

FLORA  
OF THE  
PRESIDENCY OF MADRAS

BY  
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LATE OF THE INDIAN FOREST DEPARTMENT

PART VI  
*SCROPHULARIACEAE TO PLANTAGINACEAE*

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## INTRODUCTION TO PART VI.

I HAVE thought it best to add a few pages to the proper number of the Part, in order to complete the Families of the GAMOPETALÆ. Part VII will therefore be able to start at once with the MONOCHLAMYDÆÆ.

Such Supplementary Notes as are necessary for Parts V and VI will soon appear in the 'Kew Bulletin,' but they are not many.

J. S. GAMBLE.

Liss: March, 1924.



17. *Microcarpaea*, R. Br.

A very small slender diffuse or creeping ~~neatly~~ glabrous herb. *Leaves* opposite, sessile, oblong, obtuse, entire. *Flowers* minute, axillary, solitary, sessile; bracteoles 0. *Calyx* tubular, 5-angled, 5-lobed, the ribs thick. *Corolla* very short; tube broad; lobes 5, broad, spreading, the 2 upper partially connate. *Stamens* 2 perfect; filaments filiform; anthers confluent, 1-celled; staminodes 0. *Ovary* many-ovuled; style filiform; stigma capitate recurved. *Fruit* a small ovoid loculicidal capsule, included in the calyx, valves separating from the placentiferous dissepiment. *Seeds* very small, ellipsoid.

*MICROCARPAEA MUSCOSA*, R. Br.; F. B. I. iv. 287.

W. Coast, S. Canara to Travancore, in marshy places.

A minute tufted slender herb, the branches interlacing, the stems rooting at the nodes, the leaves about .25 in. long.

18. *Peplidium*, Delile.

Small prostrate or creeping glabrous herbs. *Leaves* opposite, fleshy, entire, more or less obovate. *Flowers* small, axillary, subsessile, 1-3-nate. *Calyx* tubular, 5-ribbed, obtusely 5-lobed, enlarged and ovoid-globose in fruit. *Corolla*-tube short; lobes 5, broad, subequal or one broader. *Stamens* 2, included; filaments broad, curved; anthers 1-celled; staminodes 0. *Ovary* many-ovuled; style short; stigma large, flat, recurved over the anthers. *Fruit* a globose or ovoid capsule, the walls fragile, bursting irregularly, the placentiferous dissepiment winged. *Seeds* numerous, angular, truncate, dotted.

*PEPLIDIUM MARITIMUM*, Wettst. *P. humifusum*, Del.; F. B. I. iv. 287. *Microcarpaea cochlearifolia*, Sm.; Wight in Hook. Bot. Misc. iii. Suppl. t. 29.

E. Coast Districts, on the margins of tanks and in similar wet places; W. Gháts, swamps and ponds in the Pulney Hills (Bourne).

A small prostrate herb, rooting at the nodes, the small flowers pale pink, the capsules bursting very easily, the leaves orbicular obovate or spatulate.

19. *Glossostigma*, Arn.

Minute glabrous creeping herbs. *Leaves* opposite or fascicled, linear or spathulate, entire. *Flowers* minute, axillary, solitary, bracteoles 0. *Calyx* campanulate, obtusely 3-4-lobed. *Corolla*-tube short; lobes 5, subequal, spreading. *Stamens* 2 (in the Indian species) or 4; filaments filiform; anthers with diverging cells, their tips confluent. *Ovary* many-ovuled; style short; stigma dilated, spathulate, recurved. *Fruit* a small loculicidal capsule, enclosed in the calyx; valves entire, separating from the columnar not winged placentiferous axis. *Seeds* minute, ellipsoid.

GLOSSOSTIGMA SPATHULATUM, Arn.; F. B. I. iv. 288. *Microcarpaea spathulata*, Benth.; Wight in Hook. Bot. Misc. ii. Suppl. t. 4.

Carnatic, margins of tanks and other wet places.

A minute tufted herb creeping and rooting at the nodes, the branches much interwoven. The flowers in Wight's fig. are pale pink.

20. *Scoparia*, Linn.

Herbs or undershrubs, with twiggy branches. *Leaves* opposite or whorled, entire or toothed, punctate. *Flowers* small, white or yellow, axillary, solitary or binate; bracteoles 0. *Calyx* small, 4-5-partite, the lobes imbricate. *Corolla* rotate, 4-lobed, the throat densely bearded; lobes obtuse, subequal. *Stamens* 4, subequal; filaments filiform; anther-cells distinct, parallel or diverging. *Ovary* with many ovules; style subclavate; stigma notched or truncate. *Fruit* a small globose or ovoid septicidal capsule, enclosed in the calyx, the valves membranous, separating from the placentiferous axis. *Seeds* many, angled, scrobiculate.

SCOPARIA DULCIS, Linn.; F. B. I. iv. 289.

All plains Districts and to about 3,000 ft. on dry hills, a tropical American plant now run wild and very common in India, on waste lands and fallow fields.

A glabrous undershrub sometimes up to 3 ft. in height, with small white flowers and lanceolate or elliptic-lanceolate coarsely serrate leaves.

21. *Veronica*, Linn.

Herbs or shrubs, rarely trees. *Leaves* opposite, the upper ones only or sometimes all occasionally alternate. *Flowers* solitary axillary, or in terminal or axillary racemes, bracteate but not bracteolate. *Calyx* 4-5-partite, the lower lobes connate, the upper if present smaller. *Corolla* rotate or shortly salver-shaped, blue purple or white; lobes 4 or 5, the upper and lower usually narrower. *Stamens* 2, exserted, adnate to the corolla-tube on either side of the upper lobe; anther-cells confluent at their tips. *Ovary* many- or few-ovuled; style simple; stigma subcapitate. *Fruit* a compressed or turgid 2-grooved capsule, dehiscing in various ways. *Seeds* many or few, smooth or rugose, sometimes winged.

Prostrate herbs, the leaves of flowering branches alternate; flowers solitary in the leaf-axils:—

Pedicels about as long as the leaves; capsule-cells globose, turgid, hispid; leaves ovate-cordate or orbicular, coarsely serrate, up to .75 in. in diam. .... 1. *agrestis*.

Pedicels much longer than the leaves; capsule-cells flattened, reticulate; leaves ovate, coarsely crenate-serrate, up to 1.5 in. long

2. *persica*.

Erect herbs, capsules broadly obcordate:—

Flowers in long terminal bracteate racemes; leaves very small, ovate-cordate, crenate, subsessile, those of the flowering raceme alternate ..... 3. *arvensis*.

Flowers in axillary slender racemes; leaves rather large, ovate, crenate-serrate, truncate at base, opposite ..... 4. *javanica*.

1. *VERONICA AGRESTIS*, Linn.; F. B. I. iv. 294.

Nilgiri Hills, usually above 5,000 ft., a weed of cultivation, probably introduced.

A prostrate annual weed with small blue flowers.

2. *VERONICA PERSICA*, Poir.; F. B. I. iv. 294.

Nilgiri Hills, about Ootacamund, at 7,000 ft., a weed of cultivation, probably introduced but likely to spread as in other countries.

A prostrate annual weed with rather large blue flowers.

3. *VERONICA ARVENSIS*, Linn.; F. B. I. iv. 296.

Nilgiri Hills, above 6,000 ft., a weed of cultivation and waste land, probably introduced.

An erect annual weed, with very small blue or white flowers.

4. *VERONICA JAVANICA*, Bl.; F. B. I. iv. 296.

W. Gháts, Nilgiris, Pulneys and hills of Travancore above 6,000 ft.

A pubescent annual herb with many-branched slender stems and small flowers and capsules.

22. *Buchnera*, Linn.

Annual rigid herbs, black when dry. *Leaves*: lower opposite, broad; upper alternate, narrow. *Flowers* sessile, axillary or in bracteate spikes, bracteoles 2. *Calyx* tubular, 5-lobed, 10-ribbed, the lobes short. *Corolla*-tube slender; lobes 5, flat, subequal, spreading, the upper inmost in bud. *Stamens* 4, didynamous, included; anthers 1-celled, vertical, dorsifixed, the connective sometimes mucronate. *Ovary* with many ovules; style thickened or clavate above; stigma entire or notched. *Fruit* an oblong loculicidal capsule; valves entire, coriaceous, separating from the placentas. *Seeds* very many, angled, obovoid or oblong.

*BUCHNERA HISPIDA*, Ham.; F. B. I. iv. 298; Wt. Ic. t. 1413.

Most Forest Districts, in grassy places.

An erect hispid herb with pale purple flowers growing to about 18-24 in. in height, the lower leaves obovate or oblong, coarsely serrate, the upper lanceolate or linear.

23. *Striga*, Lour.

Herbs, usually scabrid, discoloured or black when dry, generally parasitic. *Leaves*: the lower opposite, the upper alternate, linear, entire, rarely toothed, sometimes reduced to scales. *Flowers* axillary or the upper in bracteate spikes; bracteoles usually 2. *Calyx* tubular, the tube with 5, 10 or 15 ribs; lobes 5. *Corolla*-tube slender, abruptly incurved at or above the middle; limb spreading, the upper lip inner in bud, usually short, notched or 2-fid, the lower 3-lobed. *Stamens* 4, didynamous, included; anthers 1-celled, vertical, dorsifixed, the connective sometimes mucronate. *Ovary* many-ovuled; style slender, thickened upwards; stigma entire. *Fruit* an oblong obovoid or subglobose capsule, loculicidal, the valves entire septiferous, separating

from the placentas. *Seeds* very many, ovoid or oblong, usually reticulate.

Calyx 5-ribbed, the ribs running to the apex of each lobe :—

A reddish-brown root parasite with tuberous rootstock, often many branched ; leaves scale-like ; corolla pink .....1. *orobanchoides*.

A green plant, not recorded as parasitic, the root not tuberous, little branched ; leaves linear with crustaceous glandular scabrid margins ; corolla white .....2. *densiflora*.

