HANDBOOKS to the FLORA OF SOUTH AUSTRALIA

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

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

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

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

FLORA

OF

SOUTH AUSTRALIA.

Part IV.

Bignoniaceae-Compositae.

By J. M. BLACK.

WITH ILLUSTRATIONS BY THE AUTHOR.

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

Price: SEVEN SHILLINGS.

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Part 1, pp. 1-154, published 1922.
Part 2, pp. 155-358, published 1924.
Part 3, pp. 359-514, published 1926.
Part 4, pp. 515-746, published 1929.

FAMILY 101.—**BIGNONIACEAE.**

Flowers irregular, bisexual; corolla with 5 imbricate lobes, often 2-lipped; stamens usually 4, in pairs, inserted in the tube, the 5th stamen mostly reduced to a small staminode; anthers 2-celled; ovary superior, 2-celled, with 2 septal placentas; ovules several or numerous; style with 2 short stigmatic lobes; fruit a capsule much longer than calyx, opening from the summit in 2 valves; seeds winged, without albumen; radicle close to hilum. Shrubs or woody climbers with exstipulate usually opposite and compound leaves.

Bignonia, which gives its name to the family, is an American genus of climbers with handsome tubular flowers, differing principally from *Tecoma* in the septifragal dehiscence of the capsule. *Jacaranda ovalifolia*, R. Br. (*J. mimosifolia*, D. Don), a popular ornamental tree from South America, with panicles of blue flowers, belongs to this family.

1. TECOMA, Juss.

(A contraction of *tecomaxochitl*, the name of a Mexican species.)

1. **T. doratoxylon,** J. M. Black. *Spearwood Bush.* Glabrous shrub, 3-5 m. high, the branches not twining; leaves imparipinnate, opposite; leaflets 5-11, narrow-lanceolate, 2-5 cm. long, 3-8 mm. broad, entire, the rhachis grooved; flowers in racemes, forming terminal leafy panicles; calyx campanulate, 4-5 mm. long, with 5 short obtuse lobes; corolla funnel-shaped, about 25 m. long, cream-colored, glabrous on the tube, which has reddish-brown stripes, minutely pubescent inside and outside the limb, which is slightly 2-lipped and about ¼ the length of the tube, the upper lip of 2 shorter rounded erect lobes which enclose the lower ones in bud, the lower lip of 3 broader spreading lobes; stamens 4, enclosed, with 1 minute staminode; anther-cells finally divaricate; style with 2 short vate stigmatic lobes; ovary ovoid, with the numerous ovules in several rows on each placenta; the dissepiment at right angles to the valves; fruit a long pod-like capsule opening loculicidally in 2 boat-shaped valves, separating entirely from the dissepiment, which is covered by the numerous imbricate flat broadly winged seeds.—*T. australis*, Benth. partly, not of R. Br.

Alberga River, westward to Musgrave Range. Chiefly winter. The natives are said to make spears from the long tough straight cane-like stems. Usually grows on rocky ranges.—MacDonnell Range and elsewhere in Central Australia.

Nearest to *T. Oxleyi*, A. Cunn., which has similar flowers, but the stems are twining and the leaflets linear, 1½-2½ cm. long, 2 mm. broad; capsule about 2 cm. long, 5 mm. broad. It grows in the interior of New South Wales and as far west as the Bulloo watershed, Queensland, so that it may occur in our State.

Two other twining species from Eastern Australia are much cultivated on trellises:—

T. pandorana (Andr.) Skeels (1913). *Wonga Vine.* Leaflets usually 5, ovate-acuminate or ovate-lanceolate, 2-5 cm. long, glossy above; corolla cream-colored, 15-20 mm. long, with purplish spots.—*Bignonia pandorana*, Andr. (1800); *Tecoma australis*, R. Br. (1810); *Pandorea australis* (R. Br.) Spach.

T. jasminoides, Lindl. Leaflets mostly 5-7, ovate-lanceolate, glossy above, 3-5 cm. long; corolla 4-5 cm. long, the tube almost white outside, purplish inside, dilated upwards, the limb broad, spreading, 5-lobed, pale-pink.

FAMILY 102.—**PEDALIACEAE.**

Flowers bisexual, irregular; corolla 5-lobed, more or less 2-lipped; stamens 4, in pairs, with a minute staminode; anther-cells parallel; ovary superior, of 2-4 carpels, but finally divided by secondary dissepiments into twice as many cells; ovules anatropous, several in each cell on axile placentas or rarely solitary and almost basal; style filiform, with as many stigmatic lobes as carpels; fruit a nut or capsule; seeds with scanty albumen; embryo straight, with very short radicle. Glandular herbs, chiefly tropical, with opposite exstipulate leaves.

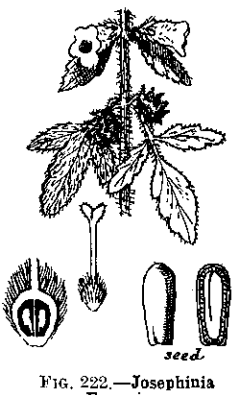

FIG. 222.—**Josephinia Eugeniae.**

1. JOSEPHINIA, Vent.

(Named by Ventenat in 1804 after the Empress Joséphine.)

1. **J. Eugeniae,** F. v. M. Usually erect herb, 20-60 cm. high, the stems and branches villous with spreading jointed hairs; leaves oblong or ovate-oblong, obtuse, distantly toothed, petiolate, 2-6 cm. long, becoming glabrous above, beset beneath with jointed hairs and subsessile 4-celled glands, the lower leaves on longer petioles and often 3-lobed or of 3 distinct leaflets; flowers solitary on short peduncles in the upper axils; calyx villous, about 4 mm. long, of 5 lanceolate obtuse segments, all equal or the upper one shorter; corolla about 10 mm. long, pink, tubular, hairy outside, gibbous at

base on the upper side, the lobes short, rounded, the lowest rather larger; connective tipped by a stipitate gland; ovary 4-celled, with 1 erect ovule in each cell; stigmatic lobes 2, ciliolate; nut woody, indehiscent, ovoid-globular, about 10 mm. diam., covered with short villous spines; seeds 4, erect, oblong; radicle inferior.

Stevenson and Macumba Rivers; Minnie Downs, near Diamentina River (all Far North). Mostly winter.—Queensland; Northern Territory. The specific name was given by Mueller in 1857 in honor of the Empress Eugénie.

FAMILY 102A.—MARTYNIACEAE.

Differs from *Pedaliaceae* in the ovary at first 1-celled, with 2 intruding parietal placentas, each terminating in a broad plate at right angles to the placenta, which thus assumes a T-shape in cross section; the plates finally meet more or less in the centre and form the 4-celled drupaceous horned fruit; differs also in the divaricate anther-cells.

1. MARTYNIA (Houst.) L.

(After John Martyn, 1699-1768, professor of botany at Cambridge and author of several botanical works).

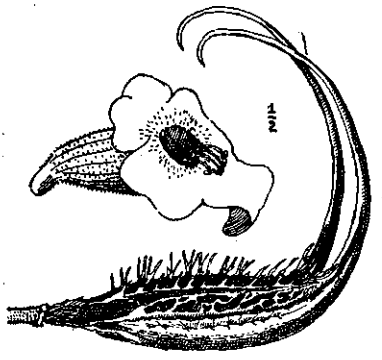

FIG. 223.—**Martynia Louisiana.**

*1. **M. Louisiana,** Mill, (1768). Stout procumbent viscid annual, with spreading mostly glandular hairs; leaves opposite, on long stout petioles, orbicular or broad-ovate, cordate, 5-20 cm. diam.; flowers pedicellate, in short terminal racemes; calyx 15 mm. long, with 5 rounded unequal lobes, and slit to base on lower side; corolla pale-lilac, with a swelling tube over 3 cm. long and a broad spreading often purple-spotted limb, the 2 upper lobes much smaller than the 3 lower; stamens 4, in pairs; ovary superior, with numerous ovules on parietal placentas; style with 2 flat stigmatic lobes at summit; capsule oblong, tapering into a long incurved beak, in all 12-18 cm. long, the fleshy exocarp seceding and leaving the woody endocarp, which opens more or less from the summit in 2 2-celled valves, each crested along the upper margin and terminating in a long curved woody beak; seeds large, black tuberculate.—*M. proboscidea,* Glox. (1785); *Proboscidea Jussieui,* Steud.

Near Snowtown; Lyndoch. Summer.—Louisiana. Called "Unicorn Plant" in the United States.

FAMILY 103.—OROBANCHACEAE.

Flowers irregular, bisexual; sepals 4 or 5, united in a calyx or apparently reduced to 2 distinct often toothed sepals; corolla tubular, curved, 2-lipped, more or less 5-lobed; stamens 4, in pairs, inserted in the corolla-tube; anther-cells 2, mucronate at base; ovary superior, 1-celled, with 2-4 intruding parietal placentas; ovules numerous, anatropous; style simple, with a capitate or 2-lobed stigma; fruit a 1-celled capsule opening loculicidally in 2 valves; seeds minute, albuminous. Herbs parasitic on the roots of other plants and not green; leaves reduced to alternate scales; flowers in terminal bracteate spikes or racemes.

1. OROBANCHE (Tourn.), L.

(Greco-Latin name of the dodder and probably also applied to the broom-rape: from Greek *orobos,* vetch; *ankhein,* to strangle).

1. **O. australiana,** F. v. M. *Australian Broom-rape.* Stem stout, simple, erect, brownish, 20-40 cm. high, glandular-pubescent; scales ovate to lanceolate, acute, 10-15 mm. long; flowers in a rather dense spike, each in the axil of a bract somewhat shorter than flower; calyx reduced to 2 ovate-acuminate sepals (with sometimes a minute third one), keeled in upper part, about 5-nerved, entire or toothed on 1 margin, 8-10 mm. long and more than half as long as corolla-tube; corolla 18-20 mm. long, purple, pubescent, swollen below the

FIG 224.—**Orobanche australiana.**

middle of tube, where the stamens are inserted, contracted above the middle, the limb deflexed, the upper lip 2-lobed, the lower with 3 rounded spreading lobes; stigma 2-lobed, deflexed, whitish or yellowish; capsule within the withered corolla-tube, ovoid-oblong, opening in 2 valves.—*O. cernua*, Loefl. var. *australiana*, Beck.

Usually in sandy soil along the coast near Adelaide and on Yorke and Eyre Peninsulas; also recorded from creeks in the neighborhood of Lake Torrens. Sept.-Dec.—Temperate Australia.

**O. Mutelii*, Schulz, a smaller and more slender Mediterranean plant, has been founp growing on sandhills near Glenelg. The calyx is campanulate, with 5 lanceolate lobes about as long as tube, and 2 narrow bracteoles at base, as well as the floral bract; corolla lilac, about 20 mm. long, with 2 protuberances on the lower lip; stamens inserted much below middle of tube; stem simple or branched near base.

FAMILY 104.—LENTIBULARIACEAE.

Flowers irregular, bisexual; calyx persistent, of 2 or 4 sepals; corolla 2-lipped, the lower lip usually prolonged at base into a spur; stamens 2, connivent, inserted at base of upper lip of corolla, enclosed; anthers 1-celled; ovary superior, 1-celled, with numerous anatropous ovules attached to a free central placenta; style very short; stigma broadly 2-lipped, the lips somewhat unequal; fruit a capsule, with many small exalbuminous seeds. Herbs growing in water or wet places; leaves radical; flowers solitary or racemose at the summit of erect scapes.

Sepals 2	UTRICULARIA 1.
Sepals 4	POLYPOMPHOLYX 2.

1. UTRICULARIA, L.

(From Latin *utriculus*, a small leathern bottle: alluding to the minute bladders).

Sepals 2, spreading, almost equal; corolla with scarcely any tube, the upper lip erect, obtuse or notched, the lower one much longer and broader, spreading, more or less closing the throat by a protruding palate and prolonged downwards into a spur; capsule globular, membranous, about as long as sepals, opening irregularly or in 2 valves. Slender glabrous herbs growing near the edge of marshes; leaves radical, caducous, a few green and flat, the others filiform, root-like, simple or almost so, bearing a few minute stipitate bladders. Flowers on usually simple scapes, with 1-3 small bracts at the base of each pedicel. The bladders are subglobular, with an aperture which is closed by a sort of clack-valve opening inwards, thus permitting the entry but not the exit of water-animalcules; these probably serve as food.

Flowers opposite, whorled or 1 terminal; spur much shorter than lower lip	*U. dichotoma* 1.
Flowers distant, solitary; spur about as long as lower lip	*U. lateriflora* 2.

1. **U. dichotoma,** Labill. Scape 5-30 cm. long; green leaves spathulate or oblong-cuneate, 5-15 mm. long; flowers in pairs or in whorls of 3-4 at or near summit of scape or sometimes solitary and terminal; pedicels filiform, 3-8 mm. long; bracts narrow, produced downwards below their insertion in a very short blunt spur; sepals suborbicular, purplish, entire or notched, about 3 mm. long; corolla purple or lilac, rarely white, the upper lip longer than sepals, entire or obtusely notched; the lower lip 12-20 mm. broad, flat, or the margins recurved, entire or obscurely sinuate, the palate yellow or white, striate; spur obtuse, 3-4 mm. long, spreading or decurved, much shorter than lower lip.

Southern districts to Flinders Range; Kangaroo Island; Bordertown; South-East. Oct.-March.—Victoria; New South Wales; Tasmania.

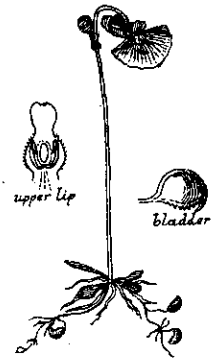

FIG. 225. **Utricularia dichotoma.**

2. **U. lateriflora,** R. Br. Scape 3-12 cm. long, with a few empty distant bracts along the lower part; leaves rarely present at flowering time, the green ones short, spathulate; flowers few, solitaty and distant, on pedicels about 1 mm. long and scarcely longer than the bracts, which are not spurred at base; sepals about 2 mm. long; corolla purple or lilac, the obtuse upper lip shortly exceeding sepals; lower lip twice as long and broadly truncate, the margins recurved; spur conical, pointed forward, about as long as lower lip.

Square Waterhole; Inman Valley (Mt. Lofty Range); South-East. Oct.-March.—Victoria; New South Wales; Tasmania.

2. POLYPOMPHOLYX, Lehm.

(From Greek *polys*, many ; *pompholyx*, a bubble : alluding to the small bladders.)

Only differs from *Utricularia* in having 4 sepals, 2 outer and 2 inner, arranged decussately. The genus contains only 2 species, both Australian, whereas *Utricularia* is almost cosmopolitan.

1. **P. tenella** (R. Br.) Lehm. Scape filiform, 3-7 cm. high ; green leaves linear-spathulate, 3-6 mm. long ; flowers 2 distant or 1 terminal, on pedicels 1½-4 mm. long ; 2 outer sepals ovate, about 2 mm. long, the 2 inner smaller and orbicular ; corolla pink, delicate, the upper lip bipartite, about ⅓ as long as the lower lip, which is about 6 mm. long and obtusely 2-3-partite ; palate yellow or white ; spur nearly as long as lower lip, pointed forward.

In swamps or on damp flats : Mt. Lofty Range ; Kangaroo Island; South-East. Oct.-Jan.—Victoria ; Tasmania ; West Australia.

FAMILY 105.—ACANTHACEAE.

Flowers irregular, bisexual ; calyx of 4 or 5 sepals ; corolla 5-lobed, often 2-lipped ; stamens 2, or 4 in pairs ; ovary superior, 2-celled, with 2 or more ovules in each cell on septal placentas ; style simple, filiform ; stigma usually entire ; fruit a capsule opening loculicidally in 2 valves, which bear the dissepiment along their centre ; seeds compressed, without albumen, subtended by hooked processes of the funicle (*jaculators* or *retinacula*) which serve to scatter the seeds ; embryo curved. Herbs or shrubs with opposite simple exstipulate leaves ; flowers usually with 2 bracteoles at base of calyx.

The family takes its name from the genus *Acanthus*, of which one species (*A. ilicifolius*, L.) occurs in tropical Australia and Asia. Two or three Mediterranean species are grown in gardens for their handsome foliage.

1. JUSTICIA (Houst.) L.

(After James Justice, who published some works on gardening at Edinburgh about the middle of the 18th century.)

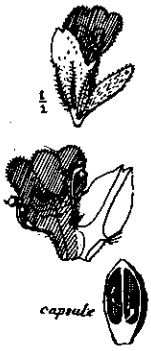

FIG. 226.—**Justicia procumbens.**

1. **J. procumbens**, L. Procumbent or erect perennial herb, 10-30 cm. high, more or less scabrous with short curved hairs ; leaves ovate-oblong, oblong, or lanceolate, very shortly petiolate, 1-3 cm. long, rarely longer ; flowers solitary in axil of bract, forming a rather dense terminal spike 2-7 cm. long, sometimes interrupted towards base ; bracts lanceolate or oblanceolate, about as long as calyx, or the lower ones much longer and leafy ; bracteoles narrow-lanceolate, often shorter than calyx ; sepals 4, linear-lanceolate, 5-7 mm. long, with rarely a minute fifth one, all (like bracts and bracteoles) ciliolate ; corolla pubescent, 10-15 mm. long, the tube as long as calyx ; upper lip white, shorter than lower, notched and with 2 parallel lines decurrent inside, diverging towards base of tube and ending in hair-tufts which represent 2 missing stamens ; lower lip red, transversely veined in the throat, with 3 rounded imbricate lobes ; stamens 2 ; anther-cells divergent, mucronate, one attached higher up than the other ; ovules 2 in each cell of the hairy ovary ; capsule linear-oblong, solid towards base, about 7 mm. long ; seeds tuberculate ; jaculators obtuse.

Flinders Range to Far North. Winter and spring.—New South Wales ; central and tropical Australia ; tropical Asia and Africa.

J. Kempeana, F. v. M. grows in the MacDonnell Range and in West Australia and may therefore be found in our North-West. The leaves are orbicular or ovate, toothed, 5-15 mm. long ; flowers usually solitary, axillary, subsessile ; bracteoles small, leaflike ; sepals 5, lanceolate, swollen at base ; corolla shaped as in the preceding ; ovary glabrous.

FAMILY 106.—MYOPORACEAE.

Flowers bisexual, irregular or nearly regular ; calyx persistent, usually 5-lobed or 5-sect ; corolla caducous, with 4 or 5 almost equal imbricate lobes or sometimes 2-lipped, the upper lip or upper lobes outside the others in bud ; stamens usually 4, inserted in the corolla-tube and alternate with its lower lobes ; anther-cells finally confluent at summit ; ovary superior, normally of 2 carpels, 2-celled, usually becoming 4-celled by 2 intruding septal placentas (spurious dissepiments), with 2 or several pendulous anatropous ovules in each of the 2 cells, or sometimes the cells 2-5, distinct, 1-ovulate ; micropyle superior ; style simple ; stigma entire or faintly notched ; fruit a drupe, sometimes almost dry ; seeds with scanty albumen, straight embryo and superior radicle. Shrubs or small trees with exstipulate simple usually alternate leaves ; flowers axillary, solitary or clustered, without bracteoles.

All the species of *Myoporum* and *Eremophila* known in the year 1886 were figured by R. Graff in Mueller's "Illustrations of the Myoporinous plants of Australia."

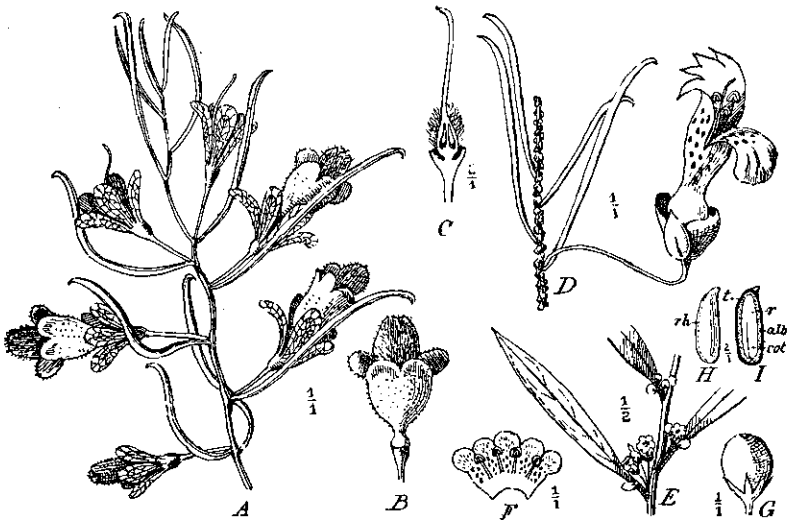

FIG. 227.—**Myoporaceae.** A-C, *Eremophila Stuartii*: A, flowering branch; B, corolla; C, vertical section of pistil. D, flowering branch of *E. alternifolia*. E-I, *Myoporum montanum*: E, flowering branch; F, corolla spread open; G, drupe and calyx; H, seed; I, vertical section of seed; *rh*, rhaphe; *t*, testa; *alb*, albumen; *r*, radicle; *cot*, cotyledons.

Corolla regular, with a short tube	MYOPORUM 1.
Corolla irregular, with a long tube.....	EREMOPHILA 2.

1. MYOPORUM, Banks et Sol.

(From Greek *myô*, I close; *poros*, pore: alluding to the closed appearance of the leaf-glands).

Calyx of 5, rarely 4 or 6 segments, more or less imbricate at base; corolla almost campanulate, with 4, rarely 5 or 6, spreading almost equal lobes; stamens 4, or rarely 5, nearly equal; ovary 2-5-celled; ovules 1 in each cell (except in *M. deserti*, which has 2 cells, each divided by a spurious dissepiment and containing 2 ovules); fruit a small drupe, longer than the calyx. Shrubs or small trees; leaves alternate (in our species), flat; flowers small, usually clustered in the axils.

Most of the species are Australian, with 1 or 2 in New Zealand and the Pacific Islands.

A. Erect shrubs over 1 m. high or small trees.	
B. Drupe globular or ovoid, mostly 3-4-celled.	
C. Leaves entire.	
Drupe purple; stamens 4	*M. montanum* 1.
Drupe yellowish; stamens usually 5	*M. deserti* 2.
C. Leaves serrulate or toothed.	
Leaves thin, serrulate	*M. viscosum* 2.
Leaves thick, usually bluntly toothed	*M. insulare* 4.
B. Drupe flattened, acute, 2-celled; leaves distantly and minutely toothed	*M. platycarpum* 5.
A. Dwarf, often prostrate shrubs; leaves thick, often obscurely and bluntly toothed.	
D. Leaves 3-6 times as long as broad, spreading-erect, narrowed towards base.	
Corolla bearded inside, the lobes as long as tube; drupe globular	*M. parvifolium* 6.
Corolla glabrous inside, the lobes half as long as tube; drupe ovoid oblong	*M. brevipes* 7.
D. Leaves about twice as long as broad, deflexed, broad-based, sessile.....	*M. refractum* 8.

1. **M. montanum,** R. Br. (1810). *Native Myrtle.* Handsome erect shrub 1-3 m. high; leaves alternate, lanceolate, very acute, 3-10 cm. long, 5-10 mm. broad, narrowed into a short petiole; peduncles 2-5, rarely solitary, in axillary clusters, 6-10 mm. long; calyx,

3-4 mm. long, the segments lanceolate; corolla 7-8 mm. long, white, with purple spots in throat; lobes rounded, as long as tube, bearded inside; stamens 4, the anthers protruding from tube; ovary 3-5-celled; drupe globular or ovoid, 6-8 mm. diam., finally purple; endocarp 2-5-celled. (Fig. 227, E-I.).—*M. Cunninghamii*, Benth. (1837); *M. Dampieri*, A. Cunn. (1847); *M. acuminatum*, R. Br. var. *angustifolium*, Benth. (1870).

From Spalding and Laura northwards through the Flinders Range to the Far North; west of Lake Torrens; Murray lands. Sept.-Nov.—North-western Victoria; New South Wales; Queensland; Central and West Australia.

2. **M. deserti,** A. Cunn. (1837). Erect shrub 1-4 m. high, the branchlets usually with tubercular glands; leaves thick, narrowly oblanceolate or lanceolate, mucronate, 2-5 cm. long, rarely longer, 3-6 mm. broad, narrowed into a short petiole; peduncles 1-4, mostly drooping, 5-10 mm. long; calyx 2-3 mm. long, the segments lanceolate; corolla white, glabrous or almost so inside, about 8 mm. long, the lobes rounded; stamens 5, rarely 4, the anthers not exerted; ovary 2-celled, with a very thin dissepiment springing from the axis and dividing each cell imperfectly into 2, so that the ovary becomes almost 4-celled, with 4 ovules; drupe ovoid or subglobular, yellow, 7-8 mm. long by 6 mm. broad, ripening 2-4 seeds.—*M. strictum et M. patens*, A. Cunn. (1847); *M. mucronulatum*, A.DC. (1847).

From Adelaide northwards to Flinders Range and Far North; Murray lands and north thereof; Yorke and Eyre Peninsulas; westward to Everard Range and along the Great Bight. May-Oct. Sometimes called *Turkey Bush*, because the wild turkey (*Eupodotis australis*) is fond of the fruit. The leaves are sometimes wrinkled on the surface, at least when dry.—Drier parts of Australia.

3. **M. viscosum,** R. Br. Viscid shrub about 2 m. high, often with drooping branches usually beset with scattered tubercles; leaves thin, ovate-lanceolate, acute, finely serrate, 2-7 cm. long, 10-24 mm. broad, tapering into a petiole; peduncles usually 3-6 in the axil, 6-10 mm. long; calyx 4-5 mm. long, the segments acuminate; corolla white, purple-spotted and villous inside and on the subacute lobes, 10-12 mm. long; stamens 4, exserted; ovary 2-3-celled, with 1 ovule in each cell; drupe globular, about 5 mm. diam.—*M. glandulosum*, A.DC.; *M. serratum*, R. Br. var. *glandulosum*, Benth.

Mt. Lofty Range northward from Encounter Bay to Flinders Range; Kangaroo Island; Yorke and Eyre Peninsulas; South-East. Sept.-Dec.—Victoria; New South Wales.

4. **M. insulare,** R. Br. *Blue-berry Tree; Native Juniper.* Stout spreading shrub about 2 m. high or sometimes a small tree to 6 m. high; leaves thick, lanceolate and acute or obovate-cuneate and mucronate, entire or bluntly and obscurely toothed in the upper half, 3-7 cm. long, 6-20 mm. broad; petiole short, thick; peduncles 2-7 in axil, 5-7 mm. long; calyx 2-3 mm. long, with lanceolate segments; corolla thrice as long, white with a few purple spots in the hairy throat; lobes rounded; stamens 4, not exserted; ovary 2-3-celled; drupe depressed-globular, bluish-purple, about 8 mm. diam.—*M. adscendens*, R. Br.; *M. serratum*, R. Br. var. *obovatum*, Benth.

Along the coast, or not far inland, from the South-East along the Coorong and St. Vincent's Gulf to Yorke Peninsula; Kangaroo Island; Elliston, E.P. Most of the year, —Eastern States and Tasmania; West Australia. Called "Boobialla" in Victoria.

5. **M. platycarpum,** R. Br. Tree 5-10 m. high, or shrub 2-3 m. high, growing taller in northern than in southern districts, the young parts often viscid; leaves linear-lanceolate, long-mucronate, 3-6 cm. long, 4-7 mm. broad, contracted into a short petiole, usually with a few minute distant teeth in upper half; peduncles 4-8, about 4 mm. long; calyx 1½ m. long; corolla 6-8 mm. long, white, pubescent inside and often yellow in throat; stamens 4, exserted; ovary 2-celled; drupe almost dry, ovoid-compressed, acute, about 6 mm. long, always 2-celled and 2-seeded.

From Yorke Peninsula along western side of Flinders Range to Lake Eyre and westward to Ooldea and along the Great Bight; Spalding to Booleroo; Murray lands; 90-Mile Desert; Eyre Peninsula. Aug.-Dec. Erroneously called "Sandalwood" throughout South Australia, on account of its soft pale-yellow sweet-scented wood.—Western parts of Victoria and New South Wales, where it is known as "Sugar Tree" or "Sugar-wood," on account of a sweetish resin which it sometimes exudes. The specific name means "flat-fruited."

6. **M. parvifolium,** R. Br. Prostrate procumbent or low suberect shrub, usually tuberculate-glandular, often covering a considerable area of ground, leaves thick, spreading, oblong-cuneate or linear-cuneate, obtuse, entire, obscurely toothed or crenate, 6-30 mm. long, 2-7 mm. broad; peduncles 1-5, 6-18 mm. long; calyx 3 mm. long, with broad lanceolate segments; corolla white, usually with pale purple spots and almost glabrous inside, about 8 mm. long, the obtuse lobes at least as long as tube; stamens usually 4, exserted; ovary 2-4-celled; drupe globular, purple, 5-7 mm. diam.—*M. humile*, R. Br.

Coast near Adelaide and round Yorke and Eyre Peninsulas and Kangaroo Island to Fowler's Bay; Lake Eyre; flats near River Murray and Murray scrub; South-East. Mostly in summer.—Temperate Australia; Tasmania.

The 2 species published by Brown in 1810 were first united by Bentham in 1870 as *M. parvifolium*, and by Mueller in 1882 as *M. humile*.

7. **M. brevipes,** Benth., is described by him as differing from *M. parvifolium* in the leaves narrower and not over 12 mm. long; peduncles mostly solitary, not above 4 mm. long, the corolla quite glabrous, with lobes only half as long as tube; fruit oblong, about 4 mm. long, 2-celled. "From McDouall Stuart's journey into the interior." I have seen no specimen. In plate 63 of Mueller's "Myoporinous Plants" the fruit is shown as 3-celled. It was originally recorded by Mueller as *M. parvifolium* in his list of Stuart's plants in Trans. Phil. Inst. Vict. 4: 187 (1860). This list dealt with the collection made by J. McDouall Stuart during his journeys of 1859 in the country west of Lakes Torrens and Eyre. No exact locality is given.

8. **M. refractum,** Maid. et Betche. Differs from *M. parvifolium* in the leaves shorter, more crowded, reflexed on the branches, quite sessile and often subcordate at base, broadly oblong, obtuse, 10-18 mm. long, 5-8 mm. broad, obscurely toothed in upper part; peduncles 1-2, 4-6 mm. long; calyx 4 mm. long, the segments broad, rather obtuse, cordate and distinctly imbricate at base; corolla white, 8 mm. long, sparsely hairy on the tube inside, the obtuse lobes shorter than the tube; stamens usually 4, exserted; ovary 2-celled; drupe ovoid.

Mt. Lyndhurst to Mt. Hopeless (Flinders Range). Sept.-Oct.

2. EREMOPHILA, R. Br.

(From Greek *erēmophilēs*, loving solitude or desert: alluding to the arid habitat).

Calyx 5-sect, rarely 4-sect or 5-lobed; corolla narrow at base round the ovary, expanded upwards into a tubular or campanulate usually curved middle portion and terminating in an oblique 5-lobed and more or less 2-lipped limb; stamens 4, one pair usually longer than the other; ovary 2-celled or usually becoming 4-celled by spurious dissepiments; 1 pair of ovules in each of the 2 cells or sometimes 2-3 superposed pairs in each cell; style filiform, with a hooked point; fruit a drupe, whose endocarp has 4 or (by abortion) fewer usually 1-seeded, more or less complete cells, or splits into 4 1-seeded fruitlets. Shrubs inhabiting dry country with usually alternate leaves, or, in a few species, some or most of the leaves opposite; flowers comparatively large, often showy and scented, solitary or few in the axil, without bracts. The corolla is usually more or less woolly inside. Several species produce white, as well as the normally colored flowers. The number of ovules in each cell appears to be often irregular, even in the same species, and abortion of ovules is frequent.

A purely Australian genus of about 80 species. *Eremophila, Pholidia,* and *Stenochilus,* established by R. Brown in 1810, were united by Mueller in 1858 (Trans. Roy. Soc. Tasm., vol. 3) under the name *Eremophila,* and about 30 years later by Baillon under the name *Pholidia.* Bentham united *Stenochilus* to *Eremophila,* but retained *Pholidia* as a separate genus.

A. Calyx-segments not or scarcely imbricate at base; upper lip of corolla 2-lobed, lower lip 3-lobed, all the lobes rounded and subequal, cut to about ⅓ of the corolla (Section 1. *Eremocosmos*).
  B. Calyx-segments cuneate and obtuse, becoming scarious and reticulate; peduncles shorter or not longer than calyx; leaves linear or lanceolate.
    C. Ovary pubescent.
      Corolla large; stamens exserted; peduncles solitary; leaves hoary, some opposite ..... *E. oppositifola* 1.
      Corolla small; stamens enclosed; peduncles mostly 2-5 together; leaves glabrous, all alternate *E. Paisleyi* 2.
    C. Ovary woolly; corolla small; stamens enclosed; leaves narrow-linear, glabrous ..... *E. Sturtii* 3.
  B. Calyx-segments lanceolate, acute; leaves linear or linear-lanceolate.
    D. Peduncles shorter than calyx, which is enlarged and scarious after flowering; stamens exserted; ovary glabrous..... *E. Latrobei* 4.
    D. Peduncles longer than calyx, which is not enlarged or scarious after flowering; corolla pubescent outside.
      Leaves 3-6 cm. long; stamens enclosed; ovary woolly ..... *E. Gilesii* 5.
      Leaves 6-18 cm. long; stamens shortly exserted; ovary glabrous ..... *E. longifolia* 6.

A. Calyx-segments imbricate at base; upper lip of corolla 2-lobed, lower lip 3-lobed, the lobes rounded and subequal, cut to about ⅓ of the corolla. (Section 2. *Platychilus*).

E. Calyx-segments 4, lanceolate, slightly imbricate; corolla small, pubescent; ovary glabrous; stamens enclosed; peduncles shorter than calyx; leaves small, oblanceolate, glabrous ..... *E. divaricata* 7.

E. Calyx-segments 5.

F. Calyx-segments ovate or oblong, obtuse or acute, much imbricate, becoming scarious and reticulate (except *E. Battii*), the inner ones narrower and usually longer; corolla pubescent outside; stamens enclosed; ovary hairy.

G. Leaves small, rarely exceeding 1 cm. in length; peduncles shorter than calyx.

H. Leaves folded and recurved towards summit, pubescent.

Leaves orbicular ..... *E. rotundifolia* 8.
Leaves linear-cuneate ..... *E. Battii* 9.

H. Leaves flattish, glabrous, obovate ..... *E. exotrachys* 10.

G. Leaves to 3 cm. long, glabrous, often denticulate.

Leaves oblong-cuneate, peduncles shorter than calyx ..... *E. Willsii* 11.
Leaves narrow-linear; peduncles about as long as calyx ..... *E. Gibsonii* 12.

G. Leaves 2-6 cm. long; peduncles equalling or exceeding calyx.

Leaves to 6 cm. long, lanceolate, viscid-pubescent with simple hairs ..... *E. Freelingii* 13.
Leaves to 5 cm., linear-lanceolate; plant more or less glandular-hairy ..... *E. Goodwinii* 14.

F. Calyx-segments lanceolate or ovate-lanceote, imbricate at base, not becoming scarious or reticulate, the inner ones not narrower; corolla glabrous outside.

I. Leaves small, under 1 cm. long, thick, glabrous; corolla small, glabrous; stamens enclosed; peduncles shorter than calyx.

J. Leaves spreading, flattish or concave above.

K. Ovary glabrous; leaves ovate ..... *E. crassifolia* 15.

K. Ovary pubescent near summit.

Leaves oblanceolate ..... *E. Weldii* 16.
Leaves suborbicular, minute ..... *E. parvifolia* 17.

J. Leaves erect, plano-convex, strongly warted.. *E. gibbifolia* 18.

I. Leaves to 18 cm. long, linear-lanceolate; stamens shortly exserted; peduncles slightly longer than calyx; corolla and ovary glabrous.. *E. bignoniiflora* 19.

I. Leaves 2-7 cm. long, glabrous; corolla glabrous, the lowest lobe very broad; stamens enclosed; ovary glabrous.

Leaves lanceolate; peduncles much longer than calyx ..... *E. santalina* 20.
Leaves linear; peduncles usually rather longer than calyx ..... *E. polyclada* 21.

I. Leaves 1-3 cm. long; corolla and ovary glabrous; lowest lobes of corolla very broad; stamens enclosed; flowers subsessile (peduncles very short).

Leaves obovate-cuneate, thin, somewhat hairy, often toothed at summit; corolla small; peduncle terete ..... *E. Behriana* 22.
Leaves oblong-cuneate, thick, entire, glabrous; corolla large; peduncle sharply 5-angled ..... *E. pentaptera* 23.

A. Calyx-segments imbricate at base (except in *E. MacGillivrayi*); corolla lobes so arranged that the 4 erect upper ones appear to constitute an upper lip (the true upper lip consisting of the 2 uppermost lobes united for about ½ their length) the 5th and lowest lobe cut much deeper than the others (from ⅓ to ½ of the corolla), narrow, spreading or reflexed, and forming a lower lip. (Section 3. *Stenochilus*).
L. Upper lip of 4 acute lobes; ovary glabrous.
M. Peduncles longer than the calyx and curved upwards under it.
N. Stamens exserted.
O. Leaves entire, lanceolate.
P. Calyx large, the segments obtuse, enlarged in fruit, the inner ones narrower; drupe small . *E. Duttonii* 24.
P. Calyx small, the segments acute, scarcely enlarged in fruit.
Branches hoary with simple hairs; drupe large ..... *E. maculata* 25.
Branches hoary with stellate hairs; drupe small ..... *E. decipiens* 26.
O. Leaves often serrulate.
Calyx-segments obovate, enlarged and reticulate in fruit; leaves ovate ..... *E. serrulata* 27.
Calyx-segments lanceolate, scarcely enlarged in fruit; leaves mostly lanceolate..... *E. denticulata* 28.
N. Stamens enclosed; leaves narrow-linear; calyx scarcely enlarged in fruit, the inner segments orbicular, the 2 outer smaller and narrower ..... *E. alternifolia* 29.
M. Peduncles shorter or not longer than calyx and not curved upwards under it; leaves linear-lanceolate to ovate, sometimes toothed; calyx-segments lanceolate, scarcely enlarged; stamens exserted ..... *E. glabra* 30.
L. Upper lip of 4 lobes, of which 2 or 4 are obtuse; stamens exserted.
Q. All 4 lobes of upper lip obtuse; calyx-segments obovate, obtuse, imbricate, enlarged in fruit, the 2 inner ones narrower; ovary glabrous; leaves lanceolate, viscid-pubsecent.
Peduncles not longer than calyx ..... *E. calycina* 31.
Peduncles longer than calyx, curved upwards below it ..... *E. neglecta* 32.
Q. Two lobes of upper lip obtuse, the other 2 acute; calyx-segments lanceolate, not imbricate at base, becoming enlarged; ovary woolly; leaves lanceolate, minutely white-tomentose..... *E. MacGillivrayi* 33.
A. Calyx small, with lanceolate lobes; leaves mostly opposite; corolla-lobes short, rounded, almost equal, cut scarcely ¼ of the corolla; stamens enclosed. (Section 4. *Pholidia*).
R. Leaves linear, silvery-scaly; calyx-segments lanceolate, not imbricate; peduncles about as long as calyx.
Leaves under 1½ cm. long ..... *E. scoparia* 34.
Leaves 3-5 cm. long ..... *E. Dalyana* 35.
R. Leaves ovate, stellate-hairy; calyx-segments oblong-lanceolate, imbricate at base; flowers sessile..... *E. Delisseri* 36.
A. Calyx campanulate, 5-lobed above the middle; corolla-lobes rounded, cut to about ⅓ of the corolla, the upper lip bifid, the lower lip of 3 broad lobes; stamens enclosed. (Section 5. *Platycalyx*).
Peduncles not longer than calyx ..... *E. MacDonnellii* 37.

1. **E. oppositifolia,** R. Br. Shrub 2-4 m. high, or sometimes taller, hoary with minute appressed hairs; leaves often opposite, linear, plano-convex, 3-9 cm. long, 1-3 mm. broad, with a hooked point; peduncles solitary, 3-6 mm. long; calyx hoary, 10-18 mm. long, varying much in size even on the same plant, the segments oblong-cuneate, thin, reticulate, narrowed so much towards the base that the corolla or fruit is visible between them; corolla white or shaded with pink, 25-30 mm. long, glabrous outside, pubescent inside towards base and not woolly but glabrous on the upper part inside, the upper lip

bifid, all lobes broad and rounded; stamens as long as corolla, the longer pair exserted; drupe almost dry, ovoid-oblong, hoary, much shorter than calyx.

Murray lands northward to Flinders Range; west of Lake Torrens; Gawler Range. Aug.-Oct.—Western Victoria and New South Wales.

2. **E. Paisleyi,** F. v. M. Erect glabrous viscid shrub, 1-1½ m. high, with slender often tuberculate branches; leaves thick, linear or lanceolate, 2-3½ cm. long, 2-7 mm. broad, with a hooked point and tapering into a short petiole; peduncles 2-5, rarely solitary, 2-4 mm. long; calyx viscid, glandular-hairy, about 4 mm. long, the segments oblong-cuneate, obtuse, ciliate, not imbricate at base, reticulate in fruit; corolla lilac, 12-18 mm. long, pubescent outside, the lobes rounded, the upper lip notched, the spotted middle lobe of lower lip very broad and notched; stamens enclosed; drupe almost dry, about as long as calyx, compressed, pubescent, 4-celled.

Lake Torrens westward to Ooldea; near Everard Range. Most of the year.—Central and West Australia.

3. **E. Sturtii,** R. Br. *Turpentine Bush.* Very viscid glabrous shrub 1-4 m. high, with slender non-tuberculate branches, the branchlets often drooping; leaves linear, 1½-3 cm. long, 1-2 mm. broad, with a hooked point, narrowed at base; peduncles solitary, 6-8 mm. long; calyx viscid, glabrous, 5-10 mm. long, the segments oblong- or oblong-cuneate, obtuse, not imbricate at base, whitish, scarious, reticulate; corolla of shape and size of that of *E. Paisleyi*, pale lilac, pubescent outside; stamens enclosed; drupe ovoid-acute, almost dry, villous with long spreading hairs. (Fig. 227, A-C).

River Murray to Far North. Chiefly winter and spring. Specimens from Curnamona, in which the ovary has been attacked by insects, have developed a small globular succulent barren glabrous drupe with thickened and shortened calyx-segments.—North-western Victoria; western New South Wales; Central Australia.

4. **E. Latrobei,** F. v. M. Shrub 1-3 m. high, glabrous or hoary, with a close stellate tomentum, tuberculate on the branches and often on the foliage; leaves linear or narrowly oblanceolate, rather thick, 2-4 cm. long, 1-4 mm. broad, the margins often recurved; peduncles solitary, 6-10 mm. long; calyx 10-15 mm. long, the segments lanceolate, covered with or merely bordered by stellate hairs, becoming scarious, reticulate and sometimes 20 mm. long in fruit, not imbricate at base; corolla red or purple, 25-30 mm. long, almost glabrous outside and inside, the upper lip bifid, the middle lobe of lower lip shorter than the others, all obtuse; anthers well exserted; drupe glabrous, succulent, ovoid-conical, shorter than calyx.—*E. Tietkensii*, F. v. M. et Tate.

Northern part of Flinders Range to Far North, extending from Cooper's Creek to West Australian border; Gawler Range westward along Great Bight and to Tarcoola and Ooldea.—Western New South Wales and Queensland; Central and West Australia. The lowest lobe being more deeply cut into the corolla-tube than the other lobes shows an approach to the section *Stenochilus.*

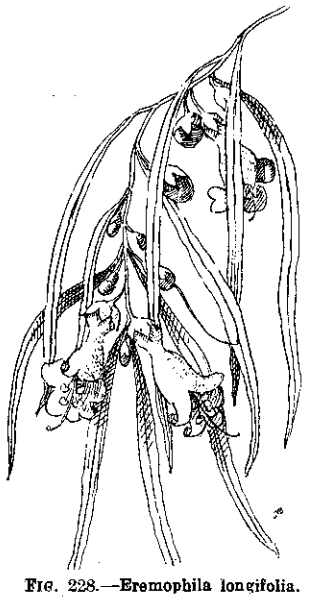

FIG. 228.—**Eremophila longifolia.**

5. **E. Gilesii,** F. v. M. Viscid shrub about 1 m. high, sparsely pubescent with minute simple often curved hairs; leaves linear or linear-lanceolate, entire or obscurely denticulate, channelled above, narrowed towards base, 3-6 cm. long, 1-3 mm. broad; peduncles solitary or twin, 12-20 mm. long, turned upwards under the flower; calyx about 10 mm. long, pubescent, the segments lanceolate with long points, not or scarcely imbricate at base; corolla pink or lilac, 25-30 mm. long, pubescent outside, the upper lip shortly bifid, the middle lobe of lower lip broader than the others, all rounded; stamens enclosed; drupe ovoid, almost dry, villous, about as long as calyx. —*E. Berryi*, F. v. M.

Between Ooldea and Ouldabinna; Arkaringa Creek; Musgrave Range. Chiefly winter.—Central Australia. This is perhaps the same as *E. Clarkei*, F. v. M., and if so, the latter name has priority.

6. **E. longifolia** (R. Br.), F. v. M *Long-leaved Eremophila; Native Plum-tree.* Shrub or small tree, 2-6 m. high, with drooping branches, the branches, young leaves, calyx and outside of corolla densely pubescent with short appressed

septate hairs; leaves broad-linear, flat, 6-18 cm. long, 4-7 mm. broad, acute, becoming glabrous with age, tapering into a short petiole; peduncles 1-3, usually not much longer than calyx, which is about 5 mm. long, the segments ovate-acuminate, not imbricate at base; corolla 25-30 mm. long, densely pubescent outside, pink or red, red-spotted inside, the base of the curved tube globular round the ovary, the upper lip bifid and all the lobes obtuse; stamens slightly exserted; drupe very succulent, blackish-purple, ovoid or globular, 8-12 mm. long, glabrous.—*Stenochilus longifolius*, R. Br.

From Yorke Peninsula and Murray Lands northward to Far North; Gawler and Stuart Ranges; westward to Musgrave Range and Ooldea. Most of the year. Sometimes also called "Juniper Tree" or "Dogwood."—Almost all the drier part of Australia; called "Emu Bush" or "Berrigan" in the eastern States. The pale-brown bark, rough and deeply fissured, bears a strong resemblance to that of *Heterodendron oleifolium* and *Myoporum platycarpum*, which inhabit the same class of country.

7. **E. divaricata,** F. v. M. Erect glabrous shrub 1-2 m. high, with slender divaricate branches sometimes ending in a spine and sometimes with a short white pubescence just above the leaf-axil; leaves linear-cuneate, 5-15 mm. long; flowers subsessile; calyx 5 mm. long, the segments usually only 4, lanceolate-acuminate, ciliate; corolla densely stellate-pubescent outside, about 14 mm. long, the upper lip bifid, the lower of 3 rounded lobes; drupe almost dry, ovoid-beaked, longer than calyx.—*Pholidia divaricata*, F. v. M.

Murray lands. Summer.—Western New South Wales.

8. **E. rotundifolia,** F. v. M. Stout shrub 1-1·50 m. high, hoary with a dense appressed tomentum of minute simple hairs; leaves thick, crowded, orbicular, 6-8 mm. diam., concave above and complicate towards the small recurved obtuse point, shortly petiolate; peduncles solitary, 4-10 mm. long; calyx about 15 mm. long, the segments reddish inside, hoary outside, oblong-cuneate, the outermost obovate-cuneate, imbricate, scarious, and reticulate in fruit; corolla 25-30 mm. long, lilac, pubescent outside, globular round ovary the lobes broad, rounded, the middle one of the lower lip very broad and notched; stamens enclosed; drupe almost dry, ovoid-acute, hoary, shorter than calyx.

Lakes Gairdner and Torrens northward to Far North, but apparently not in the north-eastern region. Chiefly winter.

E. strongylophylla, F. v. M., which occurs in West and Central Australia and western Queensland and New South Wales, may be discovered in our Far North-East. It resembles the preceding, but the tomentum is of stellate branching hairs, the leaves are quite obtuse and without any recurved point, the calyx-segments are lanceolate, scarcely imbricate at base, and remain green around the finally glabrous drupe.

9. **E. Battii,** F. v. M. Small shrub, hoary with short spreading often curved simple hairs; leaves linear-cuneate, 5-10 mm. long, 1-3 mm. broad, obtuse, entire or denticulate near summit, folded or concave above, recurved at tip; peduncles 2-3 mm. long, straight; calyx 7 mm. long, the segments ovate-oblong, obtuse, villous, imbricate at base, the 2 innermost rather smaller; corolla about 20 mm. long, sprinkled outside with rather long septate hairs, all the lobes rounded, the lowest the broadest, the upper lip shortly bifid; stamens enclosed; drupe ovoid, about as long as calyx, densely pubescent.

Blood's Creek (Far North); near Ooldea and Eucla.—Central and West Australia.

10. **E. exotrachys,** Kraenzl (1925). Slender viscid shrub 50-100 cm. high; branches and foliage with minute spreading simple hairs or almost glabrous; leaves obovate or obovate-cuneate, subsessile, 6-12 mm. long, 3-6 mm. broad, obtuse; peduncles solitary or twin, 4-7 mm. long; calyx 10 mm. long, the 3 outer segments ovate or ovate-oblong, imbricate, the 2 inner narrower and rather longer, all obtuse and more or less beset with glandular and simple hairs, slightly enlarged, scarious and reticulate in fruit; corolla 15-20 mm. long, sprinkled outside with minute glandular and simple longer hairs, the lobes all short and rounded; stamens enclosed; drupe almost dry, shorter than calyx, pubescent.

Everard Range.—Victoria Desert, W.A.

11. **E. Willsii,** F. v. M. Erect shrub to over 1 m. high, with glandular-hairy branches; leaves crowded, obvate-or oblong-cuneate, sessile, viscid, glabrous, acute or obtuse, usually serrulate, 1½-3 cm. long; 6-12 mm. broad; peduncles solitary, 5-8 mm. long, with spreading hairs; calyx about 15 mm. long, glandular-hairy, the 2 outer segments ovate, enclosing the lanceolate inner ones, all acute, scarious and reticulate in fruit; corolla about 25 mm. long, pubescent outside, the lobes oblong, acuminate, the lowest rather broader; stamens enclosed; drupe almost dry, ovoid-acute, densely tomentose, shorter than calyx.

Everard Range to West Australian border.—Central and West Australia.

E. Elderi, F. v. M., has been recorded from our Far North-West, but I have seen no specimens from that district. It differs from *E. Willsii* in larger entire broad-lanceolate glandular-hairy leaves, 4-7 cm. long, 8-15 mm. broad; peduncles slender, twin, 20-25 mm. long, covered with spreading glandular hairs; calyx and corolla of *E. Willsii*, but the calyx-segments rather narrower; drupe ovoid, glabrous.—Central and West Australia.

12. **E. Gibsonii,** F. v. M. Viscid glabrous shrub with slender non-tuberculate branches; leaves linear, 2-3 cm. long, about 1 mm. broad, glabrous, obscurely denticulate, with a hooked point; peduncles solitary or rarely twin, 6-10 mm. long; flowering calyx 8-10 mm. long, viscid, glabrous or pubescent towards base, scarious, reticulate, and slightly enlarged in fruit, the segments imbricate, the 3 outer ones ovate, the 2 inner lanceolate, all obtuse; corolla about 25 mm. long, pubescent outside, the upper lip bifid, the lobes of the lower lip broad, rounded; stamens enclosed; drupe villous, almost dry, ovoid-compressed, shorter than calyx.

Ooldea. Aug.-Jan.—Central Australia; West Australia (Victoria Desert).

13. **E. Freelingii,** F. v. M. Shrub usually 1-2 m. high, pubescent, but the pubescence, especially on the leaves, obscured by the shining viscid covering; leaves crowded, lanceolate, 2-6 cm. long, 5-10 mm. broad, tapering into petioles whose permanent bases remain conspicuous on the branch; peduncles solitary or twin, rarely 3, 10-30 mm. long, with minute spreading hairs; calyx 8-15 mm. long, the segments much imbricate, the outermost ovate or broad-lanceolate, the others narrower, lanceolate, all acute and spreading in upper part; corolla lilac, 20-35 mm. long, pubescent outside, the upper lip shortly bifid, the middle lobe of lower lip broader than the subacute lateral ones; stamens enclosed; drupe almost dry, ovoid-acute, minutely glandular-pubescent, shorter than calyx.

Flinders Range, and from Broken Hill railway northwards to Far North; westward to Musgrave Range. Most of the year. Usually grows on stony ground or rocky slopes.—Western New South Wales; Central and West Australia.

14. **E. Goodwinii,** F. v. M. Viscid shrub, covered with short spreading glandular or simple hairs; leaves linear or linear-lanceolate, entire or obscurely denticulate, contracted at base but sessile, 2-5 cm. long, 2-4 mm. broad; peduncles solitary, 10-25 mm. long; calyx 8-15 mm. long, the segments imbricate, the outer ones ovate-lanceolate, acute, the 2 inner ones lanceolate, glandular-pubescent at least on the inner face; corolla purplish, glandular-pubescent outside, about 25 mm. long, the lobes rounded, the lowest one rather broader; stamens enclosed; drupe almost dry, ovoid-acute, hairy, nearly as long as calyx.

Recorded by Mueller as collected on Giles's expedition between Ooldea and Ouldabinna. The Mt. Freeling, where it was gathered by Stuart, is not the South Australian locality south of Lake Blanche, but another Mt. Freeling in the Northern Territory, near Central Mt. Stuart.—Western New South Wales and Queensland; Central Australia.

15. **E. crassifolia,** F. v. M. Low spreading glabrous shrub; leaves green, thick, stiff, ovate, obtuse, subsessile, 5-10 mm. long, concave above, wrinkled beneath, recurved; flowers solitary, subsessile; calyx 4 mm. long, the segments lanceolate-acuminate, imbricate at base; corolla lilac or blue, glabrous outside, cylindrical towards base, 8-12 mm. long, 2-lipped; upper lip acutely bifid, the lower of 2 acute lateral lobes and 1 broad obtuse lowest lobe, hairy inside; drupe ovoid, succulent, glabrous, about as long as calyx.—*Pholidia crassifolia*, F. v. M.

Murray scrub; Monarto South; Eyre Peninsula. Aug.-Dec.

16. **E. Weldii,** F. v. M. Twiggy glabrous shrub about 1 m. high, the branches and under-surface of leaves more or less tuberculate; leaves thick, oblanceolate or obovate-cuneate, 4-10 mm. long, slightly concave above; peduncles often shorter than calyx, which is 5 mm. long, with broad acute ciliate segments; corolla purple or pale-lilac, 12-15 mm. long, glabrous outside, narrow-cylindrical towards base, the upper lip bifid, the lateral lobes of lower lip oblong, the middle one broad and truncate; stamens enclosed; drupe somewhat succulent, ovoid-acute, exceeding calyx, pubescent in upper half.—*Pholidia Weldii*, F. v. M.

Kangaroo Island (near Kingscote); Minnipa and Streaky Bay, E.P., and westward along the Great Bight. Most of the year.—West Australia.

17. **E. parvifolia,** J. M. Black. Low slender glabrous shrub; leaves thick, orbicular or ovate, subsessile, 1½-2 mm. long; peduncles sometimes shorter than calyx, which is 2½-3 mm. long, with lanceolate ciliolate segments; corolla about 10 mm. long, shaped as in the preceding, but the lowest lobe narrower; stamens enclosed; drupe succulent, glabrous, globular, 3 mm. diam., with only 2 fertile cells in the fruits examined.

Plains from Fowler's Bay to near Eucla.—West Australia. Collected by E. Giles in 1875 and by Tate in 1879; treated by Mueller as an unnamed variety of *E. Weldii*.

18. **E. gibbifolia,** F. v. M. Slender glabrous shrub 20-60 cm. high; leaves like those of *Eriostemon brevifolius*, sessile, linear-oblong, erect or appressed, plano-convex, 2-5 mm. long, under 1 mm. broad, conspicuously tuberculate on lower face; peduncle much shorter than calyx, which is 6 mm. long, the segments subulate but dilated and imbricate at base; corolla purple, 9-12 mm. long, glabrous and shaped as in *E. crassifolia*; drupe almost dry, thin, oblong, compressed, not exceeding calyx.—*Duttonia gibbifolia*, F. v. M. (1856); *Eremophila gibbosifolia*, F. v. M. (1859); *Pholidia gibbifolia*, F. v. M.

Mount Barker to River Finnis; 90-Mile Desert. Sept.-Nov.—Western Victoria.

19. **E. bignoniiflora** (Benth.), F. v. M. Tall glabrous more or less viscid shrub; leaves lanceolate or linear-lanceolate, acuminate, 5-18 cm. long, 5-10 mm. broad, tapering into a petiole; peduncles solitary, about 10 mm. long, often drooping; calyx about 7 mm. long, viscid, the segments much imbricate, ovate; corolla glabrous outside, 25-30 mm. long, drying yellowish, the lobes all broad, but the lowest twice as broad as the others and almost truncate; stamens shortly exserted from tube; drupe ovoid-acuminate, succulent, glabrous, about 15 mm. long and more than twice as long as calyx.—*Stenochilus bignoniaeflorus*, Benth.

Near Lake Callabonna; Cooper's Creek and north thereof; perhaps Murray lands. Chiefly winter.—North-western Victoria: western New South Wales; Queensland.

20. **E. santalina,** F. v. M. Erect glabrous shrub; leaves like those of *Santalum lanceolatum*, but alternate, not opposite, lanceolate-acuminate, 3-7 cm. long, 3-8 mm. broad; flowers solitary or rarely twin, on peduncles about 12 mm. long; calyx about 3 mm. long, rarely longer, the segments ovate-acuminate, imbricate; corolla glabrous outside, whitish, 14-20 mm. long, the upper lip obtusely bifid, the middle lobe of lower lip very broad, truncate; drupe ovoid, succulent, glabrous, much exceeding calyx, 1-4-celled.—*Pholidia santalina*, F. v. M.

Flinders Range (from near Port Augusta to Leigh's Creek). Aug.-Oct. Apparently rare.

21. **E. polyclada,** F. v. M. Glabrous shrub 1-3 m. high, with divaricate rigid branches; leaves linear or linear-lanceolate, distant, 2-5 cm. long; peduncles 4-10 mm. long; calyx 5 mm. long, the segments ovate, imbricate, with spreading points; corolla pink, glabrous outside, about 25 mm. long, expanding gradually from the base, the lobes rounded, the lowest much broader than the others, very obtuse; stamens included; drupe oblong-beaked, longer than the calyx, the beak finally bifid or 4-fid.—*Pholidia polyclada*, F. v. M.

Murray lands and northwards to Cooper's Creek. Summer.—Western New South Wales; Queensland.

22. **E. Behriana,** F. v. M. Low shrub more or less scabrous, with short simple hairs; stems ascending; leaves stiff, obovate-cuneate, crowded, 8-20 mm. long, usually sharply toothed in upper part, and ciliolate; flowers solitary, subsessile; calyx 5-6 mm. long, the segments lanceolate, ciliate, imbricate at base, the inner ones smaller; corolla lilac, 10-12 mm. long, glabrous outside, shaped as in *E. crassifolia*; drupe ovoid, almost dry, glabrous, shorter than calyx.—*Pholidia Behriana*, F. v. M.

Scrub near Gawler River; Kangaroo Island; Yorke and Eyre Peninsula. Sept.-Nov.

23. **E. pentaptera,** J. M. Black. Erect glabrous shrub about 30 cm. high; leaves thick, flattish, sessile, oblong-cuneate, very obtuse, 1-3 cm. long, 4-8 mm. broad; peduncles solitary, thick, obconical, sharply 5-angled or almost 5-winged, about 5 mm. long, calyx about 12 mm. long, glabrous, the segments thick, imbricate, lanceolate, obtuse, keeled along back; corolla violet, 25-35 mm. long, spotted in throat, glabrous outside; all lobes rounded, the upper lip bifid, the middle lobe of lower lip truncate, broader than long (about 12 mm. long by 18 mm. broad); stamens enclosed; ovary glabrous; style hairy; fruit unknown.

On flats near Miller's Creek, 60 miles north of Kingoonya. Sept.

PLATE 40 (1), page 439.—A, flowering branch; B, corolla spread open; C, 5-angled peduncle and pistil; D, vertical section of ovary; E, calyx and peduncle.

24. **E. Duttonii,** F. v. M. Viscid shrub about 2 m. high, with minute scattered simple hairs visible under the lens on branches, young leaves, calyx and peduncles; leaves lanceolate, acute, contracted towards base but scarcely petiolate, 2-3½ cm. long, 3-6 mm. broad; peduncles solitary, 10-20 mm. long, curved upwards under the flower; calyx 12-15 mm. long in flower, the segments obovate, acute or acuminate, imbricate, the inner ones narrower, all sometimes enlarged in fruit to 20 mm. long, reticulate, and the outer segment almost orbicular; corolla usually pink and glabrous or almost so outside, yellow inside, about 30 mm. long, the upper lip of 4 short acute lobes, the lower lip of one broad-oblong obtuse reflexed lobe, cut to about ⅓ of the corolla; stamens well exserted; drupe succulent, glabrous, ovoid-acute, shorter than calyx.

North of Broken Hill railway to Flinders Range and Far North; west of Lake Torrens to Ooldea. Winter and spring.—Western New South Wales; Central Australia.

25. **E. maculata** (Ker) F. v. M. *Native Fuchsia.* Shrub of varying height, the branches hoary with short spreading or curved simple hairs; leaves glabrous, from linear-lanceolate to ovate-lanceolate, acute, 1½-3 cm. long, 3-10 mm. broad, narrowed into a short petiole; peduncles solitary, 12-23 mm. long, glabrous, curved upwards under flower; calyx 5-7 mm. long, glabrous, the segments ovate-acuminate, much imbricate at base; corolla glabrous outside, 25-30 mm. long, whitish or pink, usually with pink or red spots inside, sometimes tinged with yellow, globular round the ovary, the upper lip of 4 short acute lobes, the lower lip of 1 oblong obtuse reflexed lobe cut to below the middle of the corolla; stamens slightly or quite exserted; drupe succulent, glabrous, globular, or ovoid, 15-20 mm. long, acuminate, 3-4 times as long as calyx, the endocarp thick, bony, grooved longitudinally, 4-celled by a spurious dissepiment in each of the 2 cells.—*Stenochilus maculatus*, Ker.

Murray lands; Flinders Range to Far North; Lake Torrens westward to Ooldea and Nullabor Plain. Winter and spring.—Western districts of Victoria, New South Wales, and Queensland.

Var. *brevifolia*, Benth. occurs near Lake Amadeus, C.A., and near Southern Cross, W.A., and may therefore be found in our Far North-West. It has leaves ovate or oblanceolate, 5-10 mm. long, obtuse.

26. **E. decipiens**, Ostenf. Differs chiefly from *E. maculata* in the branches hoary with a minute stellate not simple tomentum; leaves lanceolate, acute, often viscid, shortly petiolate, 1½-3 cm. long, 4-6 mm. broad, the young ones with scattered stellate hairs, which may persist for a time; peduncles solitary, 10-15 mm. long, curved upwards under flower; calyx 5-6 mm. long, almost glabrous and often viscid outside, the segments broad-lanceolate, acute, imbricate, stellate-hoary inside; corolla glabrous outside and inside, shaped like that of *E. maculata*, about 25 mm. long; stamens exserted; drupe ovoid or globular, glabrous, succulent, 6-8 mm. long, scarcely exceeding calyx, 2-celled or imperfectly 4-celled.

Near Ooldea. Aug.-Oct.—Kalgoorlie, W.A. Differs from *E. glabra* chiefly in the much longer, curved, not straight peduncles.

27. **E. serrulata** (A. Cunn.), Druce (1917). Small viscid shrub, hoary with minute stellate hairs on the branches and young foliage; leaves ovate or ovate-lanceolate, more or less distinctly serrulate or sometimes entire, 2-3 cm. long, 10-15 mm. broad, petiolate; peduncles solitary, slender, about 15 mm. long, curved upwards under the flower; calyx 7-8 mm. long in flower, 10-15 mm. long in fruit, the segments broadly obovate, imbricate, sprinkled with sessile glands, finally spreading, rigid and reticulate; corolla greenish, glandular-pubescent outside, 20-25 mm. long, the upper lip of 4 short acute lobes, the lower lip of 1 narrow acute reflexed lobe, shorter than the others and cut to below the middle of corolla; stamens exserted; drupe globular, succulent, glabrous, much shorter than calyx.—*Stenochilus serrulatus*, A. Cunn. (1847); *Eremophila latifolia*, F. v. M. (1852).

Murray lands to Flinders Range and westward to Musgrave and Blyth Ranges; Lake Gilles and Gawler Range westward along Great Bight.—Western New South Wales; West Australia.

28. **E. denticulata**, F. v. M. Viscid shrub, glabrous or almost so; leaves lanceolate or ovate-lanceolate, shortly petiolate, 3-5 cm. long, 6-14 mm. broad, serrulate; peduncles solitary or twin, 12-20 mm. long, curved upwards under flower; calyx 5-8 mm. long, the segments broad-lanceolate, imbricate, acute, ciliolate; corolla red, almost glabrous outside and inside, about 25 mm. long, the upper lip of 4 short acute lobes, the lower lip of 1 short narrow recurved lobe cut to below the middle of the corolla and not nearly reaching to its summit; stamens exserted; drupe succulent, ovoid, glabrous, about as long as calyx.

Near Eucla.—West Australia.

29. **E. alternifolia**, R. Br. Shrub 1-2½ m. high, glabrous, slightly viscid, the branches tuberculate; leaves subterete, usually with a recurved point, 1-3 cm. long, about 1½ mm. broad; peduncles solitary, 10-30 mm. long, curved upwards under the flower; calyx 8-10 mm. long, the segments scarious, reticulate, imbricate, the 3 inner ones almost orbicular, the 2 outer ones ovate, shorter; corolla 25-30 mm. long, globular at base, glabrous outside, pink or red, spotted with darker red, sometimes white, the upper lip of 4 short acute lobes, the lower lip of one very broad obtuse spreading lobe; stamens not exserted beyond upper lip; drupe succulent, ovoid-conical, glabrous, shorter than calyx. (Fig. 227, D).

Murray lands and north thereof; River Broughton northwards along Flinders Range to Lake Torrens and westward to Musgrave Range and Ooldea; Lake Gilles to Fowler's Bay. Most of the year.—Western New South Wales.

Var. *latifolia*, F. v. M. Leaves thick but flat, 2-3 mm. broad.—Mt. Brown, Mt. Lyndhurst (Flinders Range); near Streaky Bay; Ooldea; Great Bight.—West Australia.

30. **E. glabra** (R. Br.), Ostenf. (1921). *Tar Bush.* Shrub up to 1 m. or more in height, sometimes very viscid, rarely quite glabrous, the branchlets and leaves often white or grey with a dense stellate tomentum; leaves lanceolate or rarely ovate, obtuse or acute, sometimes toothed in the upper part, 1-4 cm. long, 2-10 mm. broad, usually becoming glabrous, contracted gradually into a petiole; peduncles solitary, 4-5 mm. long; calyx 5-7 mm. long, the lobes lanceolate-acuminate, imbricate at base when flowering, more or less stellate-pubescent; corolla 20-30 mm. long, glandular-pubescent or almost glabrous outside, very sparsely pubescent inside, the tube globular round the ovary, expanded and incurved above, the upper lip of 4 short acute lobes, the lower lip of 1 linear-oblong obtuse acuminate lobe, cut to about the middle of corolla and reflexed; stamens well exserted; drupe ovoid, succulent, glabrous, as long as or rather longer than calyx, 2-celled or imperfectly 4-celled.—*Stenochilus glaber*, R. Br. (1810); *Eremophila Brownii*, F. v. M. (1858).

Dublin scrub; Kangaroo Island; Yorke Peninsula to Flinders Range and westward to Great Bight and Ooldea; Murray lands to Far North; northern Eyre Peninsula. Most of the year.—Dry temperate Australia.

Var. *viridiflora*, F. v. M. Stems more or less procumbent; leaves stellate-tomentose-sometimes thick and velvety, oblong-lanceolate, obtuse or subacute, 2-4 cm. long, some times with a few obtuse teeth near the summit; peduncles 2-3 mm. long, densely white-tomentose like the calyx, which is 8-10 mm. long; corolla 20 mm. long, dull-green, lowest lobe almost acute.—*Stenochilus incanus*, Lindl. (1839); *Eremophila incana*, F. v. M. (1858).—Murray lands; northern Yorke Peninsula; inland from Denial and Fowler's Bays. Specimens from the 2 last-named sites have almost the calyx of *E. eriocalyx*, F. v. M., but the corolla and leaves are different.—West Australia.

31. **E. calycina,** S. Moore (1902). Viscid shrub with a tomentum of minute simple hairs, obscured among the resinous exudation, as in *E. Duttonii* and *E. Freelingii*, but even shorter and more appressed; leaves lanceolate, acute, 2-4 cm. long, 4-7 mm. broad, becoming glabrous, viscid and greyish-green or shining, narrowed into a very short petiole; peduncles solitary, 7-8 mm. long, minutely pubescent, straight or slightly curved upwards under flower; calyx 8-10 mm. long, the segments obovate, obtuse, sparsely beset with simple and branched hairs outside and in, much imbricate, the 2 outer very broad, the others narrower, all slightly enlarged and reticulate in fruit; corolla 20-30 mm. long, minutely glandular-pubescent outside and on the lobes inside, the 4 upper lobes rounded, the lowest broad-oblong, obtuse, or slightly notched, reflexed, cut to about $\frac{1}{3}$ of the corolla; stamens exserted; ovary and style glabrous; ripe fruit not seen.

Oodnadatta to Musgrave Range; Macumba Creek.—Central Australia. Described by Moore in 1902 from a specimen obtained " near the head of St. Vincent's Gulf." Perhaps this is a slip for " Spencer's Gulf." Differs from *E. viscida*, Endl. (a West Australian species which has not been re-discovered since it was collected by J. S. Roe about 1835), in the pubescence, the solitary flowers, and the pistil, the latter species having 1-3 flowers together and the ovary, style and drupe all pubescent, the plant being otherwise glabrous.

32. **E. neglecta,** J. M. Black (1914). Clothing and foliage as in the preceding, although the leaves are sometimes a little broader; peduncles solitary, 12-20 mm. long, slender, viscid, almost glabrous, curved upwards under flower; calyx, corolla, and stamens of *E. calycina*; ovary and style glabrous; ripe fruit not seen.—*E. viscida*, F. v. M. non Endl.

Near Oodnadatta; upper part of Arkaringa Creek; Yellow Cliffs, near Charlotte Waters.—Central Australia. The branches of both species are marked by the shortly decurrent, often viscid, bases of the caducous leaves, but these remains are not nearly so large as in *E. Freelingii*.

PLATE 45.—1, corolla; 2, corolla spread open; 3, pistil; 4, vertical section of ovary; 5, bud.

33. **E. MacGillivrayi,** J. M. Black. Stout shrub 2-3 m. high, white on the branchlets, foliage and calyxes with a dense close stellate tomentum, the leaf-scars crowded and rather prominent; leaves 1½-6 cm. long, 4-6 mm. broad, narrow-lanceolate, rather thick, mucronate, narrowed into a very short petiole; peduncles solitary, 8-12 mm. long, thickened towards summit; calyx 4-6 mm. long, the segments ovate-lanceolate, acute, not imbricate at base, lengthened to 10 mm. in fruit; corolla reddish, about 25 mm. long, sparsely stellate-pubescent outside, glabrous inside, the upper lip of 4 short oblong lobes, of which the 2 uppermost are acute, the 2 others obtuse, the lower lip of 1 oblong obtuse reflexed lobe cut nearly to the middle of the corolla; at least 2 stamens exserted; unripe drupe almost dry, woolly with branched hairs, 2-celled, rather longer than calyx, the epicarp seceding from the bony endocarp.

Cordillo Downs. Aug.-Oct.—Queensland (Arrabury Station, Wilson River). The calyx is that of section *Eriocalyx*, but the corolla is that of *Stenochilus*. Locally called " Dog Bush " on account of the scent.

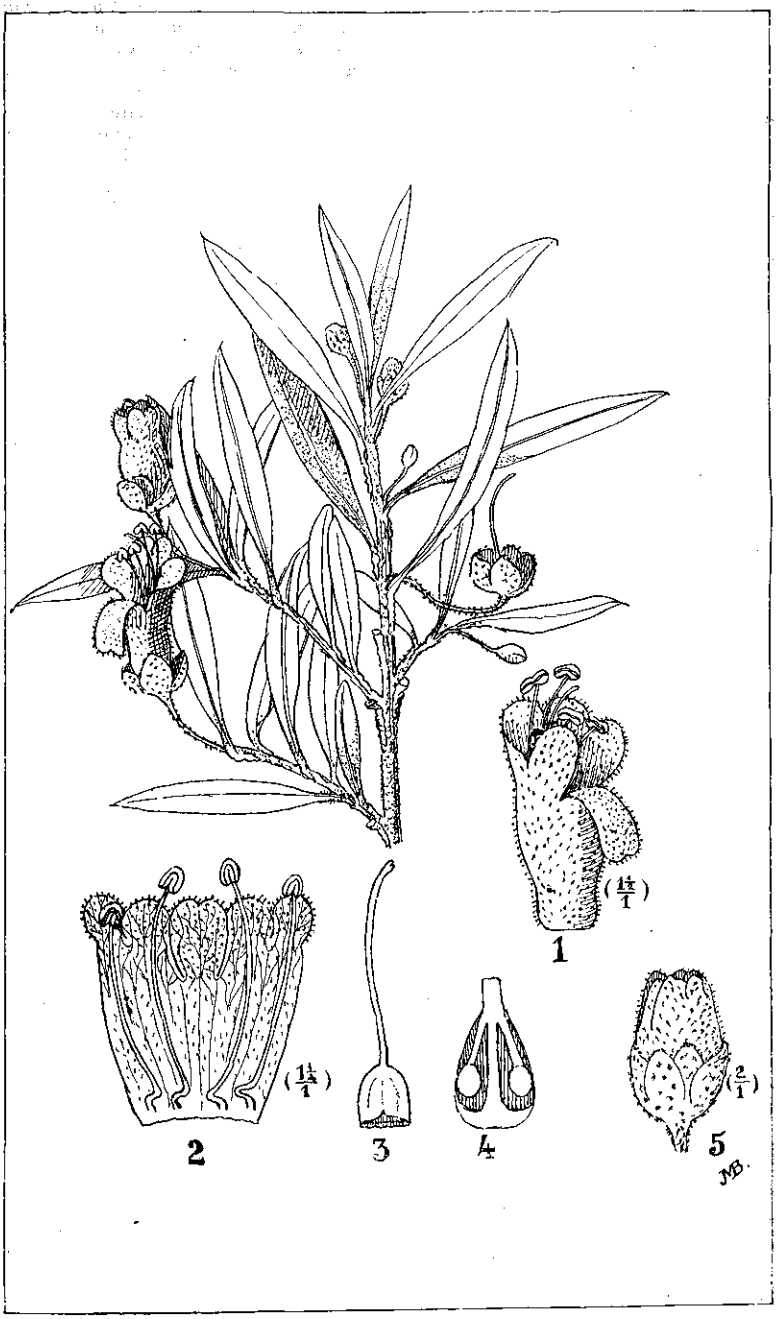

PLATE 45.—**Eremophila neglecta.**

34. **E. scoparia** (R. Br.), F. v. M. Small slender erect broom-like shrub, beset with silvery appressed scales or sometimes densely tuberculate; leaves mostly opposite narrow-linear, plano-convex, decurrent, 7-15 mm. long, scarcely 1 mm. thick, with a sharp recurved point; peduncles solitary, about as long as calyx, which is 2 mm. long,

the lobes lanceolate, keeled, not imbricate; corolla violet, 15-20 mm. long, narrow-cylindrical towards base, campanulate above, the lobes rounded, subequal; drupe almost dry, ovoid-beaked, 6 mm. long.—*Pholidia scoparia*, R. Br.

Flinders Range and adjoining plains: Fort Augusta to Gawler and Stuart Ranges and westward along Great Bight; Tarcoola; Ooldea; Musgrave Range; Murray lands and north thereof. Aug.-Feb.—Western New South Wales; West Australia.

35. **E. Dalyana,** F. v. M. Differs from *E. scoparia* in the leaves 3-5 cm. long, even more slender and less rigid, the ovary and fruit densely hairy.—*Pholidia Dalyana*, F. v. M.

Innamincka (Cooper's Creek).—North-western New South Wales.

36. **E. Delisseri,** F. v. M. Shrub about 1 m. high, white with a close stellate tomentum, the branches sometimes tuberculate; leaves mostly opposite, often recurved, obovate or oblong, subsessile, 5-8 mm. long, 3-5 mm. broad; flowers solitary, sessile; calyx about 6 mm. long, the segments oblong-lanceolate, imbricate at base; corolla 20-25 mm. long, tomentose outside, narrow-cylindrical towards base, campanulate above, the lobes rounded, subequal; drupe almost dry, ovoid-acute, woolly with plumose hairs, not longer than calyx.—*Pholidia Delisseri*, F. v. M.

From Ooldea and Pidinga to the West Australian border.—West Australia. Named after E. A. Delisser, a surveyor, who was engaged by the South Australian Government in 1865 to explore the country between the Gawler Range and the West Australian border, and who discovered the roadstead of Eucla. He made a small botanical collection which was submitted to Mueller.

37. **E. MacDonnellii,** F. v. M. Small diffuse shrub, flowering when only 30 cm. high, closely tomentose with branched stellate hairs and with long scattered simple hairs on the branches and peduncles; leaves sessile, oblong or lanceolate, acute or obtuse, 5-20 mm. long; peduncles solitary, 3-8 mm. long; calyx 8-14 mm. long, campanulate, becoming membranous in fruit, with 5 broad acuminate lobes about as long as the tube, the 2 upper lobes rather longer than the 3 lower; corolla purplish, glabrous outside, 25-30 mm. long, narrow-cylindrical round the ovary, the upper lip shortly bifid, the lower of 3 broad rounded lobes; stamens enclosed; drupe ovoid or globular, succulent, minutely pubescent, about as long as calyx, the membranous epicarp finally splitting at summit and sparating from the mesocarp and endocarp.

Plains round Lake Torrens to Far North and westward to Musgrave Range. Most of the year.—Western New South Wales and Queensland. The specific name commemorates Sir Richard MacDonnell, Governor of South Australia, 1855-62.

Var. *glabriuscula*, J. M. Black. Branches with only the long simple hairs; leaves quite glabrous.—Hamilton Creek.

E. Strehlowii, E. Pritzel (1918) grows along the Finke River and in the MacDonnell Range, C.A., and may therefore be found in our territory. It differs from the preceding in a still closer tomentum with shorter hairs, leaves 5-10 mm. long, peduncles 20-25 mm. long and often spreading or deflexed; calyx-lobes shorter than tube.—*E. MacDonnellii*, F. v. M. var. *gracilis*, J. M. Black (1914).

Family 107.—PLANTAGINACEAE.

Flowers regular; sepals 4, persistent, imbricate; corolla scarious, with 4 spreading lobes, imbricate in bud; stamens 4, usually inserted in the corolla-tube and alternate with its lobes; anthers 2-celled; ovary superior, 2-celled, or 4-celled by spurious dissepiments, with 1 or more anatropous ovules in each cell, peltately affixed to septal placentas; style simple, hairy; capsule small, circumsciss or indehiscent; seeds albuminous; embryo straight, with inferior radicle. Herbs with simple exstipulate leaves; flowers small, sessile, in dense bracteate heads or spikes.

A family of only 3 genera, of which 1 is represented in Australia.

1. PLANTAGO (Tourn.) L.

(Latin name applied to more than one European species of this genus.)

Corolla withering on the capsule, the tube about as long as the calyx, the lobes finally reflexed; stamens inserted at base of corolla tube and protruding; capsule membranous, circumsciss. Flowers sessile, each in the axil of a small bract, forming spikes or heads at the summit of scapes or axillary peduncles; leaves usually in a radical rosette. The delicate partitions of the ovary break off from the walls of the ripening capsule, so that they appear like a free-central placental column with 2 to 4 wings. *Plantain.*

It is worthy of note that the name plantain is also applied to the very distant tropical genus *Musa*, to which the banana belongs.

A. Stem none; leaves all radical.
  B. Leaves linear or lanceolate.
    C. Leaves entire or obscurely toothed; ovary 2-celled.
      D. Spikes to 20 cm. long, rarely small; perennials.
        Bract obtuse, shorter than the sepals, which are all free; ovary with 2 ovules in each cell — *P. varia* 1.
        Bract pointed, longer than the sepals, of which 2 are united; ovary with 1 ovule in each cell — *P. lanceolata* 2.
      D. Spikes usually under 1 cm. long; small villous annual; ovary with 2 ovules in each cell ..... *P. Bellardii* 3.
    C. Leaves pinnatifid or sharply and conspicuously toothed, rarely almost entire; bract pointed, as long as the ciliate sepals; ovary 3-4-celled, with 1 ovule in each cell ..... *P. Coronopus* 4.
  B. Leaves broad-ovate; bract obtuse, nearly as long as the glabrous sepals; ovary 2-celled, with more than 2 ovules in each cell ..... *P. major* 5.
A. Stem developed, bearing opposite or whorled leaves; bract pointed, glandular-pubescent, longer than sepals; ovary 2-celled, with 1 ovule in each cell ..... *P. Psyllium* 6.

1. **P. varia,** R. Br. *Variable Plantain.* Polymorphous perennial, flowering in its first year, more or less beset with rather long weak white septate spreading or appressed hairs; leaves all radical, linear to broad-lanceolate, from under 1 to nearly 30 cm. in length, entire or distantly toothed, sometimes 3-nerved, narrowed into a petiole; scapes usually longer than leaves; spike cylindrical, dense or interrupted, usually 2-18 cm. long, but in small plants sometimes reduced to a head of few or only 2-3 flowers; bract ovate, rather shorter than the obovate sepals, which are $2\frac{1}{2}$-4 mm. long, both bract and sepals with broad scarious margins and hairy on the green keel or merely ciliate; capsule 2-celled, with usually 4 reddish-brown oblong biconvex seeds 2-3 mm. long.

Throughout the State. May-Nov.—Temperate Australia.

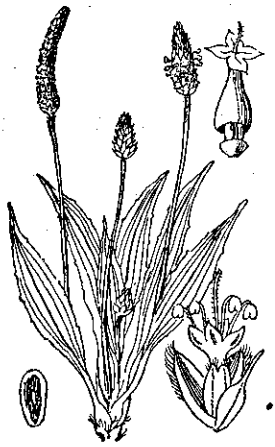

FIG. 229.—**Plantago lanceolata.**

*2. **P. lanceolata,** L. *Ribgrass; Ribwort.* Perennial, woolly about the base of the leaves with long unicellular not septate hairs; leaves radical, lanceolate, acute, entire or obscurely denticulate, 3-20 cm. long, more or less petiolate, glabrous, slightly hairy or woolly, with usually 5, sometimes 3 or 7, conspicuous nerves or ribs; scapes much longer than leaves, angular, furrowed; spike ovoid, oblong or cylindrical, 1-7 cm. long; bract ovate-acuminate, longer than the sepals, of which the 2 upper are free, the 2 lower united to near the summit, all hairy on the keels, or the lower ones glabrous; capsule 2-celled, with 2 brown oblong seeds, channelled on the inner face.

A common weed throughout the settled districts. Oct.-Jan.—Europe; Asia.

*3. **P. Bellardii,** All. Small annual, villous with long white slender septate spreading hairs; leaves linear-lanceolate, acute, erect, radical, 1-5 cm. long; scapes rather shorter or slightly longer than leaves; spike ovoid or oblong, dense, 4-12 mm. long; bracts lanceolate-acuminate, villous, longer than the ovate-oblong villous sepals; capsule 2-celled, with 2 ovate seeds, channelled on the inner face.

Southern districts; Bordertown. Sept.-Jan.—Mediterranean region.

* 4. **P. Coronopus,** L. *Buck's-horn Plantain.* Pubescent or villous annual or biennial; leaves radical, spreading, broad-linear, pinnatifid or bipinnatifid, 2-15 cm. long, with narrow acute lobes or teeth; scapes slightly or much longer than leaves; spikes slender-cylindrical, dense, 2-14 cm. long; bract ovate-acuminate, as long as sepals; 2 posterior (upper sepals with a ciliate keel or wing, the 2 lower ciliate on margin; corolla-tube pubescent; capsule 3-4-celled, with 3-4 plano-convex, sometimes winged seeds.

Southern districts; Murray lands; South-East; often found along the coast.—Oct.-March.—Europe; western Asia.

* 5. **P. major,** L. *Greater Plantain.* Perennial, glabrous or pubescent with short septate hairs; leaves radical, thick, broad-ovate, 5-20 cm. long, 5-9-nerved, with a slightly winged petiole; scapes equalling or somewhat exceeding the leaves; spikes cylindrical, dense except at very base, 2-20 cm. long; bracts as long as or rather shorter than sepals, all ovate, obtuse, and glabrous; capsule 2-celled, with usually 8-16 small angular seeds.

Moist places along the River Torrens and watercourses in the Mt. Lofty Range; not common. Oct.-Apl.—Europe; Asia.

* 6. **P. Psyllium,** L. Glandular-pubescent annual, 10-30 cm. high, the stem leafy, usually erect; leaves opposite or whorled, linear, 2-3 cm. long; flowerheads ovoid or globular, 5-10 mm. long, on axillary peduncles longer than leaves; bracts lanceolate-acuminate, longer than the lanceolate sepals, all glandular-pubescent; capsule 2-celled, with 2 oblong shining seeds, channelled on the inner face.

North of Port Wakefield. Oct.-Jan.—Mediterranean region. The testa of the seeds exudes in water a mucilage which is used in Europe in the preparation of silks, cottons, &c.

Family 108.—**RUBIACEAE.**

Flowers usually bisexual and regular; calyx or corolla inserted at the summit of the receptacle and often surrounding an epigynous disk; calyx with a very short tube and 3-5 lobes or segments or obsolete; corolla with 4-5 lobes or segments; stamens as many as corolla-lobes, alternate with them, inserted in the tube and usually enclosed; anthers versatile, 2-celled; ovary inferior or rarely half-superior, adnate to the receptacle, usually 2-celled, sometimes 1- or more-celled, with 1 or more anatropous ovules in each cell; style simple or with as many branches as ovary-cells; fruit a capsule or succulent drupe; seeds usually with a horny albumen. Herbs or shrubs with opposite simple entire leaves and interpetiolar stipules, which are sometimes developed like the leaves, so that there appears to be a whorl of leaves round the stem; flowers small, arranged more or less in cymes, sometimes reduced to heads.

A large almost cosmopolitan family, including many important plants, such as *Coffea arabica*, L., a small tree, probably indigenous in tropical Africa, with crimson drupes,

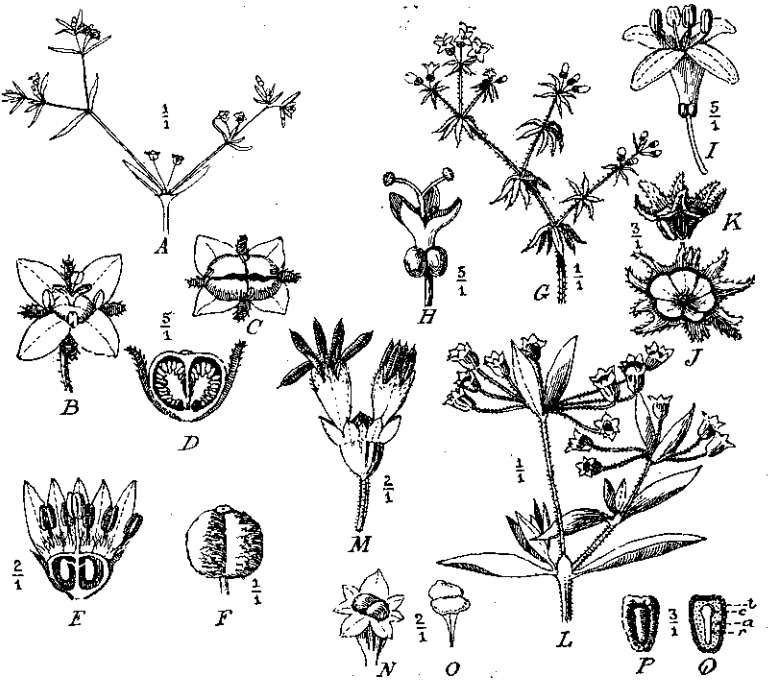

Fig. 230.—**Rubiaceae.** A-D, *Synaptantha tillaeacea*; A, flowering branch; B, flower; C, cupsule seen from above; D, vertical section of capsule. E-F, *Plectronia latifolia*: E, flower spread open; F, drupe. G-I, *Asperula scoparia*: G, flowering stem; H, female flower; I, male flower. J-K, *Opercularia varia*: J, solitary (simple) syncarpium of 6 capsules, after lid has fallen; K, lid with 2 seeds in position. L-Q, *Pomax umbellata*: L, fruiting branches; M, flowering head of 2 flowers; N, fruiting head (syncarpium) of 2 capsules; O, lid removed; P, seed; Q, vertical section of seed: *t*, testa; *c*, cotyledons; *a*, albumen; *r*, radicle.

each containing 2 stones; from the seeds or "beans" coffee is made. It also includes various species of *Cinchona*, South American shrubs or trees, whose bark yields quinine. *Rubia*, from which the family takes its name, is a genus of herbs; one Mediterranean species, *R. tinctorum*, L., or Dyers' Madder, was formerly much cultivated for the scarlet dye obtained from its roots.

A. Ovules several in each cell. (Sub-family *Cinchonoideae*).
Fruit a capsule; corolla-lobes valvate; ovules on an ovoid or globular placenta which rises from the base of the dissepiment; seeds minute, reticulate; leaves opposite, rarely whorled, with small scarious stipules connate in a sheath; herbs.
B. Flower-parts 4; calyx divided to base; capsule slightly compressed; seeds numerous.
Corolla divided almost to base, persistent..... SYNAPTANTHA 1.
Corolla with a distinct tube, caducous ..... OLDENLANDIA 2.
B. Flower-parts 5; calyx divided to middle; capsule globular; seeds 4-10 ..... DENTELLA 3.
A. Ovules solitary in each cell. (Sub-family *Coffeoideae*).
C. Leaves opposite, rarely whorled, with small scarious connate stipules; corolla-lobes valvate.
D. Ovule pendulous from near summit of ovary; fruit a berry-like drupe; albumen copious; micropyle superior; shrub ..... PLECTRONIA 4.
D. Ovule erect from base of ovary; micropyle inferior.
E. Fruit a berry-like drupe; flowers unisexual, not contracted into heads; albumen copious; shrubs COPROSMA 5.
E. Fruit a 2-valved capsule, the capsules connate in a collective fruit opening by a lid; flowers in heads; albumen copious; herbs.
Flowerheads usually connate in a compound head; seeds rounded at summit ..... OPERCULARIA 6.
Flowers on the branches of an umbel; seeds truncate at summit ..... POMAX 7.
C. Leaves usually appearing whorled owing to the leaf-like stipules; fruit of 2 small nutlike fruitlets; herbs.
F. Corolla funnel-shaped, with a distinct tube, at least in the male flowers.
Calyx obsolete ..... ASPERULA 8.
Calyx 6-toothed ..... SHERARDIA 9.
F. Corolla rotate, the tube none or very short..... GALIUM 10.

1. SYNAPTANTHA, Hook. f.

(From Greek *synaptos*, joined together; *anthos*, flower; because the filaments are adherent both to the ovary and the base of the corolla).

1. **S. tillaeacea** (F. v. M.) Hook. f. Apparently annual, glabrous or pubescent; stems branching, 8-10 cm. high; leaves lanceolate or linear-oblong, 4-12 mm. long, 1-3 mm. broad; stipular sheath with 2-4 long or short teeth on each side; peduncles 2-4 in one axil, shorter than or about as long as the leaves; calyx-segments 4, linear, distant, about 1 mm. long and about as long as the turbinate receptacle; corolla rotate, divided almost to base into 4 white ovate persistent segments; style 2-lobed at summit; capsule fully ½-superior, 2-celled, about 2 mm. broad and broader than long, opening loculicidally along the summit, and usually septicidally later; seeds 10-20, minute. (Fig. 230, A-D).—*Hedyotis tillaeacea*, F. v. M.(1863); *H. elatinoides*, Benth. (1866); *Oldenlandia tillaeacea*, F. v. M. (1882).

Lake Torrens to Far North and North-East.—Western New South Wales and Queensland; Central and West Australia. A species varying in the clothing and in the shape or size of the leaves, stipules and peduncles.

2. OLDENLANDIA (Plum.) L.

(Named by Plumier in 1703 after Henrik Bernhard Oldenland, a Danish naturalist who travelled in South Africa and died there about the end of the 17th century.)

1. **O. corymbosa,** L. Glabrous slender annual about 30 cm. high, with striate branches; leaves narrow-lanceolate, 1½-4 cm. long, 2-5 mm. broad, paler beneath; stipular sheath with 3-4 bristly teeth on each side; flowers 2-5 in axillary cymose or umbellate corymbs, on peduncles 10-15 mm. long, but much shorter than the leaves, the short pedicels with minute bristly bracts at base; calyx-segments 4, lanceolate, ciliate, 1 mm. long and about as long as the receptacle; corolla white, caducous, 4-lobed, 2 mm. long, the tube about as long as sepals, bearded in the throat; style notched; capsule 2 mm. long and

rather broader, 2-celled, scarcely exceeding the receptacle, opening by a loculicidal slit at summit; seeds numerous.

Somewhat doubtful, as the only specimen is one collected by O. E. Menzel in the Barossa Range in 1896, and preserved in his herbarium with the name "*Cryptandra tomentosa.*"—Queensland; eastern Asia; tropical Africa and America.

3. DENTELLA, Forst. et f.

(Diminutive from Latin *dens*, a tooth: the corolla-lobes are sometimes denticulate).

1. **D. repens** (L.) Forst. et f. Prostrate moss-like perennial, often rooting at nodes, more or less pubescent; leaves crowded, opposite or whorled, ovate, spathulate or lanceolate, only 2-3 mm. long (in our specimens); stipules connate, toothed; flowers axillary, closely sessile; calyx about 2 mm. long, pubescent, becoming white and membranous, with 5 lanceolate lobes about as long as the tube, the whole longer than the globular receptacle; corolla funnel-shaped, white, caducous, pubescent inside, about 5 mm. long, the 5 short lobes entire or denticulate; style bifid; capsule globular, more or less pubescent, 1-2 mm. diameter, 2-celled, crowned by the persistent calyx, indehiscent; seeds 4-10 in each capsule, minute ($\frac{3}{4}$ mm. long), black, angular, punctulate.—*Oldenlandia repens*, L.

Lake Torrens to Far North and North-East.—New South Wales; Queensland; Central and tropical Australia; eastern Asia.

4. PLECTRONIA, L. (1767).

(From Greek *plêktron*, a cock's spur: alluding to the spines on the branches of some South African species).

1. **P. latifolia** (F. v. M.) Benth. et Hook. Glabrous shrub 1-2 m. high; leaves broadly ovate or lanceolate, sometimes almost orbicular, rigid, shortly petiolate, 4-10 cm. long, 2-3½ cm. broad, prominently penninerved and reticulate; stipular sheaths deltoid, acuminate; flowers shortly pedicellate, numerous in pedunculate cymes which are shorter than leaves; calyx a minute scarious 5-toothed rim, much shorter than the turbinate receptacle, which is about 2 mm. long; corolla white, funnel-shaped, about 5 mm. long, bearded towards base inside, the 5 lobes longer than tube; style slightly exserted from the tube, the stigma thick, oblong, furrowed; drupe compressed-globular, 6-10 mm. long, containing 2 1-seeded stones, and slightly furrowed longitudinally between them, or by abortion containing only 1 stone. (Fig. 230, E-F).—*Canthium latifolium*, F. v. M.

From head of Arkaringa Creek westward to Birksgate Range; from Ouldabinna towards West Australian boundary.—Western New South Wales; central Australia.

5. COPROSMA, Forst. et f.

(From Greek *kopros*, dung; *osmê*, smell: alluding to the fetid odor of some species).

Differs from *Plectronia* chiefly in the minute calyx 4-5-toothed and the small corolla 4-5-lobed, the solitary ovule erect from the base in each of the 2 ovary-cells, the stamens exserted and the style divided almost to base into 2 long filiform lobes. Shrubs with deltoid-acuminate stipular sheaths and usually dioecious flowers.

Two species have been assigned to our South-East on somewhat doubtful authority.

C. hirtella, Labill., has been recorded by Mueller for South Australia, probably because of its occurrence as near our border as Portland, Vict. It is a glabrous or minutely scabrous-pubescent shrub, the leaves thick, ovate-acuminate, 2-6 cm. long, the flowers in small shortly pedunculate clusters, the drupe red or brownish.

C. quadrifida (Labill.) Robinson (1910), was recorded by J. P. Eckert in 1893 for our country near the Glenelg River, but no specimen has been preserved in Adelaide. It has thin lanceolate leaves 6-12 mm. long, branchlets often ending in a spine, flowers solitary, the receptacle subtended by a 4-lobed bract, the drupe red.—*Canthium quadrifidum*, Labill. (1804); *Marquisia Billardieri*, A. Rich. (1819); *Coprosma Billardieri*, Hook, f. (1847). Both species are found in Victoria, New South Wales, and Tasmania.

C. lucida, Forst. et f., with ovate or oblong coriaceous leaves, 3-8 cm. long, shining above, flowers in dense pedunculate clusters and orange obovoid drupes, is a New Zealand species often planted here as a hedge or grown singly as an ornamental shrub.

6. OPERCULARIA, Gaertn.

(From Latin *operculum*, a lid, cover: alluding to the lid of each partial fruiting head.)

Calyx-segments 3-5; corolla usually funnel-shaped, 3-5-lobed; stamens attached to base of corolla-tube and usually as many as the lobes; anthers large, exserted; ovary 1-celled with 1 erect ovule; style filiform, deeply divided into 2 long hairy stigmatic branches; capsule 2-valved and 2-7 capsules united in a head (collective fruit or syncarpium), of which the outer valves form a persistent rigid cup, while the inner ones form a deciduous lid or operculum; these heads, beset by the persistent hardened calyx-segments or sepals, are usually again united in a compound globular fruiting head or compound collective fruit; seeds ovoid-oblong. Procumbent or ascending often fetid herbs

with slender but rather stiff striate stems; stipules united in a sheath; flowers small, white, in cymes which are contracted into heads and united by their connate receptacles, terminal or in the forks or appearing axillary. A genus limited to Australia.

A. Peduncles erect, rather long; seeds almost smooth and trigonous ..... *O. scabrida* 1.
A. Peduncles recurved, short; seeds ovoid-oblong, plano-convex, 2-ribbed on inner face.
B. Flowers bisexual.
Leaves mostly ovate, almost glabrous; seeds smooth on back ..... *O. ovata* 2.
Leaves linear-oblong to lanceolate, scabrous-hairy; seeds wrinkled on back ..... *O. varia* 3.
B. Flowers dioecious; leaves narrow-linear ..... *O. turpis* 4.

1. **O. scabrida,** Schlechtd. More or less scabrous with short spreading hairs; leaves linear or linear-lanceolate, 8-30 mm. long, shortly petiolate; stipular sheath often with leafy teeth; flowerheads on erect peduncles 5-35 mm. long, with usually 1-3 linear floral leaves close under the head; flower-parts all usually 4; calyx-segments linear-subulate, ciliate, about 4 mm. long, corolla scarcely longer; seeds obovoid, about 1 mm. long, wrinkled transversely, subtrigonous, scarcely grooved on the inner face.

Southern districts to Bordertown, but rather rare; Kangaroo Island; South-East; Eyre Peninsula. Sept.-Nov.—Victoria; New South Wales.

2. **O. ovata,** Hook. f. Glabrous or nearly so; leaves ovate or lanceolate, 5-20 mm. long, thin, tapering into a short petiole; flowerheads on very short recurved peduncles; calyx-segments 3-4, lanceolate, rather broad towards base; corolla 3-5-lobed, scarcely longer; seeds ovoid, about 3½ mm. long, smooth on the outer face, concave and slightly wrinkled on the inner face, with 2 longitudinal ribs.

Mt. Lofty Range; South-East. Oct.-Dec.—Victoria; New South Wales; Tasmania. Differs from the type in longer calyx-segments.

3. **O. varia,** Hook. f. More or less scabrous-pubescent; leaves linear-oblong to broadly lanceolate, subsessile, 4-15 mm. long; flowers bisexual, in heads on very short usually recurved peduncles; calyx-segments mostly 3, lanceolate-subulate; corolla slightly longer, pubescent outside, 4-5-lobed, about 5 mm. long; partial heads 2-4 in the compound head, sometimes solitary, each partial head containing 2-7 capsules and seeds; seeds about 2½ mm. long, slightly wrinkled, with 2 prominent longitudinal ribs on the inner face and usually a very thin rib visible between them. (Fig. 230, J-K.)

Southern districts; Yorke Peninsula; Kangaroo Island; South-East. Aug.-Nov.—Victoria; New South Wales; Tasmania. Our specimens do not conform to Hooker's description of the Tasmanian type as having only 2 stamens. In our flowers the stamens almost always equal the corolla-lobes in number, and when any are wanting they have probably fallen off. Rodway (Tasm. Fl. 70) says the Tasmanian species have 3-5 stamens. These two species sometimes show a tendency to run into one another, and the whole genus requires revision.

