-East to Flinders Range ; Kangaroo Island ; Eyre Peninsula. Sept.-Jan.—Temperate Australia ; New Zealand. A native fodder plant.

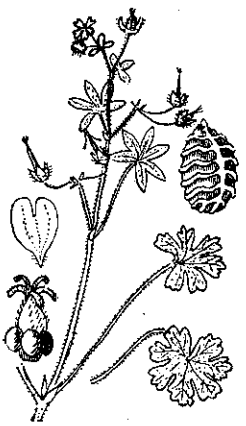

FIG. 149.—**Geranium molle.**

*2. **G. molle,** L. Slender softly hairy annual ; leave orbicular, palmatifid into 5-7 cuneate incised lobes those of the upper leaves lanceolate and entire ; peduncles 2-flowered ; sepals with long spreading hairs ; petals scarcely longer, purple or pink, deeply notched ; beak 5-6 mm. long ; carpels glabrous, wrinkled transversely ; seeds almost smooth.

Moist places in settled districts. Sept.-Jan.—Europe ; western Asia.

2. ERODIUM, L'Hér.

(From Greek *erôdios*, heron.)

Differs from *Geranium* in the 5 outer stamens scale like and without anthers, the awns with long silky hairs on the inner face and becoming spirally coiled after falling from the fruiting axis, becoming straight again when moistened and thus pushing into the ground the sharp-pointed tardily dehiscent hairy carpels ; petals obovate, not notched, ciliate near base. *Heron's bill.*

A. leaves of 3 lobes or segments ..... *E. cygnorum* 1.
A. Leaves of several lobes or segments.
B. Leaves pinnatifid ; beak 7-10 cm. long ..... *E. botrys* 2.
B. Leaves pinnatisect ; beak 2-4 cm. long.
Leaf-segments toothed ..... *E. moschatum* 3.
Leaf-segments deeply cut ..... *E. cicutarium* 4.

1. **E. cygnorum,** Nees. Hairy annual ; leaves 3-cleft almost to the base or the lower ones sometimes only 3-fid, the segments or lobes obovate, incised-crenate, the central one the largest and again 3-lobed ; umbel 2-6-flowered ; petals blue, 4-8 mm. long, shorter or rather longer than sepals ; filaments not toothed ; beak 4-7 cm. long ; carpel with a pit on each side at the summit and 2 concentric folds below each pit. (Fig. 148, 7.)

Southern districts to Far North ; Eyre Peninsula and westward to Ooldea ; Murray lands. June-Oct.—Temperate Australia. Popularly called "Wild Geranium," and is a good fodder plant when young.

* 2. **E. botrys** (Cav.), Bertol. Annual with scattered white hairs ; leaves ovate-oblong, the radical ones with several crenate lobes, the stem-leaves pinnatifid with sharply toothed lobes ; umbels 1-4-flowered ; petals purplish, erect, half as long again as the sepals ; filaments toothed or not ; beak 7-10 cm. long ; pits of carpel with 2-3 concentric folds.

Settled districts and as far west as Ooldea. Aug.-Oct.—Mediterranean region.

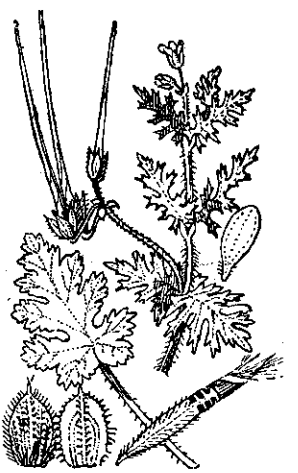

FIG. 150.—**Erodium botrys.**

* 3. **E. moschatum,** (L.) L'Hér. Annual or biennial with spreading hairs, many of which are glandular; leaves up to 15 cm. long, oblong in outline, pinnatisect into several ovate incised-toothed shortly petiolulate segments; stipules broadly ovate; umbels 1-10-flowered on long peduncles; petals pale-purple, rather longer than sepals; filaments 2-toothed near base; beak 3-4 cm. long; carpel with 2 concentric folds below the pits.

Settled districts. July-Nov.—Central and southern Europe; western Asia. The specific name is derived from the musky odor of the plant, which is usually faint in South Australian specimens.

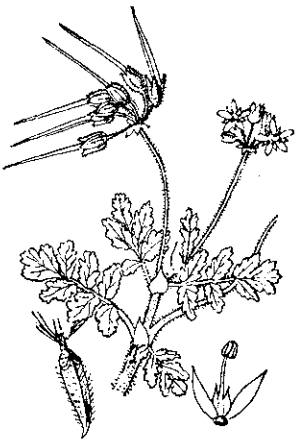

FIG. 151.—**Erodium moschatum.**

* 4. **E. cicutarium,** (L.) L'Hér. Usually a smaller plant than the preceding; leaves pinnatisect, the segments ovate or oblong, pinnatifid or pinnatipartite; umbels 1-8-flowered, on long slender peduncles; petals pink or purplish, spreading, rather longer than or twice as long as sepals; filaments not toothed; beak 2-4 cm. long; carpel with 1 concentric fold below pits.

Var. *stellatum*, Graebn. Small almost stemless plant, the 2 upper petals white with a dark-red spot.

Settled districts and beyond them. July-Oct.—Almost all the temperate countries.

3. PELARGONIUM, (Burm.) L'Hér.

(From Greek *pelargos*, stork.)

Sepals united at base, the uppermost one produced downwards into a tube or spur adnate to the pedicel; 2 upper petals differently shaped and usually larger than the 3 lower; stamens 10, of which 5-7 are usually fertile, the remainder without anthers, all united towards base; ovary, awns, and carpels as in *Erodium*. *Stork's bill.*

Stems rather long; flowers comparatively small	*P. australe* 1.
Stem almost absent; flowers large	*P. Rodneyanum* 2.

1. **P. australe,** Willd. Perennial, the stems rather stout, suberect, 15-70 cm. high, softly white-pubescent with spreading hairs; leaves ovate-cordate or reniform, velvety below, the radical ones 8-10 cm. broad and scarcely 3-lobed, the upper ones 3-6 cm. broad, and often shortly 3-7-lobed, the lobes crenate; stipules broad; umbels 4-20-flowered on peduncles longer than leaves; sepals hairy, 5-6 mm. long; spur 1-3 mm. long; whole pedicel 3-10 mm. long; petals 7-10 mm. long, pink streaked with red, the 2 upper broader; beak 10 mm. long; seeds smooth.

Along the coast from the South-East to St. Vincent's Gulf; Eyre Peninsula and adjacent islands. Oct.-Jan.—Temperate Australia.

Var. *erodioides*, Benth. Smaller and more slender plant, flowering, in its first year; leaves thinner and less hairy, 1-4 cm. broad; umbels 3-10-flowered; spur 3 mm. long, or reduced to a tubercle at base of calyx; beak 10-15 mm. long.—*P. inodorum*, Willd.—Southern districts; Murray lands; Eyre Peninsula; South-East.—Temperate Australia; New Zealand.

2. **P. Rodneyanum,** Lindl. Almost stemless perennial with thick rootstock; leaves nearly all radical, ovate, crenate, sometimes shortly lobed, 1-4 cm. long; peduncles much longer than leaves, minutely pubescent; umbel 4-6-flowered; sepals 6-7 mm. long; spur 3-6 mm. long; petals 15-20 mm. long, red, streaked with crimson.

Rare in southern districts; chiefly from 90-Mile Desert southwards to Naracoorte and Penola. Oct.-Jan.—Temperate Australia.

The cultivated "Geraniums" belong for the most part to *Pelargonium* and are usually hybrids between various South African species. Two shrubby species have established themselves more or less.

* *P. graveolens*, (Thunb.) L'Hér. Fragrant, with short rather rough hairs; leaves palmately 5-7-lobed or partite; flowers 4-10 in the umbel; sepals 10 mm. long; petals pink, nearly twice as long.—Happy Valley; Anstey's Hill; Victor Harbor.

* *P. cucullatum*, (L.) Ait. Villous with long soft hairs; leaves reniform, sharply toothed; flowers 6-8 in the umbel, very showy, the petals purple, 3 cm. long and the upper 2 more than 15 mm. broad, twice as long as the acute villous sepals; bracts large.—Near Robe. Both these plants are probably hybrids to some extent.

Family 62.—**OXALIDACEAE.**

1. OXALIS, L.

(Greco-latin name of some plant with acid leaves).

Flowers bisexual, regular; sepals 5, imbricate; petals 5, equal, imbricate; stamens 10, united towards base, the 5 opposite the petals longer; styles 5, free, with terminal stigmas; ovary superior, 5-celled; ovules usually several in each cell, pendulous, anatropous; capsule of 5 cells opening loculicidally, the valves persistant on the fruiting axis; seeds small, with an outer fleshy aril-like covering, which opens elastically; testa crustaceous; endopleura membranous; embryo straight within the fleshy albumen; radicle superior. Herbs with petiolate leaves of 3 leaflets, which are folded in repose; flowers solitary or umbellate on axillary or radical peduncles; pedicels 2-bracteate at base; leaves and stems of an acid taste. *Wood sorrel.*

A. Stems bearing leaves and peduncles ..... *O. corniculata* 1.
A. Stems absent; peduncles radical.
Flowers umbellate; leaflets notched ..... *O. cernua* 2.
Flower solitary; leaflets entire ..... *O. variabilis* 3.

1. **O. corniculata,** L. Pubescent perennial; stems prostrate and rooting at nodes, or long, slender, and ascending; leaflets broadly obcordate, 3-16 mm. long; stipules small; flowers solitary or in umbels of 2-5, rarely more, on slender axillary peduncles usually longer than leaf; sepals 3-5 mm. long, obtuse, ciliolate; petals yellow, about twice as long; pedicels usually reflexed in fruit; capsule cylindrical, pubescent, beaked, 6-25 mm. long; seeds reddish-brown, compressed, transversely rugose, several in each cell. (Fig. 148, 8-11).

All over the State, although not very common. Sometimes known locally as "Sour-grass." Most of the year.—Almost cosmopolitan.

* 2. **O. cernua,** Thunb. *Soursob.* Stemless almost glabrous perennial; rootstock producing numerous bulbs and bulbils, and here and there swollen into white fusiform tubers; leaflets obcordate, 2-lobed, 1-4 cm. broad; flowers yellow, drooping, 3-16 in umbels on long radical peduncles; sepals 6 mm. long, with 2 orange calli at tip; petals 25 mm. long; capsule oblong-acuminate, rarely matured here.

Common in settled districts. June-Oct.—South Africa.

* 3. **O. variabilis,** Jacq. Stemless, with dark ovoid bulb, usually hairy except on upper face of leaflets, which are suborbicular, the middle one larger and cuneate towards base; flower solitary on a radical peduncle which is only about as long as the leaf, the 2 bracts near its base; sepals 6 mm. long; petals 25-30 mm. long, pink above, yellow below, with a wide tube.

Pasture, Mount Lofty Range. June-Oct.—South Africa.

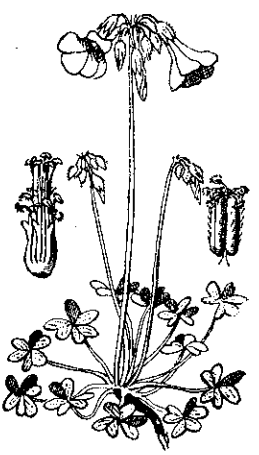

Fig. 152.—**Oxalis cernua.**

Family 63.—**LINACEAE.**

1. LINUM, (Tourn.) L.

(Latin name of the cultivated flax).

Sepals and petals 5, imbricate; stamens 5, united at base and alternating with 5 small staminodia; ovary superior, 5-celled, entire, with 2 collateral pendulous anatropous ovules in each cell; styles 5; capsule subglobular, opening septicidally and loculicidally, each cell 2-seeded and more or less completely divided into 2 halves by a false partition intruding from the dorsal suture, so that the capsule usually splits into 10 1-seeded divisions leaving no central axis; seeds compressed, shining, with a straight embryo and scanty albumen; radicle superior. Herbs with sessile entire leaves (alternate in our species), without stipules, those opposite the pedicels often small and bractlike; flowers regular, bractless but leaf-opposed, arranged in cymes and corymbs. *Flax.*

A. Flowers blue; styles united more than halfway; stigmas decurrent along inner side of style-branches..... *L. marginale* 1.
A. Flowers yellow; styles free; stigmas capitate.
Inflorescence dense; sepals twice as long as capsule.. *L. strictum* 2.
Inflorescence loose; sepals scarcely longer than capsule ..... *L. gallicum* 3.

1. **L. marginale,** A. Cunn. (1848). Glabrous perennial, with slender erect stems; leaves linear-lanceolate, 1-nerved, 5-20 mm. long; flowers in loose terminal panicles, sometimes very few; pedicels slender, erect, much lengthened in fruit; sepals ovate, acuminate, 4-6 mm. long, keeled near base, with white-membranous ciliolate margins; petals about twice as long, blue; styles united from the base for $\frac{3}{4}$ or $\frac{4}{5}$ of their length; capsule 5 mm. broad, abruptly pointed, as long as or rather longer than sepals; seeds brown, about 3 mm. long. (Fig. 2, p. 19).

Southern districts to Flinders Range; Murray lands and north thereof; Eyre Peninsula; South-East. Aug.-Nov.—Temperate Australia. Very close to *L. hologynum*, Reichb. (1833), of the Balkan Peninsula. Both species are distinguished from the European *L. angustifolium*, Huds., chiefly by the styles united to above the middle. The latter is considered by some botanists to represent the original form of the cultivated flax (*L. usitatissimum*, L.). The flowers of *L. hologynum* are said to be "bright-reddish violet," those of our plant are usually pale-blue.

* 2. **L. strictum,** L. Almost glabrous annual, with stiff erect stems; leaves linear-lanceolate, 10-25 mm. long, rough with minute stiff hairs; flowers small, on thick pedicels shorter than calyx, in small clusters forming compact corymbs or false spikes; sepals with stalked glands along the margins and long narrow points; petals yellow, longer; capsule 3 mm. broad, globular-conical, half as long as sepals; seeds scarcely 2 mm. long.

Yorke Peninsula. Sept.-Nov.—Mediterranean region.

* 3. **L. gallicum,** L. Slender glabrous annual; leaves linear-lanceolate, contracted towards base; flowers small, on slender pedicels as long as calyx, forming loose corymbose panicles; sepals lanceolate glandular-ciliolate on margins; petals yellow, twice as long; capsule depressed-globular, $2\frac{1}{2}$ mm. broad, slightly shorter than sepals; seeds $1\frac{1}{2}$ mm. long.

Mount Lofty Range. Oct.-Dec.—Mediterranean region.

FAMILY 64.—ZYGOPHYLLACEAE.

Flowers bisexual, regular; sepals and petals 4-5; stamens as many, or twice or about thrice as many; ovary superior, 3-5-celled, with a simple style; ovules 1 or more in each cell, superposed, pendulous, anatropous; fruit usually a capsule, often separating into carpels (fruitlets), rarely a drupe; seeds with or without albumen; embryo usually straight; radicle superior. Herbs or shrubs; leaves paripinnate or simple, stipulate.

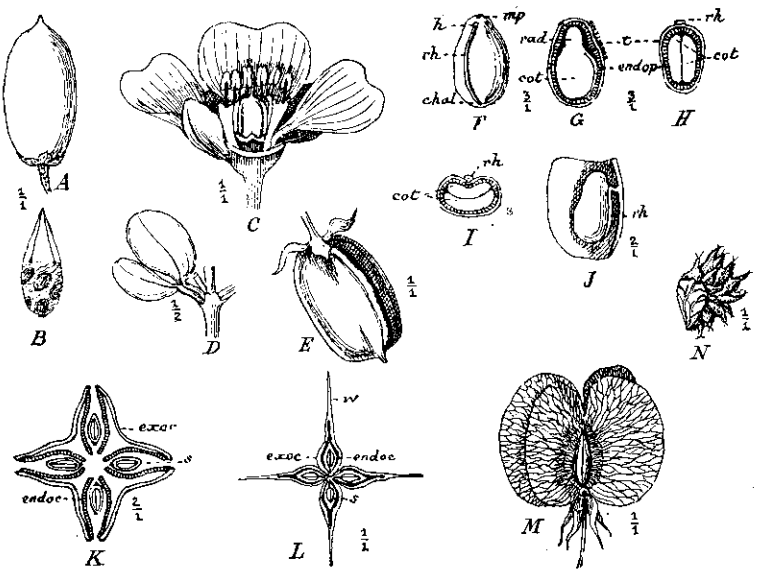

FIG. 153.—**Zygophyllaceae.** A-B, *Nitraria Schoberi:* A, fruit: B, stone (putamen). C-H, *Zygophyllum glaucescens:* C, vertical section of flower (1 petal and 2 stamens removed); D, leaf; E, fruit; F, seed; G, vertical section of seed; H, transverse section of seed (rhaphe opposite to edges of cotyledons); *mp*, micropyle; *h*, hilum; *rh*, rhaphe; *chal*, chalaza; *rad*, radicle; *cot*, cotyledons; *endop*, endopleura. I, seed of *Z. crenatum* cut traversely (rhaphe lying in a groove and opposite the back of one cotyledon). J, valve of endocarp of *Z. apiculatum*, with seed in position; *rh*, ventral rhaphe. K, transverse section of capsule of *Z. Billardieri* when dehiscing: *exoc*, exocarp; *endoc*, endocarp; *s*, seed. L-M, *Z. fruticulosum:* M, capsule; L, transverse section of same. N, one carpel of *Tribulus occidentalis*.

