

4. *COLDENIA*, Linn.

(*Lobophyllum*, F. Muell.)

Calyx deeply divided into 4 or 5 segments. Corolla with a short cylindrical tube; lobes 4 or 5, spreading, imbricate in the bud. Stamens inserted in the tube; anthers included. Ovary entire, 4-celled, with 1 pendulous ovule in each cell; style terminal, bifid or divided to the base into 2 styles, with a capitate or clavate stigma on each branch or style. Fruit more or less 4-lobed, dry or scarcely succulent, separating into 2 hard 2-celled carpels or finally into 4 1-seeded nuts. Seeds with a very thin (or without any?) albumen, the cotyledons not folded.—Hispid herbs. Leaves toothed or lobed. Flowers small, solitary in the axils, the upper ones often forming one-sided leafy spikes.

Besides the Australian species, which is a common one in tropical Asia and Africa, the genus has been extended by A. Gray so as to comprise several from N.W. and W. tropical America.

1. **C. procumbens**, *Linn.*; *DC. Prod.* ix. 558. A hard, prostrate, hirsute annual, the branches radiating from the crown of the root to a considerable length, but not rooting. Leaves petiolate, obovate or oblong, much undulate, wrinkled and crenate or obtusely lobed, the largest ones scarcely exceeding 1 in., the floral ones usually very small. Flowers nearly sessile in their axils, often forming leafy spikes on the branchlets, usually 4-merous, at least in the Australian specimens. Calyx-segments herbaceous, ovate-lanceolate, not 1 line long. Corolla scarcely exceeding the calyx, the lobes broad, shorter than the tube, glabrous inside. Style bifid. Fruit depressed-globular, glandular-hispid, about 1 line long, more or less distinctly 4-lobed and often with prominent ribs between the lobes.—*Lobophyllum tetrandrum*, F. Muell. in Hook. Kew Journ. ix. 21.

N. Australia. Victoria river, Sturt's Creek, and Upper Roper river, F. Mueller.

S. Australia. Cooper's Creek, *Howell's Expedition*.

The species is common in a great part of tropical Asia and Africa.

Calyx deeply divided into 5 segments. Corolla with a short or cylindrical tube; limb of 5 spreading lobes, imbricate in the bud. Stamens inserted in the tube; anthers exserted or rarely almost included. Ovary 2-celled with 2 ovules in each cell, or 4 celled with 1 ovule in each cell; style terminal, more or less 2-lobed or forked, the lobes entire, without any prominent ring. Fruit a drupe, the endocarp forming 2 2-seeded or 4 1-seeded pyrenes. Seeds with a membranous testa and usually scanty albumen; cotyledons ovate, not folded.—Trees or shrubs, often glabrous. Leaves entire or toothed. Flowers rather small, usually white, in panicles or cymes, either terminal in the upper axils or rarely all axillary. Bracts small. Fruits usually much smaller than in *Cordia*.

The genus is widely distributed over the tropical regions of the New as well as the Old World. Of the Australian species, one or perhaps two are common E. Indian ones, the four or three others are endemic.

SECT. I. **Euehretia**.—Flowers in irregularly-branched panicles. Ovary 4-celled, with 1 ovule in each cell.

Leaves glabrous underneath, rather narrow 1. *E. acuminata*.
Leaves pubescent underneath, usually broad 2. *E. pilosula*.

SECT. II. **Bourreria**.—Flowers in divaricately dichotomous cymes. Ovary 2-celled, with 2 ovules in each cell.

Corolla-tube longer than the calyx; lobes shorter. Cymes mostly terminal. Leaves oblong or lanceolate.

Leaves long-lanceolate, with very oblique veins. Anthers included in the tube or scarcely exserted 3. *E. saligna*.

Leaves oblong or oblong-lanceolate, the veins rather oblique. Anthers quite exserted 4. *E. membranifolia*.

Corolla-tube not longer than the calyx; lobes twice as long. Cymes small, lateral. Leaves mostly ovate 5. *E. laevis*.

S. E. saigna, *H. Br. Prod.* 491. A shrub or tree, quite glabrous, the foliage apparently glaucous. Leaves long-lanceolate or linear, tapering to a fine point, quite entire, contracted into a rather long petiole, rather thick, very obliquely veined, 2 to 5 in. long. Flowers in divaricately dichotomous shortly pedunculate cymes. Calyx-segments narrow-ovate, almost acute, $\frac{3}{4}$ line long. Corolla-tube cylindrical, fully 1 line long; lobes very spreading, nearly as long as the tube. Anthers included in the tube or very shortly protruding. Ovary 2-celled, with 2 ovules in each cell. Style deeply forked, with obtuse stigmas. Fruit about 2 lines diameter, containing 4 distinct, not very hard pyrenes.—DC. *Prod.* ix. 504.