Calyx 10-ribbed, occasionally 15-ribbed, but the secondary ribs always ending at the sinus between the lobes, the ribs with stiff hairs on bulbous bases ; an erect parasitic herb, little branched ; leaves linear ; corolla yellow or sometimes white .....3. *lutea*.

Calyx 15-ribbed, all ribs continued to the apex of the lobe :—

Corolla small, white, tube under .75 in. long, limb about .5 in. in diam. ; calyx-ribs usually with crustaceous glands bearing minute spines and sometimes almost quite white ; leaves linear, up to 2 in. long and sometimes with 1-2 teeth on the margins ; parasitic

4. *euphrasioides*.

Corolla large, tube over .75 in. long, limb nearly 1 in. in diam. ; calyx slender, the lobes long acuminate with close glandular and pubescent ribs ; leaves linear, up to 2 in. long, narrow

5. *Masuria*.

1. *STRIGA OROBANCHOIDES*, Benth. ; F. B. I. iv. 299 ; Wt. Ic. t. 1414.

Deccan, in most Districts ; Carnatic, in Tinnevely ; W. Gháts, in S. Canara and Malabar, up to 6,000 ft. in the hills, usually on red and gravelly soils.

A parasitic plant found on the roots of various plants, chiefly on *Lepidagathis* in Acanthaceae (Wight and others), also on *Euphorbia antiquorum* (Fischer), *Dysophylla* (Barber). The pink corolla has a white spot at the base of each lobe. The calyx is hispid-pubescent, the flowers in dense terminal spikes with short bracts.

2. *STRIGA DENSIFLORA*, Benth. ; F. B. I. iv. 299.

N. Circars, Deccan and Carnatic.

An erect scabrid herb, the leaves up to 1.5 in. long, very narrow, the flowers in slender spikes with long bracts and linear bracteoles, the calyx with crustaceous glandular subulate lobes.

3. *STRIGA LUTEA*, Lour.; F. B. I. iv. 299.

All Districts and up to 7,000 ft. in hills, in dry grassy places and among crops.

An erect scabrous hirsute branching parasitic herb, usually pale when dry, the leaves up to 1·5 in. long, very narrow and rough, the flowers in slender spikes with long bracts and minute bracteoles. Watt in *Comml. Prod. Ind.* records it as parasitic and harmful on sugarcane and Sorghum. I have found it myself on the latter.

4. *STRIGA EUPHRASIOIDES*, Benth.; F. B. I. iv. 299; Wt. Ic. t. 855.

Most Districts, both in the plains and up to about 4,000 ft. in the hills.

A very variable erect herb either slender and rather short, turning black when dry, or stout and branching and greenish-grey when dry. Duthie (*Fl. Gang. Pl. ii.* 157) says that it is parasitic and destructive in crops of sugarcane and Sorghum, but this is not recorded from Madras. The leaves reach 2 in. in length and are scabrous.

5. *STRIGA MASURIA*, Benth.; F. B. I. iv. 300.

Carnatic, at Guindy near Madras (Shuter).

A slender erect scabrid herb.

24. *Alectra*, Thunb.

Erect rigid usually scabrid herbs, black when dry. *Leaves* opposite or alternate, sometimes reduced to scales. *Flowers* in terminal spikes or racemes, bracteate and bracteolate. *Calyx* campanulate, 5-lobed, the lobes valvate or open in bud. *Corolla* tube broad, the limb oblique; lobes 5, spreading, the lower outer in bud. *Stamens* 4, didynamous, the anthers touching in pairs; cells parallel, their bases mucronate. *Ovary* 2-celled; ovules very many; style simple; stigma elongate, oblong-clavate. *Fruit* a subglobose or ovoid loculicidal capsule, the valves entire, bearing the placentas. *Seeds* very many, minute, linear-cuneate, the testa lax, reticulate longitudinally.

*ALECTEA THOMSONI*, Hook. f.; F. B. I., iv. 297.

N. Circars, Ethakonda in Godavari, 1,700 ft. (V. Narayan-swami).

An erect stiff herb with stems having the leaves reduced to green brown or purple scales, and corolla yellow with red

nerves. It is apparently parasitic and usually on Acanthaceae like *Strobilanthes auriculatus*.

### 25. *Rhamphicarpa*, Benth.

Erect glabrous herbs, drying black. *Leaves*: lower opposite, upper alternate, narrow, entire or pinnatisect. *Flowers* axillary and pedicelled or in bracteate racemes; bracteoles 1-2 or 0. *Calyx* campanulate with 5 acuminate lobes. *Corolla*-tube slender, elongate, straight or incurved; lobes 5, broad, spreading, subequal or the upper connate. *Stamens* 4, didynamous, included; anthers 1-celled, vertical, dorsifixed. *Ovary* many-ovuled; style slender, thickened above; stigma simple. *Fruit* a capsule compressed at right angles to the septum, usually beaked, loculicidal; valves septiferous, placentas large. *Seeds* small, obovoid or oblong; testa reticulate.

*RHAMPHICARPA LONGIFLORA*, Benth.; F. B. I. iv. 300; Wt. Ic. t. 1415.

W. Coast, in S. Canara, in marshy pastures.

An erect herb reaching 2-12 in. in height with white corolla and beaked capsule, the leaves pinnatisect with filiform segments.

### 26. *Sopubia*, Ham.

Erect perennial herbs. *Leaves* opposite, or the upper alternate, narrow, linear trifid or pinnatisect. *Flowers* in spikes or racemes with leafy bracts; bracteoles 2. *Calyx* campanulate, 5-lobed. *Corolla*-tube funnel-shaped, dilated at the throat; lobes 5, spreading, the 2 upper inmost in bud. *Stamens* 4, didynamous, the anthers meeting in pairs; one anther-cell fertile, longitudinally dehiscent, the other small and imperfect. *Ovary* many-ovuled; style slender; stigma thickened and tongue-shaped, obtuse or capitate at apex. *Fruit* an ovoid or oblong loculicidal capsule, the valves entire or bifid, separating from the dissepiment which bears large placentas. *Seeds* numerous, oblong or cuneate, often truncate; testa lax, striate or reticulate.

*Calyx*-teeth subulate, very slender, glabrous within, longer than the ribbed tube; corolla purple, 1-1.5 in. long, the lobes broad, spreading; sterile anther-cells acuminate; lower leaves pinnatisect 1-1.5 in. long,

the lobes filiform, these passing gradually into trifold and then to simple floral bracts; capsule oblong, seeds truncate, striate

1. *delphinifolia*.

Calyx-teeth deltoid-ovate, acute, woolly within, equalling the tube; corolla yellow with a purplish eye, under .5 in. long, the limb rotate; sterile anther-cells obtuse; lower leaves trifold, .5-1.5 in. long, the lobes linear or filiform, passing into linear floral bracts; capsule emarginate, seeds oblong, spirally reticulate ..... 2. *trifida*.

1. *SOPUBIA DELPHINIFOLIA*, G. Don; F. B. I. iv. 302. *Gerardia delphinifolia*, Roxb. Cor. Pl. t. 90.

Deccan, Carnatic and E. side of W. Gháts, up to 7,000 ft., less common on W. Coast, in rocky places in the forests, fields and grassy slopes.

A pretty erect herb, reaching 1-3 ft. in height: Fyson says it is a root parasite.

2. *SOPUBIA TRIFIDA*, Ham.; F. B. I. iv. 302.

N. Circars, Mahendragiri in Ganjam at 4,500 ft. (Gamble); Deccan, on Ramandrug in Bellary (Beddome); W. Gháts, Bababudan Hills of Mysore, Nilgiris, Anamalais, Pulneys and Travancore Hills at 3,000-7,000 ft. in grassy pasture land.

A pretty herb, 1-2 ft. high.

27. *Micrargeria*, Benth.

Rigid scabrid erect herbs, black when dry. *Leaves* alternate or the lower opposite, entire or pinnatifid. *Flowers* small, in the upper axils or in long terminal bracteate spikes or racemes; bracteoles 2. *Calyx* campanulate or hemispheric; lobes 5, broad. *Corolla*-tube dilated above, incurved; lobes 5, broad, spreading, entire, subequal, the 2 upper inner in bud. *Stamens* 4, didynamous, included; anthers free, meeting in pairs, cells distinct, subequal, attached by their tips. *Ovary* many-ovuled; style slender; stigma, tongue-shaped. *Fruit* a small globose loculicidal capsule; the valves separating from 2 small globose placentas. *Seeds* numerous, oblong-cuneate; testa lax.

*MICRARGERIA WIGHTII*, Benth; F. B. I. iv. 303; Wt. Ic. t. 1417.

Deccan, in Mysore and Coimbatore; Carnatic in Tinnevely. An erect herb reaching 18 in. high, with small corolla and



pubescent much cut leaves, the lobes filiform in upper ones, spatulate in lower.

28. *Centranthera*, R. Br.

Scabrid herbs, probably more or less parasitic. *Leaves* opposite or the upper alternate, entire or toothed. *Flowers* axillary or in bracteate spikes or racemes; bracteoles 2. *Calyx* spathaceous, split on one side, compressed, entire or shortly 3-5-lobed. *Corolla*-tube long, tubular or funnel-shaped, incurved and dilated above; limb oblique; lobes subequal, spreading, the 2 upper inside in bud. *Stamens* 4, didynamous, included; anthers meeting in pairs, cells transverse, spurred or mucronate at base; one cell often imperfect. *Ovary* with many ovules; style simple, dilated above; stigma tongue-shaped, acute. *Fruit* an ovoid or subglobose loculicidal capsule; valves entire, the placentas in the middle. *Seeds* very many, conical or cuneate; testa lax, reticulate.