A. Leaves simple, alternate; fruit a drupe ..... NITRARIA 1.
A. Leaves compound, mostly opposite; fruit a capsule.
Leaves of 2 leaflets; capsule angular or winged, of rather thin texture ..... ZYGOPHYLLUM 2.
Leaves of several leaflets; capsule separating into 5 hard solid fruitlets ..... TRIBULUS 3.

1. NITRARIA, L.

(From Greco-latin *nitrum*, saltpetre; on account of the saline plains in Siberia where the plant was first found.)

1. **N. Schoberi,** L. *Nitre-bush.* Rigid spreading shrub, 1-2 m. high, the branchlets sometimes spiny; leaves thick, glaucous or green, mostly oblong-cuneate, alternate or more often clustered, 1-4 cm. long; stipules minute; flowers small, in forked scorpioid cymes; calyx pubescent, with 5 valvate lobes; petals 5, rarely 6, white, 3-4 mm. long, hooded, induplicate-valvate; stamens 10-17; ovary 3-celled, with 1 ovule in each cell; style short, thick; drupe edible, ovoid-oblong, 1-2 cm. long, purple, red, or golden when ripe; putamen tapering upwards, 6-furrowed and finally opening in 6 valves in the upper half; seed usually solitary, exalbuminous. (Fig. 149, A-B.)

Along the coast from the South-East to the Great Bight; inland to the Far North and westward to Ooldea. Most of the year.—Temperate Australia; southern Russia to Mongolia; Mesopotamia. The specific name commemorates Dr. Gottlob Schober, 1670-1739, who explored various districts of Russia for scientific purposes.

2. ZYGOPHYLLUM, L.

(From Greek *zygon*, yoke, pair; *phyllon*, leaf: referring to the pair of leaflets which compose each leaf.)

Sepals and petals 4-5, imbricate, the latter clawed; receptacle swollen into an annular sinuate fleshy disk between the ovary and the stamens, sometimes reduced to almost separate glands; stamens usually twice as many as the ovary-cells; ovary 3-5-celled, with 2 or more ovules in each cell; style subulate; capsule with 4-5 angles or 3-4 vertical wings, the exocarp usually fleshy; seeds 1-6 in each cell, albuminous, compressed, often subtrigonous; testa covered with spiral fibres which exude mucus when moistened, the endopleura hard. Glabrous herbs or undershrubs; leaves opposite, fleshy, consisting of 2 leaflets, or 2-lobed when the leaflets are continuous with the flattened petiole; stipules small; flowers solitary, axillary, pedunculate. Petals which are yellow when fresh often dry white.

A. Capsule 4-5-celled and 4-5-angled, opening loculicidally by the valves of the exocarp, the endocarp of each cell separating from the exocarp and splitting elastically into 2 cartilaginous shining valves along both the dorsal and ventral sutures. (Section *Roepera.*)
B. Capsule truncate at summit.
Capsule 5-angled, with 5 short horizontal appendages — *Z. apiculatum* 1.
Capsule 4-angled, without appendages ..... — *Z. Billardieri* 2.
B. Capsule rounded at summit.
C. Capsule 4-angled; sepals and petals 4.
D. Capsule sessile, narrow, with 4 erect appendages at summit ..... — *Z. prismatothecum* 3.
D. Capsule stalked, broad, without appendages.
E. Petals yellow, longer than sepals.
F. Leaflets entire.
Flowers and capsule large ..... — *Z. glaucescens* 4.
Flowers and capsule small ..... — *Z. compressum* 5.
F. Leaflets crenate at summit; capsule large.. — *Z. crenatum* 6.
F. Leaflets notched at summit; capsule very small ..... — *Z. humillimum* 7.
E. Petals white, not as long as sepals; leaflets obtuse or notched ..... — *Z. ovatum* 8.
C. Capsule 5-angled; sepals and petals 5.
G. Capsule globular, small.
Petals scarcely exceeding sepals; peduncles short..... — *Z. iodocarpum* 9.
Petals twice as long as sepals; peduncles rather long ..... — *Z. tesquorum* 10.
G. Capsule oblong.
Capsule on erect stalk; leaflets entire ..... — *Z. hybridum* 11.
Capsule on deflexed stalk; leaflets crenate at summit ..... — *Z. Kochii* 12.

A. Capsule 4-celled, opening septicidally into 4 indehiscent carpels or fruitlets, each with a broad vertical wing and without a separable endocarp. (Section *Agrophyllum.*)
Capsule 4-winged; stamens 8; leaves distinct; small slender shrub ..... *Z. fruticulosum* 13.

A. Capsule indehiscent, 3-celled, by abortion 1-seeded; each cell or carpel with a broad vertical wing. (Section *Sarcozygium.*)
Capsule 3-winged; stamens 6; leaves united at base; prostrate annual ..... *Z. Howittii* 14.

1. **Z. apiculatum,** F. v. M. Undershrub; leaflets obliquely obovate, 1½-4 cm. long; petals 5, bright yellow, 10-15 mm. long; stamens 10, the filaments winged and denticulate at summit of wings; capsule 5-angled, rectangularly truncate at the summit, 7-10 mm. long, with a short blunt appendage at the upper corner of each angle; seed 1 in each cell. (Fig. 153, J.)

Dublin scrub to Far North; Murray lands; Eyre Peninsula. Aug.-Oct.—Temperate Australia.

2. **Z. Billardieri,** DC. Procumbent annual or perennial herb; leaflets linear, oblong or cuneate, 1-2½ cm. long; stamens 8, the filaments not winged; petals 4, obovate-cuneate, 6-10 mm. long, yellow, about twice as long as sepals; capsule drooping, acutely 4-angled, 8-12 mm. long, obliquely truncate with a slight upward slope; seeds 1-2 in each cell, brown, subtrigonous, rugulose-granular. (Fig. 153, K.)

Var. *ammophilum* (F. v. M.), J. M. Black. Usually a smaller plant; petals yellow or white, subacute, shorter than or slightly exceeding sepals; stamens 4 or 8; capsule smaller; seeds usually 2-3 in each cell.—*Z. ammophilum,* F. v. M.

Most parts of the State. Throughout the year.—Temperate Australia.

3. **Z. prismatothecum,** F. v. M. Small annual; leaflets all continuous with the broad petiole, forming a 2-lobed leaf; petals 3 mm. long, yellow, acute, about as long as sepals; stamens 8, winged towards base; capsule erect, almost sessile, narrow-oblong, obtusely 4-angled, 10-15 mm. long, the angles terminating at summit in 4 erect herbaceous appendages; seeds usually 2-3 in each cell.

Leigh's Creek to Marree (Flinders Range). June-Nov.—Central Australia; western New South Wales.

4. **Z. glaucescens,** F. v. M. Erect or ascending annual, with rather stout stems; leaflets obliquely obovate, 1-3 cm. long; petals 4, bright yellow, obovate, truncate, 12-15 mm. long and much exceeding the sepals; stamens 8, the filaments broadly winged in lower half, the wings truncate and denticulate at summit; disk sinuate, much shorter than ovary; capsule drooping, ovoid-oblong, with 4 angles rounded at base and summit, 14-18 mm. long; seeds 3-5 in each cell. (Fig. 153, C-H.)

Southern districts to Far North; Murray lands; Eyre Peninsula. June-Dec.—Western New South Wales and Victoria; Central Australia.

5. **Z. compressum,** J. M. Black. Erect annual; leaflets ovate or orbicular, or the uppermost oblong, 8-15 mm. long, appressed to each other (not divergent in the same plane, as in most other species); petals 4, yellow, rounded at summit, 4-6 mm. long, twice as long as sepals; stamens 8, the filaments winged and faintly 2-toothed; disk divided into 4 erect linear-oblong truncate glands, about as long as ovary and ciliolate at summit; capsule obovoid, drooping, 7-10 mm. long, with 4 angles rounded at base and summit; seeds 2-3 in each cell.

From Port Augusta westward to near Fowler's Bay, and northward to Far North. Most of the year.—Central Australia.

6. **Z. crenatum,** F. v. M. Annual, with rather stout ascending stems; leaflets broadly and obliquely cuneate, 1-2 cm. long, crenate with 3 rounded lobes at summit; petals 4, bright yellow, obovate, about 8 mm. long and twice as long as sepals; stamens 8, the filaments with wings fringed at summit; disk short, sinuate; capsule of *Z. glaucescens,* drooping, ovoid-oblong, 15-20 mm. long, with 4 rigid angles rounded at base and summit; seeds 3-6 in each cell. (Fig. 153, I.)—*Z. glaucescens,* F. v. M. var. *lobulatum,* Benth.

Yorke Peninsula; Murray lands and northward to Flinders Range and Lake Torrens; Eyre Peninsula. Aug.-Oct.—Western New South Wales and Victoria.

7. **Z. humillimum,** M. Koch, in Trans. Roy. Soc., S.A., 24 : 82 (1900). Small prostrate annual ; leaflets oblong-cuneate, 5-10 mm. long, often faintly notched at summit ; flowers small, erect, on very short peduncles ; petals 4, yellow, 3 mm. long, slightly exceeding sepals ; stamens 8, the filaments narrowly winged in lower half ; capsule drooping, subglobular, 3½ mm. long, umbilicate at summit, the 4 angles rounded at summit, but each with a minute membranous appendage forming a slight upper corner ; seed 1 in each cell, smooth, shining.

Mt. Lyndhurst run (Flinders Range). May-July.

8. **Z. ovatum,** Ewart. Small ascending annual ; leaflets narrowly cuneate, obtuse or faintly notched, 4-10 mm. long ; flowers small, drooping, on very short peduncles ; petals 4, white, lanceolate, 1-1½ mm. long, from one-half to nearly as long as sepals ; stamens 8, the filaments dilated towards base but scarcely winged ; capsule drooping, ovoid-oblong, rounded at base and summit, about 8 mm. long, inconspicuously 4-angled ; seeds usually 2 in each cell.

Near Port Broughton ; Murray lands and northwards to Broken Hill railway ; northern Eyre Peninsula and westward to Ooldea and Nullarbor Plains. July-Oct.—Western Victoria ; West Australia.

9. **Z. iodocarpum,** F. v. M. Diffuse annual ; leaflets oblong-cuneate, 1-2 cm. long, notched at summit or rarely entire ; petiole winged ; petals 5, yellow, 3-4 mm. long, not or slightly exceeding the sepals ; stamens 10, the filaments broadly winged but not toothed in the lower half ; capsule globular, drooping, 5-7 mm. long, rather broader than long, 5-angled, the exocarp becoming membranous ; fruiting peduncles slender, 3-4 mm. long ; seed 1 in each cell, shining.

Flinders Range and Lake Torrens to Far North ; eastward to Strzelecki Creek and Broken Hill ; westward to Musgrave Range. June-Dec.—Dry parts of Australia.

10. **Z. tesquorum,** J. M. Black. Ascending annual ; leaflets obliquely oblanceolate or oblong-elliptical, 6-10 mm. long, entire ; petals 5, drying white, 6 mm. long, about twice as long as sepals ; stamens 10, the filaments dilated but not winged in lower half ; capsule globular, 6-7 mm. long, 5-angled, on a slender spreading or deflexed peduncle 7-10 mm. long ; seed 1 in each cell, not shining.

Lake Torrens ; Far North.—Central Australia.

11. **Z. hybridum,** Tate. Ascending annual ; leaflets oblong, 5-15 mm. long, gibbous at base along the outer margin ; petals 5, yellow, 5-6 mm. long, twice as long as sepals ; stamens 10, the filaments winged near the base and slightly toothed ; capsule oblong, about 10 mm. long, rounded at both ends, obtusely 5-angled, on a slender erect rigid peduncle 12-20 mm. long ; seeds 3-6 in each cell, not shining.

Mt. Lyndhurst to Lake Blanche (Flinders Range). June-Aug.

12. **Z. Kochii,** Tate. Ascending branching annual ; leaflets closely resembling those of *Z. crenatum ;* petals 5, yellow, 8 mm. long, twice as long as sepals ; stamens 10, the filaments winged but not toothed ; capsule ovoid-oblong, rounded but subobtuse at both ends, about 12 mm. long, strongly reticulate, 5-angled, on a drooping peduncle 12-15 mm. long ; seeds 3-4 in each cell.

Flinders Range, towards Lake Callabonna. July-Sept.

13. **Z. fruticulosum,** DC. Shrub with slender rigid stems, sometimes elongated and climbing ; leaflets linear, continuous with and longer or shorter than the petiole, sometimes very short and broad and the petiolar part much dilated upwards ; stipules ovate, green, with membranous tip ; petals 4, yellow, 10-12 mm. long, obtuse or faintly notched at summit, twice as long as sepals ; stamens 8, the filaments not winged ; capsule drooping, depressed-globular in outline, 12-18 mm. long, including the 4 broad scarious finely reticulate wings, each of the 4 carpels ripening 1 seed, very rarely 2, or 1 or more of the carpels barren. (Fig. 153, L-M).

Var. *eremaeum,* Diels. Petals white or yellow, lanceolate, scarcely exceeding the sepals ; capsule 8-10 mm. long, the wings very thin ; seeds by abortion usually only 1-2 in the whole capsule.—*Z. eremaeum,* (Diels) Ostenf.

Yorke Peninsula northwards to Flinders Range and Far North ; Murray lands and north thereof ; Eyre Peninsula and westward to beyond Ooldea. July-Oct.—Temperate Australia.

14. **Z. Howittii,** F. v. M. Diffuse prostrate annual ; leaflets short and rounded, continuous with the broad petiole so that the leaf appears broadly 2-lobed and cuneate, the upper pairs of leaves united at base and encircling the stem, the membranous stipules at the junction ; flowers small, on slender peduncles ; petals 4, yellow, 2½ mm. long,

scarcely exceeding the sepals; stamens 6, opposite to and alternate with the 3 ciliolate orbicular glands of the disk; filaments not winged; capsule indehiscent, drooping, 12-18 mm. long and about as broad, including the 3 broad membranous wings, which are rounded at summit and base; 2 of the 3 cells abortive, so that only 1 fusiform-trigonous seed is ripened.

Northern part of Flinders Range to the Far North, Cooper's Creek, and Warburton River; Lake Eyre. Most of the year.—Central Australia.

3. TRIBULUS, (Tourn.) L.

(Latin for the military instrument called the "caltrop," from Greek *tribolos*, on account of the 3 upturned points; also applied to *T. terrestris*).

Sepals and petals 5, imbricate, caducous; hypogynous disk thin, 5-lobed; stamens 10; ovary 5-celled, with erect hairs; ovules few in each cell; stigma 5-furrowed and 5-lobed at base; fruit 5-angled, separating into 5 woody indehiscent spiny carpels, or fewer by abortion; seeds without albumen, almost horizontal, separated by hard transverse partitions (in our species). Small herbs with paripinnate leaves; flowers solitary on axillary peduncles.

A. Spines 2-4 on back of each carpel ..... *T. terrestris* 1.

A. Spines numerous, covering the back of each carpel.
Spines short, conical; flowers of medium size..... *T. occidentalis* 2.
Spines long, subulate, unequal; flowers large, showy *T. hystrix* 3.

1. **T. terrestris,** L. *Caltrop.* Prostrate villous annual; leaves opposite, with 4-8 pairs of obliquely oblong leaflets 5-10 mm. long; sepals about 3 mm. long; petals yellow, about ½ longer; fruit slightly hairy or tomentose, 6-10 mm. long, the carpels spreading stellately, rugose-muricate on back, with two divergent spines, 3-8 mm. long, near the summit and usually 2 shorter ones near the base; seeds 2-4 in each carpel.

In the drier parts of the State from the Murray lands to the Far North. The less hairy form, with usually longer thorns on the fruit, sometimes found in the settled districts, is perhaps introduced. Winter and spring.—Subtropical Australia, Europe, Africa, and Asia.