4. **O. turpis,** F. v. M. Scabrous-pubescent or almost glabrous; leaves narrow-linear, 5-15 mm. long, about 1 mm. broad; stipular sheath linear-lanceolate; heads 5-9-flowered, on short finally recurved peduncles; flowers dioecious, the males with short styles and no ovary, the females with a minute cup-shaped deeply 4-5-lobed corolla (½-1½ mm. long), much shorter than the 3 calyx-segments, long protruding style-branches and no stamens; seeds of *O. varia.*—*O. varia,* Hook. f. var. *rigidior,* Benth.

Mount Lofty Range to Encounter Bay; Mt. Remarkable (Flinders Range). Aug.-Oct.

7. POMAX, Sol.

(From Greek *pôma,* a lid: alluding to the lid of the compound fruit.)

1. **P. umbellata,** Sol. Erect perennial herb 10-30 cm. high, scabrous-pubescent on the stems and sometimes on the leaves also; leaves subsessile, ovate-lanceolate or lanceolate, 8-25 mm. long; stipular sheath lanceolate; flowers 2-3 united by their receptacles in a head, the receptacles of each head appearing like a simple campanulate receptacle, the heads 5-11 in a terminal sessile umbel on slender peduncles about 10 mm. long in fruit; calyx-segments deltoid-acuminate, short, unequal, crowning the compound receptacle and 6-7 in number, whether they surround 2 or 3 flowers; corolla funnel-shaped, caducous, 4 mm. long, 5-lobed; stamens 5, with exserted anthers; ovary, style, and capsule as in *Opercularia,* but the fruiting head is a campanulate 2-3-celled collective fruit, about 3 mm. long, has never more than one lid, and contains 2-3 thick reddish obconical rugulose seeds, 2½-3 mm. long, 2-grooved on the outer or dorsal face. The persistent calyx-segments or sepals are arranged on the outer side of each corolla; they

therefore crown the circumference of the fruiting head and there are none on the lid, as there are in *Opercularia*. (Fig. 230, L-Q.)

Flinders Range to Far North and westward to Birksgate Range and Ooldea. July-Sept.—Temperate Australia. The only species and limited to Australia.

8. ASPERULA (Dod.) L.

(From Latin *asper*, rough: alluding to the stiff hairy clothing.)

Calyx none; corolla funnel-shaped, with a conspicuous tube in the bisexual and male flowers, the tube much shorter in the females, the lobes 4, spreading; ovary 2-celled, with 1 ascending ovule in each cell; style 2-lobed with capitate stigmas; fruit small, glabrous (in our species), dry, resembling that of some *Umbelliferae*, consisting of 2 subglobular indehiscent 1-seeded fruitlets, or by abortion only 1. Weak herbs with slender quadrangular stems; leaves subsessile, apparently whorled; when whorled in 4's, 2 are true leaves and 2 are leaf-like stipules, when in 6's, the 2 opposite ones are leaves and the 4 others are stipules; flowers small, whitish or pink, in terminal cymes, unisexual or bisexual. A widely distributed genus in the Old World. *Woodruff.*

A. Leaves narrow-linear; flowers dioecious.
  Leaves with a prominent mucro ..... *A. scoparia* 1.
  Leaves obtuse or merely acute ..... *A. conferta* 2.
A. Leaves almost ovate; flowers bisexual..... *A. Gunnii* 3.

1. **A. scoparia,** Hook. f. (1847). Small, scabrous-pubescent; leaves in whorls of 4-6, spreading or recurved, linear, 3-8 mm. long, finely mucronate; flowers dioecious, usually 3 in cymes scarcely longer than the whorl of leafy bracts at their base, and often supported on 2-3 terminal umbellate branchlets; male corolla quite 3 mm. long, the lobes slightly longer than tube, the style obsolete; female corolla 1½ mm. long, with lobes much longer than tube and 4 staminodes; fruit about 2 mm. long and rather broader. (Fig. 230, G-I).—*A. oligantha*, F. v. M. (1859) partly.

Southern districts to Flinders Range; Kangaroo Island; Murray lands; South-East. Aug.-Nov.—Temperate eastern Australia and Tasmania.

2. **A. conferta,** Hook. f. Near the preceding, but usually less scabrous, the leaves obtuse or acute, but without the prominent mucro; flowers dioecious, slightly larger, in little 3-flowered cymes on very short peduncles and pedicels, so that they appear almost sessile among the terminal leaves or bracts.—*A. oligantha*, F. v. M. partly.

Murray lands on both sides of the river; rare in Mt. Lofty Range. Sept.-Nov.—Temperate eastern Australia and Tasmania.

3. **A. Gunnii,** Hook. f. Small, sparsely scabrous-pubescent; leaves in whorls of 4-6, ovate-oblong, obtuse, ciliolate, 3-5 mm. long; flowers usually bisexual, 2-3 in the partial cymes and usually 1 in the fork, on short peduncles and pedicels but exceeding the terminal whorl of leaves or bracts; corolla 3-4 mm. long, the lobes about as long as the tube.—*A. oligantha*, F. v. M. partly.

Kangaroo Island (between Kingscote and Vivonne Bay and near Rocky River). Oct.-Dec.—Victoria; New South Wales; Tasmania.

9. SHERARDIA, Dill.

(After William Sherard, 1659-1728, English botanist and antiquarian, who collected plants in England and on the Continent, and bequeathed £3,000 to found a chair of botany at Oxford).

* 1. **Sh. arvensis,** L. *Field Madder.* Small annual with weak quadrangular stems; leaves in whorls of 6, rarely 5, the lowest usually in 4's, the lower obovate, the upper lanceolate, 5-10 mm. long, all more or less scabrous-pubescent, mucronate, the margins stiff and nerve-like; flowers in little terminal heads surrounded and exceeded by an involucre of 8 floral leaves united at base; calyx minute, 6-toothed; corolla violet, about 4 mm. long, funnel-shaped, the slender tube longer than the 4 lobes; fruit oblong, dry, indehiscent, pubescent, the 2 cohering fruitlets crowned by the persistent calyx.

A weed in the settled districts. Sept.-Dec.—Europe; western Asia.

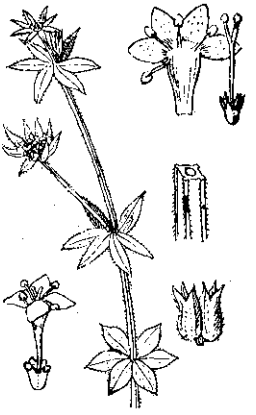

FIG. 231.—**Sherardia arvensis.**

10. GALIUM (Dod.) L.

(Greco-Latin *galion*, the name of *G. verum*, L., said to be derived from the Greek *gala*, milk, because that plant was used to curdle milk).

Calyx none; corolla rotate, with scarcely any tube and 4 spreading lobes; pistil and fruit as in *Asperula*, except that the fruit is sometimes bristly or hairy. Weak herbs with quadrangular stems, apparently whorled sessile or subsessile leaves and usually whitish flowers. An almost cosmopolitan genus. *Bedstraw.*

A. Fruit glabrous, reniform (*i.e.*, the 2 fruitlets ovoid or globular).
  B. Leaves in whorls of 4.
    C. Cymes shorter than or scarcely exceeding leaves, sometimes reduced to small clusters.
      Flowers whitish; leaves linear or narrow-lanceolate ..... *G. Gaudichaudii* 1.
      Flowers yellow; leaves broader ..... *G. ciliare* 2.
    C. Cymes on peduncles which alone are longer than leaves; leaves tending towards ovate ..... *G. umbrosum* 3.
  B. Leaves in pairs, linear ..... *G. geminifolium* 4.
A. Fruit tuberculate, reniform.
  D. Stems slender; peduncles long; fruiting pedicels filiform, straight
    Leaves 4 in whorl; perennial..... *G. umbrosum* var.
    Leaves 4-6 in whorl; filiform annual ..... *G. divaricatum* 5.
  D. Stems rather stout; leaves 6-8 in whorl; peduncles short; fruiting pedicels stout, recurved, usually 3 ... *G. tricorne* 6.
A. Fruit bristly with hooked hairs.
E. Fruit reniform.
  F. Stems slender.
    Leaves in whorls of 4, mostly linear-lanceolate ... *G. australe* 7.
    Leaves in whorls of 5-6, obovate ..... *G. tenerum* 8.
  F. Stems rather stout; leaves 6-8 in whorl, oblanceolate *G. Aparine* 9.
  E. Fruits linear-oblong, in pairs, drooping below the whorl of 4-5 leaves; small weak annual ..... *G. murale* 10.

1. **G. Gaudichaudii, DC.** More or less scabrous-pubescent perennial; stems slender; leaves almost always 4 in a whorl, sessile, linear or linear-lanceolate, 3-8 mm. long, with recurved margins; flowers 1-4 on axillary peduncles much shorter than the leaves and often almost sessile; corolla white; fruit glabrous, about 2 mm. long and rather broader when both fruitlets have ripened.

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

2. **G. ciliare,** Hook f. Small procumbent scabrous-pubescent perennial; leaves in 4's, lanceolate or ovate, often crowded, ciliate, 3-4 mm. long; flowers 1-3, on axillary peduncles not longer than leaf; corolla and anthers yellow; fruit glabrous.

Encounter Bay; Hallett's Cove; Cape du Couëdic, K.I.; Beachport, S.E. Sept.-Dec.—Tasmania.

3. **G. umbrosum,** Sol. More or less scabrous-pubescent perennial; leaves lanceolate to ovate-lanceolate, 5-10 mm. long, sometimes of rather thin texture, usually 4 in the whorl; cymes 3-7-flowered, on axillary peduncles which become much longer than the leaves; pedicels slender, usually longer than fruit and with 1 or 2 small leafy bracts at base; fruit glabrous, nearly 2 mm. long, reddish-brown, smooth when fresh, caducous.—*G. Gaudichaudii*, Benth. partly, not of DC.; *G. vagans*, Hook, f.

Southern districts to Flinders Range; Kangaroo Island; Yorke Peninsula; Murray lands. Sept.-Nov.—Eastern Australia; New Zealand.

Var. *muriculatum* (Benth.) Ewart. Fruit covered with tubercles which are rounded or taper into a very short almost straight hair-like summit and thus, as Bentham remarks, connect the species with *G. australe*.—Southern districts to Flinders Range; Kan aroo Island; Yorke Peninsula.—Victoria; New South Wales.

4. **G. geminifolium,** F. v. M. (1855). Glabrous or almost so; stems long, weak, climbing; leaves usually only 2 and opposite, narrow-linear or linear-lanceolate, 1-3 cm. long; flowers dioecious, 2-3 in the cymes or solitary in the fork or by abortion, on short pedicels but often exceeding the terminal pair of leaves or bracts; male corolla 1½-2 mm. long, yellowish inside, the lobes more than twice as long as tube; female corolla rotate, scarcely 1½ mm. long, with 4 staminodes, the lobes 4 times as long as tube; usually only 1 fruitlet ripening, globular, glabrous, succulent, 3-4 mm. diam.—*G. umbrosum*, Sol. var. *geminifolium*, Maid. et Betche.

The male corolla shows a tendency towards *Asperula*, and it is possible that this species and *A. geminifolia*, F. v. M. (recorded by Mueller for eastern Queensland, and by Moore and Betche for " all over the colony " of New South Wales), are one and the same.

Barossa Range; near marshes and floodwaters along the Murray and north of Cooper's Creek. Summer.—Victoria; New South Wales; western Queensland (Wilson River). The type came from the Murray and its tributaries in Victoria.

*5. **G. divaricatum,** Lamk. Slender erect annual, 3-15 cm. high; stems capillary, minutely scabrous, branching from about the middle; leaves usually 4-6 in whorl, 2-8 mm. long, ciliolate with minute bristles on the recurved margins, the lowest oblong, the others linear-lanceolate; cymes 2-4-flowered, forming axillary and terminal panicles with long divaricate branches; peduncles capillary, usually much longer than the fruit, which is about ½ mm. long and tuberculate.

Happy Valley; McLaren Vale; Kinchina. Oct.-Nov.—Mediterranean region.

* 6. **G. tricorne,** With. *Three-horned Bedstraw.* Annual with long rather stout stems clinging by reflexed prickles; leaves 6 or 8 in whorl, linear-lanceolate, 15-30 mm. long, glabrous above, reflexed-prickly on margin; cymes usually 3-flowered, on peduncles shorter than leaves, the fruiting pedicels much recurved; fruitlets globular, 4 mm. long, minutely tuberculate.

Fields and roadsides near Adelaide and in Mount Lofty Range. Oct.-Nov.—Europe; western Asia.

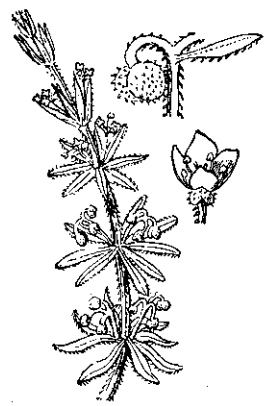

FIG. 232.—**Galium tricorne.**

7. **G. australe,** DC. More or less scabrous-pubescent, with minute reflexed hairs on the long weak stems; leaves in whorls of 4, mostly linear-lanceolate, 4-8 mm. long; cymes 1-3-flowered, arranged along axillary branches or peduncles, which are shorter than or twice as long as the leaves; pedicels very short, or sometimes longer than fruit, with 1 or 2 leafy bracts at base; fruit about 2 mm. long, covered with hooked hairs.

Southern districts to Flinders Range; Kangaroo Island; South-East. Sept.-Dec.—Temperate Australia.

*8. **G. tenerum,** Schleicher. Stems as in *G. Aparine* but slender; leaves 5-6 in a whorl, oblanceolate or obovate, tapering towards base, 7-15 mm. long, mucronate, ciliate; cymes 1-3-flowered, on peduncles finally longer than leaves, fruiting pedicels straight, divaricate, much longer than fruit, which is about 2½ mm. long and covered with hooked hairs.

Flinders Range; Gawler Range; South-East. Aug.-Oct.—Mediterranean region. This is probably the same as the *G. Aparine*, L. var. *minor*, Req., given by Bentham as occurring in Victoria and South and West Australia. This variety is recorded by De Candolle in the Prodromus as having been found only near Narbonne, in the South of France. It is not mentioned in any modern French or Italian flora which I have seen, and is probably considered equivalent to *G. tenerum*, with which our plant agrees very well, although it appears to have slightly larger fruits. Nos. 8 and 9 are more or less prickly on the upper face of the leaf with small stiff hairs curved upwards, while the somewhat recurved margins and the midrib below are ciliate with similar hairs or prickles curved downwards towards the base of the leaf.

*9. **G. Aparine,** L. *Cleavers, Goose-grass.* Stems rather stout, clinging by recurved prickles; leaves 6 or 8 in a whorl, oblanceolate, mucronate, 1-4 cm. long, prickly above; cymes 1- to several-flowered, bracteate at base, on peduncles longer than the leaves; fruiting pedicels straight, divaricate, longer than fruit; fruit 3-4 mm. long, covered with hooked hairs thickened towards the base.

Mount Lofty Range; rare.—Europe; western Asia.

*10. **G. murale** (L.) All. Small almost glabrous annual with weak filiform stems; leaves in whorls of 4-5, oblanceolate, scabrous, 3-5 mm. long; flowers usually in pairs, each on a peduncle much shorter than the leaves and usually reflexed in fruit; fruit linear-oblong, 1¼ mm. long, covered with spreading hooked hairs.

Throughout the settled districts. Sept.-Oct.—Mediterranean region.

FAMILY 109.—CAPRIFOLIACEAE.

Flowers bisexual, sometimes irregular; calyx and corolla inserted at the summit of the receptacle; calyx 3-5-partite; corolla caducous, with 3-5 imbricate lobes; stamens as many as corolla-lobes, alternate with them and inserted in the tube; ovary inferior, adnate to the receptacle, 2-5-celled, with 1 or more pendulous anatropous axile ovules in each cell; fruit usually a berry or drupe; seeds albuminous, the radicle superior.

Trees or shrubs; leaves opposite, without stipules or with stipules much smaller than the leaves or leaflets and not rising between the petioles or connecting them as in *Rubiaceae. Honeysuckle Family.*

The family, which is only represented by 1 genus in Australia, derives its name from the Latin *Caprifolium* (Honeysuckle), formerly used as a generic name, but now united with *Lonicera.* Other popular members are the Guelder Rose (*Viburnum Opulus*), the Laurustinus (*V. Tinus*), and the Snowberry (*Symphoricarpus racemosus*).

1. SAMBUCUS (Tourn.) L.

(Latin name for the elder-tree).

1. **S. Gaudichaudiana,** DC. *White Elder.* Shrub 1-2 m. high; leaves imparipinnate, of 5-9 lanceolate or ovate-lanceolate acuminate coarsely serrate leaflets 5-10 cm. long; stipules resembling the leaflets but smaller; flowers small, fragrant, in large corymbs, of which the main branches are usually 4 and umbellate; calyx-lobes 3, rarely 4, very short and broad, with scarcely any tube; corolla white, with 3, rarely 4, blunt spreading lobes much longer than the short tube; ovary 3-4-celled, with 1 ovule in each cell and 3 short sessile stigmas; fruit a globular white berry-like drupe, about 5 mm. diam., containing 3-4 small 1-seeded stones.

South-East, from Glenelg River to Beachport. Nov.-Dec.—Temperate Australia, except West Australia. The specific name commemorates Charles Gaudichaud, who collected plants in the Blue Mountains as botanist of Freycinet's scientific expedition, 1817-20.

* *S. nigra,* L., the Common or Black Elder of Europe, with 5-7 ovate-acuminate leaflets, white 5-parted flowers in a broad corymb with 5 umbel-branches and black drupes, has been planted along the banks of the Onkaparinga near Woodside and in Morialta Gully.

Family 110.—VALERIANACEAE.

Flowers more or less irregular, bisexual or unisexual; calyx and corolla inserted at summit of receptacle; calyx inconspicuous in flower, becoming toothed or developing into a plumose pappus; corolla funnel-shaped, 5-lobed, sometimes spurred at base; stamens 1-3, inserted in the corolla-tube; ovary inferior, adnate to receptacle, with 3 cells, of which only 1 contains a pendulous anatropous ovule; style filiform, with 1-3 stigmas; fruit dry, indehiscent, seed-like, crowned by the persistent calyx, with 1 fertile cell and 1 exalbuminous seed; embryo straight, with superior radicle. Herbs with opposite exstipulate leaves.

A family represented in most parts of the globe, but in Australia only by introduced species. *Centranthus ruber* (L.), DC. (Red Valerian), with a spurred corolla and 1 stamen, and *Fedia Cornucopiae* (L.), Gaertn. (African Valerian), with a 2-lipped corolla and 2 stamens, are garden plants which have escaped here and there in the hills near Adelaide, but can scarcely be considered established.

1. VALERIANELLA, Haller.

(Diminutive of *Valeriana,* another genus of this family).

Calyx usually erect, with 1 or more teeth; corolla-lobes almost equal, spreading; stamens 3; fruit small, convex on back, the 2 barren cells usually marked by longitudinal lines or swellings on the front or ventral face. Slender more or less pubescent annuals, branching dichotomously; lower leaves obovate, in a radical rosette, the upper ones oblong-lanceolate, stem-clasping; flowers very small, lilac, in compact terminal bracteate cymes, or solitary in the forks. The English species are called *Cornsalad* because the leaves are sometimes eaten.

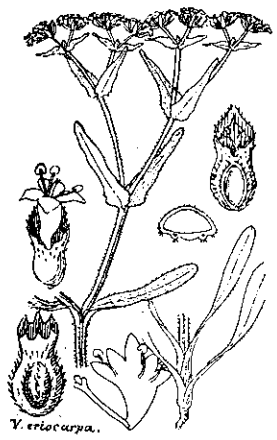

Fig. 233.—**Valerianella truncata.**

A. Fruits in dense corymbs.
- Calyx obliquely truncate, 1-toothed *V. truncata* 1.
- Calyx crown-shaped ..... *V. eriocarpa* 2.

A. Fruits in globular heads; calyx almost rotate..... *V. discoidea* 3.

* 1. **V. truncata,** Betcke. Upper leaves entire or very slightly toothed towards base; heads (corymbs) flat-topped; bracts lanceolate, ciliate; calyx truncate very obliquely, so that the posterior tooth takes the shape of an erect pointed ear about as long and broad as the fruit, the other teeth almost obsolete; fruit ovoid, pubescent, nearly 2 mm. long, with an oval depression on the ventral face, surrounded by the 2 ribs representing the barren cells.

Mt. Lofty Range and foothills near Adelaide. Oct.-Nov.—Mediterranean region.

* 2. **V. eriocarpa,** Desv. Scarcely differs from the preceding except in the calyx, which forms a complete reticulate slightly oblique crown, about as long and broad as the fruit and surmounted by 6 short straight broad teeth; fruit pubescent, with an oval depression on the ventral base.

Waterfall Gully. Oct.-Nov.—Mediterranean region.

* 3. **V. discoidea** (L.), Lois. Stem-leaves toothed or pinnatifid with linear lobes; flowerheads globular, with ovate ciliate bracts; calyx hairy inside, almost rotate, about as long and broad as fruit, divided for $\frac{2}{3}$ of its length into 6 lanceolate spreading hooked teeth, 1 or more of which are sometimes unequally bifid; fruit ovoid-obconical about 2 mm. long, hairy, with an ovoid depression on the ventral face, each of the 2 barren cells almost as large as the fertile one.

Mt. Lofty Range from near Adelaide to McLaren Vale. Oct.-Nov.—Mediterranean region.

Family 111.—DIPSACACEAE.

Flowers bisexual, slightly irregular; calyx small, continuous with the thin receptacle (hollow floral axis or receptacular tube) above which it is narrowed and then spreads outward in teeth or awns; corolla funnel-shaped, with 4-5 lobes, of which the lowest is the largest; stamens never more than 4, inserted in the corolla-tube; ovary inferior, adnate to the receptacle, 1-celled, with 1 pendulous anatropous ovule; style filiform, the stigma entire or notched; fruit small, dry, indehiscent, 1-seeded, surmounted by the persistent calyx and enveloped in the outer calyx. Herbs or undershrubs with opposite exstipulate leaves; flowers sessile in a head on a common receptacle or floral base, which is furnished with scales between the flowers and is surrounded by an involucre of bracts, as in *Compositae*, each flower having also a loose outer calyx (sometimes called *involucel*), which encloses the real calyx and ovary and is probably formed of connate bracts.

The family, which is widely diffused in the Old World, but has no native representatives in Australia, differs from *Compositae* in the free anthers and outer calyx.

Scales of the common receptacle rigid, spiny and conspicuous ..... Dipsacus 1.
Scales of the common receptacle small, weak and inconspicuous ..... Scabiosa 2.

1. DIPSACUS, L.

(Greco-Latin name of some species of this genus.)

* 1. **D. fullonum,** L. *Fuller's Teasel.* Stout biennial with small prickles on the stem and involucre; leaves oblong or lanceolate, those of the stem connate at base, entire or toothed; flowerheads, becoming cylindrical, 4-9 cm. long, 3-4 cm. diam.; calyx cup-shaped, ciliate; outer calyx 8-ribbed; corolla pink, 4-lobed; involucral bracts stiff, linear-lanceolate, unequal, some nearly as long as the head; scales of the common receptacle broad-based, hairy, tapering into a rigid hook; seed oblong, tetragonous, 4-5 mm. long.

Near Tantanoola, S.E., also said to grow wild in parts of the Mount Lofty Range. Summer.—Perhaps a cultivated form of *D. silvestris,* Huds. or *D. ferox,* Lois., both of southern Europe. The heads of *D. fullonum* were used to tease or raise the nap on woollen cloth.

2. SCABIOSA (Tourn.) L.

(Medieval Latin name of some species which was believed to provide a cure for scab or itch, in Latin *scabies.*)

* 1. **S. maritima,** L. *Purple Pincushion, Sweet Scabious.* Annual or perennial herb, to 1 m. high; radical leaves petiolate, oblong, crenate or coarsely toothed, the stem-leaves irregularly cut, often lyrate or pinnatisect; flowerheads on long peduncles, hemispherical, becoming ovoid or oblong in fruit; calyx-tube narrow, terminating in a short limb and 5 spreading awns; outer calyx campanulate 8-ribbed, terminating in a short scarious spongy incurved crown; corolla white to lilac and dark-purple, with 4-5 unequal lobes; scales of the receptacle narrow, ciliate; involucral bracts lanceolate, finally reflexed; seed ovoid, $2\frac{1}{2}$ mm. long.

Fig. 234.—**Scabiosa maritima.**

The name *S. atropurpurea* was given by Linnaeus to a cultivated form with dark-purple flowers, the wild plant (*S. maritima*) having in Europe white, lilac, or blue flowers.

Adelaide plains and Mount Lofty Range; Encounter Bay. Nov.-March. An escape from cultivation.—Mediterranean region.

FAMILY 112.—CUCURBITACEAE.

Flowers unisexual, regular; calyx and corolla inserted on the margin of the cup-shaped upper or free part of the receptacle, the calyx of normally 5 sepals and the corolla 5-sect; male flowers consisting only of the free cup-shaped part of the receptacle, the sepals, corolla and stamens and sometimes a rudimentary ovary in the base of the cup; stamens 5, free in 1 tribe (the *Fevilleae*, not represented in Australia) in all the others more or less united by some or all of the filaments; anthers 1-celled, facing outwards, straight or more frequently long, linear and abruptly curved or waved (*sinuous*); receptacle in the female flowers adnate to the inferior ovary, above which it is narrowed to a neck and then expanded upwards in a cupular shape as in the male flowers; ovary usually 3-celled, each cell containing a thick 2-branched parietal placenta bearing usually many anatropous ovules on each branch, the 3 placentas finally meeting in the middle; stamens reduced to staminoids or absent; style usually short, with 3 thick stigmas; fruit fleshy, mostly indehiscent; seeds usually flat, without albumen; embryo straight, with large broad cotyledons and a small radicle. Herbs, usually with weak furrowed and ribbed stems, prostrate or climbing by means of almost axillary tendrils; leaves alternate, petiolate, without stipules, usually palmately nerved and lobed; flowers axillary, chiefly yellow.

The above description of the flower is that adopted by Naudin, Baillon, Engler, Warming, Cogniaux, Harms, and other botanists; E. G. O. Müller and Pax in the Natürlichen Pflanzenfamilien consider what is here called the cup-shaped portion of the receptacle as the connate base of the calyx and corolla, thus making the calyx consist of a cup-shaped or campanulate tube and 5 teeth or lobes; Bentham and Hooker in the Genera plantarum treat the receptacle, where it is adnate to the ovary, as an adherent calyx-tube and the upper free part as a 5-toothed calyx-limb, with the base of the corolla adnate to its inner surface below the teeth. The anthers, instead of being 4-celled in the earliest stage and then becoming 2-celled, as in the ordinary anther, are 2-celled in the earliest stage and open by a longitudinal slit between the 2 cells, thus becoming 1-celled. Several authorities consider that the 3 stamens apparent in most of the genera are not 5 more or less united stamens, but are really 3 simple stamens, 2 of them with 2-celled anthers and 1 with a 1-celled anther.

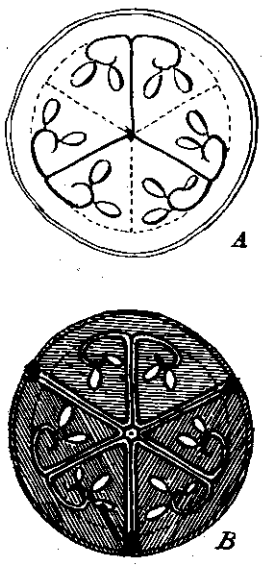

FIG. 235.—Section of fruit.

Nor are the leading authorities at one as to the structure of the ovary and fruit, for some maintain that the placentas are only parietal in appearance and that in reality the 2 margins of each carpel, after meeting in the centre of the ovary, are turned inward and backward, become adnate to each other and pass along the middle of the carpel nearly to the circumference of the ovary, where they branch and bear the ovules. According to this view the placentas are axile. The accompanying figure illustrates this question by a transverse section of the ovary: A shows the ripening ovary as it appears; B its structure on the theory of axile placentation.

A large and important family, most abundant in warm countries. *Cucumis Melo*, L. is the Melon, with its varieties or races: var. *cantalupensis*, Naud. (Rock Melon, Ribbed Melon, Cantaloupe); var. *saccharinus*, Naud. (Sweet Melon); var. *reticulatus*, Naud. (Netted Melon). *Cucumis sativus*, L. is the Cucumber, also with variously shaped fruit. *Citrullus vulgaris*, Schrad. is in its cultivated form the Water-melon, and another form with firmer flesh is known in Australia as the Pie-melon. The drug colocynth is obtained from the very bitter fruits of *Citrullus Colocynthis* (L.) Schrad. *Cucurbita Pepo*, L. is the Vegetable Marrow or Pumpkin, with fruit of many shapes (Turban Marrow, Bush Marrow, Trombone, &c.). *Lagenaria vulgaris*, Ser. is the Bottle Gourd or Calabash, from some of whose multiform fruits wine-bottles and snuff boxes are made, and in South America a globular form is used for mate cups. *Luffa cylindrica* (L.) Roem. has a cylindrical fruit, whose fibrous interior is the vegetable bath-sponge or loofah.

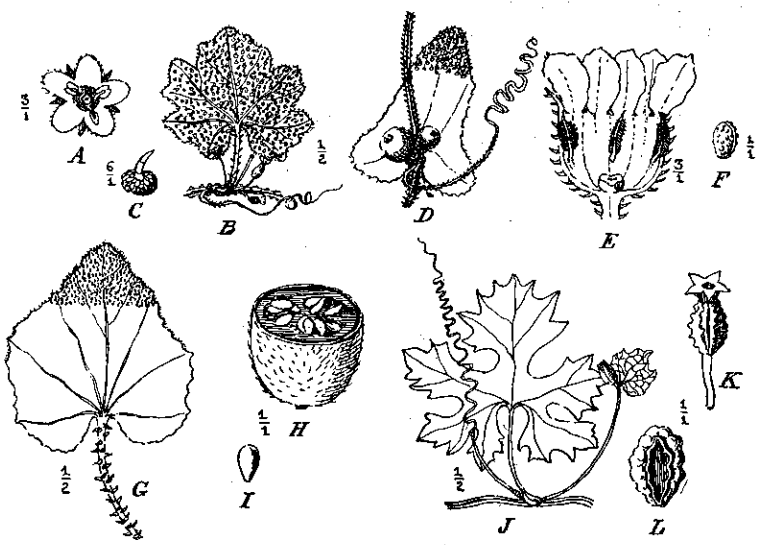

FIG. 236.—**Cucurbitaceae.** A-C *Melothria micrantha:* A, male flower seen from above; B, leaf and cluster of flowers; C, hair from leaf. D-F, *M. maderaspatana:* D, leaf and fruits; E, male flower spread open; F, seed. G-I, *Cucumis Melo* var. *agrestis:* G, leaf; H, transverse section of fruit; I, seed. J-L, *Momordica Balsamina:* J, leaf and male bud and bract; K, female flower (corolla fallen); L, seed.

A. Anthers-cells straight; stamens apparently 3, free. (Tribe *Melothrieae*) ..... MELOTHRIA 1.

A. Anther-cells sinuous; stamens apparently 3, the filaments free, the anthers free or at first cohering; corolla rotate. (Tribe *Cucurbiteae;* sub-tribe *Cucumerinae.*

B. Connective not produced above anthers; disk none.

Tendrils usually 2-3-fid; stamens inserted on the tube of the receptacle..... CITRULLUS 2.

Tendrils simple; stamens inserted at orifice of receptacle ..... MOMORDICA 3.

Tendrils none; seeds discharged elastically..... ECBALLIUM 4.

B. Connective produced above anthers; annular disk at style; tendrils simple..... CUCUMIS 5.

1. MELOTHRIA, L.

(From Greek *mêlôthron*, the name of some species of *Bryonia*, another genus of this family.)

Stamens in the male flowers apparently 3, inserted about the middle of the receptacular tube, 4 of the filaments connate in 2's so as to form 2 stamens with 2 anthers each, leaving 1 free stamen with 1 anther; anthers not united round the style, their cells short and straight; ovary rudimentary; ovary in the females 3-celled, with few or many horizontal ovules; fruit small, berry-like. Slender herbs, with simple tendrils; flowers monoecious (in our species), small, yellow.

Connective not extending above the anthers; seeds smooth; leaves suborbicular in outline..... *M. micrantha* 1.

Connective extending above the anthers in a short point; seeds roughened; leaves broadly lanceolate in outline.. *M. maderaspatana* 2.

1. **M. micrantha,** F. v. M. ex Cogn. (1881). Stems slender, ribbed, sometimes over 1m. long; plant scabrous with small white tubercles on which short hairs are seated, especially dense on the under-surface of the leaves; leaves on petioles of 1-3 cm., the blades usually orbicular-cordate in outline, 2-4 cm long and broad, with 5-7 shallow crenulate obtuse lobes; flowers very small, the males and females clustered together in the same axil; sepals acute, about ½ mm. long, the pale-yellow rounded corolla-segments scarcely exceeding them; fruit shortly pedunculate, globular or subovoid, glabrous, 10-14 mm. thick; seeds white, smooth, obovate, narrowed towards base, 5 mm. long.

(Fig. 236, A-C). *Cucurbita micrantha*, F. v. M. (1855); *Cucumis Muelleri*, Naud. (1859); *Melothria Muelleri*, Benth. (1866).

Along the River Murray, often in "lignum" swamps; floodbed of Cooper's Creek; Diamantina River. Summer.—Western Victoria, New South Wales, and Queensland.

2. **M. maderaspatana** (L.) Cogn. (1881). Annual with slender scabrous furrowed stems often climbing on shrubs or trees and over 2 m. long; leaves petiolate or almost sessile, ovate-lanceolate or triangular, 1½-6 cm. long, deeply cordate, obscurely 3-lobed, the margins slightly crenate, very rough on both faces with short tubercle-seated hairs; male flowers clustered on short peduncles, the receptacle 2 mm. long, hairy, the sepals subulate, 1-1½ mm. long, often recurved; corolla slightly longer; female flowers solitary, subsessile; fruit globular, glabrous, red, 8-12 mm. diam., seeds 2-5, ovoid-compressed, dark or pale, tuberculate or rugulose, 5-6 mm. long.—(Fig. 236, D-F). *Cucumis maderaspatanus*, L. (1753); *Bryonia scabrella*, L. f. (1781); *Mukia scabrella* (L. f.) Arn. (1841).

Flinders Range to Far North; westward to Everard and Birksgate Ranges; eastward to Lake Frome and Queensland border. Summer.—Northern New South Wales; central and northern Australia; tropical Asia; Africa. The specific name means "of Madras."

2. CITRULLUS, Forsk.

(Diminutive of Latin *citrus*, the citron-tree, because the fruits are sometimes orange-shaped).

FIG. 237.—**Citrullus vulgaris.**

* 1. **C. vulgaris,** Schrad. *Wild, Bitter,* or *Bastard Melon.* Annual with long villous stems, woolly towards summit; leaves ovate-cordate in outline, 2-8 cm. long, pubescent and slightly scabrous beneath, with longer hairs on the nerves, the upper surface much less hairy or almost glabrous, palmatifid into 3 or almost 5 lobes, the middle lobe the longest, all the lobes, and especially the central one, again divided into faintly toothed obovate lobules; petiole villous, rather shorter than leaf; tendrils bifid, rarely trifid; flowers monoecious, solitary, axillary; males on villous peduncles 5-20 mm. long, the sepals linear-lanceolate, 3-5 mm. long and about as long as the villous receptacle, the corolla yellowish, pubescent, 6-10 mm. long, its segments ovate-oblong, acuminate; stamens apparently 3, with 3 free filaments and free sinuous anthers not surmounted by an appendage; female flower with a densely woolly ovary (adnate receptacle) and 3 small staminodes round the style; fruit glabrous, smooth, usually globular and 6-15 cm. diam., green, mottled with irregular longitudinal rows of white spots, sometimes ovoid-oblong and rather longer; flesh white, solid, very bitter; seeds numerous, obovate, narrowed towards base, at first white, finally light-brown with blackish streaks, 9-10 mm. long, 6 mm. broad.

Usually in sandy land, cultivated or uncultivated, near the sea, in the agricultural districts, and as far north as Oodnadatta and the Macumba Creek. Nov.-April.—This is the wild bitter-fruited form of the Water Melon or Pie Melon, and is a native of South Africa, where it grows in the drier districts along with another wild form which has tasteless fruit. Closely allied to *C. Colocynthis* (L.), Schrad. (the Colocynth), of the Mediterranean region and western Asia, but the latter has usually a perennial root, the leaves very scabrous-hairy on both faces, the stems not woolly at summit, the tendrils bifid or simple, the ovary with shorter and fewer hairs, the fruit smaller and spongy inside, the seeds only 6 mm. long.

The cultivated form of *C. vulgaris* is sometimes found as an escape in our State.

3. MOMORDICA (Tourn.), L.

(From the Latin *momordi*, perfect tense of *mordere*, to bite: the edges of the seeds appear as though gnawed).

1. **M. Balsamina,** L. *Balsam Apple.* Slender glabrous climber; leaves bright green, orbicular-cordate in outline, 4-7 cm. diam., palmatipartite into 5 rhomboid lobes with coarse acute uneven teeth or lobules; tendrils simple; flowers monoecious, solitary, the male peduncle 2-6 cm. long, bearing at its summit an orbicular-cordate denticulate green-nerved bract 10-12 mm. broad; base of the receptacle closed by 2-3 scales; sepals ovate-acuminate, pubescent, about 3 mm. long; corolla-segments yellow, 12-15 mm. long; stamens apparently 3, with free filaments; anthers sinuous, at first cohering, afterwards free; female peduncle much shorter, with bract at base or absent; style

rather slender; ovary fusiform, warted; fruit orange-red, ovoid or subglobular, tuberculate, 3-6 cm. long; seeds 3-6, ovoid-compressed, 10-12 mm. long, blackish, crenulate on margin. (Fig. 236, J-L).

Todmorden Station, on the Alberga River (Far North).—New South Wales; Queensland; western Asia to India; Africa.

4. ECBALLIUM, A. Rich.

(From Greek *ekballō*, I throw out: alluding to the discharge of the seeds).

* **1. E. Elaterium** (L.), A. Rich. *Squirting Cucumber*. Rough-hairy perennial with thick succulent stems and no tendrils; leaves thick, triangular-cordate, 3-7 cm. long, obtuse, whitish below; flowers monoecious, the males in racemes, the females peduculate and solitary or in the same axils as the males; sepals linear-lanceolate; corolla yellow; stamens apparently 3, the anthers sinuous, free; style short; stigmas 2-forked; fruit fleshy, drooping, oblong, bristly, about 3 cm. long, opening elastically and discharging the seeds from its base; seeds numerous, dark-brown, ovoid-compressed, 4-5 mm. long.

A weed in fields at Lyndoch and Callington. Summer.—Mediterranean region.

5. CUCUMIS, L.

(Latin name of the cucumber).

Stamens in the male flowers apparently 3, free; anthers linear, sinuous; connective produced above the anthers in a short appendage; ovary in the females usually 3-celled, with numerous horizontal ovules; seeds ovate or oblong, compressed, the margins not thickened. Prostrate herbs, with simple tendrils; flowers yellow, monoecious.

Fruit slightly hairy or almost glabrous; leaves merely angled or shortly lobed	*C. Melo* 1.
Fruit bristly; leaves deeply lobed	*C. myriocarpus* 2.

1. **C. Melo,** L. var. *agrestis*, Naud. *Ulcardo Melon*. Annual with slender angular scabrous stems; leaves ovate-cordate or almost orbicular-cordate in outline, 2-7 cm. long, slightly 3-5-angled or shortly 3-7-lobed, denticulate, scabrous on both faces with minute hairs seated on tubercles; flowers on peduncles much shorter than petioles, which about equal the leaves; male flowers few, clustered, the receptacle villous or pubescent, 5-6 mm. long, the sepals subulate, shorter; corolla 6-15 mm. long, the segments acute; terminal appendages scarcely shorter than anthers; female flowers solitary or twin; fruit greenish, ovoid or elliptical-oblong, 1½-3 cm. long, glabrous or retaining a clothing of short scattered hairs; seeds numerous, whitish, acute at base, 5-6 mm. long. (Fig. 236, G-I),—*C. chate*, Hasselquist (1757), L. (1759); *C. trigonus*, Benth. non Roxb.; *C. jucundus*, F. v. M.; *C. picrocarpus*, F. v. M.

Near creeks and waterholes north of Oodnadatta and Cooper's Creek. Most of the year. —Northern New South Wales; Queensland; central and tropical Australia; tropical Asia and Africa. This is the wild plant from which the cultivated melon is derived.

*2. **C. myriocarpus,** Naud. *Paddy Melon*. Annual with slender prostrate scabrous stems; leaves ovate-cordate in outline, 3-6 cm. long, palmatifid into 5 obovate toothed lobes, the middle one the longest and often 3-lobulate, almost glabrous above, very rough with tubercle-seated hairs below; petioles stout, scabrous, about as long as leaves; male flowers in clusters of 2-4, on short slender peduncles, the receptacle pubescent, 3 mm. long, the sepals subulate, 1½ mm. long, the corolla about 4 mm. long, the lobes ovate; appendages shorter than anthers; female flowers solitary or twin, the ovary with rather distant bristles; fruit globular, 20-25 mm. diam., beset with long, soft bristles, marked with dark-green longitudinal stripes, finally yellow; pulp bitter; seeds oblong, pale-yellow, 3½-4 mm. long.

Roadsides and cultivated land in settled districts. Nov.-Mar.—South Africa.

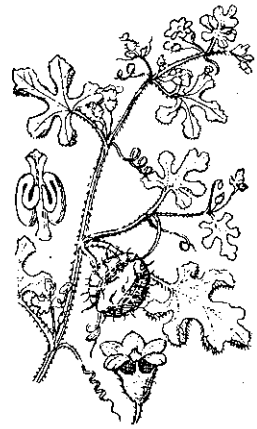

FIG. 238.—**Cucumis myriocarpus.**

Family 113.—**CAMPANULACEAE.**

Flowers bisexual, or unisexual by abortion in some species, regular or irregular; sepals usually 5, persistent; corolla with usually 5 valvate lobes, both calyx and corolla seated on the hollow receptacle; stamens as many as corolla-lobes and alternate with them, inserted at the base of the corolla-tube, usually free from it and epigynous; ovary inferior, adnate to the receptacle, 2-3-celled (in our species), with numerous anatropous ovules on axile or septal placentas; style filiform, with 2-3 stigmatic lobes; fruit a capsule, usually with a free summit rising between the sepals, rarely a berry; seeds numerous, small, with a straight embryo in the middle of the albumen. Herbs, often with a milky juice; leaves exstipulate, usually alternate.

The family derives its name from the genus *Campanula*, or Bell-flower, inhabiting the northern hemisphere.

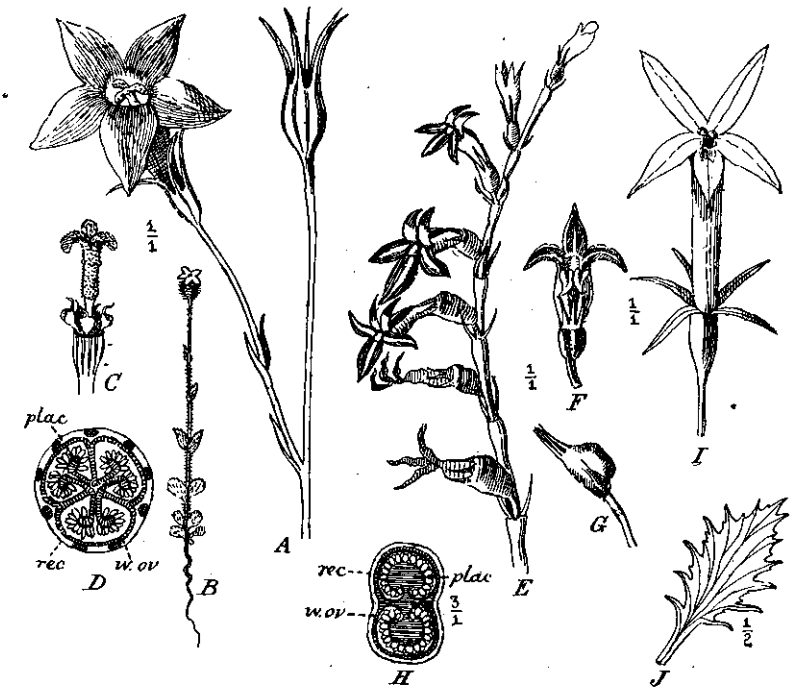

Fig. 239.—**Campanulaceae.** A-D, *Wahlenbergia gracilis:* A, flowering and fruiting branch; B, dwarf form from Flinders Range; C, pistil and filaments (anthers fallen); D, cross-section of ovary. E-H, *Lobelia gibbosa:* E, flowering part of stem; F, flower; G, fruit; H, cross-section of ovary. I-J, *Isotoma petraea:* I, flower; J, leaf. Abbreviations: *rec*, hollow receptacle; *w. ov*, wall of ovary; *plac*, axile placenta (in D), septal placenta (in H).

A. Corolla regular; anthers free; ovary 2-3-celled. (Subfamily *Campanuloideae*) ..... Wahlenbergia 1.
A. Corolla usually irregular; flowers resupinate; anthers cohering in a ring round the style; ovary 2-celled. (Subfamily *Lobelioideae*).
  B. Corolla-tube slit open to base, the limb 2-lipped; stamens attached at base of corolla-tube.
    Fruit a loculicidal capsule..... Lobelia 2.
    Fruit more or less succulent, indehiscent ..... Pratia 3.
  B. Corolla-tube not slit to base, the limb almost regular; stamens attached above middle of corolla-tube .... Isotoma 4.

1. WAHLENBERGIA, Schrad.

(Named by Schrader in 1814 after George Wahlenberg, professor of botany at the University of Upsala).

1. W. gracilis (Forst. f.). A. DC. *Native Bluebell.* Glabrous or hairy; stems slender, erect, 2-60 cm. high, simple or branched, sometimes procumbent and straggling; lower leaves obovate or oblong to linear, sessile, sometimes in a basal rosette, rarely opposite, 3-40 mm. long, entire, sometimes undulate, rarely with minute glandular teeth, the stem-

leaves becoming narrower and the uppermost few and bract-like; flowers on terminal peduncles 1-25 cm. long; sepals 5, rarely 4 or 6, narrow, 2-20 mm. long; corolla campanulate, deep or pale blue, rarely white, 3-28 mm. long, with 5 rarely 4 or 6 broad equal spreading lobes about as long as the tube; stamens free, the filaments dilated gradually or abruptly towards base into 2 narrow or broad ciliate wings or auricles; anthers often caducous, longer or shorter than filaments; ovary 2-3-celled; style with 2-3 stigmatic lobes and pubescent or bristly below them with collecting hairs for about ¾ of its length, the hairy portion rather thicker than the remaining fourth; capsule ovoid or oblong, 4-10 mm. long, opening loculicidally at summit in 2-3 valves; seeds numerous, minute, oblong, smooth, shining. (Fig. 239, A-D.)—*Campanula gracilis*, Forst. f. (1786).

All over the State. Most of the year.—Throughout Australia; New Zealand; southern Asia.

A very variable plant, annual or apparently perennial, forms of which have been described as distinct species, but neither Bentham nor Sir Joseph Hooker were able to maintain them even as varieties. "They run so variously into one another that they would require to be differently defined for every separate collection of specimens" says Bentham. (Fl. Austral. 4 : 138.) I do not think that the specimens with linear-oblong glabrous or hairy leaves arranged in a rosette at the base of the stem, which have been found in the southern part of the Flinders Range, can be classed under *W. saxicola* (R. Br.) A. DC., of Tasmania and New Zealand, because, although the stems are leafless except at the very base, they are branched, and the branches are furnished with small bract-like leaves. *W. saxicola* is described as having 1-flowered leafless scapes and as being always glabrous. On the other hand there are specimens from along the Broken Hill railway which are intermediate between the rosulate and ordinary leafy-stemmed forms, so that it does not appear advisable to describe a rosulate variety.

2. LOBELIA, L.

(After Matthias de Lobel, Flemish botanist, born at Lille in 1538, became physician to William of Orange and then botanist to James I. of England; died in London, 1616).

Sepals 5; corolla-tube slit to the base on the upper or posterior side, the 2 upper lobes more deeply separated and forming a more or less distinct upper lip, the lower lip 3-lobed, spreading, and in the throat below it are frequently 2 protuberances, as in some *Scrophulariaceae*; filaments inserted at the base of the corolla and often united to each other above the middle; anthers united in an oblique ring round the style; stigma 2-lobed, usually with a ring of collecting hairs below it and exserted beyond the anthers in the female or bisexual flowers; ovary 2-celled; capsule opening at summit loculicidally in 2 valves. Herbs; flowers in some species dioecious by the sterility of the anthers in the females and of the small ovary in the males.

This and the 2 following genera are much alike; the flowers become resupinate by the twisting of the peduncle long before the corolla opens. The terms "upper" and "lower" are, however, here used to describe the parts of the flower as they appear in the flowering stage.

A. All the anthers surmounted by a tuft of short bristles; annuals. (Section *Holopogon.*)	
Flowers in a scorpioid cyme; leaves linear.....	*L. gibbosa* 1.
Flowers solitary, terminal; leaves obovate.....	*L. rhombifolia* 2.
A. Two lower anthers only surmounted by a tuft consisting of 1 central bristle surrounded by several ones; perennials. (Section *Hemipogon.*)	
Glabrous; stems 2-3-edged or winged; receptacle oblong	*L. anceps* 3.
Pubescent at least on the flowers; stems terete; receptacle cup-shaped.	*L. pratioides* 4.

1. **L. gibbosa,** Labill. Glabrous annual, with an erect usually simple succulent stem, 10-40 cm. high, its base withering early; leaves linear, 1-2 cm. long, withering early; flowers shortly pedicellate in a scorpioid cyme resembling a terminal unilateral raceme, with 2 subulate bracteoles at base of each pedicel; sepals subulate, about 3 mm. long; corolla bluish-purple, about 15 mm. long, the lobes acute; capsule 6-10 mm. long, swollen and gibbous on the upper side; seeds minute, angled. (Fig. 239, E-H).—*L. simplicicaulis* R. Br.; *L. Browniana*, Roem. et Schult.; *L. microsperma*, F. v. M.

Southern districts; Kangaroo Island; Yorke and Eyre Peninsulas; probably South-East. Summer.—Temperate Australia.

2. **L. rhombifolia,** De Vriese. Slender glabrous annual 5-20 cm. high; leaves obovate-cuneate, 1-2 cm. long, with a few coarse teeth or lobes, the upper ones narrower and sometimes entire; flowers solitary, on terminal peduncles much longer than leaves

sepals lanceolate, 3-5 mm. long; corolla blue, rarely whitish, glabrous, about 12 mm. long; capsule about 6 mm. long, gibbous on upper side; seeds minute, angled.

Mount Lofty Range to Encounter Bay; Kangaroo Island. Oct.-Dec.—Victoria; West Australia.

3. **L. anceps,** Thunb. Procumbent or ascending glabrous perennial, the stems angled or winged by the decurrent leaves; leaves distant, obovate-cuneate or oblanceolate, 1-5 cm. long, entire or faintly toothed, narrowed into a short petiole; flowers bisexual, solitary, on peduncles shorter than the narrow floral leaves; receptacle cylindrical, 6-8 mm. long in fruit; sepals much shorter; corolla glabrous, bluish, 6-8 mm. long, the lobes narrow; upper anthers with a row of hairs on the back near the summit, the 2 lower anthers tufted.

Southern districts to Flinders Range; Kangaroo Island; Eyre Peninsula; South-East. Usually near water. Summer.—Temperate Australia; New Zealand; South Africa; temperate South America.

4. **L. pratioides,** Benth. Slender prostrate perennial, almost glabrous except the flowers, or the stems and leaves more or less pubescent; leaves sessile or subsessile, lanceolate, faintly toothed, 6-15 mm. long; flowers often bisexual, solitary on pubescent peduncles shorter than or quite as long as floral leaves; receptacle cup-shaped, pubescent, about 2½ mm. long; sepals lanceolate, nearly as long; corolla purplish, glabrous outside, 8-9 mm. long, with 2 small protuberances in the throat below the 3 lobes of the lower lip and short spreading hairs further down; upper anthers glabrous.

Kangaroo Island; near Mount Gambier and in Monbulla Scrub, S.E. Oct.-Dec.—Victoria; New South Wales; Tasmania.

L. purpurascens, R. Br. has been recorded for the South-East, but no specimens appear to have been collected there. It differs from the preceding in being quite glabrous in all its parts and in the peduncles usually 2-3 times as long as the floral leaves and reflexed after flowering. It grows in the Grampians and other parts of Victoria and in eastern Australia.

3. PRATIA, Gaudich. (1826).

(After Charles L. Prat-Bernon, a midshipman in Freycinet's scientific voyage round the world; he died at sea soon after the expedition set sail in 1817.)

Perennial herbs differing from *Lobelia* in the fruit, which is indehiscent and more or less succulent; only the two lower anthers are tipped with bristles, as in section *Hemipogon* of *Lobelia*. A genus extending to New Zealand and South America, united with *Lobelia* by F. v. Mueller, but maintained distinct by the great majority of botanists.

A. Peduncles shorter or scarcely longer than leaves.

B. Glabrous.

Stems erect or ascending; leaves rather broad, with broad base, toothed ..... *P. concolor* 1.

Stems creeping and rooting; leaves tapering towards base, entire ..... *P. platycalyx* 2.

B. Pubescent, creeping; leaves broad-ovate, faintly toothed ..... *P. puberula* 3.

A. Peduncles much longer than the suborbicular leaves and very slender; stems creeping ..... *P. pedunculata* 4.

1. **P. concolor** (R. Br.) Druce (1917). Glabrous perennial, with erect or ascending stems; leaves subsessile, spreading horizontally, ovate-lanceolate or lanceolate, rather firm, broad at base, 1-3 cm. long, sinuate-toothed; flowers solitary on peduncles almost always shorter than the floral leaves; sepals about 2 mm. long, lanceolate, broad-based; corolla glabrous, 6-9 mm. long, white or pink, often violet-streaked, the lobes linear-lanceolate, turned to one side; fruit subglobular, 6-8 mm. diam.—*P. erecta*, Gaudich. (1826); *Lobelia concolor*, R. Br. (1810).

Near water: along River Murray; Bordertown; Coorong. Summer.—Victoria; New South Wales; Queensland.

2. **P. platycalyx** (F. v. M.), Benth. Small glabrous creeping perennial; leaves oblanceolate or oblong-cuneate, obtuse, entire, thick, 1-2½ cm. long; flowers solitary, on peduncles rarely more than half as long as leaf and usually much shorter; sepals under 1 mm. long, almost deltoid; corolla white, glabrous, 3-4 mm. long, 2-lipped; fruit ovoid, about 4 mm. long.—*Lobelia platycalyx*, F. v. M.

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

3. **P. puberula,** Benth. (1869). Small creeping pubescent perennial; leaves sessile, orbicular or ovate, obscurely toothed, 4-8 mm. long; flowers solitary on peduncles shorter or scarcely longer than leaf; sepals lanceolate; corolla about 6 mm. long; fruit globular, about 6 mm. diam.—*Lobelia Benthamii*, F. v. M. (1882).

Only known in this State by Bentham's record: "Cooper's Creek, *Bowman*."—Victoria; New South Wales.

4. **P. pedunculata** (R. Br.), Benth. Slender perennial with creeping filiform stems, quite glabrous in our specimens; leaves thin, ovate or orbicular, subsessile, 4-10 mm. long, distinctly or obscurely toothed; flowers solitary on capillary peduncles 2-6 times as long as the floral leaf; sepals lanceolate, obtuse, 1-2 mm. long; corolla bluish, glabrous, 6-8 mm. long, with 2 protuberances in the throat, the lobes oblanceolate and broader in the middle; 3 upper anthers glabrous or hairy on back; fruit globular.—*Lobelia pedunculata*, R. Br.

Clarendon (Mt. Lofty Range); South-East. Summer.—Victoria; New South Wales; Tasmania.

4. ISOTOMA (R. Br.), Lindl.

(From Greek *isos*, equal; *tomē*, a cutting: alluding to the corolla-lobes nearly equal in length).

Herbs only differing from *Lobelia* in the 5 nearly equal spreading lobes of the corolla, and the tube entire or very slightly slit on the upper side, also in the filaments adnate to the corolla-tube from its base to above the middle, instead of being free from the base, as in *Lobelia* and *Pratia*. Only the 2 lower-anthers are tipped by bristles; flowers bisexual. The corolla, although its lobes are more equal than in most *Lobelias*, is really slightly 2-lipped. Robert Brown placed these species in a section of *Lobelia* which he named *Isotoma*.

A. Plants with branching stems; flowers axillary.
  Stems erect, stiff; flowers and leaves large..... *I. petraea* 1.
  Stems creeping, slender; flowers and leaves small ... *I. fluviatilis* 2.
A. Plant almost stemless; leaves radical; flowers solitary on slender scapes ..... *I. scapigera* 3.

1. **I. petraea,** F. v. M. Glabrous erect perennial, 10-40 cm. high; leaves ovate-lanceolate or broadly lanceolate, tapering at both ends, 2-6 cm. long, with rather long spreading lanceolate teeth and sometimes smaller ones between; flowers solitary on erect peduncles 2-3 times as long as the floral leaf; sepals linear-lanceolate, 8-10 mm. long; corolla glabrous, white and lilac, 35-40 mm. long, the cylindrical tube longer than the spreading lanceolate lobes; anthers hairy on back, the 2 lower ones each tipped by a single rather long bristle; capsule oblong, 15-20 mm. long; seeds minute, punctulate. (Fig. 239, I-J).

Usually in rocky country: Hallett and Crystal Brook to Far North, eastward to Broken Hill and westward to Everard Range, Tarcoola, Gawler Range, and Venus Bay. Most of the year.—New South Wales; central and West Australia.

2. **I. fluviatilis** (R. Br.), F. v. M. Slender creeping perennial, almost glabrous except the inflorescence; leaves obovate, orbicular or the upper ones lanceolate or oblanceolate, faintly toothed, 6-10 mm. long, narrowed into a very short petiole; flowers solitary on pubescent or almost glabrous peduncles as long as or 2-3 times as long as the floral leaf; receptacle glabrous or pubescent; sepals 2 mm. long, lanceolate, obtuse; corolla bluish, 10-14 mm. long, the lobes linear-oblong, about as long as the tube, villous with scattered hairs on the upper face, the tube hairy inside, anthers glabrous on back, the 2 lower ones tipped each by 1 conspicuous bristle and several smaller ones; capsule about 4 mm. long; seeds smooth.—*Lobelia fluviatilis*, R. Br.; *L. inundata*, R. Br.

Near water: Myponga (Mt. Lofty Range); South-East. Summer.—Victoria; New South Wales; Tasmania. Resembles *Lobelia pratioides* and *Pratia pedunculata*. All these 3 species have a microscopic pubescence on the upper face of the corolla-lobes. Bentham says that it also resembles *Pratia puberula*.

3. **I. scapigera** (R. Br.), G Don. Glabrous annual, with leaves either all radical or few on very short stems, obovate or oblong, faintly toothed, 5-25 mm. long; scapes or peduncles erect, slender, 3-12 cm. long, 1-flowered; sepals lanceolate, 4 mm. long; corolla glabrous, bluish, persistent, 10-12 mm. long, the lobes obovate-oblong, about as long as tube; anthers as in the preceding; capsule obovoid, beaked within the corolla and sepals, 8-10 mm. long, 10-ribbed; seeds ovoid, smooth.—*Lobelia scapigera*, R. Br.

Usually in salt swamps: southern Yorke Peninsula; Eyre Peninsula to Great Bight. Summer.—West Australia.

Family 114.—GOODENIACEAE.

Flowers bisexual, irregular; sepals 5, persistent, sometimes inconspicuous, inserted at the summit of the adnate hollow receptacle and more or less epigynous, or perigynous, in *Velleia* hypogynous; corolla-tube slit almost to base on the upper or posterior side, sometimes adnate to the summit of the ovary or more or less decurrent along it, the limb of 5 unequal or equal lobes, usually arranged in 2 lips, the upper lip 2-lobed, the lower 3-lobed, the lobes valvate in bud, but mostly bordered by membranous glabrous colored undulate induplicate wings; stamens 5, inserted at the base of the corolla-tube but almost or quite free from it and alternate with the lobes; anthers basifixed, 2-celled, facing inwards, free or united in a ring round the style; ovary inferior, or the summit rising above the adnate receptacle and the insertion of the sepals and then partly inferior, or in *Velleia* superior and free, 2-celled rarely 1-celled, with 1 or more anatropous or rarely campylotropous ovules in each cell, erect or ascending on septal or almost basal placentas (pendulous in *Catosperma*); style mostly simple, terminated by a compressed cup-shaped or 2-lipped indusium, which is usually ciliate round the edge and contains the small mostly 2-lobed stigma; fruit a capsule opening septicidally in 2 valves or also loculicidally in 2 additional valves, or a drupe or nut; seeds mostly flat, often winged

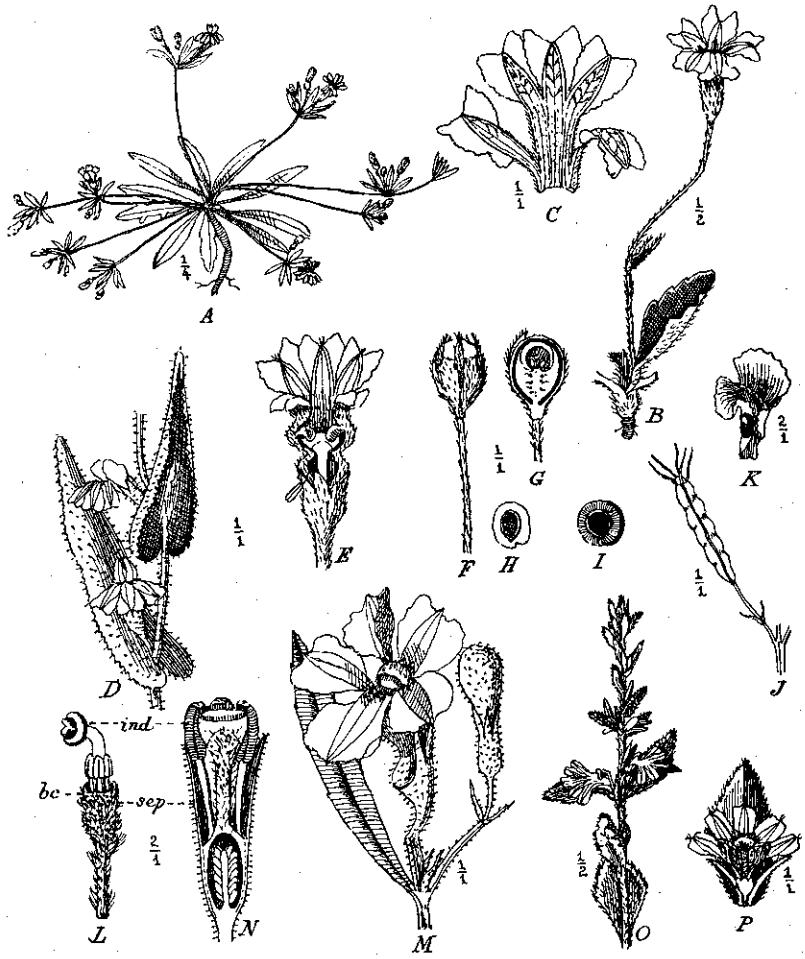

Fig. 240.—**Goodeniaceae.** A, *Goodenia heteromera*. B-C, *G. primulacea*: B, part of plant; C, corolla spread open. D, *G. amplexans*. E-H, *G. subinteera*: E, opening flower with the auricles of the upper lobes folded over the indusium; F, capsule; G, one valve of capsule, showing dissepiment and seeds; H, seed. I, seed of *G. cycloptera*. J, capsule of *G. ovata*. K-L, *Dampiera rosmarinifolia*: K, one of the 2 upper corolla-lobes, showing auricle; L, flower after the upper part of corolla has fallen: *ind*, indusium; *bc*, persistent base of corolla; *sep*, sepals. M-N, *Goodenia albiflora*: M, flowers; N, pistil and 3 stamens. O-P, *Scaevola microcarpa*: O, flowering branch; P, flower with bract and 2 bracteoles.

or bordered; embryo straight in the middle of the fleshy albumen. Shrubs, undershrubs or herbs; leaves alternate or radical, without stipules.

A family of which the great majority of species are Australian, and especially West Australian. It was the subject of a monograph by W. H. de Vriese (Haarlem, 1854); the Australian species, as far as then known, were described by Geo. Bentham in the Flora Australiensis (London, 1869) and the whole family was revised, with numerous illustrations, by K. Krause in Engler's Pflanzenreich (Leipzig, 1912).

A. Ovules 2 or more in each of the 2 cells of the ovary, which is often imperfectly divided; corolla 2-lipped (except *Catosperma*).
  B. Fruit a 2-4-valved capsule.
    C. Capsule ovoid; seeds flat, winged or bordered.
      D. Style entire.
        Ovary more or less inferior ..... GOODENIA 1.
        Ovary superior ..... VELLEIA 2.
      D. Style 2-branched; ovary inferior ..... CALOGYNE 3.
    C. Capsule cylindrical; seeds oblong, not winged; ovary inferior ..... LESCHENAULTIA 4.
  B. Fruit drupaceous, ovoid; ovary inferior.
    Ovules in each cell numerous, erect or ascending; corolla not winged; seeds flattened, winged ..... SELLIERA 5.
    Ovules in each cell 2, pendulous; corolla winged; seed oblong, not winged ..... CATOSPERMA 6.
A. Ovary 1- or 2-celled, inferior, with 1-2 ovules in the whole ovary; fruit ovoid, nut-like or drupaceous; seeds not winged.
  Upper corolla-lobes without auricles, the limb 1-sided; anthers free ..... SCAEVOLA 7.
  Upper corolla-lobes auricled, the limb 2-lipped; anthers cohering round the style ..... DAMPIERA 8.

1. GOODENIA, Sm.

(After Samuel Goodenough, 1743-1827, Bishop of Carlisle, botanist and vice-president of the Royal Society of London).

Sepals 5; corolla-tube slit on the upper side down to its short base, which is adnate to the summit of the ovary above the insertion of the sepals, sometimes decurrent beneath the lower lobes as a hollow tube adnate to the ovary or even extended below it as a free spur, the 2 upper lobes free to a greater depth than the 3 lower (in all our species), and usually arched over the free stamens and style; ovary inferior, except the convex summit, which protrudes above the insertion of the sepals, incompletely 2-celled by the lunate dissepiment, which never quite reaches the summit of the ovary, and is sometimes very short; ovules ascending, several or numerous in each cell; indusium cup-shaped, usually densely ciliate at summit; capsule opening in 2, rarely 4 valves, sometimes almost half-superior as far as the sepals are concerned; seeds almost always flat, bordered or winged. Herbs, shrubs or undershrubs; peduncles radical, axillary or rarely racemose, 1-flowered or bearing small few-flowered cymes.

A purely Australian genus. The membranous wing on the outer margin of the 2 upper lobes of the corolla is usually extended much lower downward than the opposite inner wing, and this decurrent portion is mostly hardened into an inflexed auricle which plays the principal part in sheltering the stamens and style of the young flower. The early flowers are often larger than the later ones on the same plant.

A. Ovules few or many, imbricate in 2 rows in each cell (Section *Eugoodenia*).
  B. Peduncles or pedicels with 2 bracteoles. (Subsection *Bracteolatae*).
    C. Herbs with ascending stems or none, the lower or all the leaves in a radical rosette.
      D. Bracteoles inserted about the middle of the 1-flowered peduncles.
        E. Sepals obtuse; leaves almost entire, rather thick, hairy; peduncles mostly longer than leaves, radical or axillary; seeds flat, bordered.
          F. Clothing of short simple hairs only.
            Leaves green and pubescent on both faces *G. geniculata* 1.
            Leaves green and almost glabrous above, white-tomentose below ..... *G. primulacea* 2.

F. Clothing of long simple hairs mixed with a dense stellate tomentum; woolly plants.
Stem-leaves, when present, narrowed at base ..... *G. affinis* 3.
Stem-leaves with broad half-clasping base *G. robusta* 4.
E. Sepals acute; stem-leaves oblong, thin, with 1 large unilateral lobe at base; peduncles axillary, shorter than leaves ..... *G. unilobata* 5.
D. Bracteoles usually close under the flower; peduncles 1-3-flowered, axillary; leaves suborbicular ..... *G. rotundifolia* 6.
C. Shrubs or undershrubs with erect leafy stems; leaves broadly ovate or oblong, mostly denticulate; peduncles axillary, 1-3-flowered; bracteoles at some distance from flower.
G. Leaves distinctly stalked; glabrous shrub; corolla glabrous; capsule cylindrical..... *G. ovata* 7.
G. Leaves gradually narrowed towards base; glabrous shrubs; capsule ovoid.
H. Seeds without caruncle, flat, narrowly bordered.
Corolla glabrous; dissepiment half as long as capsule ..... *G. varia* 8.
Corolla pubescent; dissepiment almost as long as capsule ..... *G. vernicosa* 9.
H. Seeds carunculate; dissepiment scarcely any; corolla stellate-pubescent ..... *G. strophiolata* 10.
G. Leaves sessile, stem-clasping; glandular plant; corolla pubescent ..... *G. amplexans* 11.
B. Peduncles and pedicels without bracteoles (or sometimes irregularly bracteolate in *G. grandiflora* and *albiflora*); peduncles usually articulate below the flower. (Subsection *Ebracteolatae*).
I. Herbs with mostly erect leafy stems; seeds flat, with a rather thick border.
J. Tomentose or pubescent, without glandular hairs; stems terete; peduncles 1-flowered; corolla pubescent, the 2 upper lobes almost wingless.
Corolla not decurrent; leaves subsessile ..... *G. heterochila* 12.
Corolla decurrent and glabrous; leaves petiolate *G. Mitchellii* 13.
J. Glandular-pubescent; stems angular; leaves petiolate, broad, toothed; corolla yellow.
Stem-leaves usually sublyrate, with a few small lateral segments below the large terminal one; peduncles 1-3-flowered; corolla pouched, pubescent ..... *G. grandiflora* 14.
Stem-leaves pinnatisect; peduncles 1-flowered; corolla spurred, glabrous..... *G. calcarata* 15.
J. Glabrous except inflorescence; stems angular; leaves all simple, petiolate, broad, toothed; peduncles 1-3-flowered; corolla white, pouched.. *G. albiflora* 16.
I. Herbs with the lower leaves in a radical rosette, the upper ones usually smaller and narrower; peduncles 1-flowered, axillary or in terminal tufts, rarely radical also.
K. Peduncles and leaves softly tomentose; radical leaves rather broadly oblong, obtuse, toothed; corolla pubescent; seeds orbicular with a broad thick border ..... *G. cycloptera* 17.
K. Peduncles and leaves glabrous or with short usually appressed hairs.
L. Radical leaves mostly pinnatifid, or sometimes toothed or entire.
M. Leaf-lobes several, flaccid; dissepiment short; seeds black, with narrow border; sparsely pubescent plants.
Corolla 15-25 mm. long, glabrous; indusium entire ..... *G. pinnatifida* 18.
Corolla 6-8 mm. long, pubescent; indusium notched ..... *G. pusilliflora* 19.

M. Leaf-lobes 2-6, rigid; silvery-pubescent plant; corolla about 15 mm. long, pubescent; dissepiment very short; seeds brown, broadly winged ..... *G. lunata* 20.

L. Radical leaves chiefly linear or lanceolate, mostly entire, some often toothed or lobed; corolla pubescent.

N. Hairs, when present, not glandular.

O. Stems straight; dissepiment about half as long as capsules.

P. Stems rather stiff; radical leaves lanceolate to ovate; seeds usually brown.

Q. Stems mostly erect or ascending; stem-leaves few; corolla 15-25 mm. long; seeds winged.

Almost glabrous; style silky; indusium pubescent; capsule globular; seeds 3-3½ mm. long ..... *G. glauca* 21.

Appressed-pubescent; style and indusium glabrous; capsule obovoid; seeds 5-7 mm. long ..... *G. subintegra* 22.

Q. Stems almost prostrate; stem-leaves none; peduncles woolly at summit; corolla 8-10 mm. long; seeds narrowly bordered ..... *G. heteromera* 23.

P. Stems weak; silvery-pubescent plant; leaves linear; corolla about 15 mm. long *G. argentea* 24.

O. Stems zigzag, rigid; stem-leaves linear, thick, glabrous; corolla about 12 mm. long; dissepiment nearly as long as capsule *G. anfracta* 25.

N. Hairs glandular; leaves lanceolate; corolla 8 mm. long; dissepiment minute ..... *G. Havilandii* 26.

A. Ovules very numerous, imbricate in more than 2 rows in each cell of ovary. (Section *Amphichila*).

Flowers in small panicles or solitary on radical peduncles, scarcely exceeding the radical leaves; leaves: bracteoles mostly shorter than pedicels ..... *G. humilis* 27.

Flowers solitary on axillary peduncles; stems much exceeding radical leaves; bracteoles leafy, longer than pedicels ..... *G. modesta* 28.

1. **G. geniculata,** R. Br. Perennial, pubescent all over with short erect or spreading simple straight hairs, stemless or with procumbent or ascending stems to 30 cm. long; leaves mostly radical, oblanceolate, rarely obovate-oblong, acute or obtuse, 2-10 cm. long, including the petiole into which they taper, 3-8 mm. broad, greenish on both faces, usually with minute, distant, often glandular teeth; peduncles slender, usually longer than the leaves when radical, much longer when axillary on the stems, 1-flowered, with 2 conspicuous linear bracteoles near the middle, the part above the bracteoles (properly the pedicel) reflexed in fruit; sepals linear, obtuse; corolla yellow, pubescent outside, 15-24 mm. long, the 2 upper lobes free almost to the base, unequally winged; dissepiment reaching to above middle of ovary; capsule ovoid, 6-10 mm. long; seeds flat, pale, ovate-oblong, with a thick white margin.

Southern districts and as far east as the Murray; south coast of Kangaroo Island; Eyre Peninsula; 90-Mile Desert. July-Jan.—Victoria; New South Wales; Tasmania.

2. **G. primulacea,** Schlechtd. Near the preceding, but the leaves are obovate or oblanceolate, with minute distant teeth or almost entire, mostly 3-8 cm. long, including the petiole, 3-12 mm. broad, becoming green and glabrous above, densely white-tomentose beneath with intricate sinuous but simple hairs; peduncles radical or axillary, with 2 linear bractoles near or sometimes considerably below the middle; sepals oblong or lanceolate, obtuse; corolla pale yellow, pubescent outside, 12-20 mm. long; dissepiment higher than middle of ovary; capsule and seeds as in the preceding. (Fig. 240, B-C.)—*G. geniculata*, R. Br., var. *primulacea* (Schlechtd.) Benth.

Southern districts to Flinders Range; Kangaroo Island; Murray lands: South-East; Eyre Peninsula. July-Jan. A variable species, the leaves rarely 20 mm. broad, the wings of the corolla more obtuse at summit than in *G. geniculata*. The Kangaroo Island specimens are mostly small, some with oblanceolate often entire leaves and radical peduncles more than twice as long; others with ovate-cuneate very hairy denticulate

leaves only 8-15 mm. long and peduncles radical and axillary. There are also intermediate forms. The specific name was given because the plant was known to the early colonists as "Native Primrose."—Western Victoria; West Australia.

3. **G. affinis,** De Vriese. Small woolly perennial; leaves radical or sometimes also on the short ascending stems, oblanceolate or oblong-lanceolate, rarely obovate, 3-10 cm. long, 3-15 mm. broad, including the rather broad petiole, soft and woolly on both faces with long simple hairs, which often conceal the close coating of stellate hairs below, entire or faintly crenate or denticulate; peduncles radical or axillary, as long as or rather longer than the leaves, with 2 linear bracteoles usually somewhat below the middle; sepals linear-oblong, obtuse, 4-6 mm. long; corolla yellow, 16-20 mm. long, pubescent outside; capsule 10-14 mm. long; seeds ovate, with a thick margin.—*G. geniculata,* R. Br. var. *eriophylla,* Benth.

Southern districts northwards to Flinders Range; Murray lands; Yorke and Eyre Peninsulas. Aug.-Oct., or flowering through the summer.—West Australia. The leaves of the West Australian specimens are usually broader, more obtuse, and more regularly crenate than ours.

G. lanata, R. Br., which appears to be closely allied to the preceding, has been found near the Victorian part of the Glenelg River and may therefore occur in our South-East. It is described as having densely woolly obovate leaves 6 cm. long (with the petiole), 10-30 mm. broad, coarsely toothed, and the capsule rather shorter.

4. **G. robusta** (Benth.) Krause. Woolly perennial with stout stems 20-40 cm. high; radical leaves broad- or narrow-lanceolate, obtuse, 6-18 cm. long including the petiole, 8-28 mm. broad, entire or faintly toothed, softly woolly on both faces, the long simple hairs at first concealing the stellate tomentum, the broader leaves usually 3-nerved, those on the stem shorter, sessile and half-clasping; peduncles mostly axillary and longer than the leaves, with 2 linear bracteoles rather below the middle; sepals linear-oblong, 5-6 mm. long, woolly on both faces; corolla yellow, pubescent outside, 18-25 mm. long; capsule ovoid-oblong, 10-12 mm. long; seeds pale, ovate with thick margin.—*G. geniculata,* R. Br. var. *robusta,* Benth.

Yorke Peninsula to Flinders Range; Murray lands and along the Coorong; Eyre Peninsula. Aug.-Dec.—North-western Victoria.

5. **G. unilobata,** J. M. Black. Stem slender, terete, hoary at summit with minute curly hairs, otherwise glabrous; radical leaves unknown; stem-leaves at base of peduncles, green and almost glabrous, oblong, obtuse, thin, 2-3 cm. long, 4-5 mm. broad, entire or with a few minute teeth along the margin and a larger tooth or spreading oblong lobe, 3-12 mm. long, as broad as the leaf and on one side of the base; petiole only 2 mm. long; peduncles solitary, 1-flowered, shorter than leaf, with 2 narrow-linear bracteoles, about 5 mm. long, near the middle; sepals linear, acute, 6-7 mm. long, longer than the obconical at first hoary receptacle; corolla yellow, 20-25 mm. long, sparsely pubescent outside, glabrous inside, the 2 upper lobes unequally winged and auricled; style 7-8 mm. long, almost glabrous; indusium almost glabrous, with very short cilia; dissepiment nearly as long as ovary; ovules about 18, in 2 rows; capsule not seen.

Only known by a small piece in the Tate Herbarium labelled "Ooldea."

6. **G. rotundifolia,** R. Br. Perennial with short or long ascending or procumbent slightly pubescent stems simple or branching near the summit; radical leaves ovate, 3-4 cm. long, coarsely but almost regularly toothed, minutely tomentose below, almost glabrous and bright-green above, narrowed into petioles nearly as long; stem-leaves similar but smaller and often almost orbicular; peduncles slender, in the axils of most of the stem-leaves and about as long, 1-3- or rarely 5-flowered, the pedicels usually short and with two linear bracteoles, scarcely 2 mm. long, inserted mostly close under the flower, the peduncles on the branches rather longer than the reduced leaves or bracts; sepals linear, hoary, about 3 mm. long, shorter than the obconical receptacle; corolla yellow, about 15 mm. long, pubescent outside, almost glabrous inside, all the lobes broadly winged, the outer wing of the 2 upper lobes decurrent into a small auricle; anthers apiculate; style 6-7 mm. long, pubescent in upper part; indusium almost glabrous on back; dissepiment about $\frac{1}{2}$ as long as ovary; capsule obovoid, 4-6 mm. long; seeds flat, with a narrow margin.

Upper Arkaringa Valley and between Musgrave and Birksgate Ranges.—New South Wales; Queensland; West Australia (Barrow Range).

Near to this species is probably *G. hirsuta,* F. v. M., which is known only by imperfect flowerless specimens collected by McDouall Stuart in "Central Australia." It is villous all over with long spreading hairs, the leaves obovate or almost orbicular, coarsely toothed, petiolate, the peduncles axillary, 1-flowered, with 2 linear bracteoles 5-6 mm. long at some distance below the flower; capsule ovoid, 6-8 mm. long; seeds flat, brown, broadly winged.

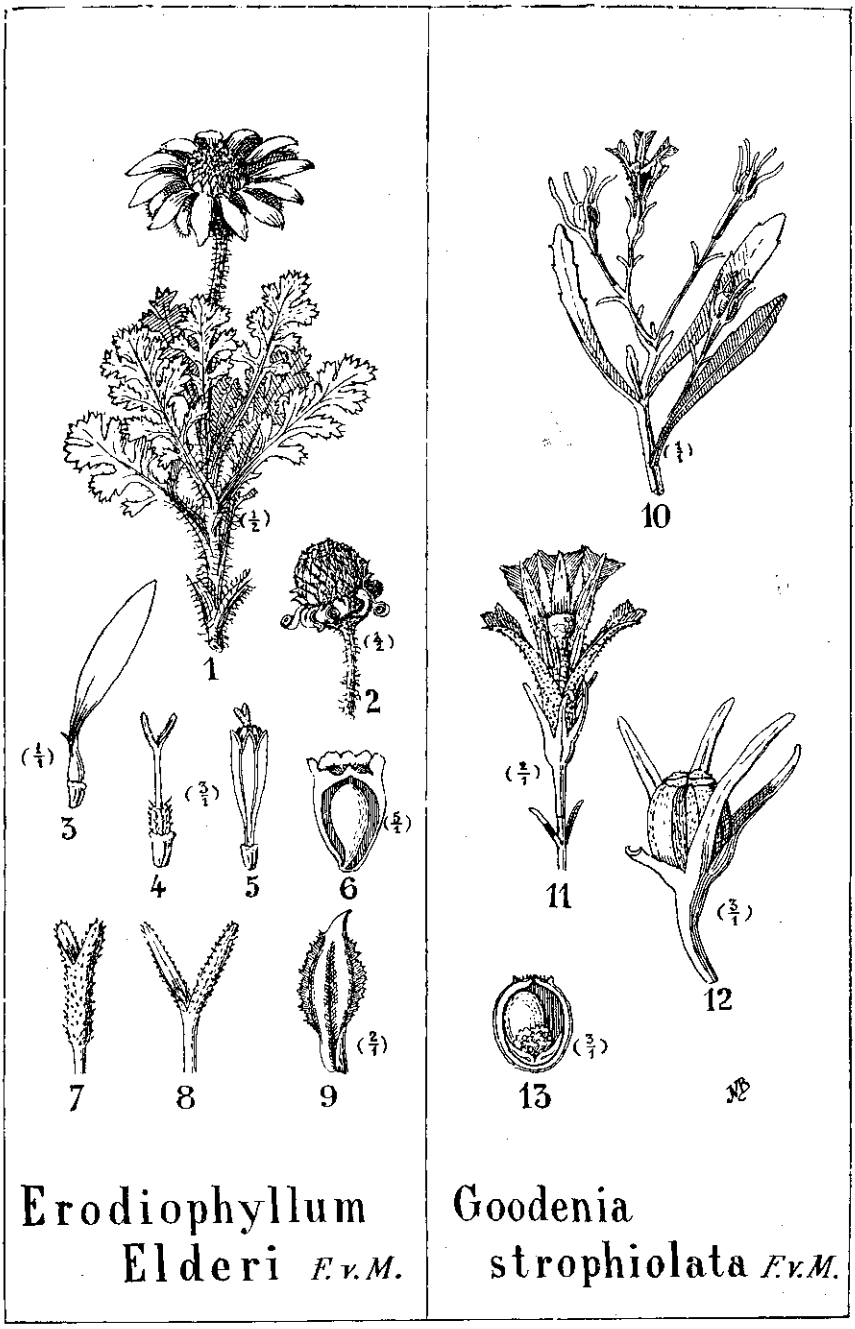

PLATE 46.—(1-9) **Erodiophyllum Elderi**; (10-13) **Goodenia strophiolata.**

7. **G. ovata,** Sm. Slender erect glabrous shrub, the young parts often viscid; leaves ovate, ovate-cordate or lanceolate, sharply denticulate, 3-10 cm. long, 12-40 mm. broad; petioles shorter than the leaves; peduncles slender, axillary, solitary or twin, 1-3-flowered, almost always shorter than the leaves; bracteoles narrow-linear, at some distance from the flower; receptacle narrow; sepals subulate, 5-8 mm. long; corolla yellow, 15-20 mm. long, glabrous outside; dissepiment reaching nearly to summit of ovary; capsule narrow-cylindical, slightly moniliform, 8-14 mm. long; seeds compressed, almost in 1 row, pale, oblong, about 2½ mm. long, with a very narrow border.

Southern districts to Flinders Range; Kangaroo Island. Most of the year.—Temperate Australia except the West.

8. **G. varia,** R. Br. Glabrous sometimes viscid undershrub with slender prostrate or ascending stems; leaves ovate-lanceolate, obovate or orbicular, more or less denticulate or sometimes entire, 2-5 cm. long, 10-35 mm. broad, rather thick (in maritime specimens very thick, rigid, and broad), the upper ones sometimes linear-lanceolate or lanceolate and only 2-8 mm. broad, narrowed gradually into a short petiole or subsessile; peduncles solitary, axillary, 1-3-flowered, shorter or longer than the floral leaves; bracteoles small, linear, at some distance below flower, at the base of a pedicel shorter than the receptacle; sepals subulate, 2-4 mm. long; corolla yellow, glabrous outside, 12-18 mm. long; capsule ovoid or oblong, 4-8 mm. long, the dissepiment reaching beyond the middle; seeds in 2 rows, flat, pale, ovate, about 2 mm. long, with a very narrow border. This and the previous species have the style and indusium glabrous except for a tuft of hairs near the base of the indusium and the usual ciliate margin.

Encounter Bay; Kangaroo Island: Murray lands to Bordertown; Flinders Range; York and Eyre Peninsulas and along the Great Bight. Most of the year.—North-western Victoria.

9. **G. vernicosa,** J. M. Black (1919). Erect glabrous undershrub, less than 1m. high, so thickly viscid as to appear varnished; leaves rigid, oblanceolate or obovate, serrulate, 1½-4 cm. long, 5-20 mm. broad, exclusive of the petiole into which they taper, the floral ones lanceolate and often entire; peduncles axillary, solitary, 1-3-flowered, as long as or shorter than leaves; bracteoles linear, at the base of the short pedicel; sepals subulate, 6-10 mm. long; corolla yellow, about 15 mm. long, minutely pubescent outside and in; style villous; capsule ovoid-oblong, 7-8 mm. long, but not seen ripe; dissepiment reaching to above middle; seeds flat, ovate, thickly margined.

Flinders Range (Mt. Aroona, Mt. Lyndhurst, Mt. Patawurta). Oct.-Dec.

PLATE 34 (page 345).—1, bud; 2, style and indusium; 3, vertical section of capsule; 4, corolla spread open.

10. **G. strophiolata,** F. v. M. Erect branching glabrous viscid shrub, about 1 m. high; leaves rather thick and rigid, all oblanceolate, obtuse, or the lower obovate, toothed or almost entire, 2-3½ cm. long, including the short petiole, 3-8 mm. broad; peduncles axillary, shorter than the leaves, 1-3-flowered, with 2 linear bracteoles at the base of each short pedicel; sepals 5-7 mm. long, linear; corolla whitish, 12-15 mm. long, stellate-pubescent outside, the 2 upper lobes equally winged; style shortly hairy; capsule ovoid or subglobular, about 4 mm. long, half-superior to the sepals; dissepiment very short; seeds only 2-3, compressed-ovoid, smooth, 2½ mm. long, with a large papillose caruncle at base.

Near Ooldea. Sept.-Jan.—West Australia.

PLATE 46 (2).—10, flowering and fruiting branch; 11, flower; 12, capsule; 13, vertical section of capsule, showing minute dissepiment and carunculate seed.

11. **G. amplexans,** F. v. M. Erect glandular-pubescent clammy aromatic undershrub to 1 m. high; leaves sessile, stem-clasping by 2 broad auricles, ovate- or oblong-lanceolate, acute, denticulate, 2-9 cm. long, 8-25 mm. broad; peduncles axillary, very short, 1-2-flowered, with small bracteoles at the base of the short pedicels; sepals linear, 4-7 mm. long; corolla yellow, pubescent outside, 15-18 mm. long, the 2 upper lobes equally winged; style hairy; capsule ovoid-oblong, 6-8 mm. long; dissepiment reaching half-way up; seeds ovate-oblong, flat, with thick margin. (Fig. 240, D.)

Mt. Lofty Range and foothills to Encounter Bay; southern part of Flinders Range. Sept.-Feb.—Western Victoria.

Var. *angustifolia,* Krause. The long lower leaves narrower than in the type, 8-10 mm. broad; capsule oblong, to 10 mm. long.—North-western coast of Kangaroo Island.

12. **G. heterochila,** F. v. M. Softly pubescent or villous perennial herb; leaves obovate, ovate-oblong or lanceolate, rather thick, few-toothed or almost entire, narrowed towards base, 1½-5 cm. long, 3-10 mm. broad; peduncles axillary, 1-flowered, shorter or scarcely longer than leaves, articulate shortly below flower, bracteoles absent or minute and caducous; sepals linear, 2½ mm. long; corolla yellow, about 15 mm. long, pubescent

outside and inside, the wings of the 3 lower lobes broad and short, the 2 upper lobes shorter but more deeply separated, with scarcely any wings but a conspicuous auricle on the outer side; style glabrous, short; capsule ovoid, 6-9 mm. long; dissepiment very short; seeds flat, orbicular, 6 mm. diam., including the rather broad thick wing or border.

Head of Arkaringa Valley; near Mt. Watson (Birksgate Range). Flowering and fruiting May-July.—Central and tropical Australia.

13. **G. Mitchellii,** Benth. Densely pubescent or villous perennial herb, the radical and lower leaves obovate-oblong, 4-7 cm. long, 2-3½ cm. broad, more or less coarsely toothed or almost pinnatifid, tapering into a rather long petiole, the upper ones gradually smaller and lanceolate; peduncles slender, axillary, 1-flowered, without bracteoles, shorter than floral leaves; sepals linear, scarcely 3 mm. long; corolla yellow, 15-20 mm. long, pubescent outside and inside, the lobes as in *G. heterochila,* the tube gibbous and extended adnately downwards so as sometimes to form a minute spur; style and indusium glabrous except for the ciliation at summit; dissepiment not reaching middle of ovary; capsule globular, 5-6 mm. diam.; seeds few, usually only 1 or 2, flat, with a broad thick margin.

Head of the Arkaringa Valley (near Everard Range); near Lake Eyre; also recorded from Charlotte Waters, close to our border.—Central and tropical Australia.

14. **G. grandiflora,** Sims. Erect herb, densely and minutely glandular pubescent; stems angular; leaves (or terminal segments thereof) petiolate, ovate, acute, sharply toothed, truncate or cordate at base, 2-5 cm. long, 1-4 cm. broad, with or without a few small distant segments along the petiole; peduncles axillary, shorter than leaves, usually with 2 linear bracteoles at base, 1-3-flowered; sepals lanceolate, about 5 mm. long; corolla yellow, 20-25 mm. long, pubescent outside and in the tube, which is decurrent to base of receptacle in a more or less prominent protuberance, all the lobes broadly and equally winged; style pubescent; indusium glabrous on back or with a few hairs at the base; capsule ovoid-oblong, 8-12 mm. long; dissepiment reaching to above the middle; seeds flat, with a thick margin.

Flinders Range; Far North. Aug.-Nov.—Central Australia; eastern New South Wales; Queensland.

Var. *Nicholsonii* (F. v. M.), Krause. Terminal segment cuneate and usually with 1 or 2 narrow lobes at base, the distant segments along the petiole often rather longer than in the type, but always much smaller than the larger ovate terminal segment.—*G. Nicholsonii,* F. v. M.—Flinders Range (Beltana); west of Lake Eyre.

Var. *Chambersii* (F. v. M.), Krause. Leaves orbicular, 12-20 mm. diam, very shortly petiolate, without any lateral segments along the petiole; flowers rather smaller than in the type.—*G. Chambersii,* F. v. M.—Near Lake Eyre.

15. **G. calcarata,** F. v. M. Glaucous erect annual, 10-30 cm. high, usually described as glabrous, but in our specimens with minute scattered glandular hairs on the under-surface of the leaves and on the inflorescence; stem very angular; leaves petiolate, the radical ones ovate, toothed, the stem-leaves pinnatisect, 1-6 cm. long, 6-50 mm. broad, the segments ovate or lanceolate, incised-dentate, the terminal usually the largest, or all subequal; peduncles 1-flowered, solitary in the upper axils, shorter than the narrow floral bracts and forming a short terminal raceme; sepals lanceolate, 3-4 mm. long, shorter than the oblong glandular-hairy receptacle; corolla yellow, glabrous outside, the free part 10-15 mm. long, pubescent inside the tube, which extends downwards adnate to the ovary and receptacle and ends in a conspicuous spur, all the lobes broadly and equally winged; style almost glabrous; indusium hairy on back; capsule ovoid-oblong, about 10 mm. long, the dissepiment reaching nearly to summit; seeds flat, with a thick margin.

Flinders Range (Woolshed Flat, Mount Lyndhurst run); Gawler Range and Lake Gillies. Summer.—Western New South Wales.

16. **G. albiflora,** Schlechtd. Erect rather stout perennial, glabrous except on the flowers; stems angular, 30-60 cm. high; leaves ovate-lanceolate or lanceolate, sharply toothed, 3-9 cm. long, 5-40 mm. broad, narrowed into a petiole, the uppermost floral ones becoming small and bractlike; peduncles 1-2 in the upper axils, in the lower axils often rather long, although shorter than the floral leaf, with 2 bracts at summit and bearing a cyme of 2-3 flowers, the lateral pedicels with 2 narrow bracteoles at some distance below the flower; sepals 5-6 mm. long; corolla white, 20-25 mm. long, more or less glandular-pubescent outside (as are also the sepals, receptacle and peduncles), bristly in the tube, pouched at base by a protuberance decurrent along the receptacle; style hairy; indusium hairy at base; capsule and seeds as in *G. grandiflora.* (Fig. 240, M-N.)—*G. grandiflora,* Sims var. *albiflora* (Schlechtd.), Krause.

Southern districts to Flinders Range. Sept.-Jan.

17. **G. cycloptera,** R. Br. Softly pubescent or villous herb, with long or short procumbent erect or ascending stems; radical leaves on rather long petioles, obovate or oblong, coarsely toothed or slightly lobed, 2½-7 cm. long, 8-20 mm. broad, the stem-leaves scattered but usually crowded at the summit, narrower, shorter and sometimes entire; peduncles axillary, without bracteoles, 1-flowered, often longer than the leaves, mostly spreading or deflexed in fruit; sepals narrow-linear, 5-6 mm. long and longer than the hairy receptacle; corolla yellow, pubescent outside and in the tube, 15-25 mm. long, the 2 upper lobes broadly winged, auricled on the outer side, the tube decurrent in a protuberance which sometimes forms a short spur below the receptacle; style glabrous; indusium with a tuft of hairs at base; capsule almost globular, 6-8 mm. long, the dissepiment minute; seeds almost black, 6-8, orbicular, flat, nearly as broad as the capsule, with a rather broad thick wing or border. (Fig. 240, I.)

Southern part of Flinders Range to Far North and westward to Musgrave Range and Lake Gairdner; north and south of Cooper's Creek. Most of the year.—Western New South Wales; West Australia (Barrow Range). The specific name alludes to the circular wing of the seed.

18. **G. pinnatifida,** Schlechtd. Herb beset more or less with scattered simple hairs; stems erect or ascending, 2-40 cm. long; radical leaves oblong-cuneate in outline, 1½-7 cm. long, pinnatifid or pinnatipartite into several rather narrow acute or obtuse lobes, or sometimes merely crenate or entire and narrow-lanceolate, all tapering into a rather long petiole; stem-leaves usually at the base of the branches, mostly pinnatifid, sometimes wanting; floral leaves linear-lanceolate or linear, almost always quite entire, much shorter than the peduncles, which are axillary, 1-flowered, without bracteoles, 3-16 cm. long, often clustered at the ends of the branches or stems, erect or reflexed in fruit; sepals 4-6 mm. long, linear-lanceolate; corolla yellow, 15-25 mm. long, almost or quite glabrous outside, pubescent in throat, the tube slightly decurrent and protuberant along the receptacle, the upper lobes with a broad wing on the inner side and a narrow rounded wing decurrent in a large auricle on the outer side; style short (3-5 mm. long) glabrous at least towards base; indusium pubescent on back; anthers apiculate; capsule ovoid-globular, 5-8 mm. long, rarely half-superior to the sepals; dissepiment reaching to about ¼ or ½ of the capsule; seeds in 1 row, 6-22, flat, ovate, black with a white border ½ mm. broad, in all 4-5 mm. long.

Southern districts to Flinders Range and Far North, westward to Ooldea and Nullarbor Plain; Yorke and Eyre Peninsulas; Murray lands; South-East. Aug.-Dec.—Victoria; New South Wales.

19. **G. pusilliflora,** F. v. M. More or less pubescent annual; stems ascending, 1-20 cm. long; radical leaves petiolate, oblong-cuneate, pinnatifid, pinnatipartite or coarsely toothed, rarely almost entire, 1-4 cm. long; stem-leaves only at the base of the peduncles, smaller, toothed or entire, obovate or lanceolate; peduncles 1-flowered, without bracteoles, axillary, sometimes solitary and terminal or in terminal clusters, slender and much longer than the floral leaves; sepals lanceolate, 2½-3 mm. long; corolla yellow, 6-8 mm. long, more or less pubescent outside and in the throat, the upper lobes almost as in *G. pinnatifida*; indusium pubescent on back, very shortly ciliate, bluntly notched or bilobed; capsule ovoid-globular, 5-8 mm. long, the dissepiment only about $^1/_5$ of its length; seeds in 1 row, about 6, black, ovate, 4-5 mm. long, including the white wing, which is about 1 mm. broad.

Southern districts to Flinders Range, eastward to Broken Hill and westward to Ooldea; Murray lands; Eyre Peninsula. June-Nov.—Western Victoria and New South Wales; West Australia. The floral leaves are obovate-cuneate and 3-5-toothed or broad-lanceolate and entire or almost so, while in *G. pinnatifida* they are linear or narrow-lanceolate and entire.

20. **G. lunata,** J. M. Black. Small perennial, with erect or ascending pubescent stems 6-20 cm. long, woolly at base; leaves stiff, hoary with a close appressed pubescence, the radical ones oblong-lanceolate, acute, 4-7 cm. long, without the rather long petiole into which they taper, more or less deeply pinnatifid, with 2-6 acute lanceolate spreading lateral lobes 8-20 mm. long, shorter than the terminal one, the outer and earlier radical leaves entire; stem-leaves absent or 1 only, lanceolate, entire; floral leaves narrow, scarcely shorter than the erect pubescent 1-flowered peduncles, which are axillary or clustered and terminal, without bracteoles; sepals 3-4 mm. long; corolla yellow, about 15 mm. long, pubescent outside and in lower part of tube, the wings all broad and the upper lobes auricled; style glabrous, short; indusium glabrous on back, very shortly and sparsely ciliate at summit; capsule ovoid, 7-10 mm. long; dissepiment very short, crescent-shaped, scarcely ¼ as long as capsule; seeds suborbicular, brown, about 5 mm. diam., including the broad wing.

Cordillo Downs (on creek banks); near Macumba, Alberga, and Diamantina Rivers.—South-west Queensland.

21. **G. glauca,** F. v. M. Perennial herb with erect or ascending glabrous stems 10-20 cm. long; leaves all glabrous and glaucous, or sometimes the earlier and caducous radical leaves more or less appressed-pubescent, oblong-cuneate and obtuse, the other radical ones broadly or narrowly lanceolate, acute, entire or rarely with a few acute spreading teeth, 3-10 cm. long, including the petiole, 4-12 mm. broad; stem-leaves 1-3, entire, lanceolate, 2-5 mm. broad, the floral ones equalling or shorter than the peduncles, sometimes linear and clustered; peduncles 2-8 cm. long, glabrous, axillary, 1-flowered, without bracteoles; sepals lanceolate, pubescent, about 5 mm. long; corolla yellow, 15-20 mm. long, pubescent outside with short appressed silvery hairs, minutely pubescent in tube, all the lobes broadly winged and the 2 upper ones auricled; style 6-9 mm. long, almost villous with spreading hairs; indusium more or less pubescent on back, densely ciliate at summit; anthers apiculate; capsule globular, 5-7 cm. diam., the dissepiment reaching to about the middle; seeds brown, ovate, flat, 3-3½ mm. long, including the white wing, which is ½ mm. broad.

Murray lands to Flinders Range and Far North. Chiefly summer.—Western Victoria and New South Wales; central and parts of tropical Australia.