N. Australia. Islands of the Gulf of Carpentaria, *R. Brown*; Victoria river, *F. Mueller*.

Queensland? N.E. Australia, precise station not given, *Fitzalan*.

BORAGINACEAE

Ehretia urceolata W.V. Frhgg.

Calyx deeply divided into 5 segments. Corolla with a very short tube, rotate with 5 broad lobes in the bud. Stamens 5, inserted in the throat, the filaments very short and flat; anthers erect, connate in a short cylinder contracted into a long straight beak, formed of the linear terminal appendages of the anthers, enclosing the style. Ovary entire, 4-celled, with 1 pendulous ovule in each cell; style terminal, filiform, with a minute stigma. Fruit dry or the exocarp very slightly succulent, separating into 2 carpels, each with a crustaceous 2-celled endocarp. Seeds 1 in each cell, more or less albuminous; embryo terete, straight.—Undershrubs or small much-branched shrubs, rarely entirely herbaceous, more or less tomentose or hirsute, or rarely glabrous. Leaves entire or toothed. Flowers blue purple or white, often rather large and showy, in terminal or at length lateral cymes, sometimes reduced to short simple spikes or almost to single flowers. Bracts few or none.

The genus is limited to Australia. The flowers, including the ovary and style, are very nearly those of *Trichodesma*, but the fruit is rather that of the section *Heliophytum* of *Heliotropium*. The species, though usually very different in aspect, are very difficult to characterize, as most of them appear connected by occasional intermediate specimens.

Leaves more or less toothed or rarely entire, flat concave or complicated.

Scabrous-pubescent or nearly glabrous shrubs or undershrubs.

Leaves entire or obtusely toothed. Corolla-lobes broad, usually obtuse.

Leaves mostly entire, obovate oblong or cuneate. Calyx-lobes obtuse

1. *H. solanacea*.

Leaves mostly obtusely toothed, at least at the end

2. *H. littoralis*.

Undershrub. Stems erect, corymbose at the top, hispid as well as the foliage with long spreading hairs. Corolla-lobes acute .

3. *H. corymbosa*.

Undershrubs. Corolla-lobes rather acute. Inflorescence white, with appressed silky hairs

4. *H. sericiflora*.

Glandular-glutinous, small branching shrubs, nearly glabrous or with a very short appressed pubescence.

Leaves mostly complicate, the margins undulate-plicate, with very prominent teeth

5. *H. Preissiana*.

Leaves narrow, mostly shortly 3-toothed at the end only . .

6. *H. strigosa*.

Leaves quite entire, thick, convex or with recurved margins.

Leaves mostly obtuse, $\frac{1}{2}$ to $\frac{3}{4}$ in. long. Outer calyx-lobes broad.

Flowers in cymes

7. *H. lavandulacea*.

Leaves under $\frac{1}{2}$ in. long, few and distant. Flowers almost solitary.

Calyx-lobes linear

8. *H. integerrima*.

H. Lehmanniana, Sond. in Pl. Preiss. ii. 238, from York district, *Preiss*, n. 2336, is entirely unknown to me, but, from the character given, it would appear to be one of the numerous forms of *H. Preissiana*.

BORAGINACEAE

Halgania glabra J. M. Black

2. **H. littoralis**, Gaudich. in Freyc. Voy. Bot. 449. t. 59. A shrub or undershrub, with ascending or erect rigid branching stems, more or less hirsute with short appressed and rigid or longer and loose hairs, or the foliage nearly glabrous. Leaves cuneate-oblong, obtuse, bordered especially at the end by a few coarse broad mostly obtuse teeth, entire and narrowed at the base, thick and firm, $\frac{1}{2}$ to $1\frac{1}{2}$ in. long. Cymes without bracts, compact and corymbose when many-flowered, but often reduced to very few flowers, the inflorescence usually villous with rather long soft hairs. Calyx-segments linear or lanceolate, rather obtuse, varying at the time of flowering from scarcely 3 to above 4 lines in length, and sometimes still longer after flowering. Corolla-lobes broad, rather obtuse, spreading to a diameter of $\frac{3}{4}$ to $1\frac{1}{4}$

in. Anthers pubescent, the beak longer than the cells. Fruit oblong, shorter than the calyx, transversely rugose when dry.—DC. Prod. x. 177.

W. Australia. Sharks' Bay, Gaudichaud, Denham; Dirk Hartog's Island, A. Cunningham; Swan and Murchison rivers, Drummond, n. 52, 653, and 6th Coll. n. 132.

Var. *glabrifolia*. Leaves rather broad and quite glabrous.—H. Bebrana, F. Muell. Fragm. i. 209.—South Hutt river and Port Gregory, Oldfield.

Drummond, n. 122, appears to be a small-leaved form of the same species, which is a very variable one, and several of our specimens are very indifferent.