2. **T. occidentalis,** R. Br. Prostrate or ascending perennial with appressed woolly or silky hairs; upper leaves opposite, with 6-9 pairs of oblong leaflets 7-15 mm. long; sepals about 5 mm. long, the yellow petals twice as long; stigma almost sessile; fruit tomentose, 8-12 mm. long, the back of the carpels covered with short conical hairy spines 2-3 mm. long, sometimes merely muricate towards the base; seeds 3-4 in each carpel. (Fig. 153, N).

Far North and westward to Tarcoola. Winter and spring.—New South Wales; West Australia. Often called "Bullhead" by bushmen.

3. **T. hystrix,** R. Br. Clothing and leaves as in the preceding; sepals 12-15 mm. long, silky; petals bright yellow, 25-30 mm. long; style conspicuous, 3-4 mm. long; fruit tomentose, about 15 mm. long without the spines, the back of each carpel covered with hairy unequal subulate spines 5-12 mm. long, the longest sometimes 2-fid or 3-fid; seeds 2-4 in each carpel.

Far North. Winter and spring.—Central Australia; New South Wales.

T. macrocarpus, F. v. M., has been found between the Finke River and Charlotte Waters, very near our border. It is a minutely pubescent plant, with 5-7 pairs of leaflets and a globular 5-winged almost glabrous fruit, each carpel ribbed along the middle of the back between the 2 wings and usually with a short spine on each side of the midrib; seeds 2 in each carpel.

FAMILY 65.—RUTACEAE.

Flowers regular, bisexual; sepals 4-5, more or less coherent at base or united in a cup; petals 4-5, imbricate or valvate; stamens as many or twice as many; pistil superior, of 4-5, rarely 2 carpels, sometimes coherent towards their bases and always united above by their styles; each carpel 1-celled, with 2 (rarely 1) anatropous mostly superposed ovules; between the pistil and stamens there is usually an annular fleshy disk; styles united almost from base and appearing as a simple style; fruit of 4-5 small usually compressed fruiting carpels or fruitlets, often reduced in number by abortion, opening loculicidally along the inner suture; exocarp coriaceous; endocarp splitting elastically into 2 smooth cartilaginous or horny valves; seed usually 1, albuminous (in our genera), the embryo in the axis of the albumen, the radicle superior, the rhaphe ventral. Shrubs

or rarely trees, the leaves and other herbaceous parts usually marked with transparent glandular dots containing oil, and often scented ; stipules none.

The most important genus in cultivation here is *Citrus*, whose fruit is a large berry with a separable rind (epicarp and mesocarp), and separable cells filled with a juicy pulp : *C. vulgaris*, Risso, the bitter or Seville orange : *C. aurantium*, L., the sweet orange ; *C. medica*, L., the citron ; *C limonum*, Risso, the lemon ; *C. decumana*, L., the grape-fruit or pompelmoose ; *C. nobilis*, Lour., the mandarin. *Coleonema album*, Bartl. et Wendl. (*Diosma alba*, Thunb.), is a fragrant South African shrub often cultivated in gardens. Most of our native species are also graceful sweet-scented shrubs.

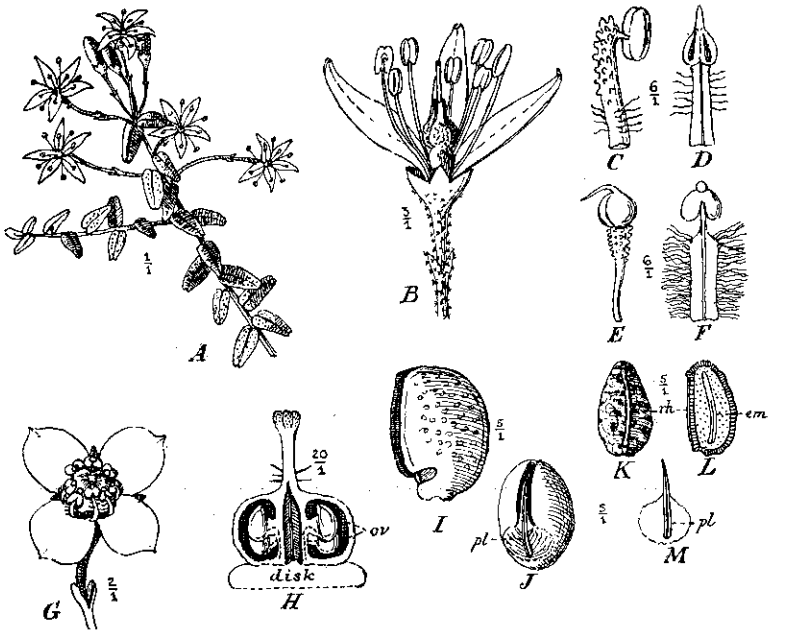

FIG. 154.—**Rutaceae.**—A-B, *Phebalium bilobum* : A, flowering branch ; B, flower, with 2 petals and 3 stamens removed. C, stamen of *Boronia filifolia*. D, stamen of *B. polygalifolia*. E, stamen of *B. Edwardsii*. F, stamen of *Eriostemon brevifolius*. G-M, *Boronia caerulescens* : G, flower ; H, pistil, showing vertical section of 2 carpels ; *ov*, ovules ; I, fruitlet ; J, endocarp ; *pl*, placenta ; K, seed ; L, vertical section of seed ; *rh*, rhaphe ; *em*, embryo : M, placenta to which the sessile seed is attached, with 2 membranous wings which form part of the endocarp but become detached from it at maturity.

A. Leaves opposite, simple or compound ; petals 4 ; embryo terete ; small shrubs.

B. Petals free, spreading, small.
Disk 4-lobed ; stamens 4 ..... ZIERIA 1.
Disk entire : stamens 8, or in 1 species 4..... BORONIA 2.

B. Petals rather long, united in a tube, at least before expansion ..... CORREA 3.

A. Leaves alternate, simple ; petals 5, free.

C. Stamens 10 ; embryo terete ; small shrubs.

D. Calyx inconspicuous ; no disk..... ASTEROLASIA 4.

D. Calyx conspicuous ; disk present (except in *Microcybe*).

E. Petals imbricate, not scaly ..... ERIOSTEMON 5.

E. Petals valvate or slightly imbricate, always with inflexed valvate tips, often scaly.
Carpels 5 ; flowers pedunculate, axillary or subcorymbose ..... PHEBALIUM 6.
Carpels 2 ; flowers sessile in small heads..... MICROCYBE 7.

C. Stamens 5 ; cotyledons broad ; trees or shrubs..... GEIJERA 8.

1. ZIERIA, Sm.

(After John Zier, a Polish botanist, who assisted F. C. Ehrhart in his collection of plants of the Electorate of Hanover, 1780-83, and afterwards worked in London, where he died in 1796).

1. Z. veronicea, F. v. M. Dwarf tomentose lemon-scented shrub; leaves simple, opposite, sessile, ovate-oblong with recurved margins, obtuse, 8-12 mm. long; flowers small, white or pink, 1-3 in short axillary cymes; petals 4, valvate in bud, stellate-pubescent inside and outside, longer than the 4 lanceolate tomentose sepals; stamens 4, opposite the sepals and outside the 4 prominent gland-like lobes of the disk; stigma capitate, 4-lobed; fruiting carpels stellate-pubescent, about 5 mm. long and twice as long as calyx, 2-valved, the endocarp separating from the exocarp; seed 1 or rarely 2 in each carpel, ovoid-oblong.—*Boronia veronicea*, F. v. M.

Square Waterhole (Mt. Lofty Range); Kangaroo Island. Oct.-Jan.—Western Victoria.

2. BORONIA, Sm.

(After Francesco Boronc, assistant of John Sibthorp, when the latter was collecting material in Greece for the composition of his *Flora graeca*. Borone died in Athens in 1794, as the result of falling from a window while asleep).

Sepals and petals 4, usually persistant; stamens 8 (in 1 species 4) usually glandular and hairy on the filament; carpels 4, more or less distinct, united by the connate styles; each carpel 2-ovulate; hypogynous disk thick, entire or undulate along outer margins; fruitlets normally 4, obtuse, with 1 or rarely 2 seeds in each; endocarp separating; testa crustaceous. Shrubs or undershrubs with opposite simple or compound leaves; flowers small, solitary or in cymes or umbels, usually with 2 small bracts at the articulation of the pedicel proper with the peduncle. When leaflets occur, they are articulate on the petiole, and when there are only 3 they are digitately arranged; when more, the lower ones are pinnately arranged.

A purely Australian genus, of which the best-known species, from the florist's point of view, is the West Australian *B. megastigma*, Nees, with flowers solitary in the axils, the petals dark-purple outside, yellowish inside, the stigma purple and very large.

A. Petals twice or thrice as long as sepals; bracts small; stamens 8.
  B. Petals valvate in bud; leaflets 3, oblong, sessile..... *B. Edwardsii* 1.
  B. Petals imbricate in bud; leaves or leaflets linear or narrow-lanceolate.
    C. Flowers solitary, axillary.
      Leaves simple; flowers bluish..... *B. caerulescens* 2.
      Leaves simple or 3-foliolate; flowers pink..... *B. polygalifolia* 3.
    C. Flowers terminal and axillary, pink, red, or white.
      Leaves simple or 3-foliolate; leaflets 7-12 mm. long; branchlets smooth ..... *B. filifolia* 4.
      Leaves 3-5-foliolate; leaflets 3-4-mm. long; branchlets glandular-tuberculate ..... *B. inornata* 5.
      Leaves 3-9-foliolate; branchlets hairy..... *B. pilosa* 6.
A. Petals about as long as or shorter than sepals, imbricate in bud; bracts represented by 2 leaves at base of short solitary peduncle; leaves lanceolate
  Stems ascending; stamens 8 ..... *B. parviflora* 7.
  Stems erect; stamens 4 ..... *B. palustris* 8.

1. B. Edwardsii, Benth. Small erect shrub with pubescent branches; leaflets 3, almost sessile, resembling small whorled leaves, oblong, 4-6 mm. long, almost glabrous, pale beneath; flowers pink, 1-3, terminal and axillary; bracts minute at base of peduncles; filaments clavate, glabrous, glandular in upper part; anthers with recurved slender points; disk depressed-globular; stigma globular, almost sessile. (Fig. 154, E).

Mt. Barker (Mt. Lofty Range); Kangaroo Island. Oct.-Dec.

2. B. caerulescens, F. v. M. Small glabrous or pubescent shrub, often with prominent glands; leaves simple, usually erect, thick, linear, obtuse, 3-7 mm. long; flowers purplish, lilac or white, mostly solitary in axils; filaments flat, ciliate on margins; anthers with a short obtuse gland-like tip; stigma capitate; seed black, wrinkled or reticulate. (Fig. 154, G-M).

Southern districts; Murray lands; South-East; Eyre Peninsula and westward to Ooldea. Aug.-Jan.—Temperate Australia.

3. **B. polygalifolia,** Sm. Low shrub or undershrub, the slender branches pubescent with 2 rows of minute hairs alternating from node to node; leaves linear-lanceolate, flat, 5-25 mm. long, simple or of 3 small similar leaflets on a petiole ½ as long or as long as the leaflets; flowers pink, solitary, axillary, with 2 small bracts about the middle of the

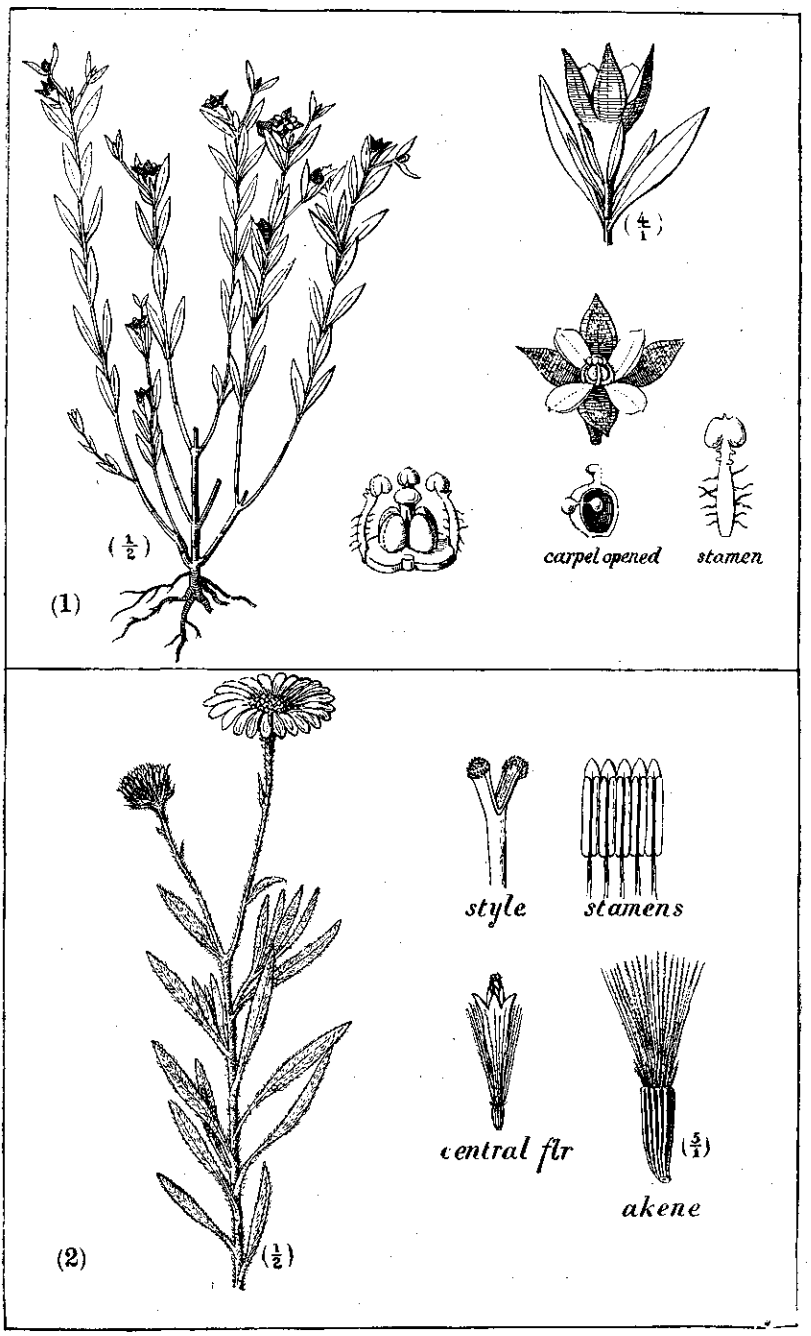

PLATE 31.—(1) **Boronia palustris**; (2) **Olearia picridifolia.**

peduncle; sepals narrow, about 2½ mm. long; petals glabrous outside; filaments flattish, with long spreading hairs, glandular at summit; anthers apiculate, with an acute point which is often rather long; seed dull, rough; style hairy. (Fig. 154, D).

Mt. Lofty Range. Summer.—Temperate Australia.

4. **B. filifolia,** F. v. M. Small glabrous shrub with rigid branches; leaves simple, subterete, 10-20 mm. long, or of 3 similar but smaller leaflets on a short common petiole; flowers pink, terminating slender branchlets or rarely axillary, solitary or sometimes in a cyme of 3, often on rather long filiform 2-bracteate pedicels or peduncles; petals minutely pubescent on both faces; filaments terete, glandular on back in upper half, narrowed and abruptly bent inwards at summit, ciliate towards base; style hairy; stigma small, capitate; seed shining. (Fig. 154, C.)

Near Encounter Bay; Kangaroo Island. Sept.-Dec.—Western Victoria.

5. **B. inornata,** Turcz. (1852). Small rigid shrub, usually minutely pubescent on the young parts, the branches tuberculate-glandular; leaflets 3, rarely 5, terete, obtuse, usually 3-4 mm. long, glabrous; flowers red, pink, or white, terminal and axillary, usually solitary on short peduncles, sometimes in 2-3-flowered cymes; sepals broad, ciliolate; petals almost glabrous; filaments clavate, glandular in upper half, narrowed but erect at summit; anthers apiculate; stigma capitate; seed dull.—*B. clavellifolia,* F. v. M. (1854).

Yorke Peninsula to Port Pirie; Murray lands; Eyre Peninsula. July-Oct.—Dry parts of temperate Australia.

6. **B. pilosa,** Labill. Slender shrub with minutely hairy branches; leaves of 3-9 linear acute leaflets, 5-10 mm. long, flat or plano-convex, the petiole very short below the lowest pair; flowers pink, 3-6 in terminal and axillary cymes, rarely solitary; peduncles rather long, with 2 narrow bracts near base; sepals acute, glabrous, about 2½ mm. long; filaments terete, hairy and glandular, especially near the summit, where they are narrowed and abruptly bent inward; anthers without any point; style short, hairy; seed black and shining.