*Leaves* oblong; corolla funnel-shaped; leaves hispid, the hairs on tubercular bases; seeds conical, the testa spirally reticulate :—

*Calyx* .25 in. long, ovate, acute; corolla rose-coloured or white, up to .75 in. long; leaves elliptic- or linear-oblong, up to 1.5 in. long; lower filaments pilose ..... 1. *hispida*.

*Calyx* .5 in. long or longer, oblong, acute; corolla white with a brownish-red blotch in the tube, .75-1 in. long; leaves oblong, the tubercles conspicuous, .5-1 in. long; all filaments pilose

2. *indica*.

*Leaves* linear, up to 1 in. long, sparsely tubercular-hispid; corolla tubular, short, yellow; calyx ovoid, .2 in. long, obtuse or subacute; filaments glabrous; seeds cuneate, truncate, the testa reticulate with shining areoles ..... 3. *humifusa*.

1. *CENTRANTHERA HISPIDA*, R. Br.; F. B. I. iv. 301; Wall. Pl. As. Rar. t. 45.

Deccan, in Mysore, up to 3,000 ft.; W. Coast, S. Canara to Travancore in wet places and rice-fields.

An erect herb reaching 2 ft. in height.

2. *CENTRANTHERA INDICA*, Gamble n. comb. *C. procumbens*, Benth.; F. B. I. iv. 301; Trimen Fl. Ceyl. t. 68.

W. Coast in Malabar and Travancore (Wight, Fischer); S. E. Wynaad (Beddome), in wet places.

An erect diffuse herb with bright orange-coloured roots (Trimen).

3. *CENTRANTHERA HUMIFUSA*, Wall.; F. B. I. iv. 301.

E. Coast, Tada in Nellore (Bourne); W. Coast, S. Canara to Travancore, in wet places.

A diffuse small, erect or prostrate, herb.

29. *Pedicularis*, Linn.

Perennial or rarely annual semiparasitic herbs. *Leaves* alternate opposite or whorled, pinnatifid or pinnatisect. *Flowers* in bracteate terminal spikes or racemes; bracteoles 0. *Calyx* tubular or campanulate, entire or split down one side, 2-5-toothed, lateral teeth free or connate, entire or crested, lower small or 0. *Corolla* 2-lipped; tube cylindric; upper lip erect, hooded compressed obtuse acute or beaked; lower with 3 spreading or deflexed lobes. *Stamens* 4, didynamous; anthers under the upper lip meeting in pairs; cells distinct, equal, parallel, both perfect. *Ovary* many-ovuled; style slender; stigma subcapitate. *Fruit* a compressed capsule, usually more or less oblique and often beaked, loculicidal; valves often joined to the middle. *Seeds* numerous, various in shape and markings of the testa, usually reticulate.

Calyx .25-.5 in. long, cleft to near the base, the teeth crested; corolla rose-pink, .75-1 in. long, the upper lip very slightly beaked; capsule obliquely ovate-falcate, .6 in. long; leaves oblong, prominently crenate, up to 2.5 in. long, .6 in. broad, pubescent. . . . . 1. *zeylanica*. Calyx 1 in. long, tubular, the teeth crested; corolla white, 3-6 in. long with slender tube, the upper lip rounded; capsule falcate, 1 in. long; leaves pinnatifid, cut more than half way to the midrib with crenate lobes, 1.5-2.5 in. long, glandular-hairy. . . . . 2. *Perrottetii*.

1. *PEDICULARIS ZEYLANICA*, Benth.; F. B. I. iv. 317; Wt. Ic. t. 1419; Prain Ann. Calc. iii. 153. t. 14.

W. Ghâts, in all Districts at about 5,000-7,000 ft. in open grass lands in dampish localities; Shevaroy Hills of Salem.

A handsome species of which there are two forms, one erect up to about 2 ft. high, the other branching near the ground and diffuse, but they have no varietal differences.

2. *PEDICULARIS PERROTTETII*, Benth.; F. B. I. iv. 317; Wt. Ic. t. 1418; Prain Ann. Calc. iii. 119. t. 8.

W. Gháts, Nilgiris above 7,000 ft., not rare near Avalanché and Nilgiri and Makurti Peaks in the Kundahs; Anamalais above Iyerpadi, 7,000 ft. (Barber), on grass lands.

A striking species with very long corolla-tube. The host plant, if any, has not been recorded.

*Calceolaria mexicana*, Benth., is a pretty yellow-flowered weed from Mexico now naturalised on the higher parts of the Nilgiris and Pulneys, also on the hills of N. Coimbatore and the Bababudan Hills of Mysore. *Antirrhinum Orontium*, Linn., has been found as an escape in the Nilgiris, and *A. majus*, Linn., the Snapdragon, in both the Nilgiri and Pulney Hills. *Scrophularia peregrina*, Linn., a herb of Asia Minor, is found as a roadside weed in the Nilgiris (Bourne). *Digitalis purpurea*, Linn., the Foxglove, is said to have lately run wild in the Nilgiris. Many handsome-flowered species may be found in gardens, such as those of *Alonsoa*, *Angelonia*, *Maurandia*, *Pentstemon*, *Russelia*.

#### Family CVIII. OROBANCHACEAE.

Leafless root-parasites; stem usually simple, sometimes branched, the stem or branches with scales. *Flowers* hermaphrodite, irregular, solitary or in spikes or racemes; bracts large, scale-like; bracteoles 1-2 scale-like, or 0. *Calyx* spathaceous or 2-lipped or with 4 or 5 free or connate lobes. *Corolla* hypogynous, curved, usually 2-lipped, sometimes subequally 5-lobed; upper lip often arched, lower 3-lobed, throat often with 2 villous folds. *Stamens* 4, didynamous, adnate to the corolla-tube; anthers 1-2-celled, one cell often imperfect, cells frequently spurred at the base, dehiscence by slits or apical pores. *Disk* usually obscure. *Ovary* of 2 rarely 3 connate carpels, 1- rarely 2-celled; ovules many, on free or confluent parietal placentas. *Fruit* a capsule, usually 1-celled; valves 2 rarely 3. *Seeds* many, minute; testa pitted or reticulate; albumen fleshy; embryo ovoid, often undivided.

Corolla-lobes broad, subequal, spreading:—

Calyx spathaceous, split in front nearly to the base; anther-cells unequal ..... 1. *Aeginetia*.

Calyx tubular-campanulate, 5-lobed:—

Anthers 2-celled, 1 cell often imperfect, spurred at base ; stigma peltate .....2. *Christisonia*.

Anthers 1-celled, not spurred ; stigma clavate....3. *Campbellia*,

Corolla 2-lipped, upper lip 2-lobed, lower 3-lobed ; anther-cells equal

4. *Orobanche*.

### 1. *Aeginetia*, Linn.

Leafless herbs with simple or branched, naked or scaly scapes or stems. *Flowers* few, large, solitary or corymbose ; bracteoles 0. *Calyx* spathaceous, split in front nearly to the base. *Corolla*-tube broad, incurved, obscurely 2-lipped ; lobes 5, broad, spreading, the two upper connate, outer in bud. *Stamens* 4, didynamous, included ; anthers meeting in pairs with 1 perfect cell adnate to the filament not spurred below, the other absent from the upper pair, empty clavate and deflexed in the lower. *Ovary* 1-celled ; placentas 2- or more-lobed, filling the cavity, bearing ovules all over ; style slender ; stigma large, peltate. *Fruit* a partially 2-valved capsule. *Seeds* crowded, minute, reticulate.

Scape slender, naked ; corolla deep purple-red ; placentas multifid

1. *indica*.

Scape short, stout, bracteate ; corolla-tube yellow, mouth blue ;

placentas 2-lamellate.....2. *pedunculata*.

1. *AEGINETIA INDICA*, Linn. ; F. B. I. iv. 320 ; Roxb. Cor. Pl. t. 91 ; Wt. Ic. t. 895.

Hills of the N. Circars ; W. Gháts, in almost all Districts up to about 3,000 ft.

Parasitic herb of a purplish red colour, the root of interlaced fleshy fibres. It grows apparently on the roots of many different plants.

2. *AEGINETIA PEDUNCULATA*, Wall. Pl. As. Rar. t. 219 ; F. B. I. iv. 320 ; Wt. Ic. t. 1421.

W. Gháts, S. Canara to Travancore, up to 4,000 ft.

Parasitic on the roots of grasses. A reddish or yellowish herb with short stem underground and many often long branches with sheathing bracts, the calyx orange colour.

### 2. *Christisonia*, Gardn.

Fleshy parasitic herbs, the stems simple or tufted on the root-stock and bearing alternate obtuse or acute scales instead of

leaves. *Flowers* usually peduncled, with or without bracteoles. *Calyx* tubular, 2-lipped or with 5 lobes. *Corolla*-tube tubular or funnel-shaped, straight or slightly curved, the mouth with 5 nearly equal lobes or obscurely 2-lipped. *Stamens* 4, usually included; filaments stout, anthers 2-celled, one cell perfect the other imperfect and spurred, the upper pair sometimes with both cells perfect. *Ovary* 1-celled, placentas large, 2- or more-lobed, bearing all over very numerous ovules; style long; stigma large, peltate. *Fruit* a partially 2-valved capsule. *Seeds* very many, minute, testa reticulate.

Stems elongate, up to 12 in. long or longer, with few distant peduncled flowers with one bract, no bracteoles, glabrous except the corolla; anthers 2-celled, one fertile, the other sterile sharply spurred; calyx subbilabiate:—

Stem scales very small, under .25 in. long, obtuse, bracts rather longer; calyx-tube .5 to 1 in. long with triangular lobes; corolla large, up to 2.5 in. long, the lobes broad, rounded, spreading, 1.5 in. in diam. at the mouth .....1. *tubulosa*.

Stem scales oblong, up to .5 in. long, obtuse, bracts longer; calyx-tube .5-.75 in. long, the lobes triangular; corolla rather small, up to 1.5 in. long, the lobes short, obtuse, suberect, .75 in. in diam. at the mouth .....2. *Saulièrei*.