1. **H. solanacea**, *F. Muell. in Hook. Kew Journ.* ix. 21. An erect branching undershrub, the stems and foliage covered with a close pubescence, with more or less of longer appressed or loose hairs, almost silky on the inflorescence and calyx. Leaves obovate or cuneate-oblong, very obtuse, entire (or sparingly toothed?), flat, penniveined with the midrib prominent underneath, narrowed into a short petiole, $\frac{3}{4}$ to $1\frac{1}{2}$ in. long. Cymes loose, with 1 or 2 leafy bracts at the base, or without any bracts. Calyx-segments lanceolate, obtuse, 3 to 4 lines long. Corolla-lobes shortly exceeding the calyx, apparently obtuse, but not seen perfect. Anthers pubescent. Fruit obtuse, 2 to $2\frac{1}{2}$ lines long.

N. Australia. Upper Victoria river and Sturt's Creek, *F. Mueller*; between the Bonney river and Mount Morpeth, *M'Douall Stuart*.

Calyx deeply divided into 5 segments. Corolla with a cylindrical tube; lobes 5, spreading, plicate and imbricate in the bud. Stamens inserted in the tube; anthers often mucronate or acuminate and sometimes cohering by their tips, included or the tips slightly protruding. Ovary entire, 4-celled, with 1 laterally attached or pendulous ovule in each cell; style terminal, short or long, the stigma or stigmatic summit broadly umbrella-shaped or with a fleshy ring surrounding the base of a more or less distinct central cone or point. Fruit more or less 2- or 4-lobed or furrowed, separating into 4 1-seeded nuts, or in species not Australian into 2 hard 2-seeded carpels. Seeds with a scanty or rarely with a rather thick albumen.—Herbs under-shrubs or rarely shrubs, with appressed and strigose or with rigid and spreading hairs, very rarely glabrous. Flowers usually small, sessile or pedicellate in one-sided simple or once- or twice-forked spikes, with or without bracts, which when present are often not immediately under the pedicels.

The genus is widely dispersed over the tropical and subtropical regions of the globe, a few species extending beyond the tropics both in the northern and the southern hemispheres. Of the twenty-one Australian species, three belong to the warmer regions of the Old World, chiefly abundant in Africa and western Asia; one is widely spread over the temperate and subtropical regions of the Old World; another extends over the seacoasts of almost all warm countries; the remaining sixteen, as far as known, are all endemic. All the Australian species belong to the genus or section of *Heliotropium* proper as limited by De Candolle, or to *Heliotropium* and *Schleidenia* as defined by Presenius (in Mart. Fl. Bras.). The section *Heliotropium*, with the fruit separating into 2 2-seeded carpels, established by De Candolle as a genus, comprises the *H. indicum*, Linn., a very common S. Asiatic weed, but which does not appear to have been yet found in Australia.

SECT. I. **Platygyne**.—*Stigma nearly sessile, umbrella-shaped, without any distinct central cone.*

Glabrous and glaucous prostrate perennial 1. *H. curassavicum*.

SECT. II. **Euheliotropium**.—*Stigma a thick ring at the base of or round a central cone or point. Anthers obtuse or shortly acuminate, not cohering (except in H. brachygynae?). Throat of the corolla not bearded.*

Flowers in scorpioid forked or rarely simple spikes, without bracts.

Leaves petiolate or contracted at the base.

Style shorter than the stigma.

Leaves ovate, flat. Anthers obtuse 2. *H. europæum*.

Leaves oblong or lanceolate, rugose, undulate. Anthers very shortly acuminate 3. *H. undulatum*.

Style longer than the stigma.

Leaves oblong or lanceolate, contracted into a very short petiole 4. *H. asperrimum*.

Leaves ovate, undulate, on long petioles 5. *H. crispatum*.

Flowers few, sessile within the uppermost leaves or forming leafy spikes. Leaves sessile, small.

Leaves linear-lanceolate, rather crowded. Anthers scarcely pointed. Style longer than the stigma 6. *H. fasciculatum*.

Leaves lanceolate, almost imbricate. Anther-points long. Style longer than the stigma 7. *H. vestitum*.

Leaves lanceolate or linear, distant. Anther-points long. Style very short 8. *H. brachygynae*.

Leaves ovate or ovate-lanceolate, crowded. Anther-points short. Stigma all but sessile 9. *H. epacrideum*.

SECT. III. **Schleidenia**.—*Stigma a thick ring round a central cone or point. Anthers acuminate, cohering by the minutely hairy tips. Corolla-throat bearded or pubescent inside.*

Corolla-tube scarcely swollen. Style shorter than the stigma. Calyx-segments very unequal.

Leaves obovate-oblong or lanceolate, flat. Spikes without bracts 10. *H. ovalifolium*.

Leaves linear with revolute margins. Spikes bracteate 11. *H. strigonum*.

Leaves lanceolate. Flowers axillary, scarcely forming leafy spikes 8. *H. brachygynae*.

Corolla-tube swollen round the anthers at or above the middle. Style as long as or longer than the stigma.