Swampy land near Millicent to the Victorian border. Summer.—Victoria; New South Wales; Tasmania.

7. **B. parviflora,** Sm. Dwarf glabrous procumbent undershrub; leaves lanceolate, flat, 1-2 cm. long; glandular dots not visible; flowers usually solitary, terminal, and axillary, the peduncle thick and clavate, subtended by 2 leaf-like bracts sometimes as long as the flower; sepals reddish, 5-6 mm. long, valvate in bud, ovate-lanceolate, rather longer or shorter than the white or pink petals; filaments subulate, slightly hairy towards base, narrowed, bent inward and sometimes slightly glandular towards summit; anthers scarcely apiculate; style very short, glabrous; seed black, shining.

Near Square Waterhole (Mount Lofty Range). Summer.—Eastern States.

8. **B. palustris,** Maid. et Black. Near the preceding, but the stems mostly erect, the leaves more cuneate towards base, the peduncle shorter and obconical, not much exceeded by the leafy bracts, the petals obtuse and shorter than the sepals; stamens only 4. (Plate 31.—1.)

Western part of Kangaroo Island. Summer. This species has the stamens of *Zieria,* but the disk and other characters of *Boronia.*

The Schomburgk herbarium contains a specimen of *B. ledifolia,* (Vent.) J. Gay from Lake Eyre, without date or name of collector. This is an unlikely station for a plant found chiefly on the east coast of Australia, but may be correct, especially as the same species is recorded for West Australia. It has sepals and petals much as in *B. Edwardsii,* but the filaments ciliate and the anthers scarcely apiculate; flowers solitary in the axils, on penduncles half as long as the simple lanceolate-oblong leaves, which are about 3 cm. long, with reflexed margins and white-tomentose beneath.

3. CORREA, Andr.

(After José Francisco Correa de Serra, Portuguese botanist, 1751-1823.)

Calyx cupshaped, persistant; petals 4, valvate, much longer than calyx, tomentose outside, united in a cylindrical tube for ¾ of their length, or becoming entirely free; stamens 8, more or less exserted, the filaments glabrous, the anthers without terminal appendages; carpels 4, 2-ovulate; style long, slender with small sometimes 4-lobed stigma; disk shortly 8-lobed; fruitlets normally 4, 1-2-seeded, obtuse; endocarp separating. Stellate-

tomentose shrubs with simple opposite coriaceous shortly petiolate leaves; flowers large, usually drooping, solitary or 2-3 together; bracts, where present, small and caducous; oil glands not apparent externally.

A. Petals separating after the flower is expanded.
Calyx with 4 lobes longer than tube ..... *C. aemula* 1.
Calyx truncate, with or without 4 minute teeth .... *C. alba* 2.

A. Petals coherent, at least in the middle portion, until they fall off, the limb spreading.

B. Calyx shortly 4-toothed or toothless.
Leaves small or medium; flowers red, rarely green, often erect ..... *C. rubra* 3.
Leaves large; flowers green, always drooping ... *C. reflexa* 4.

B. Calyx 8-toothed ..... *C. decumbens* 5.

1. **C. aemula,** (Lindl.), F. v. M. Tall shrub with densely tomentose branches; leaves orbicular, ovate or ovate-lanceolate, 2-4 cm. long, scabrous above, paler and tomentose beneath; calyx with 4 lanceolate lobes longer than tube; petals free, greenish or purplish, about 2½ cm. long; filaments dilated towards base; anthers yellow.
Among rocks near waterfall, Hindmarsh Valley (Mount Lofty Range); gullies of Barossa Range. Spring and summer.—Western Victoria.

2. **C. alba,** Andr. Coastal shrub, the branches covered with a grey or rusty tomentum; leaves ovate or orbicular, 1½-3 cm. long, sometimes becoming glabrous above, tomentose below; peduncles very short; calyx 3-4 mm. long, truncate, minutely 4-toothed or toothless; petals free, white, 10-15 mm. long; filaments filiform, scarcely dilated towards base; anthers red.
Apparently rare along our coasts; Encounter Bay and as far west as Pearson Island. Most of the year.—Eastern States.

3. **C. rubra,** Sm. (1805). Shrub of varying height, with a loose tomentum on the branches; leaves ovate, almost orbicular, oblong or oblong-lanceolate, often subcordate at base, usually scabrous and becoming glabrous above, tomentose below, more or less recurved on margins, 1-3 cm. long; flowers on short peduncles, drooping or erect; calyx truncate, 4-8 mm. long, with 4 short teeth or none; petals united, red or rarely yellowish-green, 2-3½ cm. long; the 4 filaments opposite the petals dilated in lower half, the other 4 subulate and grooved towards base; anthers yellow, becoming red on back.—*C. speciosa,* Andr. (1811); *C. pulchella,* Mackay (1827-28).

Var. *glabra,* Benth. Leaves glabrous, flat, from ovate to linear-oblong; flowers red, usually solitary, axillary, on slender peduncles which are 5-8 mm. long.—*C. glabra,* Lindl.
Around the coast as far west as the Great Bight; also inland from the Mount Lofty Range to Flinders Range; Murray lands. Most of the year.—Temperate Australia.

4. **C. reflexa,** Labill. (1806). Rather tall shrub with closely tomentose branches; leaves flattish, ovate or ovate oblong, rounded at base, 2-5 cm. long, smooth and glabrous above, white-tomentose below, often reflexed over the flowers, which are terminal and axillary, drooping, 1-3, on very short peduncles; calyx about 6 mm. long, with 4 short deltoid teeth; petals united, greenish-white, 2-2½ cm. long; stamens exserted; 4 alternate filaments dilated in lower half.—*Mazeutoxeron reflexum,* Labill. (1800); *C. virens,* Sm. (1805).
Waitpinga scrub, near Encounter Bay. Summer.—Tasmania.

5. **C. decumbens,** F. v. M. Low shrub with tomentose branches; leaves narrow-oblong, obtuse, 1½-3½ cm. long, glabrous above, tomentose below, the margins slightly recurved; flowers solitary, terminal, on short peduncles; calyx with 4 long subulate teeth alternating with 4 short deltoid teeth; petals united, red, about 25 mm. long; stamens much exserted, the filaments as in *C. rubra.*
Mount Lofty Range; Kangaroo Island. Most of the year.

4. ASTEROLASIA, F. v. M.

(From Greek *astêr,* star; *lasios,* hairy: referring to the stellate tomentum).

1. **A. muricata,** J. M. Black. Low slender shrub; leaves alternate, simple, rigid, shortly petiolate, oblong, 7-14 mm. long, muricate above, stellate-tomentose and concave below owing to the recurved margins; flowers subsessile, solitary in the axils or 1-3 terminal; calyx minute; petals 5, yellow, ovate, spreading, 5-6 mm. long, induplicate-valvate in bud, stellate-hairy outside; carpels 2, each 2-ovulate; stigma large, notched; stamens 10, the filaments glabrous; hypogynous disk absent. (Plate 31 : 2).
Near Mount Thisbe, Kangaroo Island. Oct.-Nov.

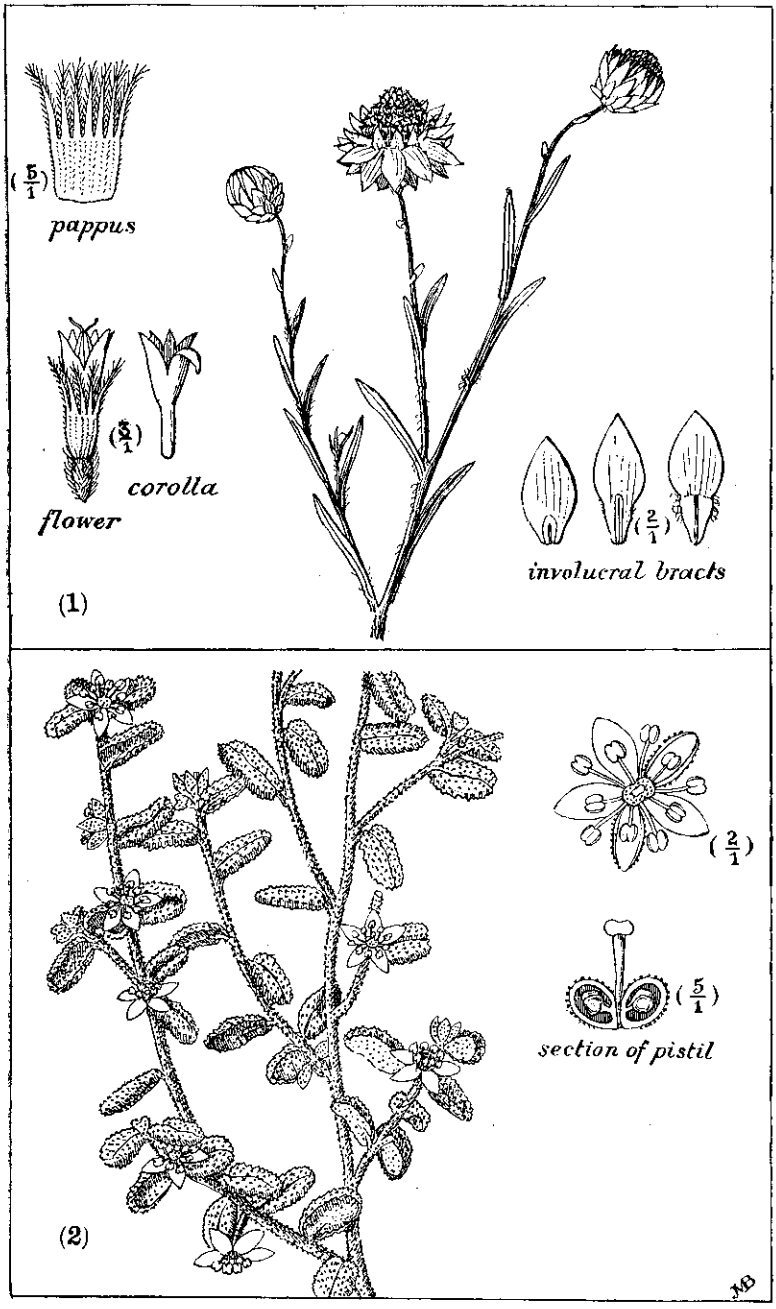

PLATE 32.—(1) **Helipterum floribundum ; (2) Asterolasia muricata.**

5. ERIOSTEMON, Sm.

(From Greek *erion*, wool ; *stémôn*, thread : referring to the hairy filaments).

Sepals 5, short, broad, imbricate, united towards base; petals 5, imbricate ; stamens 10, the filaments hairy ; carpels 5, almost distinct, 2-ovulate ; styles short, inserted below the middle of the carpels and immediately united into 1 style ; disk almost entire ; fruit-

lets 2-valved, 1-seeded, beaked, the endocarp separating. Shrubs without any clothing of minute scales; leaves thick, alternate, simple, subsessile; oil glands conspicuous; flowers small, usually solitary and axillary, the petals white or on the outside pink (in our species). Sepals and petals rarely 4, and stamens 8. The genus is Australian except one species from New Caledonia.

A. Flowers axillary; leaves 7-20 mm. long.
  Leaves obovate ..... *E. obovalis* 1.
  Leaves narrow, almost terete ..... *E. linearis* 2.
A. Flowers terminal; leaves clavate, 3-5 mm. long..... *E. brevifolius* 3.

1. **E. obovalis,** A. Cunn. Glabrous glandular-tuberculate shrub; leaves obovate, 8-12 mm. long, obtuse or notched; flowers solitary, axillary; petals ovate, glabrous, about 8 mm. long; filaments flat, ciliate.
The only specimens are in the Tate Herbarium, collected by T. W. Wilkinson, at Black Springs, in Oct. 1893. This place is half-way between Manoora and the Burra. Tate also records the plant from his Tatiara district.—Eastern States.

2. **E. linearis,** A. Cunn. Rigid glabrous glandular-tuberculate shrub; leaves terete, crowded, obtuse or mucronate, 7-20 mm. long; flowers solitary, axillary; petals oblong, densely pubescent outside, especially near the margins, about 6 mm. long; stamens slightly flattened and ciliate in lower half; anthers with a gland-like appendage at summit; stigma minutely 5-lobed.
Gawler Range to Everard Range. June-Oct.—New South Wales.

3. **E. brevifolius,** A. Cunn. Slender glandular-tuberculate shrub; branchlets glabrous or with longitudinal streaks of minute pubescence; leaves clavate, very small (3-5 mm. long), erect, crowded, tuberculate with usually very prominent glands; flowers 1-3, terminal; petals ovate, glabrous outside, pubescent inside, 4-6 mm. long; filaments flat, densely ciliate; anthers with a gland-like appendage at summit. (Fig. 154, F).—*E. difformis,* A. Cunn. var, (?) *teretifolius,* Benth.
Mt. Lofty Range to northern part of Flinders Range; Kangaroo Island. Aug.-Dec.—Temperate Australia.

6. PHEBALIUM, Vent.

(Said to have been adapted by Ventenat from *phibaleós*, the Greek name for an early fig-tree, and formerly supposed to indicate a myrtle).

Differs from *Eriostemon* in the 5 petals valvate or laterally imbricate, but always with inflexed valvate tips. Shrubs, sometimes glandular-tuberculate and scaly, with alternate rigid, subsessile simple leaves; flowers small, white or yellow. All Australian except 1 New Zealand species.

A. Shrubs without scales or tubercles; petals valvate in all their length, deciduous, glabrous, white inside, often pink outside.
  B. Flowers axillary, solitary; leaves pungent..... *Ph. pungens* 1.
  B. Flowers terminal, crowded in apparent corymbs or umbels.
    Leaves obcuneate, often notched ..... *Ph. bilobum* 2.
    Leaves suborbicular, very small and thick..... *Ph. brachyphyllum* 3.
A. Shrubs more or less covered with minute shining appressed peltate scales, composed of stellate hairs whose branches are united, and often beset with tubercles; petals yellow, scaly outside, slightly imbricate, with valvate tips; leaves linear-cuneate.
  Leaves with recurved margins and inconspicuous midrib ..... *Ph. glandulosum* 4.
  Leaves with spreading margins and very conspicuous midrib ..... *Ph. bullatum* 5.

1. **Ph. pungens,** (Lindl.) Benth. Low often procumbent shrub, the branches beset with minute spreading hairs; leaves linear-lanceolate, rigid, prickly-pointed, 6-18 mm. long, minutely hairy and with a prominent midrib beneath; flowers white, solitary in the axils, on slender peduncles; petals lanceolate, 4-6 mm. long, glandular-dotted; stamens shorter than petals, the filaments flattish, more or less ciliate; seed black, dull.—*Eriostemon pungens,* Lindl.
Mt. Lofty Range; Kangaroo Island; Murray scrub; Eyre Peninsula. Aug.-Oct.—Victoria; New South Wales.

2. **Ph. bilobum,** Lindl. (1839). Slender often procumbent shrub; branches minutely stellate-hairy; leaves oblong or obcuneate, 5-15 mm. long, cordate or rounded at base,

truncate or 2-lobed at summit, recurved on margins, pale beneath, with immersed transparent glands; flowers white, solitary but approximate in the upper axils, the uppermost without leaves, so that the inflorescence resembles a corymb or umbel; peduncles usually 2-bracteate about the middle; stamens about as long as petals, the filaments filiform, glabrous; carpels 2-3, rarely 4; disk stalk-like; seed shining. (Fig. 153, A-B).—*Eriostemon Hillebrandii*, F. v. M. (1855).

Mount Lofty and Barossa Ranges. Aug.-Oct.—Victoria; Tasmania.