Stems short, up to about 8 in. long, glandular-hairy, with many ovate-obtuse pubescent scales, flowers up to about 10, corymbosely arranged on stout peduncles or nearly sessile, bracteoles 2, large; anthers 2-celled, one perfect, the other imperfect long and sharply spurred; calyx and corolla each tubular, glandular-hairy with equal lobes

3. *bicolor*.

Stems very short, scarcely 1 in. long or none, glabrous, with large scales; flowers crowded on stout short peduncles without bracteoles; anthers: those of longer stamens with 1 perfect cell, the other a fleshy spur; those of shorter stamens both perfect; calyx large, 2-lipped, with long acute lobes; corolla longer with equal lobes

4. *subacaulis*.

1. CHRISTISONIA TUBULOSA, Hook. f.; F. B. I. iv. 321. *Oligopholis tubulosa*, Wt. Ic. t. 1422.

W. Gháts, Mysore, Nilgiris, Anamalais, Pulneys and hills of Tinnevely and Travancore, usually at about 3,000-4,000 ft., about Courtallum on roots of bamboo (Wight), in S.E. Wynaad on rice (Gamble).

A tall parasitic herb, with large sparse flowers, the stems and calyx light brown, the flowers pink, yellowish on the lower lip.

2. *CHRISTISONIA SAULIÈREI*, Dunn in Kew Bull. 1914, 30.

W. Ghâts, Pulney Hills, at Kodaikanal, 7,000 ft. (Saulière).

A slender erect herb, like the former, but with smaller flowers and shorter peduncles.

3. *CHRISTISONIA BICOLOR*, Gardn.; F. B. I. iv. 322. *C. aurantiaca*, Wt. Ic. t. 1486; Spic. Neilgh. t. 167.

Nilgiri Hills, sholas at the head of the Ochterlony Valley at 6,000 ft., probably chiefly parasitic on Acanthaceae like *Strobilanthes*; Pulney Hills at Periyar Shola (Bourne); Bolampatti Hills of Coimbatore (Wight).

A fleshy plant with thick brownish yellow scaly stem, orange-coloured calyx and yellow corolla. The Pulney specimens are very small and differ slightly; they are said to have corolla and calyx rose-coloured.

4. *CHRISTISONIA SUBACALIS*, Gardn.; F. B. I. iv. 321; Wt. Ic. t. 1423 (corrected in text).

Tinnevely Hills, about Courtallum, probably parasitic on the roots of bamboos (Trimen in Fl. Ceyl.).

A fleshy plant, scarcely showing above ground and covered with a viscid mucilage. The flowers are white, the margins of the corolla-lobes pale blue (Wt. in MS.).

### 3. *Campbellia*, Wt.

Fleshy parasitic herbs with thick rootstock, the stems with many obtuse scales, usually much imbricate, at any rate at first. *Flowers* peduncled, in crowded heads; bracteoles 2. *Calyx* tubular-campanulate with 5 equal lobes. *Corolla* funnel-shaped, more or less bilabiate; lobes 5, the upper lip 2- the lower 3-lobed, the lobes spreading. *Stamens* 4, exserted; filaments stout; anthers 1-celled opening by a pore at the apex, the opening then extending upwards. *Ovary* 1-celled; placentas 2, meeting in the centre, bearing very numerous ovules; style simple; stigma ovoid or clavate. *Fruit* an imperfectly 2-celled capsule. *Seeds* very many, minute, oblong; testa loose, reticulate.

*CAMPBELLIA CYTINOIDES*, Wt. Ic. t. 1425. *Christisonia neilgherrica*, Gardn.; F. B. I. iv. 322.

W. Gháts, Nilgiri and Pulney Hills, in sholas at about 5,000-7,000 ft., parasitic on roots of *Strobilanthes*.

A thick plant of a yellow colour, at first with the scales much imbricate, but they become more distant as the stem elongates with age. The capsules are often quite globose.

#### 4. *Orobanche*, Linn.

Scapigerous herbs; scapes simple or branched; scales acute, *Flowers* in spikes or racemes, each with a scale-like bract; bracteoles 2 or 0. *Calyx* unequally 4-fid or bipartite from back to front, the lobes entire or bifid with rarely a fifth lobe. *Corolla* 2-lipped; tube curved, dilated above, circumscissile at the base; upper lip erect, crenulate notched or bifid, lower somewhat spreading, 3-lobed. *Stamens* 4, didynamous, included; anther-cells equal, parallel, the bases usually mucronate. *Disk* 0 or glandular. *Ovary* 1-celled, placentas 4, equidistant or in pairs; ovules very many; style simple; stigma funnel-shaped peltate or somewhat laterally bilobed. *Fruit* a 2-valved capsule, the valves often cohering with the style. *Seeds* very many, small, globose or ovoid.

OROBANCHE CERNUA, Loeßl.; F. B. I. iv. 325.

Var. *desertorum*, Beck. *O. nicotianae*, Wt. Ill. t. 158; F. B. I. iv. 326.

N. Circars and Deccan, parasitic on tobacco (see Wight's remarks in Spic. Neilg.) and perhaps other plants.

An erect herb with pale brown stems, the corolla with a white tube and pale blue or violet lobes.

#### Family CIX. LENTIBULARIACEAE.

Herbs, aquatic or in wet places, often insectivorous. *Leaves* rosulate or, when submerged, capillaceo-multifid, sometimes obsolete. *Flowers* irregular, hermaphrodite, in 1-many-flowered simple or branched scapes; bracts small or 0; bracteoles 2 or 0. *Calyx* inferior, 2-5-lobed or -partite. *Corolla* 2-lipped, spurred; the upper lip usually the smaller, entire or emarginate, the lower usually much larger, 3-5-lobed. *Stamens* 2, attached to the base of the corolla; filaments curved; anthers 2-celled, dorsifixed, the cells transversely confluent, longitudinally dehiscing. *Ovary* 1-celled, globose; ovules very many, on a free

basal placenta; style short; stigma unequally 2-lobed. *Seeds* very many, minute, exalbuminous.

### **Utricularia, Linn.**

Herbs, floating and rootless, or, on wet ground and rocks, rooting among other plants, sometimes twining, often furnished with minute bladder-like insect traps, sometimes also in floating species with floating supports to the scape. *Leaves* in floating species multifid with capillary segments, in erect or twining species entire. *Flowers* on simple or branched scapes, racemose; pedicels bracteate and often bibracteolate. *Calyx* 2-partite; lobes entire or nearly so, often accrescent. *Corolla* 2-lipped, the upper lip entire or emarginate, the lower larger and lobed, the spur straight or curved. *Stamens* 2; filaments broad. *Ovary* 1-celled, many-ovuled. *Seeds* of various shapes, minute, the testa often lax and reticulate.

Water plants, the stolons submerged; leaves whorled, with capillary segments mostly interspersed with minute bladders:—

Peduncles with a whorl of spongy floats below the inflorescence; pedicels short; seeds tabular prismatic, with 4-6 usually sharp angles and slightly winged margins .....1. *stellaris*.

Peduncles without a whorl of spongy floats; pedicels long:—

Peduncles and pedicels stout; submerged leaves very many, long, sometimes the uppermost with the rhachis inflated; seeds prismatic with sharp angles and slightly winged margins; flowers rather large, usually 3-8 .....2. *flexuosa*.

Peduncles and pedicels slender; submerged leaves very short, lobes capillary; seeds lenticular, with a broad dentate corky wing; flowers small, 1-3 .....3. *exoleta*.

Terrestrial plants, the stems rooted in mud or moss or among the roots of other plants; leaves often disappearing before flowering and sometimes capillary and furnished with minute bladders:—

Leaves more or less linear or linear-spathulate:—

Stems and bracts of the scape attached by their base:—

Flowers chiefly blue or purple:—

Scapes erect:—

Pedicels recurved in fruit; seed testa reticulate longitudinally:—

Scapes 3-8 in. high, 3-8-flowered, very slender, sometimes bifid; sepals ovate, acute, subequal; lower lip of corolla large, .5 in. in diam.; spur long, slender, con-



spicuously curved under the lower lip of the corolla ; seeds ellipsoid .....4. *arcuata*.  
 Scapes 3-6 in. high, 3-10-flowered, rather stout, sometimes bifid ; sepals ovate, acute, subequal, decurrent ; lower lip of corolla .25 in. in diam. ; spur straight, conical, deflexed ; seeds obovoid.....5. *stricticaulis*.

Pedicels not recurved in fruit :—

Scapes slender, simple, 2-6 in. high, 3-6-flowered ; sepals ovate, acute ; corolla small with obovate upper and orbicular entire lower lip, the latter .2-.3 in. broad with straight conical spur slightly curved forwards ; seeds subglobose, the testa with subhexagonal scrobiculate areoles .....6. *uliginosa*.  
 Scapes slender, sometimes slightly twining ; spur narrowly-conic, curved ; seeds reticulate with elongate areoles :—

Scapes short, 4-6 in. long rarely longer, the scales few distant lanceolate ; calyx-lobes ovate, acuminate ; corolla with obovate upper and broadly ovate reticulate lower lip ; seeds reticulate with elongate areoles

7. *graminifolia*.

Scapes long, 6-18 in. long, very slender, with numerous ovate acute small scales ; calyx-lobes lanceolate, acuminate ; corolla with obovate upper and sub-orbicular lower lip, the spur often much incurved ; seeds globose, scrobiculate (Wight).....8. *squamosa*.

Scapes twining :—

Flowers large, on scapes up to 10 in. long, erect or twining, scales few minute ; calyx-lobes ovate, one obtuse, the other acute ; corolla with obovate upper and broadly suborbicular lower lip .5 in. broad, the spur conical and curved, nearly as long ; seeds globose, scrobiculate (Wight)

9. *Smithiana*.