Leaves lanceolate or linear-lanceolate, flat or with recurved margins, mostly acute and above $\frac{1}{4}$ in. long. Bracts leaf-like. Plant hirsute or pubescent.

Stems long and prostrate. Corolla-limb longer than the tube.

Bracts small 12. *H. prostratum*.

Stems diffuse. Bracts longer than the calyx, petiolate or contracted at the base 13. *H. bracteatum*.

Stems ascending or erect. Bracts longer than the calyx, sessile.

Leaves rather crowded, narrow. Nuts usually 4 14. *H. pauciflorum*.

Leaves lanceolate. Fruit of a single conical nut, the others abortive 15. *H. conocarpum*.

Leaves oblong-lanceolate, obtuse, crowded, under 2 lines long.

Bracts leaf-like, imbricate. Plant cottony-white 16. *H. filaginoides*.

Leaves all narrow-linear, with revolute margins. Bracts rarely exceeding the calyx, usually few and small. Nuts usually scabrous-pubescent.

Stigmatic cone very short.

Erect slightly-branched annual. Hairs spreading. Corolla-tube very slender 17. *H. ventricosum*.

Stem paniculately branched. Hairs appressed. Calyx-segments acuminate.

Calyx 2 lines long. Leaves linear 18. *H. tenuifolium*.

Calyx 1 line long. Leaves filiform 19. *H. paniculatum*.

Stigmatic cone long and narrow. Calyx-segments 1 line long.

Leaves linear 20. *H. Cunninghamii*.

Lower leaves ovate, petiolate, crowded. Flowering branches elongated, with few narrow small bract-like leaves. Nuts very hispid 21. *H. diversifolium*.

H. asperatum, R. Br. 1768. 435. A perennial with erect or ascending stems of 1 to 1½ ft., the branches and foliage very scabrous and sprinkled with rigid spreading hairs. Leaves shortly petiolate, oblong or lanceolate, obtuse, with undulate revolute margins but not very rugose, 1 to 2 in. long. Spikes short and dense, once- or sometimes twice-forked, rarely simple, without bracts. Calyx-segments linear or lanceolate, hispid, 2 lines long. Corolla-tube shortly exceeding the calyx, the throat glabrous inside; lobes much plicate, very broad, expanding to ¼ in. diameter. Anthers oblong, very shortly acuminate. Style filiform; stigmatic cone long and narrow, but shorter than the style.—DC. Prod. ix. 542; *H. foliatum*, Lehm. Pl. Preiss. ii. 238 (from the description given) not of R. Br.

S. Australia. Head of Spencer's Gulf, *R. Brown*; sterile rocky and sandy places, Flinders' Range, Cudnaka, etc., *P. Mueller*; Mount Searle, *Warburton*.

W. Australia, *Drummond*, 5th Coll. n. 337, *Maxwell*.

13. **H. bracteatum**, R. Br. *Flou.* 493. A mispid annual, either erect and branching or with several stems ascending from the base, under 1 ft. high. Leaves more or less petiolate, lanceolate, rather acute, narrowed at the base, flat or the margins slightly recurved, from under $\frac{1}{2}$ to about $\frac{3}{4}$ in. long. Spikes terminal, leafy, 1-sided but scarcely scorpioid, the leafy bracts more or less petiolate or very much contracted at the base, as long as or longer than the calyx. Calyx-segments lanceolate, about $1\frac{1}{2}$ lines long. Corolla-tube rather shorter than the calyx, ventricose at or below the middle, the throat bearded inside, the lobes shorter than the tube. Anthers acuminate, cohering at the tips. Stigmatic cone slender, but shorter than the filiform style. Nuts minutely pubescent, the segments of the fruiting calyx usually elongated and spreading.—DC. Prod. ix. 547; *H. foliatum*, R. Br. Prod. 493; DC. Prod. ix. 548.

N. Australia. Islands of the Gulf of Carpentaria, *R. Brown*. The specimens of *H. foliatum* seem to me to represent a rather luxurious form of *H. bracteatum*, with larger, more distinctly petiolate bracts.

Var. *leptostachyum*. Diffuse and much branched, 1 ft. long or more. Leaves shortly petiolate, acute. Style rather shorter.

Queensland. Cape York, *Daemel*.

15. **H. conocarpum**, *F. Muell. in Herb. Hook.* Much branched, with a hard base but perhaps annual, hoary with appressed hairs, and the leaves, bracts, and calyx-segments copiously ciliate with long spreading hairs. Leaves sessile, lanceolate or almost linear, the margins slightly recurved, the lower ones above $\frac{1}{2}$ in. long, the upper ones small. Spikes simple or once-forked, the leafy bracts lanceolate, at least as long as the calyx. Calyx-segments about 2 lines long, the outer ones lanceolate, the inner narrow, all densely ciliate, especially at the base. Corolla-tube slender, nearly as long as the calyx, ventricose above the middle, the throat pubescent inside. Anthers acuminate, the points cohering at the tips. Style long and slender, the stigmatic cone small. Nuts only one ripening in each calyx in all those examined, rather large with an acutely conical point, slightly scabrous. Albumen scanty as in all the allied species, but the embryo very much curved, not straight as in the species that ripen the four nuts.