22. **G. subintegra,** F. v. M. Perennial herb with erect or ascending sparsely appressed-pubescent stems 5-30 cm. long; leaves more or less appressed-pubescent, the radical ones 3-10 cm. long, including the petiole, 4-18 mm. broad, the earlier caducous ones broad-lanceolate to obovate, often obtuse, entire or with a few teeth, sometimes lyrate, or (when obovate) with rounded lobes or crenatures, the later more permanent, leaves rather broadly-lanceolate, acute, usually entire; stem-leaves 1-3, petiolate, lanceolate or linear-lanceolate; peduncles 2-7 cm. long, pubescent, axillary, 1-flowered, without bracteoles, usually much longer than the narrow floral leaves, sometimes clustered at summit of stems; sepals 4-5 mm. long, lanceolate, pubescent; corolla yellow, 15-25 mm. long, silvery-pubescent outside, the 2 lower lobes auricled; style 3-6 mm. long, quite glabrous or sometimes bearded on inner side near summit; indusium glabrous on back; anthers apiculate; capsule obovoid, subcompressed, usually contracted towards base, 7-10 mm. long, the dissepiment from ⅓ to nearly half as long; seeds brown, ovate, punctulate, flat, 5-7 mm. long, including the white wing, which is 1-2 mm. broad. (Fig. 240, E-H.)—*G. glauca*, F. v. M. var. *sericea*, Benth. (1869).

Murray lands to Flinders Range and Far North. Most of the year.—Western Victoria and New South Wales; Central Australia.

G. subintegra was imperfectly described by Mueller in Viet. Nat. 5 : 13 (1888) as a distinct species or a variety of *G. glauca*, and his statement that Bentham had already treated it as a variety of that species shows that Mueller considered it equivalent to var. *sericea*. As a varietal name *sericea* has a priority of nearly 20 years, but when that variety is raised to specific rank (as I think it should be) Mueller's specific name takes precedence in accordance with article 49 of the international rules.

23. **G. heteromera,** F. v. M. Perennial herb, the stems slender, prostrate or procumbent, 4-20 cm. long, becoming glabrous; radical leaves lanceolate, 3-8 cm. long, including the petiole, 3-8 mm. broad, entire or minutely and distantly toothed or rarely with 2-4 oblong lobes, appressed-pubescent, becoming glabrous; stem-leaves none except the floral ones in terminal or rarely lateral tufts; peduncles pubescent, the hairs longer and almost woolly just below the flower, 1-flowered, 10-25 mm. long, without bracteoles, about as long as or rarely shorter than the floral leaves, sometimes a few peduncles radical; sepals about 3 mm. long, somewhat unequal; corolla yellow, about 10 mm. long, pubescent outside and in tube, the 2 upper lobes very unequally winged, auricled; style short, glabrous; indusium somewhat hairy on back, densely ciliate; capsule obovoid, 4-6 mm. long; seeds ovate-orbicular, about 2 mm. long, dark-brown, with a very narrow wing or border; dissepiment reaching above middle of capsule. (Fig. 240, A.)

River Murray above Morgan, but apparently rare in our State. Summer.—Western Victoria and New South Wales.

Var. *deminuta*, J. M. Black. Dwarf form, woolly at base; radical leaves 5-15 mm. long, including the petiole; peduncles filiform, sometimes all radical, 15-20 mm. long, very woolly below the flower, or sometimes there is also a short flower-bearing stem; indusium glabrous on back. Collected near the Wilson River, south-western Queensland, and may therefore occur in our territory north of Cooper's Creek.—Sept.-Oct.

24. **G. argentea,** J. M. Black. Weak herb, silvery-pubescent with dense short appressed hairs; stems slender, erect or ascending, 10-20 cm. long; radical leaves linear- or oblong-lanceolate, 3-12 cm. long, including the long petiole into which they taper, 2-7 mm. broad, entire or with 2-4 linear spreading lobes or teeth 4-20 mm. long; stem-leaves 1-2, narrow-linear; floral leaves very narrow, about as long as the filiform axillary peduncles, which are 2-6 cm. long and without bracteoles; sepals about 3 mm. long; corolla white (or pale yellow ?), 14-16 mm. long, pubescent outside and in the tube, all the wings broad and rounded at summit, the 2 upper lobes auricled; anthers apiculate; style 3 mm. long, glabrous; indusium almost glabrous on back and at summit, the cilia being nearly

obsolete; dissepiment reaching to middle of ovary and hairy round the margins; ovules about 12, winged; fruit not seen.

Strangways Springs (west of Lake Eyre); Yadlakina Soakage (east of Lake Torrens).

25. **G. anfracta,** J. M. Black. Small perennial, glabrous except for a little wool in the axils; stems procumbent, zig-zag, slender but rigid, about 10 cm. long; radical leaves entire or almost so, lanceolate or obovate-cuneate, 15-20 mm. long, including the short petiole, 1-6 mm. broad; stem-leaves distant, only at the base of the branches and peduncles, linear, rather thick, slightly contracted towards base, 20-25 mm. long, about 1 mm. broad, often curved; peduncles solitary, 1-flowered, axillary, filiform, about as long as the leaves, usually reflexed, without bracteoles; sepals 3 mm. long, linear-lanceolate, pubescent, longer than the small receptacle; corolla yellow (or white ?), about 12 mm. long, pubescent outside and in tube, the wings small and at the summit of the lobes, the 2 upper lobes with conspicuous auricles; style 3-4 mm. long, glabrous; indusium pubescent on back and shortly but densely ciliate; dissepiment reaching nearly to summit of ovary; ovules about 12, in 2 rows; fruit not seen.

Only known by a specimen collected by Helms in May, 1891, at Cootanoorinna, between Warrina and Arkaringa Creek. Near *G. linifolia,* W. V. Fitzg. ex Krause, of North-West Australia, but differs in the much shorter stem-leaves, longer peduncles, glabrous style and procumbent habit.

26. **G. Havilandii,** Maiden et Betche. Slender herb, beset all over with minute glandular hairs mixed with a few longer simple ones; stems erect or ascending, 20-30 cm. long; radical leaves lanceolate, 4-7 cm. long, including the long petiole, 3-7 mm. broad, entire or with a few small distant teeth, rarely pinnatifid; stem-leaves scarcely any except the shorter and narrower ones at the base of the branches and peduncles; peduncles 1-flowered, those on the stems 8-15 mm. long, and usually shorter than the linear-lanceolate floral leaves, without bracteoles, spreading and curved upwards or inwards at summit when in fruit, the radical peduncles very few and shorter than the leaves; sepals lanceolate, 2½ mm. long; corolla yellow, about 8 mm. long, glandular-pubescent outside, slightly pubescent in tube, all the lobes with short broad wings, the 2 lower lobes with ciliolate auricles; style 4 mm. long, hairy; indusium slightly and bluntly notched, hairy on back, densely ciliate at summit; anthers apiculate; capsule globular, 4-5 mm. long and quite as broad; dissepiment minute, about 1 mm. high, thickened and very hairy at summit; seeds ovate, flat, black and shining when ripe, about 2½ mm. long, including the white wing about ½ mm. broad.

Between Bogan and Darling Rivers, N.S.W., and has been found in the Barrier Range within 30 miles of our border.

Var. *pauperata,* J. M. Black. Radical leaves shorter, narrower, and entire or almost so; stems 3-8 cm. long; axillary peduncles 5-10 mm. long.—Near Ooldea.—West Australia (Victoria Desert).

27. **G. humilis,** R. Br. Dwarf perennial; leaves radical, linear-lanceolate to ovate-lanceolate, at first pubescent but usually becoming glabrous, 2-7 cm. long, including the petiole, 2-9 mm. broad, quite entire or with a few minute distant marginal glands; flowers usually in small terminal panicles on short stems leafless or with very narrow leaves or bracts, rarely on 1-flowered scapes, panicles and scapes shorter than or scarcely exceeding the radical leaves; pedicels short, pubescent, with 2 linear bracteoles at base; sepals about 3 mm. long; corolla yellow, 10-12 mm. long, pubescent outside, the 2 upper lobes unequally winged; style hairy; indusium glabrous on back; ovules very numerous; capsule ovoid, about 4 mm. long; dissepiment reaching nearly to summit; seeds flat, orbicular, small.

South-East; usually in marshy soil. Summer.—Victoria; New South Wales; Tasmania.

28. **G. modesta,** J. M. Black (1912). Glabrous herb, except for a little wool in the leaf-axils; stem slender, erect, almost simple, 20-30 cm. high; radical leaves oblanceolate or ovate-oblong, entire or with a few distant spreading teeth, 2-5 cm. long, including the long petiole; stem-leaves none except the floral ones, which are oblanceolate and longer than peduncles; peduncles 1-flowered, solitary, axillary, with 2 leafy lanceolate bracteoles about the middle and longer than the articulate upper half or pedicel; sepals linear-lanceolate, pubescent, about 3 mm. long; corolla yellow, 12-14 mm. long, pubescent outside and in the tube, which is decurrent in a pouch extending to the base of the ovary, the 2 upper lobes unequally winged; style hairy; indusium pubescent on back; dissepiment reaching nearly to summit of ovary; ovules very numerous in about 4 rows; capsule ovoid, about 5 mm. long; seeds not seen.

Near Tarcoola. Flowering in winter.

PLATE 29 (page 288).—1, corolla spread open; 2, placenta and ovules; 3, style and indusium; 4, vertical section of ovary: *a, a,* sepals; *b,* decurrent pouch of corolla; *c,* articulation of upper part of peduncle.

2. VELLEIA, Sm.

(After Thomas Velley, 1748-1806, English botanist who made a special study of seaweeds.)

Sepals 5 (in our species), free or connate towards base; corolla slit nearly to base, somewhat 2-lipped, the 2 upper lobes separated lower down than the others; receptacle extending slightly above the sepals and bearing the corolla at its summit; stamens free; ovary superior to the sepals but adnate near its base to the corolla, almost 1-celled owing to the short dissepiment; ovules numerous, ascending; indusium cup-shaped; capsule superior, 4- or rarely 2-valved; seeds flat. Herbs with radical leaves and radical flowering stems, which branch dichotomously or trichotomously and bear opposite conspicuous bracts at the forks of the cymose inflorescence.

Bracts and sepals free ..... *V. paradoxa* 1.
Bracts and sepals connate towards base ..... *V. connata* 2.

1. **V. paradoxa,** R. Br. Stems erect or ascending, 10-60 cm. long, more or less hairy; leaves radical, broadly oblanceolate, toothed or almost entire, sometimes lyrate, slightly pubescent or nearly glabrous, 2-18 cm. long, including the petiole into which they taper; lower bracts leafy, sessile, ovate-lanceolate, entire, toothed or lobed, 1-4 cm. long, the upper ones smaller; sepals free, pubescent, oblong-lanceolate, the outer broader and longer than the others and 8-15 mm. long; corolla yellow or white, pubescent outside, 15-30 mm. long, the lobes all broadly winged, the basal spur usually conspicuous, rarely almost obsolete; style almost glabrous; indusium large, pubescent on back; fruiting pedicels erect or deflexed; capsule shorter than longest sepal; seeds brown, winged, 4-6 mm. diam.

Southern districts to Flinders Range and eastward to Broken Hill; Murray lands to Bordertown; Yorke and Eyre Peninsulas and westward to Ooldea. Most of the year.—Temperate eastern Australia and Tasmania; West Australia (Victoria Desert).

FIG. 241.—**Velleia paradoxa.**

2. **V. connata,** F. v. M. Glabrous and glaucous; stems rather stout, erect, 20-50 cm. high; leaves radical, obovate-oblong, slightly toothed or almost entire, often shortly lobed at the base or lyrate, 10-30 cm. long, including the petiole; bracts very broad, connate, the lower ones 2-3 cm. long, entire or the lower ones more or less toothed; pedicels short; calyx about 10 mm. long, the 5 ovate acuminate lobes longer than the tube, the upper one longer than the others and often toothed; corolla purplish, about 15 mm. long, glabrous outside, pubescent inside, the 3 lower lobes almost wingless, the 2 upper ones unequally winged; style hairy in upper part; indusium with long cilia; capsule subglobular, shorter than calyx; seeds pale, broadly winged, 4-5 mm. diam.

Murray lands (Renmark, Berri, Alawoona, Karoonda). Summer.—North-western Victoria; western New South Wales; Central Australia.

3. CALOGYNE, R. Br.

(From Greek *kalos*, beautiful; *gynê*, woman, in the sense of gynoecium: alluding to the graceful bifid or trifid style.)

1. **C. Berardiana** (Gaudich.) F. v. M. Glandular-pubescent annual with ascending stems 10-30 cm. high; leaves lanceolate or linear-lanceolate, entire or irregularly toothed, 3-6 cm. long, including the short petiole, the radical ones in a rosette, the stem-leaves few and alternate at the base of the branches, the floral ones or bracts smaller and often linear; peduncles erect, 1-4 cm. long; sepals 5, lanceolate, about 3 mm. long; corolla yellow or white, 15-25 mm. long, hairy outside, slit nearly to base, the 2 upper lobes deeply separated, unequally winged, auricled, the 3 lower lobes equally winged; ovary inferior; ovules in 2 rows; style deeply divided into 2 hairy branches, each bearing a ciliate indusium at summit; stamens free; capsule ovoid, 6-10 mm. long the dissepiment reaching to the middle; seeds compressed, ovate, black, winged, 4-5 mm. long.

Near Tarcoola; Far North. June-Oct.—Central and West Australia. Resembles forms of *Goodenia subintegra*, but the clothing is different and the capsules are usually more oblong.

4. LESCHENAULTIA, R. Br.

(After Leschenault de la Tour, 1773-1826, botanist of the voyage of discovery under Captain Nicolas Baudin, which visited Australia in 1802-3.)

1. **L. divaricata,** F. v. M. Small glabrous shrub, 30-60 cm. high, with terete rigid striate stems and branches, the latter numerous and divaricate; leaves reduced to minute bracts at the base of the branchlets; flowers subsessile, terminal or opposite the bracts; sepals lanceolate, 3 mm. long, about half as long as the terete receptacle; corolla yellow, slit to base on the upper side, 15-20 mm. long, glabrous outside, hairy inside, the 3 lower lobes broadly winged and fringed, the 2 lower narrowly winged at summit; stamens free; ovary inferior, with several ovules in 2 rows; style slender, glabrous, about 10 mm. long; stigma 2-lipped, the upper lip shorter and glandular inside; capsule pod-like, cylindrical, 10-25 mm. long, 4-valved, with 1-4 seeds and contracted between them, tapering into a long or short empty beak; seeds ovoid-oblong and often truncate at summit, 4-5 mm. long, with a thick bony testa; embryo terete.

Far North and North-East. Resembles *Scaevola depauperata.*—North-western New South Wales; Central Australia.

In *Leschenaultia* the pollen-grains are united in tetrads (groups of 4); in the other genera they are free. Of the 19 known species all but 3 (forming the section *Latouria*, with beaked capsules) belong to West Australia.

5. SELLIERA, Cav.

(After Natale Sellier, who made botanical drawings for Cavanilles' works.)

1. **S. radicans,** Cav. Glabrous prostrate perennial, rooting at the nodes of the creeping stem; leaves clustered or solitary at the nodes, fleshy, obovate- or oblong-spathulate 1-10 cm. long, including the rather long petioles into which they taper; peduncles axillary, 1-flowered, shorter than the leaves, with 2 bracteoles at or above the middle; sepals 2-3 cm. long; corolla glabrous, violet or purple outside, 6-8 mm. long, the tube slit to the base on the upper side, the 5 lobes almost equal and spreading digitately, not winged; stamens free; ovary inferior, with numerous ascending ovules in 2 rows; style hairy at summit; indusium cup-shaped, minutely ciliate; fruit ovoid, somewhat fleshy, indehiscent, 4-6 mm. long, the dissepiment reaching above the middle; seeds under 2 mm. diam., compressed, brown, shining, with a thick white border or wing.

Southern districts; Kangaroo Island; Eyre Peninsula; South-East. Near water. Summer.—Victoria; New South Wales; Tasmania; New Zealand; Chili.

6. CATOSPERMA, Benth.

(From Greek *katō*, downwards; *sperma*, seed: alluding to the pendulous seeds.)

1. **C. goodeniaceum** (F. v. M.) Krause. Glabrous perennial, with procumbent or ascending stems; leaves thick, rather distant, broadly ovate-rhomboid, 1-2½ cm. long and nearly as broad, with a few blunt teeth, the petioles shorter; peduncles axillary, shorter than leaves, bearing cymes of usually 3 flowers, the lateral pedicels with 2 minute bracteoles below the middle; sepals 2 mm. long, fleshy, lanceolate; corolla yellow, about 12 mm. long, minutely pubescent outside, almost glabrous inside, slit nearly to the base on the upper side, the 3 lower lobes with small triangular wings, the 2 upper ones more deeply separated and very unequally winged; stamens free; style straight, sparsely hairy in upper part; ovary inferior, 2-celled, with 2 ovules in each cell pendulous from the summit; indusium cup-shaped, glabrous on back, ciliate; fruit drupaceous, indehiscent, ovoid, 5-6 mm. long, 10-ribbed, with a bony endocarp, and usually 1 oblong seed in each cell.—*C. Muelleri*, Benth. (1868); *Scaevola goodeniacea*, F. v. M. (1858).

Recorded by Tate from between the River Alberga, S.A., and Mount Olga, C.A.—Central Australia and tropical part of Northern Territory.

I have altered the "*C. goodeniacea*" of Krause so as to accord with the gender of *sperma* and with the fact that other genera with a like ending (*Aspidosperma*, *Podosperma*) are always treated as neuter.

7. SCAEVOLA, L.

(A Roman family name, meaning "left-handed," from *scaevus*, left: alluding to the one-sided fan-shaped corolla.)

Sepals 5, short, sometimes minute; corolla slit to base on the upper side, the lobes subequal, spreading digitately; wings equal; auricles absent; stamens free; ovary inferior, 2-celled with 1 erect ovule in each cell, rarely 1-celled with 1-2 erect basal ovules; style usually curved inwards at summit; indusium cupshaped, ciliate at summit; fruit indehiscent, dry or succulent, the endocarp usually bony; seeds oblong, the embryo mostly terete. Herbs, undershrubs, or shrubs; flowers axillary, sessile or pedunculate, bracteolate. *Fan-flower.*

A genus of over 80 species, of which more than 50 are Australian; the others are distributed over the warmer parts of the old and new worlds and are chiefly coastal.

A. Shrubs; flowers on short solitary axillary peduncles; bracteoles immediately under flower; leaves entire, obtuse; ovary 2-celled. (Section *Crossotoma*.)
  Leaves clustered; branchlets spiny; style hairy..... *S. spinescens* 1.
  Leaves scattered; spines absent; style glabrous..... *S. bursariifolia* 2.
A. Undershrubs; flowers on axillary peduncles; bracteoles distant from flower; ovary 2-celled. (Section *Pogonanthera*, but in our species the anthers are not bearded.)
  Stem-leaves mostly reduced to minute bracts; fruit without beak..... *S. depauperata* 3.
  Stem-leaves many, long, linear, entire; fruit narrowed to a beak at summit below the sepals..... *S. collaris* 4.
A. Perennial herbs or undershrubs; flowers sessile or subsessile, forming terminal leafy spikes; fruit mostly dry. (Section *Xerocarpaea*.)
  B. Ovary 2-celled.
    C. Indusium with short scattered hairs on the back; style hairy.
      D. Glabrous undershrubs; leaves petiolate, toothed.
        Leaves elliptical..... *S. nitida* 5.
        Leaves obovate or orbicular..... *S. crassifolia* 6.
      D. Hairy perennials or undershrubs; lower leaves petiolate, ovate or obovate.
        Stems erect..... *S. ovalifolia* 7.
        Stems procumbent..... *S. calendulacea* 8.
    C. Indusium with a dense tuft of hairs rising from its base and as long as the indusium; leaves shortly petiolate, obovate-cuneate, toothed; perennial herbs.
      Corolla 18-30 mm. long; style glabrous or sometimes hairy..... *S. aemula* 9.
      Corolla 10-13 mm. long; style villous..... *S. humilis* 10.
  B. Ovary 1-celled; fruit usually 1-seeded.
    E. Leaves shortly petiolate, toothed; pubescent perennial herbs.
      Leaves obovate-cuneate; corolla 10-18 mm. long; style hairy..... *S. microcarpa* 11.
      Leaves oblanceolate; corolla about 8 mm. long; style glabrous..... *S. pallida* 12.
    E. Leaves sessile, linear, revolute, almost always entire; villous shrub or undershrub..... *S. linearis* 13.

1. **S. spinescens,** R. Br. Rigid shrub 50 cm. to over 1 m. high, hoary with a close minute stellate tomentum; leaves often clustered, oblanceolate or obovate-cuneate, rather thick, 5-20 mm. long, 2-5 mm. broad, each cluster usually accompanied by a rigid simple or branched spine shorter or longer than the leaves; peduncles solitary, axillary, slender, usually shorter than the leaves, 3-14 mm. long; bracteoles linear, minute or nearly as long as the receptacle; sepals minute, forming an annular almost truncate calyx; corolla white, 10-16 mm. long, stellate-tomentose or almost glabrous outside, bearded inside the tube, which is 3 times longer than the narrowly winged fringed lobes; style 8-9 mm. long, with spreading hairs, especially near base; dissepiment of ovary thick and reaching to summit; drupe ovoid-oblong, 5-7 mm. long.

Murray lands and north thereof; Yorke Peninsula to the Flinders Range and across the whole far-northern part of the State; Eyre Peninsula and along the Great Bight to Ooldea. Most of the year.—Drier parts of temperate Australia. Resembles *Lycium australe*.

2. **S. bursariifolia,** J. M. Black. Glabrous shrub with viscid branchlets; leaves rather thick, obovate-cuneate or oblanceolate, 10-15 mm. long, including the very short petiole, approximate but not clustered; flowers few, solitary, axillary, sub-sessile, about as long as or shorter than the leaves, on thick peduncles only 1-2 mm. long, with 2 linear bracteoles half as long as receptacle; sepals rounded, about ½ mm. long; corolla apparently yellow, 8-9 mm. long, glabrous outside, bearded inside, the lobes ½ to ⅔ as long as the tube, almost wingless; style glabrous, 4-5 mm. long; indusium pubescent on back; dissepiment of ovary thin and not reaching to summit; fruit unknown.

Collected by Tate in Feb., 1879, on the "Bunda Plateau," extending from north of Fowler's Bay along the Great Bight towards Eucla. The leaves resemble the smaller ones of *Bursaria spinosa* and those of *Dodonaea bursariifolia*. It was at first recorded

by the discoverer as a form of *S. spinescens*, and later as a form of *S. myrtifolia* (De Vriese) Krause (*S. Groeneri*, F. v. M.), from which latter it differs in the viscid branchlets, smaller thicker obtuse leaves, shorter stout peduncles, smaller corolla with almost obsolete wings and shorter glabrous style.

3. **S. depauperata,** R. Br. Erect undershrub; stems and branches rigid, striate, glabrous or rough with short spreading hairs; radical leaves lanceolate or oblong, pubescent, shortly petiolate, 2-6 cm. long, distantly toothed; stem-leaves linear, entire and soon reduced to linear rigid bracts, 3-6 mm. long, at the base of the branches and peduncles; peduncles axillary, rigid, spreading, 2-5 cm. long, 1-flowered, with 2 small bracteoles at the base of the short pedicel, the terminal peduncles opposite, with a shorter one in the fork; calyx campanulate, hairy, divided less than half-way into 5 lanceolate lobes; corolla pale lavender inside, 20-25 mm. long, scented, pubescent outside, villous in the tube, the wings ciliate; style glabrous, 12-15 mm. long; indusium with a dense tuft of white hairs reaching to its summit; fruit ovoid-oblong, about 8 mm. long, warted.

Far North from Queensland to West Australia.—Central and West Australia.

4. **S. collaris,** F. v. M. Low glabrous undershrub; leaves linear or linear-lanceolate, pale-green, thick but flaccid, entire, 2-7 cm. long, 3-6 mm. broad; peduncles axillary, solitary or 2-3 together, short, with 2 bracteoles at base; sepals deltoid, glabrous, about 1 mm. long, much shorter than the cylindrical receptacle; corolla 10-12 mm. long, glabrous and yellowish outside, with white wings, purplish and glandular-pubescent inside; style glandular-pubescent; indusium minutely ciliate; drupe ovoid, with a long neck bearing the persistent sepals at summit, 12-15 mm. long in all; endocarp ribbed.

Port Augusta to Far North and North-East; westward to Ooldea. All the year. Said to be useful as a sand-binder.—West Australia (Ullaring).

6. **S. crassifolia,** Labill. Glabrous undershrub, usually about 1 m. high and spreading so as to cover a large circular patch of ground; leaves thick, rigid, obovate-cuneate, orbicular or ovate, serrate, 2-5 cm. long without the rather long petiole; flowers sessile in rather dense terminal spikes; bract linear-lanceolate, scarcely half as long as flower, the two bracteoles much smaller; calyx a truncate rim, about ½ mm. long; corolla pale-violet, 12-15 mm. long, glabrous outside, pubescent in the tube, which is about as long as the winged lobes; style about 8 mm. long, hairy; fruit subglobular, 2-3 mm. diam., with a bony endocarp.

From near Adelaide northwards round the coast to the Great Bight; Kangaroo and other islands. Summer.—West Australia.

7. **S. ovalifolia,** R. Br. Erect densely pubescent perennial or undershrub, 20-60 cm. high; leaves obovate-cuneate, ovate-lanceolate or almost orbicular, the lower ones shortly petiolate, mostly 2-4 cm. long, 10-20 mm. broad, sharply and irregularly toothed, rarely subentire, sometimes almost glabrous except on the ciliate margins, the upper leaves gradually smaller, subsessile and passing into the floral bracts; flowers sessile, scented, in terminal loose leafy spikes; sepals minute, rounded, ciliolate, about ½ mm. long; corolla purple, pink or cream, about 20 mm. long, pubescent outside and inside; bracteoles linear-lanceolate, 6-8 mm. long; style 8-10 mm. long, with spreading hairs and also a tuft of hairs at summit about half as long as the indusium; fruit ovoid-oblong, about 4 mm. long.

Northward from the neighborhood of Lakes Torrens and Frome, and throughout the Far North. Most of the year.—Western New South Wales and Queensland; central and tropical Australia.

Var. *glabra*, R. Br. Whole plant and outside of corolla glabrous.—Far North.—Central Australia.

8. **S. calendulacea** (Andr.) Druce (1917). More or less silky-hairy perennial or undershrub, with procumbent stems; leaves coriaceous, obovate-oblong, entire, 3-7 cm. long, including the petiole into which they taper, 8-12 mm. broad; flowers sessile in terminal leafy spikes, with 2 or 3 oblong-linear hairy bracts shorter than the flower and two smaller linear bracteoles; calyx very short, ciliate, obscurely 5-lobed; corolla blue, about 15 mm. long, hairy outside, with spreading simple or capitate bristles in the throat; style hairy; indusium pubescent on back, ciliate; drupe ovoid.—*S. suaveolens*, R. Br. (1810); *Goodenia calendulacea*, Andr. (1798).

Sandhills between Victor Harbor and Port Elliot; Lake Alexandrina; Rivoli Bay, S.E. Summer.—Victoria; New South Wales; Queensland.

5. **S. nitida,** R. Br. Erect glabrous shrub; leaves ovate-elliptical or lanceolate, denticulate, 3-9 cm. long, including the petiole, 5-35 mm. broad; flowers sessile, in terminal or axillary rather dense spikes, each flower with 1 linear-lanceolate channelled bract shorter than it, and 2 small bracteoles; calyx minute, truncate; corolla pale violet,

16-18 mm. long, glabrous outside, with spreading simple or penicillate bristles in the throat; style villous; indusium almost glabrous on back, shortly ciliate; fruit ovoid-globular, 4-5 mm. long.

Near Beachport, S.E. Summer.—West Australia.

9. **S. aemula,** R. Br. More or less pubescent perennial, with ascending or procumbent stems, 10-70 cm. long; leaves green, pubescent or almost glabrous, obovate-cuneate or lanceolate-cuneate, the lower ones mostly 2-7 cm. long, including the petiole, 5-25 mm. broad, sharply and distantly toothed, or sometimes the leaves only 1-1½ cm. long and slightly or bluntly toothed, the upper ones becoming almost sessile and tending towards entire; flowers sub-sessile, in a short or long rather loose spike, longer or shorter than the leafy bracts; bracteoles 6-15 mm. long, linear-lanceolate, rarely oblanceolate; sepals rounded or deltoid, ciliate, ½-1 mm. long; corolla purple, bright blue or lilac to almost white, 18-30 mm. long, pubescent outside and almost woolly in the tube; style slender, 8-12 mm. long, glabrous in southern specimens, in far-northern ones hairy near summit or for the greater part of its length; indusium with a dense tuft of purplish or whitish hairs rising from its base and equalling or exceeding it; stigma with 2 acute lobes which sometimes (especially in northern specimens) protrude beyond the indusium like 2 opposite teeth; fruit ovoid, 3-4 mm. long.

From near Gladstone and Spalding northwards to Flinders Range and Far North; Kangaroo Island; Yorke Peninsula; Eyre Peninsula to Gawler Range; South-East. Most of the year.—Temperate Australia. Some specimens resemble *S. ovalifolia* in foliage, but the latter is without the tuft of long hairs behind the indusium, and its leaves dry to a pale ash-color.

10. **S. humilis,** R. Br. More or less pubescent perennial, with ascending stems 10-30 cm. long, sometimes branching; leaves green, the lower ones obovate-cuneate or oblanceolate-cuneate, sharply and distantly toothed, 2-5 cm. long, including the petiole, 5-15 mm. broad, the upper ones smaller and passing into the entire broad-lanceolate bracts; flowers sessile in a short terminal leafy spike; bracteoles linear-lanceolate, 5-6 mm. long; sepals rounded, ciliate, about ½ mm. long; corolla purplish, 10-13 mm. long, pubescent outside and in tube; style 5-6 mm. long, beset with long spreading hairs; indusium with a dense tuft of usually purplish hairs at base and as long as itself; fruit ovoid-oblong, about 4 mm. long.

From about Clare northwards to Flinders Range and Far North; west of Lake Torrens. Summer. Scarcely differs from *S. aemula* except in the smaller corolla, always villous style, and inconspicuous stigma.

11. **S. microcarpa,** Cav. More or less pubescent perennial, with prostrate or ascending stems 4-30 cm. long; lower leaves ovate- or obovate-cuneate, coarsely or slightly toothed, 1-6 cm. long including the short petiole, 6-20 mm. broad, sometimes resembling those of *S. aemula* and *humilis*, the upper ones smaller and passing into the leafy entire bracts; flowers sessile in a rather loose spike, mostly longer than the bracts; sepals ovate, ciliolate, about ½ mm. long; corolla lilac or almost white, 10-18 mm. long, pubescent outside and in tube, with a few longer deflexed hairs fringing the lower margins of the lobes; bracteoles oblanceolate, 5-8 mm. long; style hairy; indusium hairy at base of the back, but the hairs not exceeding half its length, glabrous on the upper part; ovary 1-celled, with 2 ovules; fruit ovoid-oblong, 3 mm. long. (Fig. 240, O-P.)

Southern districts to Flinders Range; South-East. Sept.-Jan.—Victoria; New South Wales; Tasmania.

12. **S. pallida,** R. Br. Differs from the preceding in the lower leaves smaller and narrower, 7-20 mm. long, 2-6 mm. broad, the corolla about 8 mm. long, always pale and the style glabrous.—*S. microcarpa*, Cav. var. *pallida*, Benth.

South-East. Summer.— Western Victoria.

13. **S. linearis,** R. Br. Low shrub or undershrub with erect or ascending branching stems, rather roughly villous and with some minute glandular hairs among the longer ones; leaves stiff, linear or linear-lanceolate, obtuse, with entire revolute margins, sessile, alternate, 1½-4 cm. long, 1-5 mm. broad; flowers sessile in terminal leafy spikes, longer than the bracts; bracteoles linear, 5-10 mm. long; sepals minute, rounded; corolla blue, 18-22 mm. long, pubescent outside and in tube, with some penicillate hairs descending from the lower margins of the lobes; ovary 1-celled, with 2 ovules; style hairy; indusium pubescent on back but not tufted from the base; fruit oblong, 3 mm. long.

Yorke and Eyre Peninsulas. Sept.-Dec. There is often a rudimentary dissepiment intruding a short distance from either side of the ovary, but never meeting in the centre or separating the 2 ovules.

Var. *confertifolia*, J. M. Black. Sometimes procumbent; leaves 2-20 mm. long flowers 1-8 in dense leafy clusters which are terminal or apparently axillary owing to the

branchlets being contracted into a cluster of leaves; corolla blue, 12-15 mm. long.—Hope Valley (near Adelaide); Encounter Bay; scrub near River Finniss; Kangaroo Island. Some island specimens have greyish leaves only 2-5 mm. long.

8. DAMPIERA, R. Br.

(After William Dampier, 1652-1715; a buccaneer in the West Indies and Pacific Ocean; was later made captain of the Admiralty vessel *Roebuck*, and visited the north-west coasts of Australia in 1698; published an account of the country and natives; collected Australian plants, which are still preserved in the British Museum and at Oxford.)

Sepals 5, very small and inconspicuous; corolla usually deeply slit on the upper side, but with an entire persistent finally circumsciss and often ragged base, the 2 upper lobes deeply separated, with a broad wing on the inner margin and a smaller wing and thick concave, usually red, auricle along the outer margin, the 3 lower lobes less deeply separated, broadly and equally winged; anthers cohering in a tube round the glabrous style; indusium somewhat 2-lipped, reddish, glabrous on back and not ciliate at summit; stigma with 2 rounded usually prominent lobes; ovary inferior, 1-celled, with 1 erect basal ovule (in all our species); fruit small, a nut or drupe; embryo terete. Perennial herbs or undershrubs, more or less tomentose with stellate hairs, which are either short, or longer and stellately branched, or stellate only at base and then long and barbellate or almost simple upwards, sometimes with short spreading scattered branches up to the summit (plumose), or, in a few species, with short hairs whose branches are divaricate, fasciate, and lie in the same plane.

A purely Australian genus, most of the 53 known species being West Australian.

A. Young leaves tomentose on both faces, the older ones often becoming glabrous above; hairs stellate.
  B. Flowers usually solitary on peduncles not longer than the floral leaves.
    Leaves flat, elliptic, hairy on both faces ..... *D. marifolia* 1.
    Leaves with strongly revolute margins, linear-oblong, glabrous above ..... *D. rosmarinifolia* 2.
  B. Flowers usually in cymes or apparently in racemes much longer than the leaves; leaves becoming glabrous above, with slightly recurved margins.
    Corolla with rather short hairs; bracts and bracteoles linear, 5-7 mm. long ..... *D. lavandulacea* 3.
    Corolla with long plumose hairs; bracts and bracteoles ovate-acute, 2-3 mm. long ..... *D. lanceolata* 4.
A. Young and adult leaves glabrous on both faces; leaves flat, few-toothed; hairs of corolla with divaricate fasciate branches ..... *D. leptoclada* 5.

1. **D. marifolia,** Benth. Small erect densely branching undershrub 10-40 cm. high; stems and branches terete, more or less beset with spreading stellate hairs, the young stems rusty-villous; leaves sessile, stiff, ovate-oblong or elliptic-oblong, erect, entire, flat, but with thickened margins, 1-1½ cm. long, 4-8 mm. broad, greyish on both faces with a dense close stellate tomentum; flowers rather numerous, usually solitary, on peduncles shorter than or nearly as long as the floral leaves or bracts; bracteoles oblong, 3-5 mm. long; sepals ovate, tomentose, about 1½ mm. long and nearly as long as the receptacle; corolla blue, 10-12 mm. long, rather loosely stellate-tomentose outside; auricles red.

Murray scrub on both sides of the river. Sept.-Dec.—Western Victoria and New South Wales. The specific name is founded on the resemblance of the leaves to those of *Teucrium Marum*, L., a Mediterranean undershrub.

2. **D. rosmarinifolia,** Schlechtd. *Wild Rosemary.* Erect or procumbent branching undershrub; stems 20-50 cm. long, terete, stellate-tomentose; leaves thick, sessile, rather crowded, often arranged in 3's, entire, oblong or linear-oblong, obtuse, 10-25 mm. long, green, glabrous and shining above, the margins usually so revolute as to hide the white-tomentose undersurface, but the leaves sometimes more open and broader; peduncles 1-flowered, white-tomentose, 1-3 together in the upper axils, shorter or rarely almost as long as the floral leaves or bracts; bracteoles scarcely 2 mm. long, shortly below the flowers; sepals ½-1 mm. long, inconspicuous under the tomentum; corolla purplish-blue or pink, 12-14 mm. long, densely tomentose outside with stellate pale or dark hairs, which are sometimes almost as long as in *D. lanceolata*, the auricles red, but sometimes present or absent on flowers of the same plant. (Fig. 240, K-L.)

Murray lands on both sides of the river and round Lakes Alexandrina and Albert; 90-Mile Desert; recorded from Encounter Bay and Mt. Remarkable. Sept.-Nov.—Western Victoria and New South Wales.

3. **D. lavandulacea,** Lindl. Branching perennial, the stems erect or diffuse, rigid, furrowed, white-tomentose or becoming glabrous towards the base, 20-40 cm. long; leaves sessile stiff, oblong- or linear-lanceolate, narrowed towards base, the radical ones sometimes obovate-cuneate, entire or (especially the radical ones) with a few distant spreading teeth, 8-20 mm. long, 2-7 mm. broad, the margins recurved but rarely concealing the white-tomentose under-surface, the upper face becoming green and glabrous; flowers rarely solitary on a peduncle longer or shorter than the subtending leaf, usually in slender loose irregular axillary 2-4-flowered cymes much longer than the leaf; bracts and bracteoles alike, linear-lanceolate, leafy but channelled above, not below, 5-7 mm. long, the 2 bracteoles at the base of the very short thick pedicel; sepals minute, almost concealed by the dense tomentum; corolla lilac or blue, 12-20 mm. long, with a rather close greyish stellate tomentum outside; auricles red.

Mount Lofty and Barossa Ranges; between Murray Bridge and Callington; near Bordertown; southern part of Flinders Range and at least as far north as Wilpena Pound. Sept.-Dec.—West Australia.

4. **D. lanceolata,** A. Cunn. Small undershrub, the stems erect or procumbent, 20-50 cm. long, at first white-tomentose or almost woolly, later nearly glabrous, slightly furrowed; leaves sessile, rather thick, lanceolate or obovate-oblong, contracted towards base, flat or slightly recurved, especially the upper ones, which are often linear-lanceolate, 1-5 cm. long, 3-25 mm. broad, stellate-tomentose but usually becoming glabrous above or rarely on both faces, entire or sometimes with a few distant teeth; flowers rarely solitary, usually 2-5 in loose irregular axillary cymes much longer than the leaf, the cymes solitary or apparently clustered, the rhachis and peduncles white-tomentose; bracts and bracteoles ovate-lanceolate, 2-3 mm. long, tomentose, the 2 bracteoles at the base of the very short thick pedicels; receptacle larger and thicker than in other species, 3-4 mm. long, densely tomentose; sepals minute; corolla 12-14 mm. long, blue, covered outside with a loose tomentum of stellate and longer plumose blackish or sometimes greyish hairs; auricles pale in all the specimens seen.

Near coast south of Adelaide; Kangaroo Island; Murray lands; Minnipa, E.P.; Ooldea. Most of the year.—Western Victoria and New South Wales.

5. **D. leptoclada,** Benth. Rigid undershrub, 25-40 cm. high, glabrous except on the inflorescence, the stems erect or ascending, trigonous; leaves sessile, stiff, oblanceolate or oblong-cuneate, flat, subobtuse, 1½-4 cm. long, 3-6 mm. broad, entire or with 2-4 small distant spreading teeth, the floral leaves lanceolate; peduncles slender, erect, almost glabrous, 1-3 in the upper axils, 10-15 mm. long, 1-2-flowered, about as long as or sometimes longer than the floral leaves; bracts lanceolate, glabrous, 2-4 mm. long, at the base of the peduncles, the 2 bracteoles at their summit 1-2 mm. long, often persistent; pedicels minute; sepals small, almost concealed in the tomentum; corolla blue, about 12 mm. long, tomentose outside with short blackish appressed hairs, each with 6-10 contiguous parallel divaricate branches; auricles red.

Myponga (Mt. Lofty Range). Summer. Apparently very rare.—West Australia.

D. stricta (Sm.) R. Br. was recorded by Mueller and Tate for the South-East, apparently without authority. It inhabits eastern Australia, has more sharply angled stems and branches, and similar but rust-colored hairs on the corolla.

Family 115—**BRUNONIACEAE.**

This family has, like *Goodeniaceae*, an indusium at the summit of the style, but differs in the exalbuminous seed and the superior ovary enclosed in the free hollow ovoid receptacle. In one Goodeniaceous genus (*Velleia*) the ovary is also superior, but there it is surrounded by the hypogynous sepals, whereas in *Brunonia* the ovary is completely enclosed in the receptacle, at the summit of which stand the perigynous sepals. The corolla-lobes have no wings and are therefore simply valvate, not induplicate-valvate, as in all *Goodeniaceae* except *Selliera radicans*. The flower-heads, which consist of much-contracted cymes, resemble those of *Compositae* and *Dipsacaceae*. The family is peculiar in containing only 1 genus and 1 species.

1. BRUNONIA, Sm.

(Named by Sir James E. Smith in 1810 after Robert Brown, the famous botanist, who was born at Montrose, Scotland, in 1773, and came to Australia in 1802 as naturalist to Captain Flinders' voyage of discovery in the *Investigator*.)

1. **B. australis,** Sm. *Blue Pincushion.* Silky-villous perennial herb; leaves all radical, oblanceolate or obovate-cuneate, entire, mostly 4-10 cm. long, including the petiole, 3-15 mm. broad; flowers sessile in dense hemispherical heads 15-20 mm. across, surrounded by an involucre of outer ovate-lanceolate berbaceous villous bracts shorter than the flowers, the inner bracts smaller and pubescent on back; each flower surrounded

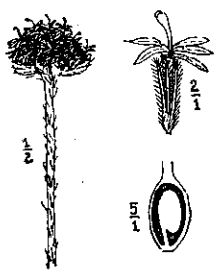

FIG. 242.—**Brunonia australis.**

by 4 ovate-oblong bracteoles, the 2 outer stiffer and hairy, or all membranous and glabrous; flower-heads on leafless terete scapes 10-30 cm. long; sepals 5, subulate, plumose, 3-4 mm. long, twice as long as the ovoid receptacle; corolla blue, slightly 2-lipped, 6-8 mm. long, the 5 glabrous lanceolate lobes subequal and about as long as the hairy tube; stamens 5, inserted at base of corolla, the anthers 2-celled, opening inwards and cohering in a tube round the simple style; indusium cup-shaped, enclosing the small 2-lobed stigma; ovary superior, 1-celled, glabrous, with 1 erect anatropous ovule; fruit a small nut enclosed in the hardened receptacle; seed ovoid, without albumen; embryo straight; radicle short, inferior.

Southern districts to Far North and westward to Ooldea and Everard and Musgrave Ranges; South-East. Most of the year.—Temperate Australia and Tasmania.

FAMILY 116—STYLIDIACEAE.

Flowers irregular, bisexual; sepals 5, persistent, inserted at the summit of the hollow adnate receptacle; corolla deeply 5-lobed, the tube short, the lowest or anterior lobe smaller than the others, different in shape and called the *labellum*; stamens 2, lateral, the filaments connate with the style in a *column* or *gynostemium*; anthers sessile at the summit of the column, 2-celled, opening outwards, often concealing the entire or 2-lobed stigma; ovary inferior, more or less 2-celled or almost 1-celled, with numerous anatropous ovules; fruit a capsule opening from the summit in 2 valves; seeds small, the minute embryo enclosed in a fleshy albumen. Mostly herbs, with simple alternate or rosulate leaves usually without stipules.

The family is chiefly Australian, with a few species in New Zealand, India, and Tierra del Fuego. It was revised by J. Mildbraed in Engler's Pflanzenreich in 1908.

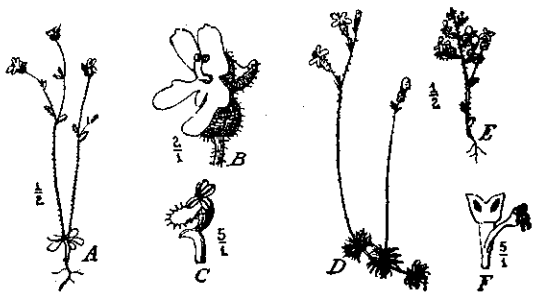

FIG. 243.—**Stylidiaceae.** A-C, *Stylidium calcaratum*; A, plant; B, flower; C, column. D, *S. Tepperianum*. E-F, *Levenhookia dubia*: E, plant; F, labellum spread open and column.

Labellum about $\frac{1}{4}$ the length of the 4 other corolla-lobes, not enclosing the irritable column ..... STYLIDIUM 1.

Labellum about $\frac{1}{2}$ as long as the other lobes, hooded, and enclosing the erect column ..... LEVENHOOKIA 2.

1. STYLIDIUM, Swartz (1805).

(Name formed from Greek *stylos*, column: alluding to the united stamens and style.)

Sepals 5, arranged more or less in 2 lips; corolla more or less 2-lipped, the 4 longer lobes subequal (the 2 posterior sometimes shorter than the 2 anterior), the 5th lobe (labellum) much smaller than the others; column long, usually exserted, curved near the summit or middle (when the corolla-lobes are touched the column moves elastically between the labellum and the posterior lobes); stigma undivided; ovary 2-celled. When the herbs are perennial, the radical rosette may increase each year, or a short stem may spring from the rootstock, bearing at its summit another rosette and scape; the stem may be thus lengthened for several years.—*Candollea*, Labill. (1805) non Labill. (1806) nec Baumg. (1810) nec Steudel (1840). *Stylidium* was published in 1790 by Loureiro as the generic name of a plant (*S. chinense*) which has not been successfully identified, so that *Stylidium*, Lour. is now a doubtful synonym of *Marlea* in the family *Cornaceae*. *Stylidium* is sometimes called "Trigger-plant" or "Spring back" on account of the movable column.

A. Stigma shortly stalked between the anthers; sepals free; slender annuals.
  Corolla spurred ..... *S. calcaratum* 1.
  Corolla not spurred ..... *S. perpusillum* 2.
A. Stigma sessile between the anthers; sepals more or less united.
  B. Capsule ovoid or oblong; perennials with all the leaves in rosettes.
    C. Sepals in both lips united almost to summit; leaves to 30 cm. long ..... *S. graminifolium* 3.
    C. Sepals of anterior lip more or less united, of the posterior lip free.
      Leaves 5-12 mm. long ..... *S. Tepperianum* 4.
      Leaves 15-25 mm. long ..... *S. ciliatum* 5.
  B. Capsule terete; slender annual with small bractlike mostly alternate leaves ..... *S. despectum* 6.

1. **S. calcaratum,** R. Br. Slender annual with scattered glandular hairs; leaves few in a radical rosette, ovate, 3-5 mm. long, including the short petiole; scapes 2-12 cm. high, bracteate, bearing up to 9 flowers on long pedicels arranged in a loose irregular corymb, sometimes simple and 1-flowered; sepals free, 2-3 mm. long and about as long as the globular receptacle; corolla white or pale-pink, about 5 mm. long, the tube very short, with a spur about as long as and parallel to the spreading posterior sepal, the lobes obtuse, the 2 anterior rather longer and angled; labellum scarcely half as long as the other lobes, deflexed, acute; column bent about the middle, channelled in the upper part, with a recurved tooth at the bend; stigma protruding, fringed; capsule subglobular, 2-3 mm. long; placenta almost free-central. (Fig. 243, A-C.)

Southern districts; Yorke Peninsula; Kangaroo Island; South-East. Sept.-Nov.—Western Victoria; West Australia.

2. **S. perpusillum,** Hook. f. Annual 2-4 cm. high; scapes often single and simple; closely resembles small forms of the preceding, but differs in the absence of a spur to the corolla or a tooth in the middle of the column; the small labellum ascending; radical leaves sometimes oblanceolate.

Encounter Bay; Kangaroo Island; South-East.—Western Victoria; Tasmania; West Australia.

3. **S. graminifolium,** Swartz. Perennial with glabrous leaves and glandular-pubescent infloresence; leaves all radical, linear, stiff, flattish but often 1-grooved above, 6-30 cm. long, 1-5 mm. broad; scapes rigid, simple, 20-60 cm. high, often reddish, bearing a spike-like raceme in their upper portion; flowering bracts small, lanceolate at the base of the short pedicels; sepals united in 2 ovate-oblong lips 3 mm. long, one minutely 2-toothed, the other minutely 3-toothed; corolla white or pale-pink, about 10 mm. long, the tube about as long as the sepals, the lobes subequal, obtuse, with 6 linear papillose appendages rising from the throat; labellum small, obtuse or acute, with 2 spreading linear appendages at its base; capsule ovoid-oblong, 5-10 mm. long; placenta stipitate.

Southern districts; Kangaroo Island; South-East. Oct.-Jan.—Temperate Australia except the West.

4. **S. Tepperianum** (F. v. M.) Mildbraed. Small slender perennial; leaves in a dense radical rosette and also in rosettes or tufts at the summit of short red glabrous proliferous extensions of the stem which are 1-2 cm. long; leaves narrow-linear, mucronate, ciliolate, 5-12 mm. long, under 1 mm. broad; scapes filiform, reddish, sparsely glandular-pubescent, simple, 4-10 cm. high, with few-flowered racemes near the summit and linear bracts at the base of the short pedicels; sepals linear, glandular-pubescent, about 2½ mm. long, the 3 posterior ones free, the 2 anterior ones united to near the summit; corolla pink, about 6 mm. long, with 6 clavate appendages in the throat, the lobes ovate, the labellum small, acute; capsule obconical, 5-8 mm. long. (Fig. 243, D.)—*Candollea Tepperiama*, F. v. M.

Kangaroo Island. Oct.-Jan.

5. **S. ciliatum,** Lindl. Perennial; leaves in a dense globular radical rosette, linear-spathulate, 15-25 mm. long, about 1 mm. broad in upper part, terminating in a fine hair 2-5 mm. long, and ciliate with spreading bristly hairs about ½ mm. long; scapes 10-30 cm. high, almost villous with spreading yellowish glandular hairs, or glabrous towards base; flowers glandular-hairy, in a loose raceme along the upper part of the scape, the lower flowers usually 2-3 on slender pedicels and peduncles; bracts small, hair-tipped; sepals ovate, about 2 mm. long, the 3 posterior ones free, the 2 anterior

united above the middle; corolla pale-yellow, the lobes 5-6 mm. long, pubescent outside, the labellum small and broad with 2 short appendages at base; capsule obovoid, 4-7 mm. long.—*S. piliferum*, R. Br. var *ciliatum* (Lindl.) Mildbraed.

Sent by a country school probably on Eyre Peninsula, to the Wild Flower Show held in Adelaide, 1920. Sept.-Oct.—West Australia.

6. **S. despectum,** R. Br. Small erect annual, 2-8 cm. high, glabrous except a few minute scattered glandular hairs; leaves lanceolate, 2-7 mm. long, alternate and distant, with 2-6 often caducous ones clustered at the summit of a short membranous sheath at the base of the stem; flowers shortly pedicellate, rarely solitary and terminal, usually in few-flowered subcorymbose racemes; sepals linear, scarcely 1½ mm. long, but much longer than the receptacle, the 3 posterior ones free, the 2 anterior united to about the middle; corolla pink, slightly exceeding the sepals, the lobes ovate-oblong; labellum minute, ovate, deflexed; capsule terete, 5-8 mm. long, contracted towards base.—*S. brachyphyllum*, Sond.

Southern districts to Flinders Range; Kangaroo Island; Eyre Peninsula; South-East. Oct.-Dec. Usually in dry creeks or drying swamps.—Temperate Australia and Tasmania.

2. LEVENHOOKIA, R. Br.

(After Antonius van Leeuwenhoek, 1632-1723, Dutch zoologist and one of the earliest users of the microscope.)

Sepals 5, free; corolla with 4 posterior subequal lobes, the 5th one or labellum about half as long, hooded or boatshaped, bifid at summit, enclosing the erect column in bud, afterwards spreading; stigma 2-lobed; ovary almost 1-celled, with a globular basal placenta; capsule globular, glandular-hairy. Small erect annuals; leaves minute, scattered, not rosulate; each flower pedicellate in the axis of a small bract.

Labellum sessile, without appendages at base; glandular-pubescent plant ..... *L. dubia* 1.

Labellum shortly clawed, with 2 subulate appendages at its base; plant glabrous except receptacle ..... *L. pusilla* 2.

1. **L. dubia,** Sond. Glandular-pubescent all over and rather viscid, the stem 2-6 cm. high, usually simple; leaves ovate or ovate-oblong, subsessile, 2-5 mm. long, the leafy bracts similar; flowers few, in a short raceme, mostly on short pedicels; sepals about 2 mm. long, at first rather longer than the globular receptacle; corolla about twice as long as calyx, the lobes pale-pink, obovate, about 2 mm. long, the labellum sessile, white with 2 pink spots near summit; stigmatic lobes curved, exceeding the anthers; capsule about 2 mm. diameter. (Fig. 243, E-F.)

Southern districts to Flinders Range; Kangaroo Island; Yorke and Eyre Peninsulas; probably South-East. Aug.-Nov.—Victoria; New South Wales; West Australia; Tasmania.

2. **L. pusilla,** R. Br. Glabrous except the glandular-pubescent receptacle; stem 1-6 cm. high, branching near the summit or rarely from near the base; leaves orbicular or oblong-spathulate, 2-6 mm. long, shortly petiolate, the leafy bracts oblanceolate, about as long as the flowers; flowers crowded at the summit of the branches, on short pedicels, forming a dense corymb; sepals about 1½ mm. long, glabrous, rather longer than the globular glandular-pubescent receptacle; corolla slightly exceeding the calyx, the lobes pale-pink or white, spathulate, the tube very short; labellum crimson, apiculate, with 2 recurved subulate appendages at base and supported on a broad claw; stigmatic lobes filiform, much surpassing the anthers; capsule about 2 mm. diam.

Mount Lofty Range to Encounter Bay; Tintinara (90-Mile Desert). Sept.-Nov.—West Australia.

FAMILY 117.—COMPOSITAE.

Flowers regular or irregular, bisexual or unisexual, sessile or almost so, collected together on a common receptacle or floral base in heads surrounded by an involucre of bracts arranged in 1 or several rows; surface of the receptacle naked or furnished with bracts called *chaffy scales*, normally 1 to each flower, but sometimes split into fine bristles; calyx mounted on the summit of the ovary and consisting of a ring of bristles or scales or of a small cup or crown called the *pappus*, or rarely absent; corolla sympetalous, either regular and tubular, the tube expanded upwards into a long or short limb, which is more or less deeply cut into 4 rarely 5 valvate lobes or teeth, or irregular, with the teeth or lobes united and extended outwards on one side into a flat usually linear or oblong tongue or *ligule*, or sometimes the outer female flowers are very slender (filiform), with 2 or 3 minute teeth; stamens as many as corolla-lobes, alternate with them and inserted in the tube, the anthers linear, 2-celled, opening inwards by longitudinal slits and united in a

tube round the style, except in the subtribe *Ambrosiinae*, where they are usually free; ovary inferior, 1-celled, with 1 erect anatropous ovule; style divided at the summit in the fertile flowers into 2 (rarely more) long or short stigmatic branches; fruit a small indehiscent achene, naked or crowned by the pappus; seed exalbuminous, with a thin testa often adherent to the pericarp; embryo straight, with a short inferior radicle. Herbs or shrubs with alternate or opposite exstipulate leaves. *The Composite Family.*

When the head contains tubular flowers in the centre and conspicuous ligulate flowers round the circumference, the former are called the *disk* and the latter the *ray*; the whole head is then said to be *radiate*. When all the flowers are tubular (the outer ones may sometimes be female, with minute ligules or none) the head is called *discoid*; when all the flowers are ligulate the head is termed *liguliflora*l, and the genera with such heads form a separate division of the family. When all the flowers are alike as regards sex (and such flowers are almost always bisexual) the head is *homogamous*; when the ray-flowers are female, or *neuter* and sterile (*i.e.*, with an imperfectly developed or undeveloped style and ovary) and the disk-flowers are bisexual or (by imperfect development of the pistil) male, the head is *heterogamous*. The disk-flowers are usually yellow; the outer ones vary in color. The descriptions of the style apply only to the fertile bisexual flowers. Where the bisexual flowers have became merely male in their function, through abortion of the achene, the style-branches have no stigmatic lines and are usually abnormal in other ways. When the pappus consists of capillary bristles the latter may appear simple,

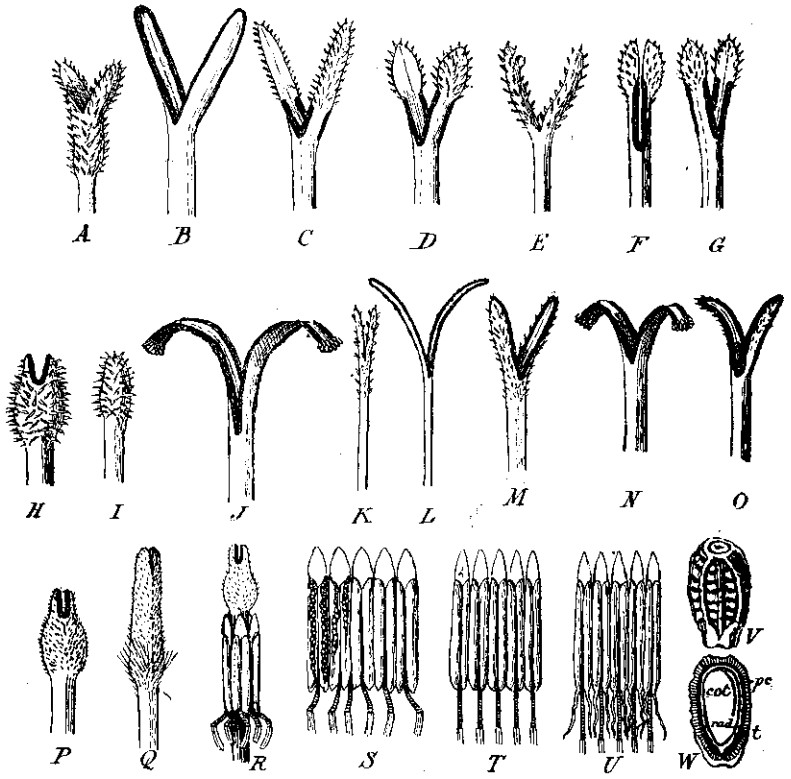

FIG. 244.—**Compositae.** Upper part of styles (all much enlarged):—A, *Erodiophyllum Elderi*: bisexual barren disk-flower; B, female ray-flower. C, *Brachycome trachycarpa*: fertile disk-flower. D, *Erigeron sessilifolius*: fertile disk-flower. E, *Lagenophora stipitata*: barren disk-flower. F, *Olearia Ferresii*: fertile disk-flower (side-view); G, the same from another angle (Tribe *Astereae*). H, *Epaltes australis*: fertile disk-flower; I, *Epaltes Cunninghamii*: barren disk-flower (Tribe *Inuleae*, subtribe *Plucheinae*); J, *Ixiolaena supina*: fertile disk-flower (subtribe *Gnaphaliinae*); K, *Pterigeron cylindriceps*: barren disk-flower: L, female ray-flower (subtribe *Plucheinae*); M, *Inula graveolens*: fertile disk-flower (subtribe *Inulinae*). N, *Flaveria australis*: fertile disk-flower (Tribe *Heleniеae*). O, *Siegesbeckia orientalis*: fertile disk-flower (Tribe *Heliantheae*). P, *Cymbonotus Lawsonianus*, fertile disk-flower (Tribe *Calenduleae*). Q, *Centaurea Calcitrapa*: fertile disk-flower—the stigmatic surface covers the flat inner side of the short style branches (Tribe *Cynareae*). Stamens (much enlarged):—R, style of *Cymbonotus Lawsonianus* surrounded by the anther-tube; S, the same anther-tube spread open; the anthers are acute (shortly sagittate) at base (Tribe *Calenduleae*). T, *Podocoma cuneifolia*: anthers obtuse at base (Tribe *Astereae*). U, *Ixiolena tomentosa*: anthers tailed at base (Tribe *Inuleae*). Fruit:—V, achene of *Cymbonotus Lawsonianus*; W, vertical section of same: *pc*, pericarp; *t*, testa; *cot*, cotyledons; *rad*, radicle.

the barbules (tips of the cells composing the bristle) being visible only under the microscope, or the barbules may be longer, especially near the summit of the bristle, when it is called *barbellate*, or finally the barbs may be so long as to present a feathery appearance, when the bristle is *plumose*. The term "receptacle" is here confined to the floral base or enlarged summit of the peduncle, on which the flowers of each head are crowded. It may also be described as the dilated and more or less depressed axis of the flower-head. The development of the heads is centrifugal, that of the flowers is centripetal.

A very large family, represented in all parts of the world, and estimated to contain about 800 genera and 14,000 species. The name is due to the fact that the early botanists described the flowerhead as *flos compositus* (compound or composite flower). Therefore the family was named *Compositae* (*i.e.*, *Plantae Compositae* or Composite Plants) by Adanson in 1763. The head is still popularly known as the "flower" and the involucre shelters the floral cluster after the manner of the calyx in most other families. The frequently conspicuous ray-flowers attract pollenising insects and the same function is performed in several Australian genera by the white or colored radiating appendages of the inner involucral bracts.

The family contains many ornamental species belonging to the genera *Aster*, *Callistephus*, *Cosmos*, *Coreopsis*, *Dahlia*, *Chrysanthemum*, *Helichrysum*, *Helipterum*, *Zinnia*, &c. The seeds of the annual sunflower (*Helianthus annuus*, L.) yield oil; the fleshy part of the involucral bracts of the artichoke (*Cynaria Scolymus*, L.) are eaten, as are also the tubers of the Jerusalem artichoke (*Helianthus tuberosus*, L.); chicory is produced from the root of *Cichorium Intybus*, L., and the crushed heads of *Chrysanthemum roseum* (*Pyrethrum roseum*) yield insect-powder.

Key to the Tribes.

A. Disk-flowers not ligulate; plants without milky juice; leaves usually alternate or radical, opposite in *Siegesbeckia*, *Flaveria*, *Eclipta* and *Galinsoga*. (Division *Tubuliflorae*.)

B. Anthers obtuse at base.

C. Style-branches of the fertile disk-flowers flattish, with 2 marginal papillose stigmatic lines along the lower part of the branches and a long or short non-stigmatic appendage at the summit bearing short collecting hairs on the outside; flower-heads heterogamous-radiate; receptacle naked (except in *Erodiophyllum* and *Achnophora*); pappus consisting of bristles, awns or scales, rarely absent; leaves alternate ..... **Astereae 1.**

C. Style-branches flattish, usually truncate, with a tuft of collecting hairs at the summit immediately above the stigmatic lines and no appendage, or more rarely the collecting hairs are on the back of the branches or there may be a lanceolate appendage at summit.

D. Pappus not of fine hairs.

E. Involucral bracts without scarious margins.

Receptacle with chaffy scales; heads heterogamous-radiate, except in the anomalous genera *Ambrosia* and *Xanthium*; pappus of scales, awns or stiff plumose bristles, rarely absent; style-branches not truncate; leaves often opposite ..... **Heliantheae 2.**

Receptacle naked; heads heterogamous or rarely with only 1 or 2 female flowers; pappus none and leaves opposite (in our genus)..... **Helenieae 3.**

E. Involucral bracts with scarious margins; heads heterogamous-radiate, or heterogamous-discoid with the female flowers tubular; receptacle naked or chaffy; style-branches of the fertile bisexual flowers always truncate, with a tuft of collecting hairs at summit; pappus none or rarely of scales or bristles or a small crown; leaves alternate ..... **Anthemideae 4.**

D. Pappus of fine silky hairs; heads discoid, the flowers all tubular and bisexual (homogamous) or the outer ones female (heterogamous); involucral bracts usually in 1 row, with some small ones at base; receptacle naked; leaves alternate..... **Senecioneae 5.**

B. Anthers acute or obtuse at base but not tailed; heads heterogamous-radiate.

Disk-flowers bisexual but sterile (except in *Dimorphotheca*, where the style-branches are truncate and tufted at summit); styles of the sterile disk-flowers shortly bifid or entire at summit; receptacle naked; anthers acute or acuminate at base; achenes comparatively large and variable in shape; pappus none; leaves alternate ..... **Calenduleae 6.**

Disk-flowers mostly fertile, the style thickened in the terete upper part bearing the collecting hairs, shortly bifid at summit; receptacle naked, but often deeply pitted; anthers obtuse or slightly sagittate at base; pappus of scales or none; leaves alternate or radical **Arctotideae 7.**

B. Anthers tailed at base (except in *Sphaeranthus* and *Cratystylis*).

Flower-heads usually discoid, with all the flowers bisexual (homogamous) or the outer ones female and tubular or filiform, with small or irregular teeth or lobes or rarely with very short lobed ligules (heterogamous), or the heads rarely more or less dioecious, sometimes united in a a compound head or densely clustered; involucral bracts often scarious and sometimes with petaloid radiating tips; style-branches various; pappus usually of simple barbellate or plumose bristles, more rarely of scales or none; receptacle usually naked; leaves almost always alternate ..... **Inuleae 8.**

Flower-heads large or rather large, always discoid, the flowers all tubular, bisexual and fertile or the outer row rarely sterile, the corolla-lobes often long and narrow; involucral bracts numerous in unequal rows, often leathery and ending in spines; style thickened at the base of the branches and usually furnished at the same place with a ring of long collecting hairs, short collecting hairs covering the back of the branches; pappus of simple or plumose bristles or scales; receptacle beset with fine hairs or rarely naked; leaves alternate; herbs (mostly known as *Thistles*) with prickly leaves or involucres..... **Cynareae 9.**

A. Flowers all ligulate; plants with milky juice; leaves alternate or radical. (Division *Liguliflorae.*)

Flower-heads homogamous, the flowers all bisexual, the ligules mostly shortly 5-toothed at summit and the outer ones often radiating; style with plano-convex branches attenuated towards the summit, bearing stigmatic papillae on the whole of the inner side and well-developed collecting hairs on the outside down to below the place where the branches fork; anthers acute or acuminate at base ..... **Cichorieae 10.**

Key to the Genera.

Tribe 1.—Astereae.

A. Pappus none or much shorter than the achene. (Subtribe *Bellidinae*).

B. Receptacle with rigid scales to the female flowers; involucral bracts in 1 equal row; pappus a short rim Erodiophyllum 1.

B. Receptacle naked; involucral bracts in 2-4 subequal rows.

Achenes beaked or contracted at summit; disk-flowers sterile; pappus none..... Lagenophora 2.

Achenes obtuse at summit, often winged; disk-flowers mostly fertile; pappus none or of few short bristles Brachycome 3.

A. Pappus well-developed. (Subtribe *Asterinae*).

C. Pappus of scales or awns or sometimes partly of bristles; disk-flowers sterile.

D. Receptacle naked.
Ray-flowers in 2 or more rows, the pappus of numerous bristles; disk-pappus of few sometimes connate bristles and scales ..... MINURIA 4.
Ray-flowers in 1 row; pappus of few stiff bristles called "awns," rarely combined with a few broad or narrow scales ..... CALOTIS 5.
D. Receptacle with chaffy scales; ray-flowers in 1 row, with a pappus of lanceolate scales; disk-pappus none ..... ACHNOPHORA 6.
C. Pappus of all the flowers consisting of many simple capillary bristles (subplumose in *Vittadinia pterochaeta*); involucral bracts imbricate in 2-5 rows; achenes all fertile.
E. Herbs.
F. Achenes obtuse, not beaked at summit; ray-flowers in 2 or more rows.
G. Style-branches of the bisexual flowers with lanceolate or triangular appendages above the stigmatic lines; achenes compressed; annuals.
Ray-flowers about 20-30; ligules oblong ..... ASTER 7.
Ray-flowers very numerous; ligules narrow-linear or obsolete ..... ERIGERON 8.
G. Style-branches with subulate appendages; hairy perennials ..... VITTADINIA 9.
F. Achenes beaked; ray-flowers numerous, with very narrow tubes and ligules ..... PODOCOMA 10.
E. Shrubs or undershrubs; ray-flowers in 1 row; achenes terete or slightly compressed ..... OLEARIA 11.

TRIBE 2.—**Heliantheae.**

A. Heads unisexual, monoecious; corolla tubular in the males, absent in the females; fruiting head enclosed in a hard usually spiny involucre composed of the connate involucral bracts; pappus none; leaves alternate. (Subtribe *Ambrosiinae.*)
Involucre of male flowers consisting of connate bracts; female heads 1-flowered ..... AMBROSIA 12.
Involucre of male flowers consisting of free bracts; female heads 2-flowered ..... XANTHIUM 13.
A. Heads bisexual; corolla present in both sexes; fruits not enclosed in a hard involucre; ligule of the female ray-flowers usually small.
B. Pappus obsolete or almost so, or of stiff awns.
C. Achenes thick, angular, or the disk ones laterally compressed. (Subtribe *Verbesininae.*)
Inner involucral bracts embracing the ray-achenes, the outer bracts few, leafy, narrow; receptacular scales broad, concave; pappus none; leaves opposite ..... SIEGESBECKIA 14.
Involucral bracts all nearly equal, the inner ones flat; receptacular scales very narrow; pappus a minute border; leaves opposite ..... ECLIPTA 15.
C. Disk-achenes more or less dorsally compressed; receptacular scales flattish. (Subtribe *Coreopsidinae*).
Pappus of 2 stiff awns; involucral bracts few, narrow; leaves alternate ..... GLOSSOGYNE 16.
B. Pappus, at least in the disk-flowers, consisting of rather large scales. (Subtribe *Galinsoginae*).
Involucral bracts few, nearly equal; receptacle conical, with narrow scales; pappus-scales ciliate; annual with opposite leaves ..... GALINSOGA 17.

TRIBE 3.—**Helenieae.**

Heads few-flowered, contracted into compound heads, the female flowers with minute ligules; involucral bracts very few; pappus none; leaves opposite; annual ..... FLAVERIA 18.

TRIBE 4.—**Anthemideae.**

A. Receptacle with chaffy scales; flower-heads heterogamous-radiate; disk-flowers numerous, fertile; pappus obsolete or almost so; leaves usually much divided. (Subtribe *Anthemidinae*).
  Achenes not or very slightly compressed; ligules oblong — ANTHEMIS 19.
  Achenes much compressed; ligules almost orbicular ... — ACHILLEA 20.

A. Receptacle naked. (Subtribe *Chrysantheminae*.)
  B. Heads heterogamous-radiate; ligules of ray-flowers longer than the numerous involucral bracts; disk-flowers numerous; pappus none or a minute crown.. — CHRYSANTHEMUM 21.
  B. Heads heterogamous-discoid, the outer female flowers with very short ligules or none, not or scarcely surpassing the involucre.
    C. Corolla of the few female flowers with very short ligule; disk-flowers few, sterile; involucral bracts in 1-2 rows; leaves entire; small annuals.
      Pappus none; achenes compressed, with 2 involute wings terminating in horn-shaped appendages.... — CERATOGYNE 22.
      Pappus of female flowers consisting of numerous capillary bristles and 5-6 inner scales..... — DIMORPHOCOMA 23.
    C. Corolla of the female flowers tubular or wanting.
      D. Disk-flowers bisexual, all or mostly fertile; pappus none.
        Involucral bracts in 2 subequal rows; female corollas minute or none; disk-flowers 4-toothed; small ascending herbs.
          Heads pedunculate, terminal; female flowers in 1 or many rows; disk-flowers numerous; achenes flattened ..... — COTULA 24.
          Heads sessile or almost so; female flowers in many rows; disk-flowers few; achenes 4-angled ..... — CENTIPEDA 25.
      D. Disk-flowers bisexual but sterile, 3-4-toothed, fewer than the outer female ones, their styles entire or bifid; achenes of female flowers subterete, silky, with a pappus of several flat lanceolate scales; small annual herbs.
        Stemless herb; heads clustered among radical leaves; disk-achenes without pappus..... — ISOETOPSIS 26.
        Branching herb; heads terminal; disk-achenes with a pappus of few bristles..... — ELACHANTHUS 27.

TRIBE 5.—**Senecioneae.**

Involucral bracts in 1 row, usually with an outer calyx of very small bracts at their base; style-branches of the bisexual flowers truncate, with a tuft of collecting hairs above the stigmatic lines. (Subtribe *Senecioninae*.)
  Heads heterogamous-discoid, the outer flowers female, filiform, 3-4-toothed, in 2 or more rows..... — ERECHTHITES 28.
  Heads homogamous-discoid, with the flowers all tubular and bisexual, or heterogamous-radiate, with the outer flowers female and ligulate ..... — SENECIO 29.

TRIBE 6.—**Calenduleae.**

A. Achenes of the female flowers varying in shape, all incurved; disk-achenes abortive; annuals..... — CALENDULA 30.

A. Achenes of the female flowers uniform.
  B. Involucral bracts in 1 row; annuals.
    Ray-achenes trigonous; disk-achenes also fertile, 2-winged ..... — DIMORPHOTHECA 31.
    Ray-achenes 3-winged; disk-achenes abortive..... — TRIPTERIS 32.
  B. Involucral bracts in 3-4 rows; ray-achenes globular, hard; disk-achenes abortive; shrub..... — OSTEOSPERMUM 33.

Tribe 7—**Arctotideae.**

A. Ray-flowers female; achenes 3-ribbed on the back.
  Pappus of 2 rows of scales; achenes silky, 2 of the ribs winged and incurved so that the fruit appears 3-celled — Arctotis 34.
  Pappus none; achenes glabrous, the ribs not winged.... — Cymbonotus 35.
A. Ray-flowers neuter; achenes woolly, not ribbed; pappus of scales ..... — Cryptostemma 36.

Tribe 8.—**Inuleae.**

A. Heads mostly heterogamous.
  B. Style-branches filiform, stigmatic on the inner side, beset with collecting hairs downwards to below the place of division; heads heterogamous-discoid, the female flowers with minute ligules or none (except in *Pterigeron liatroides*); bisexual disk-flowers often sterile, with shortly bifid or entire styles; receptacle naked. (Subtribe *Plucheinae.*).....
    C. Heads distinct, not clustered.
      D. Pappus of numerous simple or barbellate bristles; involucral bracts stiff, in several unequal rows.
        E. Heads heterogamous; disk-flowers often sterile; leaves mostly toothed; small perennials.
          Female flowers filiform, 2-3-toothed; heads very small ..... — Pluchea 37.
          Female flowers tubular, with a conspicuous or very short usually 2-3-toothed ligule; heads rather large ..... — Pterigeron 38.
        E. Heads homogamous, semi-dioecious; female flowers filiform; leaves small, entire, hoary; shrub ..... — Cratystylis 39.
      D. Pappus of the ray-flowers none or a small crown; disk-flowers with a few caducous bristles; heads heterogamous-discoid; female flowers filiform; achenes ribbed; herbs ..... — Epaltes 40.
    C. Heads small, heterogamous-discoid, in dense globular clusters or compound heads (see also the subtribes *Gnaphaliinae* and *Angianthinae*, the genera *Isoetopsis* and *Flaveria*, and the species *Rutidosis multiflora*, *Helipterum moschatum*, *H. pterochaetum* and *Helichrysum Mellorianum*); involucral bracts linear; female flowers filiform; bisexual flowers very few; leaves toothed, decurrent; herbs.
      Pappus of capillary bristles; anthers shortly tailed.. — Pterocaulon 41.
      Pappus none; anthers obtuse at base..... — Sphaeranthus 42.
  B. Style-branches usually truncate or rounded at summit, the stigmatic lines not confluent at summit, which when truncate is crowned by a tuft of collecting hairs; styles of bisexual but sterile flowers obtuse, usually clavate; female outer flowers, when present, filiform, in 1 to many rows; inner involucral bracts often ending in radiating (stellately spreading) petaloid laminae (*Everlastings*); receptacle mostly naked. (Subtribe *Gnaphaliinae*).
    F. Heads clustered, heterogamous-discoid, with more filiform female flowers than bisexual inner flowers; involucral bracts without radiating laminae; receptacle naked; style-branches truncate; woolly herbs.
      Achenes without pappus; female flowers few; 2 innermost involucral bracts with sharp recurved tips ..... — Stuartina 43.
      Achenes with capillary pappus; female flowers numerous; involucral bracts not hooked ..... — Gnaphalium 44.
    F. Heads distinct, homogamous-discoid with the flowers all bisexual or heterogamous-discoid with the bisexual flowers more numerous than the slender outer female flowers; style-branches truncate.
      G. Pappus of simple, barbellate or plumose bristles.

H. Receptacle with long deciduous chaffy scales; heads few-flowered, paniculed; involucral bracts scarious, white or golden, not radiating; flowers all bisexual and fertile ..... CASSINIA 45.

H. Receptacle naked; flowers all fertile or some of the inner ones sterile.

I. Achenes neither stipitate nor beaked.

J. Pappus-bristles plumose from base; involucral bracts mostly scarious or the inner ones petaloid and radiating; chiefly herbs HELIPTERUM 46.

J. Pappus-bristles simple, barbellate or sometimes subplumose towards summit.

Involucral bracts herbaceous, only the inner ones with small scarious tips, shorter than the flowers; herbs ..... IXIOLAENA 47.

Involucral bracts mostly scarious or the inner ones petaloid and radiating; herbs or shrubs ..... HELICHRYSUM 48.

I. Achenes stipitate; pappus plumose; involucral bracts herbaceous, not radiating; annuals.. PODOSPERMA 49.

I. Achenes beaked; herbs.

K. Involucral bracts in many rows, often colored, the outer ones shorter, the inner ones very narrow or clawed; pappus-bristles simple or barbellate.

Outer involucral bracts membranous, the inner ones with scarious tips, not radiating LEPTORRHYNCHUS 50.

Involucral bracts petaloid, sometimes radiating ..... WAITZIA 51.

K. Involucral bracts few, nearly equal, herbaceous, narrow; pappus-bristles barbellate, plumose or none ..... MILLOTIA 52.

G. Pappus of scales; heads homogamous-discoid, the flowers all tubular and bisexual; receptacle naked.

Pappus of 3-8 awned scales; involucral bracts narrow, silky, nearly equal; style-branches acute; small annual..... QUINETIA 53.

Pappus of several obtuse scales; involucral bracts broad, membranous; style-branches truncate; annual or perennial herbs ..... RUTIDOSIS 54.

G. Pappus none; heads homogamous-discoid, the flowers all tubular and bisexual.

L. Receptacle naked; involucral bracts not radiating.

M. Involucral bracts linear, herbaceous, few, nearly equal, shorter than the flowers; style-branches with short terminal appendages.

Corollas slender, recurved; dwarf annuals.. TOXANTHUS 55.

Corollas straight; erect annuals....(partly) MILLOTIA 52.

M. Involucral bracts scarious; style-branches truncate; heads with very few flowers; shrubs ..... HUMEA 56.

L. Receptacle chaffy; involucral bracts sticky, the inner ones with white, radiating laminae; style-branches truncate; under-shrub ..... IXODIA 57.

F. Heads distinct, heterogamous, the outer female flowers fewer and mostly longer than the inner bisexual ones, all longer than the involucre, whose bracts are in many rows, none petaloid; style-branches truncate; pappus barbellate or plumose towards summit; receptacle naked; herbs. (Subtribe *Athrixinae*).

Involucral bracts all membranous, the inner ones clawed; outer row of female flowers ligulate or 3-4-lobed ..... PODOLEPIS 58.

Involucral bracts subulate, ciliate; outer female flowers tubular ..... ATHRIXIA 59.

B. Style-branches somewhat obtuse, but without an appendage, the stigmatic lines meeting at summit, the short collecting hairs only on the upper part of the branches; receptacle naked. (Subtribe *Inulinae*).
Heads distinct, many-flowered; ray-flowers female, shortly ligulate; pappus of capillary bristles; sticky annual ..... INULA 60.

B. Style-branches as in *Inulinae;* receptacle with chaffy scales. (Subtribe *Buphthalminae*).
Heads distinct, many-flowered; ray-flowers female, ligulate; corollas swollen and corky in lower part; involucral bracts spiny; pappus a small jagged crown; biennial ..... PALLENIS 61.

A. Heads all homogamous-discoid (the flowers all tubular and bisexual, only in *Basedowia* unisexual), small, crowded (under the name of " partial heads ") in a compound head, which is usually globular or ovoid and is sometimes subtended by a general involucre; style-branches truncate, terminated by a tuft of collecting hairs. (Subtribe *Angianthinae*).

N. Receptacle of the partial heads naked; compound heads terminal on the branches.

O. Compound heads broad, surrounded by a general involucre of numerous bracts with white usually radiating laminae; partial heads 1-8-flowered; pappus of 1 to several bristles ..... MYRIOCEPHALUS 62.

O. Compound heads without a general involucre or with one of a few scarious or leafy bracts.

P. Pappus none or of a few short scales, sometimes ending in a barbellate or plumose bristle, or united in a small cup, rarely of very short bristles; heads sometimes oblong or cylindrical.

Q. Partial heads usually 1-3-flowered, the bracts mostly hyaline.
Involucres of the partial heads compressed, consisting of a few bracts ..... ANGIANTHUS 63.
Involucres of the partial heads not so much compressed and usually consisting of several bracts ..... GNEPHOSIS 64.

Q. Partial heads many-flowered; involucres densely woolly, the bracts broad, herbaceous or with a scarious margin; small annual..... ERIOCHLAMYS 65.

P. Pappus conspicuous.

R. Inner involucral bracts of partial heads with or without small petaloid laminae; achenes glabrous.
Pappus of several narrow plumose bristles; general involucre absent or of very short bracts; partial heads 2-20-flowered; erect woolly herbs ..... CALOCEPHALUS 66.
Pappus of 5 plumose rather broad bristles; general involucre of broad leafy bracts surrounding the head; partial heads many-flowered; dwarf white-woolly annual ..... GNAPHALODES 67.

R. Inner involucral bracts of partial heads with long radiating laminae; no general involucre; partial heads 12-18-flowered; pappus-bristles 3-6, sub-plumose; achenes woolly ..... CEPHALIPTERUM 68.

N. Receptacle of the partial heads with chaffy scales; partial heads with obtuse membranous involucral bracts, not radiating.

S. Pappus of plumose bristles or narrow scales; compound heads on erect peduncles with short inconspicuous involucres or none; bracts of partial involucres often golden; woolly herbs ..... CRASPEDIA 69.

S. Pappus none.
Flowers all bisexual, 4-toothed; 1 chaffy scale to each flower; compound heads sessile, with no general involucre except radical leaves; dwarf stemless annual ..... CHTHONOCEPHALUS 70.

Outer flowers 2-3, female, without corollas; inner ones 4-6, bisexual but sterile, with 5-toothed corollas; chaffy scales arranged irregularly; compound heads white, pedunculate, with general involucre of few hyaline bracts; branching herb.. BASEDOWIA 71.

TRIBE 9.—**Cynareae.**

A. Achenes attached by their bases to the receptacle, glabrous. (Subtribe *Carduinae*).
  B. Receptacle beset with fine soft hairs, originating from the splitting-up of the chaffy scales; pappus of numerous bristles, united in a short ring at base and falling off in one piece.
    C. Filaments free.
      D. Pappus of plumose bristles.
        Receptacle and base of involucral bracts fleshy; heads large ..... CYNARA 72.
        Receptacle not fleshy ..... CIRSIUM 73.
      D. Pappus of simple bristles ..... CARDUUS 74.
    C. Filaments united in a tube; pappus of simple bristles SILYBUM 75.
  B. Receptacle honey-combed, without hairs; pappus of simple bristles..... ONOPORDON 76.
A. Achenes obliquely or laterally attached to the receptacle, which is beset with fine soft hairs; pappus of free linear persistent scales in several very unequal rows, rarely absent; anther tails sometimes short. (Subtribe *Centaureinae*).
  Involucral bracts all similar, with spiny or scarious jagged appendages ..... CENTAUREA 77.
  Outer involucral bracts large, spiny, and resembling the leaves ..... CARTHAMUS 78.

TRIBE 10.—**Cichorieae.**

A. Pappus of scales. (Subtribe *Cichorinae*).
  B. Flowers blue; pappus a crown of short scales; receptacle bristly towards the centre ..... CICHORIUM 79.
  B. Flowers yellow; achenes ribbed; receptacle naked.
    Involucral bracts in 2-3 rows, not or scarcely changed in fruit; pappus of flat scales tapering into bristles.... MICROSERIS 80.
    Involucral bracts in 1 row, hardened in fruit and embracing the outer achenes, which have a crown-shaped pappus ..... HEDYPNOIS 81.
A. Pappus of plumose bristles. (Subtribe *Leontodontinae*.)
  C. Receptacle with chaffy scales; achenes mostly beaked. HYPOCHOERIS 82.
  C. Receptacle naked.
    D. Involucral bracts few, in 1 row; achenes with a long beak.
      Beak hollow and swollen at base; flowers yellow; achenes compressed ..... UROSPERMUM 83.
      Beak not swollen at base; flowers violet; achenes fusiform ..... TRAGOPOGON 84.
    D. Involucral bracts in several rows; achenes contracted at summit or sometimes shortly beaked.
      E. Long barbs of the pappus-bristles interwoven, achenes longitudinally striate..... SCORZONERA 85.
      E. Barbs of the pappus-bristles not interwoven; achenes striate lengthwise and wrinkled transversely.
        Leaves all radical; pappus persistent..... LEONTODON 86.
        Stems leafy; pappus-bristles united at base, caducous ..... PICRIS 87.
A. Pappus of numerous capillary bristles; receptacle (in our genera) naked. (Subtribe *Crepidinae*).
  F. Achenes beaked.
    Achenes subcylindrical, rough towards summit; leaves radical ..... TARAXACUM 88.
    Achenes flattened, ribbed lengthwise; stems leafy.... LACTUCA 89.

F. Achenes without beak.
G. Achenes compressed, ribbed lengthwise ..... SONCHUS 90.
G. Achenes not compressed.
Achenes subcylindrical, tapering at summit, many-ribbed lengthwise ..... CREPIS 91.
Achenes almost truncate and tetragonous, 4-furrowed and tuberculate ..... REICHARDIA 92.

1. ERODIOPHYLLUM, F. v. M.

(From *Erodium*, the plant Heron's bill; Greek *phyllon*, leaf: likeness of the leaves to those of some *Erodium* such as *E. botrys*.)

1. **E. Elderi,** F. v. M. *Koonamore Daisy.* Rough-hairy herb 15-30 cm. high, with stout erect stem; leaves alternate, 5-10 cm. long, broadly petiolate, twice pinnatipartite, with oblong lobes; heads large, solitary, terminal, becoming in fruit ovoid and 20-25 mm. long; involucral bracts about 8, lanceolate, fringed, equal, becoming hard and reflexed, about 15 mm. long; receptacle conical; female flowers in about 6 rows, the outer row with 15-25 purple ligules, entire or sometimes 3-fid at summit, about 20 mm. long, the other female flowers with minute tubular truncate hairy corollas only 1 mm. long, concealed by lanceolate ciliate imbricate receptacular scales which in fruit become horny, with rigid spreading points, the central flowers numerous, bisexual but sterile, 5-toothed, without scales; anthers obtuse at base; achene obconical, hard, subtetragonous, crowned by a short crenate rim.

From north-east of the Burra to Lake Frome and Strzelecki Creek; west of Port Augusta; often growing on flooded flats. Aug.-Dec. There are sometimes 2 or 3 free stamens in the ligulate female flowers, as in *Cratystylis*.

PLATE 46 (fig. 1-9, p. 555)—1, flowering branch; 2, fruiting head; 3, ligulate female flower; 4, tubular female flower; 5, bisexual sterile flower; 6, vertical section of ripe achene, showing seed; 7, style of bisexual (sterile) flower; 8, style of female flower; 9, hardened receptacular scale of the tubular female flowers.

2. LAGENOPHORA, Cass.

(From Greek *lagênos*, a flask, flagon; *phoros*, bearing: alluding to the form of the achenes.)

Involucre hemispherical, with the bracts in 3-4 rows; receptacle convex, naked; outer female flowers in several rows, much more numerous than the disk-flowers, which are 5-toothed, bisexual but sterile; anthers obtuse at base; achenes compressed, often oblique, beaked or merely rounded at summit; pappus none. Small perennials, with chiefly radical shortly petiolate leaves and solitary terminal flowerheads.

A. Outer flowers ligulate, exceeding the involucre; achenes beaked.
Ligules conspicuous ..... *L. stipitata* 1.
Ligules very short ..... *L. Huegelii* 2.
A. Outer flowers not ligulate nor exceeding the involucre; achenes not beaked ..... *L. Gunnii* 3.

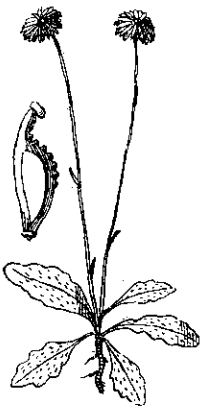

FIG. 245.—**Lagenophora stipitata.**

1. **L. stipitata** (Labill.) Druce (1917). More or less hairy; leaves all or almost all radical, obovate or oblong-cuneate, 2-5 cm. long, coarsely toothed; stems slender, erect, 5-25 cm. long, scape-like or with a few leaves near base; involucral bracts linear; ligules blue, or pink, 4-6 mm. long; achenes as long as involucre, with a conspicuous or very short sometimes curved beak, which is tipped by a dilated ring.—*L. Billardieri,* Cass. (1882); *Bellis stipitata,* Labill. (1806).

Southern districts to Flinders Range; Kangaroo Island; South-East. Summer.—Temperate Australia.

2. **L. Huegelii,** Benth. Near the preceding, but the stems are stouter, the ligules only about 1 mm. long, and the involucral bracts rather broader.

Southern districts; Yorke Peninsula; Kangaroo Island; South-East. Summer.—Victoria; Tasmania; West Australia.

3. **L. Gunnii** (Hook. f.) comb. nov. Hairy or almost glabrous; leaves all radical, oblong-cuneate, mostly 2-4 cm. long, crenate; flowering stems shorter than or scarcely exceeding

the leaves; involucral bracts ovate-oblong, about 3 mm. long; outer flowers tubular, 2-3-toothed, 1 tooth rather longer than the others; achenes as long as involucre, ovate-oblong, not beaked.—*L. Emphysopus*, Hook. f. (1860); *Emphysopus Gunnii*, Hook. f. (1847); *Solenogyne Emphysopus* (Hook. f.) F. v. M.

Mount Lofty Range; Encounter Bay; Kangaroo Island; South-East. Summer.—Victoria; New South Wales; Tasmania.

3. BRACHYCOME, Cass.

(From Greek *brakhys*, short; *komê*, a head of hair: alluding to the comparatively short pappus.)

Involucre usually hemispherical, the bracts in about 2 rows, nearly equal, with scarious often purplish margins; receptacle convex or conical, naked; ray-flowers ligulate, female, mostly in 1 row; disk-flowers usually many or at least more numerous than ray-flowers, bisexual, tubular, a few of the innermost sometimes barren; anthers obtuse at base; appendages of style-branches lanceolate, usually longer than the stigmatic lines; achenes obtuse at summit, the body (central seed-bearing part) broad or narrow, often extended in longitudinal wings, thickened margins or ribs; pappus of short bristles or none. Herbs with branching or scape-like stems and terminal flower-heads; leaves alternate.

Mainly an Australian genus, with a few representatives in New Zealand and North America. It is impossible to determine some species satisfactorily unless the specimens have ripe fruits for examination.

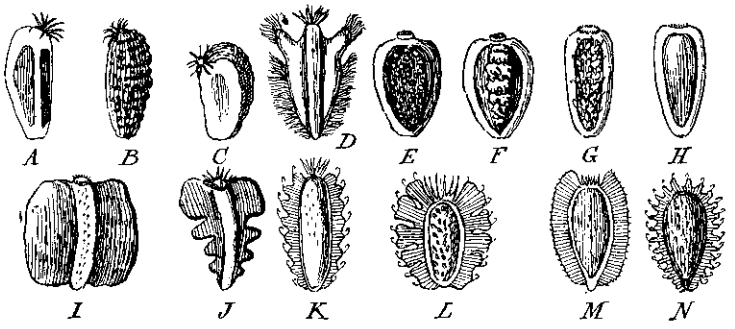

FIG. 246.—**Brachycome.** Achenes, enlarged about 5 times. A, *B. diversifolia*; B, *B. melanocarpa*; C, *B. goniocarpa*; D, *B. pachyptera*; E, *B. graminea*; F, *B. basaltica*; G, *B. trachycarpa*; H, *B. lissocarpa*; I, *B. Muelleri*; J, *B. campylocarpa*; K, *B. debilis*; L, *B. calocarpa*; M, *B. cardiocarpa*; N, *B. perpusilla*.

A. Achenes thick, with thickened obtuse angles or margins; pappus conspicuous, usually spreading stellately. (Section 1. *Brachystephium*).
  B. Ligules of ray-flowers conspicuous; perennials.
    Tall, with stout almost simple stems and large heads; achenes pale, obconical, ribbed ..... *B. diversifolia* 1.
    Small, branching, with small heads; achenes black, very narrow ..... *B. melanocarpa* 2.
  B. Ligules short, but longer than involucre; heads small; annuals.
    Stem branched and leafy; achenes glabrous, obconical, ribbed ..... *B. goniocarpa* 3.
    Stem almost simple; leaves mostly radical; achenes cuneate, with corky-woolly margins ..... *B. pachyptera* 4.
A. Achenes usually compressed, but with thickened obtuse margins; ligules longer than involucre; pappus minute or none, except in *B. campylocarpa*. (Section 2. *Paquerina*).
  C. Achenes brown or pale-colored.
    D. Leaves all entire; achenes tuberculate or granular; pappus minute; perennials.
      E. Leaves linear-lanceolate; rootstock creeping.
        Almost glabrous; leaves thin ..... *B. graminea* 5.
        Glandular-hairy; leaves thick..... *B. angustifolia* 6.
      E. Leaves ovate-lanceolate; rootstock not creeping.. *B. basaltica* 7.

D. Leaves, or some of them, toothed or lobed.
F. Leaves almost all entire, the lowest rarely with 1 or 2 lobes; achenes narrow, tuberculate; almost glabrous perennial ..... *B. trachycarpa* 8.
F. Leaves almost all toothed or lobed.
G. Perennials.
H. Leaves narrow, not fleshy.
Leaves distantly toothed; achenes thick, tuberculate-hairy; pappus absent; plant glandular-hairy ..... *B. tesquorum* 9.
Leaves few-lobed or entire; achenes flattish, smooth, shining; pappus minute; plant glabrous ..... *B. lissocarpa* 10.
H. Leaves obovate, crenate, fleshy; achenes flattish, subglabrous; pappus minute or none ..... *B. Tatei* 11.
G. Annuals; more or less glandular-hairy; achenes obconical, thick, hairy; pappus minute or none.
Leaves pinnatisect, with rather long linear segments ..... *B. iberidifolia* 12.
Leaves obovate- or oblong-cuneate, with a few coarse teeth or short lobes ..... *B. neglecta* 13.
C. Achenes black, with broad thick wing-like margins.
Stems weak, succulent; leaves broadly lobed; achenes square, with entire margins; pappus minute; plant glabrous ..... *B. Muelleri* 14.
Stems rigid; leaves with linear lobes; achenes cuneate, with crenate margins; pappus rather conspicuous; plant glabrous ..... *B. campylocarpa* 15.
A. Achenes flat, with 2 membranous vertical wings (except in *B. exilis*); ligules longer than involucre; pappus conspicuous or minute. (Section 3. *Eubrachycome*).
I. Stems branching, more or less leafy.
J. Small annuals; stems short, slender; peduncles long; leaves lobed near summit; achenes narrow; pappus conspicuous.
Achenes with thickened margins, not winged ..... *B. exilis* 16.
Achenes winged ..... *B. debilis* 17.
J. Perennials; achene-wings ciliate.
Stem-leaves almost all lobed or toothed; wings of disk-achenes with shallow lobes; pappus usually minute ..... *B. ciliaris* 18.
Stem-leaves mostly entire; wings of achenes deeply and broadly lobed; pappus conspicuous ..... *B. calocarpa* 19.
I. Leaves almost all radical.
Leaves linear, entire, long; pappus conspicuous ..... *B. cardiocarpa* 20.
Leaves oblong-cuneate, lobed near summit; pappus minute ..... *B. cuneifolia* 21.
A. Ligules of ray-flowers not longer than involucre or style; achenes flat, winged; pappus none. (Section 4, *Silphiosperma*).
Small annual; achene-wing denticulate-ciliate ..... *B. perpusilla* 22.

1. **B. diversifolia** (Grah.) Fisch. et Mey. More or less glandular-hairy perennial; stem simple, erect, 30-50 cm. high, almost naked in upper part; lower leaves subrosulate, oblong-cuneate, 4-8 cm. long, including the petiole, coarsely toothed, pinnatifid or pinnatisect into short broad or narrow lobes, the upper ones narrower, the uppermost linear-lanceolate and entire; heads large, the involucral bracts 7-10 mm. long, ciliolate; ligules numerous, white, 10-15 mm. long; achenes brownish, narrow-obconical, bluntly ribbed, the outer ones incurved at summit and the short pappus oblique. (Fig. 245, A).
Mount Lofty Range; South-East; rather rare. Oct.-Dec.—Victoria; New South Wales; Tasmania.

2. **B. melanocarpa,** Sond. et F. v. M. Perennial, 15-20 cm. high, more or less beset with minute glandular hairs; stems almost erect, bearing the small heads on slender peduncles 4-12 cm. long, much longer than the terminal narrow leaf; leaves oblong- or orbicular-cuneate, 1½-5 cm. long, including the petiole, pinnatifid or obtusely lobed or toothed, often toothed only near the summit, the uppermost leaves linear; involucral

bracts 4 mm. long; ligules 20-30, bluish, about 7 mm. long; ripe achenes compressed but thick, narrow, black, rugulose, 2-2½ mm. long, the short pappus somewhat oblique. (Fig. 245, B).

River Murray, near Renmark and Berri. Sept.-Dec.—Victoria; New South Wales.

3. **B. goniocarpa,** Sond. et F. v. M. Small ascending annual, 2-6 cm. long, more or less beset with minute glandular or septate hairs; leaves linear- or oblong-cuneate, 1-2 cm. long, with 3-5 broad or narrow teeth or lobes near the summit, rarely almost all linear-lanceolate and entire; peduncles 1-3 cm. long, or the heads almost sessile; involucral bracts obovate, about 2½ mm. long; ligules about 8, usually very short; achenes obconical, brown or black, about 1½ mm. long, truncate and nearly as broad at summit, with a broad rib down each face and 2 thick obtuse wrinkled margins, the outer achenes oblique at summit; pappus of short spreading bristles. (Fig. 245, C).

Murray lands to the Burra and Bordertown; Eyre Peninsula to Fowler's Bay. Aug.-Dec.—Dry parts of temperate Australia.

Var. *eriogona,* J. M. Black. Marginal ribs of achene woolly-ciliate; leaves linear, with linear lobes.—Near Lake Frome. Perhaps a distinct more erect species.

4. **B. pachyptera,** Turcz. Almost glabrous annual; leaves chiefly radical, linear, 1-4 cm. long, with 3-7 linear obtuse lobes above the middle, rarely entire; peduncles almost naked, rather stiff, reddish, ½-18 cm. long, scape-like or rarely on very short stems; involucre 3-5 mm. long, the bracts broad, very obtuse; ray-flowers 8-15, the ligules 5-10 mm. long, white or violet; achenes thick, compressed, truncate at summit, cuneate, 3 mm. long, the body linear, subterete, and resembling a narrow rib running down each face, the broad corky margins ciliate with long woolly hairs; pappus of short erect scales or bristles united towards base and about ⅓ as long as the achene.

Southern districts to Flinders Range and Far North; Murray lands; Eyre Peninsula. Aug.-Dec.—Dry parts of temperate Australia. The almost hemispherical fruiting heads appear white owing to the dense pappus.

5. **B. graminea** (Labill.) F. v. M. Perennial, almost entirely glabrous; rootstock creeping; stems erect or ascending, usually branched above the middle, 20-40 cm. long; leaves linear or linear-lanceolate, 1-nerved, entire, the lower ones 3-10 cm. long, including the long petiole, the upper ones shorter, sessile, distant; peduncles 2-10 cm. long; involucral bracts 4-5 mm. long, obovate-oblong, obtuse; ligules 30-40, about 10 mm. long, white on the upper face, pink below; achenes compressed, obovate, 2-2½ mm. long, with thick hard margins, glandular-tuberculate on the somewhat concave body or sometimes on the margins also, or almost glabrous; pappus a minute crown or almost obsolete. (Fig. 245, E).

Usually near water: southern districts; along the Murray; Eyre Peninsula; South-East. Most of the year.—Victoria; New South Wales; Tasmania.

6. **B. angustifolia,** A. Cunn. Near *B. graminea,* with the same creeping rootstock but usually a smaller plant and more or less glandular-pubescent all over, the stems often simple and the leaves thicker and stiffer, the flowers lilac or white; achenes thick and flat, more or less glandular-hairy; pappus minute.

South-East. Oct.-Feb.—Victoria; New South Wales; Tasmania.

7. **B. basaltica,** F. v. M. Perennial, glabrous except sometimes a few glandular hairs on the involucral bracts and peduncles; stems erect, rigid, branching, 20-50 cm. high or more; radical and some of the lower stem-leaves petiolate, ovate-lanceolate, 2-7 cm. long, the others sessile, distant, broad-lanceolate to linear-lanceolate, all entire; peduncles slender, 1-6 cm. long; involucral bracts obtuse, 4-5 mm. long; ligules about 30, about 10 mm. long; achenes obovate, compressed, nearly 2 mm. long, with thick margins and tuberculate-rugose down the thickened centre; pappus a minute crown. (Fig. 245, F).

North of Cooper's Creek.—Queensland.