Flowers large, on twining often interlacing flexuose scapes up to 2 ft. long, the scales few, ovate, very small ; calyx-lobes ovate acuminate, much enlarged and decurrent in fruit ; corolla with broadly obovate upper and large sub-orbicular lower lip, .5-1 in. broad, the spur shorter slightly curved ; seeds rhomboid, reticulate

10. *reticulata*.

Flowers very small, on exceedingly slender twining scapes at most 6 in. long, the scales minute, ovate ; calyx-lobes

ovate, acute in flower, obtuse in fruit; corolla with ovate obtuse upper and ovate lower lip the spur conical pendent; seeds minute, reticulate, scrobiculate .....11. *scandens*.

Flowers yellow :—

Scapes erect, glabrous; pedicels recurved in fruit; corolla with rounded upper and emarginate lower lip, the palate swollen, the spur as long (.25 in.) slightly curved; seeds obovoid, the testa reticulate.....12. *bifida*.

Scapes filiform, twining; pedicels suberect in fruit; corolla with obovate slightly emarginate upper and similar but larger lower lip, the spur nearly as long and curved outwards; seeds ellipsoid, reticulate .....13. *Wallichiana*.

Scales and bracts of the scape attached by their middle; flowers subsessile; capsule globose, the seed-testa reticulate :—

Spur longer than the lower lip of the corolla, acute and curved upwards; the upper lip oblong-obovate, obtuse, the lower .2 in. long, the margins somewhat crenulate.....14. *caerulea*.

Spur shorter than the lower lip of the corolla, obtuse and straight; the upper lip obovate, the lower .3 in. long, slightly more broad, the sides reflexed .....15. *roseo-purpurea*.

Leaves orbicular or reniform, persistent; calyx-lobes very unequal; seeds glochidiate; corolla with the upper lip small suborbicular emarginate, the lower spreading, 5-lobed .....16. *striatula*.

1. *UTRICULARIA STELLARIS*, Linn. f.; F. B. I. iv. 328; Roxb. Cor. Pl. t. 180; Wt. Ic. t. 1567.

N. Circars, in standing fresh water; Carnatic, Madras, Tanjore (*vide* Wight).

A water plant with yellow flowers, only the inflorescence showing above the surface, held up by the floats, which have filiform external pinnules at their apices.

2. *UTRICULARIA FLEXUOSA*, Vahl; F. B. I. iv. 329. *U. fasciculata*, Roxb.; Wt. Ic. t. 1568.

N. Circars and Carnatic, chiefly near the coast; W. Coast, in all Districts, in rice-fields, tanks and other fresh-water wet places.

A water plant with yellow flowers, similar to the former but with longer peduncles, larger flowers and pedicels deflexed after flowering; no floats but occasional inflated upper leaf rhachises; capsules rather large.

3. *UTRICULARIA EXOLETA*, R. Br.; F. B. I. iv. 329. *U. diantha*, Roem. & Sch.; Wt. Ic. t. 1569.

W. Coast, S. Canara to Malabar, Travancore and Tinnevely, in wet places.

A small water plant floating in water or sometimes rooting in wet mud, the leaves very small and sparingly lobed, occasionally the whole leaf inflated and linear, especially on mud. Flowers yellow with orange streaks, the spur rather long, the capsules small and globose.

4. *UTRICULARIA ARCUATA*, Wt. Ic. t. 1571, fig. 1; F. B. I. iv. 330.

Bababudan Hills of Mysore (Law); S. Travancore (Wight).

A pretty delicate species with bluish-purple flowers and prominently curved slender spur. The roots have small round bladders as have the linear-spathulate leaves.

5. *UTRICULARIA STRICTICAULIS*, Stapf in Herb. Kew. *U. caerulea* var. *stricticaulis*, Koenig. *U. reticulata* var. *uliginosa*, C. B. Clarke; F. B. I. iv. 331. *U. humilis*, Wt. Ic. t. 1572, 2, not of Vahl.

N. Circars, frequent in Ganjam (Gamble); Deccan and Carnatic, Mysore, Madras and Nellore.

A rather thick-stemmed plant with blue flowers and prominent fruiting calyx, the leaves linear, very narrow, the root bladders very small.

6. *UTRICULARIA ULIGINOSA*, Vahl. *U. affinis*, Wt. Ic. t. 1580, fig. 1; F. B. I. iv. 330. *U. brachypoda*, Wt. Ic. t. 1578, fig. 1.

W. Gháts, S. Canara and Mysore to Nilgiris and Travancore, up to 7,000 ft. in the hills in swampy land, more common northwards.

A small rather obscure species with bluish-purple flowers and conical spur. The linear-oblong obtuse leaves and small bladders are very evanescent.

7. *UTRICULARIA GRAMINIFOLIA*, Vahl. *U. caerulea*, C. B. Clarke; F. B. I. iv. 331, not of Linn. *U. pedicellata*, Wt. Ic. t. 1578, fig. 2. *U. uliginoides*, Wt. Ic. t. 1573. *U. conferta*, Wt. Ic. t. 1575.

W. Gháts, in all Districts, especially Nilgiris and Pulneys, in bogs and other wet places at high levels, common.

A slender species with bluish-purple flowers and linear leaves on filiform stolons rooting among grass- and other plant-roots, and provided with small bladders.

8. *UTRICULARIA SQUAMOSA*, Wt. Ic. t. 1579. *U. caerulea* var. *squamosa*, C. B. Clarke; F. B. I. iv. 331.  
 Nilgiri Hills, about Sispara at 5,000 ft.; Attapadi Hills of Malabar at 5,300 ft. (Fischer).  
 A very slender erect plant with blue flowers and linear-spathulate leaves, very evanescent.
9. *UTRICULARIA SMITHIANA*, Wt. Ic. t. 1577. *U. caerulea* var. *Smithiana*, C. B. Clarke; F. B. I. iv. 331.  
 W. Gháts, Malabar or Coorg (Wight); Pulneys, at high levels (Bourne).  
 A slender plant resembling *U. graminifolia* but much larger, also *U. reticulata* but less twining. Flowers blue shaded mauve and lilac, leaves linear-spathulate on filiform rhizomes bearing bladders.
10. *UTRICULARIA RETICULATA*, Smith Exot. Bot. t. 119; F. B. I. iv. 331; Wt. Ill. t. 143. *U. uliginosa*, Wt. Ic. t. 1574 (*right-hand fig. only*).  
 W. Coast, in all Districts, in rice-fields, climbing up the stems of the rice.  
 A striking and interesting species with blue-violet corolla, the palate reticulated with pale blue and white.
11. *UTRICULARIA SCANDENS*, Oliver; F. B. I. iv. 332.  
 Carnatic, Madras, Arcot (Shuter); Madura, near the hills (Wight); W. Gháts up to 5,000 ft. in Anamalais (Barber).  
 A very minute twining plant, often found on other species like *U. Wallichiana*, the flowers blue.
12. *UTRICULARIA BIFIDA*, Linn.; F. B. I. iv. 332; Bot. Mag. t. 6689.  
 Deccan and Carnatic, Kambakam Hills of Chingleput (Bourne, etc.), hills of Cuddapah at 2,500 ft.; S. Travancore, in wet places (Bourdillon).  
 An erect rigid slender herb with yellow flowers, filiform leaves and 2-horned small bladders on threads at their bases.
13. *UTRICULARIA WALLICHIANA*, Wt. Ic. t. 1572, fig. 1; F. B. I. iv. 332.  
 Deccan, in hilly country in Salem and Coimbatore above 1,000 ft.; W. Gháts, in all Districts up to 7,000 ft., in bogs and other wet places, common.

A very slender twining plant with yellow flowers and linear evanescent leaves.

Var. *macrolepis*, Gamble. *U. macrolepis*, Wt. Ic. t. 1580, fig. 2 excl. seeds.

Tinnevelly and S. Travancore (Wight).

Scales on the stem comparatively large, ovate, acute.

14. *UTRICULARIA CAERULEA*, Linn.; Wt. Ic. t. 1583. *U. racemosa*, Wall.; F. B. I. iv. 333. *U. nivea*, Vahl; Wt. Ic. t. 1582.

N. Circars, in Ganjam (Gamble); Deccan, Seshachalam Hills of Cuddapah, at 2,500 ft. (Gamble); W. Gháts, Anamalais, Pulneys and hills of Travancore, up to 7,000 ft.; Shevaroy Hills of Salem; always in swampy places.

A very slender plant with flowers from white to purple, nearly sessile on the scape, the leaves short and spatulate with minute bladders. The very small form with few usually white flowers is var. *filicaulis*, C. B. Clarke.

15. *UTRICULARIA ROSEO-PURPUREA*, Stapf in Herb. Kew. *A. rosea*, C. B. Clarke; F. B. I. iv. 333, not of Edgw.

W. Gháts, Anamalais, Pulneys and hills of Travancore, to 7,000 ft., in swamps.

A slender plant with dark purple (Trimen) or sometimes apparently pinkish flowers, rather large, the leaves rather short and spatulate.

16. *UTRICULARIA STRIATULA*, Sm. *U. orbiculata*, Wall.; F. B. I. iv. 334. *U. glochidiata*, Wt. Ic. t. 1581.

N. Circars, Mahendragiri Hill, Ganjam, 4,000 ft. (Fischer); W. Gháts, in almost all Districts from S. Canara and Mysore to Tinnevelly, above 3,000 ft., on wet rocks; Shevaroy Hills of Salem (Bourne).

A small very pretty slender herb with persistent leaves, filiform stolons bearing many small bladders, and flowers with the upper lip of the corolla white, the lower white with lilac margins and yellow in the throat.