N. Australia. Sturt's Creek, *F. Mueller.*

H. 22. *Caspatum*, F. *laetis*. Herb. Much branched and very hispid. Leaves on rather long petioles, ovate, acute or obtuse, rugose, with undulate margins, $\frac{3}{4}$ to $1\frac{1}{2}$ in. long. Spikes dense, forked or simple, very hispid, without bracts. Flowers large as in *H. asperinum*. Calyx-segments linear, 2 lines long at the time of flowering, 3 lines when in fruit, one usually rather larger than the others. Corolla-tube hispid, scarcely exceeding the calyx, the throat glabrous inside; lobes nearly as long as the tube. Anthers oblong, very shortly acuminate. Style filiform; stigmatic cone long and narrow, but shorter than the style. Nuts much shorter than the calyx, the seed-bearing part tuberculate, but one side, almost one half, of each nut smooth and empty.

N. Australia. N.W. coast, *Bynoe*; Hammersley Range, *Maitland Brown*. The leaves are nearly those of *H. europæum*, but much more rugose; the flowers more like those of *H. asperinum*.

BORAGINACEAE

Heliotropum cunninghamii
Benth.

21. *A. diversifolium*, F. Muell. in *Herb. Hook.* Stems much branched and decumbent at the base, in some specimens apparently annual in others evidently perennial and almost woody at the base, the slender flowering branches extending to from 3 or 4 in. to above twice that height strigose with appressed hairs as well as the foliage. Leaves crowded in the lower part of the stem and on the short sterile branches, petiolate, ovate or ovate-lanceolate, $\frac{1}{4}$ to $\frac{1}{2}$ in. long, those of the flowering branches small and distant, linear or linear-lanceolate. Flowers small, distant, forming long slender interrupted spikes, with a few small bracts, usually much below each flower. Calyx-segments lanceolate, acute, strigose, above 1 line long. Corolla-tube $1\frac{1}{2}$ lines long, ventricose above the middle, shortly bearded in the throat, the lobes shorter than the tube. Anthers acuminate, the points cohering by the minutely-hairy tips. Style long and filiform, the stigmatic ring undulate or lobed, with a short central cone. Nuts very hispid, with a deep cavity on each side of the central angle of the inner face.

N. Australia. Cygnet Bay, N.W. coast, A. Cunningham, Bynoe; Sturt's Creek, F. Mueller.

9. **H. epacrideum**, *F. Muell. in Herb. Hook.* An erect, hard, much-branched annual of 6 to 8 in., looking almost woody at the base, the branches rather softly pubescent or villous. Leaves crowded, sessile, ovate or lanceolate, mostly obtuse, with nerve-like somewhat recurved margins, ciliate with rigid hairs, 2 to 3 or rarely 4 lines long. Flowers few, scattered, sessile amongst the upper leaves, scarcely forming leafy spikes. Calyx-segments ovate, obtuse, ciliate, about $1\frac{1}{4}$ lines long. Corolla very villous, the tube very short, the throat glabrous inside; lobes longer than the calyx, convolute towards the end. Anthers very shortly acuminate. Stigma very broad and thick, almost sessile on the ovary, with an exceedingly short truncate and pubescent central cone.

N. Australia. Sturt's Creek, *F. Mueller.*

2. **H. europæum**, Linn.; DC. Prod. ix. 534. An erect divaricately-branched or spreading rather hard annual, scabrous-pubescent or hirsute, rarely above 1 ft. high. Leaves on rather long petioles, oval, obtuse, entire but undulate when young, green on both sides, the principal veins very prominent underneath, $\frac{3}{4}$ to $1\frac{1}{2}$ in. long. Spikes once-forked or rarely simple, hirsute, without bracts. Calyx-segments lanceolate, hirsute, about 1 line long. Corolla white, the tube about 1 line long, the throat glabrous inside, the lobes shorter than the tube. Anthers obtuse. Style shorter than the stigmatic cone, which is usually pubescent. Nuts pubescent.—*H. glandulosum*, R. Br. Prod. 493; DC. Prod. ix. 542; *H. lacunarium*, F. Muell. in Hook. Kew Journ. viii. 167, and in Trans. Phil. Soc. Vict. i. 20.