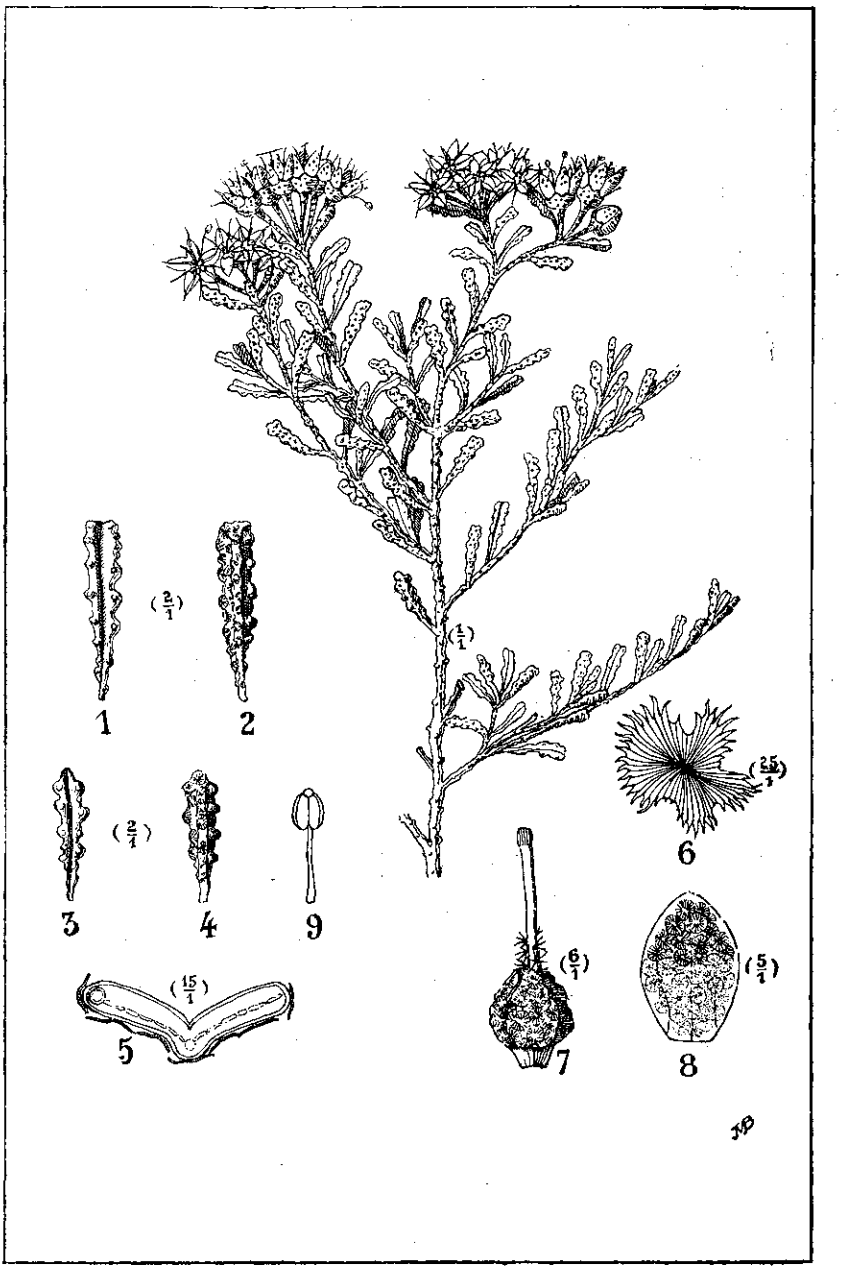

PLATE 33.—**Phebalium bullatum**

3. **Ph. brachyphyllum,** Benth. Dwarf shrub; leaves crowded, spreading, obovate or orbicular, about 4 mm. long, thick, convex; flowers few (usually 3-5) in terminal clusters or short racemes; petals about 3 mm. long; filaments filiform; carpels on a stalk-like disk.

Recorded in Fl. Aust. for "Encounter Bay and near Coffin Bay, *F. Mueller.*" Probably rare or localised; I have seen no specimen.

4. **Ph. glandulosum,** Hook. (1848). Shrub, the branchlets, lower face of the leaves and inflorescence covered with a whitish scurf formed of small scales; leaves linear-cuneate or linear, always broader at summit than base, truncate or emarginate by the recurved tip, the margins recurved and sometimes almost concealing the white under-surface, 5-10 mm. long, about 1½ mm. broad, the upper surface glandular-tuberculate, the midrib not prominent below; flowers 6-12, yellow, in terminal corymbs or umbels among the uppermost leaves; petals ovate, about 4 mm. long, very scaly outside; stamens exserted, the filaments filiform; anthers tipped by a gland; carpels scaly; style rather long, usually glabrous.—*Eriostemon sediflorus,* F. v. M. (1859).

Hoyleton; Ardrossan. Aug.-Oct.—Eastern States.

5. **Ph. bullatum,** J. M. Black. Slender graceful shrub about 1 m. high; branchlets both scaly and tuberculate; leaves linear-cuneate, truncate or notched, 5-15 mm. long, about 2 mm. broad, channelled on upper face, glandular-tuberculate on the margins, which are not recurved, the undersurface silvery-scaly and keeled by a prominent tuberculate midrib; flowers as in the preceding; style stellate-hairy towards base.

Scrub on both sides of the Murray. Sept.-Dec.—North-western Victoria.

PLATE 33.—1, 3, upper face of leaf; 2, 4, lower face; 5, transverse section of leaf; 6, scale; 7, pistil; 8, petal; 9, stamen.

Ph. stenophyllum, F. v. M., like the two preceding, but without tubercles, the leaves merely obtuse at summit, almost terete owing to the closely revolute margins and scarcely 1 mm. broad, occurs in the Victorian Tatiara, and may be found on our side of the border. *P. squamulosum,* Vent. var. (?) *stenophyllum,* Benth.

7. MICROCYBE, Turcz.

(From Greek *mikros,* small; *kybê,* head: alluding to the small flowerheads.)

Sepals 5, free, thin; petals 5, quite glabrous or ciliolate near base, slightly imbricate; hypogynous disk absent; stamens 10, exserted; filaments filiform; anthers with a small gland at summit; carpels only 2, distinct, each with 2 collateral ovules; styles united into 1 filiform style; fruitlets rounded at summit, 2-valved, with 1 black seed. Low heath-like shrubs, with numerous small alternate rigid sessile leaves: flowers sessile, really axillary and solitary, but crowded towards the ends of the branches, and the uppermost leaves reduced in size so that the flowers appear capitate.

Leaves spreading, with many small glandular tubercles.... *M. pauciflora* 1.

Leaves suberect, with few large prominent tubercles ..... *M. multiflora* 2.

1. **M. pauciflora,** Turcz. (1852). Branchlets and lower face of leaves tomentose with minute stellate hairs; leaves spreading, 4-8 mm. long, almost terete owing to the revolute margins; flowers 5-20 in head; sepals free, oblanceolate, hairy, 1-1½ mm. long; petals bright yellow, more than twice as long; 5 sepaline filaments villous in lower half, the petaline ones almost or quite glabrous; fruitlets pitted.—*Eriostemon capitatus,* F. v. M. (1859).

Yorke Peninsula; Kangaroo Island; Eyre Peninsula; probably Murray lands. Summer. North-western Victoria; West Australia.

PLATE 34 (5-7).—5, pistil; 6, one-half of flower spread open; 7, flower.

2. **M. multiflora,** Turcz. Branches minutely tomentose but almost concealed by the small spreading-erect or appressed leaves, which are almost terete or conical owing to the revolute margins hiding the under-surface, 2-4 mm. long, subpeltately attached to the branch by an excavation at the base of the upper face, with 6-8 prominent tubercles on the margins; flowers usually 10-12 in head; sepals hairy, 1½ mm. long, petals white, drying brown, 3 mm. long; filaments glabrous; fruitlets transversely wrinkled.—*Eriostemon capitatus* var. *baccharoides,* F. v. M.

Hoyleton; Sedan; Murray lands; Gawler Range to Great Bight. Summer.—North-western Victoria; West Australia.

PLATE 34 (8-11).—8, one-half of flower spread open; 9, leaf (upper face); 10, leaf (lower face); 11, fruitlet: *a,* wrinkled exocarp; *b,* endocarp; *c,* seed.

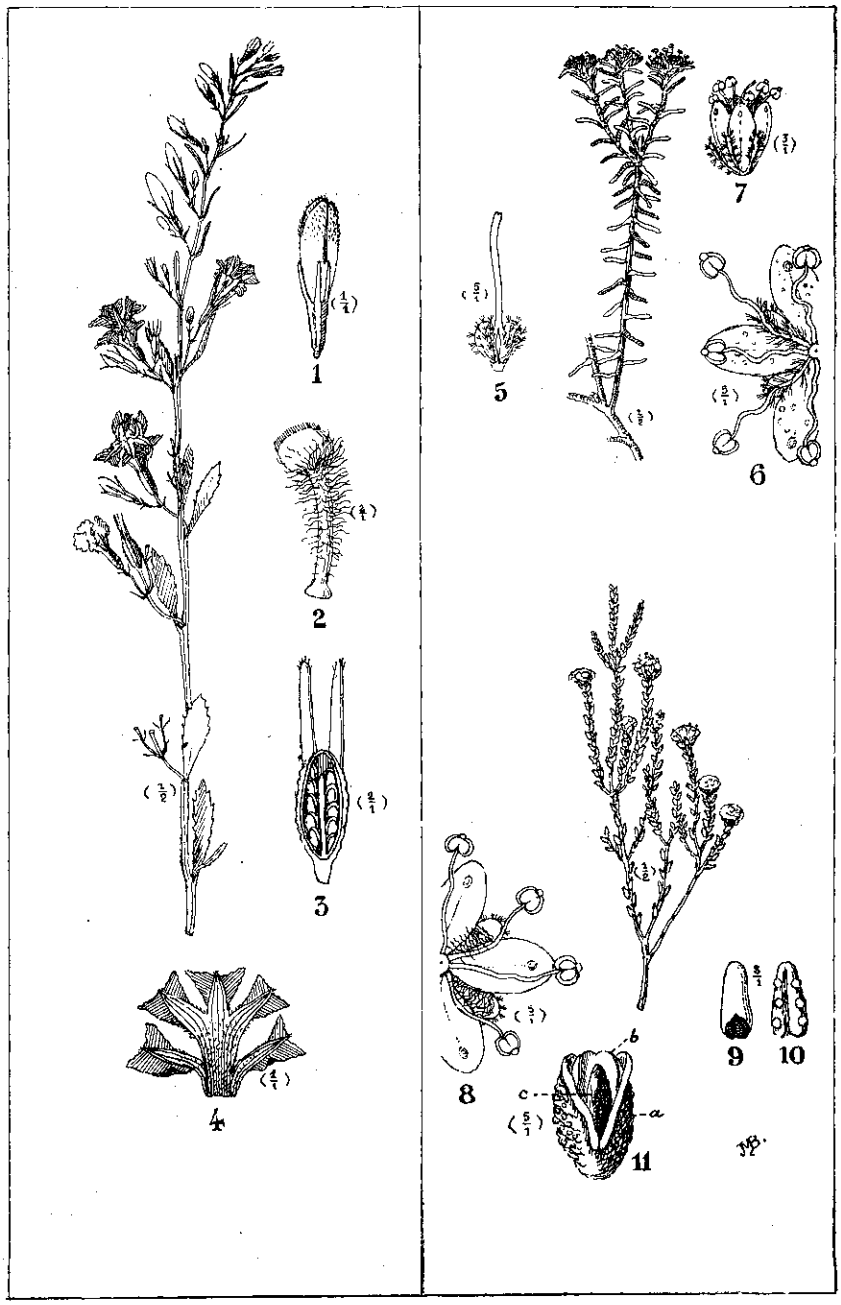

PLATE 34.—(1-4), **Goodenia vernicosa**; (5-7), **Microcybe pauciflora**; (8-11), **M. multiflora**.

8. GEIJERA, Schott.

(After J. D. Geijer, a botanical author).

Calyx persistant, with 5 short rounded lobes; petals 5, valvate (in our species), ovate-acuminate, caducous; stamens 5; filaments short, glabrous; carpels 5, each with usually

1 pendulous ovule ; style short, with a capitate stigma ; disk fleshy, undulate, surrounding the carpels ; fruitlets globular, 2-valved, reduced by abortion to 1-3, rarely 4 ; exocarp rather thick, with the endocarp more or less adherent to it ; seed ovoid, black, shining, with a hard testa ; cotyledons broad. Trees or shrubs ; leaves alternate, simple, flat, with immersed glandular dots and not articulate on the short petiole ; flowers small, white, in panicles which are terminal or 1 or 2 in the upper axils ; pedicels short, stout, bracteate, much swollen just below the flower.

Leaves linear-lanceolate, 6-18 cm. long ..... *G. parviflora* 1.
Leaves linear-oblong, very obtuse, 2-5 cm. long..... *G. linearifolia* 2.

1. **G. parviflora,** Lindl. *Wilga.* Small tree 6-8 m. high, almost glabrous ; branches often pendulous ; leaves linear-lanceolate, 6-18 cm. long, 4-7 mm. broad, acute, rarely obtuse, the midrib prominent beneath ; panicle 4-7 cm. long ; fruitlets 5-6 mm. diam.
Creeks and plains near Boolcoomata to the New South Wales border. Winter and spring.—Western districts of New South Wales, Victoria, and Queensland.

2. **G. linearifolia,** (DC.) comb. nov. *Sheep Bush.* Spherical shrub with spreading branches ; leaves thicker and more rigid than in the preceding, linear-oblong, rounded or notched at summit, 2-5 cm. long, 3-6 mm. broad, the midrib obscure ; panicle 1-3 cm. long ; fruitlets as in the preceding.—*G. parviflora,* Lindl. var. (?) *crassifolia,* Benth. ; *Eriostemon linearifolium,* DC. (1824) ; *Zanthoxylum australasicum,* A. Juss. (1825).
Coastal districts as far west as the Great Bight ; Kangaroo Island ; Murray lands. Winter and spring.—West Australia. The leaves of both species are much relished by sheep and cattle.

Family 66.—**TREMANDRACEAE.**

A purely Australian family of heath-like shrubs, comprising 3 genera, of which only one occurs in South Australia.

1. TETRATHECA, Sm.

(Greek *tetra,* four ; *thēkē,* box, cell : alluding to the 4-celled anthers.)

Sepals and petals 4, rarely 5, valvate ; petals ovate-oblong, caducous ; stamens 8, rarely 10, free ; anthers erect, rigid, 4-celled, with 2 cells in front of the other 2, contracted above into a tube and opening at its summit in 1 pore, tapering at the base into the short rigid filament ; ovary superior, 2-celled, with 1-2 pendulous anatropous ovules in each cell ; style simple, filiform ; disk none ; fruit a flattened capsule, narrowed towards base, considerably longer than the persistant calyx, opening loculicidally in 2 valves ; seeds albuminous, with a coiled appendage articulate on the chalaza at the summit of the seed, the proximal part of the appendage terete and hard, the distal part membranous ; rhaphe ventral ; embryo terete, in the axis of the albumen ; radicle superior. Leaves simple, exstipulate, subsessile, alternate or whorled ; flowers regular, bisexual, solitary and axillary on filiform peduncles.

A. Sepals and petals 4.
  B. Leaves linear.
    Leaves scattered, often longer than peduncles..... *T. pilosa* 1.
    Leaves whorled, shorter than peduncles ..... *T. ericifolia* 2.
  B. Leaves ovate or orbicular, mostly whorled..... *T. ciliata* 3.
A. Sepals and petals 5 ; stems leafless ..... *T. halmaturina* 4.

1. **T. pilosa,** Labill. Low glabrous or hairy undershrub ; leaves alternate, linear, with recurved margins, 8-12 mm. long ; flowers often drooping, in long leafy racemes, the peduncles usually shorter than the leaves ; sepals ovate, about 2 mm. long ; petals 8-10 mm. long, varying from dark-purple to almost white, 4 in number ; ovary pubescent and with a few longer glandular hairs ; ovules 1 in each cell ; capsule obovate-cuneate ; seeds hairy.
Mt. Lofty Range ; Barossa Range. Most of the year.—Eastern States.

2. **T. ericifolia,** Sm. Low undershrub ; leaves mostly whorled in 4's, linear or linear-lanceolate, 4-8 mm. long, with recurved margins ; flowers red, on peduncles longer than leaves ; ovary pubescent, with 2 ovules in each cell ; capsule and seeds as in the preceding.
Kangaroo Island.—Victoria ; New South Wales.

3. **T. ciliata,** Lindl. Undershrub, sometimes reaching 1 m. in height, with slender usually pubescent branches ; leaves ovate or orbicular, acuminate, about 10 mm. long, alternate or whorled in 3's and 4's, ciliate, paler below ; flowers lilac to red, on hairy

peduncles about as long as the leaves ; sepals spreading or reflexed ; ovary pubescent, each cell 2-ovulate ; capsule broadly obovate ; seeds hairy.

South-East, from Penola towards Millicent. Spring and summer.—Victoria ; Tasmania.

4. **T. halmaturina,** J. M. Black. Low almost glabrous undershrub, with rigid rush-like terete stems, rough, with sessile glands ; leaves reduced to a few minute subulate scales ; flowers on short peduncles in the axils of subulate bracts like the scales ; petals 5, red to almost white, 9-13 mm. long ; tube nearly as long as anther ; ovary slightly pubescent near summit, with 1 ovule in each cell ; capsule obovate-cuneate ; seeds hairy.

Kangaroo Island. Spring and summer.