#### Family CX. GESNERIACEAE.

Herbs or undershrubs, sometimes epiphytic. *Leaves* opposite alternate or solitary, entire or toothed; stipules 0. *Flowers* hermaphrodite, usually irregular, or axillary on terminal peduncles

rarely 1-flowered; bracts present; bracteoles usually small. *Calyx* of 5 lobes, valvate or open rarely imbricate. *Corolla* gamopetalous, tubular, more or less 2-labiate; lobes 5. *Stamens* on the corolla-tube, usually didynamous, sometimes 5, often only 2 perfect; anthers 2- or by confluence 1-celled, usually connate in pairs. *Disk* annular or cylindric or 0. *Ovary* 1- or imperfectly 2-celled; ovules numerous on bifid parietal sometimes subconfluent placentas; style linear; stigma capitate or 2-lobed. *Fruit* a 2-valved capsule or a berry; placentas parietal. *Seeds* very many, small, sometimes tipped with long hairs, sometimes with a longish funicle; testa usually reticulate; albumen scanty or 0; embryo straight.

Seeds tipped with one or more hairs from near the hilum, one from the apex; epiphytic undershrubs with fleshy or leathery leaves

#### 1. *Aeschynanthus*.

Seeds not tipped with hairs :—

*Fruit* a loculicidal 2-valved capsule; placentas deeply intruded :—

*Capsule* linear, subfollicular; *stamens* 2 perfect . . . 2. *Didymocarpus*.

*Capsule* ellipsoid or ovoid :—

Erect herbs with blue flowers and leaves with unequal bases :—

*Stamens* 4 perfect . . . . . 3. *Klugia*.

*Stamens* 2 perfect . . . . . 4. *Rhyncoglossum*.

Scapigerous herbs with 4 perfect *stamens* . . . . . 5. *Jerdonia*.

*Fruit* a capsule dehiscing circumscissily; succulent herb with flowers in heads . . . . . 6. *Epithema*.

*Fruit* a berry with large placentas; undershrub with small flowers and 4 perfect *stamens* . . . . . 7. *Isanthera*.

#### 1. *Aeschynanthus*, Jack.

Epiphytic undershrubs, the stems often rooting at the nodes. *Leaves* opposite, fleshy or leathery, usually entire, the nerves obscure but sometimes apparent in dry specimens. *Flowers* often showy, in fascicles on terminal or axillary peduncles, rarely solitary; bracts usually small but sometimes large and coloured, deciduous; bracteoles small. *Calyx* 5-fid or 5-partite. *Corolla* tubular-ventricose, usually large and curved, the limb bilabiate, the upper lip of 2 small, the lower of 3 larger lobes. *Stamens* usually 4 perfect, with sometimes a rudimentary fifth, anthers 2 oblong, usually connate in pairs by their tips. *Disk* annular. *Ovary* superior, oblong or linear, stipitate; placentas naked on

the inner face, bearing ovules on the involute margin; stigma dilated. *Fruit* a long linear capsule, loculicidally 2-valved, the valves with placentas recurved at the margins. *Seeds* very many, small, oblong or linear, with 1 or more hairs at the end near the hilum and 1 at the apex; albumen 0; cotyledons very small.

Leaves linear-lanceolate, acuminate at apex, acute or somewhat rounded at base, up to 4.5 in. long, .75 in. broad, the nerves, about 5-6 pairs (apparent when dry), very oblique; calyx-lobes linear, .2-.3 in. long; corolla curved, glabrous without except the ciliate lobes, about 1.25 in. long.....1. *Perrottetii*.

Leaves elliptic or elliptic-lanceolate, acute, up to 2.5 or even 3 in. long, 1 in. broad, the nerves (when visible) about 5 pairs, spreading and not very oblique; calyx-lobes linear, .5 in. long; corolla slightly curved, pubescent without, the lobes glandular-ciliate, 1.3-1.5 in. long.....2. *planiculmis*.

1. *AESCHYNANTHUS PERROTTETII*, A. DC.; F. B. I. iv. 339. W. Gháts, in all Districts, at 4,000-7,000 ft., on trees and rocks in moist forests.

An epiphyte with distant narrow leaves on smooth branches swollen at the nodes and there giving out rootlets. The flowers are handsome, scarlet with purple lines or spots on the lobes and the long papery capsules have seeds with one long hair at each end. *Ae. ceylanica* var. *pinguis*, C. B. Clarke, seems to be only a small form of this with thicker leaves.

2. *AESCHYNANTHUS PLANICULMIS*, Gamble n. comb. *Aeschynanthus Perrottetii*, A. DC., var. *planiculmis* (by error *platyculmis*), C. B. Clarke; F. B. I. iv. 340. *Ae. ceylanica*, Wt. Ic. t. 1347, not of Gardn.

W. Gháts, hills of Tinnevely above 4,000 ft., in damp forests.

An epiphyte with thick flattened stems and close rather broad fleshy leaves, the nodes giving out rootlets. The handsome flowers, larger than those of the former species, are also, apparently, scarlet and spotted, and the capsules and seeds are similar. It is doubtfully distinct.

## 2. *Didymocarpus*; Wall.

Herbs, rarely undershrubs, erect scapigerous or creeping. *Leaves* opposite alternate or crowded, rarely solitary. *Flowers*

axillary, fascicled or pedunculate, cymose subumbellate or racemose with the pedicels in pairs; bracts small. *Calyx* small. 5-fid or 5-partite, the lobes narrow. *Corolla* tubular or campanulate, often ventricose, the mouth often oblique; lobes 5, rounded. *Stamens* included, the 2 anterior perfect, the anthers connate in pairs, the posterior 2 or 3 reduced to staminodes, rarely 4 perfect. *Disk* cylindric or 0. *Ovary* narrow, 1-celled, sessile or stipitate; placentas intruded and then recurved bearing the numerous ovules; style long or short; stigma peltate, emarginate or subcapitate, rarely 2-lobed. *Fruit* a linear rarely lanceolate capsule loculicidally 2-valved or follicular, bearing seeds on the back of the placenta lobes. *Seeds* very many, minute, ellipsoid or subtrigonus, the testa pitted or waved or reticulate.

Very small herb with short stem and only one very thin leaf, ovate-cordate, obtuse, entire, sessile, pilose, the nerves 8-9 pairs chiefly from near the base and prominently arching upwards; flower-pedicels few, fascicled in the leaf-axils; calyx-lobes linear, .1-.2 in. long; corolla tubular-funnel-shaped, .3 in. long; capsule .5-.7 in. long, pilose.....1. *pygmaea*.

Trailing silvery-pilose herb with stems rooting at intervals, the nodes bearing each one long-petioled orbicular cordate leaf and a rather longer peduncle with a few flowers; the leaf up to about 4 in. in diam. and doubly crenate, the nerves about 6-7 pairs chiefly from the base and arching upwards; calyx-lobes linear, .2 in. long; corolla tubular, curved upwards, .5-.75 in. long; capsule slender, 1 in. long, pubescent  
2. *repens*.

Scapigerous herbs, the leaves in a basal rosette:—

All the leaves with simple petioles not winged or broadened:—

Leaves entire, membranous, ovate, subacute, rounded at base, white-pellucid hairy, up to 4 in. long, 2 in. broad, nerves obscure, about 5 pairs, petiole up to 4 in. long; scapes 8-12 in. long, slender, with many flowers in racemes; calyx-lobes linear, .2 in. long; corolla funnel-shaped, .7-1 in. long; capsule slender, 1-1.25 in. long, glabrous .....3. *missionis*.  
Leaves regularly shallowly crenate-serrate, elliptic-ovate, obtuse, white-strigose, up to 3 in. long, 2 in. broad, nerves prominent, 8-12 pairs, petiole up to 4 in. long; scapes up to 4 in., umbellately 2-6-flowered; calyx-lobes lanceolate, .2 in. long; corolla tubular ventricose, .75 in. long; capsule slender, 1 in. long, pubescent.....4. *ovalifolia*.



Older leaves with elongate petioles, winged and more or less lacerate, the younger and central leaves subsessile, more woolly :—

Petioles up to 6 in. long, inciso-pinnatifid, the blades membranous, ovate, lobulate, the lobes irregularly crenate, both surfaces softly villous, up to 3 in. long, 2 in. broad, nerves about 5 pairs, much branched; scapes slender, subcorymbose, many-flowered, up to 6 in. long, softly villous; corolla small, tubular-ventricose; capsule .5 in. long, erect, pubescent .....5. *lyrata*.

Petioles up to 5 in. long, narrowly winged, the wings scarcely lacerate, the blades membranous, ovate, obtuse at apex, narrowed at base, prominently crenate, up to 4 in. long, 2.5 in. broad, nerves 5–7 pairs, prominent beneath and branched; scapes slender, up to 10 in. long in fruit; corolla ventricose, .75 in. long; capsule up to 1.5 in. long, oblique, glabrous...6. *Meeboldii*.

Petioles up to 2 in. long, narrowly winged, the blades ovate, obtuse at apex, rounded or subcordate at base, crenate, up to 3 in. long, 2 in. broad, nerves 4–6 pairs; scapes slender, up to 7 in. long; corolla tubular-ventricose, about .5 in. long; capsule up to 1.5 in. long, oblique, pubescent.....7. *Humboldtiana*.

Older leaves with short petioles, broadened or winged, not lacerate, the younger and central leaves sessile or nearly so :—

Crenatures of the leaves broad and deep, irregular, leaves rather thin, spatulate, the blade broadly decurrent on the petiole, bullate and with tufts of white hair, up to 6 in. long, 2.5–3 in. broad :—

Scape-peduncles about 4 in. long, slender, dichotomously branching several times to lax corymbs about 4 in. in diam.; corolla small, oblique at the mouth, .3–.4 in. long; capsule slender, .5–.8 in. long, very acuminate, villous...8. *Rottleriana*. Scape-peduncles up to 10 in. long, stout, once dichotomously branching in few-flowered racemes elongating in fruit; corolla broadly campanulate and slightly ventricose, wide at the mouth, .5 in. long; capsule stout, shortly acute, up to 1.25 in. long, slightly villous.....9. *Fischeri*.