N. S. Wales. Lagoons on the Murray, Murrumbidgee, and Darling rivers, *F. Mueller*.

S. Australia. Head of Spencer's Gulf, *R. Brown*; in the interior, *M'Donnell Stuart*.

The species is very abundant in the Mediterranean region of the northern hemisphere, extending eastward to Afghanistan and westward to the Canary Islands. I can find no character to distinguish the Australian specimens from the northern ones. Brown's specimens have a somewhat different aspect, but they are evidently stunted, gathered late in the season, in fruit, and retaining only the small leaves of the smaller branches, and might be easily matched amongst old autumn specimens from the dry wastes of southern Europe.

6. ***H. fasciculatum***, *H. Br. Prod.* 494. An erect hard annual, looking almost woody at the base, with rigid divaricate branches and hispid with rigid, half-spreading hairs. Leaves rather crowded, sessile, linear-lanceolate or lanceolate, acute, with thickened nerve-like rigidly ciliate margins, all except a few on the main stem under $\frac{1}{4}$ in. long. Flowers few, scattered, sessile amongst the upper floral leaves, scarcely forming leafy spikes. Calyx-segments lanceolate, rather acute, hispid, above 1 line long. Corolla hirsute, the tube rather longer than the calyx, the throat glabrous inside. Anthers ovate-triangular, scarcely acuminate. Style terete, more than twice as long as the ovary; stigma very broad, the thick cone rather shorter than the style.—DC. *Prod.* ix. 547.

N. Australia. Rocky sandstone ranges, Victoria river, *F. Mueller*; islands of the Gulf of Carpentaria, *R. Brown*.

BORAGINACEAE

Heliotropum flaviflorum

W.V. Fitzg.

BORAGINACEAE

Heliotropium heteranthum

10. **H. ovatum**, FORST. ; R. BR. PROD. 493. A procumbent or diffuse annual, hoary or white all over with appressed rigid or silky hairs. Leaves petiolate, oval obovate or oblong, very obtuse in the common form, entire, the veins not very prominent, mostly $\frac{3}{4}$ to 1 in. long. Spikes rather slender, simple or once-forked, without bracts. Calyx-segments hirsute, not 1 line long, one much broader than the other four. Corolla-tube hirsute, not 1 line long, the throat bearded inside with a ring of reflexed hairs sometimes reduced to very few; lobes rather shorter than the tube. Anthers inserted below the middle of the tube, ovate, acuminate, the points nearly as long as the cells and usually cohering at the tips by minute terminal tufts of hairs. Stigma with a linear-conical point, longer than the very short style. Nuts small, hispid.—*H. coromandelianum*, Retz; DC. Prod. ix. 541; Wight, Ic. t. 1388.

N. Australia. Victoria river, *P. Mueller*; islands of the Gulf of Carpentaria and opposite mainland, *R. Brown, Henne, Landsborough*.

Queensland. Port Denison, *Fitzalan*; Rockingham and Edgecombe Bays, *Dallachy*; Rockhampton, *O'Shanesy*; Broad Sound, Nerakool Creek, Bowen river, *Bowman*.

S. Australia. Cooper's Creek, *Howitt's Expedition*; all over central Australia, *M'Douall Stuart*.

Var. *oblongifolium*, DC. Erect slender and not much branched, the leaves narrower and less obtuse.—*H. gracile*, R. Br. Prod. 493.—Islands of the Gulf of Carpentaria, *R. Brown*; Keppel Bay, *Thozet*.

The species is common in tropical and northern Africa and East India.

BORAGINACEAE

Heliotropum paniculatum

11. **H. strigosum**, *Willd.*; *DC. Prod.* ix. 546. An erect or diffuse much-branched annual, more or less hoary or sprinkled with appressed rigid hairs. Leaves linear, obtuse or scarcely acute, with revolute margins, under 1 in. long. Flowers small, distant, forming slender interrupted scarcely scorpioid spikes, interspersed with small bracts, at least in the lower part. Calyx-segments about 1 line long, strigose-hispid, rather obtuse, the outer ones broader than the inner. Corolla-tube not exceeding the calyx, slightly swollen round the anthers, the throat bearded inside; lobes rather shorter than the tube. Anthers acuminate, cohering by the tips of the points. Style short, the stigmatic cone broad, about as long as the style. Nuts nearly globular, shortly pubescent.

N. Australia. Cygnet Bay, N.W. coast, *A. Cunningham*; Hooker's Creek, *F. Mueller*.

Queensland. Bowen river, *Bowman*.

The species is widely spread over the warmer regions of northern Africa and western Asia.

18. **H. tenuifolium**, *R. Br. Prod.* 494. Stems erect, branching, hard or almost woody at the base, 1 ft. high or more, more or less hoary as well as the foliage with short appressed hairs. Leaves linear, acute or almost obtuse, with revolute margins, $\frac{3}{4}$ to $1\frac{1}{2}$ in. long. Flowers distant, forming interrupted once- or twice-forked spikes, interspersed especially at the base with a few bracts, which are rarely entirely wanting. Calyx glabrous or strigose, the segments very acute, about 2 lines long, the 2 outer ones often larger than the others. Corolla-tube about as long as the calyx, ventricose above the middle, shortly bearded in the contracted throat, the limb nearly as long as the tube. Anthers acuminate, the points cohering by their minutely hairy tips. Style slender, the stigma broadly 4-lobed with a small central cone. Fruit tipped by the persistent base of the style, the nuts slightly scabrous-pubescent. Embryo usually curved.—*DC. Prod.* ix. 547.