FAMILY 67.—**POLYGALACEAE.**

Flowers bisexual, irregular ; sepals 5, imbricate, almost equal or the 2 inner ones (called wings and resembling the wings of *Papilionatae*) larger and petal-like ; petals apparently 3, unequal, the anterior or outer one (called the keel) hood-shaped and enclosing the stamens and ovary, the 2 lateral minute or obsolete, the 2 posterior ones conspicuous, united towards the base with the keel ; stamens normally 8, united to above the middle in a tube open on the upper side and adnate to the petals ; anthers 1-celled, opening by a terminal pore or slit ; ovary superior, 2-celled, each cell with 1 pendulous anatropous ovule ; style simple ; rhaphe ventral ; fruit a loculicidal capsule, laterally compressed ; seeds with crustaceous testa ; embryo in the axis of the albumen. Herbs or undershrubs ; leaves simple, alternate, entire, without stipules ; flowers small, on bracteate peduncles.

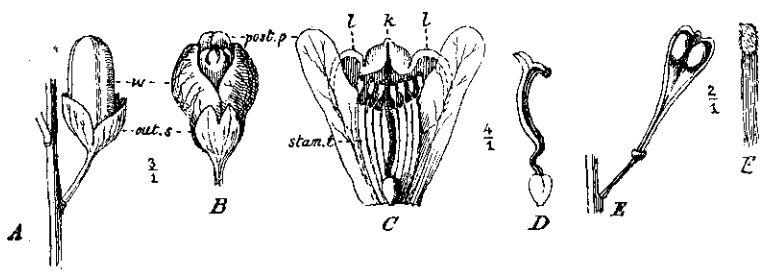

FIG. 155.—**Polygalaceae.**—A-D, *Comesperma polygaloides ;* A, flower before opening ; B, flower open ; *out.s*, outer sepals ; *w*, wings ; *post. p*, posterior petals ; C, petals spread open ; *k*, keel ; *l*, lobes of keel ; *stam. t*, staminal tube ; D, pistil. E F, *C. calymega* : E, capsule ; F, seed.

The 2 inner sepals larger and petaloid ; capsule cuneate towards base ; seeds hairy	COMESPERMA 1.
Sepals all equal ; capsule ovate, 4-horned ; seeds glabrous..	MURALTIA 2.

1. COMESPERMA, Labill.

(From Greek *komé*, hair of the head ; *sperma*, seed : alluding to the tuft of hairs.)

Sepals caducous, the 2 inner ones (wings) larger and colored ; petals 3 ; stamens mostly 6-8 ; anthers opening by pores ; style incurved, compressed, 2-lobed at summit ; albumen often scanty ; flowers in racemes ; bracts caducous.

A. Outer sepals all free.	
B. Wings much longer than the outer sepals.	
C. Leaves reduced to scales ; capsule obovate.....	*C. scoparium* 1.
C. Leaves developed ; capsule narrow-cuneate ; stems twining.	
Leaves glabrous ; capsule not winged.....	*C. volubile* 2.
Leaves ciliate ; capsule narrowly winged	*C. ciliatum* 3.
B. Wings scarcely longer than outer sepals ; leaves narrow; stems erect	*C. calymega* 4.
A. Two of the outer sepals united, all much shorter than the wings	*C. polygaloides* 5.

1. **C. scoparium,** Steetz. Shrub with rigid striate broomlike stems ; leaves reduced to minute distant scales ; flowers on very short peduncles which are concealed by several small obtuse bracts ; outer sepals small, obtuse ; wings almost orbicular, blue, 5-6 mm. long, about as long as the keel, which is 3-lobed and rather shorter than the 2 narrow posterior ciliate petals ; capsule obovate-cuneate, 5-6 mm. long ; seeds oblong, pubescent,

terminating at the chalazal end in a flat lanceolate hairy membrane more than half as long as the seed.

Eyre Peninsula and westward to the country behind the Great Bight; probably also Murray lands. Winter and spring.—Western Victoria and New South Wales; West Australia.

2. **C. volubile,** Labill. Glabrous twining undershrub, with furrowed stems; leaves linear or lanceolate, distant, mostly 4-12 mm. long; flowers racemose; wings as in the preceding, but more distinctly clawed; keel blue or lilac, shorter than the 2 yellowish posterior petals, which are ciliate and slightly pubescent towards base and equalling the wings; capsule oblong-cuneate, 12-14 mm. long; seeds oblong, villous on margins and with a long tuft of hairs filling the lower part of the capsule.

Southern districts; Eyre Peninsula and along the Great Bight; South-East. Sept.-Dec.—Temperate Australia.

3. **C. ciliatum,** Steetz. Like the preceding, but the leaves smaller and ciliate, with a few hairs on both faces; flowers more approximate in the raceme, the posterior petals densely pubescent towards base; capsule rather shorter and broader.

Cape Donington, near Port Lincoln.—West Australia.

4. **C. calymega,** Labill. Almost glabrous perennial, with slender rather rigid and erect stems; leaves lanceolate or linear-lanceolate, thick, 8-20 mm. long; flowers blue, in dense terminal racemes; outer sepals oblong, nearly 4 mm. long; wings slightly longer, obovate; posterior petals lanceolate, about as long as wings; keel shorter, 3-lobed, with a yellowish tinge; capsule cuneate, 8-9 mm. long, notched and mucronate at summit; seeds pubescent, with long tuft at summit. (Fig. 155, E-F.)

Mount Lofty and Barossa Ranges; Kangaroo Island; Eyre Peninsula. Sept.-Jan.—Temperate Australia.

5. **C. polygaloides,** F. v. M. Resembles the preceding in habit; leaves linear-lanceolate or oblong-lanceolate, sometimes oblanceolate, 6-12 mm. long, glaucous; flowers in dense racemes, outer sepals obtuse, about 2 mm. long, the 2 anterior ones united nearly to summit; wings obovate, not clawed, purple with green stripe, 6 mm. long; keel about as long, 3-lobed, yellow and white; posterior petals obtuse, purplish; capsule cuneate, truncate at summit, about 8 mm. long; seeds pubescent and tufted. (Fig. 155, A-D.)

Encounter Bay; Finniss scrub and southward to Bordertown, Naracoorte, and South-East. Summer.—Western Victoria.

2. MURALTIA, Necker.

(After Johann von Muralt, Swiss botanist, 1645-1733.)

* 1. **M. Heisteria,** (L.) DC. Erect shrub 50 cm. to 1 m. high, with rigid pubescent branches; leaves clustered, linear-subulate, pungent-pointed, keeled, ciliolate on margins, spreading; flowers solitary or twin, subsessile in the leaf-clusters; sepals persistant, lanceolate, scarious, subequal, 5 mm. long; petals 3, twice as long, the keel surmounted by a purple 2-lobed crest, the posterior petals oblong, usually lighter in color; stamens 4-8; anthers opening by slits; style dilated and truncate at summit; capsule ovate, about as long as the sepals, 4-horned at summit; seeds glabrous.

Above Morialta Gully (Mount Lofty Range). Flowers sometimes all white. Sept.-Dec.—South Africa.

FAMILY 68.—EUPHORBIACEAE.

Flowers unisexual, usually regular; sepals and petals usually 4-6, the petals (or the whole perianth) sometimes wanting; stamens 1 to many; anthers of 2 cells opening in longitudinal slits (except in *Poranthera*); pistil superior, consisting of 3 (rarely 1 or 2) carpels united in a lobed 3-celled ovary, each cell with 1-2 pendulous anatropous ovules; styles as many as carpels, free or united towards base, often branched, usually stigmatic along the inner face; fruit (in our species) a capsule of as many fruitlets as there are carpels in the ovary, the capsule splitting septicidally into the 2-valved fruitlets (sometimes called *cocci*) and leaving a persistant central axis; seed with or without a caruncle; rhaphe ventral; testa crustaceous; embryo in the axis of the albumen, with a superior radicle. Shrubs or herbs; flowers mostly small. In some genera there is a small disk below the ovary, reduced in the male flower to small orbicular or notched glands surrounding the base of the stamens.

A very large and important family, comprising the trees from which commercial rubber is obtained—*Hevea guianensis*, Aublet; *H. brasiliensis*, Muell., Arg.; and *Manihot Glaziovii*, Muell., Arg.; also the plants producing tapioca—*Manihot utilissima*, Pohl, and *M. dulcis*, Pax. All these are South American species.

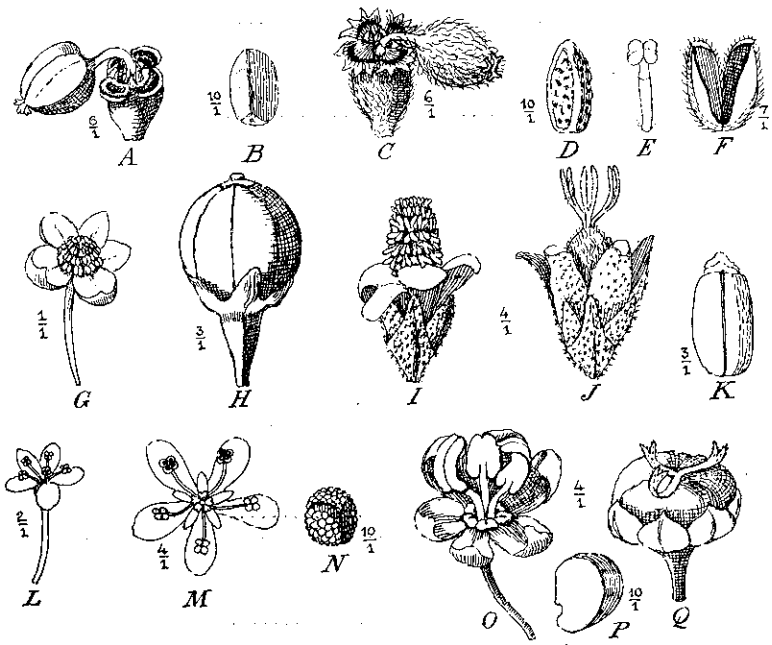

FIG. 156.—**Euphorbiaceae.** A-B, *Euphorbia Drummondii*: A, flowerhead; B, seed; C-F, *E. australis*: C, flowerhead; D, seed; E, stamen; F, fruitlet splitting open; G-H, *Beyeria Leschenaultii*: G, male flower; H, capsule; I-K, *Bertya Mitchellii*, I, male flower, J, female flower; K, seed; L-N, *Poranthera microphylla*: L, male flower, M, the same spread open; N, seed; O-Q, *Phyllanthus saxosus*: O, male flower; P, seed; Q, female flower.

A. Embryo with cotyledons much broader than the radicle; no rudimentary ovary in the male flowers.
  B. Ovules 2 in each cell; sepals 6; petals absent; seeds without caruncle; herbs or shrubs..... PHYLLANTHUS 1.
  B. Ovule 1 in each cell.
    C. Sepals 4-6; petals absent.
      D. Stamens numerous; styles 3, bifid; seeds carunculate; shrubs.
        Leaves large, palmatifid ..... RICINUS 2.
        Leaves toothed, often 3-lobed ..... ADRIANA 3.
      D. Stamens 5-6; style 1, simple; seed without caruncle; small hairy annual..... EREMOCARPUS 4.
    C. Perianth replaced by a calyx-like involucre containing 1 female and several male flowers; seeds carunculate; mostly herbs with milky juice... EUPHORBIA 5.
A. Embryo narrow, the cotyledons no broader than the radicle.
  E. Ovules 2 in each cell; stamens 3-5; rudimentary ovary usually present in male flowers.
    F. Anthers 4-celled, opening by terminal pores; sepals, petals and stamens 5; styles bifid; seeds without caruncle; small white-flowered plants PORANTHERA 6.
    F. Anthers 2-celled, opening by longitudinal slits; sepals 4-6; petals absent; styles simple; seeds carunculate; dwarf shrubs.
      Capsule 2-3-celled ..... MICRANTHEUM 7.
      Capsule 1-celled ..... PSEUDANTHUS 8.
  E. Ovule 1 in each cell; no rudimentary ovary; seeds carunculate.

G. Stamens 9 or fewer; sepals 4-5.
Petals present; style-branches fringed; capsule without appendages; small shrub..... MONOTAXIS 9.
Petals absent; style-branches entire; capsule with 6 erect appendages; almost leafless perennial ..... AMPERÆA 10.

G. Stamens numerous; sepals 5; petals usually absent; shrubs.
Stamens free, crowded on a receptacle; stigma sessile, 3-lobed. ..... BEYERIA 11.
Stamens united in a short column; styles 3, branched ..... BERTYA 12.

1. PHYLLANTHUS, L.

(From Greek *phyllon*, leaf; *anthos*, flower: in some foreign species the flowers grow on the edges of dilated leaf-like branchlets.)

Sepals usually 6, imbricate; petals none; stamens 3, free or united; no rudimentary ovary in male flowers; ovary of female flowers 3-celled; ovules 2 in each cell; styles 3, short; capsule separating into 2-valved fruitlets; seeds subtrigonous, without caruncle. Herbs or shrubs with alternate very shortly petiolate entire leaves; stipules brown, scarious; flowers very small, axillary, the males usually clustered, the females solitary.

A. Filaments united all the way in a column; flowers without hypogynous disk or glands; small shrubs or herbs (Section *Synostemon*).
B. Male calyx tubular, with short rounded lobes at summit; small shrubs.
Glabrous; leaves linear-cuneate ..... *Ph. thesioides* 1
Pubescent; leaves obovate ..... *Ph. rigens* 2.
B. Calyx divided to base into ovate or lanceolate sepals; glabrous annuals.
Leaves distichous, linear-lanceolate ..... *Ph. rhytidospermus* 3.
Leaves scattered, rather broad ..... *Ph. trachyspermus* 4.

A. Filaments free or united towards base; calyx divided to the base into sepals, the male flowers with 6 glands inside, representing the disk. (Section *Paraphyllanthus.*)
C. Glabrous plants.
D. Fruiting calyx enlarged, longer than capsule; shrub *Ph. calycinus* 5.
D. Fruiting calyx shorter than capsule.
E. Shrub; leaves distichous, suborbicular ..... *Ph. saxosus* 6
E. Undershrubs or herbs; leaves oblong.
Low glabrous annual; flowers monoecious .. *Ph. lacunarius* 7.
Diffuse undershrub; flowers dioecious ..... *Ph. australis* 8.
C. Hairy plants.
Hoary perennial; leaves elliptic; flowers monoecious ..... *Ph. Fuernrohrii* 9.
Dwarf shrub; leaves obovate; flowers dioecious .. *Ph. thymoides* 10.

1. **Ph. thesioides,** Benth. Glabrous viscid undershrub with slender rigid stems; leaves linear-cuneate, obtuse, 5-12mm. long; flowers monoecious, solitary, on peduncles much shorter than leaves; male sepals united in a thick ribbed tubular calyx 4mm. long, with 6 short rounded lobes; anthers connate around the upper part of the staminal column composed of the united filaments; female sepals linear, thick, resembling the males, but free and rather shorter; capsule thrice as long, ovoid-oblong; styles 3, short, thick, undivided; stigmas capitate; seeds curved, 6 mm. long, wrinkled on back.
Arkaringa Creek, near Everard Range. Winter and spring.—New South Wales; Queensland.

2. **Ph. rigens,** Muell. Arg. Small rigid shrub, pubescent with minute hairs; branchlets often ending in a spine; leaves obcordate or obovate-cuneate, 2-10 mm. long, truncate or notched, clustered at nodes; flowers monoecious, the males sessile; male and female sepals and stamens as in the preceding; female flowers on peduncles as long as or longer than leaves; capsule and styles as in the preceding, the capsule 3 or 4 times longer than calyx.
Mount Parry, east of Lake Torrens.—Central Australia; Queensland. Our specimens have only female flowers. The typical form, which is glabrous, comes from western New South Wales.

3. **Ph. rhytidospermus,** F. v. M. Small glabrous glaucous annual, with slender rather rigid stems; leaves oblong-lanceolate, acute, almost distichous, often minutely glandular beneath, 5-10 mm. long, 2-3 mm. broad; stipules rigid, subulate, spreading, 1-2 mm. long; our specimens show only female flowers, but the flowers are said to be monoecious, the males with anthers adnate round the summit of the staminal column; female sepals lanceolate, about 2 mm. long; styles 3, short, notched; capsule ovoid, greenish, 5 mm. long, on a peduncle 1½ mm. long; seeds whitish, incurved, wrinkled, 4 mm. long.

Near Lake Torrens. Most of the year.—Central and tropical Australia.

4. **Ph. trachyspermus,** F. v. M. Habit of the preceding, but more flexible; leaves broadly oblong or ovate-lanceolate, 8-14 mm. long, 3-7 mm. broad; stipules minute, spreading; flowers said to be monoecious, the males with united filaments; fruit, seed, and peduncles as in the preceding, but the female sepals rather broader; styles 3, short, broad, spreading, notched.

Northern part of Flinders Range to Far North. Most of the year.—Western New South Wales. Both these species require further examination. From the few specimens available the flowers seem dioecious, and it is possible that the 3 broad notched styles at the summit of the very young ovaries have been mistaken for anthers.