Var. *gracilis,* Benth. Stems more slender; leaves all lanceolate or linear-lanceolate.—Near Tanunda; along the Murray.—Victoria; New South Wales; Queensland.

8. **B. trachycarpa,** F. v. M. Slender erect perennial, 15-25 cm. high, usually with a few scattered glandular hairs on the peduncles, otherwise glabrous; stems slender but stiff, branching corymbosely; leaves narrow-linear, the lower 1-2 cm. long, mostly entire, sometimes with a few small teeth or narrow lobes; peduncles 1-4 cm. long, filiform; involucral bracts oblong, about 2 mm. long; ligules 12-20, lilac, about 5 mm. long; achenes thick, linear-cuneate, 1½-2 mm. long, ½ mm. broad, with thick blunt smooth margins, the narrow body beset with tubercles each bearing a hooked hair; pappus minute. (Fig. 245, G).

Flinders Range; westward to Gawler Range, the Great Bight and Ooldea.—Temperate Australia. Resembles narrow-leaved forms of *Minuria denticulata,* with a similar woody base, but the latter has much more numerous ligules.

9. **B. tesquorum,** J. M. Black. Perennial or under shrub about 20 cm. high, rather rough with minute glandular hairs; stems erect, branching; leaves stiff, lanceolate, tapering towards base, 2-3 cm. long, with a few distant acute teeth in the lower part; peduncles slender, 2-6 cm. long; involucral bracts 4-5 mm. long, oblong, subacute, jagged on margin; ligules about 8 mm. long; achenes linear-cuneate, about 2 mm. long,

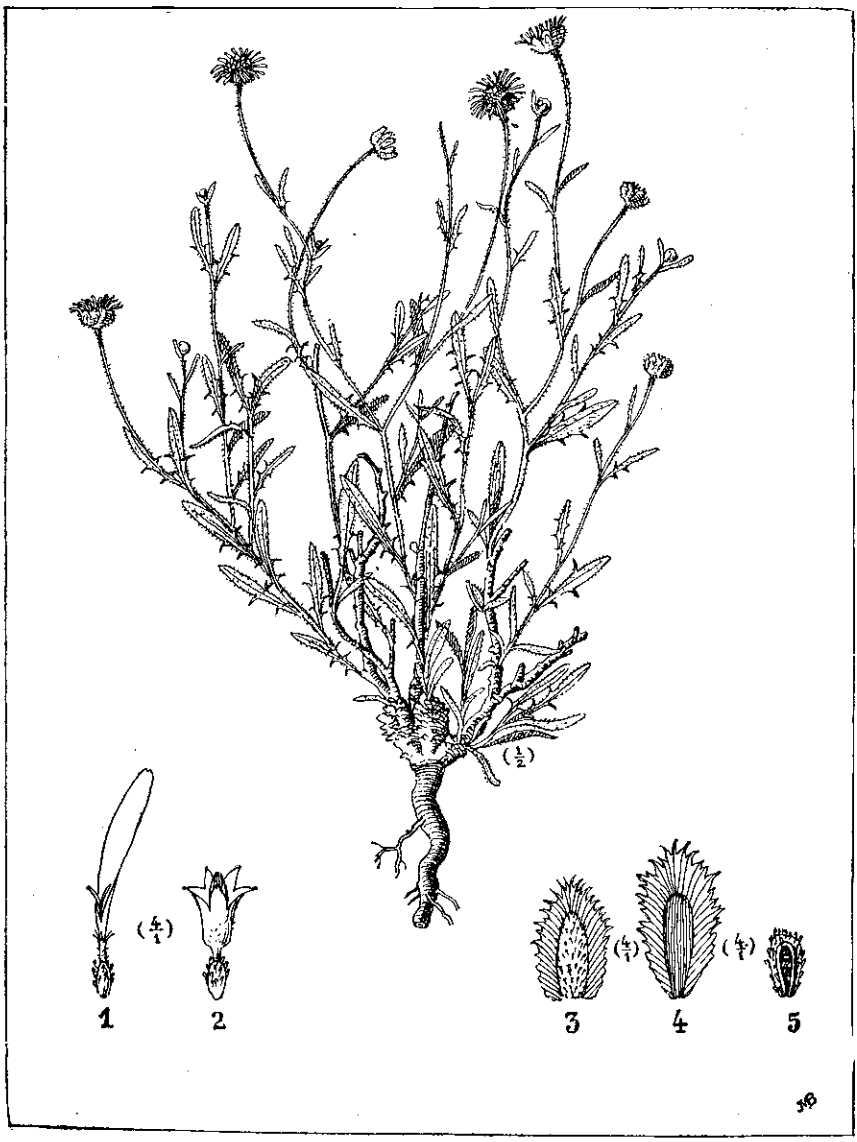

PLATE 47.—**Brachycome tesquorum.**

¾ mm. broad, compressed but thick, beset with hooked hairs, the body somewhat sunken and minutely tuberculate, the thick margins keeled; no pappus.

Oodnadatta to Musgrave Ranges.

PLATE 47.—1, female flower; 2, bisexual flower; 3, outer involucral bract; 4, inner involucral bract; 5, achene.

10 **B. lissocarpa,** J. M. Black. Almost glabrous erect perennial, 15-40 cm. high, with creeping rootstock; stems slender but stiff, usually branching once or twice; radical leaves linear or oblanceolate 5-10 cm. long including the petiole, entire or with 2-4 linear or oblong acute distant lateral lobes, 2-10 mm. long, the terminal lobe longer; stem-leaves similar but smaller, distant, the uppermost linear, entire and bract-like; peduncles 3-12 cm. long; involucral bracts obovate-oblong, about 4 mm. long, minutely glandular-hairy; ligules 50-80, violet or white; achenes oblong-cuneate, flat, thin, about 2 mm. long, not half so broad, the body reddish-brown, smooth, shining, glabrous, or beset with a few curled hairs when young, surrounded by a narrow whitish thick glabrous border; pappus almost obsolete. (Fig. 245, H).—*B. trachycarpa,* Tate partly, not of F. v. M.

From Encounter Bay northward through the Mount Lofty and Barossa Ranges; South-East.—Sept.-Nov.—Victoria (Warrnambool). Near *B. heterophylla,* Benth. (*B. linearifolia,* DC. var. *heterophylla,* Moore et Betche), of eastern New South Wales, but differs in the microscopic pappus and the larger flowerheads.

11. **B. Tatei,** J. M. Black. Dwarf, almost glabrous, perennial; leaves chiefly on the rather thick stems and branches, fleshy, obovate-cuneate, 8-15 mm. long, including the short broad petiole, 5-8 mm. broad, entire, crenate or shortly lobed; peduncles axillary, rather longer than the leaves, with a few scattered glandular hairs; involucre 4 mm. long, the bracts obovate, in 2 subequal rows; ligules about 12, about 5 mm. long; achenes obovate or oblong-cuneate, glabrous or almost so on the body, the margins thickened and sometimes with a few cilia, but not seen ripe; pappus minute or none.

Near the Great Bight west of Fowler's Bay; Eucla. Only known by 3 small incomplete specimens in the Tate Herbarium. The tough bases of the leaves are persistent, after the manner of some Eremophilas. The narrower achenes are perhaps those of the ray.

12. **B. iberidifolia,** Benth. var. *glandulifera,* J. M. Black. Annual, usually branching, 5-30 cm. high, beset with minute glandular hairs, especially on the lower part of the peduncles; leaves all pinnatisect or 1 or 2 of the uppermost linear and entire, 1-4 cm. long, with 5-13 distant narrow linear segments, those of the lower leaves sometimes with 1 or 2 secondary segments; peduncles 1-4 cm. long; involucral bracts ovate-oblong, 4-5 mm. long; ligules narrow, purplish or white, 15-20, about 10 mm. long; achenes obconical, nearly 2 mm. long, rounded or truncate at summit, more or less beset with straight or hooked hairs or almost glabrous, the outer ones sometimes tetragonous, the inner ones narrower and often clavate; pappus none or a microscopic ring of hairs.

Flinders Range; Wynbring (East-West Railway); Everard and Musgrave Ranges.—Central Australia. The type, which is glabrous and which also shows great variety in the achene, is West Australian.

13. **B. neglecta,** J. M. Black. Almost glabrous annual, 3-15 cm. high, with erect or ascending slender branching stems; lower leaves obovate- or oblong-cuneate, 1-2 cm. long, including the petiole, 3-10 mm. broad, entire or more often bordered by 3-7 coarse teeth or lobes, the upper ones smaller, sessile, but mostly toothed or lobed; peduncles filiform, 1-4 cm. long, beset with minute glandular hairs in the lower part; involucral bracts obovate-oblong, obtuse, 2-2½ mm. long; ligules 20-30, white, about 6 mm. long; achenes linear-cuneate, truncate, slightly compressed, swollen at summit, nearly 2 mm. long, under 1 mm. broad, those of the ray subtetragonous, those of the disk narrow, angular, subclavate, the whole achene usually beset with a few scattered hooked hairs, more densely near the summit; pappus none.—*B. Muelleri,* Tate non Sond.

Southern districts; Murray lands; Yorke and Eyre Peninsulas to Fowler's Bay; Kangaroo Island; South-East. Sept.-Dec.

14. **B. Muelleri,** Sond. Weak, glabrous, apparently annual, with a long tap-root; stems (apart from the peduncles) very short, simple or slightly branched; leaves chiefly radical, oblong-cuneate in outline, flaccid, 2-8 cm. long, 1-2 cm. broad, pinnatipartite into short ovate-mucronate lobes, 2-5 mm. long, which decrease in size downwards and have often a broad tooth near the base, rhachis of leaf about 3 mm. broad; peduncles 5-12 cm. long, rather thick, probably succulent, 1-2 mm. broad when dry, usually bearing 1 or 2 distant linear leaves or bracts; involucral bracts oblong-lanceolate, 4-5 mm. long; ligules about 30; achenes black, 2 mm. long, compressed, nearly square in outline, the body or disk terete, minutely glandular-hairy, much narrower than the 2 broad thick entire smooth glabrous wing-like margins; pappus a few minute glandular hairs. (Fig. 245, I).

The type came from the Para River, near Gawler; the only other specimens I have seen are from Coroona (or Corunna) Station, near Iron Knob, E.P.

15. **B. campylocarpa,** J. M. Black. Apparently annual, glabrous except the woolly upper face of the petioles; stems branching, rather stout and stiff, procumbent or ascending, 10-20 cm. long; leaves almost all pinnatipartite into 3-9 linear lobes, 1-3 cm. long including the petiole, which is dilated at base; peduncles 2-3 cm. long; involucral bracts obovate, about 4 mm. long; receptacle very convex; ligules broad, about 12, apparently white;

achenes black, obovate-cuneate, subcompressed, curved inwards, 2½ mm. long, nearly 2 mm. broad at summit, the body terete, with 2 thick margins which are broad and entire in the upper part, narrowed and crenately lobed below, ciliate with curled hairs; pappus-bristles longer than the shallow notch between the broad margins. (Fig. 245, J).

Minnie Downs (Diamantina River). The achenes often resemble those of *B. goniocarpa*, but the pappus is erect, instead of spreading stellately.

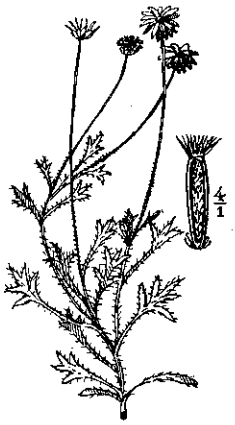

FIG. 247.—**Brachycome exilis.**

16. **B. exilis,** Sond. Slender annual, 3-20 cm. high, including the long peduncles; stems short, simple or branched, more or less beset, like the leaves, with septate hairs; leaves pinnatipartite, 5-30 mm. long, including the petiole, with 3-5 linear acute lobes, rarely entire; peduncles slender, erect, 2-15 cm. long, glandular-hairy in lower part; involucral bracts oblong, 2-3½ mm. long; ligules pale-violet or pink, 6-25, 5-10 mm. long; achenes linear, compressed, 3 mm. long, ½ mm. broad, the thickened margins smooth, the faces beset with hooked hairs; pappus of bristles united at base, about ⅓ as long as achene.

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

17. **B. debilis,** Sond. Only differs from small forms of *B. exilis* by the achenes 1½ mm. broad, owing to the margins being extended into 2 membranous crenulate wings ciliate with hooked hairs, the faces of the linear body hairy or glabrous; pappus exceeding the notch between the wings. (Fig. 245, K).

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

B. decipiens, Hook. f., a glabrous perennial closely resembling the European Daisy (*Bellis perennis,* L.) was recorded by Mueller from "near Mount Gambier," but I have seen no specimen from our State. It inhabits parts of Victoria, New South Wales and Tasmania. The leaves are radical, obovate, usually coarsely toothed, 3-10 cm. long, 8-25 mm. broad; scapes about as long, with or without 1 or 2 bracts; flowers blue, over 20 mm. diam.; achenes flat, with thickened margins; pappus-bristles short.

18. **B. ciliaris** (Labill.) Less. Perennial flowering in the first year; stems erect, slender but stiff, branching, 5-30 cm. high, glabrous or almost so, rarely minutely glandular-pubescent; leaves pinnatipartite, with usually 5-11 spreading linear or oblanceolate acuminate lobes, the upper leaves sessile and half-clasping; peduncles slender, minutely glandular-pubscent, 1-4 cm. long; involucral bracts lanceolate, acute, about 3 mm. long; ligules violet or white, about 6 mm. long; achenes black, about 2½ mm. long, flattened, those of the ray narrow, bordered but wingless, tuberculate, those of the disk obovate-oblong, with a broad or narrow white wing, which is sinuate or lobed, and ciliate with erect curled hairs; pappus minute, rarely with a few bristles much longer than the others.

Almost all parts of the State except Kangaroo Island. Most of the year.—Temperate Australia.

Var. *lanuginosa* (Steetz) Benth. Stems and leaves more or less woolly.—Drier parts of the State.—Western New South Wales; West Australia.

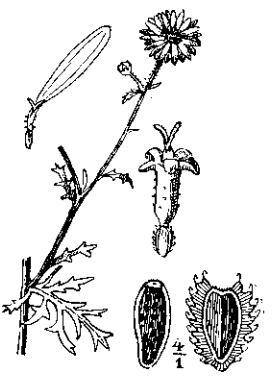

FIG. 248.—**Brachycome ciliaris.**

19. **B. calocarpa,** F. v. M. (1852). Perennial, more or less white-woolly, especially at the base of the stems and leaves and on the young shoots, 10-40 cm. high; stems erect, branching, sometimes becoming glabrous; leaves linear-cuneate or lanceolate-cuneate, the lower ones sometimes pinnatipartite with a few distant lobes, the stem-leaves mostly with 2-4 acute teeth near the summit or with a few smaller lateral teeth lower down or quite entire, woolly or sparsely scabrous-pubescent or becoming glabrous with age; peduncles long (5-20 cm.); involucral bracts obovate-oblong, 4-5 mm. long; ligules 30-40, white; achenes brown, about 2½ mm. long, flattened, obovate, tuberculate or muricate on the body, with a broad wing finally broken up into large or small often crenulate lobes ciliate with a few curled hairs; pappus-bristles as long as the notch between the wings and very conspicuous on the young achenes. (Fig. 245, L).

Mount Lofty Range northwards to Flinders Range; Murray lands. Aug.-Nov.—Victoria; New South Wales.

Judging by our specimens I think a revision of Australian material might show that *B. calocarpa* cannot be successfully distinguished from *B. marginata*, Benth. (1837), a name which has priority, but as that species is supposed to be only East-Australian I have not ventured on any change. I have seen no South Australian specimens answering to *B. chrysoglossa*, F. v. M. (yellow flowers and glandular-hairy clothing), from the Victorian Murray, a species which was united by Bentham with *B. marginata*.

20. **B. cardiocarpa**, F. v. M. Glabrous perennial; leaves all linear, entire, 1-3 mm. broad, the radical ones 4-20 cm. long; flowering stem or scape erect, simple, 10-35 cm. long, rather thick but weak, with a few distant leaves like the radical ones but shorter, the uppermost bract-like; head terminal, rather large, the involucral bracts oblong, obtuse, 6-7 mm. long; ligules about 40, violet or whitish; achenes brown, 3 mm. long, flat, obovate, with rather broad wings, ciliolate with minute straight hairs; pappus-bristles usually shorter than the notch between the wings. (Fig. 245, M).

South-East. Aug.-Nov.—Victoria; New South Wales; Tasmania.

21. **B. cuneifolia**, Tate. Probably annual, almost glabrous except for minute glandular hairs on the upper part of the flowering stems or scapes, which are erect, 8-20 cm. high, simple, with a few distant narrow leaves or bracts near the base; radical leaves cuneate, 1-4 cm. long, including the broad petiole into which they narrow, 2-12 mm. broad, with 3-5 blunt teeth or lobes near the summit; involucral bracts obtuse, 5-6 mm. long; ligules 20-25, violet or white, about 10 mm. long; achenes flat, obovate, $2\frac{1}{2}$ mm. long, 2 mm. broad, with very narrow wings bordered by short erect straight hairs; pappus-bristles slightly exceeding the notch between the wings.

Near Port Lincoln; Kangaroo Island; Naracoorte. Sept.-Dec. Very near *B. scapiformis*, DC. and *B. tenuiscapa*, Hook. f., of eastern Australia and Tasmania, but appears to differ in thinner more deeply lobed leaves, shorter more obtuse and almost glabrous involucral bracts and probably in duration.

22. **B. perpusilla** (Steetz) nov. comb. Small annual, glabrous or almost so; stems 1 or many, erect or ascending, simple or branching, 1-8 cm. long; leaves linear or oblanceolate, 5-20 mm. long, entire or pinnatipartite into a few linear mucronate lobes, the leaf dilated and sometimes ciliate towards the base with very few or several short subulate teeth; peduncles filiform, 2-10 mm. long; involucral bracts ovate-oblong, 3 mm. long, 6-12; flowers 6-24, minute, those of the ray and disk about equal in number, the ligules entire or 2-toothed, not exceeding the involucre or style, the disk-corollas 4-toothed; anthers very short and broad; achenes flat, obovate, 3 mm. long, the body sprinkled with a few hairs and surrounded by a narrow wing cut into many linear lobes bearing curled hairs; pappus none. (Fig. 245, N).—*Silphiosperma perpusillum*, Steetz (1884-45); *S. collinum*, Sond. (1852); *Brachycome collina* (Sond.) Benth. (1866).

Encounter Bay and Mount Lofty Range northwards to Flinders Range; Murray lands and 90-Mile Desert; Yorke and Eyre Peninsulas. Aug.-Oct.—Victoria; New South Wales; West Australia.

4. MINURIA, DC.

(From Greek *minyros*, in the sense of "small, thin": probably alluding to the leaves of *M. leptophylla*).

Involucre usually campanulate when fresh, the bracts narrow, with scarious margins, in 2-4 rows, the outer ones rather smaller; receptacle naked; ray-flowers female, ligulate, numerous (except in some desert specimens), in 2 or more rows; disk-flowers tubular, bisexual but sterile, numerous or few; anthers obtuse at base; style-branches of disk-flowers usually rather long; ray-achenes compressed, narrow, with a pappus of several or numerous usually free capillary bristles: disk-achenes abortive, mostly slender and glabrous, with a pappus of fewer bristles, of which the shorter are often united in a tube. Chiefly small undershrubs, with alternate leaves; flowerheads terminal on short peduncles. A genus confined to Australia.

A. Perennials; uppermost leaves shorter than flowerheads.
  B. Ray-flowers white, pink, or bluish.
    C. Leaves acute, entire; plants glabrous or almost so.
      D. Ray-pappus longer than achene.
        E. Leaves narrow-linear, about 1 mm. broad.
          Ray-achenes silky with long hairs ..... *M. leptophylla* 1.
          Ray-achenes pubescent with short hairs .. *M. Cunninghamii* 2.
        E. Leaves linear or lanceolate, 2-6 mm. broad ... *M. integerrima* 3.
      D. Ray-pappus much shorter than achene; leaves broadly lanceolate ..... *M. rigida* 4.

C. Leaves obtuse, oblanceolate, 2-4 mm. broad, often toothed; plant more or less woolly ..... *M. denticulata* 5.
B. Ray-flowers yellow, very short; leaves narrow-linear; heads small ..... *M. suaedifolia* 6.
A. Small annual; leaves linear, the uppermost much longer than the flowerheads ..... *M. annua* 7.

FIG. 249.—**Minuria leptophylla.**

1. **M. leptophylla,** DC. Undershrub with numerous erect or ascending branches, 5-20 cm. high, pubescent on the peduncles, almost glabrous in the lower part; leaves narrow-linear, 5-25 mm. long; involucral bracts ciliate, 5 mm. long; ligules white, pink, violet or purple, about 10 mm. long; ray-achenes 2 mm. long, silky-villous with hairs which are minutely 2-toothed at summit, the pappus of 30-50 bristles longer than the achene; disk-achenes terete, glabrous, with 3-9 long bristles almost plumose towards the summit and numerous shorter ones more or less united in their lower part.

Southern districts northwards to Far North and westward to Ooldea; Murray lands; Yorke and Eyre Peninsulas. Most of the year.—Drier parts of temperate Australia.

2. **M. Cunninghamii** (DC.) Benth. Glabrous undershrub with slender rigid branches; leaves narrow-linear, 5-20 mm. long, reduced to small subulate bracts near the heads; involucre ovoid, the bracts linear, acute, 6 mm. long; ligules usually white; ray-achenes 2-3 mm. long, pubescent with short hairs which are 2-hooked at summit, the pappus of about 30 bristles, much longer than the achene; disk achenes terete, glabrous, the pappus of 5-12 long bristles barbellate towards summit and a few shorter ones.

Yorke Peninsula and Murray lands to Flinders Range and Far North.—North-western Victoria and western New South Wales; Central Australia.

3. **M. integerrima** (DC.) Benth. Glabrous perennial, with erect rigid stems 20-30 cm. high, branching corymbosely near summit; leaves lanceolate or linear, entire, acute, mostly 1½-3 cm. long, the uppermost small and bract-like; flowerheads small, the involucre 3 mm. long; ligules very numerous, white or lilac, rather short; ray-achenes flat, 1 mm. long, pubescent all over or only near summit with short simple hairs, the pappus of 9-16 caducous bristles longer than achene; disk-achenes with 3-10 bristles barbellate towards summit and a few minute scales at their base.

Murray lands to Far North and west of Lake Torrens. Most of the year.—Drier parts of Australia except the West.

4. **M. rigida,** J. M. Black. Undershrub with slender branches, glabrous except for occasional small clusters of wool in the axils; leaves ovate-lanceolate or lanceolate, mucronate, stiff, mostly 5-10 mm. long, the uppermost smaller; involucral bracts 5 mm. long, ciliolate, with a small recurved point; ligules pale lilac, narrow, about 6 mm. long; ray-achenes about 2 mm. long, pubescent with short 2-hooked hairs, the pappus of about 25 very short bristles (about ½ mm. long); disk-achenes usually short, glabrous, with 6-10 long bristles barbellate towards summit and several shorter scaly ones.

Farina, Marree (Flinders Range). Most of the year.

PLATE 25 (p. 278).—1, disk-flower; 2, ray-achene; 3, hair of same; 4, upper part of style of disk-flower.

5. **M. denticulata** (DC.) Benth. Stiff erect branching perennial, more or less woolly-tomentose, especially on the young parts; leaves oblanceolate or linear, obtuse, mostly 1-3 cm. long, entire or with a few distant teeth near the summit; infloresence and achenes of *M. integerrima*, but the heads sometimes larger and the short bristles or scales at the base of the disk-pappus more distinct.

Flinders Range to Far North and westward to Everard Range.—Western Victoria and New South Wales.

6. **M. suaedifolia,** F. v. M. Small glabrous undershrub, thickly woody near base, 5-20 cm. high; leaves narrow-linear, 2-8 mm. long, with a recurved mucro; heads small, the involucral bracts only 2-3 mm. long, oblong-acute, ciliolate; ray-flowers apparently often sterile, their ligules yellow, only 1-1½ mm. long and not much exceeding the involucre; achenes all glabrous and under 1 mm. long, those of the ray with a pappus of 8-18 bristles either free or united for half or more of their length in a jagged cylindrical tube; disk-achenes obconical, the pappus a jagged cylindrical tube as long as the achene and with or without 2-5 bristles rising from the summit of the tube.

Coorong and 90-Mile Desert; northern Yorke Peninsula; Far North; west of Lake Torrens to Fowler's Bay and the Great Bight.—North-western Victoria; western New South Wales; West Australia (Victoria Desert).

7. **M. annua,** Tate. Small glabrous erect or ascending annual, 2-8 cm. high, branching from near the base; leaves narrow-linear, obtuse, mostly 2-3 cm. long, not decreasing in length upwards and the uppermost much exceeding the flowerheads; involucral bracts oblong, 3-4 mm. long, ciliolate at summit; rays 20-30, short, white; ray-achenes under 2 mm. long, silky-pubescent with hairs minutely 2-toothed at summit, the pappus of about 25 free bristles longer than the achene; disk-achenes glabrous, the pappus of 3-5 long bristles and many shorter ones, all more or less united in a cylindrical tube.—*Minuriella annua*, Tate.

Northern part of Flinders Range; Gawler Range.

5. CALOTIS, R. Br.

(From Greek *kalos*, beautiful; *ous, ôtos*, an ear: alluding to the 2 oar-shaped pappus-scales of *C. cuneifolia*).

Involucre mostly hemispherical, the bracts in about 2 rows, nearly equal, with scarious margins; receptacle flat or convex, naked; ray-flowers ligulate, female, mostly in 1 row; disk-flowers tubular, bisexual but barren (except in *C. hispidula*); anthers obtuse at base; style shortly notched or entire in the barren disk-flowers; achenes compressed, narrowed towards base, sometimes winged; pappus of short awns or bristles, barbellate with reflexed or spreading hairs (barbules), and accompanied sometimes by narrow or broad scales. Herbs with alternate leaves; fruiting heads usually globular and burr-like.

A purely Australian genus. As in *Brachycome*, ripe fruits are necessary for the satisfactory determination of several species.

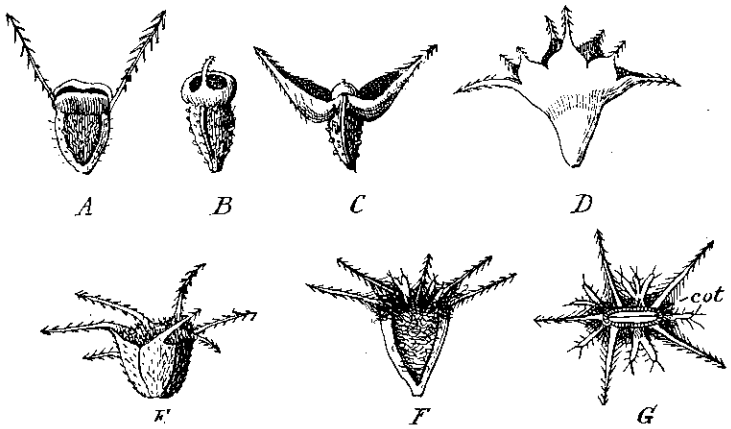

FIG. 250.—**Calotis.** Achenes, enlarged about 6 times. A, *C. cuneifolia*; B, *C. Kempei*; C, *C. cymbacantha*; D, *C. erinacea*; E, *C. latiuscula*; F, *C. hispidula*; G, the same seen from below, with the ovary cut transversely.

A. Pappus of flat truncate scales and 1-3 awns or none; perennials. (Section 1. *Eucalotis*).
  Leaves cuneate, toothed; pappus of 2 distinct scales and 2-3 awns ..... *C. cuneifolia* 1.
  Leaves oblong or lanceolate, serrate; pappus of scales united in a ring, rarely with 1 awn ..... *C. Kempei* 2.

A. Pappus of 2 or more rigid awns, dilated and united at base; flowers yellow. (Section 2. *Cymbaria*).
  Awns 2, at right angles to the achene; scabrous-pubescent annual ..... *C. cymbacantha* 3.
  Awns 2-8, united in a cup at base; glabrous perennial *C. erinacea* 4.

A. Pappus of several unequal awns, distinct at base. (Section 3. *Acantharia*).
  B. Achenes not winged; perennials.
    C. Radical leaves withering before flowering; stems numerous, several-headed, leafy.
      Stem-leaves small ..... *C. lappulacea* 5.
      Stem-leaves large ..... *C. latiuscula* 6.

C. Radical leaves persistent during flowering; stems simple or with very few heads; rootstock creeping. Radical and lower leaves rather broad, coarsely toothed ..... *C. scabiosifolia* 7.
Leaves almost all radical, linear, entire ..... *C. scapigera* 8.
B. Achenes with ciliate wings; radical leaves petiolate but withering early; small annuals.
D. Achenes hairy, with wings narrowed downwards; leaves rather broad, coarsely toothed.
Pappus-awns 14-18, as long as achene; ray-flowers white ..... *C. multicaulis* 9.
Pappus-awns 4-7, shorter than achene, ray-flowers purple ..... *C. porphyroglossa* 10.
D. Achenes glabrous, with wings dilated at base and curved upwards; leaves narrow, almost entire .. *C. ancyrocarpa* 11.
A. Pappus-awns few, alternating with shorter bristles or cleft scales; ray-flowers scarcely exceeding pappus and all the flowers in each head fertile. (Section 4. *Cheiroloma*).
Small hairy annual; achenes not winged ..... *C. hispidula* 12.

1. **C. cuneifolia,** R. Br. Scabrous-pubescent perennial, with ascending or erect branching stems 15-30 cm. long; leaves spathulate, 1-3 cm. long, broad and coarsely toothed near summit, narrowed abruptly downwards but usually stem-clasping by 2 basal auricles; peduncles 1-3 cm. long; involucral bracts lanceolate, 4-5 mm. long; ligules bluish or white, about 10 mm. long; achenes obovate, reddish-brown, flat, about 2 mm. long, tuberculate; pappus of 2 (rarely 3) awns, alternate with 2 (rarely 3) scarious scales which are broader than long, truncate and inflexed at summit. (Fig. 250, A).

Southern districts (apparently rare now); Murray lands. Most of the year.—Western Victoria; New South Wales; Queensland; Central Australia.

2. **C. Kempei,** F. v. M. Perennial with erect, stiff, branching stems to about 50 cm. high; stem-leaves lanceolate or obovate-oblong, rigid, becoming glabrous, sessile, 1-4 cm. long, 5-14 mm. broad, serrate with broad or narrow, approximate or distant acute teeth; peduncles and involucral bracts glandular-pubescent, the latter ovate-lanceolate, acute, 3-nerved, ciliolate, 5 mm. long; ligules apparently yellow; achenes obconical, slightly compressed, 2 mm. long, more or less tuberculate and glandular-hairy, the margins very narrow; pappus an undivided scarious crown or ring, inflexed at summit, awnless or with 1 short incurved awn rising from its margin. (Fig. 250, B).

Oodnadatta to Musgrave Ranges.—Central Australia.

3. **C. cymbacantha** F. v. M. Probably always annual, rather roughly pubescent all over, with erect or ascending stems of 10-30 cm.; leaves oblong-cuneate, with mostly 3-7 coarse distant teeth, the radical ones petiolate, the stem-leaves 1-5 cm. long, becoming sessile and the uppermost lanceolate, small and often entire; involucral bracts ovate-lanceolate, 4-5 mm. long, acute; ligules bright-yellow; achenes flat, obovate, 2 mm. long, tuberculate; pappus of 2 divergent awns, broad and boat-shaped towards base, set at right angles to the flat faces of the achene, with rarely 1 or 2 additional awns. (Fig. 250, C).

Murray lands northwards to Flinders Range and Far North; westward to Musgrave Ranges and Ooldea. Most of the year.—Western Victoria and New South Wales; Central Australia.

4. **C. erinacea,** Steetz. Erect glabrous perennial, 30 cm. to over 1 m. high; leaves more or less rigid, linear, lanceolate or oblong, acute, or obtuse, 1-4 cm. long, distantly and sharply toothed, rarely ciliolate, sometimes entire, only the lowest tapering into a petiole; involucral bracts ovate-lanceolate, about 4 mm. long; ligules narrow, yellow; achenes compressed, subdeltoid, about 2 mm. long, typically with 4 spreading awns, 2-3 mm. long, dilated towards base and united in a cartilaginous cup, often with alternating shorter awns, so that the total number varies from 3 to 8, the whole glabrous and usually smooth outside, but the inside of the cup and the domed summit of the achene within it are papillose-pubescent. (Fig. 250, D).

Southern plains to Far North; Murray lands; Yorke and Eyre Peninsulas.—Western Victoria and New South Wales; Central and West Australia. In desert specimens the uppermost or nearly all the leaves are sometimes minute (only 1-2 mm. long).

Var. *biaristata,* J. M. Black. Awns reduced to 2 opposite ones.—Far North and westward to Everard Range and Ooldea.—South-west Queensland. The 2 awns are parallel to the plane of the achene and not at right angles to it, as in *C. cymbacantha.*

5. **C. lappulacea,** Benth. Resembles the preceding, but not so tall, more or less scabrous-pubescent; leaves linear or oblong, mostly toothed or lobed, those of the stem 6-12 mm. long, the uppermost entire; flowerheads smaller, the involucral bracts lanceolate, scabrous-ciliate; achenes tuberculate, the awns usually 5-10, rigid, unequal, distinct and not united at base, about 2 mm. long and not longer than the achene.

Flinders Range to Far North.—Temperate Australia.

6. **C. latiuscula,** F. v. M. et Tate. Near *C. lappulacea*, but the leaves longer, oblong-cuneate, rather coarsely toothed, scabrous-hairy, the lower ones 3-8 cm. long, including the petiole, the middle ones 2-5 cm. long, often stem-clasping by the broad base, the uppermost smaller and entire; heads often corymbose, yellow; involucral bracts lanceolate, scabrous-pubescent; achenes thick, subangular, about 2 mm. long, rough or pubescent; awns usually 7-10, rigid, unequal, 1-3½ mm. long, spreading or recurved, separate to base. (Fig. 250, E).

Lake Torrens to Far North and westward to Everard Range.—Central Australia.

7. **C. scabiosifolia,** Sond. et F. v. M. Perennial, rather scabrous-hairy all over or almost glabrous, with creeping rootstock and erect or ascending stems, simple or branched near summit, 10-30 cm. high; radical leaves obovate-oblong, coarsely toothed or pinnatifid, 3-7 cm. long, including the petiole, sometimes 12-20 cm. long with the long slender petiole; stem-leaves sessile by the broad base, 1-5 cm. long, the uppermost ovate-lanceolate and entire; involucral bracts ovate, 5-6 mm. long, the outer ones often almost orbicular; ligules linear, white or bluish; achenes flat, obovate, 2½ mm. long, woolly especially near the summit; pappus of 4-7 unequal spreading awns, the longest rather shorter than the achene, the barbules of the awns rather long.

Mt. Lofty Range (a small form, apparently rare now); Flinders Range (at least as far north as Hawker); Naracoorte. Sept.-Nov.—Victoria; New South Wales; Queensland.

8. **C. scapigera,** Hook. Small flaccid perennial, glabrous or sparsely pubescent, with creeping rootstock; leaves almost all radical, linear or linear-lanceolate, 2-12 cm. long (with petiole), 2-4 mm. broad, entire or with a few distant teeth; simple stems or scapes rather longer than radical leaves, with a few small distant linear leaves or bracts; involucral bracts oblong, about 3 mm. long; ligules pink or white; achenes compressed, obovate or broadly cuneate, 2 mm. long, pubescent; pappus of 4-5 spreading or recurved awns 2-4 mm. long.

Moist places: Port Adelaide River; flats along the River Murray. Most of the year.—Victoria; New South Wales.

9. **C. multicaulis** (Turcz.) J. M. Black (1917). Annual, 6-20 cm. high, more or less scabrous with small scattered hairs; stems ascending or erect; leaves oblanceolate or oblong-cuneate, 1-3 cm. long, mostly with a few coarse teeth in the upper part, the uppermost linear-lanceolate and entire, sometimes almost all entire; involucral bracts oblong or lanceolate, about 3 mm. long; ligules narrow, white; achenes compressed-obconical, 1½-2 mm. long, covered by branched hairs, the 2 cuneate wings bordered by long branched cilia; pappus of 14-18 slender awns 1-2 mm. long. (Plate 48, fig. 5).—*C. plumulifera* F. v. M. (1859); *Goniopogon multicaule*, Turcz. (1851).

Flinders Range to Far North; Cooper's and Strzelecki Creeks; Tarcoola. Most of the year.—Western New South Wales; Central and West Australia.

Var. *breviradiata*, Ising. Ray-flowers very short; achenes with long hairs only near summit; wings with simple cilia.—Hughes (Nullarbor Plain).

10. **C. porphyroglossa,** F. v. M. A scabrous-pubescent annual, scarcely differing from the preceding except in the linear-lanceolate involucral bracts, the purple ligules and the achenes, which are about 1½ mm. long, with only 4-7 slender awns barely 1 mm. long. (Plate 48, fig. 6).

North of Oodnadatta and Cooper's Creek.—Western New South Wales; Central Australia.

11. **C. ancyrocarpa,** J. M. Black. Almost glabrous annual with erect stems, 10-20 cm. high; leaves linear or narrowly oblanceolate, obtuse, 5-25 mm. long, entire or with 1 or 2 obscure teeth; involucral bracts oblong, obtuse, 2-3 mm. long; ligules narrow, white; achenes compressed-obconical, glabrous, about 1½ mm. long; wings descending from summit of achene in a broad sinus and then curved upward like the flukes of an anchor, ciliate with short branched hairs; awns slender, unequal, 12-20, as long as or a little longer than the achene.

PLATE 48.—1, ray-flower; 2, disk-flower; 3, ripe achene.

Strzelecki Creek.

12. **C. hispidula,** F. v. M. Scabrous-pubescent annual with prostrate or ascending stems 3-15 cm. long; leaves obovate-cuneate to oblanceolate, mostly 1-2 cm. long, few-

toothed towards the summit or entire, the radical ones petiolate but withering early; involucral bracts lanceolate or oblong, very scabrous, about 3 mm. long; ligules yellow, minute, scarcely exceeding the pappus; disk-flowers fertile; achenes flat, cuneate, 2½ mm. long, pubescent, the margins narrow but thick; pappus of 4-6 stiff spreading awns about 2 mm. long, alternating with shorter bristles or ciliate scales which are simple or bifid or trifid. (Fig. 250, F-G).

From Yorke Peninsula, Flinders Range and Murray lands northwards to the whole of the Far North and westward from Port Augusta to the West Australian border. From the clinging character of the barbed achenes it is sometimes called by bushmen the "Bogan Flea."—Western Victoria and New South Wales; Central and West Australia. Resembles *C. multicaulis*, but the fruiting heads are whiter, the awns stouter, spreading horizontally and with longer barbules.

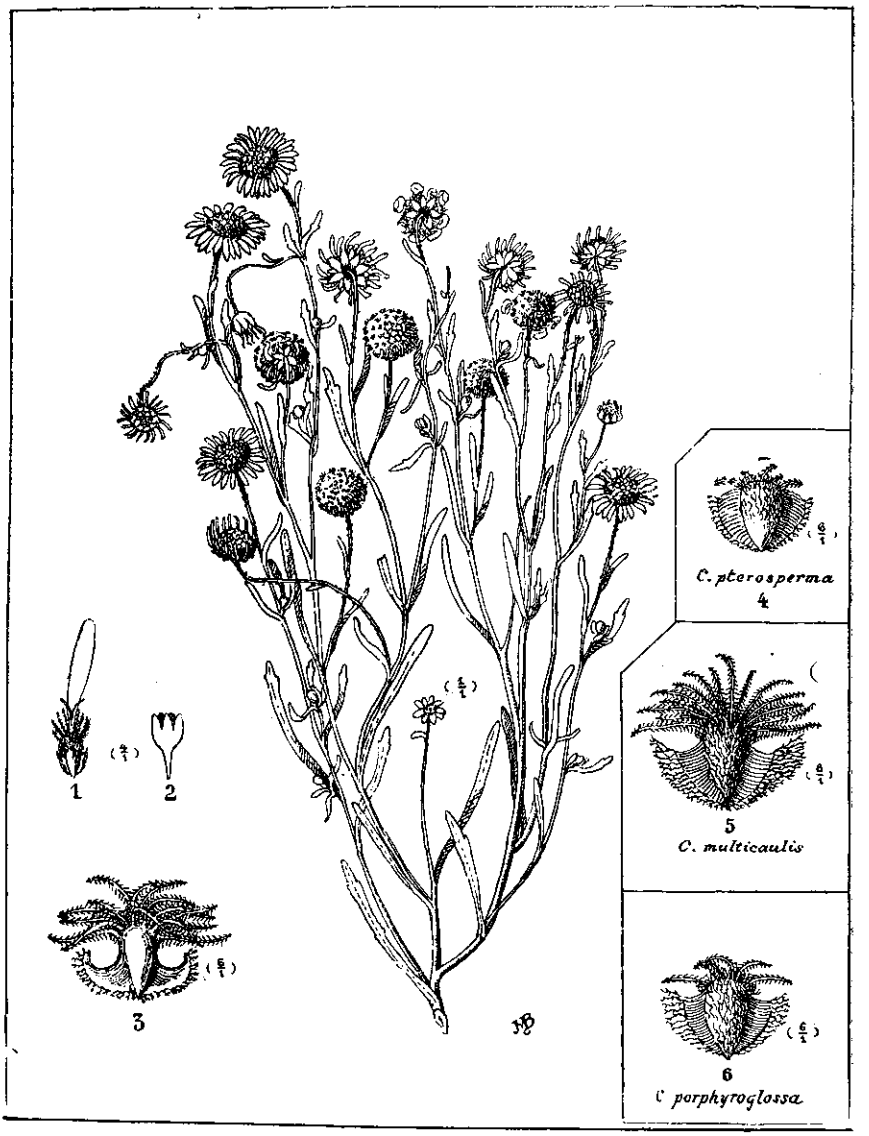

PLATE 48.—**Calotis ancyrocarpa.**

6. ACHNOPHORA, F. v. M.

(From Greek *akhnê*, chaff; *phoros*, bearing: alluding to the conspicuous scales of the pappus and receptacle).

1. **A. Tatei,** F. v. M. Small glabrous perennial; leaves all radical, crowded, narrow-linear, obtuse, 4-6 cm. long, the bases of the old ones forming a sort of fibrous sheath; stems or scapes erect, simple, 1-headed, filiform, red, almost naked, about as long as the leaves; involucre hemispherical, the bracts oblong-ovate, 4-5 mm. long, scarious along the margin; receptacle with conspicuous oblong scales between the flowers; ray-flowers female, in 1 row, the ligules about 25, narrow, blue, about 10 mm. long; disk-flowers tubular, bisexual but sterile, the style-branches capillary; anthers obtuse at base; ray-achenes cuneate, about 1½ mm. long, pubescent, with a pappus of 8-12 lanceolate finely-pointed ciliolate scales rather longer than achene; disk-achenes abortive, without pappus.

Kangaroo Island (wet places near the south coast).

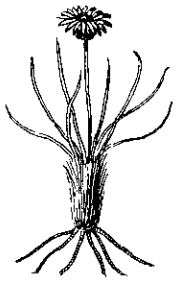

FIG. 251.—**Achnophora Tatei.**

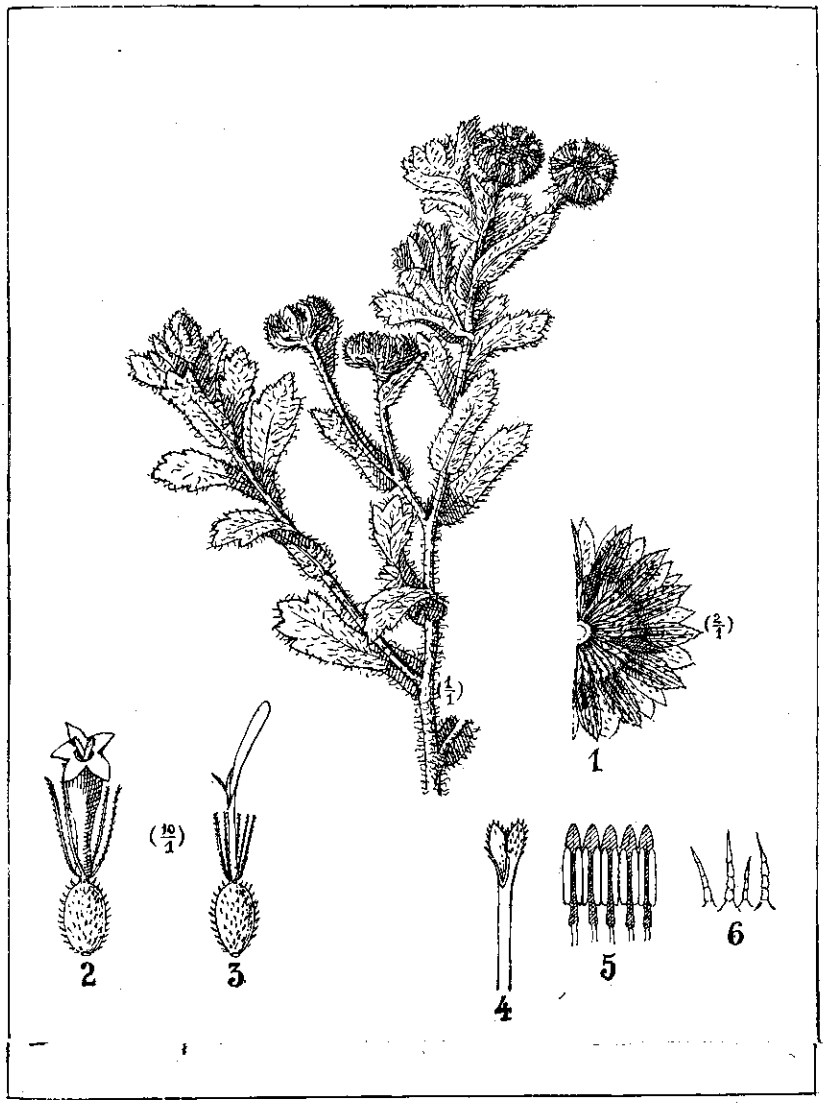

PLATE 49.—**Erigeron sessilifolius.**

7. ASTER (Tourn.) L.

(Greco-Latin *aster*, a star, and also the name of some plant of this or an allied genus: alluding to the spreading rays of the ornamental and cultivated species. The China Aster of the gardens is *Callistephus chinensis* (L.) Cass.)

*1. **A. subulatus,** Michx. Erect almost glabrous herb, 30-180 cm. high, the stems usually simple and much-branched in upper part; leaves linear-lanceolate, entire, those of the stem sessile and half-clasping, 2-12 cm. long, ciliolate on the margin with minute stiff hairs, those of the inflorescence much reduced and often bract-like; flowerheads small, in a large loose panicle; involucral bracts linear-lanceolate, scarious on the margins, in 3-4 unequal rows, the innermost about 6 mm. long; receptacle flat, naked; ray-flowers female, about 25 in 2-3 rows, the ligules white, pink, or bluish, almost erect and shortly exceeding the involucre; disk-flowers 8-10, tubular, bisexual; achenes compressed, narrow, pubescent, 2 mm. long, with a much longer pappus of about 30 soft capillary bristles.

A weed in settled districts and along the Murray and Coorong. Described by American authors as annual, but with us, at least in moist places, it is biennial.—Eastern districts of North America.

8. ERIGERON, L.

(Greco-latin name of the Groundsel, from Greek *êri*, early; *gerôn*, an old man: alluding perhaps to the bald receptacles after seeding).

Involucral bracts in 2-4 rows, with narrow scarious margins; receptacle flat, naked; ray-flowers female, slender, ligulate or toothed, in 2 or more rows; disk-flowers tubular, bisexual, 5-toothed; anthers obtuse at base; style-branches dilated above the stigmatic lines; achenes flat; pappus of capillary bristles. Herbs with alternate leaves; flower-heads on short peduncles.

Involucre about 10 mm. broad, the bracts broad; ray-flowers ligulate; dry-country plant ..... *E. sessilifolius* 1.
Involucre about 5 mm. broad, the bracts linear; ray-flowers tubular; common weed ..... *E. crispus* 2.

1. E. sessilifolius, F. v. M. Erect villous branching annual; stem-leaves broadly oblong-cuneate, 1-2½ cm. long, coarsely toothed near summit and sessile by the broad base, the uppermost smaller and sometimes entire; heads terminating short leafy branch-lets; involucre almost hemispherical, the bracts broad-lanceolate, equal, 3-4 mm. long; ray-flowers very numerous, with a short linear ligule (about 1½ mm. long but longer than the style-branches); disk-flowers 15-20; achenes ovate-oblong, pubescent, straw-colored, 1-1½ mm. long; pappus-bristles few, fragile, about as long as achene.

Macumba River; Pandie Pandie Hills (Far North).—Northern Territory.

PLATE 49.—1, half of receptacle and involucre spread out and seen from below; 2, disk-flower; 3, ray-flower; 4, upper part of style; 5, stamens; 6, hairs.

FIG. 252.—**Erigeron crispus.**

*2. **E. crispus,** Pourret (1788). Coarse erect annual, 20-70 cm. high, pubescent, the striate stems also beset with longer hairs, the lateral branches often exceeding the central axis; leaves 2-6 cm. long, the radical ones withering early, oblong-cuneate, coarsely toothed, the stem ones oblanceolate, entire or with a few distant teeth, the uppermost smaller and linear; heads in short paniculate racemes; involucre campanulate, about 5 mm. long, the bracts unequal, linear, acute, with narrow scarious margins; ray-flowers very numerous, scarcely exceeding the involucre, white, filiform-tubular, 2-3-toothed, the style-branches longer than the teeth; disk-flowers 6-20; achenes linear, straw-colored, more or less pubescent, 1½ mm. long; pappus-bristles longer, 16-20.—*E. linifolius*, Willd. (1804); *Conyza ambigua*, DC. (1815).

A common roadside weed in settled districts. Sept.-Apr.—Mediterranean region; introduced into many warm countries.

9. VITTADINIA, A. Rich.

(After Carlo Vittadini, 1800-1865, an Italian writer on fungi).

Involucre cylindrical or campanulate, the bracts narrow, in 3-5 unequal rows, with scarious margins; receptacle naked; ray-flowers female, about 15-40, the ligules narrow, arranged in 2 or more rows; disk-flowers fewer, tubular, bisexual; anthers

obtuse at base; style-branches with subulate appendages above the stigmatic lines; achenes narrow, compressed; pappus of numerous capillary bristles, except in *V. pterochaeta*. Perennial herbs or small undershrubs with alternate leaves. The achenes and pappus are accrescent, so that in fruit the latter far surpasses the involucre. The hairs of the achenes are all, or only the lower ones, notched or 2-toothed at summit.

A. Achenes striate or ribbed on each face; stems branched (Section 1. *Vittadinia vera*).
  B. Leaves obovate-cuneate or oblanceolate, obtuse, flat or somewhat folded, some of them toothed or lobed.
    Pappus-bristles capillary, longer than achene..... *V. triloba* 1.
    Pappus-bristles subplumose, not longer than achene. *V. pterochaeta* 2.
  B. Leaves inrolled and almost filiform, acute, all entire.. *V. tenuissima* 3.
A. Achenes very flat, smooth on each face, the margins thickened (Section 2. *Eurybiopsis*).
  Stems simple, each with 1 large terminal flowerhead.. *V. megacephala* 4.
  Stems branched, bearing several small flowerheads.... *V. scabra* 5.

1. **V. triloba** (Gaudich.) DC. Variable perennial, with erect or ascending stems 10-30 cm. high, more or less beset with short usually rigid hairs mixed with minute glandular hairs; leaves from obovate-cuneate to oblanceolate, mostly obtuse, 5-30 mm. long, entire or 3-7-toothed or 3-7-lobed near summit, the central lobe broad, often recurved at tip, tapering into a broad or narrow petiole; heads on terminal peduncles, more or less corymbose; involucre 6-9 mm. long, the bracts linear-lanceolate; ligules about 20-40, 5 mm. long, purple, violet or rarely white; achenes 4-7 mm. long, linear-cuneate, pubescent, finely striate with about 6 ribs on each face; pappus of numerous bristles, the longest rather longer than the achene.—*Brachycome triloba*, Gaudich. (1826); *Vittadinia australis*, A. Rich. (1832).

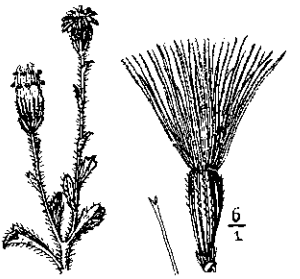

FIG. 253.—**Vittadinia triloba**

All over the State. Most of the year.—Temperate Australia; New Zealand. *V. australis*, described from New Zealand specimens as having white ligules in 1 row, is considered by some botanists to be distinct from the Australian plant, which was first described as *Brachycome triloba* from Port Jackson specimens.

Var. *dissecta*, Benth. Leaves smaller, once or twice 3-partite or 3-lobed, on slender petioles; involucre 4-6 mm. long.—Berri (River Murray).—Victoria; New South Wales. This variety passes gradually into more typical forms with bluntly 3-lobed leaves and slender petioles.

Var. *lanuginosa*, J. M. Black. Clothing woolly and soft, especially on the stems; ribs of the achenes very fine; otherwise as in the type.—*Eurybiopsis gracilis*, Hook. f.—Southern districts; Murray lands.—Tasmania.

2. **V. pterochaeta** (F. v. M.) J. M. Black. Minutely scabrous-hairy perennial, 20-30 cm. high, with erect branching stems; leaves (at least the stem ones) obovate-oblong, cuneate, entire, 1-2 cm. long; heads subcorymbose; involucre about 6 mm. long, the bracts oblanceolate, subobtuse; achenes almost terete, 4-5 mm. long, pubescent, inconspicuously striate; ligules about 15-20; pappus not longer than achene, the bristles almost plumose, but the barbules becoming shorter towards the summit.—*V. australis*, A. Rich. var. *pterochaeta*, F. v. M.

Near Hawker (Flinders Range).—Western New South Wales.

3. **V. tenuissima** (Benth.) J. M. Black. Almost glabrous perennial, 15-30 mm. high, stems usually erect, branching; leaves narrow-linear, mostly 1-2 cm. long, closely involute on margins so as to appear almost filiform and 1-furrowed above; heads subcorymbose; involucre 7-8 mm. long, the bracts linear-lanceolate; ligules about 15-20, purplish or blue; achenes 4-5 mm. long, minutely pubescent, about 6-ribbed on each face; pappus rather longer.—*V. australis*, A. Rich. var. *tenuissima*, Benth.

Southern districts; Yorke Peninsula.—New South Wales. Resembles *Minuria leptophylla*.

4. **V. megacephala** (F. v. M.) J. M. Black. Scabrous hairy perennial, with simple erect or ascending leafy stems 10-20 cm. high, each bearing a rather large terminal flowerhead; leaves oblanceolate, tapering into a petiole, the radical ones persistent, 2-4 cm. long, entire or with 1 or 2 coarse lateral teeth, the stem-leaves shorter, narrower and entire; involucre 10-14 mm. long, the bracts linear-lanceolate; ligules purplish, about 30-40;

achenes flat, cuneate, 7-8 mm. long, pubescent but smooth and ribless on the 2 faces between the thickened margins; pappus longer, of numerous unequal capillary bristles.—*V. australis*, A. Rich. var. *megacephala*, F. v. M.

Drier districts north of Adelaide (Dublin scrub, Munno Para); Murray lands (at least west of the river); Fowler's Bay.

3. **V. scabra,** D.C. Scabrous-pubescent perennial, 5 to over 30 m. high, with branching stems; leaves oblanceolate, oblong or oblong-cuneate, entire or with a few coarse obtuse teeth, those of the stem sometimes half-clasping by a broad base; heads subcorymbose; involucre 5-7 mm. long, the bracts linear-lanceolate; achenes flat, cuneate, 3-6 mm. long, pubescent and smooth between the thickened margins; pappus-bristles as long or rather longer.

Flinders Range; Far North; Ooldea.—Central Australia; New South Wales; Queensland.

10. PODOCOMA, Cass.

(From Greek *pous, podos*, a foot; *komê*, hair: alluding to the apparently stalked pappus.)

Involucre campanulate, the bracts in 3-4 unequal rows, lanceolate, the inner ones linear-acute, with scarious margins; receptacle naked; ray-flowers female, filiform, with narrow ligules, numerous in several rows; disk-flowers much fewer, tubular, bisexual; anthers obtuse at base; style-branches with long linear-lanceolate appendages above the stigmatic lines; achenes small, compressed, produced into a filiform conspicuous beak; pappus of capillary bristles in 2 or 3 rows. Herbs with alternate leaves; flowerheads solitary, terminal on naked peduncles longer than the leaves.

Leaves cuneate, densely and conspicuously ciliate, toothed at summit; perennial ..... *P. cuneifolia* 1.
Leaves oblong in outline, not conspicuously ciliate, divided into many narrow lobes; annual ..... *P. nana* 2.

1. **P. cuneifolia,** R. Br. Scabrous-hairy perennial, with short ascending stems which become woody and are usually branched, 4-20 cm. high without the peduncles; leaves crowded, spathulate or oblanceolate, usually with 3-7 teeth or lobes towards the summit, 2-4 cm. long, including the petiole, ciliate with rather long rigid white hairs; outer involucral bracts and peduncles glandular-pubescent, the inner bracts 12-15 mm. long, purplish at tips; ligules violet or white; achenes oblong-cuneate, pubescent, 2-3 mm. long, the beak 6-10 mm. long; pappus-bristles about 50, 10 mm. long.

From Flinders Range near Quorn to Far North; west of Lake Torrens. Winter and spring.—Western New South Wales; Central and West Australia.

2. **P. nana,** Ewart et White. Small annual, 2-5 cm. high without the peduncles; stems ascending, simple or once-branched; leaves 1½-4 cm. long including the petiole, once or twice pinnatipartite into linear lobes, beset with minute glandular hairs and longer scattered ones; outer involucral bracts and peduncles glandular-pubescent, the inner bracts about 8 mm. long; ligules very slender, violet or white; achenes sparsely pubescent, oblong-cuneate, 2 mm. long; beak 3-4 mm. long; pappus of about 15 long bristles 7-9 mm. long and numerous shorter bristles in an outer row.

Northern part of Flinders Range to Far North and westward to Musgrave Ranges; west of Lake Torrens to Nullarbor Plain.

11. OLEARIA, Moench.

(Probably from the Latin *olea*, the olive, and due to the resemblance of its leaves to those of *Olearia dentata*, Moench, a New South Wales species.)

Involucre cylindrical or rarely campanulate in flower, the bracts in about 3-5 unequal rows, with scarious margins; receptacle naked, pitted; ray-flowers mostly in 1 row, ligulate, rarely almost tubular; disk flowers tubular, usually 5-lobed; anthers obtuse or rarely subacute at base, never tailed; style-branches with usually short thick deltoid appendages above the stigmatic lines; achenes more or less striate, terete or slightly compressed, the hairs, when present, usually minutely notched or 2-toothed at tip; pappus of numerous capillary bristles, often with an outer row of much shorter ones. Shrubs or undershrubs with alternate or clustered leaves (in all our species); heads terminal or apparently axillary owing to the contraction of the flowering branches.

Chiefly an Australian genus, with some representatives in New Zealand.

A. Clothing of lower face of leaves consisting of centrifixed hairs. (Section 1. *Dicerotricha.*)
  B. Heads large, solitary, on long almost naked peduncles; leaves large, ovate, flat, tomentose beneath; hairs with a long stipes (T-shaped).
    Leaves denticulate ..... *O. grandiflora* 1.
    Leaves entire ..... *O. pannosa* 2.

B. Heads small, paniculate, on naked or bracteate peduncles; leaves oblong, toothed, tomentose beneath; hairs with a very short stipes..... *O. erubescens* 3.

A. Clothing of lower face of leaves consisting of curled woolly hairs; leaves with recurved or revolute margins, often small and clustered. (Section 2. *Eriotricha.*)

C. Heads small, few-flowered, sessile in the axil or at the end of short leafy branchlets, forming long leafy panicles, spikes or racemes.

D. Ray-flowers minute, tubular, without ligule; leaves linear; inland shrub ..... *O. tubuliflora* 4.

D. Ray-flowers with a ligule shorter than the style-branches; leaves oblanceolate or linear; maritime shrub ..... *O. axillaris* 5.

D. Ray-flowers with a ligule longer than the style-branches.

E. Leaves linear.

Leaves mostly 5-10 mm. long; heads all along the branches ..... *O. ramulosa* 6.

Leaves mostly 10-15 mm. long; heads crowded towards the ends of the branches ..... *O. subspicata* 7.

E. Leaves oblong to orbicular.

F. Leaves entire, $\frac{1}{2}$-2$\frac{1}{2}$ mm. long, often densely clustered and imbricate; heads sessile among the last leaves of short branchlets.

Leaves oblong or ovate; heads paniculate; inner involucral bracts subglabrous..... *O. floribunda* 8.

Leaves ovate or suborbicular; heads usually appearing spicate; inner involucral bracts woolly near summit ..... *O. lepidophylla* 9.

F. Leaves 3-toothed, 2-4 mm. long, obovate, not densely clustered or imbricate; heads on very short bracteate peduncles above the last leaves..... *O. exiguifolia* 10.

C. Heads solitary, sessile or almost so at the end of leafy branchlets.

G. Leaves more or less spreading, white beneath; disk-flowers 10-25.

Leaves oblong-cuneate to obovate, 2-12 mm. long.. *O. pimeleoides* 11.

Leaves linear, 7-20 mm. long ..... *O. arida* 12.

G. Leaves erect, all minute; disk-flowers 2-3 ..... *O. microdisca* 13.

A. Leaves glabrous, usually viscid, sometimes with immersed glands. (Section 3. *Adenotricha.*)

H. Leaves flat, the margins not or slightly recurved; heads terminal, on short peduncles above the last leaves or bracts.

I. Achenes glabrous; leaves cuneate, often toothed; heads large; ligules 14-20 ..... *O. magniflora* 14.

I. Achenes silky-pubescent.

J. Leaves obovate-cuneate or orbicular; ligules 8-12.

Leaves entire or crenulate; heads rather small. *O. Muelleri* 15.

Leaves distinctly toothed; heads larger ..... *O. calcarea* 16.

J. Leaves narrowly oblanceolate, often toothed; heads small, paniculate; ligules few..... *O. decurrens* 17.

H. Leaves compressed-terete, about 1 mm. broad, the margins curved and connate, so that the leaves are grooved above or below; heads sessile or almost so above the last leaves or bracts.

K. Leaves 8-30 mm. long, mostly spreading; heads paniculate.

Leaves obtuse; involucre 6-7 mm. long; ligules 6-9 ..... *O. glutinosa* 18.

Leaves acute; involucre 3 mm. long; ligules 12-20 ..... *O. glandulosa* 19.

K. Leaves 2-10 mm. long, obtuse.

L. Leaves erect, often appressed.

Heads in a long narrow panicle; leaves 2-5 mm. long; ligules 4-9 ..... *O. teretifolia* 20.

Heads few in a loose corymb; leaves 3-10 mm. long; ligules 10-15 ..... *O. Toppii* 21.

L. Leaves spreading or recurved, mostly 4-7 mm. long; heads solitary ..... *O. Hookeri* 22.

A. Leaves glandular-pubescent or beset with septate hairs or rarely glabrous; heads moderately large, on bracteate peduncles; ligules rather numerous; involucral bracts acute. (Section 4. *Merismotricha*.)

M. Leaves flat or almost so.

N. Involucral bracts in 4-5 unequal rows.

Leaves glandular-hairy, oblong-cuneate, toothed. *O. Stuartii* 23.

Leaves glabrous, broad-lanceolate, serrulate..... *O. Ferresii* 24.

N. Involucral bracts in 2-3 subequal rows; hairs septate.

Leaves obovate-cuneate, serrate, shortly scabrous-hairy or glabrous ..... *O. rudis* 25.

Leaves narrow-lanceolate, entire, grey-hairy..... *O. picridifolia* 26.

M. Leaves with revolute margins, linear, sessile, entire, rigid, ciliate..... *O. ciliata* 27.

1. **O. grandiflora,** Hook. Undershrub 30-100 cm. high, the branches, peduncles and lower face of leaves velvety with a dense close white or rusty tomentum of centrifixed mostly T-shaped or forked hairs; leaves shortly petiolate, ovate or ovate-lanceolate, rigidly denticulate, mostly 4-10 cm. long, 1½-6 cm. broad, green, glabrous and reticulate on the upper face; involucres tomentose, 20 mm. long, on long stout peduncles, the bracts lanceolate; ligules 12-30, white, 20-25 mm. long; achenes pubescent.—*Aster Sonderi*, F. v. M.

Mount Lofty Range. Oct.-Jan.

2. **O. pannosa,** Hook. *Silver-leaf Daisy.* Scarcely differs from the preceding except that the leaves are entire, more frequently broad-oblong or elliptical, rarely with a thin tomentum persistent on the upper face; achenes pubescent, to 6 mm. long.

Southern districts to Flinders Range; Murray lands; Yorke and Eyre Peninsulas; South-East. Sept.-Nov.—Victoria; New South Wales.

3. **O. erubescens** (DC.) Dippel (1889). Small shrub, the branches, peduncles and undersurface of leaves silvery or rusty with a close tomentum of centrifixed hairs; leaves lanceolate, often acute, mostly 2-4 cm. long, 6-15 mm. broad, glabrous, shining and reticulate above, rigidly and acutely sinuate-toothed, tapering into a very short petiole; heads 1-3 on axillary peduncles 2-5 cm. long, forming leafy oblong panicles; involucres 8-9 mm. long, the bracts linear-lanceolate, silky, the outer ones obtuse; ligules 5-8, broad, white; disk-flowers 9-12; achenes glabrous, striate; pappus bristles very numerous, unequal.—*Eurybia erubescens*, DC.; *Olearia myrsinoides* (Labill.) F. v. M. var. *erubescens*, F. v. M.

Yorke Peninsula; Burrungul, S.E. Sept.-Nov.—Victoria; New South Wales; Tasmania. Resembles *O. stellulata* (Labill.) DC. and *O. asterotricha*, F. v. M., which may account for the 2 latter having been recorded for our South-Eastern District. They have a stellate tomentum on the lower face of the leaves, and belong to the eastern States.

4. **O. tubuliflora** (Sond. et F. v. M.) Benth. Shrub 1-2 m. high, with numerous short branches, woolly tomentose with weak sinuous hairs especially on the lower face of the leaves, which are spreading, narrow-linear, sometimes clustered, mostly 5-10 mm. long, the margins revolute; heads sessile in the axils, forming leafy paniculate spikes; involucre 3 mm. long, the bracts subobtuse; ray-flowers 3-5, the corolla tubular, inconspicuous, about half as long as the style without its branches and shorter than the pappus and involucre, sometimes minutely toothed but not ligulate; disk-flowers 3-5; achenes about 1 mm. long, pubescent; pappus-bristles about 25.

Southern districts; Marble Range, E.P. Usually in gullies or near water. Most of the year. Scarcely distinguishable from *O. ramulosa* except by an examination of the ray-flowers.—Victoria; New South Wales.

5. **O. axillaris** (DC.) F. v. M. Branching aromatic maritime shrub, 2-3 m. high, the branches and lower face of the leaves hoary with a close white woolly tomentum; leaves oblanceolate or linear, 1-2½ cm. long, 1½-3 mm. broad, rarely 3 cm. long and 4-6 mm. broad, with recurved margins, tomentose or glabrous and green above; heads sessile in the axils, forming leafy paniculate spikes; involucre 4-5 mm. long, the bracts obtuse, the outer ones hoary; ligules 3-7, minute, entire or 3-toothed, shorter than the style-branches and pappus; disk-flowers 4-8; achenes pubescent; pappus-bristles 60-100, silky, accrescent.

Sandhills along most of our coasts. Usually Feb.-April.—Coasts of Australia.

6. **O. ramulosa** (Labill.) Benth. Variable more or less pubescent and aromatic shrub, 40-150 cm. high, usually erect or the stems sometimes ascending, with many slender branches, often glutinous; leaves linear, crowded, sometimes clustered, spreading, subsessile, 4-15 mm., rarely to 25 mm. long, with revolute margins, glabrous or pubescent above, tomentose below, sometimes with a close white woolly tomentum on the branches and lower surface of leaves; heads usually appearing to form leafy paniculate spikes or racemes, but really sessile at the end of very short leafy branchlets; involucre 3-6 mm. long, with 6-8 long obtuse bracts and about as many shorter ones; ligules 2-8, usually 2-4, white, pink or bluish, 2-4 mm. long, about twice as long as the style-branches; disk-flowers 3-10, usually 3-5; achenes pubescent; pappus of about 30 bristles. *Aster ramulosus*, Labill. (1806).

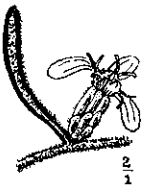

FIG. 254.—**Olearia ramulosa.**

Southern districts; Kangaroo Island; Yorke and Eyre Peninsulas; South-East. Chiefly summer.—Temperate Australia. Should probably include *O. revoluta*, F. v. M. and its var. *minor*, Benth., also *O. exilifolia*, F. v. M. Eastern specimens have usually more numerous flowers to the head, the ligules 6-10. The ligules of South Australian specimens vary from slightly longer than the style-branches to 3 times as long, and both organs vary in size, even on the same plant. Only in South-Eastern specimens have I found the ligules as many as 8 and the disk-flowers 10, although in the southern and western districts they are sometimes found to number 5-6 each. Near the sea this species is sometimes as white as *O. axillaris*, but is a much smaller and weaker plant.

Aster microphyllus, Vent. was included by Tate in his Flora, but the 2 specimens so named in his herbarium are *O. ramulosa* and *O. tubuliflora*. *O. microphylla* (Vent.) Druce (*Aster microphyllus*, Vent. non Labill.; *O. ramulosa*, Benth. var. *microphylla* (Vent.) Benth.) belongs to the eastern coast of Australia and is distinguished by flat obovate leaves 2-3 mm. long, scabrous above, tomentose below, tapering into petioles about half as long; involucre 3-4 mm. long; ligules and disk-flowers about 6 each.

7. **O. subspicata** (Hook.) Benth. Shrub with hoary tomentose branches; leaves spreading or erect, linear, 8-15 mm. long, glabrous above, with revolute margins almost hiding the tomentose under-surface; heads on short axillary peduncles, crowded into short terminal racemes or small corymbs; involucre narrow, 6-7 mm. long, of 5-6 obtuse long bracts and about as many shorter ones; ligules white, 2-3, rather broad, 3 times as long as style-branches; disk-flowers 3-4; achenes silky-pubescent; pappus-bristles about 40-50.—*Eurybia subspicata*, Hook. (1848); *Aster Mitchellii*, F. v. M. (1865).

Maitland, Y.P.; Barton, Ooldea, beyond Ouldabinna, Everard Range (all in the Far-West).—Western New South Wales and Queensland.

8. **O. floribunda** (Hook. f.) Benth. Slender branching shrub 1-2 m. high, the branchlets at first hoary-tomentose; leaves thick, ovate or oblong, 1-2½ mm. long, with revolute margins and tomentose below, often in separate clusters along the branches as abortive branchlets; each head terminating a branchlet 2-8 mm. long, which is almost concealed by the small imbricate leaves, the numerous heads forming large pyramidal panicles; involucre 3-4 mm. long, the inner bracts glabrous or slightly tomentose near summit; ligules 3-5, 2-3 times as long as style-branches; disk-flowers 3-6; achenes pubescent; pappus-bristles about 25-35.—*Eurybia floribunda*, Hook. f. (1847); *Aster florulentus*, F. v. M. (1865).

Yorke Peninsula; Murray lands east and west of the river; 90-Mile Desert; Eyre Peninsula to Gawler Ranges. Most of the year.—Victoria; New South Wales; Tasmania.

9. **O. lepidophylla** (Pers.) Benth. A rather stout erect rigid shrub 1-2 m. high, with stout or slender branches, beset with a short but somewhat loose white tomentum; leaves ovate or almost orbicular, thick, ½-2½ mm. long, with revolute margins, arranged in dense clusters (abortive branchlets) sometimes so close together as almost to conceal the woolly branches, the lower face tomentose but often hidden; heads mostly appearing sessile owing to the shortness of the leafy branchlets supporting them and thus simulating a dense spike; involucre 4-5 mm. long, the inner bracts woolly-tomentose near summit; ligules 3-6, about 3 times longer than style-branches; disk-flowers 5-10, usually violet; achenes pubescent; pappus bristles about 25-30.—*Aster microphyllus*, Labill. (1806) non Vent. (1804); *A. lepidophyllus*, Pers. (1807).

Southern districts, usually growing in scrub; Yorke Peninsula; Kangaroo Island; Murray lands and southward through 90-Mile Desert. Chiefly summer.—Victoria; New South Wales; Tasmania. These 2 species, which are sometimes rather difficult to distinguish, differ from *O. ramulosa* chiefly in their minute and usually broader leaves.

10. **O. exiguifolia,** F. v. M. Slender shrub about 1 m. high, the branches, undersurface of leaves and involucres hoary-tomentose; leaves obovate-cuneate, 2-4 mm. long, becoming glabrous and dark-green above, most of them obtusely 3-toothed, almost flat;

heads terminating short axillary leafy branchlets; involucre 4 mm. long; ligules white, 5-6, 3 times as long as style-branches; disk-flowers 5-6; achenes pubescent; pappus-bristles 30-40.

Fowler's Bay and westward along the Great Bight. Chiefly summer.—West Australia.

11. **O. pimeleoides** (DC.) Benth. Shrub about 1 m. high, hoary with a close woolly tomentum; leaves oblong-cuneate to obovate, 5-12 mm. long, 2½-4 mm. broad, with recurved margins, tomentose below, usually glabrous above; heads solitary, terminal; involucre 7-8 mm. long, the bracts numerous, subacute, woolly towards summit; ligules 8-20, white, conspicuous; disk-flowers rather more numerous; achenes silky-pubescent; pappus-bristles about 40-60.

Murray lands and north thereof; Flinders Range; Gawler Ranges and westward along the Great Bight. Aug.-Oct.—Western Victoria and New South Wales; West Australia.

Var. *minor*, Benth. Leaves 2-5 mm. long; involucre 5 mm. long; ligules 6-11; achenes pubescent or glabrous and striate.—Dublin scrub (north-west of Gawler); near Milang; Murray lands; Yorke and Eyre Peninsulas to Fowler's Bay.

12. **O. arida,** E. Pritzel (1918). Glutinous shrub, the branches angular, hoary-tomentose along the ribs; leaves linear or narrowly oblanceolate, obtuse, 7-20 mm. long, 1-2½ mm. broad, green and almost glabrous above, hoary-tomentose below, with prominent midrib, the margins recurved and glandular-dotted; heads solitary, terminating short leafy axillary branchlets, which are usually shorter than the subtending leaf of the branch; involucre 5 mm. long; ligules 10-15, about 8 mm. long; disk-flowers about as numerous; achenes glabrous; pappus-bristles 40-50.

West of Lake Eyre.—West Australia (Victoria Desert).

13. **O. microdisca,** J. M. Black. Small viscid shrub with slender stiff erect branches, thinly tomentose with short curly hairs; leaves approximate, mostly erect and often appressed, linear-oblong, thick, 1½-2½ mm. long, about ¾ mm. broad, sessile, with recurved margins, tomentose below but the under-surface sometimes concealed; heads sessile; solitary, terminating leafy lateral branchlets 5-25 mm. long; involucre narrow, about 3 mm. long, the bracts obtuse, pale-colored; ligules 2-5, about 3 mm. long and 3 times as long as the style-branches; disk-flowers 2-3; achenes pubescent; pappus-bristles 25-35.

Near Maitland and Ardrossan, Y.P.; Kangaroo Island. Summer. Has the habit of *O. teretifolia*, but differs in the smaller leaves and involucres and in the hairy clothing. The disk-flowers appear never to exceed the ligules in number and are usually fewer.

14. **O. magniflora,** F. v. M. Glabrous glutinous shrub about 1m. high; leaves thick, spreading, rather distant, oblong-cuneate, 8-18 mm. long, 2-5 mm. broad, flat, entire or 3-5-toothed at summit; heads large, solitary, terminal; involucre 15-20 mm. long, broadly cylindrical, with numerous dark-green bracts; ligules 14-20, purple, about 20 mm. long; disk-flowers numerous; achenes comparatively long (3-4 mm.), glabrous; pappus-bristles 60-100; style-appendages short, obtuse.

Murray scrub and westward to Sedan, but apparently rare or localised; Streaky Bay westward along the Great Bight. Most of the year.—Western Victoria and New South Wales.

15. **O. Muelleri** (Sond.) Benth. Small glutinous glabrous shrub, the glands mostly immersed, leaves flat or slightly concave above, obovate-cuneate or orbicular, entire or crenulate, stiff, often varnished, 6-14 mm. long, including the petiole into which they taper and which is nearly as long as the blade; heads solitary, terminal, sometimes forming small corymbs; involucre 8-10 mm. long, the bracts numerous, obtuse, ciliate; ligules white, 8-12, about 10 mm. long; disk-flowers 10-15; achenes silky-pubescent, 2-4 mm. long; pappus-bristles about 40-60; style-appendages subacute.

Dublin and Halbury to Flinders Range; Yorke Peninsula; Murray lands and north thereof; Eyre Peninsula and westward to Ooldea, Ouldabinna and Eucla. Aug.-Oct.—Western Victoria and New South Wales; West Australia.

16. **O. calcarea,** F. v. M. Very near the preceding and should perhaps be considered a variety; a few of the glands sometimes stalked; leaves always toothed or crenate and usually more distinctly so; heads solitary, the involucre 12-18 mm. long; achenes silky-pubescent, 5-6 mm. long.

Murray lands; near Kanyaka; near Ooldea.—Western New South Wales.

17. **O. decurrens** (DC.) Benth. Glabrous glutinous shrub 1-2 m. high; leaves flat, narrowly oblanceolate, 1-4 cm. long, including the short petiole into which they taper, 1-3 mm. broad, entire or with a few distant acute teeth, the margins recurved, the midrib prominent below; heads on short bracteate peduncles, forming a loose panicle or almost

corymbose; involucre about 4 mm. long, of 8-9 long obtuse bracts and several shorter ones; ligules white, 3-5; disk-flowers 5-6; achenes silky-pubescent; pappus-bristles 35-50.

Yorke Peninsula to Flinders Range; Murray lands; Eyre Peninsula. Most of the year.—Western Victoria and New South Wales. The specific name is derived from the inconspicuous decurrence of the leaves along the angular branches.

18. **O. glutinosa** (Lindl.) Benth. Glutinous glabrous shrub about 2-3 m. high; leaves compressed-terete, obtuse, mostly spreading, 8-30 mm. long, 1 mm. broad, 1-grooved above and slightly so below; heads on short bracteate peduncles, solitary or 2-5 in small terminal corymbs; involucre 6-7 mm. long, the bracts acute; ligules 6-9, white, 10 mm. long; disk-flowers 10-14, usually purple or pink; achenes pubescent; pappus-bristles about 30-50.—*Eurybia glutinosa*, Lindl. (1839); *E. glutescens*, Sond. (1852); *Aster glutescens* (Sond.) F. v. M. (1865).

Southern districts; Kangaroo Island; Murray lands. Most of the year.—Victoria; New South Wales; Tasmania.

19. **O. glandulosa** (Labill.) Benth. Glabrous shrub 1-1½ m. high; leaves compressed-terete, acute, mostly spreading and 15-30 mm. long, 1 mm. broad or less, 1-grooved above, convex below, the glandular dots rather prominent, so that the dried leaf has a knotted or constricted appearance; heads small, on short almost naked peduncles, forming corymbose panicles; involucre campanulate, 3 mm. long, the bracts lanceolate; ligules 12-20, white, about 4 mm. long; disk-flowers about 20; achenes pubescent; pappus-bristles about 30-35.

Near Myponga (Mt. Lofty Range), MacDonnell Bay, S.E. Chiefly near swamps. Summer.—Victoria; New South Wales; Tasmania.

20. **O. teretifolia** (Sond.) F. v. M. Slender glabrous glutinous shrub 80-150 cm. high; leaves compressed-terete, erect, often appressed, obtuse, 2-5 mm. long, under 1 mm. broad, convex or slightly 1-grooved below; heads terminating leafy branchlets 1-6 cm. long and forming a long narrow panicle; involucre 3½-6 mm. long; ligules 4-9, white, 5-6 mm. long; disk-flowers 5-10; achenes pubescent or glabrous; pappus-bristles 20-40.

Southern districts; Kangaroo Island; Murray lands. The specimens from the Murray region have rather larger involucres than those from the Mt. Lofty Range and Kangaroo Island. Chiefly summer.—Western New South Wales.

21. **O. Toppii,** Ewart et White. Slender glabrous wiry somewhat glutinous shrub about 50 cm. high; leaves mostly erect and 3-10 mm. long, 1 mm. broad, obtuse, compressed-terete, 1-grooved or channelled above, convex below; heads almost sessile, terminating filiform divergent branchlets, which are 1-4 cm. long, forming very loose few-headed corymbs; involucre campanulate, 4-6 mm. long, the bracts narrow; ligules 10-15, about 8 mm. long; disk-flowers about 20; achenes pubescent, 2 mm. long; pappus-bristles about 30-40.

Sandy soil near Yallum, S.E. Summer.—Western Victoria (near Dimboola).

22. **O. Hookeri** (Sond.) Benth. Slender glabrous glutinous shrub; leaves compressed-terete, chiefly spreading or recurved, obtuse, mostly 4-7 mm. long, about 1 mm. broad, 1-grooved above and rounded or slightly 1-grooved below; heads few, terminating leafy branchlets; involucre 5-6 mm. long; ligules 6-8; disk-flowers about 12; achenes pubescent; pappus-bristles about 30.

Murray lands (Karoonda, Geranium, Pinnaroo).—Western Victoria; Tasmania.

23. **O. Stuartii,** F. v. M. (1865). Small shrub beset with short glandular hairs and a few scattered longer ones; leaves oblong-cuneate, 10-25 mm. long, including the petiole, 2-6 mm. broad, bluntly or almost acutely 3-toothed at summit and with a few similar spreading teeth along each margin, almost flat, rather thick; heads on short or long slender peduncles, often corymbose, involucre 5-6 mm. long, the bracts numerous, acute; ligules 20-50, blue, 6-10 mm. long, apparently in 2 rows; disk-flowers 25-70; achenes compressed, sparsely silky-villous; pappus-bristles about 20-30.—*Eurybia Stuartii*, F. v. M. (1859); *Aster megalodontus*, F. v. M. (1874).

West of Lake Eyre; Arkaringa Creek; Everard and Musgrave Ranges.—Central Australia.

24. **O. Ferresii,** F. v. M. Glutinous aromatic erect shrub, about 1 m. high, glabrous except for minute glandular hairs on the peduncles; leaves broad-lanceolate, mucronate, serrate, 4-10 cm. long, including the short petiole into which they taper, 6-20 mm. broad; heads large, few in a terminal corymb, on peduncles with crowded or distant subulate bracts and equalling or longer than the uppermost leaves; involucre broad, 8-9 mm.

long, the bracts linear-lanceolate, with a thick glandular keel; ligules 15-20, white, about 12 mm. long; disk-flowers numerous; achenes silky-pubescent; pappus-bristles 30-40.
Everard and Musgrave Ranges.—Central Australia.

25. **O. rudis** (Benth.) F. v. M. Small shrub, scabrous with short septate hairs; leaves obovate-cuneate, serrate, sessile and often stem-clasping, 2-4 cm. long, 8-18 mm. broad; heads large, solitary or few in a terminal corymb on stout peduncles, which are naked or with 1 or 2 linear bracts and equalling or rather longer than the uppermost leaves; involucre broad, 8-10 mm. long, the bracts linear-lanceolate and more equal than in most other species; ligules 35-45, purplish, 12-15 mm. long; disk-flowers numerous; achenes striate, glabrous or almost so; pappus-bristles 30-40.—*Eurybia rudis*, Benth. (1837); *E. scabra*, Benth. (1837); *Aster exul*, Lindl. (1839).
Eyre Peninsula and along the Great Bight. Most of the year.—Western Victoria and New South Wales; West Australia.
Var. *glabriuscula*, Benth. Leaves to 5 cm. long, or sometimes small and very slightly serrate, scabrous with minute hairs or smooth with microscopic glands on the surface; ligules to 20 mm. long, rarely white.—Scrub in drier parts of the southern districts; Kangaroo Island; Yorke Peninsula; Murray lands; South-East.—Western Victoria. The scabrous form of the variety is very close to the type.

26. **O. picridifolia** (F. v. M.) Benth. Erect shrub, grey-tomentose with long septate hairs; leaves narrow-lanceolate, 2-4 cm. long, including the short petiole into which they taper, 2-6 mm. broad; heads solitary or few in a loose corymb on almost naked peduncles usually longer than the leaves; involucre broad, 6-8 mm. long, the bracts lanceolate and subequal; ligules 15-30, blue or violet; disk-flowers numerous; achenes striate, glabrous; pappus-bristles about 25-35, the small outer row distinct. (Plate 31 (2), page 338).
Drier parts of southern districts (Halbury scrub, Strathalbyn and Monarto southwards through 90-Mile Desert); between Flinders Range and Lake Torrens. Aug.-Oct.

27. **O. ciliata** (Benth.) F. v. M. (1865). Shrub 15-30 cm. high, the branches shortly scabrous-hairy; leaves linear, rigid, mucronate, decurved, sometimes clustered, mostly 10-15 mm. long, scabrous-ciliate on margins, glabrous or scabrous above, the revolute margins almost concealing the minutely tomentose under-surface; heads on terminal reddish wiry peduncles 2-14 cm. long; involucre about 7 mm. long, the bracts acute; ligules 20-35, pale purple, 12-15 mm. long; disk-flowers about 50-80; achenes glabrous or pubescent; pappus-bristles 25-35.—*Eurybia ciliata*, Benth. (1837); *Aster Huegelii*, F. v. M. (1865).
Southern districts to Flinders Range; Kangaroo Island; Murray lands; Yorke and Eyre Peninsulas. July-Nov.—Temperate Australia.
Var. *squamifolia*, Benth. Leaves very scabrous-hairy or almost glabrous above, 2-5 mm. long, so densely clustered as almost to conceal the stems and branches.—Kangaroo Island. Bentham says the leaves are "entire or 3-lobed"; all those I have seen are entire.

12. AMBROSIA, L.

(Greco-Latin for the food and perfume of the gods; the name was also applied by classical authors to some aromatic plants.)

Male flowers in small hemispherical heads with a cup-like involucre of apparently 1 bract, receptacle with capillary scales between the flowers, the corolla tubular, 5-toothed; stamens 5, the anthers free or almost so; female heads of 1 flower without corolla, surrounded by several bracts and the cylindrical chaffy scale; style with 2 long slender branches; fruiting-head obovoid, consisting of a hardened beaked involucre composed of the more or less connate bracts and the single enclosed achene. Scabrous herbs with alternate leaves; male flower-heads in long terminal paniculate bractless spikes, the female heads immediately below, in the axils of the uppermost leaves.

Annual; fruiting-head with a whorl of spines near summit *A. artemisiifolia* 1.
Perennial: fruiting-head without spines ..... *A. psilostachya* 2.

*1. **A. artemisiifolia,** L. *Ragweed.* Scabrous-pubescent annual, 30-100 cm. high; leaves pinnatipartite, with lanceolate pinnatifid segments; fruiting-head 2½-4 mm. long, with a whorl of 4-6 small spines or teeth, rarely fewer or almost obsolete, surrounding the head near the summit.
Mount Lofty Ranges, here and there. Summer.—North America, now introduced in many countries.

*2. **A. psilostachya,** DC. *Perennial Ragweed.* Resembles the preceding, but is perennial, with a creeping rootstock; fruiting-head 3-4 mm. long, reticulate, without spines.
Cultivated land, Berri; Naracoorte.—Western United States.

13. XANTHIUM, L.

(Greek *xanthion*, from *xanthos*, yellow; the name of a plant said by Dioscorides to be used for dyeing the hair yellow.)

Differs from *Ambrosia* in the globular male flower-heads surrounded by an involucre of free bracts in 1 row; receptacle-scales narrow; female flower-heads ovoid, 2-flowered with an involucre of bracts in several rows, the lowest row remaining free, the upper one consolidated in fruit into a hard burr-like mass, the free tips of the bracts becoming hooked spines, this fruiting-head 2-beaked at summit and 2-seeded. Coarse annual weeds with rather large alternate petiolate leaves; flower-heads in axillary and terminal clusters.

Leaf-blades much longer than broad, with 3-branched spines below the leaves ..... *X. spinosum* 1.
Leaf-blades about as broad as long; stems without spines.. *X. californicum* 2.

FIG. 255.—**Xanthium spinosum.**

***1. X. spinosum,** L. *Bathurst Burr.* Branching, pubescent, with one or two 3-branched spines at the base of each petiole; leaves lanceolate, entire or 3-5-lobed, green above, white-tomentose below; fruiting-head ovoid-oblong, pubescent, 10-12 mm. long, beset with numerous slender yellow hooked spines and 2 straight inconspicuous beaks at summit.

Throughout the settled districts. Feb.-July.—Native of South America; now introduced in many countries.

*** 2. X. californicum,** Greene. *Californian Burr.* Leaves ovate-triangular, cordate at base, sometimes 15 cm. broad, with 3-5 incised lobes, scabrous-pubescent, green on both faces; fruiting-head oblong, glandular-pubescent, 15-20 mm. long, reddish-brown, with numerous hooked spines and at the summit 2 stout conspicuous beaks, divergent from their bases and then incurved and hooked at top.

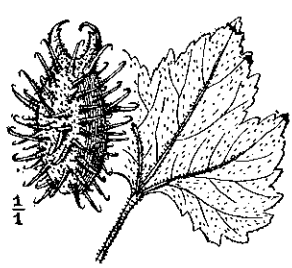

FIG. 256.—**Xanthium californicum**

Along the Murray near Renmark.—Native of California. Very near *X. orientale*, L., which differs in having the spines and beaks even more inrolled and the leaves with broadly cuneate not cordate base. The "Noogoora Burr" of Queensland is *X. pungens*, Wallr., from the eastern part of North America, with leaves much like those of *X. californicum* and a dark-brown oblong fruiting-head, 16-18 mm. long, bearing spines very shortly hooked at tip and 2 conspicuous straight approximate beaks at summit. The Noogoora Burr has usually been called *X. strumarium*, L., which is, however, another species, of European origin, with softly pubescent leaves and a smaller greenish-grey ovoid-oblong fruiting-head (12-15 mm. long) bearing hooked spines and 2 conspicuous straight slightly divergent beaks. The species domiciled in Australia have been identified by Dr. F. J. Widder, of the University of Graz, who is a specialist in this genus.

14. SIEGESBECKIA, L.

(After Johann Georg Siegesbeck, 1686-1755, German botanist and physician, for 12 years director of the botanical garden of St. Petersburg.)

1. S. orientalis, L. Branching pubescent rather stiff annual, 10-80 cm. high; leaves opposite, in distant pairs, petiolate, ovate triangular to lanceolate, irregularly toothed, the lower ones sometimes 10-12 cm. long; flowerheads on slender peduncles in a loose leafy panicle; involucre 4-5 mm. long, the outer row of 5 oblanceolate bracts, the inner row of about 8 boat-shaped glandular-hairy sticky bracts each enclosing a female flower with short yellow 2-3-lobed ligule; scales of the receptacle about the same in number, similar but thinner, each enclosing a fertile tubular bisexual 5-toothed flower; achenes black, curved, swollen towards summit, angular, 3 mm. long; pappus none.

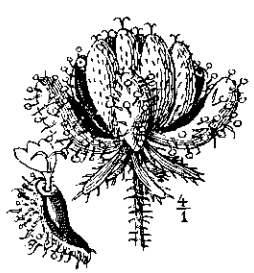

FIG. 257.—**Siegesbeckia orientalis.**

Southern districts to Flinders Range and Far North; South-East. Most of the year.—Throughout Eastern and Central Australia; warmer countries of the world.

15. ECLIPTA, L.

(Said to be derived from a supposed resemblance of the flowerhead to an eclipse of the sun.)

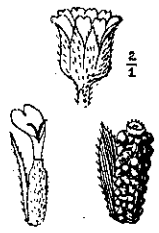

FIG. 258.—**Eclipta platyglossa.**

1. **E. platyglossa,** F. v. M. Weak prostrate or ascending scabrous-pubescent annual; leaves opposite, narrow-lanceolate, entire, 1½-5 cm. long; flowerheads on 1-2 rather short axillary peduncles; involucre campanulate, 3-5 mm. long, of 9-10 lanceolate bracts in 2 almost equal rows; ray-flowers female, 8-12, with a short yellow bifid ligule; disk-flowers rather fewer or more, bisexual, tubular, fertile, 4-toothed; receptacle-scales narrow-linear; achenes cylindrical, black, smooth or tuberculate, about 3 mm. long, the outer ones tetragonous or trigonous; pappus a minute border.

Near water, southern districts; along the Murray; Bordertown; South-East.—Eastern Australia.

16. GLOSSOGYNE, Cass.

(From Greek *glôssa,* tongue; *gynê,* pistil: alluding to the long filiform appendage of the style-branches.)

1. **G. tenuifolia** (Labill.) Cass. Slender rigid glabrous perennial, 10-40 cm. high; leaves alternate, pinnatipartite into 3-7 linear segments, which are sometimes again lobed; heads on long slender terminal peduncles; involucre about 4 mm. long, the narrow bracts nearly equal, in 2 rows, connate at base; ray-flowers female, with small yellow ligules; disk-flowers tubular, bisexual; style-branches short, with long slender hairy appendages; achenes compressed-terete, about 8 mm. long, not 1 mm. broad, striate lengthwise; pappus of 2 diverging awns barbellate backwards.

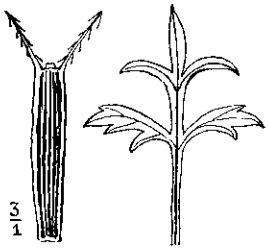

FIG. 259.—**Glossogyne tenuifolia.**

Flinders Range east of Lake Torrens.—New South Wales; Queensland.

FIG. 260.—**Galinsoga parviflora.**

17. GALINSOGA, Ruiz et Pav.

(After Mariano Martínez Galinsoga, Director of the Botanical Garden of Madrid towards the end of the 18th century.)

* 1. **G. parviflora,** Cav. Erect almost glabrous annual 30-50 cm. high; leaves opposite, ovate, or ovate-lanceolate; heads on long slender axillary or terminal peduncles; involucre about 4 mm. long, of 5 ovate bracts and about 2 outer smaller ones; ray-flowers 5, female, with a short white 3-lobed ligule; disk-flowers numerous, bisexual; receptacle conical, the scales often bifid or trifid; style-branches acute; achenes black, swollen above, angular; ray-pappus a few minute bristles; disk-pappus of 14-22 lanceolate ciliate scales.

Adelaide plains and foothills.—South America; introduced in many countries.

18. FLAVERIA, Juss.

(From Latin *flavus,* yellow, because *F. contrayerva,* Pers., of tropical America, yields a yellow dye.)

1. **F. australasica,** Hook. Erect rigid glabrous annual, usually 10-30 cm. high, branching dichotomously; leaves opposite, lanceolate, entire or faintly toothed, mostly 1½-3 cm. long; compound heads terminal or in the forks, with an involucre of leafy bracts; partial heads 10-20, cylindrical, the majority containing each 1 female flower with a very small ligule, the remainder with 2-5 flowers which are either female and tubular-bisexual or bisexual only; bracts of partial involucres few, coriaceous, wrapping the flowers; style-branches truncate and hair-tufted; achenes black, linear, compressed, 3-4 mm. long, 3-ribbed on each face.

West and north of Lake Eyre.—Western New South Wales and Queensland; Central and tropical Australia.

19. ANTHEMIS, L.

(Greco-Latin name of plants belonging to this or some allied genus.)

Involucres hemispherical, the bracts in about 3 rows; receptacle becoming conical, scaly; ray-flowers female, ligulate, in 1 row; disk-flowers tubular, bisexual; pappus none or a minute border. Herbs with alternate leaves; heads solitary on terminal peduncles.

Perennial; achenes smooth ..... *A. nobilis* 1.
Annual; achenes tuberculate ..... *A. Cotula* 2.

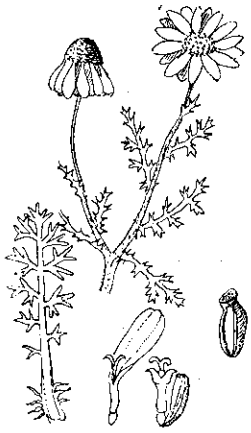

FIG. 261.—**Anthemis nobilis**

* 1. **A. nobilis,** L. *Common Chamomile.* Pubescent aromatic perennial; leaves once or twice pinnatisect, with short acute linear segments; scales of receptacle broadly oblong, obtuse; ligules white; achenes smooth, 3-ribbed.

Moist places in Mount Lofty Range. Nov.-Jan.—Western Europe.

* 2. **A. Cotula,** L. *Mayweed.* Erect annual, slightly pubescent or glabrous; leaves twice pinnatisect, with short acute linear segments; scales narrow-linear, acute; ligules white, the style sometimes obsolete or almost so; achenes with 10 strongly tuberculate ribs and without any border at summit.

Waste and cultivated places, but not common. Nov.-Jan.—Europe; an introduced weed in many countries. Our specimens, usually lacking an unpleasant odor and somewhat hairy, show a tendency towards *A. arvensis,* L., the Corn Chamomile, but the achenes are always tuberculate, whereas *A. arvensis* has an achene with smooth ribs and a small border, and has lanceolate scales to the receptacle.

20. ACHILLEA, L.

(Latin name of some curative herb, so called in honor of Achilles.)

Differs from *Anthemis* chiefly in the broad short ligules and the receptacle flat or almost so.

FIG. 262.—**Achillea tanacetifolia.**

* 1. **A. tanacetifolia,** All. *Tansy-leaved Milfoil.* Erect rigid hairy almost woolly perennial; leaves alternate, twice pinnatisect, narrow and 5-20 cm. long, the rhachis winged and toothed between the primary segments; heads in a dense broad corymb; involucre ovoid; ray-flowers 5, with a very broad short 3-lobed usually red ligule; receptacle-scales oblong; achene compressed, without ribs or pappus.

Moist places in the Mt. Lofty Range. Oct.-Apl.—Southern Europe.

21. CHRYSANTHEMUM (Tourn.) L.

(Greco-Latin name, meaning "gold-flower," of some yellow-flowered species of this genus.)

* 1. **Ch. Leucanthemum,** L. *Ox-eye Daisy.* Erect almost glabrous perennial; leaves coarsely toothed, the lower petiolate, obovate, the upper ones oblong, sessile, half-clasping; heads rather large, solitary on long peduncles; involucre hemispherical, the bracts obtuse, in few unequal rows; receptacle nearly flat, without scales; ray-flowers female, with white ligules; disk-flowers bisexual, yellow; achenes obconical, ribbed, without pappus.

Mount Lofty Range. Sept.-Dec.—Europe; Siberia; introduced in many countries.

22. CERATOGYNE, Turcz.

(From Greek *keras, keratos,* a horn; *gynê,* a pistil: alluding to the horn-like appendages of the achene.)

1. C. obionoides, Turcz. Erect slender pubescent annual, 8-15cm. high; leaves obovate or oblong, 5-12 mm. long, the lower ones petiolate; flowerheads terminal,

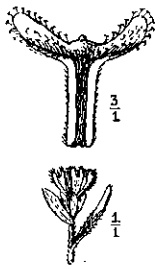

FIG. 263.—**Ceratogyne obionoides.**

subsessile, with an involucre of 3-5 lanceolate equal ciliate bracts, 2-3 mm. long; receptacle naked; flowers very small, 3-5 outer female with minute ligules and about as many inner bisexual but sterile 3-4-toothed flowers; fertile achenes compressed, about 5 mm. long, pubescent, the 2 incurved wings produced at summit into 2 divergent oblong auricles or horns ciliate with 2-hooked hairs.

Recorded by Tate for the district between Lake Torrens and the New South Wales border; no specimen in his herbarium.—Central New South Wales; Victoria (Underbool, east of Pinnaroo); West Australia. An Australian genus of one species.

23. DIMORPHOCOMA, F. v. M. et Tate.

(From Greek *dis*, twice; *morphê*, form; *komê*, hair: alluding to the bristles and scales forming the pappus.)

1. D. minutula, F. v. M. et Tate. Annual 2-12 cm. high, beset with minute glandular and longer septate hairs; leaves alternate, oblanceolate, 1-3 cm. long; flower-heads terminal, sessile among the short uppermost leaves of the branches; involucre 6 mm. long, of about 8 lanceolate bracts, enlarged in fruit; receptacle naked; ray-flowers 7-8, with short narrow white ligules; disk-flowers 3-4, tubular, bisexual, sterile; ray-achenes obovate, compressed, silky-villous, 3-4 mm. long, with an outer pappus of many capillary bristles and an inner one of 6 linear-lanceolate serrulate scales; disk-achenes terete, almost glabrous, with a pappus of 3 or 4 short bristles.

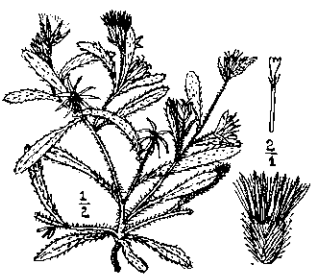

FIG. 264.—**Dimorphocoma minutula.**

Flinders Range (Beltana to Mt. Parry). The only species; the genus would perhaps be better placed next to *Minuria*, with which it has much in common.