Crenatures of the leaves shallow; leaves thick, the blade ovate or orbicular, broadly decurrent on the short petiole, bullate and thickly tufted with white silky hair, rarely over 3 in. long :—

Petiole about .25 in. broad; crenatures irregular; scapes many stout, the peduncles up to 6 in. long, dichotomously branching in corymbs up to 2 in. in diam.; corolla campanulate, curved, the mouth wide, .5 in. long; capsule 1 in. long, villous

10. *tomentosa*.

Petiole up to .75 in. broad; crenatures regular; scapes few, the peduncles up to 7 in. long, branching in elongate racemes; corolla up to .4 in. long, campanulate, the mouth very oblique; capsule .75-1 in. long, thickly crispate villous. 11. *lanuginosa*. Crenatures scarcely any; leaves thick, densely white woolly, obovate-spathulate, up to 2 in. long; scapes under 4 in. long, ending in few-flowered drooping cymes; corolla small, curved, wide at the mouth, scarcely .25 in. long; capsule lanceolate-acuminate, .4 in. long ..... 12. *Wightii*.

1. *DIDYMOCARPUS PYGMAEA*, C. B. Clarke; F. B. I. iv. 345.  
N. Circars, Rampa Hills (V. Narainswami) and Bison Hills (Barber) in Godavari, in crevices of rocks in damp places, usually above 2,000 ft.  
A very delicate hyaline-pilose little plant with only one leaf, sessile on a short weak stem up to 3 in. long and up to about 2.5 in. long, 2 in. broad, the corolla apparently pinkish, the seeds somewhat trigonous, the sides with about 5 transverse depressions.
2. *DIDYMOCARPUS REPENS*, Bedd. Ic. t. 120; F. B. I. iv. 354.  
W. Gháts, hills of Tinnevely and Travancore, in moist forests at 1,000-3,000 ft. (Beddome, Bourdillon, Barber).  
A creeping herb with blue flowers rather wide at the mouth, and dilated filaments, the seeds somewhat trigonous, minutely reticulate.
3. *DIDYMOCARPUS MISSIONIS*, Wall.; F. B. I. iv. 354. *D. membranacea*, Bedd. Ic. t. 176.  
W. Gháts, Pachemalai Hills of S. Travancore at 2,000 ft., on moist rocks, rare (Beddome).  
A delicate scapigerous stellately white-hairy herb, the flowers pale blue, the seeds angular, scurfy.
4. *DIDYMOCARPUS OVALIFOLIA*, Wt. Ic. t. 1351; F. B. I. iv. 354.  
W. Gháts, hills of Tinnevely, about 3,000 ft.  
A pretty species with large prominently ventricose flowers, said to be "blue-yellow" (Wt.), probably blue with a yellow throat, the seeds ellipsoid, flattened on one side, minutely scaly.
5. *DIDYMOCARPUS LYRATA*, Wt. Ic. t. 1350; F. B. I. iv. 353.  
Tinnevely Hills, about Courtallum, in moist shady places (Wight).

A softly villous herb with lyrate leaves and small flowers, the seeds oblong, minutely reticulate.

6. DIDYMOCARPUS MEEBOLDII, Sm. & Ramas. in Rec. Bot. Surv. Ind. vi. 43.

W. Gháts, hills of Madura and Travancore, about 3,000 ft.; at Peermade Ghát (Meebold).

A scapigerous herb with thin leaves, the older white-pilose especially on the nerves, the younger softly rusty-villous, the flowers (probably) pale blue with yellow tube, the seeds subtrigonal minutely pitted.

7. DIDYMOCARPUS HUMBOLDTIANA, Gardn.; F. B. I. iv. 353.

W. Gháts, Nilgiris, near Coonoor (Bourne, Gamble) and Pulneys (Bourne) at about 6,000 ft., on rocks.

A scapigerous herb with pale lilac flowers.

8. DIDYMOCARPUS ROTTLERIANA, Wall.; F. B. I. iv. 353.

W. Gháts, hills of Tinnevely and Travancore, at 2,000–3,000 ft.

A large scapigerous herb with many scapes and purple flowers, yellow in the throat, the seeds boat-shaped, rough.

9. DIDYMOCARPUS FISCHERI, Gamble in Kew Bull. 1923, 117.

W. Gháts, Anamalai Hills at 1,700 ft. (Fischer).

A large and handsome species.

10. DIDYMOCARPUS TOMENTOSA, Wt. Ic. t. 1349; F. B. I. iv. 353.

Deccan, Veligonda Hills of Nellore (Ramaswami), hills of N. Coimbatore at 4,000 ft. (Fischer); Carnatic, Kollimalai Hills of Trichinopoly (Barber); W. Gháts, Nilgiris, Anamalais, Pulneys and hills of Madura and Tinnevely, 3,000–6,000 ft., on rocks.

A scapigerous herb with bluish-purple flowers, the seeds subtrigonal, pitted minutely.

11. DIDYMOCARPUS LANUGINOSA, Wt., not of Wall. *D. tomentosa* var. *lanuginosa*, C. B. Clarke; F. B. I. iv. 353.

W. Gháts, hills of Madura and Tinnevely (Wight).

A scapigerous herb with thick cinnamomeous-tomentose leaves.

12. DIDYMOCARPUS WIGHTII, Gamble n. comb. *D. Rottleriana* var. *Wightii*, C. B. Clarke; F. B. I. iv. 353. *D. Rottleriana*, Wt. Ic. t. 1348, not of Wall.

Sivagiri Hills of Tinnevely (Wight), apparently very rare.

A small plant with very white woolly leaves.

3. *Klugia*, Schlect.

Herbs, the stems rooting near the base, then erect, somewhat succulent. *Leaves* alternate, unequal-sided at base, the lower side cordate, subentire or sinuate, many-nerved. *Flowers* in terminal or leaf-opposed many-flowered racemes; bracts minute or 0; bracteoles very small, linear. *Calyx* campanulate, 5-angled or -winged, one wing often large; lobes 5. *Corolla*-tube cylindric, limb 2-lipped, the upper very small, the lower broad, rounded or shortly 3-lobed, with 2 hooded depressions at base. *Stamens* 4 perfect, included, inserted above the middle of the tube; anthers 2-celled, approximate in pairs. *Disk* fleshy, annular or cylindric. *Ovary* ovoid, many-ovuled; style slender; stigma obscurely 2-lobed. *Fruit* a loculicidal 2-valved ovoid capsule, the placentas divided into 2 thick plates, bearing seeds all over. *Seeds* ellipsoid, minute, testa reticulate.

*KLUGIA NOTONIANA*, A.DC.; F. B. I. iv. 366; Wt. Ic. t. 1353.

W. Ghâts, all Districts, above 3,000 ft., in damp places in evergreen forests.

A nearly succulent annual herb reaching 2 ft. in height, with rather large flowers, white in the tube, the large lower lip bright blue with yellow near the cavities at the base; leaves very unequal-sided with many prominent parallel curved nerves, up to 8 in. or more long, 4 in. broad, glabrous or scabrid-pubescent.

4. *Rhyncoglossum*, Blume.

Herbs, usually glabrous. *Leaves* alternate, unequal-sided at base, the lower side cordate, entire or sinuate. *Flowers* in long many-flowered racemes; bracts 0; bracteoles minute. *Calyx* campanulate, 5-lobed. *Corolla*-tube cylindric, contracted at the mouth; limb 2-lipped, the upper short bifid, the lower longer, 3-lobed. *Stamens* 2 perfect included, the anthers 2-celled connivent; the others reduced to staminodes. *Disk* shortly cylindric. *Ovary* ovoid, glabrous, 1-celled; placentas intruded, of 2 thick plates bearing numerous ovules on all sides; style linear; stigma minutely 2-lobed. *Fruit* a membranous loculicidal 2-valved capsule. *Seeds* minute, ellipsoid; testa reticulate.

*RHYNCOGLOSSUM OBLIQUUM*, Bl.; F. B. I. iv. 367. Var. *parviflora*, J. B. Clarke.

N. Circars, Mahendragiri Hill, Ganjam, 4,000 ft. (Fischer); W. Coast and W. Gháts from S. Canara to Cochin, up to 3,000 ft., in damp places in evergreen forests.

A. succulent herb with blue flowers, similar to *Klugia Notoniana* but usually smaller and with the calyx not winged. Leaves oblong lanceolate acuminate, parallel-nerved, very unequal at base.

#### 5. *Jerdonia*, Wight.

A scapigerous herb, from a thick scarred root-stock. Leaves crowded at the base, elliptic, reticulate, long-petioled. Flowers in slender few-flowered scapes; bracts small. Calyx 5-partite, the lobes lanceolate, long-pilose. Corolla-tube elongate, swollen upwards; limb oblique, 2-lipped, upper lip emarginate, lower 3-lobed. Stamens 4 perfect; filaments dilated, the lower pair with a descending spur; anthers 2-celled, cohering at their apices. Disk cup-shaped. Ovary ovoid; placentas 2, each of 2 flat plates bearing ovules on both faces; style linear; stigma peltate. Fruit an ovoid, loculicidal, 2-valved villous capsule with 4 many-seeded placentas. Seeds funicled, ellipsoid, grooved at the sides.

JERDONIA INDICA, Wt. Ic. t. 1352; F. B. I. iv. 368.

W. Gháts, Nilgiri and Anamalai Hills, at about 3,000 ft., in damp evergreen forests; Bolampatti Hills of Coimbatore. A scapigerous herb with pale lilac corolla marked with red lines, and long petioled rusty-villous leaves up to 2.5 in. long, 2 in. broad, with about 5 pairs of arching nerves and prominent reticulation.