5. **Ph. calycinus,** Labill. Small glabrous shrub; leaves oblong-cuneate, 8-15 mm. long; flowers monoecious, on slender peduncles which in fruit lengthen to 10-12 mm. and are dilated at summit; sepals ovate or orbicular, whitish, enlarging in fruit to 7 mm. long; filaments and anthers free, the cells rather distant on the connective; 6 glands at base of filaments; styles free, spreading, 2-lobed; capsule depressed-globular, shorter than calyx; seeds brown, smooth or striate, 3 mm. long.

Yorke and Eyre Peninsulas. Sept.-Oct.—West Australia.

6. **Ph. saxosus,** F. v. M. Glabrous shrub, over 1m. high; leaves distichous, orbicular or obovate-cuneate, truncate or notched, 8-15 mm. long; stipules brown, lanceolate; flowers dioecious, the males in axillary clusters of 4-6, on peduncles 2 mm. long; sepals in both sexes ovate, about 2 mm. long; filaments and anthers free, with 6 glands at base; female flowers usually solitary, on peduncles which in fruit are 5-6 mm. long; styles 3, spreading, bifid; capsule depressed-globular, brown, 4-5 mm. diameter, much exceeding the sepals, which are not enlarged; seeds smooth, 2-2½ mm. long. (Fig. 156, O-Q.) *Ph. Gunnii,* Hook. f. var. *saxosus,* F. v. M.

Mt. Lofty Range to northern part of Flinders Range, Eyre Peninsula. Most of the year.—Western Victoria. Differs from *Ph. Gunnii* chiefly in the constantly dioecious not monoecious flowers.

7. **Ph. lacunarius,** F. v. M. Small glabrous glaucous annual, with slender prostrate or ascending stems; branches flowering from base upwards; leaves oblong-cuneate or oblong, 8-12 mm. long; stipules linear-lanceolate, white, caducous; flowers small, monoecious, 1 female with 2-3 males in the axil, on very short peduncles; male sepals ovate, reddish, under 1 mm. long; filaments and anthers free, with glands; female sepals lanceolate, greenish, to 1½ mm. long; styles almost free, bifid, spreading; capsule depressed-globular, 3-lobed, 3 mm. diam.; seeds brown, finely striate, 1½ mm. long.

Murray lands nothward to Lake Torrens and Far North; westward to Kingoonya and Birksgate Range. Most of the year. Sometimes called "Carraweena clover" by bushmen, and considered poisonous to stock when eaten greedily.—Western New South Wales, West Australia.

8. **Ph. australis,** Hook. f. Small glabrous undershrub, with very angular branchlets; leaves elliptical-oblong or oblong-cuneate, subacute, coriaceous, imbricate, 5-12 mm. long, with thickened margins, sometimes slightly concave above; stipules small, lanceolate, reddish-brown; flowers dioecious, the males solitary or 2-3 together, on peduncles 2-3 mm. long; sepals ovate-oblong, nearly 2 mm. long, with broad scarious margins; filaments and anthers free, the cells quite distinct, the basal glands 6; female flowers solitary on peduncles 3-6 mm. long in fruit; sepals ovate-oblong, finally 3 mm. long; styles 3, free, deeply divided into 2 linear lobes; capsule depressed-globular, 4 mm. across; seeds reddish-brown, 2 mm. long, minutely granular.

Mt. Lofty Range; Kangaroo Island. Aug.-Jan.—Eastern States. Our form differs from the eastern type in usually longer leaves, more erect stems and male sepals yellowish rather than red.

9. **Ph. Fuernrohrii,** F. v. M. Small undershrub hoary with a tomentum of minute spreading hairs; leaves obovate-oblong, mucronulate, 5-12 mm. long; stipules linear-lanceolate, membranous; flowers monoecious; males usually 1-3 in upper axils on very

short peduncles, the sepals broad, pubescent, about 1 mm. long; filaments united towards base or for more than half their length, with 6 glands; anthers free; female flowers usually solitary, on peduncles 4-7 mm. long in fruit; sepals almost ovate, 2-3 mm. long; styles 3, divided to the middle into 2 linear lobes; disk lobed; capsule pubescent, depressed-globular, 5-6 mm. across; seeds brown, smooth, 2 mm. long.

Murray lands; Flinders Range to Far North. Most of the year.—Western New South Wales; Queensland; Central Australia.

10. **Ph. thymoides,** Sieb. var. *pauciflorus*, J. M. Black. Small shrub, the branchlets thinly clothed with minute spreading hairs; leaves obovate-cuneate, almost truncate at summit, 3-6 mm. long, glabrous except along the ciliate margins; stipules small, black; flowers dioecious, on peduncles of about 1 mm., the males 2-3 together, the females solitary, the sepals ovate; male sepals 1 mm. long, ciliolate; anthers almost sessile, free, the very short filaments free, with minute glands at base; female sepals larger; styles 3, bifid; capsule, depressed-globular.

Near Wolseley.—Victoria; New South Wales. In the typical eastern form the flowers are larger, the filaments longer and sometimes united towards base.

2. RICINUS, (Tourn.) L.

(Latin name of this plant, because of the resemblance of the seed to the *ricinus* or sheep tick.)

* 1. **R. communis,** L. *Castor-oil plant.* Tall branching shrub; leaves large, palmately divided into 7-9 lanceolate serrate lobes, long-petiolate; flowers monoecious, in loose racemes on thick peduncles, the upper ones female; sepals 5, united towards base; no petals; male flowers with numerous stamens and branching filaments; females with 3-celled ovary and 1 ovule in each cell; styles 3, red, bifid; capsule ovoid, spiny, about 15 mm. long; seeds large, smooth, carunculate, mottled.

Gullies and waste places in settled districts. Dec.-March.—Probably indigenous in India and tropical Africa; now domiciled along the Mediterranean and in most tropical countries. The oil is extracted from the seeds.

FIG. 157.—**Ricinus communis.**

3. ADRIANA, Gaudich.

(After the celebrated French botanist Adrien de Jussieu, 1797-1853.)

Male calyx of 4-5 valvate segments; no petals or rudimentary ovary; stamens numerous, crowded, with very short filaments and linear anthers terminating in an erect appendage; female calyx of 6-8 imbricate sepals; ovary 3-celled, with 1 ovule in each cell; styles 3, bifid, free or shortly united towards base; capsule ovoid, separating into 3 2-valved fruitlets; seeds ovoid, carunculate. Erect shrubs; leaves alternate or opposite, usually with glandular stipules; flowers dioecious, the males in rather long bracteate spikes, the females in shorter spikes. A purely Australian genus.

A. Leaves petiolate, alternate.
- Leaf-lobes subacute; female spikes several-flowered... *A. glabrata* 1.
- Leaf-lobes rounded; female spikes with very few or only 1 flower ..... *A. Hookeri* 2.

A. Leaves sessile or almost so, white-tomentose below, opposite ..... *A. Klotzschii* 3.

1. **A. glabrata,** Gaudich. (1825). Shrub about 1 m. high, minutely stellate-tomentose; leaves alternate, rather stiff, ovate-lanceolate, rounded or sub-cuneate at base, 4-10 cm. long, coarsely crenate-toothed, undivided, or broader and more or less deeply 3-lobed, the middle lobe longest; petioles stout, 2-3 cm. long; male spikes long, the female ones shorter or contracted into a head; female sepals ovate-lanceolate, 6-7 mm. long; capsule 8 mm. long, tomentose.—*A. acerifolia*, Hook. (1848).

Cooper's Creek and north thereof. Spring.—Eastern States.

2. **A. Hookeri,** (F. v. M.) Muell. Arg. Shrub about 1 m. high, sparsely or densely stellate-tomentose; leaves alternate, oblong or ovate-oblong, rounded or cuneate at base, 2-7 cm. long, distantly crenate-toothed, sometimes obtusely 3-lobed, the lateral

lobes rounded and short; petioles ½-2 cm. long; male spikes rather long; female spikes usually 1-2-flowered and often with only 1 flower on a long peduncle; female sepals 6 mm. long, ovate, rather obtuse; capsule 8-9 mm. long, tomentose.

Far North and westward to Everard Range and Ooldea. Aug.-Dec.—Western Victoria and New South Wales; Central Australia; West Australia (Victoria Desert).

3. **A. Klotzschii,** (F. v. M.) Muell. Arg. Spreading shrub, from under 1 to over 3 m. high, with tomentose branchlets; leaves opposite, sessile or almost so, lanceolate or ovate-lanceolate, 4-10 cm. long, obtusely serrate, glabrous and glossy above, densely white-tomentose beneath; male spikes dense, 6-12 cm. long; styles sometimes merely notched; capsule 8-10 mm. long, pubescent.

Southern districts to at least as far north as Jamestown; Murray lands; Eyre Peninsula; South-East. Oct.-Jan. *A. quadripartita*, (Labill.) Gaudich. differs in being quite glabrous. —Victoria.

4. EREMOCARPUS, Benth.

(From Greek *erêmos*, desert; *karpos*, fruit: alluding to the habitat.)

* 1. **E. setigerus,** Benth. Small strong-scented grey annual, densely stellate-pubescent; stems bristly; leaves alternate, ovate-rhomboid, velvety, 2-3 cm. long, on petioles as long as blade; flowers monoecious, small, clustered at the nodes; male flowers with 5-6 slightly imbricate sepals and the same number of stamens, the filaments inflexed in bud; female flowers without any perianth; ovary 1-celled, with 1 ovule and 1 long filiform style; capsule small, ovoid; seed smooth, without caruncle.

Near Glenelg. Summer.—California, where it is known as the "woolly-white drought-weed."

5. EUPHORBIA, L.

(Name given to an African species by Juba, King of Mauritania, in honor of his Greek physician Euphorbus, who had discovered its medicinal uses.)

Several (8-15) male and 1 female flower enclosed in a cup-shaped involucre (sometimes called a *cyathium*) composed of 5 connate bracts and resembling a calyx, the involucre with 5 small membranous teeth alternating with 4 rarely 5 thick spreading honey-bearing glands, which have sometimes petaloid appendages along their outer margins; no sepals or petals; male flowers consisting each of a single stamen with an articulate filament and usually a membraneous bracteole at base; female flowers with a stipitate 3-celled ovary, each cell 1-ovulate; styles 3, often united at base, usually bifid at summit; capsule hanging out of the involucre over the space where the 5th gland is usually wanting, separating into 3 2-valved fruitlets; seeds with or without caruncle. Herbs containing a bitter milky juice; leaves simple, shortly petiolate or rarely sessile; involucres (flower-heads) on very short peduncles, the flowering branches dichotomous or umbellate. *Spurge.*

E. pulcherrima, Willd. (the Poinsettia), *E. heterophylla*, L. (the Mexican Fire Plant), both from America, and *E. splendens*, Bojer (the Crown of Thorns), from Madagascar, are often cultivated as ornamental plants.

A. Leaves almost always opposite, inequilateral at base, usually with small membranous stipules; flowerheads apparently solitary in the axil of the pair of leaves (really an abortive cyme).

B. Small prostrate plants; glands of involucre usually red, with toothed or entire borders; seeds without caruncle.

Hairy plant ..... *E. australis* 1.
Glabrous plant ..... *E. Drummondii* 2.

B. Erect or ascending glabrous plants.

C. Flowering branches dichotomous.

Leaves ovate-oblong; glands bordered; seeds without caruncle ..... *E. Wheeleri* 3.
Leaves linear; glands without border; seeds caruncle ..... *E. eremophila* 4.

C. Flowering branches forming an umbel of 2-5 rays; leaves large; seeds large, carunculate ..... *E. lathyris* 5.

A. Stem-leaves alternate, without stipules; flowerheads in umbels, with a whorl of floral leaves at the base of the primary rays, each ray usually forked several times and with a pair of opposite sessile floral bracts at each fork; naturalised plants.

D. Glands with a horn or point at each end so as to appear lunate.
E. Annuals; seeds angular.
F. Leaves broad, petiolate; fruitlets 2-keeled *E. peplus* 6.
F. Stem-leaves narrow, sessile; fruitlets scarcely keeled.
Bracts lanceolate ..... *E. exigua* 7.
Bracts suborbicular ..... *E. falcata* 8.
E. Perennials; stem-leaves narrow, sessile, seeds ovoid, carunculate.
Bracts denticulate; capsule smooth ..... *E. terracina* 9.
Bracts entire; capsule granular ..... *E. segetalis* 10.
D. Glands entire; rays 5; annual ..... *E. helioscopia* 11.

1. **E. australis,** Boiss. (1860). Small prostrate villous herb; leaves opposite, subsessile, ovate-oblong, 5-8 mm. long, minutely serrate; glands of the hairy involucre red, with pink 3-5-toothed appendages; capsule villous, under 2 mm. long; seeds angular, rugulose between the angles; styles bifid. (Fig. 156, C-F.). *E. erythrantha,* F. v. M. (1861).
Murray lands; Flinders Range and throughout the Far North. Most of the year.—Western New South Wales and tropical Australia.

2. **E. Drummondii,** Boiss. Small glabrous prostrate herb; leaves opposite, subsessile, ovate or ovate-oblong, 4-8 mm. long, entire or minutely serrate along summit; glands red, with a pink or white appendage, narrow and subentire or almost obsolete, or broader and irregularly toothed; capsule glabrous, under 2 mm. long; styles notched or bifid; seeds whitish, rugulose. (Fig. 156, A-B.)
From northern Yorke Peninsula to Flinders Range and Far North and West; Murray lands and north thereof; Eyre Peninsula. Most of the year. Often fatal to livestock when eaten greedily in the absence of other green feed.—Throughout Australia and Tasmania. The specific name commemorates James Drummond, 1784-1863, an indefatigable collector of botanical specimens in West Australia.

3. **E. Wheeleri,** Baill. Erect glabrous herb; leaves opposite, the pairs rather distant, ovate-oblong, serrulate or almost entire, 8-15 mm. long; glands bordered by a narrow almost entire white appendage; capsule 2½ mm. long; seeds whitish, honey-combed; styles shortly bifid.
Near Cooper's Creek and north thereof. Most of the year.—Central to tropical Australia.

4. **E. eremophila,** A. Cunn. Erect glabrous herb; leaves opposite or some of the lower ones alternate, linear or linear-lanceolate, or oblanceolate and obtuse; 1-3 cm. long, entire or serrulate; glands broad, red, without appendages; capsule 4 mm. long; seeds carunculate, minutely granular; styles notched.
Murray lands to Flinders Range and Far North; Eyre Peninsula and westward to the border. Has been found at Glen Osmond; probably introduced there. Most of the year.—Throughout Australia.

* 5. **E. lathyris,** L. *Caper Spurge.* Erect glabrous glaucous biennial; leaves decussate, sessile, oblong-lanceolate, 2-10 cm. long; umbel of 2-5 rays, with large ovate-lanceolate floral bracts; glands lunate, with short blunt horns; capsule 1-2 cm. long; seeds carunculate, reticulate.
Rare in southern districts. Nov.-Feb.—Europe; Asia.

* 6. **E. peplus,** L. *Petty Spurge.* Small glabrous annual; leaves scattered, thin, obovate, 1-2 cm. long; umbel of 2-3 repeatedly forked rays; bracts broadly ovate; glands lunate, with long acute horns; capsule 2 mm. long, each fruitlet with 2 wavy keels on back; seeds carunculate, ashy-white, with 2 broad furrows on the inner face and 4 rows, each of 3-4 dark pits, on the back.
Settled districts. Aug.-Dec.—Europe; Asia.

* 7. **E. exigua,** L. Slender glabrous annual; leaves crowded, sessile, linear, 5-10 mm. long; umbel small, of 3-5 forked rays; bracts lanceolate, widened and cordate at base; capsule 2 mm. long; seeds carunculate, grey, tuberculate.
Mt. Lofty Range; South-East. Sept.-Dec.—Europe; western Asia.

* 8. **E. falcata,** L. Glabrous glaucous erect annual; leaves oblong-cuneate to oblanceolate, acuminate, sessile, 1-2 cm. long; umbel of 2-5 repeatedly forked rays; bracts broadly ovate, acuminate-mucronate; capsule 2½ mm. long; seeds without caruncle, ashy-grey, furrowed transversely.
Near Adelaide. Sept.-May.—Mediterranean region.

* 9. **E. terracina,** L. Glabrous, erect, or ascending perennial; leaves sessile, linear-lanceolate, 1½-3 cm. long, denticulate towards summit; umbel of 4-5 rays, repeatedly forked; bracts ovate-rhomboidal, mucronate, denticulate; glands greenish, lunate with very long slender horns; capsule 4 mm. long, smooth; seeds carunculate, grey, smooth.

Brighton; Strathalbyn; Yorke Peninsula. July-Oct.—Mediterranean region.