24. COTULA, L.

(From medieval Latin *cotula*, derived from Greek *kotilê*, a cup: alluding to the shape of the flowerhead.)

Involucre hemispherical, the bracts nearly equal, with scarious margins, in about 2 rows; receptacle naked; outer flowers female, without corollas in all our species but one; disk-flowers numerous, tubular, 4-toothed, bisexual and usually fertile; achenes very small (rarely over 1 mm. long), compressed dorsally; smooth; pappus none. Small herbs with alternate leaves; heads small, with all the flowers of equal length, solitary on rather long terminal peduncles.

A. Leaves entire or coarsely lobed; receptacle flat or slightly convex; female flowers in 1 row, on conspicuous pedicels, without corolla.
  Leaves narrow-linear, entire; annual ..... *C. filifolia* 1.
  Leaves oblong, often lobed; perennial ..... *C. coronopifolia* 2.

A. Leaves pinnatisect, the ultimate lobes linear-lanceolate; female flowers in several rows.
  Female flowers without corolla; receptacle flattish ... *C. australis* 3.
  Female flowers with short corollas; receptacle shortly conical ..... *C. reptans* 4.

1. C. filifolia, Thunb. Small glabrous or slightly pubescent annual; leaves narrow-linear or filiform, entire, 1-3 cm. long; involucral bracts almost orbicular; inner achenes not winged.

In or near water: Southern districts to Flinders Range; River Murray; Lake Alexandrina; Kangaroo Island; South-East. Most of the year. Some of our specimens have the female flowers typically pedicellate, with winged achenes; others have the heads homogamous, with only bisexual flowers.—Temperate Australia; South Africa.

2. **C. coronopifolia,** L. Weak ascending glabrous perennial, with creeping usually stout and succulent stems; leaves oblong-lanceolate to broad-oblong, entire or coarsely toothed or lobed, 2-4 cm. long, stem-clasping at base; involucral bracts oblong; achenes of female flowers broadly winged, on much longer pedicels than those of the inner flowers, which are narrowly bordered; flowers yellow.

In mud or water: southern districts to Flinders Range; Murray River; Kangaroo Island; South-East. Most of the year.—Temperate Australia; South Africa; temperate South America.

FIG. 265.—**Cotula coronopifolia.**

3. **C. australis** (Less.) Hook. f. Small slender more or less pubescent or villous annual, the stems often prostrate and sometimes rooting near the base; leaves once or twice pinnatisect, the segments with 3 or more narrow lobes; peduncles very slender; involucral bracts rather numerous, oblong-lanceolate; female flowers in 3-4 rows, their achenes pedicellate, with a narrow thick wing; inner achenes not winged, their corollas white.

Usually in grassland or a weed on roadsides, sometimes near water: most parts of the State. The minute ring at the summit of the ovate green flat ovaries of the female flowers and surrounding the base of the style should perhaps be considered an obsolescent corolla.—Temperate Australia; New Zealand.

4. **C. reptans,** Benth. Small weak glabrous or slightly pubescent creeping perennial; leaves twice pinnatisect, with segments ovate in outline and each with 3-5 narrow lobes; involucral bracts few, broadly obovate; female flowers in 3-4 rows, their corollas very short and broad, swollen at base, 2-3-toothed at summit; disk-flowers sterile; achenes with thick narrow margins, sessile.

Marshy land, usually near coast: South-East. Summer.—Victoria; New South Wales; Tasmania.

25. CENTIPEDA, Lour. (1790).

(Latin for centipede, and so called on account of the sometimes creeping stems of *C. minima.*)

Involucral bracts almost equal, with scarious margins, in 2 rows; receptacle naked; flowers minute, the outer ones female, numerous, in several rows, tubular, minutely 2-3 toothed, inner or disk-flowers campanulate, 4-toothed, bisexual, fertile; achenes subclavate, hairy on the 4 obtuse longitudinal ribs and furrowed between them; pappus none. Small herbs with alternate toothed leaves; flowerheads small, sessile or almost so, axillary or terminal. *Sneeze-weed.*—*Myriogyne*, Less. (1831).

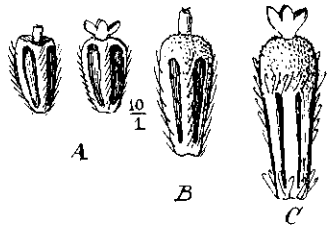

FIG. 266.—**Achenes of Centipeda.**
A, *C. minima*; B, *C. Cunninghamii*; C, *C. thespidioides.*

A. Weak procumbent or prostrate annual; heads very small, biconvex ..... *C. minima* 1.

A. Erect or ascending perennials.
Heads globular to biconvex; female flowers in many rows ..... *C. Cunninghamii* 2.

Heads ovoid-truncate; female flowers in few rows.... *C. thespidioides* 3.

1. **C. minima** (L.) A. Br. et Aschers. (1867). Small aromatic annual, glabrous, pubescent or woolly, especially about the base of the leaves, sometimes in dry districts woolly all over; stems prostrate or ascending, weak, sometimes rooting near the base; leaves oblanceolate or oblong-cuneate, tapering towards base, 5-15 mm. long, with a few short or conspicuous teeth; heads convex above, 3-4 mm. across, sessile or on very short peduncles; involucral bracts oblong, about 1 mm. long; female flowers in 3-5 rows; disk-flowers 8-12; achenes 1 mm. long, the furrows reaching to the summit.—*Artemisia minima*, L. (1753); *Cotula minuta*, Forst. f. (1786); *Centipeda orbicularis*, Lour. (1790); *Myriogyne minuta* (Forst. f.) Less. (1831).

Most parts of the State.—Temperate Australia; New Zealand; eastern Asia.

2. **C. Cunninghamii** (DC.) A. Br. et Aschers. Small aromatic perennial, flowering in the first year, quite glabrous or woolly on the young shoots; stems rather stout, rigid, erect or ascending; leaves oblanceolate or oblong-cuneate, more or less toothed, 1-3 cm. long; heads closely sessile, convex above, 4-9 mm. across; involucral bracts 2-3 mm. long; female flowers in 6-8 rows; disk-flowers 10-25; achenes 1½-2½ mm. long, the furrows not reaching to the rounded summit.—*Myriogyne Cunninghamii*, DC.

Most parts of the State.—Temperate Australia. Resembles *Epaltes australis*.

3. **C. thespidioides**, F. v. M. Almost glabrous perennial, resembling the preceding, but the sessile heads are ovoid and flat-topped, 4-5 mm. long; female flowers in about 3 rows; disk-flowers about 10; achenes 2½-3 mm. long, the furrows scarcely reaching above the middle.

Murray lands northwards to Lakes Frome and Torrens and the Far North.—Western New South Wales.

26. ISOETOPSIS, Turcz.

Name meaning "like *Isoetes*," from the resemblance to species of that genus.)

1. **I. graminifolia**, Turcz. Dwarf stemless glabrous herb; leaves all radical, narrow-linear, 1-5 cm. long; flower- heads sessile, crowded at the base of the leaves; involucre ovoid, 4-5 mm. long, of 10-12 subequal oblong scarious acute bracts in 2 rows and as long as the minute flowers; receptacle naked; female flowers 12-18, in 3-4 rows, their corollas conical, ending in 4-6 capillary teeth; inner flowers 2-3, bisexual but sterile, their corollas terete-campanulate, 4-toothed; style undivided; fertile achenes obconical, villous, about 2 mm. long, with a pappus about as long, of 8-12 obovate-oblong acute or obtuse scales; disk-achenes abortive, glabrous.

Southern districts northwards to Flinders Range; Kangaroo Island; Yorke Peninsula; Murray lands; Gawler Ranges westward to Fowler's Bay and Nullarbor Plain.

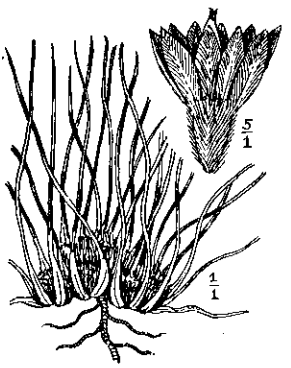

FIG. 267.—**Isoetopsis graminifolia.**

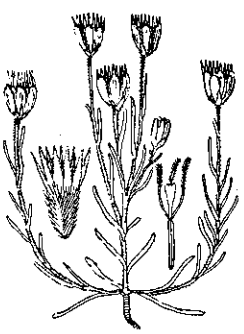
FIG. 268.—**Elachanthus pusillus.**

27. ELACHANTHUS, F. v. M.

(From Greek *elakhos*, small; *anthos*, flower.)

1. **E. pusillus**, F. v. M. Small branching erect or ascending minutely pubescent annual; leaves narrow-linear, 3-10 mm. long; heads terminal; involucre ovoid, 5 mm. long, of oblong equal bracts in 2 rows and a few shorter outer ones; receptacle naked; outer flowers female, 7-13, in 2 or 3 rows, with tubular green corolla shorter than pappus; inner flowers bisexual but sterile, 3-4-toothed; fertile achenes obconical, silky, with pappus of 12-15 lanceolate serrulate scales; abortive achenes glabrous, with pappus of 3-4 barbellate bristles.

Southern districts to Flinders Range; Murray lands and north thereof; Yorke and Eyre Peninsulas and westward to Nullarbor Plain.—Western New South Wales.

28. ERECHTHITES, Rafin.

(Greek *erekhthitês*, a name used by Dioscorides for groundsel.)

Involucre cylindrical and usually slender, of several subequal linear-lanceolate bracts in 1 row, with a few small outer ones round the base; receptacle naked; flowers all tubular, the outer ones in 2 or more rows, female, filiform, 3-4-toothed, never ligulate; inner flowers fewer, bisexual, usually 5-toothed; achenes terete, striate, pubescent; pappus of numerous white simple silky bristles. Herbs with alternate leaves; flowerheads in terminal corymbose panicles; flowers scarcely exceeding the involucre, yellow. The species are very variable and sometimes difficult to distinguish. A small genus belonging to Australia, New Zealand, and America.

A. Involucre of about 8 bracts, 6-7 mm. long; panicle mostly loose.
  Nearly glabrous; leaves often regularly toothed..... *E. prenanthoides* 1.
  Scabrous; leaves broader and coarsely lobed ..... *E. picridioides* 2.
A. Involucre of about 12 bracts.
  B. Leaves toothed, lobed or pinnatipartite, woolly below.
    Involucre 5-6 mm. long..... *E. arguta* 3.
    Involucre over 8 mm. long ..... *E. mixta* 4.
  B. Leaves linear, mostly entire, woolly below ..... *E. quadridentata* 5.
A. Involucre of 16-22 bracts, 9-13 mm. long; leaves linear-lanceolate, entire or toothed ..... *E. hispidula* 6.

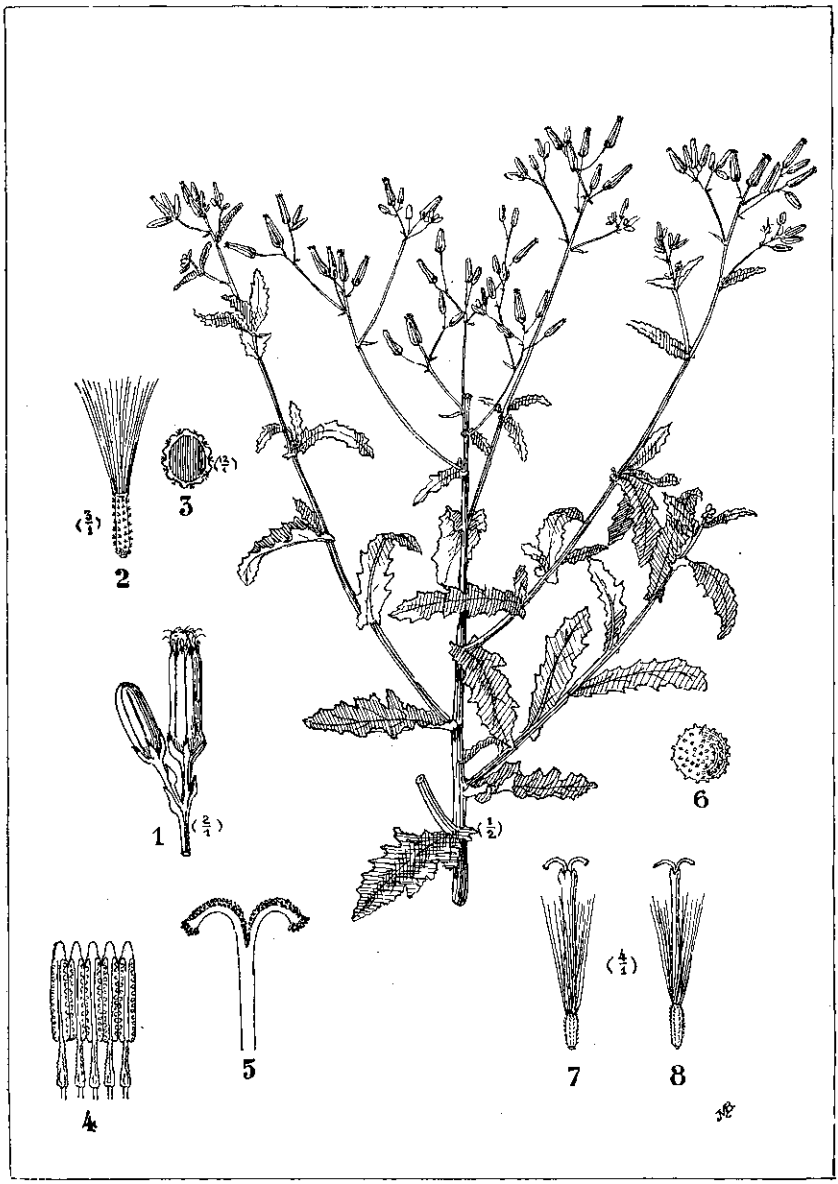

PLATE 50.—**Erechthites prenanthoides.**

1. **E. prenanthoides** (A. Rich.) DC. Erect almost glabrous annual, 30-80 cm. high; leaves lanceolate, irregularly or almost regularly toothed, clasping the stem with toothed auricles; involucres 6-7 mm. long, of about 8 bracts; female flowers 10-12; inner ones 5-8; achenes about 2½ mm. long.

PLATE 50.—1, flowerhead in bud and flower; 2, achene and pappus; 3, transverse section of achene; 4, stamens; 5, style-branches; 6, pollen-grain; 7, bisexual flower; 8, female flower.

South-East. Summer.—Temperate Australia; New Zealand.

2. **E. picridioides,** Turcz. Near the preceding, but more or less scabrous with short hairs, the leaves larger and broader (the lower ones sometimes 10-12 cm. long by 3-4 cm. broad with oblong or rounded lobes), all stem-clasping and the lobes sharply toothed.—*E. prenanthoides*, DC. var. *picridioides*, Benth.

Encounter Bay; Kangaroo Island; Murray lands; Yorke and Eyre Peninsulas; South-East. Summer.—West Australia.

3. **E. arguta** (A. Rich.) DC. Stout and erect, to 1 m. high, sometimes slightly woolly about the inflorescence; leaves lanceolate or oblong, coarsely and sharply toothed, scabrous-hairy above or sometimes almost glabrous, always grey or white below with a loose tomentum, stem-clasping by large or small toothed auricles; panicle corymbose, loose or contracted; involucre about 6 mm. long, of about 12 narrow bracts; flowers about 20-40, of which 5-10 are bisexual; achenes 2-3 mm. long.

Southern districts to Flinders Range and Far North; Kangaroo Island; South-East. Summer.—Temperate Australia; New Zealand.

Var. *dissecta*, Benth. Leaves pinnatifid or pinnatipartite, 2-5 cm. broad; involucres sometimes dark and crowded.—Southern districts; Kangaroo Island; South-East.

Var. *microcephala*, Benth. Heads only 4 mm. long.—South-East.

4. **E. mixta,** DC. Described by Bentham as near the pinnatifid form of the preceding, apparently tall and perennial, scabrous-pubescent, the panicle loose, the involucres of about 12 bracts over 8 mm. long, the localities quoted being near Port Lincoln, Murray River, and Spencer's Gulf. The only corresponding specimen which I have seen is one from the Murray Flats, slender (perhaps in its first year), 25 cm. high, with rather deeply pinnatifid leaves without auricles, and involucral bracts 10 mm. long.—Western Victoria; New South Wales.

5. **E. quadridentata** (Labill.) DC. Erect 30-60 cm. high, white-woolly especially on the underface of the leaves and often on the stems; leaves linear or linear-lanceolate, rarely with a few distant teeth, the margins usually recurved; panicle usually loose; involucre 7-10 mm. long, of about 12 bracts (10-14); flowers 25-40, of which 5-10 are bisexual; achenes about 3-5 mm. long, slightly contracted towards summit.

Southern districts to Flinders Range; Kangaroo Island; Murray lands and north thereof; Yorke and Eyre Peninsulas; South-East. Summer.—Temperate Australia; New Zealand.

6. **E. hispidula** (A. Rich.) DC. Near the preceding, sometimes taller, scabrous-pubescent or slightly woolly; leaves similar, the lower ones sometimes flat and distantly toothed; involucres 9-13 mm. long, 4-8 mm. thick, of 16-22 bracts; flowers 50 to over 80, of which about 20 are bisexual; achenes as in *E. quadridentata*.

Southern districts; Yorke and Eyre Peninsulas; Murray lands; South-East. Summer. Temperate Australia.

29. SENECIO (Tourn.) L.

(Latin for some European species of this genus, from *senex*, an old man: alluding to the white pappus.)

Involucre cylindrical, of equal bracts in 1 row, usually with a few small ones at base; receptacle naked; ray-flowers female and ligulate, in 1 row, or all the flowers tubular, bisexual and 5-toothed; achenes terete and striate; pappus of numerous white capillary silky caducous bristles. Herbs with alternate leaves; heads terminal; flowers yellow in all our native species. *Groundsel.*

A genus of about 1,300 species, extending over the whole globe.

A. Flower-heads heterogamous-radiate, the ligules spreading and conspicuous (except in *S. brachyglossus*).

B. Erect leafy annuals.

C. Ligules yellow.

D. Involucral bracts united to above the middle; leaves entire ..... *S. Gregorii* 1.

D. Involucral bracts united only at base; leaves entire or lobed.
Ligules much longer than the campanulate involucre ..... *S. platylepis* 2.
Ligules scarcely longer than the cylindrical involucre ..... *S. brachyglossus* 3.
C. Ligules purple ..... *S. elegans* 4.
B. Erect perennials, often woody towards base; ligules yellow.
E. Heads large, the involucres 10-20 mm. long; leaves broad, the upper ones stem-clasping.
Ligules 18-25 mm. long ..... *S. megaglossus* 5.
Ligules 12-18 mm. long ..... *S. magnificus* 6.
E. Heads comparatively small; involucres 4-8 mm. long.
F. Involucre campanulate; leaves linear or with linear lobes ..... *S. lautus* 7.
F. Involucre cylindrical.
Leaves lanceolate, auricled, 2-6 cm. long; rather tall glabrous plant ..... *S. orarius* 8.
Leaves linear, not auricled, 1-2½ cm. long; small tomentose plant ..... *S. Behrianus* 9.
A. Flower-heads homogamous-discoid, all the flowers tubular and bisexual, yellow; involucres cylindrical.
G. Erect perennials, woody towards base; flowers nearly twice as long as involucre.
H. Involucral bracts about 12; flowers 18-40; leaves linear to ovate-lanceolate, entire or pinnatifid.... *S. Georgianus* 10.
H. Involucral bracts about 8; flowers 10-15.
I. Leaves sessile, entire or toothed.
Leaves broad-lanceolate, with clasping auricles . *S. odoratus* 11.
Leaves linear or narrow-lanceolate, without any or with very small auricles ..... *S. Cunninghamii* 12.
I. Leaves petiolate, ovate-lanceolate, very white below ..... *S. hypoleucus* 13.
I. Leaves pinnatisect into long linear segments..... *S. anethifolius* 14.
G. Annual; leaves pinnatifid into lanceolate or oblong toothed lobes; flowers scarcely longer than involucre *S. vulgaris* 15.

1. **S. Gregorii,** F. v. M. Glabrous glaucous annual 10-30 cm. high; leaves fleshy, broad-linear, entire, 2-7 cm. long; heads solitary; involucre broad-cylindrical, 7-8 mm. long in flower, 12-14 mm. long in fruit, forming an irregularly 8-12-toothed tube, splitting longitudinally when mature, the bracts united almost to summit, without any small outer bracts; ligules 8-12, 10-20 mm. long; disk-flowers 30-40; achenes 5-8 mm. long, usually densely pubescent, rarely glabrous.

Flinders Range to Far North; west of Lake Eyre to the Great Bight and Ooldea; Murray lands and north thereof. June-Sept.—North-west Victoria; western New South Wales and Queensland; Central Australia.

2. **S. platylepis,** DC. Somewhat woolly annual; leaves narrow, pinnatifid with short distant oblong lobes or teeth; heads usually corymbose; involucre 7-10 mm. long, campanulate, of about 15 rather broad bracts with scarcely any outer ones; ligules 8-20; achenes pubescent.

Recorded by Tate for our Murray region, but I have seen no South Australian specimen.—North-west Victoria; Western New South Wales.

3. **S. brachyglossus,** F. v. M. Erect rather slender annual, 10-50 cm. high, glabrous or with a few scattered hairs; leaves linear or linear-lanceolate, 1½-5 cm. long, entire, more or less toothed or with a few distant spreading linear lobes half-clasping at base; heads few or many, in corymbs sometimes forming loose panicles; involucre cylindrical, 4-5 mm. long, of 8, rarely 9 or 10 bracts with 1 or 2 minute ones at base; ligules 5-8, about 1 mm. long and scarcely exceeding the involucre; disk-flowers 12-15; achenes densely white-pubescent.

Chiefly in the drier parts of the State, from the sea-coast near Adelaide to the Far North, and from the Murray lands westward to Nullarbor Plain and the Musgrave Ranges. Most of the year. Resembles *S. vulgaris.*—Drier parts of temperate Australia.

FIG. 269.—**Senecio brachyglossus.**

Var. *major*, Benth. Small and slender, the leaves mostly entire, the involucres 7mm. long, of 12-13 bracts; ligules 10-11; disk-flowers 20-26.—Renmark.—Victoria; West Australia.

*4. **S. elegans,** L. *Purple Ragwort.* Stout erect pubescent annual; leaves pinnatipartite, stem-clasping; heads in loose corymbs; involucral bracts 12-15, with many small black-tipped ones at base; rays purple, conspicuous; disk-flowers very numerous.

An escape from gardens in sandy soil near Robe. Summer.—South Africa.

5. **S. megaglossus,** F. v. M. Stout erect glabrous and glaucous perennial or undershrub; leaves obovate-oblong, 3-8 cm. long, entire or with minute distant glandular teeth, half-clasping at base; heads few, corymbose, on stout peduncles; involucre campanulate, 15-20 mm. long, the bracts 14-18, 4-5 mm. broad, usually without any small basal ones; ligules 8-15, 18-25 mm. long; disk-flowers numerous; achenes glabrous or minutely pubescent.

Southern part of Flinders Range; hilly country from near Hallett to the Hundred of Bright; apparently rare now. Sept.-Dec.

6. **S. magnificus,** F. v. M. Stout erect glabrous and glaucous perennial or undershrub, 30 cm. to about 1 m. high, very near the preceding and differing chiefly in the smaller and more numerous flowerheads and the leaves more lanceolate or oblanceolate, flaccid or fleshy, the radical leaves always toothed, the stem-leaves toothed or entire and sometimes with 2 clasping auricles at base; involucre 10-12 mm. long, of 12-16 bracts, about 3 mm. broad; ligules about 8, 12-18 mm. long; achenes pubescent.

From Flinders Range about Quorn to the Far North and westward to the Birksgate Range; Kangaroo Island; Murray lands and north thereof. Most of the year. Sometimes almost runs into the preceding.—Western Victoria and New South Wales; Central Australia.

FIG. 270.—**Senecio lautus.**

7. **S. lautus,** Sol. (1786). Erect glabrous perennial, 10-70 cm. high; leaves fleshy, very variable, 1-6 cm. long, linear or narrow-lanceolate, entire, toothed, pinnatifid or pinnatipartite, the lobes long or short, the broader leaves usually stem-clasping; heads loosely corymbose; involucre campanulate; mostly 5-6 mm. long, rarely 7-8 mm., the bracts 12-20, usually brown-tipped and 2-ribbed when dry, with several small ones at base; ligules 8-14, 5-10 mm. long; disk-flowers numerous; achenes pubescent.—*S. australis,* Willd. (1803).

All over the State, the coastal specimens more succulent. Some small Kangaroo Island specimens have all the leaves oblanceolate or oblong-cuneate and entire. Most of the year.—Temperate Australia.

Var. *pilosus*, J. M. Black. Small plant with simple stem only 12 cm. high in our specimen: leaves pinnatipartite, beset with short septate curly hairs.—Franklin Island (Great Bight). Glabrous forms also occur on the island.

8. **S. orarius,** J. M. Black. Glabrous shrubby perennial about 1½ m. high; leaves 2-6 cm. long, lanceolate or oblong, all stem-clasping with toothed auricles, the lower ones pinnatifid with broad lobes, the upper ones toothed; heads numerous in a loose corymbose panicle; involucre cylindrical, 6-7 mm. long, of about 12 bracts, with a few small ones at base; ligules 4-8, about 4 mm. long; disk-flowers about 25; achenes pubescent.—*S. lautus,* Sol. var *lanceolatus,* Benth.

Beachport, S.E. Resembles *Erechthites prenanthoides.*—Southern Victoria.

9. **S Behrianus,** Sond. et F. v. M. Woolly-tomentose erect perennial 15-25 cm. high; leaves linear, with revolute margins, entire or remotely toothed, about 25 mm. long, the upper ones smaller; heads in a loose corymb; involucre cylindrical, 4-5 mm. long, of about 10 2-ribbed bracts and very few small outer ones; ligules 6-8, about 4 mm. long; disk-flowers 10-15; achenes pubescent.

Only known for South Australia by Mueller's record :—" Murray River near Moorundie and Wood's Station."—Western New South Wales.

S. dryadeus, Sieb. (1826) has been recorded for our South-East, but no specimens have been collected, and it does not probably extend into our territory. It is a rather tall usually glabrous perennial, with linear-lanceolate entire leaves, sometimes auriculate at base and numerous small heads, the involucre 3½ mm. long, of 10-12 bracts, the ligules 4-6, small but conspicuous, 4-5 mm. long.—*S. australis,* A. Rich. (1832) non Willd.—Victoria; New South Wales; Tasmania.

10. **S. Georgianus,** DC. Erect rigid perennial 30-60 cm. high; leaves linear or lanceolate, entire or scarcely toothed, rarely almost pinnatifid, 2-8 cm. long, cottony on the under surface, narrowed into a petiole which is not auriculate; heads in a corymbose panicle; involucre cylindrical, 5-7 mm. long, of about 12 bracts with spreading tips and a few small basal ones; flowers 35-40, all tubular and exceeding the involucre; achenes pubescent.

Only known for South Australia by Bentham's entry: "Salt Gully, *Behr;* hills about Wheal Barton mines, *F. Mueller,*"—Temperate Australia. Resembles *Erechthites quadridentata.*

Var. *latifolius,* J. M. Black. Leaves ovate-lanceolate, 1½-3½ cm. broad, pinnatifid, with about 4-5 lanceolate lobes on each side, the uppermost narrower and sometimes entire; involucral bracts 12-16; flowers 18-25.—Caroona and Yardea Stations, Gawler Ranges, E.P.

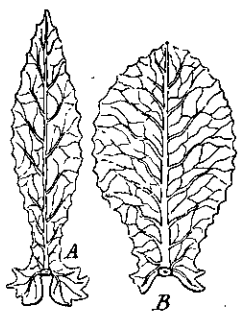

FIG. 271.—**Senecio odoratus.**

11. **S. odoratus,** Hornem. Stout erect perennial about 1 m. high, glabrous or with a white cottony tomentum on the under-surface of the leaves, which are sessile, broadly lanceolate, 3-12 cm. long, 1-3 cm. broad, more or less toothed, broadly auricled at base; heads in dense paniculate corymbs; involucre cylindrical, 5 mm. long, of 8 bracts and 2 or 3 small ones at base; flowers 10-12, exceeding the involucre, all tubular; achenes pubescent. (Fig. 271, A).

Southern districts to Flinders Range and Far North; Kangaroo Island; Eyre Peninsula; west of Lake Eyre; South-East. Most of the year.—Victoria; western New South Wales; Tasmania. In spite of its specific name this plant is rarely, if ever, fragrant.

Var. *obtusifolius,* J. M. Black. Leaves obovate, obtuse, crowded; rather thick, the lower ones 3-5 cm. broad.—A maritime form growing at Victor Harbor, Port Elliot, Robe. (Fig. 271, B).

FIG. 272.—**Senecio Cunninghamii.**

12. **S. Cunninghamii,** DC. Only differs from *S. odoratus* in the narrower leaves without any auricles at base or with very short ones. The leaves may be linear and entire, or narrow- lanceolate or oblong and then usually more or less toothed, sometimes cottony below or in some Far-Northern specimens cottony on both faces; the number of involucral bracts varies from 8 to 10; flowers 10 to 15.

Localities as for *S. odoratus.*—Temperate Australia.

13. **S. hypoleucus,** F. v. M. Distinguished from *S. odoratus* by the petioles 1-3 cm. long which support its handsome broad-lanceolate or ovate-lanceolate entire or regularly toothed leaves, 4-14 cm. long, 1-4 cm. broad, green above, densely white-tomentose below; no auricles; heads and flowers the same.—*S. odoratus,* Hornem. var. *petiolatus,* Sond.

Mount Lofty Range near Adelaide. Oct.-Jan.

14. **S. anethifolius,** A. Cunn. Glabrous aromatic shrubby perennial, usually over 1 m. high; leaves pinnatisect into 7-11 distant narrow-linear segments 2-4 cm. long; heads numerous in a compact corymb; involucre cylindrical, 7-8 mm. long, of about 8 bracts, with 2 or 3 small ones at base; flowers about 10, all tubular, longer than the involucre.

Flinders Range and towards Lake Frome; usually near creeks. Aug.-Nov.—Western New South Wales.

*15. **S. vulgaris,** L. *Common Groundsel.* Glabrous or somewhat cottony annual, 15-30 cm. high; leaves pinnatifid, with sinuate-toothed lobes, those of the stem auricled and clasping; heads in small corymbs; involucre cylindrical, about 8 mm. long, of 15-21 black-tipped bracts, with short outer ones in 2-3 rows; flowers all tubular; achenes pubescent.

A weed in settled districts. July- Nov.—Europe; introduced in almost all temperate countries.

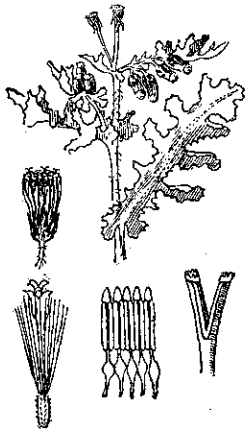
FIG. 273.—**Senecio vulgaris.**

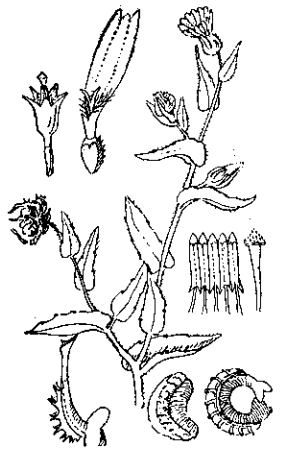

FIG. 274.—**Calendula arvensis.**

30. CALENDULA, L.

(Modern Latin for the marigold, a diminutive of *calendae*, the calends of each month: perhaps because it flowers nearly all the year.)

*1. **C. arvensis,** L. *Field Marigold.* Pubescent rather sticky annual; stem-leaves oblong-lanceolate, entire or denticulated, half-clasping; involucre campanulate, the bracts equal, in 2 rows, 7 mm. long; flowers yellow; ligules in 2-3 rows; disk-flowers tubular, bisexual but sterile; achenes incurved, the outer ones beaked and spiny on the back.

Adelaide plains and park lands. Most of the year.—Central Europe and Mediterranean region. Near the *Garden Marigold* (*C. officinalis*, L.), but smaller in all its parts.

31. DIMORPHOTHECA, Moench.

(From Greek *dis*, double; *morphê*, form; *thêkê*, case, achene: the outer and inner fruits are of different shape).

*1. **D. pluvialis** (L.) Moench. *Cape Marigold.* Stout glandular-hairy annual; leaves oblong-cuneate, more or less toothed; involucre campanulate, the bracts in 1 row; ligules white above, purple below; disk-flowers tubular, bisexual, the innermost barren; ray-achenes triquetrous, tuberculate; disk achenes flat, broadly 2-winged.

Kuitpo; Robe; a garden escape.—South Africa.

32. TRIPTERIS, Less.

(From Greek prefix *tri*, three; *pteron*, a wing: alluding to the achene.)

*1. **T. clandestina,** Less. Erect glandular-hairy annual; leaves oblong, sinuate-toothed, the upper ones stem-clasping; heads solitary on long terminal peduncles; involucral bracts 8, ovate-oblong, with broad scarious margins; ligules 8, yellow; disk-flowers about 10; tubular, greenish, bisexual but sterile; fertile ray-achenes about 10 mm. long, with 3 broad scarious vertical wings.

Fields near Brighton and Marino. Aug.-Oct.—South Africa.

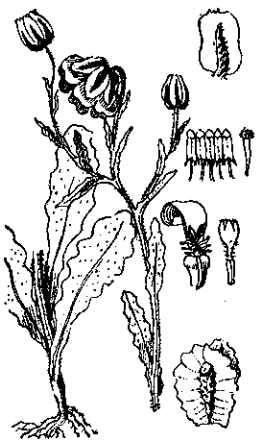

FIG. 275.—**Tripteris clandestina.**

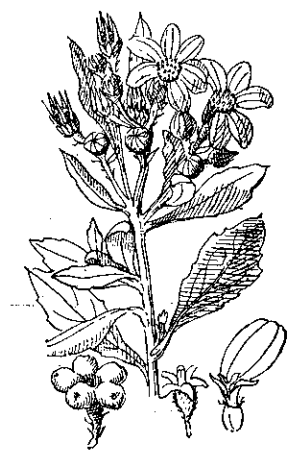

FIG. 276.—**Osteospermum moniliferum.**

33. OSTEOSPERMUM, L.

(From Greek *osteon*, bone; *sperma*, seed: alluding to the hard fruit.)

*1. **O. moniliferum,** L. Shrub about 1 m. high; leaves ovate-lanceolate, 3-6 cm. long, coarsely toothed, shortly petiolate; heads in a terminal corymb; involucral bracts in 2-3 rows; ligules 5-6, bright yellow, in 1 row; disk-flowers tubular, bisexual but sterile; achenes of ray-flowers globular or ovoid, drupaceous, finally hard and bony.

Gullies of the Mount Lofty Range. July to Oct.—South Africa.

34. ARCTOTIS, L.

(From Greek *arktos*, a bear; *ous*, *ôtos*, ear: alluding to the shaggy winged achene.)

*1. **A. stoechadifolia,** Berg. Perennial, softly white-tomentose all over; stems prostrate or ascending; leaves obovate-cuneate to lanceolate, the lower ones lyrate, the upper ones sessile and toothed; heads large, showy, solitary, terminal; involucral bracts in several rows, the outer ones with long linear points, the inner ones broad and scarious; ray-flowers female and fertile, the ligules white, with yellow base; disk-flowers dark, tubular, bisexual; achenes silky, 5-ribbed, 2 lateral ribs winged and incurved towards the middle one, giving the appearance of a 3-celled fruit; pappus of 7-8 pink oblong scales.

Sandhills from Semaphore to Brighton; a garden escape. Sept.-Jan.—South Africa.

FIG. 277.—**Arctotis stoechadifolia.**

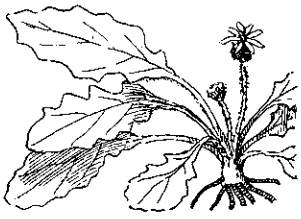

FIG. 278.—**Cymbonotus Lawsonianus.**

35. CYMBONOTUS, Cass.

(From Greek *kymbê*, a boat; *nôtos*, back: alluding to the convex back of the achenes.)

1. **C. Lawsonianus,** Gaudich. Perennial, stemless or almost so; leaves radical, ovate or lanceolate, 4-10 cm. long, sinuate-toothed or sometimes lyrate, green above, white-tomentose beneath, on long petioles; heads solitary on tomentose scapes or peduncles shorter than the leaves; involucre campanulate, 7-10 mm. long, tomentose, the bracts in about 3 rows, obtuse, the outer ones with spreading tips; ray-flowers 8-15, female, fertile, the ligules yellow, 6-10 mm. long; disk-flowers bisexual, tubular, 6-17; achenes oblong, 3½ mm. long, glabrous, with 4 vertical ribs and rugulose between them; pappus none. (Fig. 244, V-W, page 571).—*Arctotis Lawsoniana* (Gaudich.) Beauverd (1915).

Southern districts; Yorke Peninsula; Kangaroo Island; South-East. Sept.-Nov.—Temperate Australia. The only species.

36. CRYPTOSTEMMA, R. Br.

(From Greek *kryptos*, hidden; *stemma*, a crown: the scaly pappus is hidden among the wool of the achenes.)

*1. **C. calendulaceum** (L.) R. Br. *Cape Dandelion.* Prostrate stemless or short-stemmed succulent annual; leaves lyrate, 5-25 cm. long, petiolate, green above, white-tomentose below; heads solitary on glandular-hairy peduncles or scapes; involucre almost hemispherical, the bracts in 4 or 5 unequal rows, green, broad, the outer ones with short spreading tips; ray-flowers 15-20, neuter and sterile, the ligules yellow, 12-25 mm. long, often with a brown blotch at base; disk-flowers numerous, tubular, bisexual, almost black; disk-achenes oblong, enveloped in brown wool, which also conceals the pappus of 6-8 lanceolate scales.—*Arctotis calendulacea*, L.

Roadsides, pasture and cultivation in settled districts. Aug.-Oct.—South Africa. First collected in Australia at King George's Sound in 1833.

FIG. 279.—**Cryptostemma calendulaceum.**

37. PLUCHEA, Less.

(After the Abbé Noël-Antoine Pluche, 1688-1761, a French teacher and author.)

1. **P. rubelliflora** (F. v. M.) J. M. Black (1924). Erect glabrous or glandular-hairy perennial or undershrub 15-40 cm. high; leaves narrow lanceolate 1 3 cm. long, with a few small distant teeth, more or less decurrent by 2 narrow wings; heads small, subcorymbose; involucre almost hemispherical 3-4 mm. long and broad, the bracts linear-lanceolate, rigid, acute, in several rows; flowers pink or reddish, all tubular, the outer rows consisting of female, filiform, 2-3-toothed flowers, over 100 in number; disk-flowers broader, 5-toothed, bisexual but sterile, 8-12; the style shortly bifid at summit; anthers tailed; fertile achenes brown, striate, almost glabrous, terete, under 1 mm. long; female pappus of 7-15 bristles; disk-pappus of fewer caducous bristles.—*Eyrea rubelliflora*, F. v. M. (1852); *Pluchea Eyrea*, F. v. M. (1859).

Far North and eastward to Cordillo Downs. Resembles *Minuria denticulata*.—Central and Northern Australia; West Australia.

Var. *major*, Benth. Rather taller and more woody towards base; leaves less decurrent, with spreading narrow distant teeth; involucre 5-7 mm. long and broad; disk-flowers 20-25.—Flinders Range to Far North, westward to Birksgate Range and eastward to Strzelecki Creek.—Western New South Wales; Central Australia.

38. PTERIGERON, DC.

(From Greek *pteron*, a feather or wing, and *Erigeron*, of which genus these plants originally formed a section: the allusion is to the almost feathery or plumose pappus.)

Involucral bracts linear-lanceolate, in several unequal rows, the outer ones broader and rigid, the inner ones with scarious purplish points; receptacle naked; outer flowers female, in 1 or more rows, filiform, with short narrow ligules or tubular and 2-3-toothed; disk flowers broader, fewer, usually 5-toothed, bisexual and fertile; anthers tailed; style bifid at summit; achenes terete (except in *P. dentatifolius*), silky-pubescent; pappus of barbellate or almost plumose bristles. Rigid herbs more or less beset with short septate curly hairs and sometimes also with minute glandular ones; leaves alternate; flower-heads often somewhat corymbose. The ligule is very rarely 4-toothed. A purely Australian genus.

A. Female flowers exceeding the involucre; involucre large and broad ..... *P. liatroides* 1.

A. Female flowers not or scarcely exceeding the involucre.

B. Involucre campanulate or ovoid, 7-10 mm. long; leaves oblanceolate.

Involucres on short leafy peduncles and surrounded by floral leaves ..... *P. adscendens* 2.

Involucres on long naked peduncles and with very short or no floral leaves at base ..... *P. dentatifolius* 3.

B. Involucre cylindrical, 18 mm. long; leaves obovate-cuneate ..... *P. cylindriceps* 4.

1. **P. liatroides** (Turcz.) Benth. Erect rigid perennial, 15-40 cm. high, beset with short septate curly hairs; leaves oblanceolate or oblong-cuneate, 1-4 cm. long including the petiole into which they taper, entire or with a few teeth; involucre campanulate, 14-16 cm. long and often becoming broader, the bracts acuminate, the inner ones with ciliate or plumose points or awns; flowers pink or purple, those of the ray 35-80, with narrow 2-3-toothed ligules 4-6 mm. long and surpassing the involucre; disk-flowers 20-50; pappus-bristles 20-35, distinctly barbellate in upper part.

Near Lakes Torrens and Frome to Far North. July-Nov.—Central and West Australia; western New South Wales.

2. **P. adscendens,** Benth. Hairy perennial, woody towards base, with prostrate or ascending stems, 5-25 cm. long; leaves oblanceolate or oblong-cuneate, shortly petiolate, entire or toothed; heads numerous; involucre campanulate, 7-9 mm. long, surrounded by a few narrow floral leaves which are sometimes as long as it, the bracts acuminate; flowers purple, not or scarcely exceeding the involucre, the females 10-40, 2-3-toothed, more frequently with a very short 2-3-toothed ligule; disk-flowers 3-10, pappus-bristles about 18-25.

Northern part of Flinders Range to Far North.—Central Australia; Queensland.

3. **P. dentatifolius,** F. v. M. Hairy, apparently annual, 8-20 cm. high, with erect or ascending stiff stems; leaves oblanceolate or oblong-cuneate, 1-3 cm. long, including the petiole, with a few blunt teeth near the summit; peduncles mostly long, almost naked, glandular-hairy; involucre ovoid, about 10 mm. long, the bracts acute; flowers

40-50, of which a few in the centre are bisexual, the rest female, with very short ligules not exceeding the involucre; achenes compressed, minutely pubescent; pappus-bristles about 40, very unequal.

Northern part of Flinders Range to Far North and Musgrave Ranges.—Central Australia.

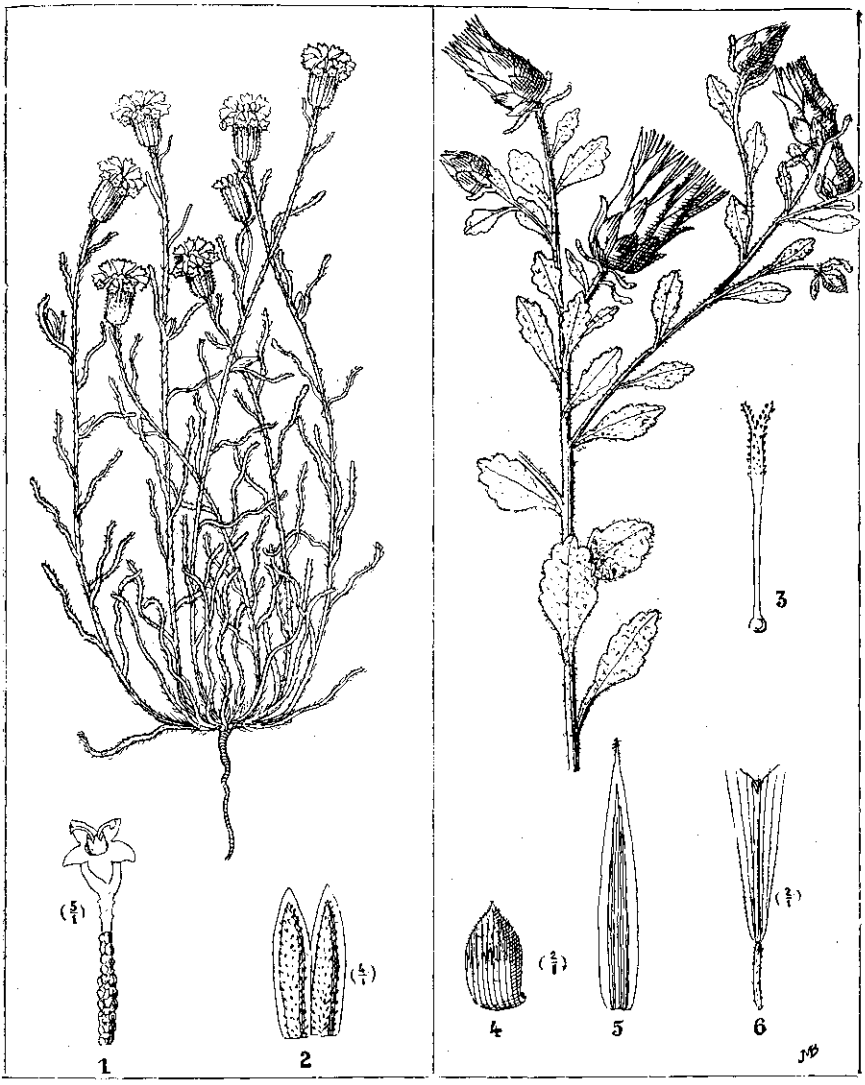

PLATE 51.—1-2, **Millotia Kempei**; 3-6, **Pterigeron cylindriceps.**

4. **P. cylindriceps**, J. M. Black. Probably annual, beset with septate and glandular hairs, with erect or ascending stems 15-20 cm. high; leaves obovate-cuneate, mostly 1-2 cm. long, including the short petiole, crenate-toothed; peduncles mostly short, leafy; involucre cylindrical, about 18 mm. long by 8 mm. thick, the outer bracts broad, almost glabrous and usually dark-purple; female flowers 30-40, 2-3-toothed or with a minute ligule, the style well exserted; disk-flowers 10-15; achenes slender, 4 mm. long; pappus-bristles 12-14.

PLATE 51 (3-6).—3, style; 4 and 5, outermost and innermost involucral bracts; 6, female flower.

North of Oodnadatta and westward to Musgrave Ranges.

P. odorus (F. v. M.) Benth., which is distinguished from the other species by its sessile oblong toothed leaves decurrent in 2 broad wings, grows in the MacDonnell Range, but has not yet been found within our border. It has a campanulate involucre about 10 mm. long, and as long as the minute ligules of the ray-flowers; disk-flowers about 7; pappus-bristles 30-40.

39. CRATYSTYLIS, S. Moore (1905).

(From Greek *kratys*, strong; *stylos*, style: alluding to the rather thick and rigid style.)

1. C. conocephala (F. v. M.) S. Moore. *Bluebush.* Compact shrub about 1 m. high, beset with a soft close greyish tomentum on leaves and branches; leaves flat, obovate-cuneate, spreading, rather thick, mostly 5-8 mm. long; heads discoid, semi-dioecious, sessile, solitary at the ends of the short branchlets; involucre cylindrical, 14 mm. long, of oblong, obtuse scarious bracts, tomentose and ciliate in the upper part, arranged in 4-5 unequal rows; flowers 4-6, all tubular, those in the female heads filiform, with 5 linear lobes and 4-5 small barren free anthers, those in the bisexual (or male ?) heads with the corolla swollen above the middle, 5 lanceolate lobes and 5 connate anthers acute at the base; style rather thick, with 2-3 branches, the stigmatic lines ascending to their summit and the minute collecting hairs descending below their junction; achenes glabrous, striate, 6-7 mm. long; pappus-bristles about 60-100, conspicuously barbellate. *Olearia conocephala*, F. v. M. (1886); *Pluchea conocephala*, F. v. M. (1887).

PLATE 23 (2), page 260.—1, female flower; 2, bisexual (or male ?) flower; 3, free stamen of female flower; 4, summit of style.

Tickera scrub north of Wallaroo; north of River Murray; Gawler Ranges westward along the Great Bight to Ooldea and Nullarbor Plain.—Western Victoria and New South Wales; West Australia. The involucral bracts separate and fall off early. This plant resembles closely the other Bluebush (*Kochia sedifolia*) in its general appearance.

40. EPALTES, Cass.

(Probably from Greek *epalthês*, healing; the root of *E. divaricata* (L.) Cass., an Indian species, is used as a tonic.)

Involucre short and broad, the bracts in 3 or 4 unequal rows, ovate or orbicular, very obtuse, rigid; receptacle naked; flowers all tubular, not exceeding the involucre, the outer ones female, filiform, numerous in several rows, minutely 2-3-toothed; disk-flowers fewer, broader, bisexual, sometimes sterile, 4-5-toothed; anthers minutely tailed; achenes minute, subterete, usually without pappus, almost glabrous or sometimes papillose. Herbs with small flowerheads.

A. Heads very small, globular; stems branching dichotomously; leaves narrow.	
Rather tall, glabrous; bisexual flowers with a few pappus-bristles	*E. Cunninghamii* 1.
Dwarf, pubescent; pappus none	*E. Tatei* 2.
A. Heads broad, hemispherical; leaves obovate	*E. australis* 3.

1. E. Cunninghamii (Hook.) Benth. Erect, glabrous, 15-40 cm. high; leaves sessile, alternate, oblong-lanceolate or broad-linear, mostly toothed; heads subsessile or shortly pedunculate, in small terminal clusters forming a loose almost leafless panicle, and more or less dioecious; involucre globular or ovoid, about 3 mm. diam.; female flowers numerous, sometimes with a few males in the head; male heads with fewer flowers, usually all bisexual but sterile, with an undivided style and a pappus of 2-5 barbellate bristles; fertile (female) achenes without pappus, under 1 mm. long, multistriate.

Lake Torrens to Far North-East; probably Murray lands.—North-western Victoria; New South Wales; Queensland.

FIG. 280.—**Epaltes australis**.

2. E. Tatei, F. v. M. Dwarf pubescent annual, much-branched dichotomously, 3-4 cm. high; leaves linear or oblanceolate, mostly opposite; involucres globular, sessile, axillary and terminal, 2½ mm. diam., the bracts ciliate; female flowers about 20; disk-flowers about 7, with a bifid style; achenes ½ mm. long; no pappus.

Murray lands east of Lake Alexandrina; Fowler's Bay. Apparently rare or localised.—North-western Victoria.

3. E. australis, Less. Almost glabrous or pubescent, usually with several ascending stems, 5-30 cm. long; leaves alternate, obovate-cuneate, 1-4 cm. long, including the petiole, 4-15 mm. broad, irregularly toothed; heads subsessile or shortly pedunculate, axillary or lateral; involucre hemispherical, 4-7 mm. across; female flowers

very numerous ; disk-flowers 8-20, usually 4-toothed, the style minutely bifid ; achenes 1-1½ mm. long, 8-14-ribbed ; pappus a minute crown or border.

Usually on flooded ground : Murray lands to Far North. Most of the year.—Northern Territory and all the States except West Australia ; Formosa. May easily be mistaken for *Centipeda Cunninghamii*.

41. PTEROCAULON, Elliot (1824).

(From Greek *pteron*, wing ; *kaulos*, stem : alluding to the decurrent wings at the base of the leaves.—*Monenteles*, Labill. (1824-25).

1. **P. sphacelatum** (Labill.) Benth. et Hook. Stiff erect undershrub, 20-60 cm. high, covered with a brownish tomentum of septate hairs, with minute almost sessile glands, especially on the lower face of the leaves, which are oblong or oblanceolate, entire or crenate, soft and wrinkled, sometimes almost glabrous above, decurrent along the stem in narrow entire wings ; flowerheads small, clustered in dense ovoid or globular compound heads, 8-20 mm. long, without any general involucre except 2 or 3 small floral leaves at base, and usually terminal ; involucre ovoid, the outer bracts spathulate, woolly, dark towards summit, 2½ mm. long, the inner ones linear-lanceolate, 3-4 mm. long, glabrous or ciliolate ; flowers all tubular, the females about 20, filiform ; only 1 bisexual flower in each head, the style bifid ; anthers tailed ; achenes sparsely pubescent ; pappus of 15 or more simple bristles.

Northern part of Flinders Range to Far North ; west of Lake Torrens.—Western New South Wales ; Queensland and tropical Australia ; New Guinea ; New Caledonia.

P. glandulosum (F. v. M.) Benth. et Hook. and its villous or woolly var. *velutinum*, Ewart et Davies have been collected in the MacDonnell Ranges, C.A., and in the Cavenagh Range, W.A., and may therefore be found in our Far North-West. It differs from the preceding in its lanceolate or ovate sharply-toothed leaves decurrent in sharply-toothed wings, and its larger ovoid-oblong compound heads, 2-3½ cm. long. This plant appears to have been erroneously recorded as *P. Billardieri*, F. v. M. (*Monenteles spicatus*, Labill.), the correct name of which is *P. redolens* (Forst. f.) F. Vill., a Queensland and East Asiatic species.

42. SPHAERANTHUS, L.

(From Greek *sphaira*, sphere ; *anthos*, flower : alluding to the globular heads.)

1. **S. indicus,** L. Stiff erect pubescent herb ; leaves obovate-oblong or lanceolate, irregularly and sharply toothed or lobed, decurrent in narrow toothed almost spiny wings ; flowerheads very small, in dense globular compound terminal heads, 10-14 mm. diam. ; involucres of partial heads ovoid, the bracts in several rows, linear-lanceolate, ciliate, about 4 mm. long ; flowers all tubular, the 6-9 female 3-toothed flowers filiform, the disk-flowers 2-3, bisexual but usually sterile, the corolla 5-toothed, much swollen in the lower half, the style shortly bifid or entire ; anthers not tailed ; fertile achenes pubescent ; pappus none.—*S. hirtus*, Willd.

North of Cooper's Creek.—Queensland and tropical Australia ; tropical Asia and Africa.

43. STUARTINA, Sond.

(After Charles Stuart, 1802-77, a diligent botanical collector in Tasmania and New South Wales.)

1. **S. Muelleri,** Sond. Small softly grey-tomentose annual, with 1 or several stems 2-12 cm. long ; leaves suborbicular, 4-18 mm., rarely to 15 mm. diam., sometimes becoming green and glabrous above, on long petioles dilated at base ; flowerheads small, conical, crowded in small clusters surrounded by radical or stem-leaves ; involucre 3-4 mm. long, the outer bracts almost ovate, hyaline, woolly, or woolly at base, the 2 or 3 inner ones longer, convex, rigid, with recurved tips ; flowers all tubular and swollen towards base, the 2-3 outer ones female and filiform, the 2-3 disk-flowers broader, bisexual, fertile, 5-toothed ; anthers tailed ; achenes obconical, usually papillose.

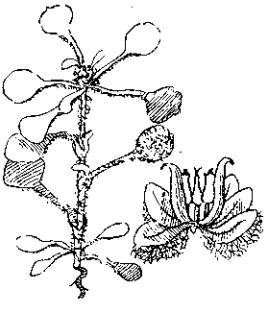

FIG. 281.—**Stuartina Muelleri.**

Southern districts to Flinders Range ; Kangaroo Island ; Murray lands ; Eyre Peninsula ; South-East. Sept.-Dec.—Victoria ; western New South Wales. If *Gnephosis rotundifolia*, Diels (1904) is synonymous, as appears from the description and figures, then West Australia must be added.

44. GNAPHALIUM, L.

(Greco-Latin *gnaphalion*, name of some woolly plant used for stuffing cushions.)

Involucre ovoid, the bracts in several rows and scarious in their upper half; receptacle naked; flowers all tubular, not exceeding the involucre, the outer ones female, filiform, numerous; disk-flowers broader, few, bisexual, fertile, 5-toothed; anthers tailed; achenes minute (about ½ mm. long), oblong, papillose or rarely glabrous; pappus of very fine simple bristles in a single row, usually about 8-12, free and falling off separately (in all our species). Tomentose or woolly herbs, with alternate leaves; flowerheads small, usually clustered.

A. Flowerheads in dense leafless clusters, usually terminal; pappus-bristles with spreading cilia near base ..... *G. luteo-album* 1.
A. Flowerheads more or less leafy; pappus-bristles without spreading cilia near base.
B. Leaves stiff, green above; heads in dense clusters surrounded by usually conspicuous floral leaves.... *G. japonicum* 2.
B. Leaves flaccid, woolly; small plants.
Heads in terminal corymbs ..... *G. indutum* 3.
Heads more or less spicate ..... *G. indicum* 4.

FIG. 282.—**Gnaphalium luteo-album.**

1. **G. luteo-album,** L. White-tomentose erect annual, 10-40 cm. high; leaves oblong, oblanceolate or linear, woolly, sessile, the lower ones obtuse; heads in dense terminal leafless clusters or corymbs, sometimes with a few interrupted clusters lower down on the stem; involucre about 3 mm. long, the bracts pale yellow or whitish, shining, all obtuse; female flowers about 100; bisexual 5-10; pappus-bristles 8-12, ciliolate near the base with a few minute spreading barbs.

All over the State. Most of the year.—Throughout Australia and most parts of the globe.

2. **G. japonicum,** Thunb. Erect annual, 3-40 cm. high, white-tomentose on the stems and lower face of the leaves; leaves rather stiff, obovate to narrow lanceolate, petiolate or sessile, green and glabrous above, 1-15 cm. long; heads in dense terminal or axillary clusters sessile among floral leaves; involucre 3-4 mm. long, the bracts green in lower half, shining, at least the outer ones obtuse; disk-flowers usually only 1-3.

All over the State. Most of the year.—Throughout Australia; New Zealand; eastern Asia.

3. **G. indutum,** Hook. f. Small weak white-woolly branching annual, 2-6 cm. high; leaves linear or oblanceolate, acute, 5-10 mm. long; heads in loose terminal corymbose clusters among floral leaves; involucre 2-2½ mm. long, the bracts pale, obtuse, shining; bisexual flowers 1-4; females usually about 30.

Flinders Range to Far North; Kangaroo Island; Murray lands; Yorke and Eyre Peninsulas; South-East.—Temperate Australia.

4. **G. indicum,** L. Ascending white-woolly annual, 3-15 cm. high; leaves spathulate or oblanceolate, 10-15 mm. long including the petiole into which they taper; heads small, in dense clusters or almost in compound heads, axillary or forming terminal leafy spikes; involucre ovoid, 2½ mm. long, the outer bracts woolly, the inner ones narrow and acute; bisexual flowers 2-7. *G. multicaule,* Willd.

Murray lands and northward to beyond Cooper's Creek and Oodnadatta.—Western Victoria and New South Wales; Queensland; southern Asia. The pappus-bristles are erroneously described in the Fl. Aust. as cohering in a ring at the base; they are quite free.

45. CASSINIA, R.Br. (1817).

(After Alexandre-Henri-Gabriel Cassini, 1784-1832, a French botanist who specialised in *Compositae.*)

Involucral bracts in several unequal rows, oblong, obtuse, appressed, scarious in the upper half, golden or greenish in the lower concealed half; receptacle with chaffy scales similar to but narrower than the involucral bracts and enclosing the flowers, which are few, all bisexual, tubular, 5-toothed and scarcely exceeding the involucre; anthers tailed; achenes terete, scarcely 1 mm. long, pubescent with minute transparent hairs or glabrous; pappus of capillary bristles in a single row, barbellate in the lower part, very shortly united in a ring at base. Mostly slender shrubs, with alternate leaves; flowerheads small, paniculate.

A. Leaves narrow-linear, about 1 mm. broad, stiff, 1-furrowed below by the revolute margins and more or less 1-furrowed above; shrubs.
  B. Panicle broader than long, usually corymbose; leaves 1-3 cm. long.
    C. Achenes pubescent; panicle dense or rather loose, convex at summit.
      Leaves scabrous-pubescent or scabrous-tuberculate above ..... *C. aculeata* 1.
      Leaves glabrous above ..... *C. laevis* 2.
    C. Achenes glabrous; panicle very dense, almost flat at summit ..... *C. complanata* 3.
  B. Panicle pyramidal, longer than broad; leaves scarcely exceeding 1 cm. ..... *C. arcuata* 4.
A. Leaves ovate-oblong, flaccid, 1-4 cm. broad; panicle very large, golden; stout herb ..... *C. spectabilis* 5.

1. **C. aculeata,** R.Br. Shrub with pubescent branches; leaves narrow-linear, 1-3 cm. long, with a small slightly recurved mucro, scabrous above with short hairs, the revolute margins usually concealing the tomentose lower face; heads numerous, in broad dense corymbose panicles; involucre ovoid-oblong, 3-4 mm. long, white or straw-colored, the bracts obtuse; flowers 4-7; pappus-bristles 20-25; achenes pubescent.

Murray lands. Apparently rare; the only specimen I have seen is from west of Bordertown. Summer.—Victoria; New South Wales; Tasmania. Resembles *Helichrysum retusum*, which is distinguished by the very obtuse strongly decurrent leaves and the more numerous flowers.

2. **C. laevis,** R.Br. Near the preceding, but the leaves glabrous, more or less sticky, smooth or slightly wrinkled above, mucronate, sometimes showing a narrow line of the white tomentum below; branches white-tomentose; panicle usually but not always looser than in the preceding, and sometimes much reduced in size; heads oblong, 3-4 mm. long, the bracts obtuse, snow-white; flowers 4-6, rarely to 10; achenes pubescent; shrub often viscid.—*C. aculeata,* R.Br. var. *laevis,* J. M. Black (1918).

Encounter Bay; Flinders Range from Telowie Gorge to north end of Lake Torrens; Murray lands and north thereof; Gawler Ranges, E.P.; west of Lakes Torrens and Eyre. Summer.—Western New South Wales; Queensland.

The characters distinguishing these 2 species are not very satisfactory. They vary so much in the size and density of the panicle that there is little left to distinguish them except the hairy or glabrous character of the upper face of the leaves.

3. **C. complanata,** J. M. Black. Very sticky shrub; branches brown, usually beset with minute spreading hairs; leaves narrow-linear, glabrous above, the lower face concealed; corymbose panicle dense, much broader than long, sometimes almost flat-topped; involucre terete, 3-4½ mm. long, the bracts dull-white, obtuse, sometimes in 5 rows; flowers 4-8; achenes glabrous.

Encounter Bay; Kangaroo Island; Yorke Peninsula to Flinders Range; Murray lands; 90-Mile Desert. Summer.—Victoria (near Bendigo).

4. **C. arcuata,** R. Br. Shrub 1-2 m. high, with white tomentose branches; leaves narrow-linear, obtuse, 4-10 mm. long, the revolute margins sometimes showing the tomentose lower face; heads in pyramidal panicles 3-6 cm. long; involucre terete, straw colored, 4 mm. long, the bracts membranous, shining; flowers 2-3; pappus-bristles abou 25; achenes pubescent.

Southern districts; Yorke Peninsula; Murray lands. Summer.—Western Victoria and New South Wales.

5. **C. spectabilis** (Labill.) R. Br. Stout erect viscid scented white-woolly herb; leaves oblong or ovate-lanceolate, acuminate, flaccid, green and pubescent above, white-tomentose below, stem-clasping, 3-14 cm. long; heads in a large loose panicle, leafy at base, 20-30 cm. long; involucre ovoid, about 4 mm. long, golden-brown, shining; flowers mostly 8-10; achenes glabrous, striate.

Encounter Bay; Kangaroo Island; Yorke Peninsula; North Pearson Island (off west coast of Eyre Peninsula). Jan.-Apl.—Victoria; Tasmania.

46. HELIPTERUM, DC.

(Separated by De Candolle from *Helichrysum* and named to indicate that it differs from that genus in its feathery or plumose pappus, from Greek *pteron*, a feather.)

Involucral bracts numerous in several rows, the outer ones scarious, the inner ones with a green midrib and broad scarious margins, or with a narrow or broad claw, often ending in a ray of white or colored spreading laminae; receptacle naked; flowers all tubular, shorter than or scarcely longer than the involucre, bisexual and 5-toothed, or a

few of the outer ones female, slender, 2-4-toothed, some of the inner ones often sterile; anthers tailed; achenes usually subterete; pappus-bristles in 1 row, plumose from the base and usually up to the summit. Herbs with entire leaves, alternate or the lower ones rarely opposite (all opposite in *H. oppositifolium*); flowers yellow. The measurements here given of the involucre include the ray.

An Australian and South African genus. *H. Manglesii* (Lindl.) F. v. M. (*Rhodanthe Manglesii*, Lindl.) and *H. roseum* (Hook.) Benth. (*Acroclinium roseum*, Hook.), both of West Australia, are favorite everlastings and often cultivated.

A. Inner involucral bracts with radiating laminae; annuals.
  B. Involucres hemispherical, solitary and terminal; flowers usually numerous in head.
    C. Achenes silky-villous.
      D. Pappus-bristles penicillate at summit; receptacle flat; small glabrous plant ..... *H. roseum* 1.
      D. Pappus-bristles equally plumose from base; receptacle conical; outer bracts broad; inner ones with broad short claw.
        E. Ray white; bracts acute.
          All involucral bracts snow-white; woolly plant ..... *H. floribundum* 2.
          Outer involucral bracts golden-brown; almost glabrous plant ..... *H. Sturtianum* 3.
        E. Ray yellow; bracts obtuse; glabrous plant.. *H. polygalifolium* 4.
    C. Achenes glabrous, terete or nearly so.
      F. Woolly plants; heads on long peduncles.
        Outer involucral bracts broad, silvery, the inner ones with narrow woolly claws and laminae 8-10 mm. long..... *H. albicans* 5.
        Outer involucral bracts subulate, the inner ones with narrow-linear glandular claws and laminae about 6 mm. long ..... *H. stipitatum* 6.
      F. Sparsely woolly plant; heads on short leafy peduncles; outer involucral bracts broad, the inner ones with short broad claws and laminae 6-10 mm. long..... *H. Cotula* 7.
      F. Glandular-hairy plant; outer involucral bracts dark-red..... *H. Fitzgibbonii* 8.
    C. Achenes glabrous or papillose, flattened or angular; small slightly woolly plants; laminae yellow, 3-4 mm. long.
      Achenes with transparent margins..... *H. variabile* 9.
      Achenes without transparent margins..... *H. Jessenii* 10.
  B. Involucres ovoid to cylindrical, usually small and arranged in corymbs or clusters.
    G. Leaves all or nearly all alternate.
      H. More or less hairy annuals; pappus-bristles equally plumose from base.
        I. Corymbs or clusters compact; heads almost sessile; involucre cylindrical; laminae 1-3 mm. long.
          J. Almost glabrous, dwarf; flowers 4-5; achenes silky ..... *H. pygmaeum* 11.
          J. Woolly; flowers 8-14.
            Achenes sparsely pubescent ..... *H. Humboldtianum* 12.
            Achenes glabrous ..... *H. Haigii* 13.
            Achenes silky ..... *H. microglossum* 14.
        I. Corymbs loose; involucre turbinate or ovoid; flowers over 12; achenes silky.
          K. Laminae 3-4 mm. long.
            Outer involucral bracts with green linear tips; laminae yellow ..... *H. tenellum* 15.
            Outer involucral bracts obtuse; laminae white ..... *H. Troedelii* 16.
          K. Laminae 5-10 mm. long, white; woolly-white plant ..... *H. corymbiflorum* 17.
      H. Glabrous annual; heads solitary on long peduncles; involucre ovoid; pappus-bristles penicillate ..... *H. strictum* 18.

G. Leaves opposite; involucre ovoid; small glabrous annual ..... *H. oppositifolium* 19.
A. Inner involucral bracts without radiating laminae; flower-heads small; flowers scarcely or slightly exceeding involucre.
L. Heads in dense terminal clusters; involucre cylindrical or almost so.
M. White-tomentose perennial; flowers 16-20; achenes papillose ..... *H. pterochaetum* 20.
M. Annuals.
N. Grey-woolly plants with the aspect of *Gnaphalium;* involucre 4-6 mm. long; achenes sparsely and minutely pubescent.
O. Achenes enveloped in dense wool.
Flowers 2-3; pappus equally plumose..... *H. moschatum* 21.
Flower solitary; pappus plumose at base only *H. uniflorum* 22.
O. Achenes not enveloped in wool; flowers 6-12.. *H. Tietkensii* 23.
N. Sparsely woolly plant; involucre 7-10 mm. long; achenes silky ..... *H. pygmaeum* var. 11.
L. Heads in dense or loose panicles; flowers 8-14; annuals.
Sparsely woolly; involucre campanulate; achenes silky ..... *H. Charsleyae* 24.
Quite glabrous; involucre cylindrical; achenes sparsely pubescent ..... *H. laeve* 25.
L. Heads sessile among floral leaves; involucre globular; small slightly hairy annuals; flowers over 20.
Outer involucral bracts thin, acute, ciliate, the inner ones thick, green ..... *H. australe* 26.
Involucral bracts all thin and obtuse..... *H. demissum* 27.

1. **H. roseum** (Hook.) Benth. var. *patens* (Ewart) J. M. Black. Small glabrous annual, 2-10 cm. high; leaves oblanceolate; heads solitary, terminal; involucre hemispherical, 5-8 mm. long, the outer bracts greenish-brown, the inner with white ovate-oblong spreading laminae 4-6 mm. long; flowers 14-40; achenes villous; pappus of 13-18 plumose bristles, each terminating in a dense golden tuft of clavate barbs.—*H. Troedelii*, F. v. M. var. *patens*, Ewart (1909).

Ooldea; Pidinga.—West Australia. Much smaller in all its parts than the typical and often cultivated form, with long pink or white laminae.

H. anthemoides (Sieb.) DC. has been recorded for "near Adelaide; between Bethany and Lyndoch Valley; Mount Remarkable." If these identifications were correct, the plant does not appear to have been again collected in South Australia during the past half century. It is a perennial with slender erect simple stems 20-30 cm. high, glabrous or with short scattered hairs; leaves linear, often crowded and erect, about 10 mm. long, usually pitted; heads solitary; involucre hemispherical, about 12 mm. long, the inner bracts with white spreading obtuse laminae 6-8 mm. long; achenes silky; pappus-bristles 13-20, plumose; receptacle flat.—Eastern States and Tasmania.

2. **H. floribundum,** DC. Rigid annual, or perhaps sometimes perennial, sparsely and loosely woolly all over; stems prostrate or ascending, 4-30 cm. long; leaves linear, 1-3 cm. long, 1-2 mm. broad; heads solitary at the ends of the branches or stems, the former often corymbosely arranged; involucre hemispherical, 8-12 mm. long, the bracts all snow-white and shining, broad but acute, the inner ones with snow-white spreading laminae 6-8 mm. long; receptacle conical; achenes silky-villous; pappus-bristles 6-10, plumose, dilated, rigid and often more or less connate in the lower half. (Plate 32: 1, page 341.)

From Wallaroo and Murray lands to the Far North; from Lake Torrens westward to Nullarbor Plain.—Western Victoria and New South Wales; Central and West Australia.

3. **H. Sturtianum,** Sond. Slender annual, glabrous except for a little wool usually present just below the flower-head; stems erect or ascending, 6-25 cm. long; leaves linear, 1-2 cm. long, the uppermost ending in scarious tips; heads solitary, terminating each stem or branch; involucre hemispherical, 12-15 mm. long, the bracts acute, the outer ones golden-brown, the inner ones with spreading snow-white laminae 8-10 mm. long; receptacle conical; achenes silky-villous; pappus-bristles 8-12, plumose, soft.—*H. floribundum* DC. var. *Sturtianum* (Sond.) Benth.

From Dublin scrub (30 miles north of Adelaide) to Lake Torrens; Murray lands and north thereof; Gawler Ranges, E.P. Aug.-Dec.—Western Victoria and New South Wales. Resembles *H. roseum* var. *patens* and *H. anthemoides*, but both these species have a flat receptacle.

4. **H. polygalifolium,** DC. Erect rigid glabrous annual, 6-30 cm. high; leaves oblanceolate to linear-lanceolate, the lower ones sometimes opposite; heads terminating long naked peduncles; involucre hemispherical, 10-20 mm. long, the outer bracts pale-brown, the inner ones with a bright or pale-yellow obtuse spreading lamina 8-12 mm. long; receptacle conical; achenes silky-villous; pappus-bristles plumose, 20-25.

Flinders Range; Murray lands and north thereof; Eyre Peninsula and westward to Ooldea. June-Nov.—Western New South Wales.

5. **H. albicans** (A. Cunn.) DC. Softly grey-woolly annual, or perhaps sometimes perennial, 10-40 cm. high; leaves chiefly near the base of stems or branches, obovate-oblong to oblanceolate or linear, mostly acute; heads on long almost naked white-tomentose peduncles; involucre hemispherical, 12-18 mm. long, the outer bracts sessile, silvery, the inner ones yellow or white, sometimes tinged with pink, the innermost on linear claws and with laminae shorter than those of the intermediate bracts; achenes glabrous, when ripe usually curved and transversely rugulose; pappus-bristles plumose, 12-20.—*Elichrysum albicans,* A. Cunn. (1825); *E. incanum,* Hook. (1829); *Helipterum incanum* (Hook.) DC.

Flinders Range to Far North; between Mingary and Cockburn; Murray lands; Gawler Ranges, E.P. Most of the year.—Temperate Australia and Tasmania except West Australia. Our northern specimens have rarely the outer laminae pink and the inner ones white or pale-yellow. In the eastern States are forms with purple, yellow and white laminae in the same head.

6. **H. stipitatum,** F. v. M. Rigid loosely woolly annual, with ascending stems 3-30 cm. long; leaves linear-lanceolate to linear 2-10 cm. long; heads on long peduncles naked except for 2 or 3 subulate bracts; involucre hemispherical, 12-18 mm. long, the outer bracts few, short and almost subulate, the intermediate with long rigid narrow-linear glandular claws and small ovate acuminate bright-yellow radiating laminae, the innermost shorter, with very small laminae; achenes glabrous; pappus-bristles plumose, about 20.

Far North (Oodnadatta to Musgrave Ranges); between Ooldea and Ouldabinna.—Central and West Australia.

7. **H. Cotula** (Benth.) DC. Small slender sparsely woolly-villous annual; leaves narrow-linear, mostly 5-10 mm. long; heads solitary; involucre hemispherical, about 10 mm. long, the bracts all white, or the outer ones brown or pink, the inner ones spreading and sometimes yellow, their claws very short and broad; achenes glabrous; pappus-bristles plumose, 10-15.

Probably grows in South Australia, as it is found in western Victoria, New South Wales, and Queensland, and in West Australia. I have not seen any specimens with South Australian localities attached.

8. **H. Fitzgibbonii,** F. v. M. Stiff glandular-hairy annual, with erect or ascending stems 6-20 cm. long; leaves broad-linear, obtuse, 1-3 cm. long; heads terminal; involucre hemispherical, about 10 mm. long, the bracts acuminate, the outer ones of a rich reddish-brown color, the inner ones with narrow-linear claws and white spreading acuminate laminae about 4 mm. long; achenes glabrous; pappus-bristles plumose, 8-10.

Lake Torrens to Oodnadatta and westward to the border; Nullarbor Plain.—Central and West Australia.

9. **H. variabile** (Sond.) Ostenf. Slender sparsely woolly or almost glabrous annual, 3-16 cm. high; leaves almost filiform, 3-10 mm. long; heads on rather long peduncles with a few minute scarious bracts; involucre campanulate, finally hemispherical, 7-10 mm. long, the outer bracts broad, hyaline, pale-brown, the inner ones with broadly winged claws and small spreading acute or obtuse yellow laminae; flowers 15-60, of which many are frequently barren; achenes much compressed, obovate, pale, glabrous, or slightly papillose, with a transparent margin; pappus-bristles plumose, 8-12, dilated and united towards the base. *Hyalospermum variabile,* Sond. (1852); *Helipterum hyalospermum,* F. v. M. (1866). There are 2 earlier names by Steetz, but, as remarked by Ostenfeld, they are preoccupied.

Southern districts to Flinders Range; Yorke and Eyre Peninsulas. Sept.-Nov.—Western Victoria and New South Wales; West Australia.

10. **H. Jessenii,** F. v. M. (1890). Very near the preceding; the involucre is smaller, (5-7 mm. long) and more spreading in flower, the outer laminae of a rich brown color, the achenes with scarcely any transparent margin, papillose and sometimes angled.

Yorke Peninsula to Flinders Range; Murray lands and north thereof; Eyre Peninsula. Aug.-Nov.—Same interstate localities. These 2 species are often difficult to distinguish owing to the variability of the achene, and I think it very probable that Bentham was right in treating them as one.

11. **H. pygmaeum** (DC.) Benth. Slender annual, branching from the base, 2-10 cm. high, slightly woolly or almost glabrous; leaves linear or almost filiform; heads sessile in dense terminal leafy clusters, rarely solitary in the forks or axillary; involucre cylindrical, 7-10 mm. long, swollen near base, the bracts golden-brown, the inner ones with small ovate white spreading laminae about 1 mm. long; flowers 4-5, of which 1-3 are barren; achenes silky-villous; pappus-bristles slender, plumose, 20-30, of the barren flowers 12-20, finally surpassing the flowers and involucre.

Southern districts to Flinders Range; Murray lands and north thereof; Yorke and Eyre Peninsulas. June-Oct.—Western Victoria and New South Wales.

Var. *occidentale*, Benth. Radiating laminae minute or quite absent.—Murray lands; Eyre Peninsula.—West Australia.

12. **H. Humboldtianum,** Gaudich. Erect sparsely and loosely woolly annual, 10-50 cm. high; leaves linear or linear-lanceolate, acute, 1-3 cm. long; heads small, in dense clusters often forming compact terminal corymbs; involucre cylindrical, 6-7 mm. long, the bracts almost all with obtuse laminae, the outer brown, the inner with small oblong bright or pale yellow spreading laminae 2-3 mm. long; flowers 8-14; achenes pubescent; pappus-bristles 10-15, plumose.

Denial Bay to Ooldea and along the Bight. Aug.-Oct.—West Australia.

13. **H. Haigii,** F. v. M. A woolly annual resembling the preceding, but the achenes are glabrous; flowers about 8-10; pappus-bristles 12-16, plumose.

Wirrulla (near Streaky Bay) and westward in places along the Great Bight.—West Australia.

14. **H. microglossum** (F. v. M.) Tate (1883). Softly grey-woolly annual with ascending or erect stems usually 2-10 cm. high, or 1 or 2 of the stems sometimes to 25 cm. high; leaves linear-lanceolate, 1-3 cm. long; heads sessile in dense leafy terminal clusters or small compact corymbs; involucre cylindrical, 6-8 mm. long, the bracts all obtuse, the outer ones golden brown, shining, the inner with broad claws and small oblong white or yellow spreading laminea, 2 mm. long; flowers 8-12; achenes silky-villous; pappus-bristles 20-25, plumose.—*H. corymbiflorum*, Schlechtd. var. ? *microglossum*, F. v. M.

Flinders Range and Broken Hill railway to Far North; westward to Musgrave and Gawler Ranges.—Western New South Wales.

15. **H. tenellum,** Turcz. Slender erect annual, 4-20 cm. high, sparsely and minutely glandular-hairy, branching corymbosely in upper part; leaves almost filiform; heads in a loose flat corymb, the small upper leaves passing into the outer bracts, which have a scarious base and erect leafy tips; involucre turbinate when in flower, 7-8 mm. long, the intermediate bracts scarious, acute, the inner ones with oblong acute yellow spreading laminae 3-4 mm. long; flowers 12-16; achenes silky; pappus-bristles plumose, 14-20.

From west of Fowler's Bay to Nullarbor Plain.—Sept.-Oct.—West Australia.

16. **H. Troedelii,** F. v. M. Annual, with erect or ascending stems 5-25 cm. long, slightly woolly on stems and branches; leaves glabrous, linear to lanceolate, somewhat succulent, half-clasping; heads in rather loose irregular corymbs; involucre ovoid, 7-8 mm. long the outer bracts broad, obtuse, hyaline, the inner ones with a broad golden-brown claw and a white ovate spreading lamina 3 mm. long; flowers 12-25; achenes silky; pappus-bristles 7-10, plumose, dilated downwards and united in a tube in the lower half.

From Gordon (Flinders Range) northward to Marree; Strzelecki Creek. Aug.-Oct.—Western New South Wales.

17. **H. corymbiflorum,** Schechtd. Erect woolly-white annual 8-30 cm. high; leaves broad-linear or lanceolate, soft, half-clasping; heads on bracteate peduncles, forming loose terminal corymbs; involucre ovoid, becoming turbinate, 12-16 mm. long, the bracts obtuse, the outer ones golden-brown, the inner ones with white spreading oblong laminae 5-10 mm. long; receptacle flat; flowers 12-30; achenes silky; pappus-bristles plumose, 14-18.

From Adelaide northwards to Flinders Range and Marree; Murray lands; Yorke and Eyre Peninsulas. June-Nov.—Western Victoria and New South Wales.

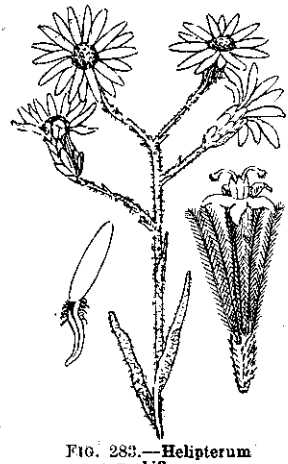

FIG. 283.—**Helipterum corymbiflorum.**

18. **H. strictum** (Lindl.) Benth. Erect glabrous annual 10-50 cm. high; leaves oblong, oblong-cuneate or lanceolate, often half-clasping; heads solitary on mostly long

slender naked peduncles; involucre ovoid, 10-14 mm. long, the bracts obtuse, dark golden-brown, the inner ones with white oblong spreading laminae 2-4 mm. long; flowers 6-25, a few of the innermost often sterile; achenes densely silky; pappus-bristles 15-23, plumose and with a tuft of clavate barbs at summit, as in *H. roseum*.

Flinders Range to Far North; Broken Hill railway to north of Cooper's Creek; Gawler Ranges, E.P., to Nullarbor Plain. July-Nov.—Western New South Wales; Central and West Australia.

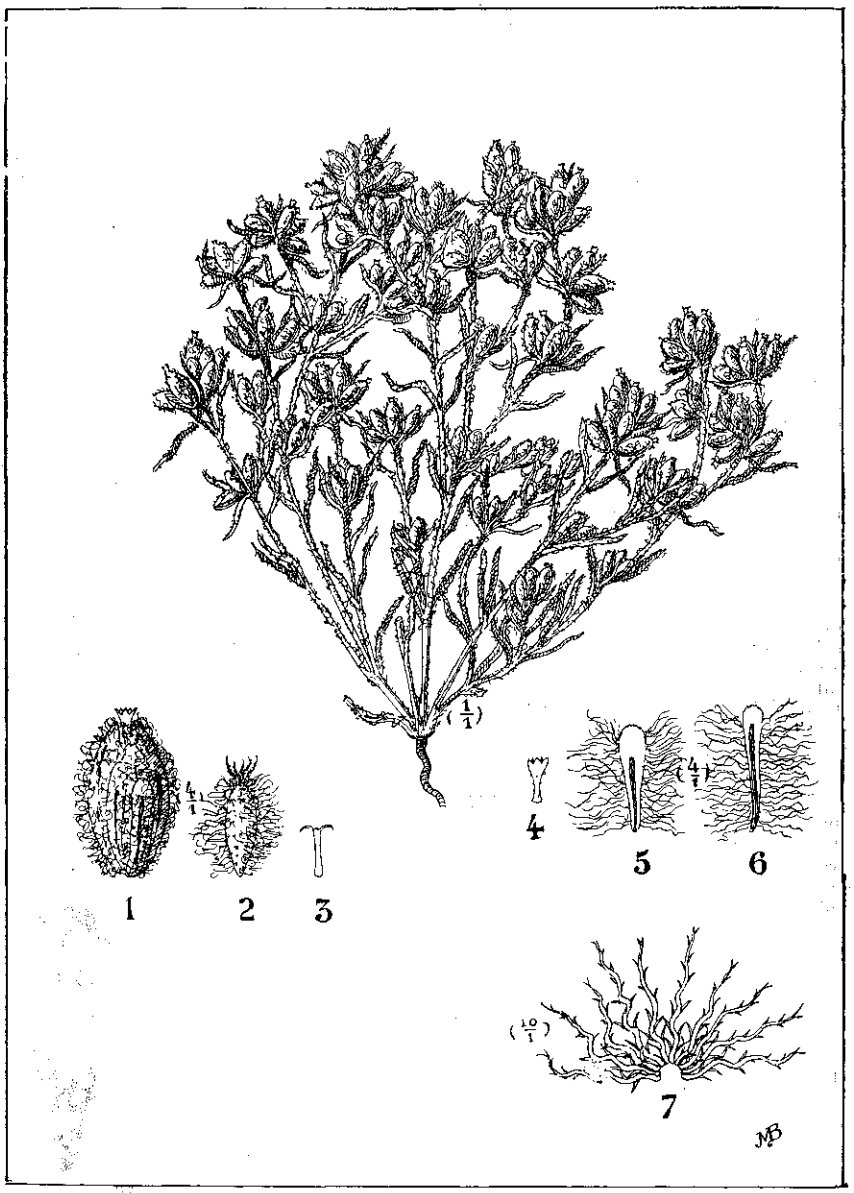

PLATE 52.—**Helipterum uniflorum.**

19. **H. oppositifolium,** S. Moore. Small erect glabrous annual, 7-12 cm. high; leaves opposite, linear or linear-lanceolate; heads solitary on short peduncles or almost sessile; involucre ovoid, 7-8 mm. long, the bracts obtuse, golden-brown, the inner ones with white

ovate spreading laminae about 2 mm. long; flowers about 15, a few of the outer ones sometimes female; anther-tails scarcely visible; achenes silky; pappus-bristles 15-20, plumose.

Only 1 specimen from the Gawler Ranges.—West Australia.

PLATE 4 (1), page 84.—1, flower; 2, style of female flower; 3, stamens; 4, involucral bracts; 5, pappus-bristle.

20. **H. pterochaetum** (F. v. M.) Benth. Rigid perennial, 15-30 cm. high, the stems and branches with a close white tomentum; leaves narrow-linear, glabrous, viscid, with revolute margins; heads sessile or on short peduncles, in small terminal clusters; involucre obconical, 5-6 mm. long, the bracts acute, ciliate, straw-colored, mostly acuminate with small golden-brown non-spreading tips; flowers 16-20, of which 1-3 outer ones are usually female, filiform, 4-toothed, and without pappus; achenes papillose; pappus-bristles 8-15, very fine, plumose in upper part, scarcely more than barbellate towards base.

Near Lakes Torrens and Eyre to Far North and westward to Birksgate Range; northern Eyre Peninsula to near Fowler's Bay and Tarcoola.—Western New South Wales.

21. **H. moschatum** (A. Cunn.) Benth. Strongly scented erect or ascending rigid woolly annual, 5-40 cm. high; leaves oblanceolate or lanceolate, the upper ones stem-clasping; heads sessile in numerous dense clusters; involucre cylindrical, 4 mm. long, the bracts pink in bud, afterwards pale straw-colored, hyaline, obovate, woolly towards base; flowers 2-3, rarely 4, all bisexual but usually 1 or 2 sterile; achenes fusiform, almost glabrous, but enveloped in the surrounding wool; pappus-bristles 5-10, plumose.

Flinders Range and Murray lands to Far North; westward to Birksgate Range; Gawler Ranges to Tarcoola. Most of the year.—Western Victoria, New South Wales, and Queensland.

22. **H. uniflorum,** J. M. Black. Softly white-woolly prostrate or ascending annual, the stems usually much-branched and 4-10 cm. long; leaves linear; heads sessile in numerous terminal or axillary leafy clusters; involucre ovoid-oblong, 5 mm. long, the bracts oblanceolate, scarious, with a green midrib, densely woolly; flower solitary, bisexual, with a very small 5-toothed corolla; achene fusiform, sparsely pubescent with short 2-hooked hairs and enveloped in wool; pappus-bristles 9-12, plumose at base, barbellate upwards.

Murray lands to Lake Eyre and Far North.—Western New South Wales.

PLATE 52.—1, flower-head; 2, ripe achene; 3, 2-hooked hair of achene; 4, corolla; 5 and 6, outer and inner involucral bracts (both showing the inner face); 7, pappus spread open.

23. **H. Tietkensii,** F. v. M. Closely resembles *H. moschatum*; the leaves are usually rather broader, the involucre 6 mm. long, the green midrib of the bracts more conspicuous, with 6-12 flowers, some of the inner ones barren; achenes sparsely pubescent; pappus-bristles 12-19.

Murray lands and north thereof; Far North and westward to the Musgrave Ranges and Ooldea.—Western New South Wales.

24. **H. Charsleyae,** F. v. M. Erect or ascending annual, 5-30 cm. high, sparsely woolly on the stems and branches; leaves oblong-cuneate to linear-lanceolate, acute, glabrous, half-clasping; heads sessile, solitary or few in clusters terminating very short branches and forming dense leafy spikes or narrow panicles; involucre campanulate, 6-8 mm. long, the bracts oblong, glabrous, golden; flowers 8-14; achenes densely silky; pappus-bristles 15-20, plumose.

Near Oodnadatta and westward to the Musgrave Ranges; Kingoonya.—Central Australia.

25. **H. laeve** (A. Gray) Benth. Slender erect glabrous annual, 3-12 cm. high; leaves linear; heads shortly pedunculate on the filiform branches, forming an irregular leafy and bracteate panicle; involucre cylindrical, 3-4 mm. long, the bracts oblong, shining, becoming reddish-brown; flowers 9-12, all bisexual; achenes sparsely pubescent with short transparent hairs; pappus-bristles 15-20, plumose.

Murray lands to Flinders Range; Eyre Peninsula and Gawler Ranges. Aug.-Oct.—Western Victoria and New South Wales; West Australia.

26. **H. australe** (A. Gray) Druce (1917). Erect or ascending annual, 2-12 cm. high, green but with rather long scattered simple or septate hairs; leaves broad-linear; heads sessile, surrounded and exceeded by a few floral leaves, solitary, terminal or lateral; involucre globular, about 5 mm. long, the outer bracts scarious, white, lanceo-

late, ciliate, the inner ones stiff, oblong, green, glandular, with small inconspicuous scarious tips; receptacle conical; flowers over 50, finally exceeding the involucre and the outer ones curved downwards, all bisexual and 4-toothed except a few female 3-toothed outer ones; achenes almost glabrous; pappus of 3 rarely 2 plumose bristles dilated towards base, the female flowers with 1 long bristle or more usually 2 or 3 microscopic ones.—*Dimorpholepis australis*, A. Gray (1852); *Helipterum dimorpholepis*, Benth. (1866).

FIG. 284.—**Helipterum australe.**

Southern districts to Flinders Range; Yorke Peninsula; Kangaroo Island; Murray lands and 90-Mile Desert. Sept.-Nov.—Temperate Australia.

27. **H. demissum** (A. Gray) Druce (1917). Dwarf almost glabrous annual, 1-2 cm. long, and usually much-branched from the base; leaves very narrow-linear, sometimes opposite; heads sessile among floral leaves; involucre globular, about 3 mm. long, the bracts ovate, brownish-white, glabrous; flowers 20-30, all bisexual; achenes papillose; pappus-bristles about 10, plumose.—*Pteropogon demissus*, A. Gray (1852); *Helipterum exiguum*, F. v. M. (1855).

Most parts of the State. Sept.-Dec.—Temperate Australia.

47. IXIOLAENA, Benth.

(Apparently for *Ixolaena*, from Greek *ixos*, birdlime; *laina*, cloak: alluding to the sticky glandular covering of the original West Australian species *I. viscosa*.)

Involucre more or less campanulate in flower, the bracts numerous in several rows, narrow, herbaceous but rigid, the inner ones with small scarious usually spreading tips 1-2 mm. long; receptacle naked; flowers very numerous, tubular, longer than the involucre, all bisexual and 5-toothed or a few outer ones female, narrower but scarcely filiform and not reduced in the pappus; achenes narrow, terete or angular; pappus of more or less barbellate bristles. Herbs with alternate entire leaves; flower-heads on terminal peduncles. A purely Australian genus.

A. Involucre campanulate; plants rarely woolly.	
Leaves lanceolate; pappus-bristles 7-11	*I. leptolepis* 1.
Leaves oblong-cuneate; pappus-bristles 22-30	*I. supina* 2.
A. Involucre cylindrical-campanulate; whole plant woolly; leaves lanceolate	*I. tomentosa* 3.

1. **I. leptolepis** (DC.) Benth. Rigid perennial, 10-30 cm. high, beset with minute hairs mixed with glandular ones, sometimes loosely woolly, often with a close white tomentum on the stems or branches; leaves lanceolate, mucronate, usually green and scabrous, rarely woolly; peduncles rather long, with a few linear leaves or bracts; involucre 5-6 mm. long, the linear bracts with small scarious spreading tips, those of the inner ones broader and golden; achenes glabrous; pappus-bristles about 7-11, barbellate, nearly as long as the corolla.

Flinders Range to Far North; Murray lands. July-Oct.—Western Victoria and New South Wales; Northern Territory.

2. **I. supina** F. v. M. Almost prostrate perennial, beset with stiff short septate hairs; leaves oblong-cuneate, thick; peduncles short or long, with a few distant leafy bracts; involucre 6-8 mm. long, the linear bracts with small brownish obtuse tips; achenes glabrous; pappus-bristles 22-30, very slender and shortly barbellate in the upper part, about as long as the corolla.

FIG. 285.—**Ixiolaena supina.**

Round the coast from Encounter Bay to Yorke Peninsula; Kangaroo Island; Eyre Peninsula. Sept.-Apl.—Islands of Bass's Straits.

3. **I. tomentosa,** Sond. et F. v. M. Erect or ascending perennial, 15-30 cm. high, loosely woolly all over; leaves lanceolate, mucronate; peduncles short or long, with a few leafy bracts; involucre 10-14 mm. long, narrower than in the two preceding, the linear-lanceolate bracts with narrow acute scarious tips; achenes glabrous;

pappus-bristles 13-40, very slender, barbellate from base or only in the upper half, as long as or slightly longer than corolla.

Broughton River to Flinders Range and Far North; Murray lands and north thereof; westward to Musgrave Ranges and Great Bight.—Western New South Wales.

48. HELICHRYSUM (Vaill.) Gaertn.

(Greco-latin name of some yellow everlasting, from Greek *hēlios*, the sun; *khrysos*, gold.)

Scarcely differs from *Helipterum* except in the pappus-bristles, which are simple or barbellate or sometimes almost plumose towards the summit, but not plumose from the base, where they are usually united in a short ring. The flowers are either all bisexual, or the majority are bisexual with comparatively few female ones in usually 1 outer row. They are shorter than or not longer than the involucre, except in *H. Ayersii* and *H. podolepideum*, where they slightly exceed it. There are rarely a very few receptacle-scales among the innermost and usually sterile flowers.

A large genus of about 300 species, distributed throughout the old world, Australia possessing more than 60. Among the species used as everlastings or immortelles are the Australian *H. bracteatum* and *H. apiculatum* and the European *H. arenarium* and *H. orientale*.

A. Herbs.
- B. Inner involucral bracts with laminae which radiate during flowering (except *H. Ayersii*).
  - C. Outer flowers fertile, with silky or pubescent achenes, fewer than the inner sterile flowers; all flowers bisexual; innermost bracts not smaller than the intermediate ones.
    - D. Ray present.
      - E. Fertile achenes broad, compressed, slightly contracted at summit; involucres cylindrical-campanulate, corymbose; laminate bracts 6-10.
        - Laminae pink or white, 8-10 mm. long.... *H. Cassinianum* 1.
        - Laminae yellow or white, 2½-5 mm. long.. *H. semifertile* 2.
      - E. Fertile schenes terete, contracted at summit; involucres hemispherical, solitary; laminate bracts 16-20, the laminae pink, 12-20 mm. long ..... *H. roseum* 3.
    - D. Ray absent; achenes compressed, truncate; involucres hemispherical, solitary ..... *H. Ayersii* 4.
  - C. Most of the flowers fertile, numerous in the head, some of the outer ones female; innermost bracts smaller and narrower than the intermediate ones, which are not ciliate; achenes terete or cylindrical, glabrous or papillose; heads solitary on terminal peduncles.
    - Laminae yellow or tinged with red, rigid, 10-15 mm. long; leaves rather large..... *H. bracteatum* 5.
    - Laminae white, 4-12 mm. long; leaves small, obtuse ..... *H. obtusifolium* 6.
- B. Inner involucral bracts with erect or ascending white lanceolate laminae, which only radiate when all the bracts spread open at maturity; flowers numerous; innermost bracts smaller than the intermediate ones; involucres hemispherical, rather large.
  - F. Heads solitary, terminal; outer bracts sessile.
    - G. Involucral bracts ciliate, the outer ones brown; a few outer flowers female; woolly plant.... *H. Baxteri* 7.
    - G. Involucral bracts not ciliate, all white or pink or the outer ones very pale brown; all flowers bisexual.
      - Leaves scabrous above, white-tomentose below ..... *H. leucopsidium* 8.
      - Leaves glandular-hairy ..... *H. adenophorum* 9.
  - F. Heads corymbose; all the involucral bracts with linear claws; velvety-tomentose plant..... *H. Blandowskianum* 10.

B. Inner involucral bracts with laminae sometimes spreading slightly at the tip, but only radiating when all the bracts spread open at maturity; flowers numerous, some of the outer ones female (except *H. podolepideum* and *H. Ayersii*).

H. Laminae of medium size, obtuse, the outer ones brown, the inner yellow, all with wrinkled often jagged tips, the innermost laminae smaller; involucres hemispherical, solitary, terminal; woolly herbs.

Laminae 6-8 mm. long ..... *H. scorpioides* 11.

Laminae about 4 mm. long ..... *H. rutidolepis* 12.

H. Laminae small, lancolate, acute, very numerous.

I. Heads in corymbose clusters; involucral bracts yellow, ciliate, the inner ones clawed; involucre ovoid or nearly globular.

J. Pappus-bristles of bisexual flowers 5-12; laminae bright yellow, about 3 mm. long; perennials.

White-tomentose plant; leaves usually rather broad ..... *H. apiculatum* 13.

Almost glabrous plant; leaves narrow-linear ..... *H. semipapposum* 14.

J. Pappus-bristle solitary in all flowers; laminae pale yellow, about 2 mm. long; woolly annual ..... *H. Mellorianum* 15.

I. Heads solitary and terminal; involucre campanulate; woolly plants.

K. Outer involucral bracts broad and sessile, the inner ones clawed; laminae yellow, ciliate, about 3 mm. long; leaves narrow.

Pappus-bristles 4-20 in the bi-sexual flowers, barbellate or almost plumose in upper half. *H. ambiguum* 16.

Pappus-bristles 1-3 in all the flowers, densely penicillate in upper half ..... *H. Basedowii* 17.

K. All the involucral bracts with woolly claws, the laminae pale, not ciliate, 4-5 mm. long; leaves broad, velvety ..... *H. podolepideum* 18.

B. Involucral bracts without distinct laminae, the midrib and wings of the bract being together about as broad as the short erect obtuse membranous tip, so that all the bracts are sessile; heads terminal, solitary.

Involucres 4-5 mm. long, on glabrous capillary peduncles..... *H. Tepperi* 19.

Involucres 8-10 mm. long, on glandular peduncles *H. Ayersii* 4.

A. Shrubs.

L. Inner involucral bracts with minute spreading white laminae; heads in dense corymbs.

Involucre cylindrical, 4 mm. long; leaves thin, flat ..... *H. ferrugineum* 20.

Involucre ovoid, 6-7 mm. long; leaves rigid, with revolute margins ..... *H. cinereum* 21.

L. Inner involucral bracts without spreading laminae.

Heads solitary; branchlets spinescent; leaves softly tomentose, not decurrent..... *H. Dockeri* 22.

Heads corymbose; branchlets not spinescent; leaves narrow, almost glabrous above, decurrent *H. retusum* 23.

1. **H. Cassinianum,** Gaudich. Erect scabrous-pubescent anuual 6-40 cm. high; leaves mostly basal, lanceolate or oblong-linear, 1-7 cm. long, some of the stem ones often opposite; heads usually 4-6, in loose terminal corymbs; involucre cylindrical, 8-10 mm. long without the ray, the outer bracts broad, hyaline, golden-brown, the inner with pink or white spreading laminae 8-10 mm. long; 4-6 outer flowers fertile, with flattened silky achenes about 4 mm. long, inner flowers 15-26, sterile, with narrow glabrous achenes; pappus-bristles finely barbellate, about 30 in the fertile flowers, 25 in the sterile.—*Schoenia Cassiniana* (Gaudich.) Steetz.

West of Lake Torrens to near Ooldea; Everard Range.—Central and West Australia.

2. **H. semifertile,** F. v. M. Slender slightly woolly or almost glabrous annual, with erect or ascending stems, 4-20 cm. high; leaves narrow-linear, obtuse; heads on peduncles usually shorter than the involucre, forming irregular corymbs; involucre cylindrical-campanulate, 6 mm. long without the ray, the outer bracts oblong, golden-brown, the inner ones with broad claws and white or yellow spreading laminae 2½-5 mm. long; flowers 10-22, of which 3-9 inner ones are sterile; fertile achenes compressed, 2½ mm. long, pubescent with hooked hairs; pappus-bristles 16-22, barbellate.