N. Australia. Victoria river, *F. Mueller*; islands of the Gulf of Carpentaria, *R. Brown*, and on the main land, *Landsborough*.

Queensland. Suttor river, *F. Mueller, Bowman*; Bowen river, *Bowman*.

5. **H. undulatum**, *Vahl*; *DC. Prodr.* ix. 536. Stems much branched, diffuse or ascending, hard and almost woody at the base, scabrous-pubescent and hispid with spreading hairs. Leaves shortly petiolate, oval-oblong, lanceolate or almost linear, obtuse, with undulate recurved margins, very rugose. Spikes at first dense, at length elongated, once- or twice-forked or rarely simple, without bracts. Calyx-segments nearly equal, about $\frac{3}{4}$ line long. Corolla-tube as long as the calyx, the throat glabrous inside; lobes shorter than the tube. Style shorter than the long stigmatic cone. Nuts rugose, above 1 line long.—*H. arenarium*, *F. Muell. Fragm.* vi. 116.

N. Australia. Nicholson and Albert rivers, *F. Mueller*.

S. Australia. Lake Gregory, *Babbage's Expedition*.

W. Australia. Murchison river, *Oldfield, Drummond, 6th Coll. n.* 134.

The species is common in northern Africa and W. Asia, extending from the Cape de Verd Islands to Affghauistan. I can find no difference whatever in the Australian specimens except that the nuts are rather larger, but their size is variable in the African specimens.

11. **II. ventricosum**, *H. Br. Prod.* 494. An erect corymbosely-branched annual of $\frac{1}{2}$ to 1 ft., becoming diffuse when old, hirsute with rigid strigose or spreading hairs. Leaves narrow-linear, acute, with revolute margins, rarely above $\frac{1}{2}$ in. long. Flowers in short compact spikes, interspersed with long leaf-like bracts, all as well as the calyxes very hispid. Calyx-segments narrow, shorter than the corolla-tube. Corolla-tube about 2 lines long, slender to above the middle, ventricose below the throat, which is pubescent inside. Anthers small, acuminate, the points connected by the minutely hairy tips. Style long and filiform, with a short stigmatic cone. Fruit tipped by the persistent base of the style, the nuts small, minutely strigose or nearly glabrous.—*DC. Prod.* ix. 547.

N. Australia. Depot Creek, Victoria river, *F. Mueller*; Gulf of Carpentaria, *R. Brown*; Port Essington, *Armstrong, Leichhardt*.
Queensland. Port Denison, *Fitzalan*.

BORAGINACEAE

Newcastelia cladotricha

5. *TOURNEFORTIA*, Linn.

Calyx deeply divided into 5 segments. Corolla-tube cylindrical; lobes 5, spreading, imbricate or induplicate in the bud. Stamens inserted in the tube; anthers included. Ovary entire, 4-celled, with 1 pendulous ovule in each cell; style terminal, entire, the stigmatic summit entire or notched, surrounded by a prominent fleshy ring (except in *T. sarmentosa*). Fruit a drupe, with 4 1-seeded pyrenes, either quite distinct or more or less cohering in pairs or quite united in a 4-celled putamen. Seeds with or without albumen, the cotyledons not folded.—Trees shrubs or woody climbers, rarely (in species not Australian) almost herbaceous, tomentose villous or rarely almost glabrous. Leaves undivided and entire. Flowers usually white or nearly so, in unilateral spikes, arranged in dichotomous cymes, usually without bracts. Fruits small.

The genus is widely distributed over the tropical regions of the New and the Old World. Of the three Australian species, two are in the Indian Archipelago, and extend from the islands of the African coast to those of the South Pacific, the third is endemic. The genus is a natural one, distinguished from *Heliotropium* by the drupaceous fruit, from *Ehretia* chiefly by the style. The fleshy annulus round the summit, which *Tournefortia* has in common with *Heliotropium*, and which Fresenius (in Mart. Fl. Bras.) considers as an absolute character of the proposed Order of *Heliotropiceæ*, is, however, wanting in *T. sarmentosa*.