* 10. **E. segetalis,** L. Resembles the preceding, but the umbel is usually as long or longer than the stem, while in *E. terracina* it is shorter than the stem; leaves glaucous, spreading, linear-lanceolate, 2-4 cm. long; floral leaves at base of umbel ovate or rhomboidal; umbel of 5 repeatedly forked rays; bracts entire, broader than long, almost semi-orbicular, mucronate; glands yellow, lunate, with rather long horns; capsule 4 mm. long, finely granular down the back of each fruitlet; seeds carunculate, ashy-white, dark-pitted all over.

Adelaide plains near Mt. Lofty Range. Most of the year.—Mediterranean region.

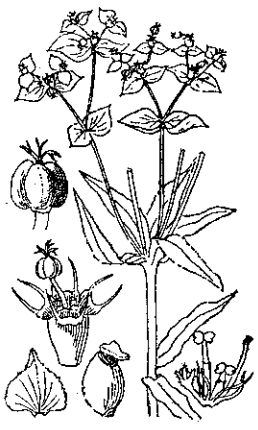

FIG. 158.—**Euphorbia terracina.**

* 11. **E. helioscopia,** L. *Sun Spurge.* Erect, almost glabrous, annual; leaves obovate-cuneate, 1-4 cm. long, serrulate in upper part; floral leaves broader; umbel of 5 long rays, which are first 3-forked, then 2-forked; bracts obovate, serrulate, one larger than the other; glands entire, yellow; capsule smooth, 3-5 mm. long; seeds carunculate, ovoid, brown, pitted-reticulate.

Near Adelaide; Port Lincoln; not common. Aug.-Dec.—Europe; Asia.

6. PORANTHERA, Rudge.

(From Greek *poros*, pore; *anthérê*, anther.)

Calyx with 5 rarely 3 petaloid imbricate segments; petals 5, rarely 3, minute, with a small gland at base of each; stamens 5, rarely 3; anthers with 4 cells opening in 4 terminal pores or finally confluent into 2; rudimentary ovary 3-partite or absent; ovary of female flowers 3-celled, with two ovules in each cell; hypogynous disk with twice as many lobes as there are petals; styles 3, spreading, deeply 2-branched or merely notched; capsule depressed globular, opening in 6 crustaceous valves; seeds trigonous; embryo terete, curved. Herbs or undershrubs; leaves entire, alternate or opposite, with small scarious stipules; flowers small, white, monoecious, in short head-like racemes, subtended by leafy bracts and usually forming broad terminal corymbs; pedicels terete, white.

A. Leaves flat, petiolate, often opposite; annuals.
Flower-parts 5 ..... *P. microphylla* 1.
Flower-parts 3 ..... *P. triandra* 2.

A. Leaves revolute, sessile, alternate; perennial; flower-parts 5 ..... *P. ericoides* 3.

1. **P. microphylla,** Brongn. Small slender glabrous annual; leaves mostly alternate, spathulate, flat, 5-10 mm. long, including the petiole; stipules lanceolate; calyx-segments about 1½ mm. long; pedicels to 5 mm. long; stamens 5; capsule about 2 mm. diam.; styles bipartite; seeds white-granular. (Fig. 156, L-N.)

Southern districts; Murray lands; South-East. Spring and summer.—Temperate Australia.

Var. *diffusa,* Muell. Arg. Stems weak and procumbent; lower leaves opposite and often most of the upper ones also.—Southern districts; South-East.—Victoria; Tasmania.

2. **P. triandra,** J. M. Black. Resembles the preceding variety, but is a still smaller plant; stems 1-3 cm. long; leaves almost all opposite, spathulate; calyx-segments, petals and stamens 3, the segments and petals rarely 4 in the female flower, scarcely 1 mm. long; styles obtuse, notched; seeds brown, granular.

Yeelanna, E.P.; Yorke Peninsula. Spring and summer.

PLATE 23 (1), page 260.—1, male flower. 2, female flower. 3, female flower viewed from above after fruit has fallen, showing the 6-lobed hypogynous disk and 3 petals and calyx-segments. 4, female flower and pedicel after fruit has fallen. 5, embryo. 6, stamen.

3. **P. ericoides,** Klotzsch. Dwarf, erect, glabrous undershrub; leaves alternate, crowded, linear or oblanceolate, subacute, 1-2 cm. long, with revolute margin; stipules lanceolate, entire; flowers at first apparently in small umbels on pedicels 2-3 mm. long; calyx-segments 2 mm. long, obovate; stamens 5; styles bipartite; capsule 2-3 mm. diam.

Myponga to Encounter Bay; Kangaroo Island; near Pt. Lincoln. Oct.-Jan.—West Australia.

7. MICRANTHEUM, Desf.

(From Greek *mikros*, small; *anthos*, flower.)

Calyx-segments 4 or 6, imbricate, petaloid, the inner ones of the male flower concave and larger than the outer; petals and glands, none; stamens 3 or 4 (in our species); rudimentary ovary present in the male flower; ovary of female flower 2-3-celled, with 2 ovules in each cell; styles 2-3, stigmatic along the inner face, undivided; seeds smooth, oblong, carunculate; embryo straight. Heath-like shrubs; leaves entire, coriaceous, flat, often clustered, very shortly petiolate; stipules none; flowers monoecious, small, pink, solitary, axillary, the males on short peduncles, the females sessile.

Calyx-segments 6; stamens 3 ..... *M. Tatei* 1.
Calyx-segments and stamens 4 ..... *M. demissum* 2.

1. **M. Tatei,** (F. v. M.) comb. nov. Dwarf shrub, the branchlets covered with minute spreading hairs; leaves alternate, crowded, ovate-oblong, 3-4 mm. long, glabrous, recurved in upper part; male calyx-segments 6, obovate-oblong, the 3 inner ones 1 mm. long, the outer smaller; stamens 3, the filaments free except at the summit, which is surrounded by the anthers in a ring; rudimentary ovary of 3 filiform segments; female calyx-segments 6, ovate, acute, 1½ mm. long; styles 2-3, subulate, recurved; capsule ovoid, about 5 mm. long; seeds with large caruncle.—*Phyllanthus Tatei,* F. v. M.

Mt. Compass and towards Encounter Bay; Bundaleer Range. Sept.-Oct.

2. **M. demissum,** F. v. M. Dwarf shrub, the branchlets with minute spreading hairs; leaves 2-5, usually 3, in a half-whorl at the nodes, ovate-elliptical, flat, glabrous, 5-8 mm. long, with thickened margins; male calyx-segments 4, suborbicular, the inner 2 1½ mm. long; stamens 4, quite free; rudimentary ovary shortly 4-lobed; female calyx-segments 4, lanceolate, nearly 3 mm. long; ovary 2-celled, with 2 short broad divergent obtuse styles; capsule ovoid-tetragonous, 6-7 mm. long, glabrous; seeds golden-brown, 4 mm. long, with a raised line down the inner face. (Plate 10: 1, page 164.)

Near Mt. Compass and Square Waterhole (Mount Lofty Range). Sept.-Nov.

Var. *microphyllum,* Grüning. Leaves mostly ovate, 3 mm. long, hairy; capsule hairy.—Snug Cove, Kangaroo Island.

8. PSEUDANTHUS, Sieb.

(From Greek *pseudos*, false; *anthos*, flower: because in one species, *P. pimeleoides,* Sieb., the small flowers clustered at the summit of the branchlets resemble one showy flower.)

1. **P. micranthus,** Benth. Dwarf rigid shrub, the branchlets minutely pubescent; leaves glabrous, orbicular or ovate, coriaceous, 2-5 mm. long, with minute stipules; flowers small, monoecious, the males usually solitary in the axils, on turbinate peduncles ½-1 mm. long; male calyx of 6 subequal orbicular segments about 1 mm. long; stamens 3, free, alternating with the rounded lobes of a minute rudimentary ovary; female calyx of 5 segments, subsessile; ovary 2-3-celled, each cell at first 2-ovulate; styles 2-3, divergent, undivided; capsule obliquely ovoid, 4-5 mm. long, 1-celled and 1-seeded by abortion; seed carunculate.

Near Encounter Bay. I have not seen the type, which is recorded from "near Adelaide," nor any fruits. The flowers have sometimes small bracts on the peduncle. The whole plant resembles closely *Micrantheum Tatei.*

9. MONOTAXIS, Brongn.

(From Greek *monos*, one; *taxis*, row: the stamens are arranged in one row.)

1. **M. luteiflora,** F. v. M. Small glabrous shrub; leaves alternate, lanceolate but rather obtuse, flat, 1½-4 cm. long, narrowed into a conspicuous petiole; stipules deltoid; flowers small, monoecious, yellow, shortly pedicellate in sessile or pedunculate axillary clusters consisting of 1-4 females and 6-15 males, with small bracts at base of pedicel: male sepals 4, valvate, lanceolate, 2 mm. long; petals 4, half as long, orbicular-cordate, shortly clawed; stamens 8, free; anther-cells distinct, conjoined only at the summit by a thick curved connective, divergent after opening; no rudimentary ovary, but 4 small glands of the disk alternating with petals; female sepals 4-5, ovate, imbricate, 2 mm. long; no petals; ovary 3-celled, with 1 ovule in each cell; capsule globular, exceeding calyx; styles 3, bifid, fringed; seeds carunculate, black.

Near Ferdinand River (south of Musgrave Range).—West Australia.

10. AMPEREA, Adr. Juss.

(After Jean-Jacques-Antoine Ampère, French historian, 1800-64.)

1. **A. spartioides,** Brongn. Small glabrous undershub, with erect greyish triquetrous or compressed stems, almost leafless when flowering, the few lower leaves small and cuneate-oblong, the upper ones linear-lanceolate; stipules small, fringed; flowers monoecious or almost dioecious, subsessile, few in small sessile clusters at the nodes, surrounded by small broad brown bracts, the females often solitary among the males; male calyx about 2 mm. long, 4-5-lobed; petals none; stamens 6-9, free, the anther-cells distinct and divergent, without rudimentary ovary; female calyx 5-lobed; ovary 3-celled, with 1 ovule in each cell; styles 3, shortly bifid; capsule ovoid, 4 mm. long, with 6 small erect teeth near the summit; seed oblong, smooth, carunculate.

Tatiara to South-East, in sandy soil. Most of the year.—Eastern States.

11. BEYERIA, Miq.

(After a Dutch cryptogamist called Beyer.)

Calyx in both sexes of 5, rarely 4, ovate concave imbricate segments; petals minute or usually absent; stamens numerous, with very short filaments, crowded on a hemispherical receptacle, without rudimentary ovary; connective broad and entire or minutely notched at summit (in our species); ovary 3-celled, with 1 ovule in each cell; stigma sessile, entire or shortly 3-lobed; capsule ovoid, containing 3 seeds, or fewer by abortion, on an erect angular peduncle dilated under the fruit; seeds oblong, smooth, shining, carunculate. Viscid shrubs with alternate subsessile exstipulate leaves; flowers dioecious, small, axillary, the males 1-3, the females solitary. A purely Australian genus.

A. Midrib of leaves narrow; leaves 1-4 cm. long.
Lower face of leaf glabrous ..... *B. opaca* 1.
Lower face of leaf covered with a dense white felt .. *B. Leschenaultii* 2.

A. Midrib of leaf broad and concealing the lower face; leaves 5 mm. long ..... *B. subtecta* 3.

1. **B. opaca,** F. v. M. Small glabrous viscid shrub; leaves oblong-cuneate, flat or with slightly recurved thickened margins, 1-1½ cm. long, 2-3 mm. broad, rounded at summit, glossy green above, paler beneath; peduncles about as long as calyx; anthers a little longer than broad, adnate to a broad entire connective; male flowers drooping.

Murray lands. Sept.-Nov.—Western Victoria.

Var. *latifolia,* J. M. Black. Leaves 4-7 mm. broad, very obtuse at summit, sometimes almost notched; male flowers not seen; capsule ovoid, 6 mm. long on a peduncle of 2-3 mm.

Near Ooldea.

2. **B. Leschenaultii,** (DC.) Baill. Viscid shrub 50 cm. to 1½ m. high; leaves oblong-linear or linear, obtuse, truncate or rounded at summit, 1-3 cm. long, 2-4 mm. broad, glossy green above, white-tomentose beneath except on the narrow midrib, the margins more or less recurved; male calyx glabrous, viscid; anthers rather longer than broad; capsule ovoid or globular, 6-7 mm. long, on a peduncle 4-8 mm. long. (Fig. 156, G-H.)—*B. opaca,* Benth. partly.

Southern districts to Flinders Range, and round the coastline to Fowler's Bay; Yorke and Eyre Peninsulas; Kangaroo Island; Murray lands. Sept.-Nov.—Victoria; West Australia.

Var. *rosmarinoides,* Baill. Leaves narrow-linear, 2-4 cm. long, 1½-2 mm. broad, obtuse, truncate or notched at summit, with reflexed margins; anthers as broad as long; capsules ovoid or globular, 6-8 mm. long, on peduncles 2-3 mm. long.—*B. opaca* var. *linearis,* Benth.

Mount Lofty Range; Murray lands.—Victoria; West Australia.

Var. *Drummondii,* Grüning. Leaves very viscid, narrow-linear, 1-1½ cm. long, 1 mm. broad, obtuse or truncate, with closely revolute margins; anthers rather longer than broad, with a shorter connective and not appressed to the filaments as in the preceding forms; capsule subglobular, on peduncle of about 4 mm.—*B. Drummondii,* Muell. Arg.

Alawoona (Murray scrub).—West Australia.

Var. *latifolia,* Grüning. Leaves oblong-lanceolate, subacute or subobtuse, flat or the margins slightly recurved, from less than 1 to 3 cm. long, 3-7 mm. broad, the white-tomentose undersurface very conspicuous; capsule ovoid, 7-8 mm. long, on peduncle 4-5 mm. long.—*B. viscosa,* F. v. M. partly, not of Miq.

Along the coast, especially in the South-East. Inland from the coast this variety verges towards the type.—Temperate Australia.

3. **B. subtecta,** J. M. Black. Small rigid very viscid shrub; leaves rigid, linear, obtuse, often clustered at the nodes, 4-6 mm. long, about 1 mm. broad, the flat midrib as broad as the rest of the leaf, and, together with the recurved margins, completely concealing the

narrow tomentose undersurface; male flowers small, on peduncles about 4 mm. long; anthers smaller than in the other species, ½ mm. long, ¾ mm. broad, adnate to the broad slightly notched connective; female flowers unknown.

Cygnet River, Kangaroo Island. Oct.-Nov.

B. uncinata, Baill. (*B. viscosa* var. *uncinata*, F. v. M.) consists of a leafy branch and some detached flowers preserved in the Victorian National Herbarium. The specimens were examined by G. Grüning, when revising *Beyeria* for Engler's Pflanzenreich. He discovered that the supposed capsule was the bud of a 5-lobed perianth, with 5 stamens alternate with the lobes, and removed the plant to *Rhamnaceae* as *Cryptandra uncinata*, (F. v. M.) Grüning. The type came from the Murray scrub in South Australia, but the plant has not been re-discovered.

12. BERTYA, Planch.

(After Count Léonce de Lambertye, French botanist and horticulturist of the 19th century.)

Calyx in both sexes of 5 petaloid ovate or oblong imbricate segments; petals none; stamens numerous, the filaments united in a staminal column which is naked in the lower part; ovary 3-celled, with 1 ovule in each cell; styles 3, branched; capsule much longer than calyx, usually 1-celled and 1-seeded by abortion; seed oblong, smooth, carunculate. Stellate-tomentose shrubs, with alternate exstipulate shortly petiolate leaves; flowers small, monoecious or subdioecious, axillary, solitary, with a few calyx-like bracts at base.

Leaves linear ..... *B. Mitchellii* 1.
Leaves ovate ..... *B. rotundifolia* 2.

1. **B. Mitchellii,** (Sond.) Muell. Arg. Erect shrub, hoary with a stellate tomentum; leaves linear, rigid, 1-2½ cm. long, becoming glabrous above, with revolute margins almost concealing the tomentose undersurface; male flowers subsessile, with conspicuous bracts; female flowers sessile; styles divided to base into 2 or 3 branches; capsule oblong-conical, 6-8 mm. long. (Fig. 156, 1-K.)

Halbury scrub to Port Broughton; Murray lands; 90-Mile Desert. Aug.-Sept.—Western Victoria and New South Wales.

2. **B. rotundifolia,** F. v. M. Low shrub, with densely tomentose branches; leaves ovate or orbicular, with recurved margins, 5-10 mm. long, becoming glabrous above, concave and white-tomentose below; flowers sessile with inconspicuous bracts; capsule ovoid, 6 mm. long; styles short, 2-3-fid.

Kangaroo Island. Aug.-Sept.