Northern Eyre Peninsula and Lake Torrens and Flinders Range to Far North and Cooper's Creek. Aug.-Oct.—Western New South Wales; Central Australia. Resembles *Helipterum Troedelii* and *H. variabile.*

3. **H. roseum** (Lindl.) Druce (1917) var. *Davenportii,* Benth. Erect scabrous-pubescent annual, 10-30 cm. high; leaves chiefly near the base, broad-linear or lanceolate, 3-8 cm. long; heads solitary on almost naked peduncles, mostly 6-20 cm. long; involucre hemispherical, 8-10 mm. long without the ray, the outer bracts lanceolate, ciliate, golden-brown, the inner ones with oblong claws and pink spreading laminae 12-20 mm. long; flowers about 70-100, of which 5-10 outer ones are fertile, with terete achenes, 8-12 mm. long when ripe, contracted or shortly beaked at summit, pubescent or almost glabrous, the remainder sterile, with shorter, narrower achenes; pappus-bristles of the fertile flowers numerous, long, almost plumose, those of the sterile flowers barbellate, shorter, fewer, but usually 20-30.—*H. Lawrencella,* F. v. M. (1866); *Lawrencella rosea,* Lindl. (1839).

Lake Torrens to Far North; westward to Ooldea.—West Australia. *H. roseum,* Baill. (1881) is a synonym of *Helipterum roseum.*

4. **H. Ayersii,** F. v. M. Erect annual, 10-30 cm. high, sprinkled with glandular and septate hairs; leaves linear-oblong, 2-7 cm. long, the upper ones sessile and half-clasping; heads terminating long or short peduncles; involucre hemispherical, 8-10 mm. long, the bracts oblong, obtuse, hyaline except the green midrib, straw-colored, rugulose transversely, without spreading laminae; flowers longer than involucre, the outer fertile about 18, in 2 rows, with slightly compressed pubescent achenes, 4-5 mm. long, the inner flowers sterile, about 30, with narrow glabrous achenes; pappus-bristles finely barbellate, those of the fertile flowers very numerous (to 140); those of the sterile flowers very few and caducous or sometimes none.

Everard to Birksgate Ranges.—Central Australia.

FIG. 286.—**Helichrysum bracteatum.**

5. **H. bracteatum** (Vent.) Andrews (1805). Erect minutely scabrous-pubescent perennial 20-80 cm. high; lower leaves oblong-cuneate, the upper ones lanceolate or linear, half-clasping; heads on long or short naked stiff peduncles; involucre hemispherical, 15-25 mm. long including the ray, the bracts all rigid and opaque, shining, yellow or tinged with reddish-brown, the outer ones ovate, the inner with a short broad claw and spreading lamina 10-15 mm. long; outer flowers female; achenes glabrous; pappus-bristles about 25, barbellate in the lower part.—*Xeranthemum bracteatum,* Vent. (1804); *Elichrysum lucidum,* Henckel (1806).

Most parts of the State, from wet places like Kangaroo Island and the Mount Lofty Range to the Farthest North and Ooldea. Sept.-Jan.—All the States.

6. **H. obtusifolium,** F. v. M. et Sond. (1852). Erect rigid much-branched perennial, 7-40 cm. high; the branches and lower face of the leaves silvery-white with a scaly clothing and often with granular exudations; leaves linear, green above, obtuse, with revolute margins, mostly 2-10 mm. long, rarely to 20 mm.; heads usually on short peduncles; involucre hemispherical, 3-4 mm. long without the ray, the bracts oblong, the outer ones golden-brown, the inner with a more or less woolly claw and white spreading lamina 4-12mm. long; a few outer flowers female and without pappus; achenes papillose; pappus-bristles 14-20, strongly barbellate towards summit.—*Ozothamnus teplrodes,* Turcz. (1851) non *H. tephrodes,* Sweet (1827).

Myponga to Encounter Bay and Strathalbyn; Kangaroo Island; Murray lands; Yorke and Eyre Peninsulas; South-East. Most of the year.—Victoria; New South Wales; West Australia. The smaller heads resemble those of *Helipterum Troedelii.*

7. **H. Baxteri,** A. Cunn. Erect perennial 20-40 cm. high, the long slender branches white with a close tomentum; leaves narrow-linear, with revolute margins, green above, white-tomentose below; heads solitary, terminal; involucre hemispherical, usually

15 mm. long, including the laminae, rarely only 10 mm. long, the bracts all lanceolate and ciliate, the outer ones brown, the inner ones with a short linear claw and an erect white lamina about 10 mm. long; a few of the outer flowers female and without pappus; achenes glabrous; pappus-bristles of bisexual flowers 6-9, almost plumose towards summit.

Southern districts; Murray lands; Yorke and Eyre Peninsulas; South-East. Sept.-Dec.—Victoria; New South Wales.

FIG. 287.—**Helichrysum leucopsidium.**

8. **H. leucopsidium,** DC. Erect or ascending loosely woolly perennial, 30-50 cm. long, usually growing in the shelter of shrubs; leaves linear or oblong-lanceolate, 2-6 cm. long, sparsely scabrous-pubescent above, usually grey-tomentose below, the margins recurved; heads solitary, terminating long branches; involucre hemispherical, 15-20 mm. long including the laminae, surrounded by a few linear floral leaves, all the bract lanceolate, snow-white or tinged with pink, the inner on short woolly claws, with erect laminae 10-15 mm. long; all flowers bisexual; achenes glabrous; pappus-bristles about 80, barbellate only towards summit.

Southern districts; Kangaroo Island; Murray lands; Yorke and Eyre Peninsulas and along the Great Bight; South-East.—Temperate Australia.

9. **H. adenophorum,** F. v. M. Near the preceding, with similar involucre, but the clothing, instead of being woolly or tomentose, is scabrous with minute glandular hairs; the leaves are mostly narrower, with dilated half-clasping base and revolute margins; achenes glabrous; pappus-bristles about 25, barbellate from base.

Murray lands from near Pinnaroo to Bordertown; Kangaroo Island. Summer.—Western Victoria.

10. **H. Blandowskianum,** Steetz. Erect perennial 25-40 cm. high, covered with a dense velvety white tomentum; leaves thick, soft, oblong-lanceolate, 2-4 cm. long; heads in rather dense terminal corymbs; involucre hemispherical, 10-15 mm. long with the laminae, the outer bracts with claws nearly as long as the white lanceolate laminae, but almost hidden by the dense wool, the inner ones with narrow claws and white ovate-oblong spreading laminae about 8 mm. long; all flowers bisexual; achenes papillose or almost pubescent; pappus-bristles 15-20, barbellate upwards.

Southern part of Mount Lofty Range; 90-Mile Desert; South-East. Summer.—Western Victoria.

11. **H. scorpioides** (Poir.) Labill. Erect loosely woolly perennial, 20-50 cm. high; lower leaves broadly oblanceolate, the upper ones lanceolate or linear; all acute; heads solitary, terminal; involucre hemispherical, 15 mm. long, including the laminae, the outer bracts brown, wrinkled, woolly, the inner ones with a short green woolly claw and an obtuse yellow oblanceolate lamina wrinkled near the summit; a few of the outer flowers female; achenes glabrous; pappus-bristles 15-25, barbellate upwards.

Southern districts; Murray lands; Yorke Peninsula; South-East. Sept.-Dec.—Victoria; New South Wales; Tasmania.

12. **H. rutidolepis,** DC. Like the preceding, but the involucres are smaller, about 8 mm. long, including the erect yellow laminae, and the female flowers have no pappus; pappus-bristles of the bisexual flowers 15-20.

Mount Lofty and Barossa Ranges. Chiefly summer.—Victoria; New South Wales.

FIG. 288.—**Helichrysum apiculatum.**

13. **H. apiculatum** (Labill.) DC. Variable erect or ascending perennial, 10-60 cm. long, covered with a dense grey velvety tomentum; leaves from obovate-cuneate to oblanceolate or linear, the larger ones 3-6 cm. long; heads in dense or rather loose terminal corymbs; involucre ovoid-truncate, 5-7 mm. long, the bracts golden-yellow, sometimes tinged with red, sometimes almost white in South-Eastern specimens, acute, ciliate, woolly at base, the outer sessile, the inner ones on slender claws, with an erect or finally spreading lanceolate lamina 2-4 mm. long; 1-2 rows of outer flowers female; achenes papillose; pappus-bristles golden, of the bisexual flowers 5-12, strongly barbellate upwards; female flowers with 1-6 bristles. The bisexual flowers are 35 to over 100, the female flowers about $\frac{1}{3}$ of the number.

All over the State. Most of the year.—Throughout Australia.

Var. *racemosum*, J. M. Black. Heads racemose along the branches, sometimes forming narrow panicles; involucre 3½ mm. long; leaves oblong-cuneate.—North of Cooper's Creek. Resembles some northern forms of *Gnaphalium luteo-album*, but the latter is distinguished by its obtuse non-ciliate involucral bracts, broader weaker claw, pappus-bristles not barbellate towards summit, excess of female over bisexual flowers, &c.

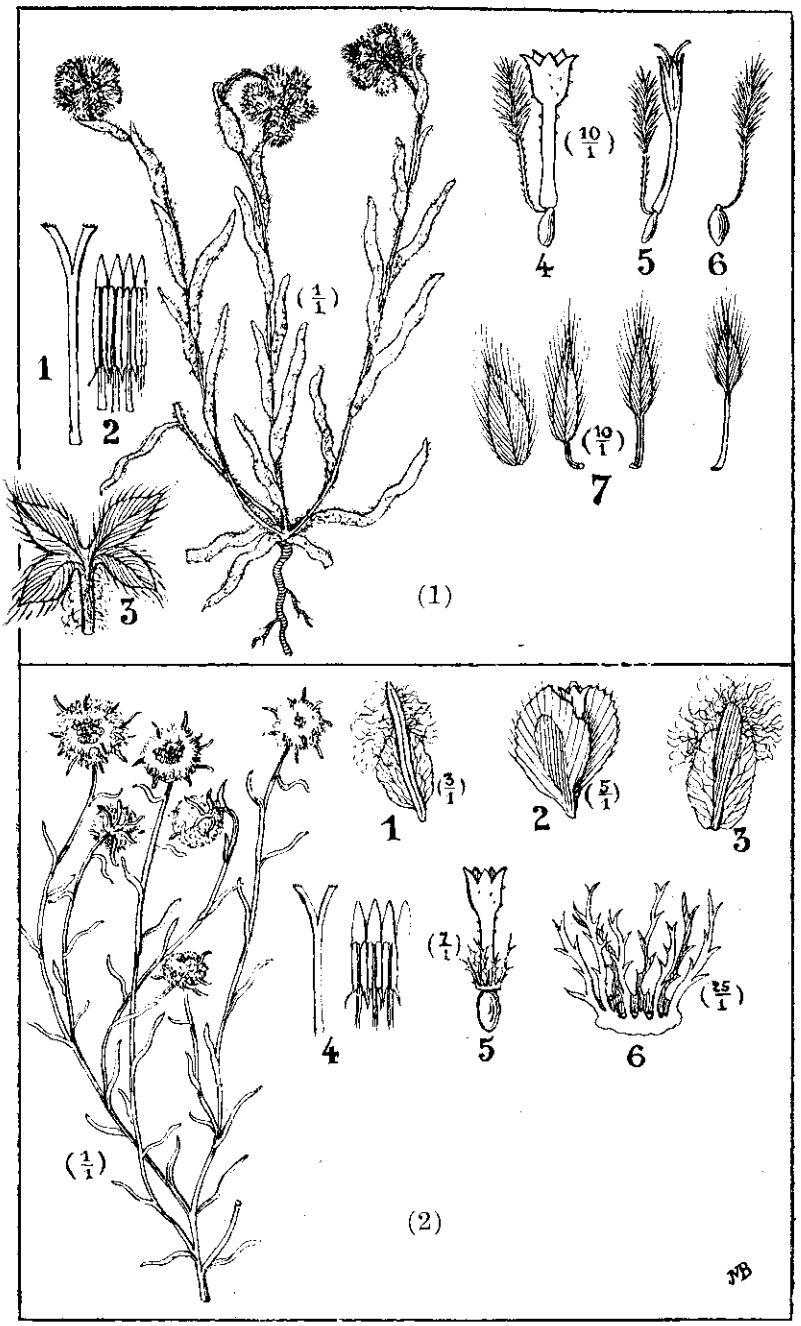

PLATE 53.—(1) **Helichrysum Mellorianum**; (2) **Angianthus Burkittii.**

14. **H. semipapposum** (Labill.) DC. Very near the preceding and perhaps not specifically distinct; leaves narrow-linear, glabrous and sticky, or sometimes with a slight amount of white tomentum.

Almost as widely distributed as *H. apiculatum.*

Var. *brevifolium*, Sond. Leaves 4-10 mm. long, often clustered.—Mount Lofty Range; Port Elliot; Murray lands.—Western Victoria and New South Wales.

15. **H. Mellorianum,** J. M. Black. Small woolly-tomentose ascending annual, 7-15 cm. high; leaves broad-linear, flat or with recurved margins, mostly obtuse, 1-2 cm. long; heads on very short peduncles in terminal globular clusters or compact corymbs; involucre almost globular, 3-4 mm. long, the bracts soft, pale yellow, acute, long-ciliate, the outer sessile, the inner with a slender claw and lanceolate lamina erect or finally spreading; outer female flowers 8-12, the bisexual ones 30-35; achenes glabrous; pappus-bristle 1, ascending, almost plumose in upper part.

PLATE 53 (1).—1, style; 2, anthers; 3, peduncle with 4 of the outer involucral bracts; 4, bisexual flower; 5, female flower; 6, achene and pappus-bristle; 7, involucral bracts.

Gawler Ranges; between Lakes Torrens and Eyre; near Ooldea; Cockburn.

16. **H. ambiguum,** Turcz. (1851). Variable perennial, 20-40 cm. high, the branches rather loosely tomentose with curly hairs, with or without small glandular hairs; leaves linear or linear-lanceolate, mucronate, stiff or flaccid, mostly 1-4 cm. long, broad at base or the lower ones contracted, but always sessile and half-clasping, flat or with recurved and sometimes undulate margins, usually glandular-scabrous above and woolly below, but sometimes almost glabrous; heads solitary on slender woolly peduncles, with a few distant bracts or minute floral leaves; involucre broadly campanulate, 5-6 mm. long, the bracts all golden, long-ciliate and acute, the outer ones rather broad and sessile, more or less woolly at base, the inner linear-lanceolate, the innermost with narrow claws and small erect laminae; bisexual flowers numerous, the outer female ones few and 3-toothed; achenes glabrous; pappus-bristles of bisexual flowers 12-20, strongly barbellate or almost plumose towards summit, of the female flowers none or rarely 1-2.—*H. semicalvum*, F. v. M. (1861); *Leptorrhynchus ambiguus* (Turcz.) Benth.

Flinders Range to Far North; westward to Musgrave Ranges.—Central and West Australia; western New South Wales. Broad-leaved specimens resemble *Ixiolaena leptolepis*, but the outer involucral bracts are not green and rigid, the pappus is different, and the flowers are scarcely if at all longer than the involucre; some softly tomentose specimens resemble *Calocephalus Dittrichii.*

Var. *paucisetum*, J. M. Black. Varies, like the type, in the size and clothing of the leaf; bisexual flowers with 4-8 pappus-bristles, some or all of which are dilated at base, toothed and almost scale-like, the rest of the bristle breaking off above this base; female flowers without any pappus in all the heads examined.—Far North; Ooldea.—Central and West Australia (Barrow Range).

The closely allied *H. Gatesii*, H. B. Williamson, with about 20 pappus-bristles to the bisexual flowers and about 12 to the female flowers, grows in western Victoria (Lorne; Myall) and may occur in our territory.

17. **H. Basedowii,** J. M. Black. Apparently annual, slender, erect, 20-30 cm. high, sparsely and loosely woolly; leaves linear, mostly 1-2 cm. long, half-clasping at base, with recurved margins, becoming almost glabrous; heads solitary, terminal on peduncles with minute bracts and a few distant floral leaves; involucre broadly campanulate, about 5 mm. long, the bracts golden, lanceolate, acute, long-ciliate, the outer ones sessile, sparsely woolly, the inner ones with linear glandular claws and small erect laminae; bisexual flowers numerous, a few outer ones female; achenes papillose; pappus-bristles 1-3, densely penicillate-plumose in upper half, very caducous.—*Leptorrhynchus tetrachaetus*, var. *penicillatus*, J. M. Black (1921).

Flinders Range to Musgrave Ranges; Tarcoola; Strzelecki Creek. This and the preceding species form a connecting link with *Leptorrhynchus.*

18. **H. podolepideum,** F. v. M. Small stout perennial, covered with a dense white velvety tomentum, 10-15 cm. high including the peduncles; leaves thick and soft, obovate-oblong, 2-6 cm. long including the short petiole into which they taper; heads on long naked woolly peduncles; involucre campanulate, about 10 mm. long, the bracts very numerous, similar, the laminae erect, small, linear-lanceolate, pale straw-colored, the claws linear, woolly and glandular, those of the outer bracts shorter, the inner ones longer than the lamina; flowers all bisexual; achenes papillose; pappus-bristles 11-15, shortly barbellate.

East and west of Lake Torrens to Strzelecki Creek and Far North.—Western New South Wales.

19. **H. Tepperi,** F. v. M. Slender erect wiry annual 4-15 cm. high, branching dichotomously, glabrous except a sparse pubescence on the leaves, of which a few are radical, those of the stem lanceolate, 5-10 mm. long, clasping, distant and mostly at the forks; heads on long capillary peduncles; involucre urn-shaped, 4-5 mm. long, the bracts hyaline, the outer broad and sessile, the inner ones oblong, scarcely clawed but with a green midrib and small erect tip; flowers 25-40, of which the outer female ones are fewer or more than the bisexual; achenes papillose; pappus-bristles shortly barbellate upwards, 6-7 in the females; 8-10 in the bisexuals.

Southern districts; Murray lands; Yorke and Eyre Peninsulas. Aug.-Nov.—North-western Victoria. Has the involucre of *Podolepis* and the habit of *P. Lessonii*, but the flowers are no longer than the involucre and the 2-3 teeth of the female flowers are very short.

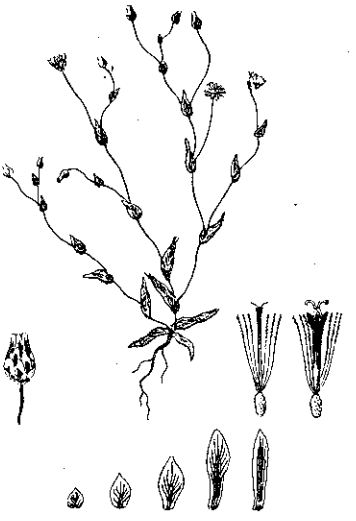

FIG. 289.—**Helichrysum Tepperi.**

20. **H. ferrugineum** (Labill.) Less. Shrub 2 m. high or more, with a close grey tomentum on the branchlets and lower face of the leaves, which are broad-linear, acute, mostly 1-3 cm. long, green and glabrous above, flat but the margins conspicuous below; heads small, numerous, in dense terminal corymbs; involucre cylindrical, 4 mm. long, straw-colored, the outer bracts sessile, woolly, the inner with broad green claws and white opaque spreading obtuse laminae about 1 mm. long; flowers 4-5, all bisexual; achenes papillose; pappus-bristles 20-30, very slender, simple.—*Ozothamnus ferrugineus* (Labill.) DC.

Blue Lake, Mount Gambier; Lake Edward; near Millicent (all S.E.). Summer.—Victoria; New South Wales; Tasmania.

21. **H. cinereum** (Labill.) F. v. M. Much-branched shrub 1-2 m. high, white-tomentose all over, the leaves usually becoming green and glabrous above; leaves crowded, spreading, linear, obtuse 1-2 cm. long, 1-3 mm. broad, rigid, with revolute margins; heads in dense terminal corymbs; involucre ovoid, 6-7 mm. long, the bracts pale, rigid, woolly, the innermost linear-oblong, with minute white slightly spreading laminae; flowers 15-30, all bisexual; achenes papillose; pappus-bristles 20-50, slightly barbellate upwards.—*Ozothamnus cinereus* (Labill.) DC.

Sea coasts along Encounter Bay, near Robe and Port Augusta. Jan.-June.—Coasts of Victoria, New South Wales, and Tasmania.

22. **H. Dockeri,** F. v. M. Small rigid shrub, white-tomentose all over, the branchlets ending in a spine; leaves broad-lanceolate or oblanceolate, soft, mostly 5-12 mm. long; heads usually solitary on very short peduncles; involucre ovoid, 6-7 mm. long, the bracts tomentose, the inner ones narrow, with glabrous erect tips; flowers over 20, all bisexual; achenes papillose; pappus-bristles over 80, fine, slightly barbellate upwards.

River Murray.—New South Wales, along the River Darling.

23. **H. retusum,** Sond. et F. v. M. (1873). Low erect shrub, the branchlets and peduncles white-tomentose or becoming almost glabrous; leaves linear, 4-25 mm. long, 1-2 mm. broad, obtuse or notched at the summit and with a recurved point, scabrous or glabrous above, the lower face white-tomentose but often concealed by the revolute margins, decurrent; heads small and numerous, in dense terminal corymbs; involucre almost cylindrical, 3-4 mm. long, white or straw-colored, the appressed bracts broad, obtuse; flowers 9-14, all bisexual or 1-3 female and without pappus; achenes papillose; pappus-bristles of bisexual flowers 10-20, slightly barbellate upwards.—*H. adnatum* (DC.) Benth. partly, not *Ozothamnus adnatus*, DC. (1837); *H. decurrens*, F. v. M. (1873); *Ozothamnus decurrens*, F. v. M. (1859); *O. retusus*, Sond. et F. v. M. (1852).

Drier part of southern districts to Flinders Range; Kangaroo Island; Murray lands; Yorke and Eyre Peninsulas. Sept.-Dec.—Western Victoria and New South Wales; West Australia. The long-leaved form, found in the Flinders Range near Hawker, resembles *Cassinia aculeata*, but is distinguished by the notch at the end of the leaves, the pappus-bristles barbellate upwards instead of near the base, &c. *H. retusum* (Lamk.) Spreng., an earlier name, is a synonym of *Facelis apiculata*, Cass.

49. PODOSPERMA, Labill. (1806).

(From Greek *pous, podos*, foot ; *sperma*, seed : alluding to the short stalks of the achenes. —*Podotheca*, Cass. 1822).

1. **P. angustifolium,** Labill. Sparsely glandular-pubescent ascending annual, 4-20 cm. high ; leaves linear or oblanceolate, thick, 2-5 cm. long ; heads terminal, the peduncles swollen below them ; involucre 25-35 mm. long (sometimes as long as the rest of the plant), narrow-conical, the bracts lanceolate, the outer ones leafy, the inner scarious ; flowers about 50, filiform, tubular, bisexual, slightly exceeding the involucre ; anthers tailed ; achenes obconical, pubescent, on minute pedicels which persist on the otherwise naked receptacle ; pappus-bristles 5, plumose upwards.—*Podotheca angustifolia* (Labill.) Less.

Common near sea, but also found inland : southern districts ; Kangaroo Island ; Yorke and Eyre Peninsulas and westward to Ooldea ; Murray lands ; South-East. Aug.-Dec.—Temperate Australia.

50. LEPTORRHYNCHUS, Less.

(From Greek *leptos*, slender ; *rhynkhos*, snout, beak : alluding to the beaked achenes.)

Involucre campanulate, the bracts numerous, unequal, the outer sessile, the inner ones clawed but without spreading laminae, all thin and scarious or membranous, the lowest ones passing into the small scale-like bracts of the peduncle ; receptacle naked ; flowers all tubular, longer than the involucre, a few of the outer ones usually female, slender, 3-4-toothed, the inner ones numerous, bisexual, 5-toothed ; anthers tailed ; achenes terete, contracted or beaked at summit ; pappus of few or many bristles. Herbs with alternate entire leaves and flowerheads on long peduncles ; flowers yellow except in *L. elongatus*.

A genus limited to Australia. As in *Ixiolaena* and *Podolepis* the outer flowers are curved and overhang the involucre.

A. Pappus-bristles 0-12 ; involucral bracts all appressed, acute, ciliate, woolly at base and with colored tips to the conspicuous laminae ; a few outer flowers female ; achenes slightly contracted at summit.
  B. Female flowers without pappus ..... *L. tenuifolius* 1.
  B. All flowers with pappus.
    Bisexual flowers with 8-12 pappus-bristles ; perennial *L. squamatus* 2.
    Bisexual flowers with about 4 pappus-bristles ; annual ..... *L. tetrachaetus* 3.

A. Pappus-bristles 15-40 ; outer involucral bracts whitish, loose, conspicuous, not woolly, the inner ones with narrow herbaceous claws and minute laminae ; all flowers bisexual ; achenes distinctly beaked.
  C. Outer bracts acute, transparent, not ciliate ; peduncles long, scaly.
    Achenes gradually tapering into a rather thick beak ; flowers white..... *L. elongatus* 4.
    Achenes narrowed abruptly into a slender beak ; flowers yellow ..... *L. medius* 5.
  C. Outer bracts mostly obtuse, opaque, ciliate ; peduncles leafy below ..... *L. Waitzia* 6.

1. **L. tenuifolius,** F. v. M. Erect wiry perennial 30-40 cm. high, glabrous except a little wool on the lower face of the leaves, which are narrow-linear, 2-5 cm. long with revolute margins ; peduncles filiform ; involucre 5-6 mm. long, the bracts lanceolate, woolly, with orange tips, the inner ones ciliate ; female flowers without pappus ; bisexual flowers with 5-7 bristles strongly barbellate upwards ; achenes glabrous.

Near Millicent and Penola, S.E.—Victoria.

2. **L. squamatus** (Labill.) Less. Wiry perennial with ascending stems 20-30 cm. long, including the long scaly peduncles ; leaves linear-lanceolate, 1-3½ cm. long, more or less unilateral, almost flat or the margins recurved, green and with long scattered hairs above, white-tomentose below, almost pungent-pointed ; involucre 7-10 mm. long, the bracts lanceolate, woolly, ciliate, with brown or orange tips ; achenes papillose ; pappus-bristles barbellate, those of the female flowers 4-6, of the bisexual ones 7-12.

Southern districts to Flinders Range ; Murray lands ; South-East. Aug.-Jan.—Victoria ; New South Wales ; Tasmania.

3. **L. tetrachaetus** (Schlechtd.) J. M. Black (1921). Slender erect sparsely woolly branching annual, 6-15 cm. high; leaves linear or narrow-linear, 1-2½ cm. long, acute, the margins more or less recurved, sparsely beset with short hairs, not tomentose below, somewhat unilateral; peduncles filiform; involucre 4-5 mm. long, the bracts scarcely woolly, but all long-ciliate, lanceolate, with straw-colored tips; achenes shortly beaked, papillose; pappus-bristles barbellate upwards, of the female flowers 3, of the bisexual ones 4.—*L. pulchellus*, F. v. M. (1858); *Doratolepis tetrachaeta*, Schlechtd. (1847).

Southern districts to Flinders Range; Yorke and Eyre Peninsulas to Fowler's Bay; Murray lands; South-East. Sept.-Dec.—Western Victoria and New South Wales.

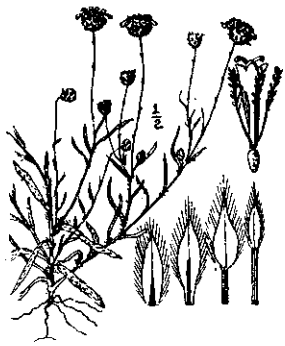

FIG. 290.—**Leptorrhynchus tetrachaetus.**

4. **L. elongatus,** DC. Erect perennial, 30-40 cm. high, sparsely pubescent with septate hairs; leaves linear-lanceolate, 2-8 cm. long; peduncles with distant scales which pass gradually into the outer involucral bracts; flowers all bisexual, white or very pale yellow, scented, considerably exceeding the involucre, which is 10-12 mm. long, the outer bracts lanceolate, loose, hyaline, the inner with rigid green linear glandular-hairy claws and a small scarious lanceolate erect tip; achenes about 8 mm. long when ripe, including the papillose-tuberculate beak into which they gradually taper, the achene also more or less papillose; pappus-bristles 25-40, very slightly barbellate.

Southern districts to Flinders Range; Yorke Peninsula. Aug.-Dec.—Victoria; New South Wales; Tasmania.

5. **L. medius,** A. Cunn. Near the preceding, but is apparently always annual, 15-20 cm. tall; leaves smaller, chiefly near the base, the long peduncles forming the principal part of the plant; involucre 8-10 mm. long, the flowers bright yellow; achenes fusiform, smooth or papillose, 1½-3 mm. long, narrowed abruptly into a slender beak as long as or twice as long as the achene.—*L. elongatus*, DC. var. *pedunculariis*, Benth.

Southern districts to Flinders Range; Yorke and Eyre Peninsulas to the Gawler Ranges; Murray lands; Naracoorte; South-East. Aug.-Nov.—Western Victoria and New South Wales; West Australia.

6. **L. Waitzia,** Sond. Erect or ascending annual, somewhat woolly with septate hairs, 5-25 cm. high; leaves broad-linear, 1-2½ cm. long; peduncles leafy in lower part; involucre 8-10 mm. long, the bracts scarious, loose, oblong, obtuse, ciliate, only the innermost row with a narrow green claw and small lamina; flowers all bisexual; achenes papillose, beaked, pappus-bristles about 15-20, barbellate.

Dry parts of southern districts; Murray lands; Yorke and Eyre Peninsulas to Gawler Ranges and the Great Bight. Aug.-Dec.

51. WAITZIA, Wendl.

(Named by Wendland in 1808 after F. C. A. Waitz, who travelled in Java and wrote on the plants of that island.)

1. **W. acuminata,** Steetz. Erect or ascending annual, 5-30 cm. high or sometimes more, scabrous-pubescent with septate hairs; leaves broad-linear, 2-7 cm. long, with recurved margins; heads in corymbs or short racemes; involucre broadly campanulate, about 15 mm. long, the bracts all clawed, with lanceolate-acuminate golden-yellow denticulate-ciliate laminae, finally spreading and reflexed, the claws narrow-linear, more or less woolly, the outer bracts with short claws and passing gradually into similar scales on the peduncle, the inner ones with long glandular claws, the innermost with broader claws and obtuse or minute laminae; flowers numerous, all bisexual, tubular; receptacle naked; anthers tailed; style-branches with conical tips; achenes fusiform, papillose, narrowed abruptly into a slender beak 2 or 3 times longer than they; pappus-bristles 15-20, very fine and brittle, scarcely barbellate.—*W. corymbosa*, Benth. non Wendl.

Dry parts of the southern districts; Murray lands; Everard and Musgrave Ranges, Gawler Ranges and westward to Ooldea. Aug.-Dec.—Western Victoria and New South Wales; Central and West Australia.

An Australian genus of 6 species.

52. MILLOTIA, Cass.

(Named by Cassini in 1829 after a French scientist called Millot.)

Involucre cylindrical, the bracts in 1-2 rows, narrow, few, equal, herbaceous with broad or narrow scarious margins; receptacle naked; flowers all bisexual, tubular, 5-toothed, longer than the involucre, some usually sterile; anthers with ciliate or fringed tails; style-branches ending in a conical tip; achenes terete, slender, tapering gradually into a beak; pappus of capillary bristles or none. Small more or less woolly annuals with alternate linear entire leaves and small flowerheads on terminal peduncles. A purely Australian genus.

Pappus as long as corolla, scarcely barbellate	*M. tenuifolia* 1.
Pappus shorter than corolla, plumose	*M. Greevesii* 2.
Pappus none	*M. Kempei* 3.

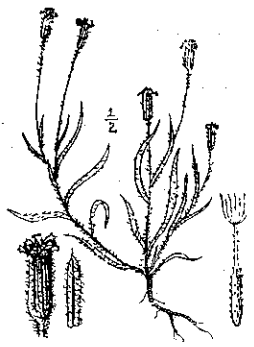

FIG. 291.—**Millotia tenuifolia.**

1. **M. tenuifolia,** Cass. Slender erect or ascending woolly annual, 2-15 cm. high; leaves soft, narrow-linear to oblanceolate and petiolate, acute, 1-3 cm. long; involucre 5-8 mm. long, the 6-12 bracts with green midribs, rarely with dense white wool outside; flowers about 10-25, white or pale yellow; achenes pubescent, 4-7 mm. long with the slender beak; pappus-bristles 15-25, minutely or rarely distinctly barbellate.

Southern districts to Flinders Range; Tarcoola; Kangaroo Island; Murray lands; Yorke and Eyre Peninsulas; South-East. Aug.-Nov.—Temperate Australia.

2. **M. Greevesii,** F. v. M. White-woolly slender ascending annual, the stems 2-10 cm. long; leaves almost filiform, 1-2 cm. long; involucre 5-7 mm. long, so densely woolly that the 8-10 bracts are often scarcely visible; flowers 10-30, yellow; achenes papillose, 5-7 mm. long with the slender beak; pappus-bristles about 15, not longer than the narrow tube of the corolla (about 1½ mm.), plumose with long distant barbs.

Lake Torrens to Far North; Murray lands and north thereof. Winter.—Western New South Wales.

3. **M. Kempei,** F. v. M. var. *Helmsii,* F. v. M. et Tate. White-woolly slender procumbent or ascending annual, the stems 2-12 cm. long; leaves narrow-linear or almost filiform, 5-15 mm. long; involucre 4-5 mm. long, the bracts 10-13, glandular-hairy; flowers 50-80, yellow; achenes papillose, 4 mm. long including the short beak; pappus none.—*Toxanthus Whitei,* J. M. Black (1915).

PLATE 51 (page 617).—1, flower; 2, two of the involucral bracts.

Lake Torrens to Far North and westward to Blyth Range and Ooldea. June-Oct.—West Australia (Victoria Desert). Differs from the type of *M. Kempei,* which came from the Finke River, C. A., by the involucral bracts glandular, not woolly. Is distinguished from *Toxanthus* by the more numerous flowers, of which the central ones are straight, not curved.

53. QUINETIA, Cass.

(After Edgar Quinet, 1803-1875, French historian and politician.)

1. **Q. Urvillei,** Cass. Slender erect grey-woolly annual, 3-12 cm. high; leaves broadly lanceolate, mucronate, conduplicate, narrowed below and then widening into the broad sheathing base or petiole, 8-15 mm. long in all; heads subsessile, usually 2 in each axil; involucre cylindrical, 4-5 mm. long, of 3 oblong ciliate herbaceous bracts with scarious margins; flowers 1-2, red, erect, longer than the involucre, tubular, bisexual; receptacle naked; anthers shortly tailed; style-branches subulate; achenes compressed, linear-cuneate, pubescent, tapering downwards into a short stipes; pappus of 3-6 lanceolate scales, each tapering into a fine awn longer than flower.

Southern districts; Murray lands. Aug.-Nov.—North-western Victoria; West Australia.

FIG. 292.—**Quinetia Urvillei.**

54. RUTIDOSIS, DC.

(From Greek *rhytidōsis*, a wrinkling, from *rhytis*, a wrinkle: alluding to the involucral bracts of *R. helichrysoides*.)

Involucre broad, the bracts scarious, rather loose; receptacle convex, naked; flowers tubular, bisexual; anthers scarcely tailed; style-branches truncate; achenes broadly obconical, conspicuously papillose, the outer ones sloping obliquely from the corolla and pappus; pappus of several stiff white obtuse scales. Herbs with entire leaves.

An Australian genus of 7 species.

Stout woolly perennial with showy golden heads and lanceolate leaves ..... *R. helichrysoides* 1.
Small almost glabrous annual with inconspicuous whitish heads and linear leaves ..... *R. multiflora* 2.

1. **R. helichrysoides,** DC. White-woolly erect perennial 25-50 cm. high; leaves soft, lanceolate, mucronate, alternate, narrowed at base, 2-6 cm. long; heads on long peduncles; involucre hemispherical, 6-7 cm. long, the bracts scarious, lanceolate, numerous, unequal, pale yellow, ciliate and transversely wrinkled, the innermost on narrow claws; flowers numerous, bright yellow, slightly exceeding the involucre, the anthers exserted; pappus of 4-6 spathulate scales, 1-1½ mm. long, about as long as the achene and scarcely half as long as the 5-toothed corolla.

Flinders Range to the Far North from Cordillo Downs to the Birksgate Range; westward to Tarcoola: often on flooded land and locally called "Yellow top."—June-Nov.—Western Victoria and New South Wales; Central Australia.

2. **R. multiflora** (Nees) B. L. Robinson (1911). Small slender annual 1½-5 cm. high, glabrous except for a few long hairs near the base of the leaves, which are succulent, linear, acute, 3-8 mm. long, stem-clasping, opposite except the uppermost ones; flowerheads clustered, sessile among floral leaves; involucre globular, about 3 mm. long, the bracts 10-15, in 3 rows, subequal, all sessile, ovate or orbicular, scarious, with green midrib; flowers minute, about 25 in the terminal heads, fewer in the lateral ones, not longer than involucre; pappus of 7-11 obovate often notched scales 1-1½ mm. long and longer than the 4-toothed corolla.—*R. Pumilo,* Benth. (1866); *Styloncerus multiflorus,* Nees (1846-47); *Pumilo argyrolepis,* Schlechtd. (1848).

Southern districts; Kangaroo Island; Murray lands; Yorke and Eyre Peninsulas to the Great Bight; South-East. Aug.-Nov.—Temperate Australia.

FIG. 293.—Rutidosis multiflora.

55. TOXANTHUS, Turcz.

(From Greek *toxon*, a bow; *anthos*, flower: alluding to the bent corollas.)

Involucre cylindrical, of 3-5 linear herbaceous subequal bracts; receptacle naked; flowers usually 3-12, bisexual, tubular, exceeding the involucre; anthers tailed; style-branches with lanceolate tips; achenes slender, terete; pappus none. Small slender branching annuals with alternate linear leaves mostly 3-10 mm. long; flowerheads sessile among floral leaves; corolla small, 3-4-toothed, recurved, rigid, persistent, continuous with the ovary and achene, white or pink.

Glandular-pubescent plant; achene twice as long as corolla ..... *T. Muelleri* 1.
Woolly plant; achene about as long as corolla ..... *T. perpusillus* 2.

FIG. 294.—Toxanthus Muelleri.

1. **T. Muelleri** (Sond.) Benth. Procumbent or ascending glandular-pubescent annual, the stems 1-6 cm. long; involucre 3-4 mm. long, the bracts erect; corolla 1½-2 mm. long, woolly or not at base; achenes almost black when ripe, glandular-pubescent, 4-5 mm. long, including the short beak into which they taper.

Most parts of the State. Aug.-Nov.—Western Victoria.

2. **T. perpusillus,** Turcz. Procumbent grey-woolly annual, or the leaves at length becoming glabrous, the stems 1-4 cm. long; involucre 3-4 mm. long, the bracts loose, acute, densely woolly; corolla 2½-3 mm. long, woolly; ripe achenes black, 3 mm. long, scarcely beaked.

Murray lands to the Burra, Hallett, and Far North; westward to Everard Range. June-Oct.—Western Victoria and New South Wales; West Australia.

56. HUMEA, Sm.

(After Sir Abraham Hume, F.R.S., 1749-1838, an English patron of art and science.)

Involucre cylindrical, the bracts in several rows, scarious, unequal, oblong, concave, appressed; receptacle naked; flowers few or solitary, tubular, bisexual, 5-toothed, scarcely exceeding the involucre; anthers finely tailed; style-branches truncate; achenes terete, without pappus. Shrubs with entire alternate leaves, small numerous corymbose flowerheads and the habit of *Cassinia*, from which they differ in the absence of pappus and of receptacle-scales. Limited to Australia.

A. Involucre white; leaves obtuse.
Leaves linear, more or less spreading; flowers 3 ..... *H. cassiniiformis* 1.
Leaves very small, appressed; flowers 4-6 ..... *H. pholidota* 2.
A. Involucre straw-colored; leaves narrow-linear, acute; flower 1 ..... *H. punctulata* 3.

1. **H. cassiniiformis** (F. v. M.) n. comb. Viscid glabrous scented shrub about 1 m. high; leaves linear, obtuse, with revolute margins, 1-2 cm. long, often clustered; heads in a compact rounded corymb; involucre white, 4-5 mm. long, the outer bracts acute, half as long as the involucre, the inner ones obtuse or notched; flowers almost always 3; achenes minutely papillose.—*Haeckeria cassiniaeformis*, F. v. M. (1855); *Humea cassiniacea*, F. v. M. (1858).
Eyre Peninsula. Feb.-May.

2. **H. pholidota** (F. v. M.) J. M. Black (1919). Sticky erect glabrous shrub of about 1 m.; leaves imbricate, closely appressed, oblong-lanceolate, obtuse, 2-4 mm. long, convex below; heads in dense corymbs; involucre white, 4-5 mm. long, the bracts all obtuse, unequal, the outer ones gradually shorter; flowers 4-6; achenes papillose-pubescent.—*Ozothamnus pholidotus*, F. v. M. (1861); *Helichrysum pholidotum*, F. v. M. (1866); *Humea squamata*, F. v. M. (1880).
Murray lands. Oct.-March.—Western Victoria and New South Wales.

3. **H. punctulata,** F. v. M. Sticky glabrous erect shrub; leaves narrow-linear, acute, trigonous or tetragonous, keeled below, slightly decurrent, the margins blunt, not recurved, 15-25 mm. long; heads in rather flat very dense corymbs; involucre straw-colored, about 3 mm. long, the bracts obtuse, subequal except those of the outer row, which are broader and shorter and usually surround several of the heads like a general involucre; flower solitary in each head.
Flinders Range from Telowie Gorge to Edeowie; apparently rare. Summer. Resembles *Cassinia complanata* in habit, but the involucral bracts, flowers, and leaves are different.

FIG. 295.—**Ixodia achilleoides.**

57. IXODIA, R. Br.

(From Greek *ixódês*, sticky, from *ixos*, birdlime.)

1. **I. achilleoides,** R. Br. Erect glabrous sticky undershrub to 1 m. high, branching in upper part; leaves usually alternate, linear, linear-lanceolate, or in maritime specimens sometimes oblong-cuneate, 1-8 cm. long, 1-7 mm. broad, more or less decurrent sometimes in wings along the stem; heads in terminal corymbs; involucre ovoid, 4-6 mm. long without the ray, the bracts unequal, in several rows, the outer greenish, appressed, the inner ones with obovate white spreading laminae; receptacle with a chaffy scale round each flower; flowers tubular, bisexual, yellow, 5-toothed; anthers tailed; style-branches truncate; achenes papillose, without pappus.
Southern districts to Flinders Range; Kangaroo Island; Murray lands; Eyre Peninsula; South-East. Summer.—Western Victoria.

58. PODOLEPIS, Labill.

(From Greek *pous, podos*, a foot; *lepis*, a scale: alluding to the stalks or claws of the inner involucral bracts.)

Involucre ovoid to hemispherical, the bracts unequal, in several rows, with hyaline non-radiating laminae, at least the outer ones sessile; receptacle flat, naked; outer flowers female, longer than the involucre and sometimes forming a conspicuous ray, the limb rather deeply cut into 3-4 narrow lobes or extended in a short 2-4-toothed ligule; inner flowers always more numerous, bisexual, tubular, usually 5-lobed; anthers tailed; style-branches truncate; achenes terete; pappus of capillary bristles shorter than corolla.

Rather rigid wiry herbs with alternate entire leaves; flowerheads terminal, usually solitary; flowers all yellow, except in *P. capillaris*.

A genus limited to Australia.

A. Involucres subsessile, clustered; involucral bracts wrinkled ..... *P. arachnoidea* 1.
A. Involucres pedunculate, solitary.
B. Involucres 8-20 mm. long, the lowest bracts passing into the scales on the peduncle; ray-flowers ligulate, sometimes 30-45, but always much fewer than the inner ones.
C. Involucral bracts usually smooth, some or all acute; somewhat woolly plants.
Perennial; involucre large ..... *P. acuminata* 2.
Annual; involucre smaller ..... *P. canescens* 3.
C. Involucral bracts wrinkled, all very obtuse; usually glabrous perennial; involucre large ..... *P. rugata* 4.
B. Involucres 4-7 mm. long, the bracts smooth; peduncles naked; slender annuals.
Leaves oblong-lanceolate; flowers numerous, the female ones 4-lobed ..... *P. Lessonii* 5.
Leaves filiform-linear; flowers 20-30, the female ones shortly ligulate ..... *P. capillaris* 6.

1. **P. arachnoidea** (Hook.) Druce (1917). Annual 30-80 cm. high, more or less woolly, especially on the lower face of the leaves, which are lanceolate, 3-10 cm. long, with recurved margins, the upper ones stem-clasping; heads nearly sessile and clustered at the ends of the branches; involucre ovoid-cylindrical, 8-10 mm. long, pale-yellow, the bracts sessile, acute, wrinkled transversely; female flowers 3-lobed, hardly longer than the inner ones; pappus-bristles rather numerous.—*Rutidosis arachnoidea*, Hook. (1848); *Podolepis rhytidochlamys*, F. v. M. (1864).

Cooper's Creek, apparently rare.—New South Wales; Queensland.

2. **P. acuminata,** R. Br. More or less woolly perennial 25-60 cm. high; leaves lanceolate or the upper ones linear, sometimes almost glabrous, 3-10 cm. long; heads on long scaly peduncles; involucre hemispherical, 15-20 mm. long, the bracts hyaline, smooth, pale-brown, the inner ones clawed, all or only the innermost acute or acuminate; female flowers much longer than the inner ones, with a 2-4-toothed yellow ligule 8-15 mm. long; achenes papillose-pubescent; pappus-bristles 25-40.

Southern districts to Flinders Range; Tarcoola; Murray lands; South-East. Oct.-Dec.—Temperate Australia; Tasmania.

3. **P. canescens,** A. Cunn. More or less loosely woolly annual 10-40 cm. high; leaves linear or lanceolate, mostly 2-8 cm. long, the upper ones stem-clasping, often narrow; heads on slender scaly peduncles; involucre hemispherical, 8-10 mm. long, the bracts hyaline, pale-brown, shining, smooth or sometimes transversely wrinkled, acuminate with fine points, the inner ones clawed; ligules of the female flowers yellow, 2-4-toothed, longer than the inner bisexual flowers; achenes papillose or almost glabrous; pappus-bristles 25-35.

Southern districts to Flinders Range and Far North; westward to Musgrave Ranges, Nullarbor Plain, and Great Bight; Murray lands. July-Dec.—Western Victoria and New South Wales; Central and West Australia.

4. **P. rugata,** Labill. Almost shrubby perennial 10-70 cm. high, usually quite glabrous, sometimes with a little loose wool; leaves linear-lanceolate, or in maritime specimens sometimes oblanceolate, mostly 2-8 cm. long, the upper ones half-clasping; peduncles scaly; involucre urn-shaped, later hemispherical, about 15 mm. long, the bracts all obtuse, hyaline, pale-brown, wrinkled transversely, the inner ones clawed; ligules yellow, mostly 3-toothed; achenes papillose; pappus-bristles about 30.

Southern districts; Kangaroo Island; Yorke and Eyre Peninsulas to the Great Bight; Murray lands; South-East. Sept.-Dec.—Western Victoria; West Australia.

FIG. 296.—**Podolepis rugata.**

5. **P. Lessonii** (Cass.) Benth. Slender erect branching annual 6-25 cm. high, sparsely hairy or almost glabrous; leaves oblong-lanceolate, 1-5 cm. long, stem-clasping, the upper ones mostly at the forks; peduncles filiform, naked; involucre hemispherical, 6-7 mm. long, umbilicate at base, the bracts hyaline, ciliolate, shining, broadly ovate, the middle ones clawed, the innermost acute; flowers all similar in size and shape, but a few of the outer ones are female, 4-lobed and have only 1 pappus bristle or none; achenes glabrous; pappus bristles of bisexual flowers usually 6-12, barbellate upwards.

Southern districts to Flinders Range. Aug.-Nov.—Western New South Wales; West Australia.

6. **P. capillaris** (Steetz) Diels. Slender glabrous much-branched annual 10-50 cm. high; leaves narrow-linear, the upper ones small and distant; peduncles capillary; involucre ovoid, 4 mm. long, the bracts oblong, obtuse, shining, all sessile, with green midribs and hyaline tips and margins; flowers white, the outer ones female, 6-10, with short 3-toothed ligules, the inner ones rather shorter, 15-20, 4-5-lobed, but deeply slit on one side so that the limb is unilateral; achenes papillose; outer flowers without pappus, the inner ones with 10-12 simple bristles.—*P. Siemssenia*, F. v. M. (1866); *Siemssenia capillaris*, Steetz (1844-45).

Barunga northwards to Flinders Range and Far North; Murray lands and north thereof; westward to Musgrave Ranges, Gawler Ranges and the Great Bight. July-Nov.—Western Victoria and New South Wales; West Australia.

59. ATHRIXIA, Ker.

(The author gives no derivation; apparently from Greek *athrix* hairless, but the application is not evident).

FIG. 297.—**Athrixia tenella.**

1. **A. tenella,** Benth. More or less woolly or pubescent annual, 4-15 cm. high; stems very short, with linear or linear-lanceolate mostly alternate rather crowded leaves 1½-3 cm. long, with recurved margins; heads on wiry filiform reddish peduncles 3-10 cm. long, which are hairy when young but usually become almost glabrous; involucre almost hemispherical, 5-6 mm. long, the bracts numerous, in 4-5 rows, the outer ones reddish, subulate, plumose, the inner ones with narrow scarious margins to the claws and plumose tips; receptacle naked; flowers yellow, numerous, longer than involucre, tubular and equal, usually all bisexual and 5-toothed; anthers tailed; achenes fusiform, papillose; pappus-bristles 2-4, plumose upwards, caducous.

Yorke Peninsula to Flinders Range; Spalding and north thereof; Murray lands; Eyre Peninsula to Gawler Ranges and the Great Bight. Aug.-Nov.—Western Victoria and New South Wales; West Australia.

Var. *horripes*, J. M. Black. Upper part of peduncles beset with plumose scales similar to the outer involucral bracts.—Karoonda (Murray lands). This approaches the West Australian *A. Croniniana*, F. v. M., but the pappus-bristles are those of *A. tenella*.

The genus includes 6 other Australian and several South African species.

60. INULA, L.

(Latin name of the European species *I. Helenium*, L.)

*1. **I. graveolens** (L.). Desf. *Stinkwort.* Erect aromatic glandular-pubescent sticky annual, 20-50 cm. high; leaves soft, narrowly oblanceolate, obscurely denticulate; heads subsessile, in a loose pyramidal panicle; involucre companulate, 6-7 mm. long, the bracts in several rows, linear-lanceolate, the outer ones herbaceous; flowers yellow, the outer female ones 10-12, with short erect ligules slightly exceeding the involucre, the inner bisexual tubular flowers about as many; anthers tailed; achenes pubescent, narrowed to a neck at summit and then expanded into a small cup supporting the rather numerous capillary pappus-bristles.

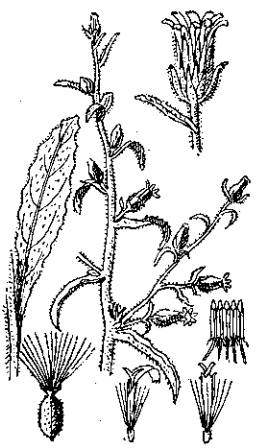

FIG. 298.—**Inula graveolens.**

A common weed in settled districts. Mar.-Apl.—Mediterranean region.

61. PALLENIS, Cass.

(Apparently from Greek *pallênis*, the adjectival form of *Pallênê*, a district near Athens; the plant is found in Greece).

*1. **P. spinosa** (L.) Cass. Pubescent biennial 20-50 cm. high; leaves oblong to oblong-lanceolate, entire; heads solitary, terminating the branches; involucre broad, about 20 cm. long, the bracts rigid, pungent-pointed, the outer ones lanceolate and much longer than the inner ones and the flowers; flowers yellow, the outer female, with short 3-toothed ligules, the inner ones bisexual, all the corollas dilated and corky towards base; receptacle scaly; ray-achenes compressed, 2-winged, with a minute scaly jagged pappus; disk-achenes pubescent, with a pappus of minute scales.—*Asteriscus spinosus* (L.) Gren. et Godr.

Near Paskeville. Oct.-Dec.—Mediterranean region.

FIG. 299.—**Pallenis spinosa.**

62. MYRIOCEPHALUS, Benth.

(From Greek *myrios*, very many; *kephalê*, head: alluding to the numerous partial heads.)

Flowerheads very numerous, few-flowered, crowded on a general receptacle in a dense compound head, which is surrounded by a general involucre of very numerous narrow bracts in many rows, each with or without a small white lamina; involucral bracts of partial heads few, transparent; receptacle naked; flowers tubular, bisexual, yellow; anthers tailed; achenes terete; pappus of few bristles. Herbs with narrow alternate entire leaves, the compound heads terminal, globular or much depressed when expanded.

A purely Australian genus.

A. Bracts of general involucre with small hyaline colorless erect tips; upper leaves much longer than the compound heads ..... *M. rhizocephalus* 1.

A. Bracts of general involucre with small white opaque radiating laminae; corollas 5-toothed; upper leaves shorter than the compound heads.

Erect plant; compound heads 2-4 cm. across; achenes silky with long white hairs ..... *M. Stuartii* 2.

Small procumbent plant; compound heads 1-1½ cm. across; achenes with short scattered hairs ..... *M. Rudallii* 3.

1. **M. rhizocephalus** (DC.) Benth. Dwarf slightly woolly annual, the stems mostly 2-40 mm. long, sometimes almost absent, covered by the broad sheathing bases of the leaves, which are narrow-linear, 2-7 cm. long, the upper ones much longer than the heads; compound heads 10-16 mm. diam., sessile among the upper leaves, the bracts of the general involucre hyaline, with a green midrib, woolly-ciliate except the small erect tips; partial heads 1-flowered, with an involucre of 3-5 oblong hyaline slightly woolly bracts united at base in a hard ring; corollas mostly 3-toothed; achenes pubescent; pappus of 1 fine simple bristle.—*Hyalolepis rhizocephala*, DC.

Yorke Peninsula to Gladstone; Kangaroo Island; Murray lands; South-East; Eyre Peninsula. Sept.-Dec.—Temperate Australia.

Var. *pluriflora*, J. M. Black. Partial heads 4-5-flowered, the bracts 5-7, very woolly.—Flinders Range (between Lakes Torrens and Frome).

2. **M. Stuartii** (F. v. M. et Sond.) Benth. Rather stout erect annual, 10-50 cm. high, woolly or sometimes glandular-pubescent; stem simple or branching only at base; leaves linear or linear-lanceolate, 2-7 cm. long; compound heads hemispherical, 2-4 cm. across, the bracts of the general involucre with herbaceous woolly claws and white spreading ovate laminae 5-7 mm. long; partial heads 4-9-flowered, with the same number of ovate-oblong entirely hyaline involucral bracts, ciliolate in upper part, and 2 subtending clawed bracts; achenes densely silky-villous; pappus-bristles 8-13, slightly dilated downwards, plumose from the base, barbellate towards summit.—*Polycalymma Stuartii*, F. v. M. et Sond.

Murray lands to Far North and westward to Birksgate Range and Ooldea. Most of the year.—Western Victoria and New South Wales; Central Australia.

3. **M. Rudallii** (F. v. M.) Benth. Procumbent or ascending sparsely woolly annual, 5-15 cm. long; leaves linear to oblong-cuneate, 5-25 mm. long, often glabrous; compound heads hemispherical, 10-15 mm. across, the involucral bracts scarious, woolly-ciliate, with green midrib and a white ovate glabrous spreading lamina 1½-2 mm. long; partial heads 4-flowered, the involucre of 4 truncate hyaline sparsely hairy bracts, the 2 outer concave, the 2 inner ones flat, and 2 subtending bracts; achenes pubescent, with 1-4 fine pappus-bristles shorter than the corolla, dilated into hyaline wings at base.

Far North, from Cooper's Creek to the Everard Range. Most of the year.

63. ANGIANTHUS, Wendl. (1809).

(From Greek *angeion*, a vessel or cup; *anthos*, flower: alluding to the cup-like shape of the ring of broad pappus-scales in *A. tomentosus*).

Partial flower-heads numerous, few-flowered, crowded on a general receptacle in a dense compound terminal head; general involucre never conspicuous, consisting, in the species with cylindrical compound heads, of a few empty basal bracts similar to those subtending the partial involucres, in the species with ovoid compound heads it consists of scarious bracts not longer than the partial involucres which they enclose, and is concealed by the floral leaves; partial involucres usually compressed, consisting of 2-several hyaline bracts, mostly opposite in pairs, the outer ones concave or conduplicate, the inner ones flat, and, in the species with cylindrical heads, the partial heads extending along the rhachis or receptacle are sheltered by broad conspicuous scarious or hyaline subtending bracts; flowers tubular, bisexual, yellow, usually 5-toothed; anthers tailed; pappus various or absent. Herbs with alternate entire leaves.

The genus is limited to Australia. *Siloxerus*, Labill. (1806) has priority of date, but the Australian Committee on Botanical Nomenclature decided to recommend the retention of Wendland's better known name.

A Compound heads sessile and subtended by floral leaves.
- B. Compound heads cylindrical, much longer than the floral leaves; receptacle terete; flowers 2.
  - C. Floral leaves finally inconspicuous.
    - Pappus of scales ending in bristles ..... *A. tomentosus* 1.
    - Pappus a minute jagged crown ..... *A. brachypappus* 2.
  - C. Floral leaves conspicuous; pappus of 1 oblique scale *A. phyllocalymmeus* 3.
- B. Compound heads turbinate to globular, shorter than the floral leaves; receptacle flattish or convex.
  - D. Compound heads ovoid or turbinate; floral leaves appressed; pappus none.
    - Flowers 2; floral leaves lanceolate, straight ... *A. Preissianus* 4.
    - Flower 1; floral leaves narrow-linear, recurved *A. strictus* 5.
  - D. Compound heads globular, white-woolly; pappus of bristles ..... *A. Burkittii* 6.

A. Compound heads cylindrical, without floral leaves at base; receptacle terete.
- Compound heads tapering gradually to a narrow base; pappus a minute jagged crown ..... *A. pusillus* 7.
- Compound heads obtuse at base; pappus none ..... *A. tenellus* 8.

1. **A. tomentosus,** Wendl. Woolly annual with many erect or ascending stems 3-25 cm. high; leaves linear or narrowly oblanceolate, obtuse; compound heads cylindrical or when small ovoid, 6-15 mm. long, 5-7 mm. thick, obtuse at base, pale yellow, with a few small appressed leaves at base which sometimes disappear on the older plant; partial involucres of 4 hyaline bracts, the 2 outer ones conduplicate, the 2 inner ones flat and enclosing the 2 flowers; achenes papillose; pappus of 2-4 broad denticulate scales, each terminating in a bristle which is plumose upwards and as long as the flower.

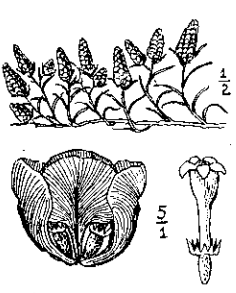

FIG. 300.—**Angianthus brachypappus,** var. *conocephalus*.

Dry parts of the southern districts to Lake Torrens; Murray lands and north thereof; Yorke and Eyre Peninsulas. Aug.-Jan.—Temperate Australia.

2. **A. brachypappus,** F. v. M. Annual, grey-tomentose or becoming almost glabrous, with procumbent branched stems 5-15 cm. long; leaves linear or linear-cuneate; compound heads numerous, cylindrical, 10-15 mm. long, 4-5 mm. thick, slightly contracted at base, pale yellow or brownish, with a few appressed floral leaves, sometimes very small, at base; partial involucres of 2 hyaline conduplicate and 2 flat clawed bracts enclosing the 2 flowers; achene

papillose; pappus a minute jagged crown, scarcely ½ mm. long, about one-fifth as long as the corolla and falling off with it, one of the united scales sometimes ending in a fine simple bristle half as long as the corolla.

North of the River Murray and westward to Lake Torrens. Aug.-Dec.—Western New South Wales.

Var. *conocephalus*, J. M. Black. Compound heads numerous, broadly and obtusely conical, 6-7 mm. thick in lower part.—Ooldea; Nullarbor Plain.

3. **A. phyllocalymmeus** (F. v. M.) n. comb. Slender annual, 8-15 cm. high, grey-tomentose or at length almost glabrous; leaves linear, mucronate; compound heads cylindrical, 10-15 mm. long, about 3 mm. thick, golden-yellow, shining, with a few conspicuous appressed floral leaves at base; partial involucres of 2 conduplicate bracts very broad towards base and 2 flat almost clawed bracts enclosing the 2 flowers, all hyaline; achene pappillose, oblique; pappus a very oblique boat-shaped jagged scale, pointed at summit and nearly as long as the corolla, with 2 auricles at base.—*A. pleuropappus*, Benth. (1866); *Pleuropappus phyllocalymmeus*, F. v. M. (1855).

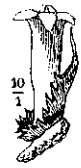

FIG. 301.—**Angianthus phyllocalymmeus.**

Southern Yorke Peninsula; Eyre Peninsula.—Sept.-Dec.

4. **A. Preissianus** (Steetz) Benth. Erect or prostrate annual, white with a woolly tomentum, the wiry stems 1-10 cm. long; leaves linear, acute, becoming glabrous, sometimes opposite; compound heads turbinate to hemispherical 3-5 mm. long, 3-6 mm. diam., exceeded by the surrounding lanceolate woolly appressed floral leaves; general involucre of several obovate hyaline bracts not longer than the partial involucres, which consist of 2 concave keeled hyaline bracts and 2 flat ones, each of the 2 inner flat ones slit along the margin to the midrib and sheltering the 4-toothed flower in the slit; achene papillose; pappus none.—*A. eriocephalus* (Hook f.) Benth.; *Skirrophorus Preissianus*, Steetz.

Chiefly near the coast, from the South-East to Eyre Peninsula, often growing near salt marshes. Summer.—Temperate Australia; Tasmania.

5. **A. strictus** (Steetz) Benth. Sparsely woolly annual, the wiry ascending stems 2-15 cm. long; leaves narrow-linear, rigid, mucronate; compound heads obovoid-turbinate, about 4 mm. long and 3-4 mm. diameter at summit, slightly exceeded by the narrow-linear floral leaves, which are woolly in the lower part, glabrous and recurved towards summit; general involucre of several oblong scarious bracts, pubescent on back and not longer than the partial involucres, which are 1-flowered, each flower enclosed in 2 narrow concave hyaline bracts ciliate at the rounded summit; corollas 5-toothed; achenes papillose; pappus none.—*Skirrophorus strictus* (Steetz) A. Gray.

FIG. 302.—**Angianthus strictus.**

Southern districts to Flinders Range; Kangaroo Island; Murray lands; Yorke and Eyre Peninsulas to the Great Bight. Aug.-Dec.—Dry parts of temperate Australia.

6. **A. Burkittii** (Benth.) n. comb. Annual, with a few minute glandular hairs; stems slender, wiry, reddish, prostrate or ascending, 1½-10 cm. long, loosely woolly in upper part; leaves narrow linear, almost glabrous; compound heads, globular, densely white-woolly, 6-8 mm. diam., exceeded by the spreading linear floral leaves and by the herbaceous tips of the broadly scarious woolly-ciliate bracts of the general involucre into which the floral leaves gradually pass; partial involucres 1-2-flowered, of 3-6 outer bracts with herbaceous midrib and broad scarious woolly margins and 2 inner flattish hyaline glabrous or ciliolate bracts enclosing the flower; achenes obovoid, glabrous; pappus of 8-12 bristles barbellate or almost plumose with conspicuous rather distant barbs and united in a ring at base.—*Gnephosis (?) Burkittii*, Benth. (1866); *Angianthus Whitei*, J. M. Black (1913).

PLATE 53 (2), p. 633.—1, bract of general involucre; 2, the 2 hyaline inner bracts of the partial involucre, with flower; 3, inner bract of general involucre; 4, style and anthers; 5, flower; 6, pappus.

North of the Broken Hill railway; Gawler Ranges, E.P. Chiefly winter.—Western New South Wales; West Australia (Victorian Desert). In Helms' specimens from the Victoria Desert some of the heads are stemless and rest on the ground.

7. **A. pusillus,** Benth. Ascending annual, pubescent with short hairs or becoming glabrous, the filiform reddish stems 3-15 cm. long, branching above; leaves oblong-linear to ovate; compound heads narrowly obconical, 7-12 mm. long, 3-4 mm. thick in the upper part, golden, shining, the subtending bracts almost orbicular, scarious, with a

thick herbaceous base ; receptacle woolly ; partial involucres 2-7-flowered, of 4 concav enclosing bracts and 4-8 flat bracts, all hyaline ; corollas 5-toothed ; achenes papillose pappus a minute jagged crown, falling off with the corolla.

Murray lands to Far North and westward to Musgrave Ranges ; Lake Torrens westwar to Ooldea. Most of the year.—Western New South Wales ; Central and West Australia

FIG. 303.—Angianthus tenellus.

8. **A. tenellus** (F. v.M.) Benth. Slender annual, 2-4 cm. long, resembling the preceding and with the same short almost scaly hairs ; leaves oblong linear ; compound heads cylindrical, 4-9 mm. long, 2½-3 mm. thick brownish, scarcely tapering at base, the subtending bracts suborbicular scarious, with a thick herbaceous base ; partial involucres 2-3-flowered of 2 broad concave hyaline ciliolate bracts ; achene papillose ; pappus none.

Near Port Lincoln. Sept.-Dec.—West Australia.

64. GNEPHOSIS, Cass.

(No satisfactory derivation of this name has been found.)

1. Partial flowerhead snumerous, few-flowered, more or less stipitate, crowded on a conical receptacle in a mostly globular terminal compound head, with scarcely any general involucre except a few floral leaves and outer bracts not longer than those of the partial involucres, which are not so much compressed as those of *Angianthus* and consist of several transparent bracts with minute laminae, the inner ones broader than the outer and more caducous ; receptacle convex, without scales ; flowers bisexual, tubular, 5-toothed, yellow ; anthers tailed ; achenes more or less compressed, narrowed towards base ; pappus a small cup or absent. Herbs with alternate entire leaves ; compound heads rather numerous, more or less corymbose.

A genus of about 12 species inhabiting the arid districts of Australia.

A. Pappus cup-like ; achenes glabrous.
  Partial heads 1-flowered, the flowers protruding beyond the involucres ..... *G. skirrophora* 1.
  Partial heads 2-flowered, the flowers not prominent .. *G. cyathopappa* 2.
A. Pappus none ; achenes with long wool ; partial heads 1-flowered ..... *G. eriocarpa* 3.

1. **G. skirrophora** (Sond. et F. v. M.) Benth. Woolly annual with many ascending stems 3-20 cm. long ; leaves narrow-linear, grey-woolly, 1-2 cm. long ; compound heads globular, 8-12 mm. diam., sessile among short floral leaves which finally almost disappear and with a general involucre of small woolly bracts with yellow erect tips ; receptacle villous with silky hairs ; bracts of partial involucres caducous, the 3-4 outer ones narrow, with a rounded incurved pale-yellow lamina and united by the woolly tuft at the base of each lamina, the 3-4 inner bracts broader, concave, glabrous or with a woolly tuft on back, terminating in a pale subacute erect lamina and enclosing the solitary flower, which is prominent above the partial involucre ; achenes oblong-cuneate, compressed, truncate at summit, glabrous, 1-1½ mm. long ; pappus a white tubular cup about the same length, jagged or lobed at summit and falling off with the corolla.—*G. codonopappa*, F. v. M.

Murray lands ; Flinders Range to the Far North ; Eyre Peninsula and westward to the Great Bight and Ooldea. Aug.-Dec.—Western Victoria and New South Wales ; West Australia.

2. **G. cyathopappa,** Benth. Slender erect branching annual, 4-30 cm. high, woolly-tomentose, becoming glabrous ; leaves linear, acute, 6-20 mm. long ; compound heads at first turbinate, later almost globular, 6-8 mm. diam. ; outer involucre of few small woolly herbaceous bracts with a minute obtuse yellow tip, passing into the small floral leaves ; partial involucres 2-flowered, with 4-6 hyaline bracts with small broad yellow laminae, 2-3 concave, the rest flattish ; clusters of 3-6 partial heads enclosed within a ring of several subtending bracts with small yellow laminae and about 20 of these clusters making up the compound head ; receptacle small, almost glabrous ; flowers scarcely exceeding the partial involucre ; achenes very slightly compressed, obovate-cuneate, rounded at summit, glabrous, ¾ mm. long ; pappus a white tubular cup, ½ mm. long, jagged at summit.—*G. arachnoidea*, Turcz. var. *foliata*, (Sond.) Benth.

From north of River Murray and from the Flinders Range to the Far North ; westward to Musgrave Ranges and Tarcoola. Aug.-Dec.—Western New South Wales ; Central Australia.

The West Australian *G. arachnoidea*, Turcz. cannot be distinguished from *G. cyathopappa* by Bentham's character of no pappus, for an examination of Drummond's type showed that almost all the corollas, although young, had a small shallow cup-shaped pappus

at base. The involucral bracts have small yellow laminae. The compound heads are smaller. Should the two prove to be conspecific, *G. arachnoidea* is the older name.

3. **G. eriocarpa** (F. v. M.) Benth. White-woolly annual, with procumbent or ascending stems 4-20 cm. long; leaves oblanceolate, 1-2½ cm. long, 1-5 mm. broad; compound heads globular, 8-15 mm. diam., sessile among 2 or 3 small floral leaves; partial heads 1-flowered, with about 6 scarious concave bracts united by the wool springing from the green midrib, terminated by small erect rounded laminae, sometimes at first pink, later white or pale-yellow; bracts of the general involucre similar, few; receptacle small, glabrous; achenes slightly compressed, obovate-oblong, 1 mm. long, densely woolly above; pappus none.

Northern part of Flinders Range and Lake Frome to Far North and westward to Musgrave Ranges. Winter and spring.—Western New South Wales; Central Australia.

65. ERIOCHLAMYS, Sond. et F. v. M.

(From Greek *erion*, wool; *khlamys*, cloak: referring to the woolly clothing.)

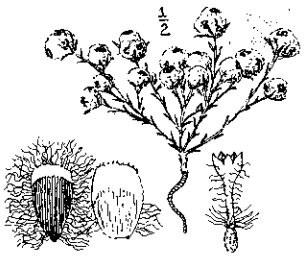

FIG. 304.—**Eriochlamys Behr**

1. **E. Behrii,** Sond. et F. v. M. Woolly-tomentose annual, with erect or ascending stems 3-12 cm. long; leaves linear-terete, 3-10 mm. long, with revolute margins, alternate, becoming glabrous; flowerheads ovoid, about 3 mm. long, usually 3-6 crowded in a woolly globular compound head 5-10 mm. diam., rarely solitary or distinct in clusters of 2-3 at the ends of the branches and then less woolly; the compound heads are at first surrounded by a few short woolly floral leaves which pass into those of the stem; partial (or separate) involucres with green ovate woolly outer bracts, the inner ones also broad but almost entirely scarious; receptacle almost flat, naked; flowers 25-40, tubular, bisexual, 5-toothed, yellow, very small (scarcely 2 mm. long), woolly on the limb and at the base; anthers shortly tailed; achenes papillose, ½ mm. long; pappus none, unless the long single hairs at the base of the corolla are considered such.

Drier parts of southern districts: Kangaroo Island; Murray lands; Eyre Peninsula to Lakes Torrens and Eyre and westward to Tarcoola; Musgrave Ranges. Most of the year.—Western Victoria and New South Wales. The specimens from the Musgrave Ranges have a few of the clusters of heads oblong instead of globular. In all cases the involucral bracts are united by their wool, and so are the corollas.

66. CALOCEPHALUS, R. Br.

(From Greek *kalos*, beautiful; *kephalê*, a head.)

Partial heads numerous, 2-many-flowered, crowded on a general receptacle in a compound head, without any conspicuous general involucre, but usually surrounded at base by a few short leafy or scarious woolly bracts; partial involucres often shortly stipitate, of several bracts, the outer ones narrower, sometimes persistent, often united by the dorsal wool, the inner ones broader, hyaline, caducous, sometimes with small obtuse laminae; receptacle naked; flowers small, tubular, bisexual, 5-toothed; anthers tailed; achenes papillose; pappus of several flat more or less plumose bristles. Herbs or small shrubs with linear entire leaves. A genus limited to Australia.

A. Partial heads 1-3-flowered.
  B. Low white coastal shrub; no laminae; pappus plumose from base ..... *C. Brownii* 1.
  B. Herbs.
    C. No laminae; pappus plumose from base; small annual ..... *C. Drummondii* 2.
    C. Inner involucral bracts with small petaloid laminae; pappus plumose towards summit.
      D. Leaves alternate; annual ..... *C. Sonderi* 3.
      D. Leaves mostly opposite; perennials.
        Laminae white ..... *C. lacteus* 4.
        Laminae yellow ..... *C. citreus* 5.

A. Partial heads 6-22-flowered; laminae small, pale or yellow; pappus plumose from base.
  Compound heads sometimes clustered; leaves woolly but greenish ..... *C. multiflorus* 6.
  Compound heads not clustered; leaves white-tomentose, small ..... *C. Dittrichii* 7.

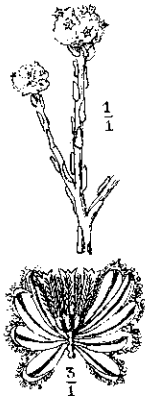

FIG. 305.—**Calocephalus Brownii.**

1. **C. Brownii** (Cass.) F. v. M. *Snow-bush.* Densely branched rounded white-tomentose shrub to 1 m. high; leaves alternate, linear, appressed, obtuse, 2-5 mm. long; compound heads globular, white, 8-12 mm. diam., with some very short floral leaves at base; partial involucres 2-3-flowered, the bracts about 10, oblong-cuneate, scarious with green midrib, united by the curly dorsal wool; flowers yellow; pappus of 8-12 plumose bristles united towards base.

Along most of our sea-coasts among sand or rocks; rare in salt country inland. Summer.—Coasts of temperate Australia.

2. **C. Drummondii** (A. Gray) Benth. Erect grey-woolly annual 3-9 cm. high; leaves alternate, narrow-linear, 1-3 cm. long, the uppermost and the few floral ones shorter or longer than the compound head, which is ovoid-globular, 6-10 mm. diam.; partial heads stipitate, 1-3-flowered, the outer row of involucral bracts oblong-cuneate, scarious with a green midrib, persistent, united by the woolly-ciliate margins, the inner row of 4 ovate-oblong concave bracts; flowers purplish-red; pappus of about 10 unequal plumose bristles, united towards base, and some of them usually dilated downwards.

Southern districts; Yorke and Eyre Peninsulas; Murray lands. Sept.-Nov.—North-western Victoria; West Australia.

3. **C. Sonderi,** F. v. M. Erect branching woolly annual 10-30 cm. high; lower leaves linear-lanceolate, tapering to base, 2-3 cm. long, the upper ones small, linear, decurrent; compound heads globular, 6-9 mm. diam., the floral leaves much shorter; partial heads 2-3-flowered, stipitate, the 5-7 involucral bracts broad, scarious, with a small broad pale-yellow lamina; flowers yellow; pappus of 6-8 plumose bristles dilated downwards and united in a ring or cup at base.

Murray lands. Summer.—Western Victoria and New South Wales.

4. **C. lacteus,** Less. Hoary-tomentose perennial, with ascending stems to 60 cm. long; leaves mostly opposite, linear or linear-oblong, 1½-8 cm. long, 1½-5 mm. broad; compound heads white, ovoid or globular, 8-15 mm. long, the small broad uppermost leaves not close under the head; partial heads 3-flowered, the involucral bracts 10-12, oblong-cuneate, scarious, concave, the inner ones with a small broad white lamina; flowers yellow; pappus of 6-10 bristles plumose towards summit, united in a ring at base.

Onkaparinga, Para, and Gawler Rivers. Summer; apparently very rare now.—Temperate Australia.

5. **C. citreus,** Less. Hoary perennial, 15-40 cm. high; leaves mostly opposite, linear, acute, to 8 cm. long, 1-2 mm. broad, the upper ones small; compound heads golden, ovoid to oblong, 7-14 mm. long; partial heads 3-flowered, the involucral bracts about 10, concave, scarious, with short broad yellow laminae, the outer ones woolly on back; flowers yellow; pappus of 4-5 bristles plumose towards summit, dilated and united in a ring at base.

Southern districts to Flinders Range; Yorke Peninsula; near Bordertown; South-East. Summer.—Victoria; New South Wales; Tasmania. Resembles *Angianthus tomentosus.*

6. **C. multiflorus** (Turcz.) Benth. *Yellow-top.* Perhaps perennial, but always flowering the first year and then appearing annual, closely woolly, the stems erect or ascending, 5-50 cm. long, simple or branched above; leaves linear, mostly obtuse and 1-2 cm. long; compound heads depressed-globular, 8-15 mm. across, but often 2-4 clustered at the summit of the branch or stem and then up to 20 mm. across; partial heads stipitate, 6-22-flowered, distinct when in full flower, the bracts hyaline, oblong, the outer ones narrower, with a small pale or yellow lamina, woolly on the back of the green midrib and at base, the inner ones about 10, glabrous or almost so, with a small yellow lamina; flowers yellow; pappus of 6-10 weak flexuose bristles, plumose with very long barbs, united in a short ring at base.—*C. platycephalus* (F. v. M.) Benth. (1866); *Pachysurus multiflorus,* Turcz. (1851); *P. platycephalus,* F. v. M. (1863).

Far North, from Cooper's Creek to the Everard Ranges. Summer.—Western New South Wales and Queensland; Central and West Australia.

7. **C. Dittrichii,** F. v. M. Probably annual, white-tomentose or slightly woolly, 20-30 cm. high; leaves narrow-linear, obtuse, mostly 3-10 mm. long, the margins recurved; compound heads depressed-globular, 8-14 mm. across; partial heads 8-16-flowered, distinct when in full flower, the involucral bracts about 15, hyaline, oblong, the outer ones cuneate, very woolly, with small pale laminae, the inner ones glabrous or almost so,

with small yellow laminae; flowers pale-yellow; pappus of 12-15 weak plumose bristles united in a short ring at base.

PLATE 54.—1, flower; 2, style; 3, bract of general involucre; 4, outer bract of partial involucre; 5, inner bract of same.

From northern end of Lake Torrens to Far North. Summer.—Western New South Wales and Queensland.

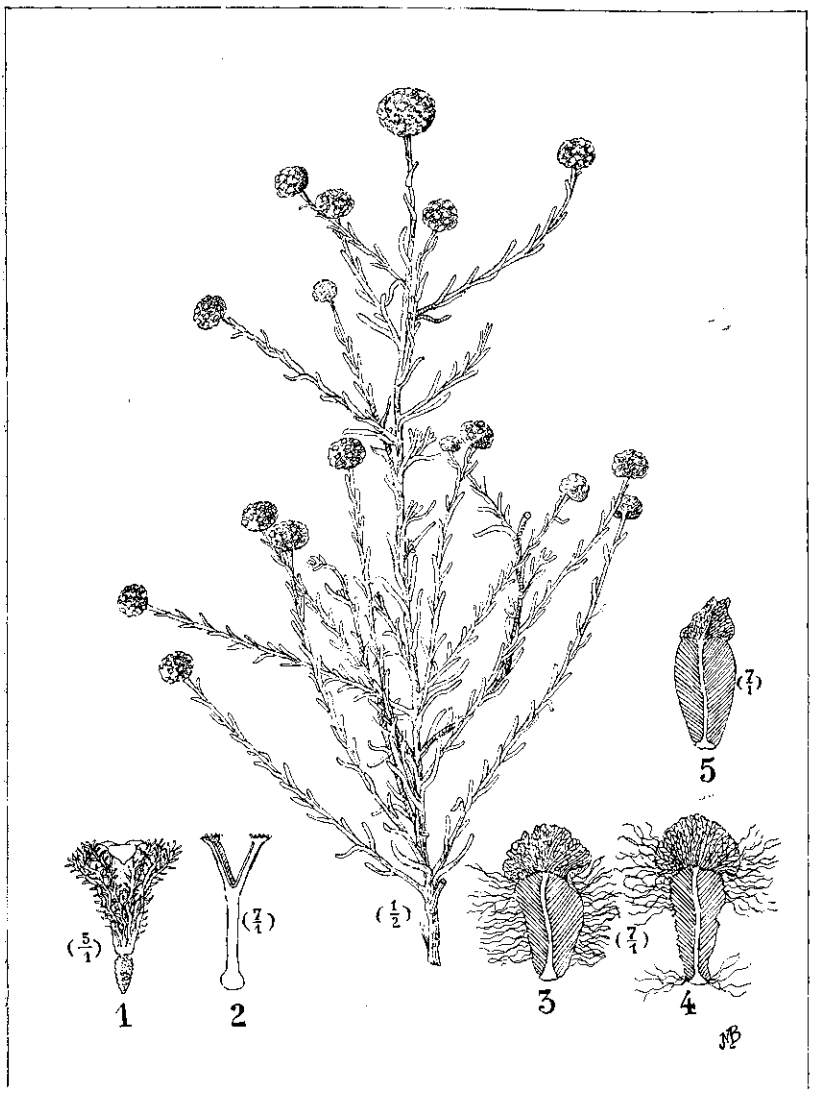

PLATE 54.—**Calocephalus Dittrichii.**

67. GNAPHALODES, A. Gray.

(The name means "like *Gnaphalium*.")

1. **G. uliginosum**, A. Gray. Densely grey-woolly annual, with prostrate stems ½-6 cm. long, or in dwarf specimens without any; leaves obovate-cuneate, 5-10 mm. long; partial heads ovoid, 3-12 sessile in a dense broad compound head surrounded by ovate or oblong floral leaves not or scarcely exceeding them; partial involucres about

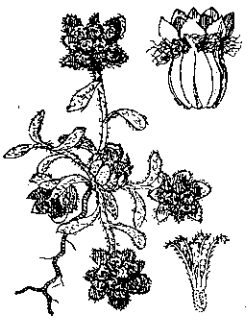

FIG. 306.—
Gnaphalodes uliginosum.

5 mm. long, double, the outer bracts leafy, thick, woolly, in 2-3 rows, the inner ones erect, hyaline, caducous, in several rows, cohering by the woolly tufts at the base of the short broad white opaque laminae; receptacle conical, naked; flowers in each partial head numerous, slender, tubular, bisexual, 5-toothed, shorter than involucre; anthers tailed; achenes obovoid, papillose; pappus of 5 rarely 4 stiff recurved flattish bristles, 2 mm. long, barbellate from base, almost plumose near summit, falling off together with the corolla.

Southern districts to Flinders Range; Yorke and Eyre Peninsulas; Murray lands and north thereof; near Bordertown; Fowler's Bay and westward to Ooldea. Aug.-Dec.—Western Victoria and New South Wales; West Australia.

68. CEPHALIPTERUM, A. Gray.

(From Greek *kephalê*, head; *pteron*, wing: alluding to the numerous conspicuous laminae of the compound head.)

1. **C. Drummondii.** A. Gray. Slender erect sparsely pubescent annual, 5-30 cm. high; leaves alternate, linear-lanceolate, the radical ones oblanceolate, mostly 1-4 cm. long; partial flowerheads obovoid, 10-15 sessile in an almost globular cluster or compound head, terminating the simple stems, which are woolly at summit; no general involucre or floral leaves; involucres of partial heads of numerous bracts in several rows, the outer shorter, hyaline, acute, persistent, the inner ones caducous, with a short broad claw and an opaque oblong or ovate white or rarely bright pink spreading lamina 4-10 mm. long; receptacle naked; flowers 15-20, small, tubular, bisexual, 5-toothed, the innermost sterile and with undivided styles; anthers tailed; achenes obovoid, bearing at the summit on the inner face a small ovate ciliate scale which is sometimes almost obsolete, and below this a dense clothing of long intricate hooked hairs; on the outer face are numerous twin hairs twisted round each other spirally; pappus of 3-5 erect caducous bristles as long as the corolla, barbellate in lower part, dilated and plumose-penicillate toward summit.

PLATE 19 (2), page 208.—1, outer flower, showing scale (*sq.*) at base of pappus; 2, achene viewed from above, showing the thick almost obsolete scale usually found in the specimens with shorter laminae; 3, one pair of spirally coiled hairs; 4, one of the long flexuose hairs with hooked barbs; 5, outer involucral bract; 6, inner involucral bract.

From Tarcoola westward to Ooldea and Nullarbor Plain. Most of the year. West Australia.

69. CRASPEDIA, Forst. f.

(From Greek *kraspedon*, a border or hem: alluding to the woolly fringe of the leaves in some New Zealand forms of *C. uniflora*.)

Partial flowerheads numerous, 3-10-flowered, sessile or nearly so in a dense globular or ovoid terminal compound head, usually with a general involucre of a few small bracts which are concealed when in full flower; general receptacle or rhachis woolly; partial involucres of a few oblong hyaline glabrous and caducous bracts without distinct laminae, rather shorter than the small flowers, which are yellow, tubular, bisexual, 5-toothed; partial receptacle with a hyaline scale enclosing each flower and similar to the involucral bracts; anthers tailed; achenes silky-hairy; pappus of more or less plumose bristles. Erect herbs with radical or alternate entire leaves.

A genus confined to Australia and New Zealand. The compound heads often resemble those of *Calocephalus* in shape and color.

A. Compound heads depressed-globular, sometimes large; bracts of partial involucres and pappus-bristles without yellow tips ..... *C. uniflora* 1.

A. Compound heads globular to oblong; bracts of partial involucres and pappus-bristles yellow at summit.

B. Bracts of general involucre herbaceous, with brown margins; heads globular or ovoid, 10-15 mm. thick .. *C. pleiocephala* 2.

B. Bracts of general involucre absent or small and concealed.

Compound heads globular or oblong, 8-10 mm. thick; leaves narrow-linear; small slender woolly plant .. *C. chrysantha* 3.

Compound heads globular, 20-25 mm. diam.; leaves broad-linear or broad-lanceolate; rather tall stout silvery-tomentose plant ..... *C. globosa* 4.

1. **C. uniflora**, Forst. f. (1786). *Bachelor's Button.* Usually annual, but perhaps sometimes perennial, sparsely and shortly hairy, the roots in wet country often fleshy; stems simple, erect, 10-60 cm. high; radical leaves oblong-cuneate, 2-16 cm. long including the petiole, the stem-leaves distant, lanceolate, with a broad clasping base; compound heads usually depressed-globular, yellow when in flower, 12 to 30 or even 40 mm. across, with a general involucre of a few short green bracts with broad brown margins, soon hidden as the partial heads expand; partial involucres 5-10-flowered, the bracts hyaline, the subtending one usually brownish; pappus of 12-18 white bristles plumose from base and united there in a very short ring.—*C. Richea*, Cass. (1818); *C. glauca* (Labill.) Spreng. (1826); *Richea glauca*, Labill. (1799).

Southern districts to Flinders Range; Yorke and Eyre Peninsulas; Murray lands; South-East. July-Dec.—Temperate Australia; Tasmania; New Zealand.

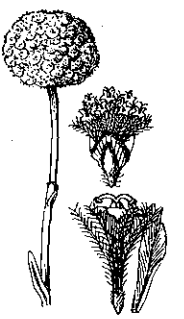

FIG. 307.—**Craspedia uniflora.**

2. **C. pleiocephala**, F. v. M. Scantily woolly annual, with erect or ascending mostly simple stems 5-30 cm. long; leaves oblong, oblanceolate or linear-lanceolate, those of the stem more or less clasping, 1½-4 cm. long, 1-7 mm. broad; compound heads bright-yellow, globular or ovoid, 1-2 cm. long, usually solitary, but sometimes twin or a large head with 1 or 2 smaller ones at base, the general involucre of a few small green woolly bracts with broad scarious margins; partial involucres enclosing 4, rarely 3 or 5 flowers, the bracts hyaline, yellow-tipped, with a slightly woolly hyaline subtending bract; corolla 4 mm. long, the teeth occupying about ⅓ of its length; pappus-bristles 9-12, plumose, golden-tipped, slightly dilated downwards, not united in a ring at base.

Murray lands or north thereof; Flinders Range to Far North: westward to Tarcoola and along the Great Bight. Aug.-Dec.—Western Victoria and New South Wales.

3. **C. chrysantha** (Schlechtd.) Benth. Apparently annual, grey-woolly, with erect or ascending usually simple stems 6-25 cm. long; leaves linear, mostly 1-2 cm. long, 1-2 mm. broad; compound heads bright-yellow, globular and about 8 mm. diam. or ovoid or ovoid-oblong and 10-20 mm. long, the general involucre quite inconspicuous; partial involucres 4-7-flowered, the bracts hyaline, with pale-yellow tips, the subtending one narrow, very woolly, herbaceous with a scarious tip; corolla 2½ mm. long, the teeth occupying about ⅙ of its length; pappus-bristles 9-16, united in a narrow ring at base, barbellate to middle, plumose and golden towards summit.

Collected on the River Light by Mueller and near Bethanien by Behr about 1850. Probably very rare in southern districts now; our only genuine specimens are from the Far North (Mungeranie to Cooper's Creek). June-Dec.—Western Victoria and New South Wales; Queensland; North Australia. There is very rarely a second small compound head at the base of the ovoid-oblong ones.

4. **C. globosa**, Benth. Apparently perennial, silvery-white with a soft close woolly tomentum; stems erect, simple, rigid, 40-100 cm. high; leaves broad-linear or lanceolate, acute, narrowed towards base, 5-12 cm. long, 3-20 mm. broad, the upper ones small and distant; compound heads globular, yellow, 20-25 mm. diam.; no general involucre; partial involucres 4-6-flowered; the bracts hyaline, with pale-yellow tips, the subtending one brownish; pappus-bristles 12-15, plumose, golden-tipped, united in a ring at base.

From Gladstone northward through Flinders Range to Marree; apparently rare. Summer.—Western Victoria and New South Wales.

70. CHTHONOCEPHALUS, Steetz.

(From Greek *khthôn*, *khthonos*, earth, ground; *kephalê*, a head: the heads rest on the ground.)

1. **Ch. pseudevax**, Steetz. Dwarf stemless more or less woolly annual; partial heads ovoid, about 4 mm. long, about 20-50 sessile in a dense depressed-globular compound head 10-25 mm. across, which is sessile among and exceeded by several linear-oblong radical leaves; partial involucres of a few oblong scarious somewhat woolly bracts which pass into the obovate hyaline ciliate scales of the receptacle, each scale sheltering one of the rather numerous tubular bisexual 4-toothed flowers and as long as they; anthers tailed; achenes turbinate, ½ mm. long, papillose; pappus none.

Murray lands northward to Far North; Port Augusta westward to Ooldea; Eyre Peninsula. Aug.-Dec.—Western Victoria and New South Wales; West Australia. The specific name is founded on a resemblance to some Mediterranean species of the Composite genus *Evax*.

FIG. 308.—**Basedowia tenerrima.**

71. BASEDOWIA, E. Pritzel.

(After Dr. Herbert Basedow, author of "The Australian Aboriginal" (1925), and a diligent botanical collector on his journeys through the interior of Australia.)

1. **B. tenerrima** (F. v. M.) nov. comb. Apparently annual, sparsely pubescent; stems weak, ascending, 10-15 cm. long; leaves thin, obovate-oblong, 10-15 mm. long, half-clasping by the broad subcordate base, the lower ones petiolate; partial heads very small, unisexual, the female flowers without corolla, solitary between 2-3 scarious bracts, the male heads of about 4-6 flowers with yellow 5-toothed corollas, the style clavate, undivided and the achene abortive, surrounded by 6-9 hyaline bracts; compound heads snow-white, ovoid, 3-4 mm. long, consisting of 2-3 female partial heads on the outside and 1 male head in the centre, the whole surrounded by an involucre of about 4 broad scarious bracts, the compound heads arranged in small corymbose terminal clusters; fertile achenes terete, glabrous; pappus none in either sex.—*B. helichrysoides*, E. Pritzel (1918); *Humea tenerrima*, F. v. M. (1896).

Everard and Musgrave Ranges. Pritzel considers the heads to be simple and heterogamous, not compound, with an involucre of 3 upper and 1 subtending bract, and treats the inner bracts as receptacle-scales surrounding the flowers.

72. CYNARA, (Vaill.) L.

(Apparently from a confusion between Greek *kinara*, the artichoke (*C. Scolymus*, L.) and *kynara*, which was probably the dog-rose.)

* 1. **C. Cardunculus,** L. *Wild Artichoke, Cardoon.* Stout erect perennial to 1½ m. high; leaves pinnatipartite into lanceolate pinnatifid lobes, the secondary lobes terminating in a spine, all white-tomentose below; involucre subglobular, 5-6 cm. long, of numerous fleshy ovate-lanceolate bracts ending in a rigid spine; flowers blue, all tubular; receptacle hairy; achenes glabrous; pappus of long plumose bristles.

Roadsides and fields in settled districts. Nov.-Feb.—Mediterranean region.

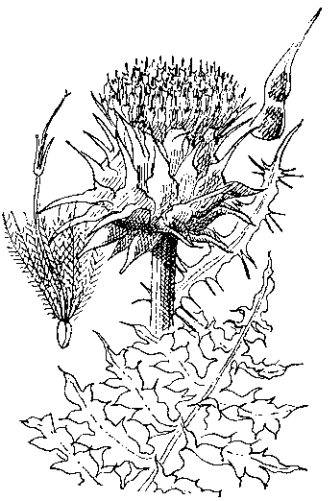

FIG. 309.—**Cynara Cardunculus.**

73. CIRSIUM, Adans.

(Greco-Latin *cirsion*, the name of some species of thistle.)

Involucre of several rows of bracts ending in a spine; receptacle hairy; flowers all tubular; stamens with hairy filaments; achenes oblong, smooth and glabrous; pappus of numerous plumose bristles much longer than the achene.

FIG. 310.—**Cirsium lanceolatum.**

A. Involucral bracts ending in a simple spine.
  Leaves rough with small prickles on the upper face.. *C. lanceolatum* 1.
  Leaves without prickles on the upper face ..... *C. arvense* 2.
A. Involucral bracts ending in a pinnatisect spine ..... *C. Acarna* 3.

* 1. **C. lanceolatum** (L.) Scop. *Spear Thistle.* Erect biennial, 50 cm. to over 1 m. high; leaves pinnatipartite, with spiny lobes, scabrous above, usually white-woolly beneath, decurrent in long spiny wings; involucre ovoid, woolly, about 25 mm. long, the bracts linear-lanceolate; flowers all bisexual, purple.

Roadsides, gullies, waste places; often known as "Scotch Thistle."—Europe; western Asia.

* 2. **C. arvense** (L.) Scop. *Creeping Thistle, Canada Thistle.* Erect perennial, with creeping rootstock; leaves oblong-lanceolate, pinnatifid, spiny on the margins, usually white-woolly below, sometimes very

shortly decurrent; heads in a corymbose panicle, dioecious by partial abortion; flowers purplish; male involucres ovoid, about 12 mm. long; female involucres longer.

A troublesome weed, hitherto only found in a few places in the South-East. Dec.-Feb.—Europe; Asia.

* 3. **C. Acarna** (L.) Moench. *Soldier Thistle.* Stout erect white-woolly annual; leaves oblong-lanceolate, decurrent along the branches, ciliate-spinulose along the edges and with long yellow spines terminating the short lobes; heads sessile, solitary or 2-4 among floral leaves longer than the heads; involucre oblong, 20-25 mm. long, the linear bracts ending in a recurved spine with 2-8 lateral spinules; flowers purple, all bisexual.—*Picnomon Acarna* (L.) Cass.

From Sellick's Hill towards Myponga jetty and Port Elliot. Dec.-Feb.—Mediterranean region.

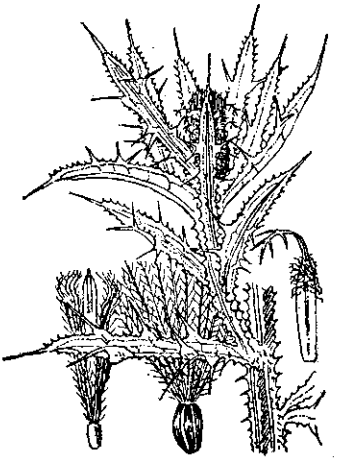

FIG. 311.—**Cirsium Acarna.**

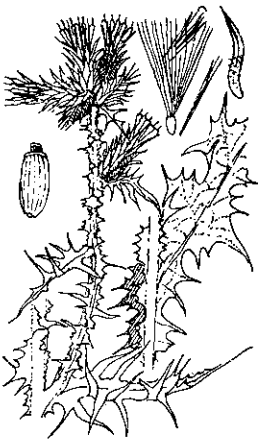

FIG. 312.—**Carduus tenuiflorus.**

74. CARDUUS, L.

(Latin name for several species of thistle.)

* 1. **C. tenuiflorus,** Curtis. *Slender Thistle.* Erect loosely white-tomentose annual or biennial, 20 cm. to over 1 m. high, spiny-winged up to the flowerheads; leaves pinnatifid with sinuate-spiny lobes, decurrent; heads sessile, usually in terminal clusters; involucre cylindrical, nearly 2 cm. long, the bracts in several unequal rows and ending in a spine; flowers purple, all tubular and bisexual; receptacle hairy; achenes oblong, glabrous; pappus of numerous simple bristles.

Throughout the settled districts. Oct.-Jan.—Western and southern Europe. The South-European *C. pycnocephalus,* L. differs in its larger ovoid less numerous heads and peduncles not winged at the summit.

75. SILYBUM (Vaill.) Gaertn.

(Greco-Latin name of some thistle-like plant.)

* 1. **S. Marianum** (L.) Gaertn. *Milk Thistle.* Stout erect almost glabrous biennial, 50 cm. to over 3 m. high; leaves glossy and mottled with white veins above, more or less pinnatifid, with spiny margins, the upper ones stem-clasping by rounded auricles; involucre subglobular, 3-4 cm. long, the bracts broad, rigid, with a rounded spinulose-ciliate appendage which terminates in a long spine; receptacle hairy; flowers all tubular, purple; achenes black, glossy, glabrous; pappus of numerous simple bristles.

Common in settled districts. June-Feb.—Southern Europe; Mediterranean region.

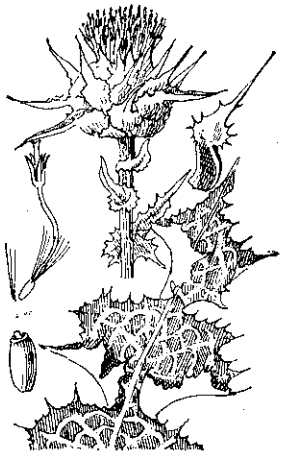

FIG. 313.—**Silybum Marianum.**

76. ONOPORDON (Vaill.) L.

(Greco-Latin name of some thistle.)

Involucre of numerous spiny bracts; receptacle fleshy, naked, honeycombed, each pit with a jagged border; flowers all tubular; achenes obovoid, wrinkled transversely; pappus caducous, of numerous bristles united in a ring at base. Biennial thistles.

Stem leafy, with decurrent wings ..... *O. Acanthium* 1.
Stem none; heads sessile among radical leaves ..... *O. acaule* 2.

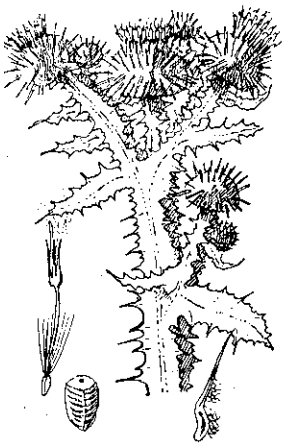

FIG. 314.—**Onopordon Acanthium.**

* 1. **O. Acanthium,** L. *Scotch Thistle.* Stout, erect, white-tomentose, usually over 1 m. high; leaves oblong-lanceolate, sinuate-toothed, very spiny along the margins, decurrent in broad spiny wings; involucres depressed-globular, about 5 cm. diam., corymbose, the bracts woolly in lower part, terminating in a long orange spine; flowers purplish; pappus scarcely twice as long as achene.

Settled districts, but not common. Dec.-Feb.—Europe; western Asia. Rare in Scotland, although generally supposed to be the origin of the Scottish heraldic thistle.

* 2. **O. acaule,** L. *Stemless Onopordon.* Stemless, softly white-tomentose; heads sessile or subsessile, several in the centre of a rosette of large radical leaves, which are oblong, pinnatifid, with spiny wavy lobes; involucre globular, 4-6 cm. diam., the bracts glabrous, ending in a long spine; flowers white; pappus about 5 times as long as the achene.

Settled districts and beyond, in some places very numerous. Nov.-Dec.—Mediterranean region.

77. CENTAUREA, L.

(The *Centaureum majus* of Pliny probably belonged to this genus, while the *Centaureum minus* was the modern *Erythraea Centaurium;* the name is derived from the Centaur Chiron, the legendary father of medicine.)

Involucre of numerous unequal bracts ending in a pungent spine or a scarious fringed or jagged appendage; receptacle beset with dense soft hairy bristles; flowers all tubular, the outer ones usually sterile and much exceeding the involucre; achenes oblong, compressed, the hilum at the base of the inner margin; pappus of short free scales in several unequal rows or none.

A genus of about 500 species, chiefly Mediterranean.