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| Corolla-lobes longer than the tube, imbricate in the bud. Foliage and inflorescence very densely silky-tomentose | 1. <i>T. argentea</i> . |
| Corolla-lobes shorter than the tube, plicate and induplicate in the bud. Foliage tomentose hirsute or nearly glabrous. | |
| Corolla-lobes rather acute. Stigma surrounded by a fleshy ring. Erect tree or shrub | 2. <i>T. mollis</i> . |
| Corolla-lobes obtuse or retuse. Stigma not thickened. Branches long weak or climbing | 3. <i>T. sarmentosa</i> . |

2. *E. mollis*, *E. muelleri*. *Frugm.* 1. 55. An erect not much branched shrub of several feet, the branches and foliage velvety-pubescent. Leaves from broadly ovate to ovate-lanceolate, obtuse or obtusely acuminate, often rugose, 2 to 4 in. long or longer on barren shoots. Cymes dichotomous, pedunculate, the pedicels exceedingly short, without bracts. Calyx-segments lanceolate, pubescent, about 1 line long. Corolla pubescent outside, the tube $1\frac{1}{2}$ to 2 lines long, somewhat contracted upwards; lobes broad, much plicate, rather acute, about one-third as long as the tube, induplicate in the bud. Ovary tapering into a short style, the stigma with a thick broad fleshy ring, round a slightly-depressed obscurely 2-lobed centre. Fruit nearly glo-bular, above 2 lines diameter when full grown, containing either 4 pyrenes or 2 pyrenes each one readily divisible into 2. Seeds with a rather thick al-bumen.

N. Australia. Montague Sound, *A. Cunningham*.

Queensland. Burdekin river, *P. Mueller*; Edgcombe Bay, Port Denison, and Her-
bert river, *Dallachy*.

7. TRICHODESMA, R. Br.

Calyx deeply divided into 5 segments. Corolla with a very short tube, almost rotate, with 5 acuminate lobes contorted in the bud. Stamens 5, inserted in the throat, the filaments very short and flat; anthers erect, linear, ciliate, cohering by the hairs in a cylinder contracted into a long spirally-twisted beak formed of the terminal appendages of the anthers. Ovary entire, 4-celled, with 1 pendulous ovule in each cell; style terminal, filiform, with a minute stigma. Fruit of 4 1-seeded nuts, attached by their whole inner face, which when detached leave 4 cavities in the thick persistent prominently 4-angled axis. Seeds without albumen; embryo straight, with a very short radicle.—Coarse hispid hoary or silky herbs. Leaves opposite or alternate, usually entire. Flowers in terminal one-sided simple or rarely forked racemes, usually accompanied by bracts.

The genus comprises very few species dispersed over the warmer regions of Asia and Africa. The only Australian species extends over nearly the whole range of the genus. Formerly included in the genus *Borago*, and still usually referred to the tribe of Borageae, *Trichodesma* differs in the entire ovary with a terminal style, and is in fact very nearly allied to *Halimolobos*. The fruit, however, does not, as in that genus, separate into distinct carpels, but the endocarp, hardening round each seed, forms 4 pyrenes or nuts, which detach themselves from the persistent remainder of the pericarp.

BORAGINACEAE
Trichodesma indicum

1. **T. zeylanicum**, *R. Br. Prod.* 496. A coarse hard annual, usually erect, not much branched, and often attaining several feet, the indumentum very various, sometimes close and hoary or longer and silky, more frequently consisting of short rigid appressed hairs or long loose scattered ones, or the various hairs intermixed, the longer ones usually arising from prominent tubercles. Leaves in the Australian specimens mostly alternate or the lower ones opposite, more rarely nearly all (as is usually the case in Indian specimens) opposite, linear, linear-lanceolate or rarely broadly oblong-lanceolate, obtuse, often 3 to 4 in. long, the margins usually recurved. Flowers pale blue, in simple racemes, with a leafy bract under each always shorter than the pedicel. Calyx-segments lanceolate, acuminate, $\frac{1}{4}$ to $\frac{1}{2}$ in. long at the time of flowering, narrow or broad, valvate or reduplicate, often cohering at the base, sometimes much enlarged round the fruit, but without the reflexed auricles of *T. indicum*. Corolla-lobes broad, longer than the calyx, the points narrow, spirally-twisted in the bud as well as the long anther-points. Nuts smooth and shining.—*A. DC. Prod.* x. 172, with the synonyms adduced; *Bot. Mag.* t. 4820.

N. Australia. N.W. coast, *A. Cunningham* and others; Victoria river, *F. Mueller* islands of the Gulf of Carpentaria and adjoining mainland, *R. Brown* and others.

Queensland. Keppel and Shoalwater Bays, *R. Brown*; common from Cape York to Moreton Bay and in the interior, *A. Cunningham*, *F. Mueller*, and many others.

N. S. Wales. Between Stokes' Range and Cooper's Creek, *Wheeler*.

S. Australia. Head of Spencer's Gulf, *R. Brown*; Elder's and Flinders' Ranges, *F. Mueller*; Cooper's Creek, *Howitt's Expedition*; Mount Searle, *Warburton*.

W. Australia. Sharks' Bay, *Milne*; Murchison river, *Oldfield*, *Drummond*, 6th *Coll.* n. 133; Flinders' Bay, *Collie*.