A. Flowers yellow; pappus present.
  Heads solitary; involucral bracts with a very long spine and spinules palmately arranged .. *C. solstitialis* 1.
  Heads sometimes clustered; involucral bracts with a short spine and spinules pinnately arranged ..... *C. melitensis* 2.
A. Flowers purple; involucral bracts horny, with a very long spreading spine; pappus absent..... *C. Calcitrapa* 3.

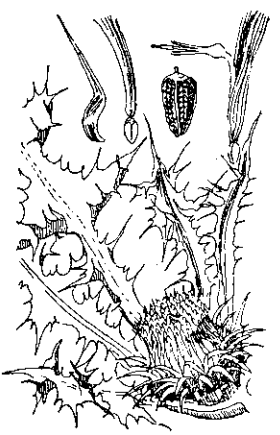

FIG. 315.—**Onopordon acaule.**

* 1. **C. solstitialis,** L. *Yellow Cockspur.* Stiff erect white-tomentose annual, 30-60 cm. high; radical leaves lyrate, the upper ones linear, entire, decurrent in long narrow wings; heads solitary; involucre urn-shaped, 10-12 mm. long, the outer bracts small with a few palmate spinules, the middle ones with a long spreading yellow spine and about 5 palmate spinules at base, the innermost with a small orbicular jagged appendage; flowers yellow; achenes shorter than the white pappus.

A weed in settled districts. Oct.-March.—Central and southern Europe.

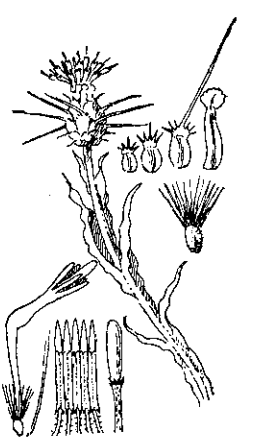

FIG. 316.—**Centaurea solstitialis.**

* 2. **C. melitensis,** L. *Maltese Cockspur.* Stiff erect scabrous-pubescent annual, 20-100 cm. high; radical leaves lyrate, the upper ones linear, entire, decurrent; heads solitary or 2-3 together, sessile among floral leaves; involucre ovoid, 7-10 mm. long, the middle bracts with a short spreading reddish spine which is pinnately spinulose from its base to the middle, the innermost bracts with lanceolate appendages; flowers yellow; achenes sparsely pubescent, longer than the pappus.

A common weed in settled districts. Sept.-Mar.—Mediterranean region.

FIG. 317.—**Centaurea melitensis.**

FIG. 318.—**Centaurea Calcitrapa.**

* 3. **C. Calcitrapa,** L. *Star Thistle.* Sparsely pubescent or slightly woolly annual or biennial, with many spreading branches, sometimes sending forth long runners in sandy soil; radical leaves pinnatipartite, with lanceolate toothed lobes; stem-leaves pinnatisect, with linear lobes; heads solitary among linear-lanceolate floral leaves; involucre urn-shaped, 10-15 mm. long without the spines, the middle bracts ending in a long robust yellow spine, with 4-6 spinules pinnately arranged near its base, or the involucre is barren and the bracts are then entire and 2-4 cm. long; flowers purple, rarely white; achenes streaked with brown; no pappus.

A common weed in settled districts. Nov.-Jan.—Southern and western Europe. The specific name is medieval Latin for the caltrop, in allusion to the spiny involucre.

78. CARTHAMUS (Tourn.) L.

(Medieval Latin from *qurtum* or *qartam,* the Arabic name of *C. tinctorius,* L., the Safflower.)

Involucre ovoid-oblong, consisting of 3-4 rows of subequal bracts ending in a spine or mucro, surrounded by several rows of rigid spiny spreading floral leaves like those of the stem and much longer than the involucre proper, of which they are sometimes described as the outer bracts; receptacle beset with long dense soft bristles; flowers all tubular and usually all fertile, longer than the involucre proper; achenes obovoid-truncate, subtetragonous, the outer ones without or almost without pappus, the inner ones with a pappus of free narrow scales in several unequal rows, the innermost row (in our species) connivent and very short; hilum near the base of the inner angle of the achene.

Flowers yellow	*C. lanatus* 1.
Flowers purple	*C. glaucus* 2.

* 1. **C. lanatus,** L. *Woolly Star Thistle.* Minutely glandular-pubescent erect annual, 20-50 cm. high, sometimes also more or less woolly; leaves coriaceous, olive-green, prominently 5-7-nerved below, half-clasping, 3-6 cm. long, pinnatifid into lanceolate spiny lobes; involucre about 2 cm. long, the bracts lanceolate, stiff, scarious on the margins and summit, ending in a sharp point or spine, passing into and almost concealed by the spiny rigid floral leaves, which are 3-5 cm. long; flowers yellow; achenes

FIG. 319.—**Carthamus lanatus.**

about 6 mm. long, 4-ribbed, sometimes pitted or wrinkled towards summit, the inner ones rather shorter than, or only half as long as the longest of the linear pappus-scales.—*Kentrophyllum lanatum* (L.) DC.

A weed in the settled districts and beyond. Nov.-Dec. Mediterranean region.

* 2. **C. glaucus,** Bieb. Very near the preceding, but usually without any wool; involucre 10-14 mm. long, the surrounding floral leaves rarely exceeding 3 cm.; flowers blue; achene 3-4 mm. long, the longest pappus-scales rather longer.—*Kentrophyllum glaucum* (Bieb.) Fischer et Mey.

Bordertown; Naracoorte. Nov.-Dec.—Eastern Mediterranean region.

79. CICHORIUM (Tourn.) L.

(Greco-Latin name of Chicory.)

* 1. **C. Intybus,** L. *Chicory.* Perennial with a long taproot and erect rigid striate branching stem to 1 m. high, somewhat scabrous-pubescent; radical leaves runcinate, 10-20 cm. long, the lobes toothed, the upper ones becoming smaller, lanceolate, clasping, and finally bracteate; heads 1-3, terminal or sessile and axillary; involucre oblong, of 8 inner bracts and 5 much shorter outer ones; flowers all with conspicuous blue ligules; receptacle scaly towards the centre; achenes slightly compressed and tetragonous, the truncate summit crowned by minute scales.

Settled districts. Nov.-May.—Europe; temperate Asia. The roasted root is mixed with coffee.

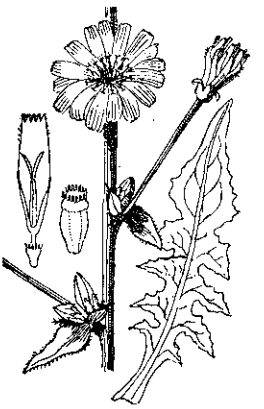

FIG. 320.—**Cichorium Intybus.**

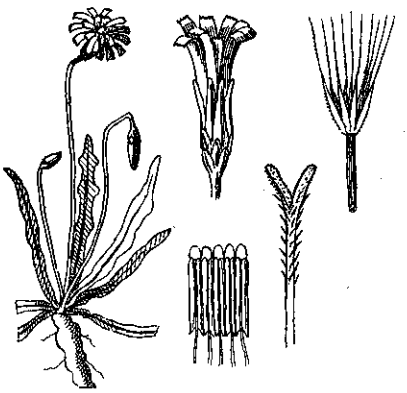

FIG. 321.—**Microseris scapigera.**

80. MICROSERIS, D. Don.

(From Greek *mikros,* small; *seris,* chicory.)

1. **M. scapigera** (Forst. f.) Schultz-Bip. (1866). *Yam.* Glabrous perennial with fleshy tapering roots; leaves all radical, linear-lanceolate or oblanceolate, 10-20 cm. long, entire or with a few distant deflexed teeth or short lobes; heads solitary on naked scapes 10-40 cm. high; involucre green, cylindrical, 20-25 mm. long, of 2 rows of subequal lanceolate inner bracts and 2-3 rows of smaller ones at base; receptacle naked; flowers all with conspicuous yellow ligules; style-branches obtuse; achene terete, glabrous or pubescent, 8-10 mm. long, with 10 obtuse longitudinal ribs, hardened and slightly swollen at base; pappus of 10-12 thin white scales about 15 mm. long, linear-lanceolate in the lower half, tapering into a fine barbellate awn.—*M. Forsteri,* Hook. f. (1853); *Scorzonera scapigera,* Forst. f. (1786).

Southern districts to Flinders Range; Kangaroo Island; Yorke and Eyre Peninsulas; Murray lands; South-East. Sept.-Nov.—Temperate Australia; Tasmania; New Zealand.

81. HEDYPNOIS (Tourn.) Schreber.

(Greco-Latin name of some plant believed to be near the Dandelion or Chicory.)

* 1. **H. cretica** (L.) Willd. Procumbent or erect annual; leaves scabrous-pubescent, the lower ones lyrate to oblong-cuneate, toothed or entire, the upper ones half-clasping; heads solitary on long naked rigid peduncles which are usually hollow and swollen towards the summit; involucre 7-9 mm. long, of about 12 herbaceous glabrous or scabrous bracts almost in 1 row, with a few small outer ones at base, the inner becoming rigid and incurved at summit, so that the fruiting head is globular; receptacle naked; flowers all ligulate, yellow; achenes terete, about 6 mm. long, curved, finely ribbed lengthwise, the outermost row enclosed in the involucral bracts; pappus of outer achenes a small denticulate crown, of the inner achenes double, consisting of 4-5 lanceolate scales ending in fine awns, with a few minute scales at base, or rarely all the achenes have crown-shaped pappus.—*H. polymorpha*, DC.

A weed in settled districts and beyond. Sept.-Nov.—Mediterranean region to India.

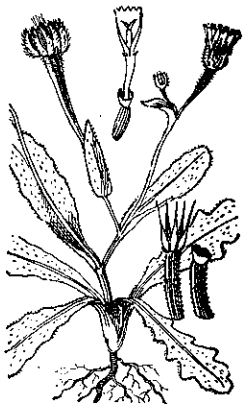

FIG. 322.—**Hedypnois cretica.**

82. HYPOCHOERIS, L.

(Greco-Latin name of this or some allied genus.)

Involucre oblong-cylindrical, lengthened after flowering, of herbaceous unequal bracts in 4-5 rows; receptacle with linear caducous interfloral scales; flowers all ligulate, yellow; achenes reddish-brown with longitudinal denticulate ribs, fusiform and tapering into a long beak or the outer ones narrowly obconical and without a beak; pappus persistent, of fine silky plumose bristles, often with an outer row of shorter more numerous almost simple ones.

Flowers longer than involucre; achenes usually all beaked.. *H. radicata* 1.

Flower about as long as involucre; outer achenes usually not beaked ..... *H. glabra* 2.

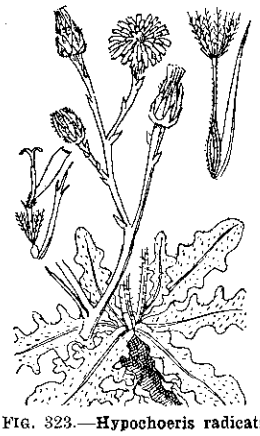

FIG. 323.—**Hypochoeris radicata.**

* 1. **H. radicata,** L. *Rooted Cat's-ear.* Perennial with erect simple or slightly branched stems 10-80 cm. high; leaves all radical, scabrous-hairy, slightly sinuate or pinnatifid with short obtuse lobes; heads on long distantly scaly peduncles; involucre about 15 mm. long, shorter than the flowers, the bracts glabrous or bristly on the midrib; achenes all long-beaked; pappus bristles in 2 rows, the outer row comparatively short and almost simple, the inner row long and plumose.

This is the typical form, but there is a variety with the outer achenes short-beaked or without beak (var. *heterocarpa*, Moris).

Roadsides and pasture in the settled districts. Most of the year.—Europe; North Africa.

* 2. **H. glabra,** L. *Glabrous Cat's-ear.* Annual, 10-40 cm. high; leaves all radical, toothed, sinuate or pinnatifid, glabrous or sparsely scabrous-hairy; involucres on long sparsely scaly peduncles, glabrous, almost as long as the yellow flowers; outer achenes without beak, so that the pappus is sessile, the long inner bristles densely and intricately plumose towards the base, scarcely more than barbellate above; inner achenes long-beaked, the pappus plumose.

There are also varieties with all the achenes beaked (var. *Balbisii*, Coss. et G.); with all the achenes without beak (var. *arachnoidea*, Poir.) and a small slender variety or form with heads of few flowers and only 7-8 involucral bracts (var. *minima*, DC.).

Roadsides and pasture in settled districts. Oct.-Dec.—Europe.

As will be seen from the description of the varieties, most of which are present in South Australia, many forms of these two species are difficult to distinguish. The principal characters dividing them are the duration of the root, the comparative length of flowers and involucre, and the number of bracts in the involucre (usually 14-20 in *H. glabra* and 30-35 in *H. radicata*).

FIG. 324.—**Urospermum picroides.**

83. UROSPERMUM, Scop.

(From Greek *oura*, tail; *sperma*, seed: alluding to the long-beaked achene.)

* 1. **U. picroides** (L.) Desf. Erect annual, 15-14 cm. high, scabrous with short spreading rigid hairs; leaves oblong or lanceolate, toothed or incised, clasping the stem by 2 acute auricles; heads solitary on long naked peduncles; involucre urn-shaped, 15-20 mm. long, scabrous, of 8 herbaceous bracts almost in 1 row and united towards base; receptacle naked; flowers all with yellow ligules exceeding the involucre; achenes compressed, oblong, tuberculate, surmounted by a curved beak twice as long as the achene and much swollen at base; pappus caducous, of 16-20 plumose bristles shortly united in a ring at base.

Settled districts. Oct.-Dec.—Mediterranean region.

84. TRAGOPOGON (Tourn.) L.

(Greco-Latin name of this genus, from Greek *tragos*, a goat; *pôgôn*, beard: alluding to the pappus.)

* 1. **T. porrifolius,** L. *Salsafy.* Stout glabrous biennial, to 1m. high, with a long taproot; leaves broad-linear, half-clasping; heads solitary on long naked peduncles which are striate and swollen towards summit; involucre about 4 cm. long, of about 8 lanceolate herbaceous bracts in 1 row, but imbricate at base, usually longer than the violet ligules of the flowers; receptacle naked; achenes fusiform, the outer ones with 10 denticulate ribs, the inner ones almost smooth, all tapering into a long beak; pappus of about 25 golden-brown bristles plumose with soft interwoven barbs.

Roadsides and gullies, chiefly near Adelaide. Oct.-Dec.—Southern Europe; north Africa. The specific name means "leek-leaved."

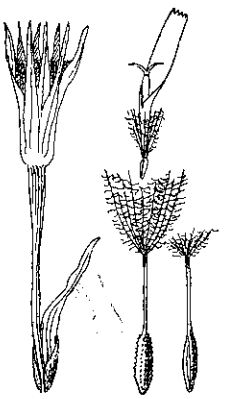

FIG. 325.—**Tragopogon porrifolius.**

85. SCORZONERA (Tourn.) L.

(Italian name of *S. hispanica*, L., from *scorza*, skin, bark; *nera*, black: alluding to the sometimes black root of that plant.)

* 1. **S. laciniata,** L. Glabrous biennial, with ascending leafy stems 10-45 cm. long; leaves linear, 3-18 cm. long, entire or usually with a few distant linear or linear-lanceolate segments; heads on long rigid almost naked peduncles; involucre cylindrical, about 15 mm. long in flower, enlarged in fruit, of unequal lanceolate herbaceous bracts in about 4 rows; receptacle naked; flowers all ligulate, yellow, scarcely exceeding involucre; achenes terete, striate, on a thick hollow stipes, so that the stipes resemble an achene and the achene a beak; pappus of fine plumose bristles with long silky interwoven barbs.—*Podospermum laciniatum* (L.) DC.

Southern districts. Sept.-Nov.—Mediterranean region.

86. LEONTODON, L.

(Neo-Greek name meaning "lion's tooth" and formed as a translation of the French *dent-de-lion* (dandelion), a plant which was placed by Linnaeus in this genus. The name was an allusion to the sharp leaf-lobes.)

* 1. **L. hirtus,** L. *Lesser Hawkbit.* Biennial or perennial, with short hairs, 2-3-toothed at summit, on the leaves and lower part of the peduncles; leaves all radical, oblong, slightly and distantly toothed or sinuate-pinnatifid with often almost triangular lobes; heads solitary on naked peduncles or scapes 10-20 cm. long; involucre glabrous or bristly, of about 12 nearly equal herbaceous bracts enclosing the outer achenes, with a few smaller bracts at base; receptacle naked; flowers all ligulate, yellow, exceeding the involucre; achenes striate, wrinkled transversely, the outer ones thick, curved, with a very short crown-shaped pappus formed of small scales more or less united, the inner achenes tapering at summit, but scarcely beaked, with a pappus of about 12 long plumose bristles dilated towards base, and an outer row of shorter barbellate bristles; both forms of pappus persistent. *Thrincia hirta* (L.) Roth.

Southern districts; South-East. Most of the year.—Central Europe.

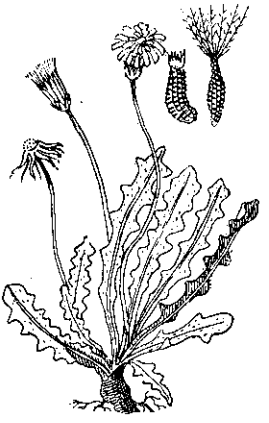

FIG. 326.—**Leontodon hirtus.**

87. PICRIS, L.

(Greco-Latin name of some plant resembling lettuce and with a bitter taste, from Greek *pikros,* bitter.)

Involucre cylindrical, the bracts herbaceous, the inner ones lanceolate, subequal, almost in 1 row, the outer ones loosely imbricate in 1-3 rows, all enlarged in fruit; receptacle naked; flowers all ligulate, yellow, longer than involucre; achenes longitudinally furrowed and transversely wrinkled, yellowish or reddish-brown, tapering upwards or beaked; pappus of silky plumose bristles in 1 row, with a few shorter barbellate ones. Coarse scabrous erect herbs with toothed leaves; flowerheads in irregular corymbs.

Outer involucral bracts small, lanceolate, in about 3 rows; achene very shortly beaked ..... *P. hieracioides* 1.

Outer involucral bracts ovate-cordate, in 1 row; achene long-beaked ..... *P. echioides* 2.

FIG. 327.—**Picris hieracioides.**

* 1. **P. hieracioides,** L. *Hawkweed Picris.* Biennial, 30-80 cm. high, scabrous with short stiff hairs mostly 2-hooked at summit; leaves lanceolate, the lower ones sinuate-toothed, to 20 cm. long, including the broad petiole, the upper leaves smaller, half-clasping, toothed or entire; flowering involucre about 12 mm. long, the outer bracts lanceolate, in 2-3 rows; achenes fusiform, 7-8 mm. long, curved, tapering into a short beak; pappus united in a short ring at base, falling off in one piece.

Mt. Lofty Range and other places in the southern districts. Oct.-Jan.—Europe; Asia.

Var. *squarrosa* (Steetz) Benth. Outer involucral bracts more numerous, very spreading or recurved; beak often half as long as achene.—*P. squarrosa,* Steetz.—Near the sea-coast, often among sandhills.—Coasts of temperate Australia. This variety is probably indigenous.

FIG. 328.—**Picris echioides.**

* 2. **P. echioides,** L. *Ox-tongue.* Annual, 30-100 cm. high, very scabrous with short stiff hairs, mostly seated on tubercles and some of them with 2 or more hooks at summit; leaves broadly lanceolate, entire or slightly sinuate-toothed, the radical ones tapering into a petiole, the upper ones smaller and embracing the stem with 2 rounded auricles; involucre 10-15 mm. long, the outer bracts usually 5, ovate-cordate, acuminate, the inner ones 8, lanceolate with long points, all very scabrous; achenes oblong, about 3 mm. long, with a slender beak as long as or longer than the achene; pappus usually falling off with the beak.—*Helminthia echioides* (L.) Gaertn.

Roadsides and waste places in settled districts. Dec.-May.—Europe; western Asia.

88. TARAXACUM, Haller.

(From Arabic *tarakhshaqûq* or *tarakhshaqûn*, probably of Persian origin and first introduced into medieval Latin as *tarasacon.*

* 1. **T. officinale,** Weber (1787). *Dandelion.* Root-stock thick, bitter, perennial; leaves all radical, runcinate-pinnatifid, glabrous or sparsely hairy, 3-15 cm. long; heads solitary on naked scapes as long as or longer than leaves; involucre oblong, the inner bracts lanceolate, erect, in 1 row, the outer ones shorter, spreading, in several rows; receptacle naked; flowers all ligulate, yellow; achenes slightly compressed, striate, spinulose towards summit, greyish or more rarely reddish, terminating in a filiform beak longer than the achene; pappus of numerous simple silky bristles.—*T. Dens-leonis,* Desf. (1798).

Settled districts. Most of the year.—Europe; Asia.

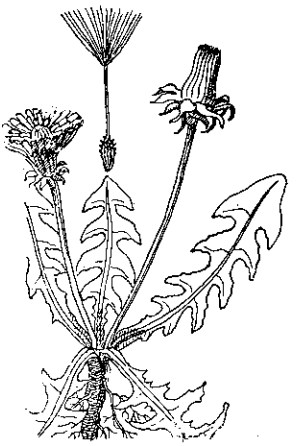

FIG. 329.—**Taraxacum officinale.**

89. LACTUCA (Tourn.) L.

(Latin for lettuce; from *lac, lactis,* milk: alluding to the milky juice.)

Involucre narrow-cylindrical, of unequal herbaceous bracts imbricate in about 5 rows; receptacle naked; flowers all ligulate, pale-yellow (in our species); achenes flattened, obovate-cuneate, striate on both faces, terminating in a long filiform beak; pappus of many simple silky hairs. Herbs with erect branching leafy stems.

FIG. 330.—**Lactuca saligna.**

A. Stem-leaves linear-lanceolate, entire, glabrous; heads subsessile, racemose; achenes glabrous ..... *L. saligna* 1.

A. Stem-leaves broadly oblong, rigidly ciliate; heads paniculate; achenes usually ciliolate towards summit.

Leaves pinnatifid, twisted ..... *L. Scariola* 2.

Leaves merely sinuate or toothed, not twisted ..... *L. virosa* 3.

* 1. **L. saligna,** L. *Willow Lettuce.* Rigid glabrous biennial, 50-100 cm. high; lowest leaves pinnatipartite, with few lobes, the others erect, linear-lanceolate, entire, clasping the stem with 2 acute entire or few-toothed auricles; heads subsessile, so as to appear racemose or almost spicate, 8-12-flowered; beak rather longer than or twice as long as the black achene.

Southern districts; Murray lands; South-East. Summer.—Europe; western Asia.

* 2. **L. Scariola,** L. *Prickly Lettuce.* Stiff erect biennial, to 1 m. high; leaves glaucous, pinnatifid with broad lobes, almost erect, mostly twisted near the base so as to be vertical instead of horizontal, spinulose on the margin and often on the midrib below, the upper ones stem-clasping with 2 auricles, the uppermost leaves small but with broad auricles; heads paniculate, 10-16-flowered; achenes grey, ciliolate near summit, about as long as the beak.

Southern districts, not common. Summer.—Europe; Asia.

The Garden Lettuce (*L. sativa,* L.) is believed to be a cultivated form of this species.

* 3. **L. virosa,** L. Differs from the preceding in the leaves broader, more spreading, not twisted or lobed, spinulose on the margin; achenes black.

Near Renmark (River Murray). Summer.—Central and southern Europe.

90. SONCHUS (Tourn.) L.

(Greco-Latin name of the sow-thistle.)

Involucre ovoid in flower, conical in fruit, the bracts numerous, herbaceous, unequal, in several rows; receptacle naked; flowers all ligulate, numerous, exceeding the involucre and (in our species) yellow; achenes flattened, with 3 rarely 5 longitudinal ribs on each face, not beaked; pappus of numerous white simple silky bristles. Herbs with sharply toothed often lobed leaves.

A. Leaves flaccid, with acute auricles; achenes transversely wrinkled ..... *S. oleraceus* 1.

A. Leaves stiff, almost spinulose on the margins; achenes smooth except for the longitudinal ribs.
Inland annual with tap-root; involucre 10-12 mm. long; achenes about 3 mm. long ..... *S. asper* 2.
Coastal perennial with creeping rootstock; involucre 18-20 mm. long; achenes 6-7 mm. long ..... *S. megalocarpus* 3.

FIG. 331.—**Sonchus oleraceus.**

* 1. **S. oleraceus,** L. *Sow-thistle.* Erect annual, 30 cm. to over 1 m. high, quite glabrous or glandular-hairy towards the summit; leaves thin, runcinate, irregularly and sharply toothed, the lower ones with broad petioles, the others clasping the stem with acute usually broad auricles, the uppermost smaller and lanceolate, also with acute auricles; heads corymbose or almost umbellate; involucre glabrous, 10-12 mm. long; achenes brown, obovate-oblong, about 3 mm. long, scarcely 1 mm. broad, wrinkled or striate transversely between and on the ribs, not bordered or winged.

A common weed of cultivation in all parts of the world; leaves edible. Most of the year.—Probably indigenous in Europe and central Asia.

* 2. **S. asper,** Hill (1760). *Prickly Sow-thistle.* Resembles the preceding in habit, differing in the stiff often undivided leaves, of a darker green, the teeth or lobes prickly, the broad basal auricles rounded and bent downwards against the stem; achenes brown, with conspicuous longitudinal ribs, otherwise smooth on the surface, about 3 mm. long and 1½ mm. broad, including the 2 narrow usually ciliolate wings.

Often growing in uncultivated land throughout the settled districts. Like the preceding it is almost cosmopolitan. Although the types of these 2 species are well distinguished, there are sometimes intermediate forms.

3. **S. megalocarpus** (Hook. f.) nov. comb. Stout erect glabrous stolon-bearing perennial 20-60 cm. high; leaves thick, coriaceous, those of the stem oblong, pinnatifid with rounded very prickly-toothed lobes or undivided and sinuate-toothed clasping with 2 broad rounded auricles; heads in irregular corymbs; involucre

18-20 mm. long, glabrous or sometimes with a few bristles on the midrib of the outer bracts; achenes ovate-oblong, 6-7 mm. long, 2-3 mm. broad including the wings, straw-colored or brown, with 3 longitudinal ribs, otherwise smooth.—*S. asper*, Hill var. *megalocarpus*, Hook. f. (1860); *S. asper* var. *littoralis*, J. M. Black (1909), and perhaps var. *littoralis*, Kirk (1894), of New Zealand.

Chiefly sandhills along the coast from Port Adelaide to Port MacDonnell, S.E. Most of the year.—Coasts of Victoria, New South Wales, and Tasmania. Differs from *S. maritimus* in its broader and divided leaves and larger winged achenes; the habitat and achenes differentiate it from *S. arvensis*, L. It appears to be endemic in Australia and Tasmania and perhaps in New Zealand.

FIG. 332.—**Sonchus megalocarpus.**

FIG. 333.—**Crepis virens.**

91. CREPIS, L.

(Latin name of some plant mentioned but not described by Pliny.)

* 1. **C. virens,** L. Erect or ascending variable annual, 15 cm. to over 1 m. high, glabrous or sparsely pubescent; leaves oblong, pinnatifid with narrow spreading lobes or sinuate-toothed, the radical ones 5-30 cm. long including the petiole, the upper ones clasping the stem with acute auricles; heads in loose often corymbose panicles; involucre cylindrical in flower, conical in fruit, 5-8 mm. long, of several subequal inner herbaceous linear bracts with scarious margins and a few smaller ones at their base, all pubescent with simple and glandular hairs; receptacle naked; flowers all ligulate, yellow; achenes pale, terete, 10-ribbed; pappus of many white simple silky hairs.

Mount Lofty Range; South-East. Dec.-Feb.—Europe.

92. REICHARDIA, Roth. (1787).

(After J. J. Reichard, 1743-82, director of the botanical garden at Frankfort.—*Picridium*, Desf. (1799).)

1. **R. picroides** (L.) Roth. Glabrous annual 10-50 cm. high; lower leaves oblong, pinnatifid, the upper ones distant, broadly lanceolate, entire or irregularly toothed; heads solitary on long peduncles which bear a few small leafy bracts and are swollen under the head; involucre cylindrical, 12-15 mm. long, the bracts unequal, in several rows, the outer ones ovate, mucronate, with broad scarious margins; flowers all ligulate, yellow; receptacle naked; achenes cylindrical, 4-furrowed, the 4 broad ribs tuberculate or notched; pappus of many fine white silky bristles falling off in one piece.—*Picridium vulgare*, Desf.

Adelaide plains near sea. Aug.-Nov.—Mediterranean region.

ADDITIONS AND CORRECTIONS.

In the six years during which the Flora has been in course of publication a large amount of fresh material has been collected in various parts of the State. The examination of these specimens has revealed new localities and sometimes new species or varieties. During the same period several Australian families or genera have been carefully revised by botanists working in Australia or Europe, more rarely in America, and their consultation of types and examination of both ancient and modern collections has necessitated many changes and the creation of a good many new species. To make these results available to readers of the Flora it has been necessary to add this considerable appendix to the original work.

Those who are endeavoring to identify plants and who encounter difficulties in doing so should consult the general index and the additions to see whether further help may be obtained from them.

I have to thank Mr. J. F. Bailey for compiling the general index, Dr. E. Couper Black for drawing up the list of authors, and Mr. Arnold B. Black for drawing the map of the State.

P. 30.—Insert after " *Rutaceae* 65 " :—

Leaves without stipules and usually without glandular dots, almost always compound; ovary mostly 3-celled, with simple style; filaments united ..... MELIACEAE 65A.

P. 32.—*Borraginaceae.* Read " calyx and corolla 5-lobed," not " 4-lobed."

P. 38.—*Blechnum discolor.* Also Burrungul, S.E. Lower segments becoming gradually more distant from each other.

P. 39.—**Hypolepis rugulosa** (Labill.) J. Smith, instead of *Dryopteris punctata* (Thunb.) C. Chr.—*Polypodium punctatum*, Thunb. non (L.) Sw.; *P. rugulosum*, Labill, (1806). *Hypolepis* differs from *Dryopteris* in having no real indusium, and Christensen now places our plant in the former genus.

P. 43.—*Marsilia hirsuta.* Numerous in water-courses north of Cooper's Creek.

P. 45.—According to Baker and Smith (Research Pines Aust., 89) the type of *C. robusta* shows a very large cone with thick warted valves, and the species is confined to Rottnest and Bald Islands and the neighboring mainland of West Australia. *C. glauca*, on the other hand, is distributed all over Australia, but chiefly inland. The type came from Mount Brown, near Port Augusta. *C. propinqua* is distinguished from it by greener foliage and stouter cones, and it appears convenient to retain the latter as a distinct species, although it shows considerable variation in the size of the cone. The arrangement should therefore be :

1. **Callitris glauca,** R.Br. Fruiting cones 1½-2 cm. long, on slender often rather long peduncles, the valves comparatively thin, finely wrinkled on back; large or small tree.

Flinders Range at least as far north as Hawker, eastward to Cockburn, westward to Eyre Peninsula, Tarcoola, and Musgrave Range; Murray lands.—Drier parts of temperate Australia.

1A. **C. propinqua,** R.Br. Large tree; fruiting cones 2-3 cm. long, sessile or on short thick peduncles, the valves thick, smooth and black when quite ripe, but sometimes becoming coarsely wrinkled and sometimes more or less warted on back.

Southern districts to Flinders Range; Kangaroo Island; Murray lands; Eyre Peninsula.—Western Victoria and New South Wales.

P. 45.—3. **Callitris tasmanica** (Benth.) Baker et Smith (1910) instead of *C. cupressiformis* var. *tasmanica*. The larger cones (18-20 mm. across when ripe), the thicker valves, the more spreading branches and shorter stature seem to justify the change to specific rank. Also found in New South Wales, Victoria (the Grampians), and Tasmania. *C. cupressiformis*, Vent. (*C. rhomboidea*, R.Br.) is confined to the eastern coasts of Australia.

P. 46.—3. **Zostera Muelleri,** Irmisch. Leaves as described under *Z. nana*; rhachis of spike flat, membranous, about 15 mm. long, the margins folded inwards and bearing 2-3 almost square distant alternate plates or bracteoles which cover most of the flowers; fruit ovoid-oblong, brown, 2-2¼ mm. long, about 1 mm. broad, striate with numerous longitudinal lines and with still more numerous and very fine transverse lines.

Mouth of Hindmarsh River, Encounter Bay. It is not yet certain whether we have also *Z. nana*, which is chiefly distinguished by its quite smooth fruits and inhabits the coasts of the Mediterranean and Atlantic, while *Z. Muelleri* is confined to Australia.

P. 46.—2. **Cymodocea Griffithii,** J. M. Black. Differs from the preceding in longer and straighter adult leaves, the blade 40-70 mm. long, the sheathing base 15-20 mm. long, as against 12-35 cm. and 8-10 mm. in *C. antarctica,* the peduncles conspicuous, the female flowers without a cup of membranous bracteoles; outermost style-branch simple (in *C. antarctica* it is bifid); fruit as in preceding.—*Pectinella Griffithii,* J. M. Black (1915).
Henley Beach; Encounter Bay.

P. 47.—*Potamogeton ochreatus.* Also Swanport, River Murray; Wilpena Creek (Flinders Range). Leaves to 9 cm. long and to 7 mm. broad; the stipules disintegrate early into many fine threads 10-15 mm. long.

P. 48.—7. **Potamogeton javanicus,** Hasskarl (1856). Floating leaves oblong-lanceolate, 2-4 cm. long, 10-15 mm. broad, 7-11-nerved; fruit with tooth-like projections.—*P. tenuicaulis* F. v. M. (1858).
Karatta, K.I.—New South Wales; Queensland; Java.

P. 48.—*Ruppia maritima.* Found in brackish water as far inland as near the Warburton River. The naked fruiting carpels are small (about 3 mm. long), ovoid, shortly beaked, often gibbous at base, on rather long filiform pedicels; the anther-cells are separated to such an extent as to resemble 4 1-celled sessile anthers surrounding the young carpels, which (at least in our maritime specimens) appear to be always 8 in each of the 2 flowers of the short spike.

P. 49.—4A. **Triglochin Muelleri,** Buchenau. Small annual; scapes 4-8 cm. long, the filiform leaves mostly longer; racemes many-flowered, only the terminal flower bisexual, the others female; fruit ovoid or elliptical, 1½ mm. long, very shortly pedicellate, the fruitlets almost fusiform without any basal projection.
Lake Bonney, River Murray. Summer.—West Australia.

4B. **T. hexagona,** J. M. Black. Small annual; scapes 2-5 cm. long, about 20-flowered, only the terminal flower bisexual; leaves filiform, mostly longer than scape; fruit ovoid in outline, nearly 2 mm. long, the fruitlets flattish, 1 mm. broad, hexagonal, broadly and stiffly 2-winged.
Lake Bonney, River Murray. Summer.

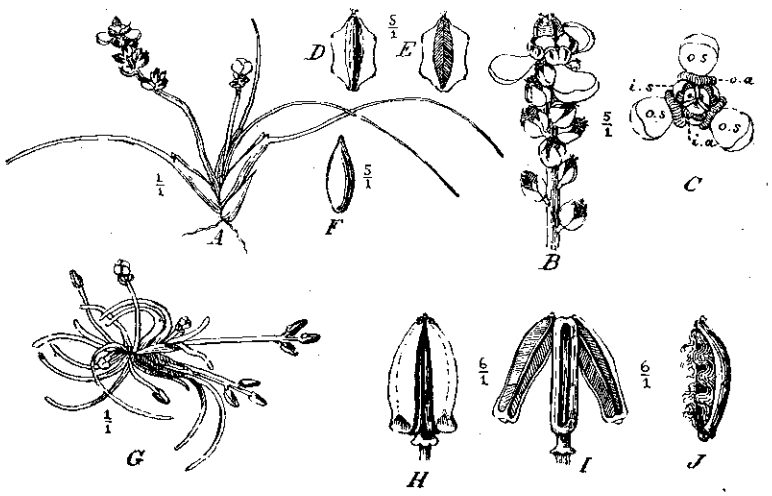

FIG. 334.—*Triglochin.* A-E, *T. hexagona:* B, flowering part of scape; C, terminal bisexual flower viewed from above: *o. s.*, outer perianth-segments; *o. a.*, outer anthers; *i. a.*, inner anthers; D, back of fruitlet; E, inner face of same. F, fruitlet of *T. Muelleri.* G-J, *T. trichophora:* H, fruit; I, 2 fruitlets hanging from summit of carpophore; the groove in the carpophore indicating the line of attachment of the third fallen fruitlet; J, fruitlet viewed from the side, showing the inner face of the pericarp disintegrating into hair-like fibres.

4C. **T. trichophora,** Nees. Small annual; scapes often only 1-3-flowered but finally longer than the filiform leaves; terminal flower alone bisexual; fruit ovoid-oblong, nearly 2½ mm. long, the fruitlets tapering upwards, dilated slightly and obtusely at base.
Pearson Island.—West Australia. In these 3 species the outer segments of the bisexual flower are larger, white and membranous.

P. 49.—*Triglochin procera.* Read "leaves 1-3 cm. broad."

P. 54.—*Pollinia fulva.* Some specimens from Cordillo Downs are slender, about 30 cm. high, the 2 spikes only 2-3 cm. long, and the 2 hyaline lobes of the flowering glume longer and narrower.

P. 55.—3. *Andropogon annulatus.* Specimens from north of Cooper's Creek are about 60 cm. high, the leaves almost glabrous; spikes 1-2, the lowest glume of the sessile spikelets with a beard of long spreading-erect hairs on each side just below the obtuse summit.

P. 56.—*Themeda avenacea* (F. v M.) Hackel (1887) instead of Maid. et Betche.

P. 56.—*Iseilema membranacea.* "Flinders Grass."

P. 57.—9A. ZOYSIA, Willd.

(After Karl von Zois, 1756-1800, a landed proprietor and plant-collector of Carniola.)

1. **Z. pungens,** Willd. Rhizome creeping; stems short, erect, bearing a small terminal spike; leaves distichous, glabrous, crowded, like those of *Distichlis spicata,* the short blades spreading, subulate with incurved margins, sometimes almost pungent; spikes cylindrical, 5-12 mm. long in our specimens, of 5-8 spikelets, which are 2-3 mm. long, 1-flowered, very shortly pedicellate, closely appressed to the flexuose unjointed rhachis; outer glume 1, broad, coriaceous, shining, keeled, often mucronate, completely enclosing the shorter hyaline flowering glume and the palea, which is still smaller or sometimes wanting.

Forming a dense sward near the Rocky River, K.I.—Coastal in many parts of Australia; New Zealand; India and eastern Asia. The leaves are said to be stiff and pungent in dry situations and softer in damp places.

P. 57.—*Isachne australis.* Also Upper Hindmarsh Valley and Black Swamp near Currency Creek.

P. 58.—Line 28 should read :—
H. Panicle-branches long, not divided.

P. 58.—All the species described under the genus *Panicum* by Bentham in the Flora Australiensis were revised by Miss D. K. Hughes in the Kew Bulletin of 1923. In accordance with the views of Dr. O. Stapf and other recent agrostologists many of the species have been transferred to other genera, old and new. This arrangement (as far as relates to our State) is given below.

KEY TO THE GENERA.

A. Fruiting glume thinly cartilaginous, with usually flat margins; inflorescence of digitate or subdigitate racemes, which are longer than the main axis; spikelets unequally pedicellate, usually in pairs, along one side of the rhachis of the raceme (very narrow in our species); nerves of 3rd glume straight and parallel; lowest glume minute ..... DIGITARIA 13A.

A. Fruiting glume crustaceous, with more or less inrolled margins.

B. Inflorescence of racemosely arranged simple or compound racemes or spikes.

C. Spikelets turned inward so that the lowest glume and the opening of the flowering glume face the rhachis of the raceme; spikelets subsessile, not arranged in pairs, along one side of the slender flattened rhachis ..... BRACHIARIA 13B.

C. Lowest glume and opening of the flowering glume turned away from the rhachis.

D. Rhachis of racemes persistent on the main axis; spikelets falling off singly.

Fruiting glume acute or acuminate, not mucronate; spikelets in 2 rows, some of them often subtended by 1 bristle or the racemes ending in a bristle ..... PASPALIDIUM 13C.

Fruiting glume obtuse, shortly and abruptly mucronate; spikelets in 1 or 2 rows or clustered, without bristles; lowest glume very small; 3rd glume enclosing a palea nearly as long as it ..... UROCHLOA 13D.

Fruiting glume acuminate or awned; margins of the glume flat upwards, not embracing the tip of the palea; spikelets subsessile in 3-4 rows along one side of the narrow angular rhachis of the spikes..... ECHINOCHLOA 13E.

D. Rhachis of racemes disarticulating at base from the main axis and falling off with the spikelets.. PARACTAENUM 13F.

B. Inflorescence an open panicle; spikelets glabrous, solitary along the slender usually much divided branches of the panicle, on capillary usually rather long pedicels.
Fruiting glume without basal appendage ..... PANICUM 13.
Fruiting glume shortly stalked, with a small annular membranous appendage at its base ..... ICHNANTHUS 13c.

13A. DIGITARIA, Hall. (1768).

(From Latin *digitus*, a finger: alluding to the digitate inflorescence.)

A. Racemes sessile or subsessile (bearing spikelets from the base upwards.)
B. Spikelets glabrous or slightly pubescent; 2nd glume lanceolate, 3-nerved, about half as long as spikelet.
Spikelets acuminate; 3rd glume with smooth nerves *D. marginata* 1.
Spikelets acute; 3rd glume with scabrous nerves.... *D. sanguinalis* 2.
B. Spikelets densely silky-hairy; 2nd glume 3-nerved, as long as the spikelet ..... *D. Brownii* 3.
A. Racemes naked at the base for at least 3 cm., finally spreading, the lowest whorled; spikelets silky-hairy.
Spikelets 2-2½ mm. long ..... *D. ammophila* 4.
Spikelets 3½-4 mm. long ..... *D. coenicola* 5.

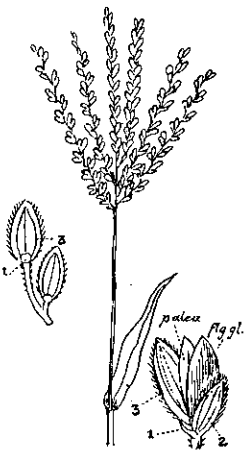

FIG. 334.—**Digitaria sanguinalis.**

1. **D. marginata,** Link. Scarcely differs from *D. sanguinalis* except in the smooth nerves of the 3rd glume and has often been united with that species. It occurs here.

2. **D. sanguinalis** (L.) Scop.—*Panicum sanguinale*, L. (No. 2).

3. **D. Brownii** (R. et S.) Hughes.—*Panicum villosum*, R. Br. (1810) non Lamk; *P. Brownii*, R. et S. (1817); *P. leucophaeum*, Benth. non H. B. et K. (No. 12).

4. **D. ammophila** (F. v. M.) Hughes.—*Panicum ammophilum*, F. v. M.; *P. divaricatissimum*, R.Br. var. *ammophilum*, Benth. Described under No. 10 on p. 60, but the true *D. divaricatissima* (R.Br.) Hughes belongs to the eastern coasts of Australia.

5. **D. coenicola** (F. v. M.) Hughes.—*Panicum coenicolum*, F. v. M. (No. 11).

13B. BRACHIARIA, Griseb. (1853).

(From Latin *brachium*, fore-arm: alluding to the racemes or spikes standing out like arms or branches along the main axis.)

1. **B. distachya** (L.) A. Camus.—*Panicum distachyum*, L. (No. 3). *Panicum argenteum*, R. Br. has been transferred to this genus as *B. argentea* (R.Br.) Hughes.

13C. PASPALIDIUM, Stapf (1920).

(Formed from the name of the genus *Paspalum*.)

Spikelets approximate and evenly arranged along the racemes or spikes in 2 close rows ..... *P. jubiflorum* 1.
Spikelets irregularly arranged in loose racemes ..... *P. gracile* 2.

1. **P. jubiflorum** (Trin.) Hughes. Stems usually rather stout, 40-80 cm. high; leaves long, flat, glabrous, 3-5 mm. broad; ligule short, ciliate; spikes several, sessile, erect, the lower ones distant, 1-4 cm. long; spikelets subsessile, 2½-3 mm. long, in 2 rows along the straight slender rhachis; lowest glume broad, obtuse, 3-nerved, half as long as spikelet; 2nd and 3rd glumes equal; fruiting glume acute, finely and transversely rugulose.—*Panicum jubiflorum*, Trin. (1826); *P. flavidum*, Benth. partly, not of Retz.; *P. gracile*, Benth. partly, not of R.Br.
Usually near water: River Murray; Flinders Range to Far North.—Western New South Wales and Queensland; West Australia.

2. **P. gracile** (R.Br.) Hughes. Differs from the preceding in more slender stems, height 20-40 cm.; leaves 1-3 mm. broad; spikelets 2-3 mm. long, shortly pedicellate, irregularly

and loosely arranged in 2 rows along several erect racemes or spikes ½-2 cm. long, sometimes branched towards base; lowest glume ½ to ⅔ as long as spikelet; some of the spikelets subtended by a solitary bristle as long as they.—*Panicum gracile*, R.Br.; *P. gracile*, Benth. (No. 8) partly.

Southern districts to Flinders Range and Far North; westward to Musgrave Ranges and Ooldea.—New South Wales; Queensland; West Australia.

Var. *rugosum*, Hughes. Fruiting glume coarsely not finely rugulose.—*P. flavidum* var. *tenuior*, Benth. partly.—Port Augusta to Far North.—New South Wales.

13D. UROCHLOA, Beauv. (1812).

(From Greek *oura*, tail; *khloê*, grass: probably alluding to the small mucro surmounting the flowering glume.)

A. Fruiting glume distinctly rugose, with a mucro under 1 mm. long.	
Spikelets glabrous	*U. notochthona* 1.
Spikelets hairy	*U. Gilesii* 2.
A. Fruiting glume minutely rugulose, with a minute mucro	*U. praetervisa* 3.

1. **U. notochthona** (Domin) Hughes.—*Panicum notochthonum*, Domin (1911); *P. helopus*, Benth. non Trin. (No. 13).

2. **U. Gilesii** (Benth.) Hughes.—*Panicum Gilesii* Benth (No. 14).

3. **U. praetervisa** (Domin) Hughes.—*Panicum praetervisum*, Domin (1915); *P. adspersum*, Benth. non Trin. (No. 1).

13E. ECHINOCHLOA, Beauv. (1812).

(From Greek *ekhinos*, hedge-hog; *khloê*, grass: alluding to the often bristly spikelets).

1. **E. crus-galli** (L.) Beauv.—*Panicum crus-galli*, L. (No. 15).

Var. *aristata*, Wirtgen. Third glume with an awn 3-6 mm. long.—Minnie Downs (near Diamentina River).

13F. PARACTAENUM, Beauv. (1812.)

1. **P. novae-hollandiae,** Beauv.—*Panicum Paractaenum*, Kunth (1833); *P. reversum* F. v. M. (1874).—(No. 7).

13. PANICUM, L.

A. Lowest glume ⅔ to ¾ the length of the spikelet, prominently 5-7-nerved; no palea in 3rd glume; nodes glabrous (No. 5)	*P. prolutum* 1.
A. Lowest glume ⅓ to ½ the length of the spikelet, almost 1-nerved; 3rd glume enclosing a palea from half as long to as long as it; nodes hairy.	
Lowest glume truncate, ⅓ as long as spikelet; uppermost leaf often nearly as long as panicle; nodes minutely pubescent (No. 4)	*P. decompositum* 2.
Lowest glume acute, ½ as long as spikelet; panicle longer than uppermost leaf; nodes bearded with long hairs (No. 6)	*P. effusum* 3.

13G. ICHNANTHUS, Beauv. (1812).

(From Greek *ikhnos*, footprint; *anthos*, flower: probably alluding to the shape of the small panicle.)

Stems short but hard; panicle 2-3 cm. long, shorter than the uppermost leaf-sheaths	*I. australiensis* 1.

1. **I. australiensis** (Domin) Hughes.—*Panicum australiense*, Domin (1912); *P. pauciflorum*, Benth. partly, not of R.Br. Described under No. 9, p. 60.

P. 62.—*Spinifex*. The male spikelet has only 2 subequal outer glumes, which are usually shorter than the 2 flowers.

P. 64.—The narrow-panicled species of *Aristida* are better arranged as follows:—

4. **A. ramosa,** R.Br. Stems erect, 30-50 cm. high; panicle 4-20 cm. long, very narrow but somewhat loose owing to the distant erect branches; outer glumes subequal, mucronate, 7-8 mm. long; flowering glume about as long; awns 10-14 mm. long; callus 1 mm. long; anthers 2 mm. long.

Flinders Range.—Eastern Victoria to Queensland.

5. **A. calycina,** R.Br. Stems and panicle as in the preceding; lowest glume 8-14 mm. long, the second one 9-16 mm. long, mucronate; flowering glume about as long as second glume; awns slender, 15-35 mm. long; callus 1½ mm. long; anthers 2 mm. long.
Flinders Range to Far North.—Western New South Wales; Central Australia; Queensland.

6. **A. Adscensionis,** L. Stems ascending, sometimes short; panicle 4-20 cm. long, dense and rather thick owing to the crowded branches and spikelets; lowest glume 5-8 mm. long, the second one 6-10 mm. long, notched and mucronate at summit; flowering glume about as long as the second one; awns slender, 8-16 mm. long; callus 1 mm. long; anthers 1 mm. long.—*A. depressa*, Retz.
Flinders Range to Far North.—Warmer parts of Australia; Asia; Africa; Mediterranean region. The specific name denotes that the type was collected on Ascension Island.

P. 64.—*Stipa.* The Australian species of this difficult genus were revised in the Kew Bulletin of 1921 by Miss D. K. Hughes under the supervision of Dr. O. Stapf, with subsequent additions by Messrs. V. S. Summerhayes and C. E. Hubbard. The result, as far as concerns South Australia, is given below in the form of a new key and descriptions of the new species.

A. Palea very small, scarcely half as long as flowering glume; panicle-branches plumose; outer glumes subequal, the lower one 3-nerved to above the middle; upper part of awn almost straight. (Section 1. *Micropaleatae*).
Outer glumes 10-12 mm. long, hairy ..... *S. elegantissima* 1.
Outer glumes 9 mm. long, almost glabrous (very doubtful for South Australia) ..... *S. Tuckeri* 2.

A. Palea about as long as the silky or pubescent flowering glume, which is shortly 2-lobed at summit; outer glumes subequal, 16-30 mm. long, the lower one 3-nerved to above middle; awn not plumose, the upper part almost straight.
Leaf-blades rudimentary. (Section 2. *Aphyllae*) .... *S. Muelleri* 3.
Leaf-blades rigid, subulate. (Section 3. *Sclerophyllae*) *S. teretifolia* 4.

A. Palea about as long as the flowering glume, which is pubescent or villous, entire or minutely 2-lobed at summit; outer glumes narrow, hyaline at least towards the summit; the lower one with faint lateral nerves reaching to about the middle; awn capillary, the upper part, when ripe, curved like a sickle, the lower part sometimes perceptibly barbellate but not plumose; perennials. (Section 4. *Falcatae.*)
B. Ligule very short, ciliate.
C. Awn subglabrous; lower leaf-sheaths glabrous or almost so; outer glumes sub-equal; nodes glabrous
Awn about 4-6 cm. long.
Outer glumes 9-14 mm. long; panicle rather loose *S. variabilis* 5.
Outer glumes 10-12 mm. long; panicle dense, shining ..... *S. nitida* 6.
Awn 8½-9 cm. long; outer glumes 11-14 mm. long. *S. incurva* 7.
C. Awn strongly barbellate in lower twisted part; lower leaf-sheaths loose, densely and softly hairy; outer glumes subequal, 8-10 mm. long; awn 5-7 cm. long ..... *S. Drummondii* 8.
B. Ligule 1-5 mm. long; nodes glabrous.
Awn 4-6 cm. long, capillary all its length; outer glumes subequal, 8-11 mm. long ..... *S. scabra* 9.
Awn 6-8 cm. long, the upper part slightly flattened and broader than the lower part; outer glumes unequal, the lower one 12-15 mm. long..... *S. platychaeta* 10.

A. Like section 4, but the upper part of the awn is straight or slightly curved, and the awn is plumose for half its length or more and up to 9½ cm. long; nodes pubescent; perennials. (Section 5. *Plumosæ.*)
Awn plumose along the lower twisted part or slightly above it ..... *S. semibarbata* 11.
Awn plumose quite or almost to its summit ..... *S. plumigera* 12.

A. Like section 4, but the upper part of the awn is almost straight and the awn is not plumose; lower outer glume with the 2 lateral nerves extending almost to the summit and as prominent as the central nerve; perennials. (Section 6. *Striatae.*)
  D. Panicle finally loose.
    E. Nodes pubescent, often enclosed; leaves inrolled; ligule short, ciliate; outer glumes unequal.
      Lower glume 20-25 mm. long; awn stout, 5½-9 cm. long; flowering glume with white hairs..... *S. pubescens* 13.
      Lower glume 14-20 mm. long, awn slender, 6-8½ cm. long; flowering glume with golden-brown hairs *S. eremophila* 14.
    E. Nodes glabrous; leaves flattish; ligule 4-5 mm. long, glabrous; lower glume 9-12 mm. long; awn 6-8 cm. long ..... *S. acrociliata* 15.
  D. Panicle dense, narrow; ligule minute, ciliate; nodes pubescent; awn 4-5½ cm. long.
    Slender plant; outer glumes narrow, thin, subequal, 10-13 mm. long ..... *S. tenuiglumis* 16.
    Stouter plant; outer glumes broader, 13-14 mm. long *S. elatior* 17.

A. Like section 4, but the awn is not plumose and the upper part is almost straight; outer glumes bulging round the swollen flowering glume and narrowed above it, the lateral nerves usually prominent; perennials. (Section 7. *Turgidulae.*)
  F. Flowering glume without a conspicuous tuft of hairs at summit.
    G. Panicle rather loose; outer glumes unequal.
      Lower glume 9-13 mm. long; awn 2½-3½ cm. long.. *S. aristiglumis* 18.
      Lower glume 14-16 mm. long; awn 4-5 cm. long .. *S. bigeniculata* 19.
    G. Panicle dense; outer glumes subequal, 12-15 mm. long; awn 2½-3½ cm. long ..... *S. congesta* 20.
  F. Flowering glume with a tuft of hairs 3-5 mm. long at summit; outer glumes unequal, the lower one 13-20 mm. long; awn 2½-4½ cm. long..... *S. Blackii* 21.

A. Like Section 4, but the awn almost straight, not plumose; the 2 lateral nerves of the hyaline lower outer glume faint or obsolete, usually present only at the base; perennials. (Section 8. *Aphanoneurae.*)
  Ligule 3-6 mm. long, glabrous; glumes broad and somewhat bulging in lower part, the lower one about 12 mm. long; awn 3-4 cm. long, twice bent; glabrous grass ..... *S. setacea* 22.
  Ligule short, ciliate; lower glume 15 mm. long; flowering glume slender, 9 mm. long with the callus, white-pubescent; awn 5-6 cm. long; pubescent grass with inrolled leaves, pubescent nodes and narrow panicle ..... *S. aphanoneura* 23.

A. Like section 4, but the plants are annual, the awn is not plumose and its upper part is almost straight. (Section 9. *Annuae.*)
  Lower leaf-sheaths beset with glistening hairs; awn 12-15 cm. long ..... *S. McAlpinei* 24.

5. **S. variabilis,** Hughes. Erect, rather slender, 20-80 cm. high; the stems 1-2 mm. thick; nodes glabrous; leaves glabrous or scabrous-pubescent, the blades involute-filiform, 5-20 cm. long, the lower sheaths usually shortly bearded at orifice; ligule short, truncate, ciliolate, sometimes lobed at side; panicle loose, unilateral, 10-30 cm. long, the rahchis and branches minutely scabrous-pubescent; outer glumes narrow, hyaline, subequal, often purplish, the lower 9-14 mm. long, 3-nerved near base, the upper one rather shorter, sub-5-nerved; flowering glume narrow, white-pubescent, 4-6 mm. long; awn capillary, much curved, minutely pubescent, about 6 cm. long.—*S. falcata,* Hughes; *S. scabra,* Benth. partly, not of Lindl.; *S. setacea,* Benth. partly, not of R.Br.; *S. pubescens,* var. *effusa,* Benth.

One of the commonest Spear-grasses throughout Australia. Described on p. 66 as *S. scabra.*

6. **S. nitida,** S. et H. *Balcarra Grass.* Rather slender, 40-60 cm. high, almost glabrous except some wool usually present at the orifice of the leaf-sheaths, which are often ciliolate on the margins; blades filiform, minutely scabrous; ligule very short, ciliolate, auricled at each side; panicle dense, 10-30 cm. long, of a pale-green, shining, soft and silky; outer glumes narrow, hyaline, subequal, 10-12 mm. long, the lower one 3-nerved only

near base, the upper one sub-5-nerved; flowering glume narrow, pubescent, 4-5 mm. long with the callus; awn capillary, curved, subglabrous, 5-6½ cm. long.

Flinders Range from Beltana to Lake Eyre and eastward to Cockburn; west of Lake Torrens; Minnipa and Gawler Ranges, E.P., and towards Ooldea.—New South Wales (near Broken Hill). The long erect acute blade of the uppermost leaf is sometimes as long as the panicle. Some specimens approach *S. variabilis*, but the latter displays its nodes, while *S. nitida* has them usually hidden by the leaf-sheaths and its loose uppermost leaf-sheath encloses the base of the panicle.

7. **S. incurva,** Hughes. Stems about 2 mm. thick, 50-70 cm. high, the nodes glabrous but usually concealed; leaf-sheaths almost glabrous, the blades long, inrolled, subulate, minutely scabrous; panicle 10-30 cm. long, narrow but loose, its base enclosed in the loose uppermost leaf-sheath; outer glumes hyaline, purplish, narrow, subequal, 11-14 mm. long, the lower one 3-nerved to above middle, the upper one 5-nerved; flowering glume narrow, white-pubescent, 7-9 mm. long with the callus; awn capillary, 8½-9 cm. long, subglabrous, much curved.—*S. scabra* var. *pubescens*, Benth.

Hallett's Cove (near Adelaide).—Victoria; West Australia.

8. **S. Drummondii,** Steud. (1855). A stiff and often stout grass, 30-80 cm. high, the lowest leaves usually subulate, rigid and forming a short radical tuft, the sheaths loose and (especially the lower ones) silky-villous; nodes subglabrous but usually concealed.—*S. Luehmannii*, Reader (1900); *S. horrifolia*, J. M. Black (1920), which see, on p. 66-67, for remainder of description and figure.

Most parts of the State, including the coast.—Western Victoria and New South Wales; West Australia.

9. **S. scabra,** Lindl. Differs from *S. variabilis* chiefly in the ligule of the stem-leaves 1-3 mm. long, the blades filiform, rarely flattish, minutely scabrous; stems slender, under 45 cm. high; nodes glabrous; panicle 20-25 cm. long, narrow but loose; outer glumes narrow, hyaline, subequal, 8-11 mm. long, the lower one faintly 3-nerved near base; flowering glume narrow, white-pubescent, 4-4½ mm. long with the callus; awn capillary, subglabrous, 4-6 cm. long, curved.—*S. scelerata*, J. M. Black non Behr.

Gawler to Far North; Murray lands; rare compared to *S. variabilis*, and closely resembling it.—Temperate Australia.

10. **S. platychaeta,** Hughes. Stems stiff, hard, erect, to 1 m. high, 3-4 mm. thick, glabrous, with many glabrous nodes; leaves glabrous, the blades flat or the uppermost inrolled; ligules truncate, glabrous, to 5 mm. long; panicle finally loose, 20-30 cm. long, the slender branches naked in the lower part, clustered, finally spreading, the lowest 4-10 cm. long; outer glumes delicate, purplish, unequal, the lower one 3-nerved only near base, 12-15 mm. long, the upper one sub-5-nerved, 8-11 mm. long; flowering glume pubescent, 5 mm. long with the callus; awn 6-8 cm. long, the lower twisted part narrower than the curved upper part, which is slightly flattened, 1-ribbed on each face and ciliolate along the margins.—*S. setacea*, R. Br. var. ? *latifolia*, Benth. partly.

Enfield (near Adelaide) to Flinders Range and Far North; westward to Ooldea; Murray lands.—Western New South Wales; West Australia.

12. **S. plumigera,** Hughes. Stems erect, to 55 cm. high, with pubescent nodes; leaf sheaths pubescent, ciliate on the margins, the blades linear, more or less pubescent; ligule short, ciliolate; panicle dense, to 20 cm. long; outer glumes unequal, hyaline, the lower one 20 mm. long, 3-nerved, the upper one 15 mm. long; flowering glume with dense dark pubescence, 10-11 mm. long with the callus; awn slender, to 9 cm. long, greyish plumose almost to the summit.—*S. eremophila*, Reader var. *dodrantaria*, J. M. Black (1922).

Near Birksgate Range.

13. **S. pubescens,** R. Br. The lower glume is typically 20-23 mm. long, and the upper glume about 17 mm. long, but rarely the lower glume is only 15-17 mm. long; the awn varies from 5½-9 cm. long, the lower twisted part stout and conspicuously white-pubescent; flowering glume with callus 10-11 mm. long, brown, narrow, sparsely pubescent. A robust form has stouter stems 4-5 mm. thick. Includes var. *subglabra*, Reader.

14. *S. eremophila*, Reader (1900) is very near *S. pubescens* and differs chiefly in the more slender awn; panicle narrow, but becoming loose, 12-25 cm. long; outer glumes usually purplish, the lower one 14-20 mm. long, 3-nerved to above the middle, the upper one 12-15 mm. long; flowering glume 7-10 mm. long with the callus, with a dense golden-brown pubescence; awn slender, 6-8½ cm. long.—*S. fusca*, C. E. Hubbard (1925); *S. variegata*, S. et H. (1927); *S. pubescens*, Benth. partly, not of R. Br.

15. *S. acrociliata*, Reader, resembles *S. platychaeta*, but the panicle, purplish and narrow at first, finally spreading, may be 40 cm. long; lower outer glume 9-12 mm. long, 3-nerved to middle, obscurely and unequally 3-toothed and ciliolate towards summit, the upper one 7- 9mm. long; awn 6-8 cm. long, equally slender throughout, the upper part almost straight.

Murray lands; South-East.—Western Victoria.

16. **S. tenuiglumis,** Hughes. Stems erect, 3-4 mm. thick, 50-80 cm. high; nodes pubescent; leaves glabrous or almost so, the blades inrolled, 10-30 cm. long; ligule minute, ciliolate; panicle rather narrow and dense, 10-30 cm. long, usually under 2 cm. broad, the branches erect and the lowest ones 6-9 cm. long; outer glumes thin, narrow, subequal, 10-13 mm. long, pale or purplish, divergent after flowering, the lower 3-nerved, the upper 5-nerved; ripe flowering glume pubescent with white or brown hairs, 7-8 mm. long with the callus; awn very slender, minutely pubescent, twice bent, 4-5½ cm. long.—*S. scabra,* Lindl. var. *striata,* Benth.

Southern districts; Kangaroo Island; South East.—West Australia.

17. **S. elatior,** Hughes. Stems stout, 4-6 mm. thick, to 1m. high; leaf-sheaths pubescent or glabrous, the blades usually glabrous, stiff, striate, inrolled, 10-30 cm. long; ligule very short, ciliolate; panicle narrow, 15-40 cm. long, dense, enclosed at base by the loose uppermost leaf-sheath; outer glumes straw-colored, subequal, 13-14 mm. long, the lower one 3-nerved to above the middle, the upper one 5-nerved; flowering glume narrow, brown, pubescent, 7-8 mm. long with the callus; awn slender, twice bent, 5-5½ cm. long, distinctly pubescent in lower part.—*S. scabra,* Lindl. var. *elatior,* Benth.

Brighton; Encounter Bay; Spalding.—Tasmania; West Australia.

18. **S. aristiglumis,** F. v. M. Stems rather stout or sometimes slender, 50-80 cm. high; leaves glabrous, the blades flattish or inrolled; nodes pubescent or almost glabrous; ligule short, almost glabrous; panicle loose, erect-spreading, 10-40 cm. long, the branches 4-10 cm. long; outer glumes rather broad, the lower one 9-13 mm. long, with 3 prominent green nerves reaching to summit, which often becomes 3-toothed; upper glume 8-10 mm. long, 5-nerved; flowering glume swollen, 5-6 mm. long with callus, pubescent with short golden-brown or grey hairs; palea glabrous; awn subglabrous, twice bent, 2½-3½ cm. long.

Mount Lofty Range to Spalding; coast near Adelaide; Murray lands.—Western Victoria and New South Wales.

19. **S. bigeniculata,** Hughes. Glabrous, rather slender, to 70 cm. high; nodes pubescent; leaf-blades subulate, to 15 cm. long; ligule short, ciliate; panicle narrow but loose, 15-25 cm. long, the branches finally spreading; lower glume 14-16 mm. long, the 3 prominent nerves extending to the summit, which is sometimes 3-toothed; upper glume 11-13 mm. long, 5-nerved; flowering glume swollen, silky-pubescent with white hairs, 7-8 mm. long with the callus; awn slender, 4-5 cm. long, twice bent.

Southern districts at least as far north as the Bundaleer Hills.—New South Wales. Near *S. aristiglumis,* but the glumes and awns are much longer.

20. **S. congesta,** S. et H. Stems rather stout, pubescent; leaves pubescent, the blades stiff, inrolled, scabrous downwards, to 30 cm. long; ligule truncate, glabrous; panicle dense, narrow, about 10 cm. long; outer glumes hyaline, minutely pubescent, faintly 3-nerved, subequal, 12-15 mm. long; flowering glume white-pubescent, 5½ mm. long with the callus; terminating in 2 minute lobes at summit; awn 2½-3½ cm. long, twice bent, distinctly barbellate below the bend.

Morialta Gully, near Adelaide.

21. **S. Blackii,** C. E. Hubbard (1925). Erect, 30-70 cm. high, with stiff stems 2-3 mm. thick; nodes pubescent; leaves glabrous, minutely scabrous or scabrous-pubescent with short spreading hairs, the blades subulate; ligule very short, ciliate; panicle narrow but loose, 10-25 cm. long; outer glumes unequal, often becoming toothed at summit, the lower 13-20 mm. long, with 3 prominent green nerves, the upper one 10-13 mm. long, sub-5-nerved; anthers bristly at summit; flowering glume swollen, silky with white hairs, 6-8 mm. long with the callus, surmounted by a tuft of white hairs 3-5 mm. long; awn 2½-4½ cm. long, twice bent, rather stout in the lower twisted part.—*S. Clelandii,* S. et H. (1927); *S. pubescens* R.Br. var *comosa,* J. M. Black (1922).

Southern districts to Flinders Range; Murray lands. Our numerous specimens vary so irregularly as regards hairiness and length of glumes and awns that I have had to unite the 2 species described at Kew.

23. *S. aphanoneura,* Hughes, is described in the key.—*S. flavescens,* Benth. partly, not of Labill.—River Murray; Victoria; Tasmania.

24. **S. McAlpinei,** Reader (1899). *One-year Grass.* Annual, with rather stout erect, stems 20-80 cm. high; lower leaf-sheaths loose, densely beset with short shining hairs, the upper sheaths and inrolled blades becoming glabrous; ligule 5-10 mm. long; panicle narrow, 10-30 cm. long, the branches naked towards base; outer glumes pale, narrow, the lower one 18-20 mm. long, 3-nerved above the middle, the upper one about 12 mm. long, 5-nerved; flowering glume narrow, white-pubescent, 8 mm. long with the callus; awn subglabrous, capillary, twice bent, 12-15 cm. long.—*S. compressa,* R. Br. var. *lachnocolea,* Benth. (1878); *S. lachnocolea,* Hughes (1921); *S. setacea,* R. Br. var. ? *latifolia;* Benth. partly (*S. scelerata,* Behr herb. ex Benth.).

Southern districts to Port Augusta; Kangaroo Island; probably South-East.—Victoria; West Australia.

P. 70.—*Calamagrostis filiformis* var. *Billardieri*. Delete the words: "but not always longer than type."

Var. *plebeja*, Maid. et Betche. Slender, with filiform leaves; outer glumes 3-4 mm. long; flowering glume nearly as long, minutely pubescent towards summit, the 2 outer teeth much longer than the 2 inner, the awn almost basal.—*Deyeuxia plebeja* (R. Br.) Benth.

Southern districts; South-East.

Var. *laeviglumis*, Benth. Panicle rather narrow, 7-12 cm. long; outer glumes 2½ mm. long; flowering glume 2 mm. long, glabrous except for the 2 tufts at base; awn almost basal; palea half as long; bristle very short; leaves becoming involute and subulate; stems slender, 50-70 cm. long.—Mt. Compass.

P. 70.—*Calamagrostis minor*. Also Rocky River, K.I.

P. 71.—*Eriachne ovata*. The var. *pallida* should include only forms with pale spikelets, as the typical form with purple outer glumes may have the panicle to 10 cm. long and the flowering glumes 8 mm. long.

P. 72.—*Aira caryophyllea*. The lower flower of the spikelet is often awnless.

P. 72.—42A. ARRHENATHERUM, Beauv.

(From Greek *arrhên*, male; *athêr*, awn: alluding to the awn of the male flower.)

Differs from *Avena* in having the lower flower of each spikelet male only.

FIG. 335.—**Arrhenatherum elatius.**

* 1. **A. elatius** (L.) Mert. et Koch var. *bulbosum*, Koch (1837). *False-oat*. Erect almost glabrous perennial, with 2-3 bulbous swellings at base of stem; leaves flat, with short truncate ligule; panicle narrow but loose, 12-30 cm. long; spikelets compressed, 7-10 mm. long, 2-flowered, the lower male, the upper bisexual; outer glumes unequal, membranous, the upper one as long as the flowers; male glume with a long bent awn rising from near the base; fertile flowering glume usually shortly awned near the summit; both glumes with hair-tufts at base; grain oblong, pubescent at summit.—*Avena elatior*, L. (1753) var. *tuberosa*, Asch. (1864); *A. tuberosa*, Gilib.; *A. bulbosa*, Willd.; *Arrhenatherum avenaceum*, Beauv. (1812) var.

Established in gullies above Burnside; Keith. Oct.-Jan. The type only differs in not having bulbous swellings at base.—Europe; western Asia. Good fodder, but in some places a weed.

P. 73.—The Australian species of *Danthonia* require a thorough revision, such as has been given to *Stipa* and *Panicum*. In the meantime the following is an effort to define our South Australian species more satisfactorily than was done in the early part of this work. The term "base of the flowering glume" is employed to describe the portion from the summit of the callus up to the commencement of the central awn and the 2 lateral lobes. *D. bipartita* and *D. carphoides* have been already described.

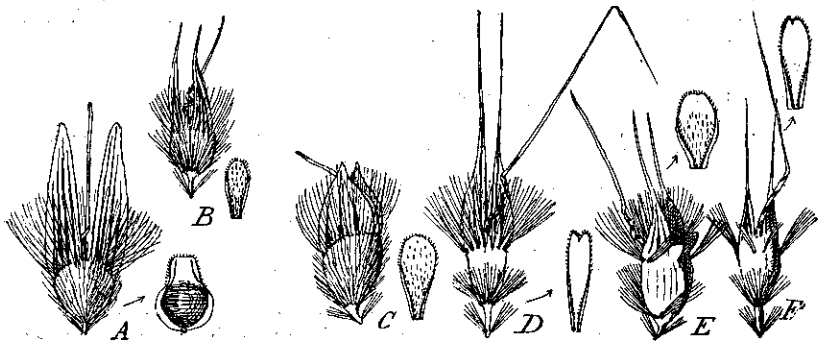

FIG. 336.—*Danthonia*. Flowering glume and back of palea, enlarged 3 times. A, *D. bipartita*; B, *D. geniculata*; C, *D. carphoides*; D, *D. semiannularis*; E, *D. auriculata*; F, *D. penicillata*.

A. Lateral lobes without any awn or with a minute one much shorter than the lobe proper; central awn equalling or scarcely exceeding the lateral lobes.
  B. Lateral lobes 2-4 times longer than the base of the flowering glume; upper ring of hairs only half as long as lobes; palea 2½-3 mm. long.
    Spikelets distant, in a rather long loose raceme; palea oblique (almost horizontal), orbicular, abruptly narrowed towards the obtuse summit, glabrous on back ..... *D. bipartita* 1.
    Spikelets in a dense short raceme or panicle; palea erect, oblong-cuneate, obtuse, pubescent on back *D. geniculata* 2.
  B. Lateral lobes shorter or no longer than base of flowering glume, broad, acuminate; upper ring of hairs as long as the lobes; palea oblong-cuneate, obtuse, 4 mm. long, pubescent on back ..... *D. carphoides* 3.
A. Lateral lobes longer than base of flowering glume and consisting chiefly of a capillary awn, the central awn usually much longer.
  C. Hairs on back of flowering glume arranged in 2 transverse rings composed of small tufts of silky hairs, one ring at the base and the other above the middle and below the lobes and central awn (in addition *Danthonia* has always 2 dense tufts of hairs at the base of the callus).
    D. Outer glumes narrow; palea glabrous on back.
      Panicle usually large, dense or somewhat loose; palea notched ..... *D. semiannularis* 4.
      Panicle shorter, sometimes almost a raceme, dense; palea obtuse ..... *D. setacea* 5.
    D. Outer glumes broad, boat-shaped; lobes of flowering glume with an auricle at base; palea obtuse, pubescent on back ..... *D. auriculata* 6.
  C. Hairs on back of flowering glume consisting of a basal ring and a tuft about the middle of each margin, often with 2 small tufts rather higher up and below the lateral lobes; palea glabrous on back.
    Infloresence a raceme; flowers (without the awns) about as long as the outer glumes; palea notched. *D. penicillata* 7.
    Infloresence usually a panicle; flowers (without the awns) much shorter than the outer glumes; palea obtuse ..... *D. setacea* 5.

1. *D. bipartita*, F. v. M. The lateral lobes of the flowering glume are described by Bentham as " very acute," but in all our specimens, and in those which I have seen from the Warrego River, N.S.W., and from the Victoria Desert, W.A., they are obtuse.

2. **D. geniculata,** J. M. Black. Stems slender, 10-35 cm. high, often geniculate near base; leaves filiform, pubescent, the radical ones in dense tufts 4-6 cm. high, those of the stem short, distant; panicle dense, 1½-2½ cm. long, 1-1½ cm. broad, of 5-15 spikelets; outer glumes pale-green, broad, 6-8 mm. long; spikelets 4-5-flowered, the awns slightly exceeding the outer glumes; base of flowering glume 2-2½ mm. long, with a ring of hairs at base and another above the middle or the upper hairs somewhat scattered, the lateral lobes 4-5½ mm. long, lanceolate and very shortly awned, the central awn scarcely longer; palea obovate, obtuse, pubescent on back, 2½ mm. long.
Keith; Bordertown; Dismal Swamp (near Mount Gambier); Millicent; Kangaroo Island.—Victoria (Hawkesdale). Resembles *D. carphoides* with smaller spikelets.

4. **D. semiannularis** (Labill.) R. Br. Stems 5-60 cm. high; leaves mostly filiform, the stem ones rarely flattish, glabrous or pubescent; panicle narrow or rather loose, 2-10 cm. long, of 4-35 spikelets on slender pedicels 2-8 mm. long; outer glumes narrow, 12-23 mm. long; spikelets 6-9-flowered, the awns exceeding the outer glumes; base of flowering glume 2½ mm. long, with 2 conspicuous rings of hairs, one at the base and the other above the middle, the back otherwise glabrous; lateral lobes 8-12 mm. long, consisting chiefly of a slender awn; central awn 12-20 mm. long, the lower twisted part usually dark-brown when ripe; palea oblong-cuneate, 4-5 mm. long, notched at summit, glabrous on back.—*Arundo semiannularis*, Labill. (1804).
Southern districts to Flinders Range; Kangaroo Island; Murray lands; Yorke and Eyre Peninsulas and westward to Nullarbor Plain; South-East.—Temperate Australia; Tasmania.

5. **D. setacea,** R. Br. Stems slender, 15-40 cm. high ; leaves all filiform, pubescent or glabrous, mostly in dense radical tufts ; panicle dense, narrow-oblong, 1½-5 cm. long, 6-12 mm. broad, purplish, of 5-25 erect spikelets on pedicels 1-3 mm. long, sometimes almost reduced to a raceme and then distinguishable from *D. penicillata* by the flowers (without the awns) much shorter than the outer glumes instead of about as long ; spikelets 5-8-flowered ; outer glumes narrow, 8-13 mm., rarely 16 mm. long ; base of flowering glume 2-3 mm. long, with a tuft of hairs at base and 2 long marginal tufts above the middle, with 2 small tufts or some scattered hairs below the lobes, or sometimes the hairs arranged in a continuous upper ring as in *D. semiannularis ;* lateral lobes 6-8 mm. long, of which the greater part is a fine awn ; central awn slightly longer to nearly twice as long ; palea oblong-cuneate, obtuse or scarcely notched, glabrous on back.

Southern districts to Flinders Range ; Kangaroo Island ; Eyre Peninsula ; South-East., Temperate Australia ; Tasmania. Some specimens are intermediate between *D. setacea* and *D. semiannularis* and it is difficult to place them.

6. **D. auriculata,** J. M. Black. Stems slender, 20-30 cm. high, sometimes geniculate ; leaves pubescent with spreading hairs, filiform, or those of the stem flattish and about 2 mm. broad ; panicle dense, sometimes reduced to a raceme, 1½-3 cm. long, 1½-2 cm. broad, of 4-15 spikelets on pedicels of 2-3 mm. ; outer glumes broad, divergent, boat-shaped, pale-green, 10-13 mm. long ; spikelets 5-8-flowered, the awns exceeding the outer glumes ; base of flowering glume broad, 3 mm. long, with a conspicuous ring of hairs at base and another above the middle ; lateral lobes 7-10 mm. long, tapering into a fine awn for more than half their length and each lobe with a triangular membranous auricle at the base of its outer margin ; central awn 2-3 mm. longer than the lateral lobes ; palea ovate-cuneate, obtuse, 4 mm. long, pubescent on back.

Adelaide plains and foothills ; Jamestown ; Bundaleer Hills. Resembles *D. carphoides* externally ; erroneously described on p. 73 as var. *setacea.*

7. **D. penicillata** (Labill.) F. v. M. sensu strictiore. Stems slender, 20-60 cm. high ; leaves pubescent, filiform or sometimes flattish and under 2 mm. broad ; raceme 3-8 cm. long, of 5-10 distant or approximate narrow erect spikelets on pedicels 2-3 mm. long, the lower branches sometimes bearing 2 spikelets ; flowers 6-9 and (without the awns) about as long as the outer glumes ; outer glumes narrow, 8-12 mm. long ; base of flowering glume 3 mm. long, with a ring of hairs at its base, a conspicuous tuft on each margin about the middle and often 2 smaller tufts below the lobes ; lateral lobes 3-9 mm. (usually 6 mm.) long, the slender awns very short or as long as the broader basal part of the lobe ; central awn 9-15 mm. (usually 10 mm.) long ; palea oblong-cuneate, about 4 mm. long, notched at summit, glabrous on back.—*Arundo penicillata,* Labill. (1804) ; *Danthonia racemosa,* R. Br. (1810).

Southern districts ; Kangaroo Island ; South-East.—Temperate Australia ; Tasmania.

P. 73.—*2. **Pentaschistis airoides** (Nees) Stapf. Delicate little annual 5-16 cm. high ; leaf-blades 1-4 cm. long, narrow, villous, the margins usually ciliate with minute stalked glands, the sheaths villous and most of them with similar glands on back ; ligule of short hairs ; spikelets 2-flowered, in a loose capillary panicle 2-4 cm. long and broad ; outer glumes membranous, about 3 mm. long, glabrous except along the 1 central nerve ; flowering glume scarcely 2 mm. long, faintly 5-nerved, with a fine apparently terminal bent awn 5-6 mm. long and 2 still finer bristles 2-2½ mm. long rising on each side of it ; callus hairy.—*Danthonia airoides,* Nees.

Pinery, near Adelaide ; Happy Valley ; between Monarto South and Murray Bridge. Oct.-Nov.—South Africa. Resembles *Aira caryophyllea,* but *Aira* is a glabrous genus.

P. 74.—1. **Triodia Basedowii,** E. Pritzel, instead of *T. pungens.* The true *T. pungens,* R.Br. has a rather shorter flowering glume, with the 3 lobes acute instead of obtuse, and appears to be confined to tropical Australia.

P. 76.—3. *Triodia aristata* var. *pauperata,* J. M. Black. Panicle narrow, 20-30 cm. ong ; spikelets 7-8 mm. long ; outer glumes 5-6 mm. long.—Sandhills north-west of Musgrave Range.

P. 76.—Add to " flowering glume " of *Diplachne* " 3-nerved."

P. 78.—1. **Eragrostis interrupta** (Lamk.) Beauv. var *tenuissima,* Stapf, instead of *E. tenella* (L.) Roem. et Schult. Dr. Stapf thinks this form, which also occurs in India and China, is better placed under *E. interrupta* than *E. tenella.* The former has only 2 stamens and even the lower panicle-branches are scarcely whorled, whereas *E. tenella* has 3 stamens and the lower panicle-branches whorled. Var. *tenuissima* is sometimes under 10 cm. in height.

P. 78.—1A. *Eragrostis interrupta* (Lamk.) Beauv. var. *densiflora,* J. M. Black. Panicle erect, spikelike, 6-10 cm. long, interrupted towards base, the branches 5-20 mm. long,

appressed in dense clusters along the main rhachis and clothed with spikelets to their bases; spikelets subsessile, 2-3 mm. long, 4-5-flowered; flowering glumes 1 mm. long; palea glabrous; grain shining, ovoid, ½ mm. long. The panicle is much more compact, the upper branches are appressed and shorter, and all the branches are more densely clothed with spikelets than in var. *tenuissima*. In both varieties the flowering glume is very delicate, almost hyaline.

Toorawatchy Waterhole, between Cordillo Downs and Innamincka.

P. 78.—2. *Eragrostis leptocarpa* has the grain sometimes only ½ mm. long, although oblong, and the panicle often remains dense and compact at least in the early fruiting stages. The spikelets are sometimes as dark as those of *E. pilosa*, but the latter is usually a stouter and taller grass.

P. 78.—5. *Eragrostis diandra*. Also Swan Reach, River Murray.

P. 79.—14. *Eragrostis Dielsii*. The leaves are sometimes flattish and 1-2½ mm. broad at base; the flowering glume is 2 mm. long, the palea nearly as long, and the ovoid-oblong compressed grain is 1 mm. long. In *E. falcata* the flowering glume is about 1½ mm. long, the almost glabrous palea nearly as long, and the ovoid-truncate grain is only ½ mm. long.

P. 81.—65A. SPHENOPUS, Trin.

(From Greek *sphên*, wedge; *pous*, foot; alluding to the pedicels thickened under the flower).

*1. **S. divaricatus** (Gouan) Reichb. Small annual, usually 5-20 cm. high; leaves filiform-channelled; ligule lanceolate; panicle loose, with capillary branches, the pedicels thickened upwards; spikelets 2-2½ mm. long, mostly 3-flowered; 2 outer glumes minute, unequal, membranous, obtuse; flowering glume ovate, obtuse, 3-nerved, 1½ mm. long; grains free.

Near Port Adelaide. Sept.-Nov.—Mediterranean region.

P. 82.—*1. **Bromus villosus,** Forsk. (1775) instead of *B. maximus*, Desf. (1798). This species has the stem (between the uppermost leaf-sheath and the lowest panicle-branches) sometimes pubescent only close to the summit or even quite glabrous; probably specimens with glabrous stems have often been mistaken for *B. sterilis*, L. The distinguishing characters are:—*B. villosus*, lower outer glume 15-18 mm. long; upper 20-25 mm.; flowering glume without awn 23-28 mm. long; awn 3½-5 cm. long; *B. sterilis*, lower outer glume about 10 mm.; upper about 16 mm.; flowering glume without awn 14-20 mm. long; awn 2-3 cm. long. The panicle-branches of *B. sterilis* are rougher when stroked downwards than those of *B. villosus* and are more minutely pubescent. *B. sterilis* has been introduced from Europe into America, and will probably find its way to Australia, or may be already established in some part. Both species often turn reddish when ripening and the ripe panicle is drooping and unilateral.

P. 82.—6. **Bromus hordeaceus,** L. (1753) in place of *B. mollis*, L. (1762).

P. 83.—2. **Cynodon ciliaris,** Benth. Small perennial, with geniculate stems; leaves with tubercle-seated spreading hairs; spikes 2, rarely 3, digitate, 3-4 cm. long; 2 outer glumes nearly 4 mm. long; flowering glume and palea 2½ mm. long, concave, ciliate on the nerves and with a transverse ring of long spreading hairs at the base of the short conical glabrous summit, so that the flower appears top-shaped, with a hairy pappus-like crown; grain obovoid, shining, 1½ mm. long; hilum punctiform, basal.

Gibber Plain on Cordillo Downs.—Western New South Wales; Central Australia.

P. 83.—4. **Chloris virgata,** Sw. in place of *Ch. barbata* var. *decora*. This species differs from *Ch. barbata* principally in the spikelet having only 1 instead of 2 empty terminal glumes.

P. 85.—*Dactyloctenium aegyptium*.—" Button-grass."

P. 85.—*Leptochloa digitata* sometimes occurs in a dwarfed form north of Oodnadatta with the spikes only 2 cm. long and the spikelets 2-2½ mm. long.

P. 87.—1. *Cyperus Eragrostis* has been found in a marsh near the Bluff, Victor Harbor, and at Cleland's Gully, near Mt. Compass.

Var. *pauperata*, J. M. Black. Stem 2-3 cm. long, apparently annual, bearing only 1-2 spikelets, subtended by 2 involucral bracts, one shorter and the other much longer than the spikelets.—Spring behind the Bluff, Victor Harbor.

P. 87.—2. *Cyperus pygmaeus*. Also round waterholes between Cordillo Downs and Cooper's Creek.

P. 87.—3A. **Cyperus laevigatus,** L. Perennial with weak stems 30-80 cm. high ; leaves reduced to pointed sheaths at base of stem ; spikelets 6-20 in a dense globular apparently lateral cluster much surpassed by the erect subulate bract ; spikelets oblong-lanceolate, thick, 6-10 mm. long, 3-3½ mm. broad, about 20-flowered ; glumes closely imbricate, smooth, whitish, or the margins dashed with brown ; style 2-cleft ; nut plano-convex, about half as long as the glume.

In water : Middleton, also west of the Bluff (Encounter Bay). Summer.—West Australia ; warmer countries of old and new world.

C. distachyus has been found near creeks at Spalding and near Lake Eyre with 1-5 spikelets in the cluster, but the plant is much smaller and more slender than *C. laevigatus*, and the spikelets only 1½-2 mm. broad.

It should be noted that *Cyperus fulvus, alterniflorus, rigidellus,* and *Gunnii* belong to the section *Mariscus*, in which the rhachilla of the spikelet is articulate below the lowest fertile glume and at maturity falls off as a whole, carrying with it the persistent flowering glumes. All the other species described in this work belong to other sections which have a persistent rhachilla not breaking off below the lowest flowering glume, and the flowering glumes fall off separately when ripe.

P. 89.—5. *Cyperus enervis* R. Br. var. *laxus,* Benth. 1 or 2 of the spikelets pedunculate, or the peduncle bearing an umbellule of 2-3 spikelets, so that the inflorescence becomes a partly compound umbel. The oblong nuts are (as also in the type) ¾ the length of the glumes and the spikelets more numerous than in *C. gracilis*.—River Murray.—Also New South Wales.

P. 89.—6A. **Cyperus rigidellus** (Benth.) n. comb. Differs from *C. gracilis* in stiffer leaves, obtuse glumes, and the rhachilla caducous.—*C. gracilis*, R. Br. var. (?) *rigidellus*, Benth. ; *Mariscus rigidellus*, C. B. Clarke. Near Lake Eyre.

P. 89.—8. *Cyperus vaginatus* var. *densiflorus*. Some specimens from Strzelecki Creek are proliferous. The umbels develop flowers and also branchlets with a bulbous base, which have normal flower-clusters at summit.

P. 89.—9. *Cyperus difformis*. The spikelets are sometimes pale-green and quite pale when ripe ; stem triquetrous but weak ; longest involucral bract 6-16 cm. long ; glumes only ¾ mm. long, with broad green keel and no lateral nerves.

P. 89.—12. *Cyperus Iria*. The more typical form has greenish 6-8-flowered spikelets, the glumes 3-nerved on the green keel. A slender plant, often only 6-20 cm. high.

P. 89.—15. *Cyperus subulatus*. The plant recorded by Bentham from Lake Eyre as *C. subulatus*, R. Br. var. *confertus*, Benth. has been raised by C. B. Clarke to a separate species as *C. Andrewsii*. Stem slender ; leaves and involucral bracts very narrow, 1 or 2 of the latter longer than the inflorescence ; umbel-rays few and short ; spikelets linear, 10-flowered ; glumes obtuse, the keel green and 3-nerved, the sides nerveless and reddish-brown. The typical *C. subulatus* belongs to eastern New South Wales.

P. 90.—16A. **Cyperus Clelandii,** J. M. Black. Stem rather stout, bluntly trigonous near summit ; leaves long, with broad basal sheaths and narrow blades with scabrous margins ; spikelets linear, golden, 6-10 mm. long, 2 mm. broad, 8-18-flowered, numerous in sessile globular clusters on the primary rays or spicate at the summit of the alternate secondary rays of a compound umbel ; primary rays about 8, 3-10 cm. long ; rhachilla persistent, scarcely winged ; involucral bracts about 5, of which 2-4 much longer than inflorescence ; glumes 2 mm. long, mucronulate, 3-4-nerved on each side, deciduous from the lowest upwards ; style 3-cleft ; nut narrow, trigonous, straw-colored, minutely granular, nearly as long as glume.

Cordillo Downs (north of Cooper's Creek). Differs from *C. Gunnii* in light-colored deciduous shorter mucronulate glumes. It is a much taller and stouter plant than the slender *C. Gilesii*, which has more numerous longer narrower glumes (3 mm. long) with longer often recurved mucro, a simpler inflorescence and no wings to the rhachilla.

P. 90.—4A. **Schoenus fluitans,** Hook. f. Stems weak, slender, floating or creeping in water or mud ; leaves filiform, 2-10 cm. long, with a small ligule, distant along the branches or clustered at the nodes ; spikelets usually solitary at the ends of the branches, or 1-2 lower down, linear, 8-12 mm. long, 3-4-flowered ; glumes thin, narrow, obtuse ; no hypogynous bristles ; nut ovoid, white, trigonous, 1½ mm. long, tipped by the minute base of the style.

Encounter Bay ; Breakneck River, K.I.—Tasmania.

P. 91.—7. *Schoenus Tepperi* has sometimes 2 fertile flowers in the spikelet, each in an excavation of the flexuose rhachilla ; spikelet about 8 mm. long, with narrow membranous glumes and sessile between 2 erect leaflike bracts, of which the lower one is rather

longer than spikelet; nut obovoid, 1½ mm. long; the rather rigid leaf-blades are only ½ mm. broad.

P. 91.—10. **Schoenus brachyphyllus,** F. v. M. (1875) instead of *S. brevifolius*, R. Br. Our plant differs in having 3-6 slender hypogynous bristles and sometimes an empty bract about the middle of the stem; the laminas of the bracts are longer and more obtuse than in *S. brevifolius*, which is an East Australian species and is devoid of hypogynous bristles. *S. brachyphyllus* is probably the same as the West Australian *S. laevigatus*, W. V. Fitzg. (1903).

P. 91.—3A. **Heleocharis halmaturina,** J. M. Black. Small perennial, with slender but rigid stems, 4-8 cm. long, slightly compressed, ½ mm. broad, grooved along one edge, arched or curved in various directions; leaf-sheaths imbricate at base of stem, the uppermost with a subulate point 2-5 mm. long; spikelet linear, acute, solitary, 6-7 mm. long, under 1 mm. broad; glumes about 6, the lowest subulate, with 2 membranous auricles at base, erect, bract-like and appearing to continue the stem, about as long as the rest of the spikelet, the second glume rather short, obtuse, mucronate, the others linear-oblong, acute, subequal, reddish, 1-nerved on back, the terminal glume enclosing the solitary bisexual flower and a small glume, stamens 3, style with 3 long branches and a conical persistent base 3 mm. long; hypogynous bristles 6, barbellate in upper half; nut not seen ripe.

Rocky River, K. I. Summer. Differs from *H. multicaulis* in more rigid stems and basal leaf-sheaths, the latter with longer points, in the narrow acute spikelet and its solitary terminal flower. The lowest glume is also longer and more bract-like than in any of our other species of *Heleocharis*. The spikelet resembles externally that of *Cladium capillaceum*.

P. 92.—4. *Heleocharis acicularis.* Rocky River, K. I.

P. 92.—5A. STENOPHYLLUS, Raf. (1825).

(From Greek *stenos*, narrow; *phyllon*, leaf.)

Differs from *Fimbristylis* by the minute persistent bulbous base of the style which crowns the summit of the nut, and from *Heleocharis* by the absence of hypogynous bristles.—*Bulbostylis*, Kunth (1837 as a section of Isolepis); C. B. Clarke (1893), non Stev. (1814) nec DC. (1836).

Spikelets sessile in a terminal cluster or head; leaf-sheaths ciliate at orifice	*S. barbatus* 1.
Spikelets pedunculate in a small umbel; leaf-sheaths not ciliate	*S. capillaris* 2.

1. **S. barbatus** (Rottb.) n. comb.—*Scirpus barbatus*, Rottb. (1773); *Isolepis barbata* (Rottb.) R. Br. (1810); *Fimbristylis barbata* (Rottb.) Benth. (1878); *Bulbostylis barbata* (Rottb.) C. B. Clarke (1893).—Also McDouall Peak, south of Stuart Range. Glumes 2 mm. long, the keel thick, green, obscurely 3-nerved, the sides brown, nerveless; nut turbinate, trigonous, whitish, less than half as long as the glume, the minute hemispherical style-base usually glabrous.—Warm countries of the Old World.

2. **S. capillaris** (L.) Britton (1894). Glabrous annual, with filiform stems 8-20 cm. high; leaves much shorter, filiform; spikelets ovoid-oblong, 4-7 mm. long, in an almost simple few-rayed umbel, which is longer than the involucral bracts; glumes about 3 mm. long, mucronate, loosely imbricate; the keel pale, the sides brown and nerveless; stamens usually 3; style glabrous, 3-branched; nut pale, turbinate, 1 mm. long, trigonous, transversely rugulose; style-base bulbous.—*Scirpus capillaris*, L.; *Fimbristylis capillaris* (L.) A. Gray; *Bulbostylis capillaris* (L.) C. B. Clarke.

Cordillo Downs (north of Cooper's Creek).—Tropical and sub-tropical parts of the globe. Our specimens lack the hairs on the leaf-sheaths or their orifices which occur on the Indian and American forms.

P. 93.—1. *Scirpus fluitans.* Also near Kalangadoo, S. E. The almost capillary leaves resemble those of *Schoenus fluitans*, but the spikelets are much shorter and broader and the branches or peduncles are naked except for the single leaf at their bases.

P. 93.—3. *Scirpus cernuus* has been found as far north as Minnie Downs, east of the Diamentina River and also on the Macumba River. The nuts, as is sometimes the case in this almost cosmopolitan species, are whitish or brown and the spikelets almost always 3 together.

P. 93.—9. *Scirpus americanus.* The spikelets are sometimes solitary or twin, rarely 5-6 together; the usually triquetrous involucral bract, which appears to continue the stem, is 2-10 cm. long.

P. 94.—12. *Scirpus maritimus.* Style-branches sometimes 2 and the nut compressed.

P. 94.—*Lipocarpha microcephala.* Swan Reach and other places along the Murray. Involucral bracts 1-2, much longer than spikelets; hypogynous scales hyaline, rather longer than the narrow nut, which is 1 mm. long.

P. 94.—2. *Cladium Gunnii* has been found at Squashy Creek, 27 miles E. of Cape Borda, K.I. Stems to 1 m. high; panicles sometimes 18 cm. long, the longer ones with erect spike-like branches; uppermost glume of spikelet 7 mm. long, much longer than the 3 others and spreading-erect; nut whitish, 3½ mm. long, 3-ribbed towards base. *C. junceum* has smaller spikelets 4-5 mm. long, the glumes almost equal.

P. 94.—3A. **Cladium monocarpum,** J. M. Black. Stems filiform but rather stiff, striate, 40-50 cm. high; leaves reduced to basal sheaths with subulate laminae ½-5 cm. long; spikelets often few, forming a narrow loose panicle 2-8 cm. long, 2-3 together on capillary peduncles 2-12 mm. long, in the axils of small sheathing bracts with a linear point or lamina; spikelets 5-8 mm. long, very narrow, most of the glumes notched and mucronate, the 5 or 6 lowest empty and gradually shorter; flower solitary within the uppermost glume; stamens 3; nut ovoid, white, faintly 3-ribbed, 1¼ mm. long.—*Schoenus monocarpus,* J. M. Black (1928).
Back Valley, near Inman River; Breakneck River, K.I. Resembles *C. capillaceum,* but is not so slender, the spikelets are longer and the nut is not crowned. The glumes of both species are subdistichous, but the rhachilla is straight, not flexuose as in *Schoenus,* and the glumes are close together.

P. 95.—6. **Cladium rubiginosum** (Soland.) Domin (1915) instead of *C. glomeratum,* R.Br. The specific name alludes to the rusty-red color of the spikelets.—*Schoenus rubiginosus,* Soland. in Forst. f. Prodr. n. 493 (1786).—Also Kangaroo Island.

P. 95.—8. *Cladium tetragonum.* Also Breakneck River, K.I. Slender specimens, the panicle about 4 cm. long.

P. 95.—10. **Cladium gracile,** J. M. Black. Stems 12-20 cm. high, flat, weak, striate, under 1 mm. broad; leaves basal, equitant, often longer than stem, flat, linear, acute, striate, about 1 mm. broad; spikelets about 3-6, distant, pedicellate, forming a loose raceme or panicle 4-7 cm. long; lower sheathing bracts flattish, with short weak erect laminae, the upper ones glume-like; spikelets 4-5 mm. long, 1-flowered; glumes subdistichous, brownish, acute, 1 or 2 outer ones empty, the next containing a flower with 3 stamens and 3 style-branches, also a narrow shorter folded empty glume; nut obovoid, trigonous, with a rounded pubescent summit.
Breakneck River, K.I. Differs from *C. acutum* in the weak, not rigid leaves and much looser panicle; from the West Australian *C. laxum* (Nees) Benth. by the smaller stature, narrower leaves and fewer spikelets, with only 1 flower instead of 2-3.

P. 95.—4A. **Gahnia hystrix,** J. M. Black. Small perennial 4-15 cm. high, with crowded erect branching stems covered towards base by the dark imbricate sheaths of old leaves; leaf-blades terete, rigid, pungent-pointed, erect, 2-5 cm. long, about ½ mm. broad, much longer than the broad sheaths, the crowded blades exceeding and almost concealing the small spike-like panicle which terminates the stem; spikelets subsessile, about 4, the uppermost twin, the others solitary, all more or less enclosed in the sheaths of leafy bracts and 6-7 mm. long, at first whitish and angular, later brownish and ovoid-acute; glumes 5, the first 4 broad, subequal, shortly awned, the 4th enclosing the solitary bisexual flower and a very small 5th glume; stamens 6; style short, terete, caducous, with 3 short branches; no hypogynous scales or bristles; nut obovoid, white, shining, 3 mm. long, trigonous in lower half, with a small black dot at summit marking the separation from the style.
Cape Borda and Cape du Couëdic, K.I. Summer. The flowering glume is as large as the others, but the 6 stamens and the absence of any swelling towards the base of the style indicate *Gahnia* rather than *Cladium.*

P. 96.—4B. **Gahnia ancistrophylla,** F. v. M. Stems slender, 30-50 cm. high; leaves erect, filiform, smooth, with involute margins, mostly at the base of the stem and nearly as long, with long fine hooked or curved points, the sheaths woolly at orifice; panicle narrow, 15-25 cm. long, interrupted, the bract below each partial panicle long and leafy, those below the spikelets with or without short awn-like points; spikelets dark-brown, approximate but not clustered, 3½ mm. long, the lower glumes acuminate; flowers 2, the upper one alone fertile; stamens 3-4; nut obovoid, trigonous, 2 mm. long.
Mount Compass (Mount Lofty Range); Waitpinga, near Encounter Bay. Summer.—West Australia. The leaves are finer and not straight and rigid as in *G. lanigera* and *G. deusta.*

P. 97.—10. **Lepidosperma semiteres.** The slender stems are biconvex and 2-edged, 1-1½ mm. broad sometimes over 1 m. long; leaf-blades flattish, ¾ mm. broad, the bract subtending the panicle very small and slender, not exceeding the first branch. In *L. canescens* the stems are terete and 1½-3 mm. thick; the leaf-blades longer, rigid, terete and 1½-2 mm. thick; the panicle broader, more branched and sometimes 8 cm. long, the erect subtending bract very short or almost as long as the panicle.

P. 98.—5. *Carex Gaudichaudiana.* The short beak of the utricle is sometimes truncate and entire, not bifid.

P. 98.—6. *Carex pumila,* var. *Bichenoviana.* Also Hindmarsh Valley.

P. 100.—2. **Lepyrodia valliculae,** J. M. Black. Stems filiform, simple, erect, 6-30 cm. high; rootstock slender, not creeping; basal sheaths and those along the stem appressed, 8-12 mm. long, with short points; flowers dioecious, in a narrow spike-like panicle 1-7 cm. long, the lower branches sometimes 1-2 cm. long and naked in lower part; bracteoles 2, shorter than perianth; segments subequal, acute, 2-3 mm. long, the outler segments as long as or slightly exceeding the inner, all rather larger in the females than the males; no staminodes or rudimentary ovary; capsule subglobular, 1½ mm. long and rather broader, opening (as in all the species) loculicidally at the 3 salient angles.
Back Valley, near Encounter Bay. Differs from *L. Muelleri* in smaller stature, more slender stems, dioecious flowers and shorter bracteoles.

P. 100.—1. *Hypolaena lateriflora.* Also Rocky River, K.I., and Back Valley, near Encounter Bay, forming tangled masses in swamps.

P. 101.—*Trithuria submersa.* Specimens from the western end of Kangaroo Island have the leaves 2-4 times longer than the scapes and sometimes 5 cm. long. Each head of this species contains 15-30 female flowers, each with a 1-celled ovary articulate on the short pedicel, and towards the centre 2-4 male flowers, each of 1 stamen, the red linear-oblong anthers basifixed, the filaments finally exceeding the female flowers.

P. 102.—3. *Centrolepis glabra.* Western end of Kangaroo Island.

P. 102.—4. *Centrolepis fascicularis.* Also Rocky River, K.I.

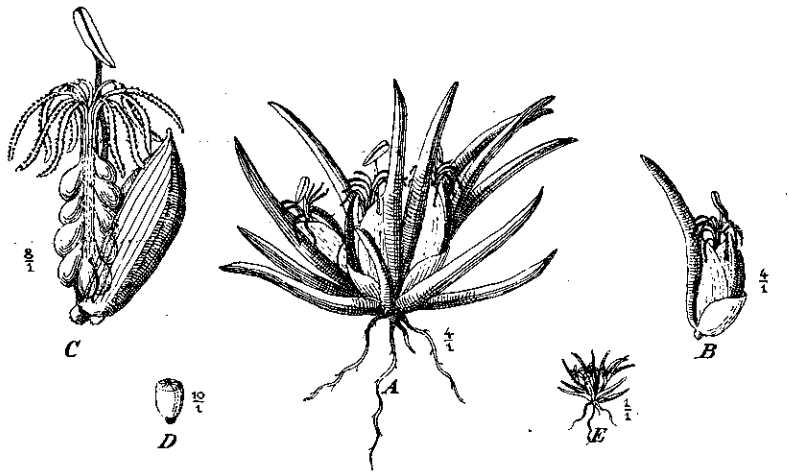

FIG. 337.—*Centrolepis Murrayi.* A, plant enlarged; B, the 2 floral bracts embraced at base by the broad sheath of an inner leaf; C, inner floral bract and flower; D, seed; E, plant, natural size.

P. 102.—7. **Centrolepis Murrayi,** J. M. Black. Dwarf glabrous annual; scapes none; leaves subulate, 3-6 mm. long; flowers solitary within the 2 sessile floral bracts, of which the lower one has an awn about as long as the sheathing part and the upper one is unawned; scales absent; carpels 8-10.
North Pearson Island (off Eyre Peninsula). Sept. Differs from the other known South Australian species in the heads sessile among the leaves.

P. 102.—*Xyris operculata.* Also Rocky River, K.I.

P. 104.—7. *Juncus lamprocarpus.* Torrens Lake (Adelaide). In marshy places the stems are often prostrate and root at the nodes.

P. 105.—10. *Juncus polyanthemus*. Also Macumba River (Far North).

P. 106.—*Burchardia*. Instead of "J. H Burchard, M.D., an English botanist," read "J. H. Burckhard, 1676-1738, German botanist."

P. 107.—6A. **Lomandra caespitosa** (Benth.) Ewart. Leaves 15-30 cm. long, narrow-linear, slightly channelled, 1-1½ mm. broad; male flowers sessile, distant, solitary or 2-3 together, each with a small bract at base, forming a short spike; male perianth-segments obovate, the 3 inner nearly 3 mm. long, fleshy, yellowish, the 3 outer thin, rather shorter; female flowers rather longer, shortly pedicellate, deflexed.—*Xerotes caespitosa*, Benth.

Morialta, Mt. Compass, Myponga (Mt. Lofty Range). Oct.-Nov.—Our specimens are male only.—West Australia.

P. 107.—7. *Lomandra glauca*. Also sandhills near Grange; Sevenhills.

P. 108.—*Thysanotus exasperatus* has been found near a creek in the Bundaleer Hills between Clare and Spalding. It has the characteristic roughness along the lower part of the stem caused by minute tubercles, about 4 filiform leaves to each stem, and some of the leaves much longer than the stem; anthers all equal, pale, obtuse, about 2 mm. long; umbels sometimes 4-flowered.

P. 109.—When not in flower the 2 Bulbines may be distinguished as follows:—*B. bulbosa*, scapes often over 30 cm. high; pedicels stouter and usually longer; seeds about 2 mm. long, smooth between the angles; *B. semibarbata*, scapes mostly under 30 cm. high; foliage denser at base and no tubers; seeds 3-5 mm. long, transversely wrinkled and somewhat reticulate between the angles.

P. 110.—2. *Dichopogon fimbriatus*. Also Keith; Yorke Peninsula; Bundaleer Hills; beside Lake Torrens. Both species of *Dichopogon* are surrounded at base by the dense brown filiform bases of the leaves of previous years, and have fusiform tubers on the roots.

P. 111.—2. *Xanthorrhoea australis*. Read "scape 40 cm." instead of "spike 40 cm."

P. 114.—2. **Romulea Columnae,** Seb. et M. instead of *R. parviflora* (Salisb.) J. Britten (1914), which latter combination is pre-occupied by *R. parviflora*, Eckl., the name of a South African species near *R. rosea*.

P. 116.—1A. GASTRODIA, R.Br.

(From Greek, *gastêr*, the belly; *odous*, a tooth, referring to the top of the column.)

Perianth-segments united into a 5-lobed bell-shaped flower. Labellum slightly shorter, movable on a wide claw adnate to the base of the sepals, ovate-oblong or obscurely 3-lobed; apex truncate; margins upraised, lacerated or fringed; lamina with conspicuous raised mesial line from the apex to centre, bifurcating posteriorly; at the base and on the claw 2 undulate callosities. Column elongated, erect; stigma at its extreme base; anther hemispherical, lid-like; pollinia 4, granular. Leafless saprophytic herbs; flowers in a loose raceme.

A small genus comprising 17 known species; represented by a single species in Australia and 3 in New Zealand; extending northwards to eastern Asia.

1. **G. sesamoides,** R.Br. (flowers like those of *Sesamum*.) A more or less slender plant, 15-50 cm. high, arising from a large irregular tuber. Flowers brownish-yellow, bell-shaped, about 1 cm. long, with characters of the genus.

Kingston, S.E.; Flinders Chase, K.I.; throughout Australia; New Zealand. Oct.-Nov.

P. 120.—5A. **Thelymitra chasmogama,** Rogers (*flowers pollinated during expansion of the perianth.*) A plant closely resembling *T. luteociliata*, Fitzg., but with a different hood, which is produced into a yellow tube with smooth entire margins. It likewise differs completely in the structure of its pollinarium, which is easily removed and therefore adapted for cross-pollination, whereas *T. luteociliata* is strictly cleistogamous. Unlike the latter the flowers open freely.

Golden Grove. October.

P. 123.—1A. **Microtis oblonga,** Rogers (*labellum oblong*). Very slender. Flowers very small and distant, with slender ovaries. Dorsal sepal almost erect, narrowly hooded, about 3 mm. long; lateral sepals tightly revolute. Labellum about 2·5 mm. long, reflexed, narrowly oblong, apex occasionally slightly notched, margins crenulate, 2 large callosities at the base, one at the apex.

Myponga, Victor Harbor, Mt. Compass. Nov. and Dec.

P. 125.—3A. **Prasophyllum validum,** Rogers (*vigorous*). A very robust plant. Flowers green, amongst the largest in the genus, arranged in a long spike of about 28. Dorsal sepal erect, ovate, acute, about 13 mm. long; lateral sepals spreading, arched, connate almost to the apex, acute, about 13½ mm. long. Petals erect, incurved, linear-lanceolate, shorter and narrower than sepals. Labellum shortly clawed, somewhat ovate; in lower half erect, concave, thereafter recurved at right angles; callous part green, conspicuously raised, ending abruptly near apex; margins white, voluminous, entire in lower half, thereafter crenulate laterally, contracted at the bend. Anther apiculate, much shorter than rostellum; lateral appendages oblong-falcate with rather large basal lobe, shorter than rostellum.
Melrose. October.

P. 129.—2. **Corysanthes dilatata,** Rupp et Nicholls (1928) in place of *C. fimbriata.*—*C. fimbriata,* Benth. partly, not of R. Br.

P. 130.—3. **Corysanthes diemenica,** Lindl. in place of *C. pruinosa.*—*C. fimbriata,* R. Br. var. *diemenica,* Benth. See paper by Rupp and Nicholls in Proc. Linn. Soc. N.S.W. 53 : 80 (1928).

P. 132.—1. **Acianthus reniformis** (R. Br.) Schlechter in place of *Cyrtostylis reniformis. Cyrtostylis* is regarded by R. Schlechter in Engler's Bot. Jahrb. 39 : 39 (1906) as a generic synonym of *Acianthus.*

P. 133.—1. **Eriochilus cucullatus** (Labill.) Reichb. f. in place of *E. autumnalis* R. Br. (1810).—*Epipactis cucullata,* Labill. (1806).

P. 137.—6A. **Caladenia clavigera,** A. Cunn. A rather variable slender species, about 11-22 cm. high. Leaf linear to oblong-lanceolate, hairy. Stem hairy, erect, slender, a loose narrow lanceolate bract at or above the middle. Flower solitary, yellowish with dark reddish-brown markings. Sepals sub-equal, from 2-3 cm. long, wider at the base, narrowing into fine points, usually clavate, yellowish traversed by a reddish-brown longitudinal stripe; dorsal one erect incurved; lateral ones spreading horizontally or drooping. Petals similar, but not clavate and rather shorter. Labellum shortly clawed, more or less ovate, recurved; lateral lobes yellowish, rounded, entire; apical lobe dark-reddish-brown, triangular, subacute, with entire or slightly irregular margins towards the base; calli linear, golf-stick type, reddish-brown, arranged in 4 (occasionally 6) longitudinal rows along the posterior half of the lamina. Column rather widely winged in upper part; 2 yellow oval glands at the base; anther with a minute mucro.
Bordertown; Kingston. Oct.—Victoria; New South Wales; Tasmania.

P. 146.—1. **Cryptostylis subulata** (Labill.) Reichb. f. in place of *C. longifolia,* R. Br. (1810).—*Malaxis subulata,* Labill. (1806).

P. 151.—9. **Pterostylis robusta,** Rogers in place of *P. reflexa.* As regards localities delete "from all other States" and substitute "Victoria; West Australia." The true *P. reflexa,* R. Br. is confined to the eastern States.

P. 155.—Miss Ellen D. Macklin published, in Trans. Roy. Soc. S.A. 51 : 257 (1927), a revision of the species of *Casuarina* which have at various times been grouped under the name of *C. distyla,* Vent. The result, as regards our own flora, is as follows :—

A. Bracteoles of male flowers deciduous; branchlets terete; internodes 1-2 cm. long; anthers golden-brown..... *C. striata* 5.
A. Bracteoles of male flowers persistent; internodes under 1 cm. long; anthers brown or reddish-brown.
  B. Branchlets terete; low shrubs.
    Sheathing-teeth 6-8, long, narrow; male spikes to 6 cm. long ..... *C. paludosa* 5A.
    Sheathing-teeth 5-7, broad, short; male spikes to 2½ cm. long ..... *C. pusilla* 5B.
  B. Branchlets angular; usually tall shrub; sheathing-teeth 5, short; anthers red ..... *C. Muelleriana* 5C.

5. **C. striata,** Macklin. Variable dioecious or monoecious shrub or small tree 1½-5 m. high; branchlets whorled, striate with rounded ribs, the internodes usually 1-2 cm. long and about 1½ mm. thick; sheathing-teeth 6-8, short, deltoid; male spikes 1-3 cm. long; bracteoles deciduous, shorter than sheathing-teeth; perianth-segments hooded, ciliolate; anthers golden-brown, exserted; cones mostly oblong, 1½-5 cm. long, truncate or rarely conical at summit, the dorsal protuberance about as long as the valves. (Fig. 35, p. 156.)
Mount Lofty Range southward to Encounter Bay and Currency Creek; Kangaroo Island. June-Dec.

5A. **C. paludosa,** Sieb. var. *robusta*, Macklin. Small shrub, 30 cm. to over 1 m. high, dioecious or monoecious; branchlets with rounded ribs, the internodes 6-9 mm. long, about 1 mm. thick; sheathing-teeth 6-8, lanceolate, acuminate, ciliolate; male spikes 2-6 cm. long; bracteoles persistent, not exceeding the sheathing-teeth; perianth-segments hooded, ciliolate; anthers reddish-brown or rusty, exserted; cones oblong or globular, 1½-2½ cm. long, truncate or conical at summit, sometimes irregular through partial abortion, pubescent when young.

Myponga to Encounter Bay (Mount Lofty Range): Keith, Wirrega (90-Mile Desert). Jan.-Aug. The typical form belongs to eastern New South Wales.

5B. **C. pusilla,** Macklin. Low rounded dioecious shrub 25 cm. to about 1 m. high; branchlets dark-green when fresh, often curved, terete and almost smooth (the ribs faintly marked), the internodes 4-8 mm. long, about ½ mm. thick; sheathing-teeth 5-7, short, ciliolate, imbricate laterally towards base; male spikes 1-2½ cm. long; bracteoles persistent, longer than sheathing-teeth, ciliate; perianth-segments hooded; anthers rust-colored, exserted; cones subglobular or ovoid, truncate, 1-2 cm. long, the dorsal protuberance of the valves conspicuous.

Southern districts and Murray lands, having been recorded from scrub between Macclesfield and Strathalbyn, Nuriootpa, Encounter Bay, Karoonda, Lameroo, Keith, Wirrega.—North-west Victoria.

5C. **C. Muelleriana,** Miq. Rounded mostly dioecious shrub or small tree, from under 1 to 4 m. high; branchlets dark-green, sometimes with a reddish tinge, angular owing to the sharp prominent ribs; internodes 4-8 mm. long, 1-1½ mm. thick; sheathing-teeth 5-7, short, deltoid; male spikes 1-5 cm. long, slender, the sheaths rather distant, so that part of the axis often appears between them; bracteoles persistent, longer than sheathing-teeth, ciliate; perianth-segments hooded; anthers red, exserted; cones ovoid or oblong, 1-2½ cm. long or rarely longer, truncate or often conical or beaked at summit, or irregular throughout by abortion of the flowers, the dorsal protuberance shorter than the valves.

Mount Lofty Range to Encounter Bay; Kangaroo Island; Flinders Range (Wilpena Pound); Murray lands; Yorke and Eyre Peninsulas to the Great Bight. May-Dec.—Western Victoria.

The true *C. distyla*, Vent., is confined, as far as known, to Victoria and Tasmania.

Miss Macklin shows that in *C. stricta* the anterior (abaxial) perianth-segment is sometimes present in its proper place, and that the posterior (adaxial) segment (plate 5, p. 88, fig. 7, 10) is simple and does not consist of the 2 connate segments.

P. 160.—Specimens from both sides of the Queensland border near Cordillo Downs make it probable that *Hakea Ivoryi* and *H. intermedia* are the same species, in which case Bailey's name (*H. Ivoryi*) has priority. *Grevillea Eyreana*, S. Moore (1920), described from a specimen without fruit collected by Sturt near Lake Eyre, is probably *Hakea Ivoryi*.

P. 160.—5. *Hakea vittata*. Near Cape Jervis.

P. 161.—11. *Hakea ulicina*. The lower leaves are sometimes 25 cm. long and scarcely rigid.

P. 162.—In the key to *Grevillea* it should read:—

C. Leaves narrow-linear, doubly grooved below (except *G. nematophylla*.)

P. 163.—7. *Grevillea nematophylla*. Specimens from near the Stuart Range have the fruits 16-20 mm. long, almost smooth and reddish-brown, as in *G. pterosperma* and *stenobotrya*.

P. 165.—9. *Grevillea striata*. "Beefwood."

P. 165.—13. *Grevillea lavandulacea*. Some specimens have all the leaves terete owing to the strongly revolute margins, 5-15 mm. long, about 1 mm. thick, and with the pubescence more persistent on the upper face, the perianth-tube 8-10 mm. long, the style often glabrous in the upper part, and the flowers sometimes only 2-4 in the umbel-like racemes. These were named var. *sericea* by Bentham and the name may be conveniently retained, although there is frequently a tendency to pass into the typical form, in which the leaves have the margins only slightly recurved and are 4-8 mm. broad.

P. 168.—Sprague and Summerhayes, in Kew Bull. 1927, p. 193, point out that *Fusanus*, having been established by Murray in 1774 as a synonym of *Colpoon*, Berg. (1767) could not legitimately be extended by Robert Brown to include plants which are now generally recognised as forming a distinct genus. They therefore revive *Eucarya*, T. L. Mitchell (1839), with the following necessary changes in nomenclature:—

1. **Eucarya acuminata** (R. Br.) Spr. et Summ. *Native Peach.—Fusanus acuminatus*, R. Br.

2. **E. Murrayana,** T. L. Mitch. (1839). *Bitter Quandong.—Santalum persicarium*, F. v. M. (1855); *Fusanus persicarius* F. v. M. ex Benth. (1873).

3. **E. spicata** (R. Br.) Spr. et Summ. *Fragrant Sandalwood.—Fusanus spicatus*, R. Br. (1810); *Santalum cygnorum*, Miq. (1844-5).

The derivation (not given by the author) is doubtless from Greek *eu*, well, fine; *karyon*, nut: alluding to the comparatively large stone or endocarp.

P. 170.—1. *Loranthus Exocarpi*. Specimens from north of Cooper's Creek, growing on *Acacia farnesiana*, have the leaves thinner and subacute and the flowers very rarely 3 on the common peduncle, the central one pedicellate.

Var. *lutea*, F. v. M. et Tate. Leaves sometimes rather acute; perianth yellow in lower part, greenish above.—Far North. On *Acacia farnesiana*.

P. 170.—3. **Loranthus Mitchellianus,** Blakely (1925) instead of *L. linearifolius*, Hook. (1848) non Bertero (1829). The leaves are 2-8 cm. long; the berry elliptic to ovoid-oblong, whitish, 12 mm. long.

P. 171.—7. *Loranthus pendulus*. North of Kingoonya on East-West railway. The minute scaly and stellate tomentum, scarcely visible on the leaves and flowers of the type, is here much more pronounced, giving them a hoary appearance. This species has sometimes 4, rarely 5 flowers in the partial cyme, instead of the normal 3.

P. 174.—*Polygonum*. In line 6 of the key read "paniculate" for "graniculate."

P. 178.—1. *Rhagodia baccata*. Read "usually whitish and convex beneath." The leaves are mostly concave above. The form with linear leaves, only 1-1½ mm. broad, found in our Murray lands, in north-western Victoria and in West Australia, is var. *linearis*, Benth.

P. 179.—7. *Rhagodia nutans*. Fruit sometimes yellow.

P. 180.—* 2A. **Chenopodium anthelminticum,** L. Usually stouter and taller than *Ch. ambrosioides*, slightly glandular, scentless; leaves more coarsely toothed, 2-4 cm. long; flowers in a long spreading panicle, the clusters with small leafy bracts or the uppermost without any; seed horizontal or vertical.—Pt. Adelaide; Semaphore.—Called in America, where it is native, "wormseed," and used as a vermifuge.

P. 180.—5A. **Chenopodium holocarpum,** Theil. et Aellen, instead of *Ch. carinatum* var. *melanocarpum* (1922); var. *holocarpum*, Thell. (1919).

P. 181.—*Chenopodium erosum*, R. Br. was united by Bentham to the introduced *Ch. murale*. Paul Aellen considers Brown's species well distinguished by its narrower leaves, seed with rounded not sharp edge, the pericarp more easily detachable and the surface of the testa covered with more or less rectangular pits of the honeycomb type, instead of with approximate waved or flexuose lines as in *Ch. murale*. *Ch. erosum*, which is native in Victoria and Tasmania, has not yet been found in South Australia.

P. 181.—15. **Chenopodium ambiguum,** R. Br. in place of *Chenopodium glaucum*, L. The latter (European and Asiatic) has narrower leaves 3 perianth-lobes and vertical seeds, except in the terminal flowers, while *Ch. ambiguum* has 4-5 very rarely 3 perianth-lobes and horizontal or almost horizontal blunt-edged seeds throughout. It is native in Australia and New Zealand.

P. 182.—2. *Dysphania simulans*. Koonamore Station, north of Broken Hill railway. Abundant on flooded ground in Dec. Seeds minute, subglobular.

P. 182.—3. *Dysphania littoralis*. Specimens from Coglin River, partly in Central and partly in South Australia, have 2 perianth-segments to each flower and only 1 style; the leaves 5-11 mm. long without the petioles, and the clusters either distinct or close together. This form therefore combines the characters given by Bentham for *D. littoralis* and *D. myriocephala*.

P. 183.—3. *Atriplex stipitatum* instead of *stipatum*.

P. 185.—*Atriplex varium*. This species or form has been found at the Hamilton Bore, north of Oodnadatta. The fruiting bracteoles are 3-4 mm. long, 5-toothed, campanulate-compressed, on a pedicel 1 mm. long. Bristles on face 2, 1 or none. The only distinguishing characters are the bristles and the pedicel, and as these are variable (the authors describe the fruit as usually sessile) it is doubtful whether this is more than a variety or form of *A. Muelleri*.

P. 186.—16. *Atriplex Muelleri* is often called "Annual Saltbush" on account of its usually annual character.

P. 187.—17A. **Atriplex lobativalve,** F. v. M. Small procumbent plant, white with a minute scaly tomentum; leaves ovate or rhomboid, 5-8 mm. long, with a few blunt teeth; flowers monoecious, the males mostly in the uppermost clusters; female clusters usually 2-3-flowered; fruiting bracteoles 2½ mm. long, nearly 4 mm. broad, united almost half-way in a subglobular tube, the upper free part fan-shaped, with 5 lanceolate divergent lobes or teeth, the bracteoles on a thick pedicel under 1 mm. long.

Macumba River (Far North).—Western New South Wales; Central Australia. Differs from *A. elachophyllum* chiefly in the toothed leaves and the broader 5-lobed lamina of each bracteole.

P. 190.—1. *Bassia uniflora*, F. v. M. var. *incongruens*, J. M. Black. Varies chiefly in the seed almost vertical; leaves 7-15 mm. long; spines slender 2-5 mm. long; hollow base of perianth more oblique.

Flinders Range and Far North.

P. 190.—3. *Bassia bicornis*. Commonly called "Goat-head" in our Far North.

P. 191.—10. *Bassia convexula*. Read "base of perianth" instead of "base and perianth."

P. 191.—8. *Bassia sclerolaenoides* is found at least as far south as Port Broughton and as far north as the Musgrave Ranges. It resembles *Kochia lobiflora*, but the latter has usually longer and rather golden-pubescent leaves, while its flowers have an angular appearance owing to the almost truncate wings of the perianth.

P. 192.—**Malacocera tricornis** (Benth.) R. H. Anderson in place of *Bassia tricornis*. On account of the soft and non-spiny perianth of this species, a new genus *Malacocera* (from Greek *malakos*, soft; *keras*, a horn) has been described by Mr. Anderson to receive it.

P. 193.—22. *Bassia decurrens*. The small decurrent spines or tubercles are sometimes reduced to 2 or 1. Specimens from Strzelecki Creek have shorter woolly leaves.

P. 193.—23A. **Bassia echinopsila,** F. v. M. Dwarf undershrub; leaves linear, crowded, 5-10 mm. long, silky-villous; flowers solitary; fruiting perianth almost glabrous, the tube 2 mm. long, ribbed longitudinally, produced into 2 short basal spurs on the outer face, the attachment-base circular and very slightly oblique; limb short: spines 6, 2-3 mm. long, reddish, spreading or slightly recurved, 2 of them united near base; seed vertical.

Minnie Downs (near Warburton River).—Western New South Wales; Queensland. A glabrous form occurs in the eastern States.

P. 193.—25. *Bassia intricata*. Instead of "perianth-tube as in the preceding" read "perianth-tube as in *B. divaricata*."

P. 195.—2. *Babbagia acroptera* var. *deminuta*.—New South Wales (Broken Hill); western Victoria (Pink Lakes).

P. 195.—**Babbagia scleroptera** has been found at Minnie Downs, near the Diamentina River. Locally called "Squash Bush."

P. 197.—9A. **Kochia enchylaenoides,** J. M. Black. Undershrub, the stems, branches, and leaves covered with a dense white woolly tomentum; leaves spreading, linear, obtuse, rather thick, 5-10 mm. long, 1 mm. broad; flowers solitary in all the axils of the short spreading branches; fruiting perianth depressed-globular, almost black when dry, 4-5 mm. diam., including the narrow horizontal wing, about 1 mm. broad, which surrounds the summit of the smooth tube, the whole quite glabrous except for the cilia of the very small lobes, the radicle forming a small lateral protuberance as in *Enchylaena tomentosa*.—*K. tomentosa* (Moq.) F. v. M. var. *enchylaenoides*. J. M. Black (1923).

Yellow Cliff, near Charlotte Waters. The fruiting perianth is not quite ripe, so that it is possible that the wing becomes somewhat broader. This species forms a connecting link between *Kochia* and *Enchylaena*.

P. 199.—20. **Kochia pentagona,** R. H. Anders. Differs from *K. coronata* in the vertical appendage or crown being thick, hard and distinctly 5-angled. As in that species and *K. ciliata* the perianth is flat-based and densely villous.

Renmark.—Western New South Wales.

P. 201.—**Kochia crassiloba,** R. H. Anderson, instead of *Enchylaena villosa*. Near *K. brevifolia*, which has also a ribbed perianth-tube, but its spreading membranous wing

grow from the back of the lobes, while in *K. crassiloba* it is the lobes themselves which are much enlarged, subsucculent and closed more or less over the fruit. The wings are probably represented by the 5 minute protuberances which terminate the vertical ribs of the perianth-tube.—Also Pinnaroo (Murray lands).

P. 203.—1. *Threlkeldia diffusa* has leaves sometimes ovoid-oblong.

P. 212.—9. *Trichinium helipteroides* var. *minor*. Also Musgrave Ranges.

P. 215.—3. *Amarantus Mitchellii*, var. *grandiflorus* (instead of *grandiflora*). The variety has recently been found from Frome Downs northward to Farina.

P. 215.—*2A. **Amarantus albus,** L. Almost glabrous branching annual 20-80 cm. high, with white rigid stems; leaves obovate or lanceolate, 5-20 mm. long, including the short petiole; flowers all in small axillary clusters; perianth-segments 3, lanceolate-mucronate, shorter than the lanceolate-subulate bract; fruit wrinkled, circumsciss, about as long as the perianth.

Adelaide plains and foothills, often in cultivated land. Jan.-April.—Originally from tropical America, now a weed in many countries.

P. 215.—6. **Amarantus macrocarpus,** Benth. Small glabrous annual; leaves ovate-oblong, mucronate, 1-2 cm. long, petiolate; flowers in axillary globular clusters; perianth-segments 3-5, oblanceolate with scarious margins, mucronate, 5-6 mm. long in fruit and longer than the sublending bracts; fruit oblong, rather longer than perianth, wrinkled, indehiscent, with 2-3 prominent styles.

Minnie Downs, near Diamentina River.—Western New South Wales and Queensland.

P. 218.—*Codonocarpus.* In line 6 read " ventral edge " instead of " vertical edge."

P. 221.—*Tetragonia implexicoma.* The fruits are often orange.

P. 222.—1A. **Trianthema Maidenii,** S. Moore (1920). Branches and leaves at first scabrous-pubescent; leaves linear-oblong, 1½-2 cm. long, with translucent dots; flowers solitary, axillary, on pubescent pedicels shorter than the leaves; perianth 4 mm. long; stamens 10-12; ovary 2-celled, with 1 ovule in each cell.

Port Lincoln.

P. 223.—*Mollugo Cerviana.* Also McDonnell Peak, near Stuart Range. This little plant is scarcely distinguished from some genera of *Caryophyllaceae* except by the 3-celled capsule, each of the 3 valves, after the loculicidal opening, bearing the dissepiment down the middle, while the placentas remain as a central column from which the dissepiments have broken away. The stems of a single plant sometimes number 10-20 and the inflorescence is umbel-like.

P. 224.—1A. **Portulaca intraterranea,** J. M. Black instead of *P. oleracea*, L. var. (?) *grandiflora*, Benth. Stout ascending succulent herb; leaves mostly alternate, oblong or oblong-cuneate, 1-2½ cm. long; stipular hairs few, caducous; flowers on very short thick peduncles, solitary or in clusters of 2-4; sepals 6-8 mm. long; petals 5, bright yellow, about 12 mm. long, obovate, very shortly united at base; stamens 30-35, the filaments thickened and glandular-hairy towards base; style-branches 3-5, shorter than the style proper; seeds black, tuberculate.

The plant is sometimes 35 cm. long. The taproot is cooked and eaten by the blacks. The stems and branches appear to remain pale-green, while those of *P. oleracea* (much more slender) turn red in the Far North. Both species are known among bushmen as " Pigweed."

P. 226.—6A. **Calandrinia sphaerophylla,** J. M. Black. Minute annual, 1-2 cm. high; stems ascending; leaves fleshy, 3-5 mm. long, obovoid or almost globular, slightly contracted towards base; racemes few-flowered, the bracts small and acute; pedicels 3-5 mm. long, spreading or reflexed in fruit; sepals pink, orbicular, very obtuse, nearly 2 mm. long; petals 5, whitish, ovate, as long as sepals; stamens 6 or sometimes fewer, united in a ring towards base; anthers globular; styles 3, short, broad; capsule pink, ovoid, about as long as calyx, 3-valved; seeds about 15, scarcely ½ mm. diam., shining but minutely granular.

Near Port Lincoln, Sept.-Nov. Resembles *C. pygmaea*, differing in reflexed pedicels, thinner not deciduous sepals, obtuse petals, broad not slender styles, filaments united about the middle and capsule splitting almost to base. Differs from Nos. 5 or 6 in its minute size, small subglobular leaves and granular seeds.

P. 226.—6B. **Calandrinia dipetala,** J. M. Black. Dwarf annual, with erect or ascending stems ½-2 cm. high, bearing few-flowered racemes; leaves few, fleshy, the lowest ovoid-oblong and 5-6 mm. long, or all obovoid and only 2-3 mm. long, contracted at base;

pedicels 2-5 mm. long, spreading or reflexed in fruit, with minute bracts at base; sepals reddish, orbicular, apiculate, about 2 mm. long; petals 2-5 obovate, purplish, or white, rather longer than sepals; stamens 2-5, free; anther-cells globular; styles 3, free; capsule rather longer than calyx, 3-valved; ovules 8-12; seeds reddish-black, orbicular, smooth and shining, $\frac{3}{4}$ mm. diam.

Myponga (Mount Lofty Range); Encounter Bay; Nonning, E.P. Sept.-Oct. In minute specimens growing among moss the petals are only 2; in somewhat larger ones they number 3-5. Only differs from *C. calyptrata* in reduced size, smaller sometimes almost globular leaves, fewer stamens with globular anther-cells more obtuse and often fewer petals.

P. 226.—7A. **Calandrinia stagnensis,** J. M. Black. Small annual with ascending stems 7-10 cm. long; leaves terete-clavate, about 2 mm. thick in the upper part, the radical ones 1-3 cm. long, those on the stem 5-15 mm. long; flowers 3-5 in terminal leafy racemes or in short cymose panicles; pedicels 4-8 mm. long, erect in fruit, each subtended by a leaf about as long as itself and by a small scarious bract; sepals broad, apiculate, $2\frac{1}{2}$ mm. long in flower, 4 mm. in fruit; petals 5, rather longer; stamens 8-9, the filaments much dilated at the base; anthers globular; style-branches 4, broad, plumose; capsule conical-obtuse, rather longer than calyx, 4-valved; ovules numerous; seeds reddish, smooth, shining, about $\frac{1}{2}$ mm. diam.

Ross's waterhole, Macumba River (Far North). Summer. Differs from *C. ptychosperma* in the narrower leaves, leafy racemes and the smooth seeds, which closely resemble those of C. *pumila*.

P. 226.—9. *Calandrinia pumila*. Minnie Downs, near Warburton River. Foliage white-mealy in these specimens; styles oblong-lanceolate, fringed.

P. 230.—2. *Sagina apetala* is sometimes found growing in dense clumps, with simple stems only 1-2 cm. high, and bearing 1-2 flowers.

P. 232.—*Minuartia tenuifolia*. Also Encounter Bay. Sometimes quite glabrous; the capsule opens at first in 3 large teeth.

P. 234.—13A. TUNICA (Rupp.) Mert. et Koch.

(From Latin *tunica*, an under-garment; alluding to the involucre of the flowerhead).

*1. **T. prolifera** (L.) Scop. *Proliferous Pink.* Glabrous annual with erect wiry stems 15-50 cm. high; leaves few, linear; flowers few in a compact terminal ovoid head, the bracteate calyxes concealed by an involucre of broad scarious imbricate scales; calyx tubular, 5-angled and 5-toothed, about 14 mm. long; petals notched, pale-pink; stamens 10; styles 2; capsule opening at summit in 4 teeth.—*Dianthus prolifer*, L.

Kangaroo Island. Summer.—A weed of Europe and the Mediterranean region. *Tunica* differs from *Saponaria* and *Gypsophila* by the involucre and by the seeds hollowed on the inner face and with a central not lateral hilum. From *Dianthus*, L. (the *Carnation* and *Pink*) it differs in the calyx 5-angled, instead of cylindrical, the spaces between the green angles white-scarious, instead of green.

T. velutina (Guss.) Fisch. et Mey., with glandular-hairy stems, very shortly pedicellate flowers and smaller seeds, has established itself in Victoria.

P. 234.—1. *Silene vulgaris* has sometimes violet petals and ovoid fruiting calyx.

P. 237.—3A. **Ranunculus pentandrus,** J. M. Black. Dwarf glabrous annual; leaves on long petioles, mostly radical, 5-8 mm. long, the lowest ovate, entire and withering early, the others rounded-cordate in outline, deeply divided into 3 trifid or incised obovate lobes or segments; flowers minute; sepals 3-5, ovate, white, membranous, $1\frac{1}{2}$-2 mm. long; petals 1-2, white (at least when dry), shorter, narrower, clawed, with a nectar-pit above the claw; stamens 5; achenes 6-12, ovate, smooth, 2-3 mm. long, with a short recurved beak; receptacle ovoid, glabrous.

Flooded land, Minnie Downs, near Warburton River. Near *R. parviflorus* (which has also few stamens) except for the smooth achenes and perhaps the color of the petals.

P. 240.—2. *Glaucium corniculatum*. The typical red-flowered form also occurs wild in our northern areas.

P. 245.—4. *Cardamine eustylis*. The petals are sometimes as long as the calyx.

P. 245.—3A. DRABA, L.

(*Drabê*, Greek name of a plant, probably *Lepidium Draba*.)

Differs from *Nasturtium* in the more flattened pod and the leaves chiefly or altogether osulate.

*1. **D. verna,** L. *Whitlow Grass.* Annual; leaves all in a radical rosette, oblanceolate, obscurely toothed, about 10 mm. long, with scattered forked or trifid hairs; scapes slender, 3-15 cm. high, bearing the small flowers in a loose raceme; sepals ovate; petals

white, bifid, rather longer; pod compressed, ovate-oblong, usually 5-6 mm. long, by nearly 2 mm. broad, with scarcely any style; valves faintly 1-nerved; seeds about 20 in each cell, in 2 rows on unequal funicles; cotyledons accumbent.—*Erophila verna*, (L.) E. Mey.
Hills near Inman River. July-Sept.—Europe; Asia.

P. 247.—1. *Blennodia filifolia* has often the leaves 3-5-sect and almost erect pedicels as in *B. trisecta*, from which it is then distinguished by the broader pod raised on a short stipes above the calyx-scar and by the short but distinct style supporting the stigma.—Also Musgrave Ranges.

P. 247.—4. *Blennodia procumbens* should bear Tate's name as author, as it was transferred by him to that genus in Trans. Roy. Soc. S.A. 22: 123 (1898).

P. 247.—4A. **Blennodia eremigena** (F. v. M.) Benth. Annual, pubescent with white simple hairs; leaves pinnatisect, with 7-9 oblong-linear segments; sepals 1½ mm. long, the petals exceeding them; pods linear, 10-20 mm. long, 1-1½ mm. broad, with 1-nerved valves and almost sessile stigma; fruiting pedicels spreading, slender; seeds mucous.—*Sisymbrium eremigenum*, F. v. M.
Innamincka, Cooper's Creek. May.—Western New South Wales and Queensland. The petals are described as yellow; in our dried specimens, which are only in flower, they appear white. In the Fl. Aust. the specific name is erroneously spelt *eremigera*.

P. 247.—7. *Blennodia lasiocarpa*. Far-northern specimens sometimes have the sepals barely 2 mm. long, but more obtuse than those of *B. brevipes*; petals sometimes only 4 mm. long, violet or purple.

P. 250.—*Carrichtera annua*. Add *Vella annua*, L. as a synonym.

P. 252.—10. *Lepidium pseudo-ruderale*. Also McDouall Peak, near Stuart Range. Stems sometimes ascending and plant glabrous; upper stem-leaves mostly lanceolate, some of them entire and not or scarcely narrowed toward base, therefore sessile.

P. 256.—21. MYAGRUM, L.

(From Greco-latin *myagros*, name of some plant probably cruciferous.)

*1. **M. perfoliatum**, L. Erect glabrous annual; stem-leaves oblong-lanceolate, denticulate, embracing the stem by 2 auricles; flowers small, yellow; fruiting pedicels appressed, thick, shorter than pods, which are hard, erect, thick, subcompressed, truncate-apiculate, broadly cuneate, about 5 mm. long, wrinkled, indehiscent, 2 small upper cells empty, the lower one with 1 oblong seed; cotyledons incumbent.
A troublesome weed in cultivated land at Kadina and at Wudinna, E.P.—Mediterranean region.

P. 257.—1. *Reseda luteola*. Port Adelaide; Eudunda. The ripe seeds are minute, black and shining, while those of *R. alba* are larger and granular.

P. 257.—*3. **Reseda lutea**, L. Annual or biennial, glabrous except for scattered papillae on stem; leaves mostly trifid, sometimes pinnatipartite, with undulate segments; sepals 6, linear; petals longer, 6, greenish-yellow, the 2 upper with a broad claw and 3 lobes, the 2 lateral lobes sublunate and crenulate on the outer edge, the middle one linear and shorter, the 4 other petals much reduced; stamens 12-20; capsule oblong, erect, 8-12 mm. long, with 3 short teeth; seeds smooth, shining.
Yorke Peninsula; Kingston, S.E. Summer.—Central Europe and Mediterranean region.

P. 263.—1. *Billardiera cymosa*. Some silky specimens from Port Lincoln have some of the leaves oblong or obovate and 15-22 mm. broad.

Pp. 266 and 267.—*Caesalpinioideae* instead of *Caesalpinoideae*.

P. 274.—2. *Acacia peuce* has been found on Andado Station, C.A., about 60 miles north of our border. It is a small and strictly localised collection of trees to 12 m. high and called the "Sheoaks," on account of the resemblance due to the drooping branchlets and long slender phyllodes. The latter are 5 to at least 25 cm. long, 1 mm. thick, conspicuously tetragonous, rigid, pale; pod to 15 cm. long and 4 cm. broad. It seems probable that this species is confined to western Queensland and Central Australia.

P. 276.—10. *Acacia microcarpa*, F. v. M. var. *linearis*, J. M. Black. Phyllodia broad-linear, 3-6 cm. long, 2½-3 mm. broad, mucronate; pod 5 mm. broad across the seeds.—Near Monarto South.

P. 277.—21A. **Acacia Gillii,** Maiden et Blakely (1927) in place of *A. rhetinodes*, Schlechtd. var. *angustifolia* (Benth.) J. M. Black.

21B. **A. confluens,** Maiden et Blakely (1927). Differs from *A. rhetinodes* in the pods 10-25 cm. long, 1 cm. broad, more or less constricted between the seeds, which are ovate or almost orbicular, while those of *A. rhetinodes* are usually oblong; funicle similar, but more slender; phyllodia 10-14 cm. long, 5-10 mm. broad.
Mt. Lyndhurst (Flinders Range). I have not seen a specimen.

P. 277.—23A. **Acacia frumentacea,** Tate. Shrub 3-5 m. high, near *A. Murrayana* and chiefly distinguished from it by the shorter and usually broader phyllodia and 4-parted flowers; phyllodia linear-oblong, 5-10 cm. long, 4-6 mm. broad, obtuse, with a minute hard point hooked over a gland, 1-nerved, with reticulate veins; heads on 2-3 slender peduncles forming racemes much shorter than phyllodia; sepals 4, linear-spathulate, 1½ mm. long and more than half as long as the 4 petals, which are minutely pubescent in the upper part; ovary glabrous; pod flat, oblong, about 4 cm. long by 6 mm. broad; seeds transverse; funicle short, with 1-2 folds under the seed.
Sandhills near Tooroowatchie Waterhole, between Cooper's Creek and Cordillo Downs. June-Oct. The roots harbor the witchity grub.—Central Australia.

P. 284.—53. *Acacia sclerophylla* var. *lissophylla* has the phyllodes sometimes only 1-2 mm. broad, the peduncles solitary and (like the branchlets) minutely hoary.

P. 285.—*A. (?) papyrocarpa* is stated by Maiden to be identical with his *Acacia Havilandii* (1920), of western New South Wales and north-western Victoria, but that species is described as a "shrub of a few feet high," with a linear pod up to 7 cm. long, only 2 mm. broad and much constricted between the seeds.

P. 286.—At foot of Plate 28 read "*A. Bynoeana*" instead of "*A. Bynocana.*"

P. 287.—67. *Acacia Kempeana.* Also Musgrave Range.

P. 287.—69. *Acacia tarculensis.* Seeds oblique in pod; funicle twice or thrice folded, swollen and wrinkled in upper part below the aril.

P. 289.—75A. **Acacia gracilifolia,** Maiden et Blakely (1927). Branchlets angular, resinous; phyllodia terete, grooved, 5-7 cm. long, about 1 mm. diam., with an oblique mucro and usually 2 distant glands; spikes pedunculate, ovoid to almost globular; calyx tomentose, shortly lobed; petals 4, free; ovary hoary; pod linear, stipitate, somewhat contracted between the seeds, 5-7 cm. long, 2 mm. broad, more or less resinous; seeds longitudinal, oblong; funicle once or twice shortly folded below seed.
Flinders Range. I have not seen a specimen.

P. 291.—2. *Neptunia monosperma* has been found on Cordillo Downs and Cooper's Creek. Leaflets in 8-15 pairs, 4-6 mm. long, ciliolate, the rhachis terminating in a short awn; stipules 5-6 mm. long, with long points; peduncles 10-20 mm. long, with 2 large cordate acuminate bracts below the middle; pedicels short; pod ovate, compressed, 8-10 mm. long, mucronate, sparsely pubescent; only 1 ovule in the ovaries examined. Our specimens, which appear to be erect and 10-20 cm. high, agree with one from Cambridge Gulf in the Victorian National Herbarium, except that the latter has short spreading hairs on branches and leaflets. The leaflets of our *Neptunias*, when folded, close imbricately over those above, as in *Mimosa.*

P. 292.—Fig. 135.—*Caesalpinioideae* instead of *Caesalpinioidae.*

P. 293.—4. *Cassia desolata.* Pod sometimes 9 cm. long by 25 mm. broad.

P. 296.—6. *Daviesia genistifolia* var. *colletioides.* Sometimes leafless or almost so along the River Murray; flowering branches stouter and more rigid than in type and ending in spines; racemes longer, 4-8-flowered.

P. 297.—*Sclerothamnus microphyllus,* R. Br. instead of "B. Br."

P. 299.—2. *Pultenaea stricta.* Also Burrungul, S. E. Leaves varying in size to 15 mm. long, 2-5 mm. broad, the mucro recurved.

P. 300.—8. *Pultenaea laxiflora.* Also Kangaroo Island.
Var. *pilosa,* H. B. Williamson. Flowers more crowded in the heads, on shorter peduncles; calyx silky-villous, with narrower lobes; bracteoles 2-stipulate.—Barossa Range; Kangaroo Island.—Victoria.

P. 300.—8A. **Pultenaea dentata,** Labill. Small erect wiry shrub; leaves 7-12 mm. long, rather distant, linear-lanceolate, obtuse, glabrous, channelled above; stipules small; flowers about 6, sessile in dense terminal heads surrounded by the uppermost leaves and then by several rows of broad brown notched bracts as long as the calyx, which is silky and nearly 4 mm. long; bracteoles inserted towards base of calyx-tube, deeply 3-toothed at summit, silky along back; standard red and yellow; keel crimson; ovary silky; pod ovoid, about as long as calyx.

Mt. Compass (Mt. Lofty Range). Oct.-Nov.—Victoria; New South Wales; Tasmania.

P. 300.—9. *Pultenaea largiflorens.* Also Burrungul, S.E. The typical form, with narrower leaves, about 2 mm. broad, very convex or even conduplicate, occurs in the Flinders Range from Bectaloo to Mt. Remarkable.

P. 302.—22. *Pultenaea tenuifolia.* Also along the coast near Adelaide. Calyx 4-6 mm. long; standard 5-8 mm. long.

P. 302.—23. *Pultenaea cymbifolia.* Read "revolute" instead of "involute" before "margin." (Plate 37, page 399.—1, lower face of leaf; 2, standard; 3, calyx spread open, seen from the outside; 4, pistil.)

P. 306.—4. *Crotalaria dissitiflora.* Mueller published in 1859 *C. eremaea* from the Darling and Cooper's Creek country with narrow pubescent leaflets, the lateral ones often small or wanting. This was afterwards united to *C. dissitiflora* by Mueller, and it was placed by Bentham as var. *eremaea.* Our specimens of this variety have mostly linear-oblong but sometimes ovate leaflets 1-3 and very variable in size and shape. The young leaflets, calyxes and ovaries are always pubescent and may remain softly hoary or become glabrous. Typical *C. dissitiflora* has 3 leaflets sometimes not exceeding 1 cm. in length.

P. 310.—10. *Trifolium suffocatum.* Also Kinchina (near Monarto South). The stems are sometimes almost obsolete and the leaves and flowerheads appear radical.

P. 311.—*18. **Trifolium stellatum,** L. Villous annual; leaflets obcordate, denticulate at summit; stipules broad, the free part ovate; flowers cream-colored, in globular heads on long peduncles; calyx villous, the lanceolate teeth glabrous and reticulate inside, twice as long as tube and spreading stellately at maturity; standard about as long as calyx.

South-East. Oct.-Dec.—Mediterranean region.

P. 315.—4. **Indigofera Basedowii,** E. Pritzel (1918) in place of *I. longibractea,* J. M. Black (1923).

5. **I. leucotricha,** E. Pritzel. Differs from true *I. brevidens* in the dense white tomentum; leaflets 9-15, subsessile, obovate-truncate, very white, 4-10 mm. long, with a mucro which is often recurved; stipules short, often spiny; calyx about 3 mm. long, with dark-brown hairs, the lanceolate lobes as long as tube, finally open; standard about 9 mm. long, purple; keel tomentose outside; ovules about 7.

Flinders Range, between Beltana and Blinman and northward to Oodnadatta.—Central Australia; Grey Range, New South Wales.

6. **I. enneaphylla,** L. Straggling grey appressed-hairy perennial herb, about 40 cm long; leaflets 5-9, alternate, oblong-cuneate, 6-12 mm. long; stipules lanceolate; flowers in dense subsessile spikes much shorter than leaf; calyx about 4 mm. long, the subulate lobes much longer than tube; standard rather longer; ovules 2; pod cylindrical, hairy, 4-6 mm. long, 2-seeded.

Cordillo Downs (north of Cooper's Creek).—Tropical and subtropical Australia; India.

The hairs of Nos. 2 to 6 should be described as "centrifixed" rather than forked.

P. 316.—2. *Psoralea cinerea.* Also near Marree and Cordillo Downs. The fruiting calyx is more open than in *P. patens* and the pod equals or slightly exceeds it.

P. 316.—2. **Tephrosia sphaerospora,** F. v. M. Pubescent perennial; leaflets 5-9, oblong-lanceolate, 3-5 cm. long, appressed-hairy, almost silky beneath, the lateral nerves oblique and parallel; stipules subulate; flowers small, in short racemes, which lengthen in fruit, and have often 2 or 3 flowers in the axil, at the base of the long naked part of peduncle; pedicel shorter than the densely pubescent calyx, which is 4 mm. long, the 2 upper teeth partly united, the lowest one the longest; standard orbicular, about 5 mm. diam., pubescent outside; pod slightly compressed, pubescent, about 3 cm. long by 4-5 mm. broad, with transverse membranous partitions between seeds; seeds 4-9, globular, greenish mottled with brown.

Between Cordillo Downs and Cooper's Creek.—Central Australia.

P. 317.—2. **Sesbania aegyptiaca,** Poir. Differs from *S. aculeata* in the leaves with 15-30 pairs of leaflets; racemes 6-12-flowered, on spreading pedicels 5-8 mm. long (instead of 2-6-flowered racemes on shorter and more erect pedicels); calyx 7 mm. long, including the turbinate base; petals larger and in our specimens white tinged with purple, the standard about 20 mm. long and broad; pod about the same length as in *S. aculeata* and sharply beaked but 4 mm. broad and sometimes slightly twisted near base.

Minnie Downs, near Queensland border; growing near waterholes.—Tropical Australia, Asia, and Africa.

P. 319.—5. *Swainsona villosa.* Leaflets to 13, often ovate-oblong and remaining villous on both faces; racemes to 12-flowered; pod ovoid, villous, 10-13 mm. long, on a stipes half as long as calyx, the 2 sutures green and prominent.—Also Central Australia.

P. 320.—11. *Swainsona oroboides* has the narrow-lanceolate leaves sometimes pubescent on both faces.

P. 320.—11A. **Swainsona Behriana,** F. v. M. herb. Slender perennial 10-20 cm. high, pubescent with short basifixed hairs; stems ascending; leaflets 5-13, obtuse, notched or acute, linear-lanceolate to oblong-cuneate, more or less pubescent, sometimes almost glabrous above and with the margins somewhat incurved, 4-20 mm. long, 1-4 mm. broad, the leaflets of the lower leaves usually broader than those of the upper; stipules broadly lanceolate, about 3 mm. long; peduncles slender, 4-10 cm. long, much exceeding the leaves; flowers purple, 3-8 in a terminal umbel, or rarely a very short raceme, on pedicels 2-5 mm. long; bracts small; bracteoles minute; calyx 4-5 mm. long, pubescent with black hairs, the lanceolate teeth nearly as long as the tube; standard 8 mm. long by 10 mm. broad, rarely more, but always broader than long, not or scarcely notched, without prominent calli; keel obtuse, not pouched, scarcely exceeding the wings and nearly as long as the standard; style shortly bearded all the way, abruptly bent inwards at the tip; pod oblong, obtuse, pubescent, 12-15 mm. long, 5-6 mm. broad.—*S. lessertiifolia,* DC. var. *tephrotricha,* Benth. Fl. Aust. 2 : 222 (1864) partly; apparently *S. tephrotricha,* Maiden, Ill. N.S.W. Pl. 77, pl. 28 (1911) not of F. v. M.; *S. oroboides,* F. v. M. var *hirsuta,* J. M. Black, Fl. S. A. 320 (1924).

Southern districts to southern part of Flinders Range; Murray lands. Sept.-Nov.—Victoria; New South Wales.

Differs from *S. oroboides* in more numerous, shorter, often obtuse leaflets, broader stipules and usually smaller calyx with black hairs and broader teeth rather shorter than the tube, whereas in *S. oroboides* the hairs of the calyx are white and the teeth slender and longer than the tube. The name *S. Behriana* was published by Mueller without description in *The South Australian Register* (1850) and is attached to the type specimen, collected on the Adelaide plains and now preserved in the Kew Herbarium. It was united by Bentham with *S. tephrotricha,* a species differing widely from it in the attachment of the hairs, the racemose inflorescence, the shape of the style, &c., *S. Behriana* is nearest to *S. reticulata,* the calyx of similar shape but with black instead of whitish hairs and the flowers umbellate or almost so instead of racemose. In the very distinct typical form, which is found from Encounter Bay to Jamestown and several parts of Victoria, the flowers are deep purple, fading blue, the standard without any calli and with 2 greenish spots near the base of the lamina, but in some specimens from the northern areas and the Murray lands the flowers are not so strictly umbellate, the standard has two small calli and there is a tendency to pass over into *S. reticulata.* Both these species have the hairs usually not quite basifixed, but with a very short blunt protuberance or branch extending beyond the place of attachment, thus showing a tendency towards the section *Mesotrichae.*

P. 320.—12. *Swainsona reticulata.* Also Victoria (Goulburn Valley and lower Murray).

P. 320.—13. *Swainsona campestris.* Also north of Eyre's Sandpatch, W. A.

P. 321.—17. *Swainsona laxa.* Also Wirrulla, near Streaky Bay, E. P. Leaflets distinctly petiolulate; stipules large, leafy; style should rather be described as penicillate with a conspicuous tuft of hairs at summit than as tufted behind the stigma.

P. 321.—17A. **Swainsona rigida** (Benth.) J. M. Black. Erect perennial 60 cm. to 1 m. or more high; stems rigid, glabrous; leaves few and inconspicuous; leaflets about 15, obovate-cuneate, notched, subsessile, caducous, 2-5 mm. long, appressed-pubescent with basifixed hairs; stipules small, ovate, pubescent; peduncles to 25 cm. long, becoming glabrous and bearing in the upper part a loose raceme of about 20 yellow flowers; bracts and bracteoles minute; calyx 5 mm. long, sparsely pubescent, minutely toothed; standard ovate, about 15 mm. long and 10 mm. broad, without calli; keel obtuse, rather shorter than standard and longer than wings; style as in *S. laxa;* pod flattish, obliquely ovate,

about 12 mm. long, 7-8 mm. broad, reticulate, glabrous, on a stipes about as long as calyx, usually ripening only 1 or 2 reniform seeds.—*S. laxa*, R. Br. var. (?) *rigida*, Benth.

Minnie Downs, near Diamentina (Warburton) River; near Lake Callabonna. Summer —Western New South Wales. Differs from *S. laxa* in much smaller hairy leaflets, longer peduncles, larger and pubescent calyx with teeth only ¼ of the tube, while *S. laxa* has teeth nearly as long as the tube.

P. 321.—19. *Swainsona viridis*. Pod cylindrical, glabrous, 2-3 cm. long, 2-3 mm. broad, impressed along the suture.—Broken Hill, N.S.W.

P. 321.—20. *Swainsona stipularis*. The standard is sometimes only 10 mm. broad and has often a bright yellow spot at base; the keel may be yellow or reddish-yellow. The stipules may vary on the same plant from quite small to 18 mm. long.

P. 322.—20A. **Swainsona fissimontana,** J. M. Black. Perennial 20-30 cm. high; stems erect or ascending, pubescent with appressed centrifixed hairs; leaflets 7-11, with similar pubescence, 8-15 mm. long, 2-4 mm. broad, those of the lower leaves oblong, of the upper ones linear-lanceolate; stipules linear-lanceolate, 5-8 mm. long; peduncles rather stiff, 12-20 cm. long, becoming glabrous, bearing near the summit a loose raceme of 5-9 flowers; calyx 5-6 mm. long, pubescent with black hairs, the lanceolate teeth nearly as long as tube; standard reddish, about 12 mm. long and 15 mm. broad, without calli; keel dark red, twisted to one side, incurved, with 2 small pouches; wings shorter; style as in *S. stipularis*; pod oblong, 25-30 mm. long, appressed-pubescent, impressed along suture.

Boolcoomatta and Koonamore Stations (north of the Broken Hill Railway). Aug.-Oct. —New South Wales (Broken Hill district).

Differs from *S. stipularis* in the stouter rigid almost glabrous peduncles, narrower stipules, usually narrower leaflets and longer pods; from *S. Morrisiana* in the broader shorter leaflets, larger flowers, standard darker and not streaked, the keel pouched and the style not so much twisted nor furnished with an almost terminal ring of hairs; from *S. phacoides* in the thinner coating, so that the leaflets appear greener, smaller flowers, absence of calli on the standard, the pod not cylindrical but broader and dilated about the middle; from *S. tephrotricha* by a greener appearance, usually fewer flowers in the raceme and the twisted keel and style; from all these other species of the section *Mesotrichae* it differs in the glabrous or almost glabrous peduncles. Mr. A. Morris, the collector, describes the color of the flowers as "magenta."

Var. *coarctata*, J. M. Black. Varies in the more numerous erect crowded stems, the leaflets only 1-2 mm. broad, the calyx-hairs paler, sometimes almost white and the standard not broader than long.—Hawker (Flinders Range).—Western New South Wales (near Mount Koonenberry). Has a different aspect from the type and may be a distinct species.

P. 322.—20B. **Swainsona Morrisiana,** J. M. Black. Probably annual, erect or ascending, sprinkled with appressed centrifixed hairs; leaflets 5-9, narrow-linear, acute, flat or with incurved margins, 12-25 mm. long, 1-2½ mm. broad; stipules linear-lanceolate, entire; flowers pink, 4-8 in the raceme, the naked part of the peduncle rather sparsely pubescent, 10-17 cm. long and much longer than leaves; pedicels about as long as calyx and much longer than the bract, calyx 5 mm. long, with black hairs, the tube twice as long as the spreading acuminate teeth; bracteoles minute; standard pale pink, red-veined, about 12 mm. long and broad, without calli; keel obtuse, incurved, twisted to one side, without lateral pouches, shorter than the wings, which are curved over it and are at least as long as the standard; style twisted, the tip incurved but not abruptly inflexed, with an annular tuft of hairs just below the summit, the beard gradually diminishing towards the broad rigid base; ovary pubescent; pod oblong, stipitate, to 3½ cm. long.

Boolcoomatta Station (north of Broken Hill railway). Aug.-Sept. Differs from *S. stipularis* in the narrower stipules, the longer, narrower and always entire leaflets, smaller and paler flowers, the style almost terminated by a ring of hairs and the beard sparse and diminishing downwards,—Victoria (Wimmera, Dimboola, Swan Hill) and therefore probably in our Murray lands.

P. 322.—21. *Swainsona phacoides*. Pod to 4 cm. long, cylindrical, about 5 mm. broad, deeply impressed along suture; flowers sometimes white.

P. 322.—22. *Swainsona tephrotricha*. The type of this species is in the Kew Herbarium and agrees in all respects with specimens collected at Pekina and at Mount Serle, Mount Lyndhurst, Lake Weatherstone (Flinders Range). The type was collected near the Burra and Spalding about 1850. It is doubtful whether this species extends to the eastern States. The keel is always 2-pouched.

P. 322.—23. *S. microcalyx*. Also near Farina (Flinders Range with narrower leaflets.

P. 322.—23A. **Swainsona adenophylla,** J. M. Black. *Wild Violet.* Probably perennial, hoary with appressed centrifixed hairs; stems 20-30 cm. long, ascending, branched; leaflets mostly 7, linear, 8-20 mm. long, green above, hoary beneath, with recurved margins and ending in 2 small rounded lobes which partly conceal a large gland or glabrous swelling just below the notch formed by the 2 lobes; stipules lanceolate, entire; flowers violet, small, 8-20 in a loose raceme, the peduncle below the flowers 4-10 cm. long, pubescent: calyx 3½ mm. long, hoary, the subulate teeth shorter than tube; bracteoles minute; pedicels shorter than calyx, with bracts half their length; standard about 8 mm. long and broad, with 2 small confluent calli at base; keel obtuse, 2-pouched, as long as wings and both rather shorter than standard; style bearded in all its length, straight and slender above the bend; pod not quite ripe, cylindrical, 15-20 mm. long, about 4 mm. broad, pubescent, reticulate, deeply grooved along the suture.

Finniss Springs (between Lake Eyre and the Marree-Oodnadatta railway); Arcoona (west of Lake Torrens). Sept. Distinguished from *S. stipularis* (which in the typical form has similar obtusely notched leaflets) by the gland at base of the notch, by the smaller bright purple flowers, and by the slender style shortly bearded all the way instead of with a long beard only towards the summit.

P. 322.—The description of *Sutherlandia* should be altered by stating that the longitudinal beard is on the inner edge of the style (as in *Swainsona*).

P. 325.—*Hardenbergia monophylla.* Also South-East.

P. 327.—*Vigna lanceolata.* Specimens from Minnie Downs (near Diamentina River) have most of the leaflets ovate-cuneate, very obtuse, 15-25 mm. long, 12-15 mm. broad (showing an approach to *V. luteola* (Jacq.) Benth.); flowers as in our other specimens.

P. 327.—*Aeschynomene indica.* At end of description read: "breaking transversely into 3-10 articles."

P. 328.—Instead of *Geranium pilosum,* var *australe,* Ostenf. (1921) read var. *potentilloides,* Benth. (1863). The peduncles are often 1-flowered, with 2 lanceolate bracts about the middle.

P. 333.—2A. **Zygophyllum ammophilum,** F. v. M. Distinguished specifically from *Z. Billardieri* by its annual and procumbent character, its preference for sandy patches and its capsule only 5-7 mm. long. *Z. Billardieri* is an almost shrubby perennial.—*Z. Billardieri,* DC. var. *ammophilum,* J. M. Black.

P. 335.—2. *Tribulus occidentalis.* The fertile fruitlets or carpels seldom exceed 3 in number, are sometimes 18 mm. long, nearly as broad, and may contain 6 transverse seeds.

P. 339.—8. *Boronia palustris* occurs in peaty marshes near Hindmarsh River and on the Tunkalilla road with pink petals as long as sepals (approaching *B. parviflora*) but with only 4 stamens. Seeds black, shining.

P. 340.—1. *Correa aemula.* Add: Leaves of thin texture, often cordate; peduncles slender, 2-3 cm. long, with 2 leafy orbicular bracts towards the base and 2 narrow bracteoles nearer the flower.—Myponga; Kangaroo Island.

P. 340.—4A. **Correa calycina,** J. M. Black. Shrub with loosely tomentose branches; leaves oblong or ovate-oblong, rather thick, obtuse, 2-4 cm. long, becoming glabrous above, stellate-hairy below; peduncles very short; calyx almost campanulate, about 12 mm. long, with scattered stellate hairs outside, stellate-tomentose inside, the broad acuminate lobes about as long as tube; corolla pink or greenish, 20-25 mm. long, with coherent petals; stamens exserted, the 4 alternate filaments much dilated towards base; ovary silky.

Waterfall, Hindmarsh Valley (Mt. Lofty Range). Summer. Differs from *C. reflexa* in the narrower greener leaves, larger calyx and broad calyx-lobes.

P. 344.—5. *Phebalium bullatum.* Also Wudinna, E.P.

P. 346.—2. *T. ericifolia.* Scabrous-hairy specimens have been gathered at Rocky River, K.I. All the ovaries examined both of the scabrous and comparatively smooth forms have the cells 1-ovulate.

P. 352.—Examination of more specimens shows that, as far as we know, *Adriana glabrata* (*A. acerifolia*) should be deleted from our flora, and all specimens from our dry far-northern and western country should be placed under *A. Hookeri.* The leaves are

mostly 3-6 cm. long, the undivided ones and the long middle lobe of the 3-lobed leaves 1-2 cm. broad, the crenatures and lobes rounded, the former rarely almost absent; flowers in the female spike from 1 to about 7. Sometimes called "Water Bush" from the belief that, where it grows, water can be found near the surface.

P. 356.—1. *Micrantheum Tatei*. Male flowers often 2-3 in the axil; 1 or 2 of the seeds often abortive.

P. 359.—*Owenia acidula*. Local names for this tree are also "Emu apple" and "Gooya" (native name).

P. 363.—5. *Dodonaea Baueri*. Also between Middleton and Currency Creek.

P. 363.—9A. **Dodonaea tenuifolia,** Lindl. Differs from *D. microzyga* in the leaflets 7-13, 3-7 mm. long, 1-2 mm. broad, linear rather than oblong or obovate, very rarely toothed at the tip, not so densely varnished and glossy, and in the smaller capsules, 8-12 mm. broad (instead of 18 mm.), the wings 2-3 mm. broad (instead of 5-6 mm.); peduncles longer than capsule (in *D. microzyga* they are shorter than capsule).

Sedan. Aug.-Sept. This is the species figured in For. Fl. S.A. part 6 as *D. microzyga*, and the localities quoted there are between Clare and Auburn and the northern end of Yorke Peninsula. It appears to be rare. *D. microzyga*, as far as we know, is confined to the more distant north and west.—New South Wales; Queensland.

P. 371.—*Hymenocapsa longipes* (Tate) J. M. Black. This proves to be the same as *Hermannia Gilesii*, F. v. M. and is therefore transferred to *Sterculiaceae*.

P. 384.—3A. HERMANNIA, L.

(After Paul Hermann, doctor of medicine and botanist; born at Halle, Saxony, in 1640, spent 8 years in the Dutch East Indies and became professor of botany at Leyden; died there, 1695.)

Belongs to the tribe *Hermannieae*, which has the petals flat and longer than calyx, as in the tribe *Dombeyeae*, but staminodes are absent and the stamens are either free (as in our plant) or slightly united towards base. *Hermannia* has the seeds reniform, the embryo curved, and the anthers usually bifid at summit.

1. **H. Gilesii,** F. v. M. (1875). This is the same as *Hymenocapsa longipes* (Tate) J. M. Black and *Corchorus longipes*, Tate. For description and figure see p. 371. The type came from Charlotte Waters, C. A. The leaves of the type are ovate-oblong or obovate, 12-17 mm. long (broader than in Tate's specimen from Farina) and rather coarsely toothed or serrate. Both are single specimens.

P. 387.—6. *Hibbertia virgata*. Glabrous specimens from the Murray lands have terete leaves 1-grooved above by the involute margins and under 1 mm. thick.

P. 391.—2. *Frankenia pulverulenta*. Also Port Noarlunga.

P. 393.—7. *Frankenia serpyllifolia*. Also Swan Reach, River Murray.

P. 395.—*Hymenanthera angustifolia*. A few specimens of this greyish densely-branched sparsely-leaved shrub under 2 m. high were found in 1927 growing between the river and the Torrens Gorge Road and also on Mt. Remarkable. Although well protected by its spiny branchlets it appears to be very rare. Flowers all bisexual, often without subtending leaves; leaves 1-nerved, usually subfalcate.

P. 397.—4. *Pimelea spathulata*. Also Burrungul, S.E.

P. 415.—5. *Eucalyptus Baxteri* var. *pedicellata*. When the fruit has an almost flat rim it resembles closely the flat-topped fruits of *E. diversifolia*.

P. 416.—8. *Eucalyptus intertexta*. Also near Oodnadatta; Wilpena Pound; between Hawker and Carrieton.

P. 417.—15. *Eucalyptus cneorifolia*. Also Encounter Bay. The cap is sometimes as long as the receptacle, the rim is flat or slightly concave and the leaves sometimes black-dotted. This species is closely allied to the narrow-leaved forms of *E. oleosa*, although the valve-tips are never as long as they usually are in the latter species. In Kangaroo Island specimens the rims are sometimes domed.

P. 418.—17. *Eucalyptus Flocktoniae.* Koonibba, E.P. Cap 10-12 mm. long.

P. 420.—*Eucalyptus terminalis.* It appears probable that the "Whitewashed gum" of the MacDonnell Ranges, C. A., is not *E. terminalis,* but *E. papuana,* F. v. M. (*E. tessellaris* F. v. M. var. *Dallachiana,* Benth.), which differs in its white bark and smaller fruit, 10-20 mm. long. Whether it extends southward into our territory is not known. The Bloodwood (*E. terminalis*) certainly grows in our Far North.

P. 421.—31A. **Eucalyptus ochrophylla,** Maid. et Blakely (1929). A mallee, 2-7 m. high with smooth whitish bark except towards the base; leaves lanceolate, thick, coriaceous, yellowish-green, the nerves inconspicuous, the intramarginal one usually close to the edge; umbels axillary, 5-7-flowered, on a compressed peduncle; receptacle twice as long as the depressed-hemispherical striate cap; fruit pedicellate, clavate, smooth and shining, 7-8 mm. long by 5-6 mm. broad, truncate, the rim small, the valves usually 4, subulate, protruding.

Ooldea and Barton; near Birksgate Range.—West Australia.

P. 422.—35. *Eucalyptus elaeophora.* Also Mount Remarkable (Flinders Range).

P. 423.—42. *Eucalyptus fasciculosa* is known as "Scrub Gum" in the Barossa Ranges.

P. 424.—1. *Darwinia micropetala.* Also Wudinna, E.P.

P. 426, line 1.—*Thryptomene calycina* (Lindl.) Stapf (1923).

P. 426.—2. **Calythrix involucrata,** J. M. Black. Glabrous shrub; leaves alternate, more or less spreading, linear-subtrigonous, 3-4 mm. long, 1 mm. thick, dotted with immersed glands and on a very short petiole; flowers sessile, solitary, or usually 2-5 in a terminal cluster surrounded by an involucre of many oblong mucronate keeled scarious ciliolate bracts twice as long as the uppermost leaves; bracteoles 2, mucronate, ciliolate, about 5 mm. long, united close to their base; receptacle 7-9 mm. long, the hollow neck rather longer than the ovary; sepals truncate, about 2 mm. long, the awns as long as the receptacle; petals ovate, pink, 5 mm. long; stamens about 20.

Near Cummins and in the hundreds of Brooker and Yadnarie, E.P. Aug.-Nov. Differs from *C. tetragona* in the floral involucre and in the neck of the receptacle, which is hollow and embraces the lower part of the long filiform style, whereas in *C. tetragona* the neck is solid and the style is inserted on its summit, in the middle of the small cup which terminates the neck.

P. 430.—2. *Halorrhagis teucrioides* instead of *teucriodes.*

P. 437.—12. *Hydrocotyle pilifera* has been found between Monarto South and Murray Bridge. It is sometimes only 1 cm. high. The scattered hairs are almost confined to the undersurface of the leaf.

P. 440.—*Lilaeopsis australica.* According to Dr. A. W. Hill's revision of the genus (1927) this is the only species found in South Australia: fruit 2½-3 mm. long, 1½-2 mm. broad; vittas 8-9, of which 4-5 are along the commissure. As Hill records a specimen collected at Cudnaka (Kanyaka) by Mueller, its area extends from Kangaroo Island to the Flinders Range. *L. Brownii,* which has the fruit 1½-2 mm. long and nearly as broad, with 13-16 vittas, of which 5-6 are along the commissure, is, as far as known, confined to Tasmania.

P. 448.—7. *Leucopogon ericoides.* Also Burrungul, S.E. Leaves usually glabrous above, pubescent beneath.

P. 449.—11. *Leucopogon Clelandii.* Also in dry swamp, Encounter Bay; only 12-15 cm. high; flowering in May.

P. 450.—2. *Acrotriche affinis.* Also Encounter Bay; Rocky River, K.I.

P. 450.—*Brachyloma.* In the key read "corolla-lobes" instead of "corolla-tubes."

P. 451.—2. *Brachyloma ciliatum.* Also Mt. Compass (Mt. Lofty Range).

P. 452.—*Centunculus minimus.* Also Happy Valley.

P. 452.—2A. ASTEROLINUM, Link et Hoffm.

(From Greek *astêr, asteros,* a star; *linon,* flax: resembles a small *Linum,* and the calyx-segments spread stellately.)

*1. **A. Linum-stellatum** (L.) Duby. Small weak glabrous annual; leaves opposite, sessile, lanceolate, 3-6 mm. long; flowers axillary, solitary on a peduncle shorter than leaf and finally recurved; calyx-segments 5, lanceolate-mucronate, 1½-3 mm. long; corolla minute, the 5 stamens rather longer than the rounded lobes;; capsule globular, shorter than calyx, opening in 4-5 valves; seeds 2-3, wrinkled.

Kinchina (near Monarto South). Sept.-Oct.—Mediterranean region.

P. 457.—4. *Logania ovata* has been found as far inland as Bordertown.

P. 464.—A fruiting specimen of *Pentatropis* from Koonamore, north of the Broken Hill railway, has linear leaves 3-4 cm. long, about 2½ mm. broad and an ovoid-acute follicle 5½ cm. long by 2½ cm. broad. This seems to indicate *P. atropurpurea* (F. v. M.) Benth., a Queensland species.

P. 464.—Read *Marsdenia australis* (R.Br.) Druce (1917).

P. 474.—*Cochranea anchusifolia.* This species has been restored by I. M. Johnstou in Contrib. Gray Herb. 81 : 21 (1928) to *Heliotropium* as **H. amplexicaule,** Vahl (1794), an earlier name than *H. anchusaefolium*, Poir. (1813).

P. 475.—Delete the generic names *Eritrichium* and *Rochelia* and insert instead :

8. PLAGIOBOTHRYS, Fisch. et Mey. (1835).

(Etymology of name not given by the authors : the first part is evidently the Greek *plagios*, oblique ; the second is either *botrys*, bunch, raceme, or *bothros*, a pit, hollow.)

Differs from *Eritrichium* by the absence of lateral wings to the nutlet and by the conspicuous dorsal and ventral keels ; from *Rochelia* by the attachment of the nutlet to the receptacle or gynobase, the areole in *Rochelia* extending nearly the whole length of the nutlet, while in *Plagiobothrys* it does not extend above the middle of the inner face. Calyx-segments 5-8, more or less accrescent ; corolla about as long, with a cylindrical tube and usually 5 short imbricate rounded lobes ; ovules and nutlets 2-4 ; style not reaching to the summit of the ripe nutlets, which are strongly keeled on the outer face and upper part of the inner face, the areole extending downwards from the base of the inner or ventral keel. Annual or perennial herbs ; flowers small, very shortly pedicellate in bracteolate raceme-like cymes extending over the greater part of the stem ; some of the lower leaves opposite, at least in the American species ; this character has not been definitely ascertained in all the Australian ones. A genus chiefly American.

A. Fruiting calyx-segments 5-8, unequal, curved, hardened, 5-8 mm. long ; nutlets 2, rarely 4, 2 mm. long ; areole lanceolate, extending from base about ½ way up the inner face ..... *P. plurisepalus* 1.

A. Fruiting calyx-segments 5, subequal, straight, herbaceous, 2-4 mm. long ; nutlets 4, about 1½ mm. long.
Nutlets ovoid, glossy, the areole small, triangular, oblique, raised considerably above the base ; stems usually procumbent ..... *P. elachanthus* 2.
Nutlets oblong-ovoid, dull, the areole lanceolate extending from base about ½ way up the inner face ; stems erect ..... *P. orthostatus* 3.

1. **P. plurisepalus** (F. v. M.) Johnston (1928).—*Maccoya plurisepalea*, F. v. M. (1859) ; *Rochelia Maccoya*, F. v. M. (1869) ; *R. plurisepalea* (F. v. M.) Druce (1917).

To the localities given under *Rochelia plurisepala* add Humbug Scrub near Gawler, and Arkaringa Creek.

2. **P. elachanthus** (F. v. M.) Johnston. In the description under *Eritrichium australasicum* delete " lengthening in fruit to 4-7 mm. and sometimes becoming rigid and curved as in *Rochelia* " and insert instead " lengthening in fruit to 3-4 mm. and remaining straight and subequal."—*Heliotropium elachanthum*, F. v. M. (1852) ; *Eritrichium australasicum*, Benth., partly, not of A.DC.

So far this species has only been found in the typical locality (Rocky River, near Gladstone, in 1851) and more recently near Port Lincoln, E.P., but it has probably been overlooked elsewhere, as it occurs in the western part of Victoria.

The true *P. australasicus* (A.DC.) Johnston is, according to Ivan M. Johnston, of the Harvard University Herbarium, who has revised the genus, confined to West Australia, and is chiefly distinguished from the preceding by the nutlets dull and bearing a larger triangular areole lower down on the inner surface, not oblique or encircled by the branching keel, as in *P. elachanthus*.

3. **P. orthostatus,** J. M. Black. Small scabrous-pubescent annual ; stems erect, 4-7 cm. high ; leaves linear, 1-3 cm. long, the radical ones dilated towards base ; calyx-segments lanceolate, in fruit 2½ mm. long, straight and subequal ; corolla white, 2 mm. long ; stamens 5, just below middle of tube ; nutlets 4, ovoid-oblong, acute, fully 1½ mm. long, dull, rugose-reticulate, the areole linear-lanceolate in outline, slightly 1-grooved lengthwise, extending from the base to nearly the middle of the inner face.

Near Mount Graham, S.E. The nutlet resembles that of *P. plurisepalus*, but is rather smaller.

P. 476.—**Amsinckia hispida** (Ruiz et Pav.) Johnston (1924) instead of *A. angustifolia*, Lehm. (1831).—*Lithospernum hispidum*, Ruiz et Pav. (1799).

P. 478.—2. *Verbena supina.* Also Swan Reach, River Murray.

P. 483.—4A. **Dicrastylis Gilesii,** F. v. M. Shrub with a dense velvety tomentum, purplish on the branches; leaves mostly opposite, petiolate, flat, ovate- or oblong-lanceolate, 3-6 cm. long, 10-20 mm. broad; flowers often purplish, in sessile heads forming a terminal spike and also in axillary shortly pedunculate heads; calyx subglobular, 5-partite, about 4mm. long; corolla rather longer, pubescent inside, the tube much exceeding the obtuse lobes; ovary tomentose.
Sandhills north-west of Musgrave Range.—Central and West Australia.

P. 491.—3. *Prostanthera striatiflora.* Also Wudinna, E.P.

P. 493.—* *Lamium amplexicaule*, L. var. *clandestinum*, Reichb. Flowers cleistogamous, the corolla not longer than calyx nor opening, the tuft of hairs at its summit conspicuous.—Near Jamestown. This variety or form is said to occur most frequently in winter or spring.

P. 497.—6. *Solanum oligacanthum.* Berry depressed-globular, drying brown (8-10 mm. diam.); seeds about 3, black, wrinkled, 5-6 mm. diam.

P. 498.—12. *S. hystrix.* The hairy West Australian plant has now been described as a distinct species under the name *Solanum hoplopetalum*, Bitter et Summerhayes (1926).

P. 499. 17. *Solanum ellipticum.* There are 2 varieties of this specis: one with a soft dark-colored edible berry 15-20 mm. diam. (var. *mollibaccalis*, J. M. Black) and another with a smaller hard yellow inedible berry (var. *duribaccalis*), resembling that of S. *petrophilum.* Both varieties have the calyx with few short prickles or none and the broad fruiting lobes ending in narrow points; seeds pale-colored.

P. 502.—*Duboisia Hopwoodii* has the leaves sometimes narrower (2-3 mm. broad) and the flowers larger (calyx nearly 3 mm., corolla 12-14 mm. long).

P. 509.—*Zaluzianskia divaricata.* Also Golden Grove and Pinery, near Adelaide.

ALIEN BUT SCARCELY NATURALISED PLANTS.

These are immigrant plants, in addition to those described in the Flora, which have appeared here and there near settlement and usually as escapes from gardens or cultivation.

GRAMINEAE.

Agropyrum littorale, Dumort. Southern Europe.
Arundo Donax, L. Giant Reed; Bamboo. Mediterranean region.
Cynosurus echinatus, L. Rough Dog's-tail. Mediterranean region.
Panicum miliaceum, L. Millet, Egypt; India.
Paspalum dilatatum, Poir. Temperate South America.
Phalaris nodosa, L. Mediterranean region.
Phleum pratense, L. Timothy Grass. Temperate countries.

ARACEAE.

Zantedeschia aethiopica (L.) Spreng. (*Richardia africana,* Kunth.) Arum Lily.

LILIACEAE.

Allium rotundum, L. Round-headed Garlic. Southern Europe.
A. triquetrum, L. Triquetrous Garlic. Mediterranean region; Cornwall.
A. vineale, L. Crow Garlic; Wild Garlic. Central and southern Europe.
Asparagus officinalis, L. Asparagus. Mediterranean region.
Muscari comosum, Mill. Grape Hyacinth. Mediterranean region.
Ornithogalum arabicum, L. Black-eyed Susan. Mediterranean region.
O. thyrsoides, Jacq. South Africa.

AMARYLLIDACEAE.

Agave americana, L. American Aloe. Tropical America.
Narcissus Tazzetta, L. Polyanthus Daffodil. Mediterranean region.

IRIDACEAE.

Acidanthera platypetala, Bak. South Africa.
Antholyza aethiopica, L. South Africa.
Babiana stricta, Ker. South Africa.
Ferraria undulata, L. South Africa.
Gladiolus blandus, Ait. South Africa.
G. cuspidatus, Jacq. South Africa.
Hesperantha falcata, Ker. South Africa.
Iris germanica, L. German Iris. Europe; Asia.
Ixia flexuosa, L. South Africa.
Moraea Pavonia, Ker. South Africa.
Sparaxis bulbifera, Ker. South Africa.
S. tricolor, Ker. South Africa.
Synnotia bicolor, Sweet. South Africa.
Tritonia lineata, Ker. South Africa.
Watsonia angusta, Ker. South Africa.
W. Meriana, Mill. South Africa.

URTICACEAE.

Cannabis sativa, L. Hemp. Central Asia.

POLYGONACEAE.

Rumex roseus, L. Red-fruited Dock. Eastern Mediterranean region.

AIZOACEAE.

Mesembrianthemum aurantiacum, Haw. South Africa.
M. cordifolium, L. South Africa.

CARYOPHYLLACEAE.

Lychnis alba, Mill. (*L. vespertina,* Sibth.). White Campion. Europe; Western Asia.
L. Coronaria (L.) Desr. Rose Campion. Southern Europe.
Paronychia argentea, Lamk. Silvery Whitlow-wort. Mediterranean region.
Silene dichotoma, Ehrh. Central and eastern Europe.
S. Schafta, Gmel. Caucasus.

RANUNCULACEAE.

Adonis aestivalis, L. Pheasant's Eye. Central and southern Europe; western Asia.

PAPAVERACEAE.

Papaver Argemone, L. Pale Poppy. Central and southern Europe; western Asia.

CRUCIFERAE.

Camelina foetida, Fries. Gold of Pleasure. Europe.
Lepidium campestre, R. Br. Mithridate Pepperwort. Europe.

CRASSULACEAE.

Crassula tetragona, L. South Africa.

LEGUMINOSAE.

Albizzia lophantha (Willd.) Benth. Crested Wattle. West Australia.
Cytisus linifolius (L.) Lamk. Mediterranean region.
Lotus Tetragonolobus, L. Winged Pea. Mediterranean region.

ROSACEAE.

Rubus moluccanus, L. French Blackberry. Northern Australia; Indian Archipelago.

SAPINDACEAE.

Melianthus comosus, Vahl. South Africa.

CISTACEAE.

Cistus hirsutus, Lamk. Hairy Rockrose. Western France and Spain.

CACTACEAE.

Opuntia monacantha (Willd.) Haw. Prickly Pear. (According to Britton and Rose this is the true *O. vulgaris*, Mill.). South America.
O. Bentonii, Griffiths (1912). Spineless Pear. This is the Common Pest Pear of Queensland and northern New South Wales.—*O. vulgaris*, auctt.; *O. inermis*, auctt. Southern United States. Britton & Rose consider *O. Bentonii* to be a synonym of *O. stricta*, Haw. The nomenclature of *Opuntia* is exceedingly confused.

GENTIANACEAE.

Microcala quadrangularis, Griseb. Temperate South America.

CONVOLVULACEAE.

Cuscuta Epithymum, Murr. Lesser Dodder. Europe; Asia.

SOLANACEAE.

Salpichroa rhomboidea, Miers. Temperate South America.

LABIATAE.

Mentha rotundifolia, L. Round-leaved Mint. Europe; Asia.
Salvia aurea, L. Golden Salvia. South Africa.

VERBENACEAE.

Lippia canescens, Kunth. Temperate South America.
Verbena tenera Spreng. Temperate South America.

COMPOSITAE.

Ammobium alatum R. Br. New South Wales.
Anacyclus radiatus, Lois. Mediterranean region.
Centaurea paniculata, L. Mediterranean region.
Chrysanthemum Parthenium (L.). Bernh. Feverfew. Europe.
Gazania Pavonia, R. Br. South Africa.
G. rigens, R. Br. South Africa.
Tanacetum boreale, Fisch. Northern Tansy. Russia and Siberia.

NAMES OF AUTHORS AND ABBREVIATIONS.

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Aellen, P.
Aiton, W. (Ait.)
Allioni, C. (All.)
Anderson, R. H. (R. H. Anders.)
Andersson, G. (Anderss.)
Andrews, H. C. (Andr.)
Arduino, P.
Arnott, G. A W. (Arn.)
Ascherson, P. (Aschers.)
Aublet, J.-B.-C.-F.
Auctt., auctorum, of several authors
Avé-Lallemand (Avé-Lall.)
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Baker, R. T. (Baker et Smith)
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Beauvois, Palisot de (Beauv.)
Beauverd, G.
Beck, G.
Behr, H.
Bennett, A. (A. Benn.)
Bentham, G. (Benth.)
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Bieberstein, F. A. M. von (Bieb.)
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Bonpland, A. (Bonpl.)
Boott, F.
Bouché, C.
Brand, A.
Braun, A. (A. Br.)
Breyne or Breynius, J. (Breyn.)
Briquet, J. (Briq.)
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Brongniart, A. (Brongn.)
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Buchenau, F. (Buch.)
Bunge, A. von
Burmann, J. (Burm.)
Burnat, E.
Cambage, R. H.
Cambessèdes, J. (Cambess.)
Campdera, F. (Campd.)
Candolle, A. de (A. DC.)
Candolle, A.-P. de (DC.)
Candolle, C. de (C.DC.)
Caruel, T.
Caspary, R. (Casp.)
Cassini, A.-H.-G. (Cass.)
Cavanilles, A. J. (Cav.)
Chaubard (Chaub.)
Cheel, E.
Cheeseman, T. F.
Choisy, J. D.
Christensen, C. (C. Chr.)
Clarke, C. B.
Cogniaux, A. (Cogn.)
Cosson, E. (Coss.)
Crantz, H. J. N.
Cunningham, A. (A. Cunn.)
Cunningham, R. (R. Cunn.)
Curtis, W. (Curt.)
Cyrillo, D. (Cyr.)
Davies, O. B.
DC. *See* Candolle.
Deane, H.
Decaisne, J. (Dene.)
Delile, A. R.
Desfontaines, R. L. (Desf.)
Desrousseaux, M. (Desr.)
Desvaux, A. N. (Desv.)
Diels, L.
Dietrich, A. (Dietr.)
Dillenius, J. J. (Dill.)
Dodonaeus, R. (Dod.)
Domin, K.
Don, D.
Don, G.
Donn, J.
Douglas, D. D.
Druce, G. C.
Drummond, J. (Drumm., J. Drumm.)
Dryander, J. (Dryand.)
Dumortier (Dumort.)
Dunal, M. F. (Dun.)
Duricu, M.-C.
Ebermaier, E. (Eberm.)
Ecklon, C. F. (Eckl.)
Ehrhart, F. (Ehrh.)
Endlicher, S. L. (Endl.)
Engelmann, G. (Engelm.)
Ewart, A. J. (Ew.)
Farmar
Fée, A. L. A.
Fenzl, E.
Fiori, A.
Fischer, F. E. L. (Fisch.)
Fitzgerald, R. D. (Fitzg.)
Fitzgerald, W. V. (W. V. Fitz.)
Fluegge, J.
Forskål, P. (Forsk.)
Forster, J. R. (Forst.)
Forster, J. G. A. (Forst. f., G. Forst.)
Fries, E. M.
G. et G. *See* Grenier and Godron.
Gaertner, J. (Gaertn.)
Garcke, F. A.
Garsault (Gars.)
Gaudichaud, C. (Gaudich.)
Gaudin, J. F.
Gay, J.
Gilg, E.
Gilibert, J. E. (Gilib.)

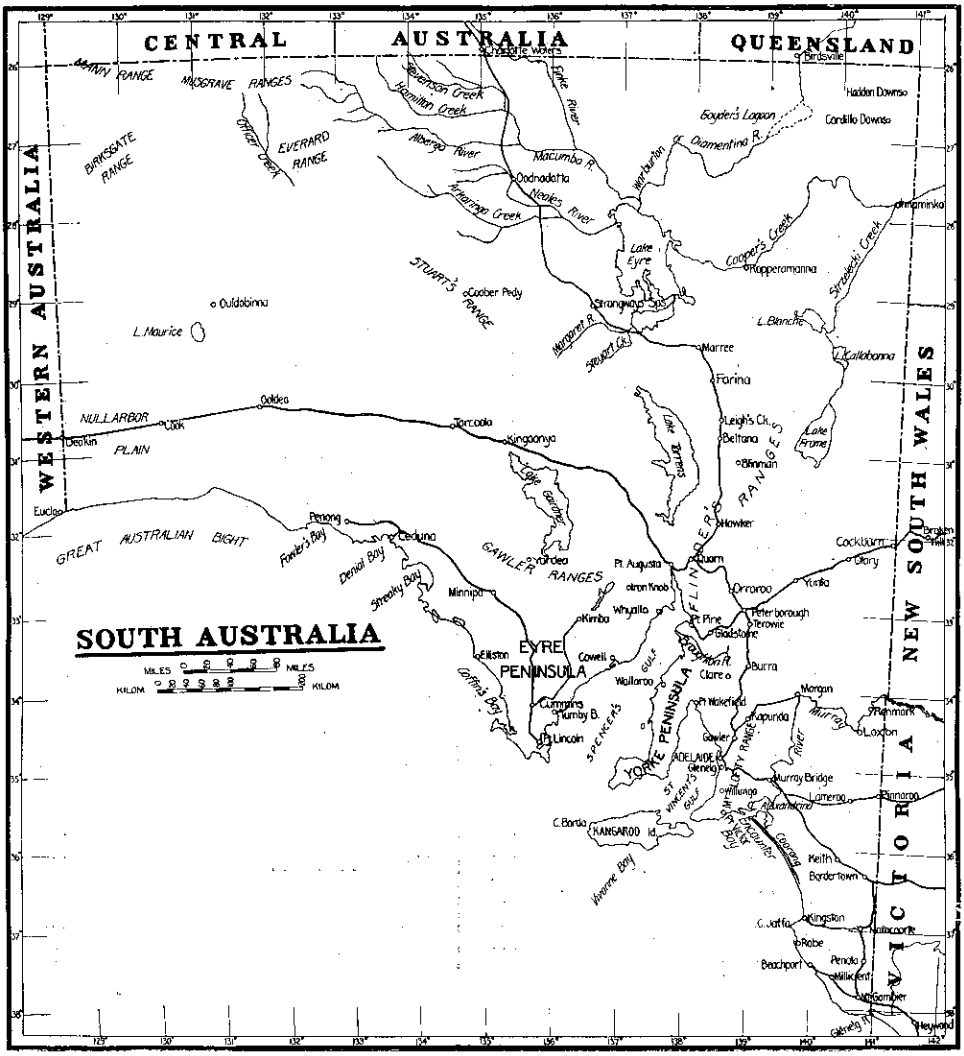
Gillies (Gill.)
Gingins, F.-C.-J. de (Ging.)
Giordano, F. (Giord.)
Gleditsch, J. G.
Gmelin, C. C. (C. C. Gmel.)
Gmelin, J. G. (Gmel.)
Godron, D. A. (Godr.)
Graebner, P. (Graebn.)
Graham, R. (Grah.)
Gray, A.
Gray, S. F.
Grenier, C. (Gren.)
Grisebach, A. H. R. (Griseb.)
Grufberg (Grufb.)
Grüning, G.
Gürke, M.
Gussone, G. (Guss.)
Hackel, E.
Hacquet, B.
Haller, A. von (Hall.)
Hamilton, F. (Hamilt.)
Hasselquist, F.
Hasskarl, J. K.
Haworth, A. H. (Haw.)
H. B. et K. *See* Humboldt, Bonpland, and Kunth.
Hegelmaier, F. (Hegelm.)
Heimerl, A.
Heldreich, T. von (Heldr.)
Henckel von Donnersmarck, L. (Henckel)
Herbert, W. (Herb.)
Hermann, P. (Herm.)
Heward, R.
Heyne, B.
Hieronymus, G. (Hieron.)
Hiern, W. P.
Hill, A. W.
Hill, J.
Hochreutiner (Hochr.)
Hoffmann, G. F. (Hoffm.)
Honckeny, G. A. (Honck.)
Hooker, Sir J. D. (Hook. f.)
Hooker, Sir W. J. (Hook.)
Horkel (Hork.)
Hornemann, J. W. (Horn., Hornem.)
Host, N. T.
Houstoun, W. (Houst.)
Hubbard, C. E.
Hudson, W. (Huds.)
Huegel, C., Baron von (Hueg.)
Hughes, D. K.
Humboldt, A. von (Humb.)
Irmisch, T.
Ising, E. H.
Jacquin, N. J., Baron von (Jacq.)
Johnston, I. M.
Jordon, A. (Jord.)
Jussieu, A. de (A. Juss.)
Jussieu, A. L. de (Juss.)
Ker, J. B.
Keyserling, A. (Keys.)
Kirk, T.
Kittel, M. B. (Kitt.)
Klotzsch, J. F.
Koch, K.
Koch, Max
Koch, W. D. J.
Koehne, E.
Koenig, J. G. (Koen.)
Kœrnicke, F. (Koern.)
Kraenzlin, F. (Kraenzl.)
Krause, K.
Kuhn, M.
Kükenthal, G. (Kükenth.)
Kunth, K. S.
Kuntze, O.
Kunze, G.
Kurz, S.
L. *See* Linné.
Labillardière, J.-J. H. de (Labill.)
Lagasca, M. (Lag.)
Lamarck, J. B. de (Lamk.)
Lange, J.
Ledebour, K. F. von
Lehmann, J. G. C. (Lehm.)
Lessing, C. F. (Less.)
Levsser (Leyss.)
L'Héritier, C. L. (L'Hér., L'Hérit.)
Lindern, Baron F. von
Lindley, J. (Lindl.)
Link, H. F.
Linné, C. von, Latinised as Linnaeus (L.)
Linné, C. von (L. f. *i.e.* Linnaei filius)
Loefling, P. (Loefl.)
Loiseleur, J.-L.-A. (Lois.)
Loureiro, J. (Lour.)
Macbride, J. F.
Mackay, J.
Macklin, E. D.
MacOwan, P.
Maiden, J. H. (Maid.)
Maratti, F.
Martens, G. V.
Medicus, F. C. (Med., Medic.)
Meisner, K. F. (Meisn., Meissn.)
Mertens, F. C. (Mert.)
Meyer, C. A. (C. A. Mey.)
Meyer, E. H. F. (E. Mey., E. Meyer)
Michaux, A. (Michx.)
Micheli, P. A. (Mich.)
Miers, J.
Mildbraed, J.
Miller, P. (Mill.)
Miquel, F. A. W. (Miq.)
Moench, K.
Moore, C. (Moore et Betche)
Moore, S. le M. (S. Moore)
Moore, T.
Moquin-Tandon, H.-B.-A. (Moq.)
Moris, G. G.
Mueller, F., Baron von (F. v. M.)
Mueller, J. (Muell. Arg., *i.e.* Argoviensis, of Aargau)
Murr, J.
Murray, J. A. (Murr.)
Mutis, J. C.
Naudin, C. (Naud.)
Necker, N. J. von (Neck.)
Necs von Esenbeck, C. G. (Nees)
Nicholls, W. H.
Niedenzu, F.
Noronha, F.
Nuttall, T. (Nutt.)
Ostenfeld, C. H. (Ostenf.)

Otto, F.
Pallas, P. S.
Parlatore, F. (Parlat.)
Pavón, J. (Pav.)
Pax, F.
Persoon, C. H. (Pers.)
Petit-Thouars, L. M. A. du (Pet.-Thou.)
Pilger, R.
Planchon, J. E. (Planch.)
Plumier, C. (Plum.)
Pohl, J. B. E.
Poiret, J. L. M. (Poir.)
Pourret
Prantl, K.
Preiss, L.
Presl, C. B.
Presl, J. S.
Pritzel, E.
Pursh, F. T.
R. et S. *See* Roemer and Schultes.
Rafinesque, C. S. (Rafin., Raf.)
Raoul, E.
Reader, F. M.
Rees, B.
Regel, E. von
Reichenbach, H. G. (Reichb. f.)
Reichenbach, H. G. L. (Reichb., Reichenb.)
Reisseck, S. (Reiss.)
Reneaulme, P. de (Ren.)
Retzius, A. J. (Retz.)
Richard, A. (A. Rich.)
Richard, L. C. (L. C. Rich.)
Robinson, B. L.
Roemer, J. J. (Roem.)
Rogers, R. S.
Rohrbach, P. (Rohrb.)
Roth, A. W.
Rottboell, C. F. (Rottb.)
Rouy, G.
Roxburgh, W. (Roxb.)
Royen, A. van
Rudge, E.
Ruiz-López, H. (Ruiz.)
Rumpf, G. E. (Rumph. for Latinised Rumphius)
Rupp, H. M. R. (Rupp et Nicholls)
Ruppius, H. B. (Rupp.)
S. et H. *See* Summerhayes and Hubbard.
Salisbury, R. A. (Salisb.)
Sauvages, F. B. de (Sauv.)
Savi, G.
Schauer, J. C. (Schau.)
Schindler, A. K.
Schinz, H.
Schkuhr, C.
Schlechtendal, D. F. L. von (Schlechtd., Schlecht.)
Schlechter, R.
Schleicher, J. C.
Schleiden, M. J. (Schleid.)
Schmidt, F. W.
Schott, H. W.
Schrader, H. A. (Schrad.)
Schrank, F. von Paula
Schreber, J. C. D. von (Schreb.)
Schultes, J. A. (Schult.)
Schultes, H. (Schult. f.)
Schultz, C. H. (Schultz-Bip., *i.e.*, Bipontinus, of Zweibrücken)
Schweinfurth, G. (Schweinf.)
Scopoli, J. A. (Scop.)
Sebastiani, A. (Seb.)
Seringe, N. C. (Ser.)
Sibthorp, J. (Sibth.)
Sieber, F. W. (Sieb.)
Siebold, P. F. von (Sieb. et Zucc.)
Sims, J.
Smith, John
Smith, Sir J. E. (Sm.)
Solander, D. C. (Soland., Sol.)
Sonder, W. O. (Sond.)
Spach, E.
Sprague, T. A.
Sprengel, K. P. J. (Spreng.)
Spring, A. F.
Stapf, O.
Steetz, J.
Steinheil (Steinh.)
Stephan, F. (Steph.)
Steudel, E. T. (Steud.)
Stokes, J.
Stuart, C.
Sturm, J. W.
Summerhayes, V. S. (S., Summ.)
Swartz, O. (Sw.)
Sweet, R.
Syme, J. T. B.
Tate, R.
Tenore, M. (Ten.)
Tepper, J. G. O.
Thellung, A. (Thell.)
Thuillier, J.-L. (Thuill.)
Thunberg, C. P. (Thunb.)
Torrey, J. (Torr.)
Tournefort, J. P. de (Tourn., Tournef.)
Trinius, C. B. von (Trin.)
Turczaninow, N. (Turcz.)
Urban, I. (Urb.)
Usteri, P. (Ust.)
Vahl, M.
Vaillant, S. (Vaill.)
Ventenat, E. P. (Vent.)
Villar, F. (F. Vill.)
Villars, D. (Vill.)
Visiani, R. (Vis.)
Viviani, D. (Viv.)
Vriese, W. H. de (De Vriese).
Wagner, R.
Wahlenberg, G. (Wahlbg.)
Wallroth, C. F. W. (Wallr.)
Walpers, W. G. (Walp.)
Walter, T. (Walt.)
Weber, F.
Weigel, C. E. (Weig.)
Wendland, H. L. (Wendl.)
Wight, R.
Wikstroem, J. E. (Wikstr.)
Willdenow, C. L. (Willd.)
Williamson, H. B.
Willkomm, M. (Willk.)
Wimmer, F. (Wimm.)
Withering, W. (With.)
Zuccarini, J. G. (Zucc.)

INDEX OF SCIENTIFIC NAMES.

This index contains the names of families, genera, and species described or mentioned in the body of the flora or in the additions and corrections. The stressed syllable is indicated by an acute accent on the vowel. Synonyms are printed in italics. Groups not quoted in the index are accentuated thus:— Subfamilies: *Mimosoidéae, Borraginoidéae*; tribes: *Andropogóneae, Genisteae, Trifolieae, Anthemideae*; subtribes: *Bellidinae, Ambrosiinae, Angiánthinae.*

INDEX OF POPULAR NAMES.



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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.

By J. M. BLACK.

(Orchidaceae by R. S. Rogers, M.D.)

WITH ILLUSTRATIONS BY THE AUTHOR.

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

ADELAIDE:

PRINTED BY HARRISON WEIR, GOVERNMENT PRINTER, NORTH TERRACE.

1922-1929.

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Part 1, pp. 1-154, published 1922.
Part 2, pp. 155-358, published 1924.
Part 3, pp. 359-514, published 1926.
Part 4, pp. 515-746, published 1929.