#### 6. *Epithema*, Blume.

Small succulent pubescent herbs; stem simple or branched. Leaves few, alternate or opposite. Flowers small, in dense pedunculate scorpioid cymes; bract large, solitary, hooded or subspathaceous; bracteoles small, narrow; pedicels very short. Calyx campanulate; lobes 5, acute, valvate in bud. Corolla small, tubular, 2-lipped, lobes 5, subequal. Stamens 4, 2 upper perfect, the anthers 2-celled, cohering, the cells short, soon confluent; 2 lower reduced to staminodes. Disk one-sided. Ovary ovoid, 1-celled; placentas parietal, stalked, peltate, with ovules on all sides; style filiform; stigma small. Fruit a

globose membranous capsule included in the calyx and dehiscing circumscissily; placentas T-shaped. *Seeds* very numerous, on slender funicles, oblong, acute at both ends; testa usually spirally striaté.

**EPITHEMA CARNOSUM**, Benth.; F. B. I. iv. 369. Var. *hispida*, C. B. Clarke. *E. ceylanicum*, Wt. Ic. t. 1354, not of Gardn.

W. Gháts, Nilgiris to Tinnevely Hills, on shaded rocks, at low levels.

A small herb with bluish flowers and leaves of variable size sometimes up to 5 in. in diam. and broadly ovate cordate.

### 7. *Isanthera*, Nees.

Small undershrubs; almost all parts tawny-silkily woolly. *Leaves* alternate, large, oblanceolate, long-petioled. *Flowers* in axillary peduncled cymes towards the end of the stem; bracts narrow. *Calyx* of 5 narrow lobes extending nearly to the base. *Corolla* small, shortly campanulate, scarcely 2-lipped; lobes 5, ovate. *Stamens* 4 perfect, adnate to the base of the corolla; filaments short; anthers 1-celled, dehiscing marginally, in an arch; staminodes usually absent. *Disk* small, annular. *Ovary* ovoid; placentas 2, recurved and bearing many ovules; style short; stigma small, capitate. *Fruit* an ovoid fleshy indehiscent berry; placentas large, the margin recurved vertically. *Seeds* very small, ellipsoid; testa smooth or slightly wrinkled.

**ISANTHERA PERMOLLIS**, Nees; F. B. I. iv. 372; Wt. Ic. t. 1355.

W. Gháts, S. E. Wynaad and Malabar slopes at 2,000–3,000 ft.; hills of Tinnevely, in moist places in evergreen forests.

An erect undershrub with smooth pale brown bark under soft tawny wool, small white flowers and large softly tawny-villous leaves up to 10 in. long, 4 in. broad, long decurrent on a long petiole, the conspicuous parallel nerves about 20 pairs.

### Family CXI. BIGNONIACEAE.

Trees or shrubs, sometimes climbing, rarely herbs. *Leaves* opposite, rarely alternate or whorled, 1–3 times odd-pinnate, very rarely simple; leaflets entire or sometimes toothed. *Flowers*

hermaphrodite, irregular, in racemes or panicles usually terminal, often large and showy; bracts various. *Calyx* gamosepalous, campanulate or spathaceous; lobes 2-5 or 0, valvate. *Corolla* 2-lipped, tubular-ventricose; lobes 5, subequal, imbricate in bud. *Stamens* 4, didynamous, with often a 5th usually imperfect, rarely perfect; inserted where the corolla-tube is suddenly swollen; filaments glabrous or hairy at base; anthers 2-celled, the cells parallel or divergent, dehiscing longitudinally. *Disk* usually thick or annular. *Ovary* subsessile, 2-celled; ovules numerous, in many rows, anatropous; style long, glabrous; stigma of 2 elliptic lobes. *Fruit* a usually elongate loculicidally or septicidally 2-valved capsule, the septum enlarging, deciduous with the placentas. *Seeds* compressed, discoid or trigonous, usually prominently winged, the embryo in an interior membranous testa; albumen 0; cotyledons flattened, sometimes folded.

Perfect stamens 5; a tree with 2-3-pinnate leaves and very large flat capsules .....1. *Oroxylum*.

Perfect stamens 4; trees:—

Anther-cells 1 perfect, 1 reduced to a small hook; a tall tree with 2-3-pinnate leaves and very long linear corolla-tube...2. *Millingtonia*.

Anther-cells 2, both perfect:—

Capsule not winged, cylindric flattened or subquadrangular:—

*Calyx* spathaceous, split on one side; corolla-tube slender, lobes spreading, crisped on the margins....3. *Dolichandrone*.

*Calyx* not spathaceous; corolla-tube ventricose:—

Capsule with a flat or angular septum....4. *Heterophragma*.

Capsule with a cylindric spongy septum:—

Septum prominently pitted, the seeds trigonous, transversely grooved without, the inner edge fitting into the pit; ovules 2-seriate in each cell.....5. *Stereospermum*.

Septum only faintly pitted, the seeds flat; ovules many-seriate in each cell .....6. *Radermachera*.

Capsule winged on both margins, the septum flat; a large tree with large flowers and large pinnate leaves .....7. *Pajanelia*.

### 1. *Oroxylum*, Vent.

A glabrous tree. *Leaves* large, opposite, 2-3-pinnate; leaflets entire. *Flowers* large, in long terminal racemes. *Calyx* large, leathery, campanulate, the limb truncate or obscurely toothed. *Corolla* large, fleshy, campanulate; lobes 5, subequal, crisped.

*Stamens* 5 perfect, the posterior one the shortest; filaments inserted near the base of the tube; anthers 2-celled, the cells parallel, oblong. *Disk* large, cushion-like. *Ovary* subsessile, contracted at the base, compressed; ovules very many; style slender; stigma 2-lobed. *Fruit* a very large broadly linear septifragally 2-valved capsule, compressed parallel to the septum. *Seeds* very many, flattened, surrounded by a broad hyaline papery wing; cotyledons emarginate.

*OROXYLUM INDICUM*, Vent.: F. B. I. iv. 378. *Calosanthes indica*, Bl.; Wt. Ic. t. 1337.

Most Forest Districts, chiefly in moist places in deciduous forest; in evergreen forests in Travancore (Bourdillon) up to 2,000 ft.

A small conspicuous but ungainly tree, at once known by the 2-3-pinnate large leaves and the flat capsule, which may reach 3 ft. in length. Bark light brownish-grey, greenish when cut; wood yellowish-white, soft, not used. Vern. *Hind.* Ullu, Sauna; *Ur.* Pomponia; *Tel.* Pampini, Pampana; *Tam.* Achi, Pana, Pei; *Mal.* Palaga-paiyani; *Kan.* Bunepalé.

## 2. *Millingtonia*, Linn. f.

A tall tree with corky bark. *Leaves* opposite, 2-3-pinnate, the leaflets entire or crenate. *Flowers* in terminal corymbose panicles. *Calyx* small, campanulate, truncate or with 5 short teeth. *Corolla* white; tube long, slender; limb obscurely bilabiate; lobes 5, subequal. *Stamens* 4, didynamous, shortly exsert; anthers 1-celled, the second cell rudimentary, hooked. *Disk* annular. *Ovary* subsessile, cylindric-conical; ovules many 1- or more-seriate; style slender; stigma 2-lobed. *Fruit* an elongate linear capsule compressed parallel to the septum, septicidally 2-valved. *Seeds* very many, flattened, with a broad hyaline wing.

*MILLINGTONIA HORTENSIS*, Linn. f.; F. B. I. iv. 377; Bedd. Fl. t. 249 (except anthers). *Bignonia suberosa*, Roxb. Cor. Pl. t. 214.

Plains Districts, planted in avenues and gardens and often found run wild. It is said to have come from Burma. Indian Cork Tree.

A tall handsome tree with sweet-scented flowers. Bark



thick corky; wood soft, yellowish-white, likely to be useful as a "deal." The tree reproduces well both by seed and by suckers. Vern. *Hind.* Akao-nim; *Tam.* Kat malli; *Tel.* Kavuki.

### 3. Dolichandrone, Fenzl.

Trees. *Leaves* opposite, pinnate, the leaflets entire or obscurely toothed. *Flowers* few, opening at night, usually white, large or moderate-sized, in terminal corymbs or panicles. *Calyx* spathaceous, cleft to the base on one side. *Corolla*-tube long or short; lobes 5, nearly equal, crisped on the margin. *Stamens* 4, didynamous, included; anthers glabrous, the cells parallel. *Disk* annular. *Ovary* sessile; ovules numerous, many-seriate; style long; stigma 2-lobed. *Fruit* a long subterete or compressed capsule, loculicidally 2-valved; the septum narrow with a transverse false septum, making seemingly 4 cells. *Seeds* much compressed, almost rectangular, with broad wings on each side; cotyledons usually broader than long, emarginate.

*Corolla* 4-7 in. long, the tube long and slender below, widening after half-way in a funnel, the lobes spreading up to a 4 in. broad mouth; calyx spathe abruptly acuminate at apex; leaves with 5-9 acuminate rhomboid leaflets up to 4 in. long, unequal at base; capsule straight, up to 18 in. long, 1 in. broad, the seeds with corky wings

#### 1. *spathacea*.

*Corolla* under 3 in. long, the tube slender below slightly widening, the mouth about 2 in. in diam.; seeds with membranous wings:—

*Corolla* more than 1.5 in. long, usually 2 in.; calyx-spathe with a recurved point; capsule arcuate with conspicuous speckles, only slightly compressed, 12 in. or more long:—

Glabrous or nearly so, leaflets usually 5 rarely 7, ovate, acuminate, nerves about 5-7 pairs, petiolules .3-.6 in. long, that of end-leaflet longer ..... 2. *atrovirens*.

Pubescent or subfloccose, leaflets usually 5 or 7, sometimes up to 11, ovate or orbicular, obtuse or with a short point, nerves about 5-6 pairs, petiolules .1-.3 in. long, that of end leaflet longer ..... 3. *arcuata*.

*Corolla* less than 1.5 in. long, calyx-spathe obtuse or emarginate; capsule falcately curved, much flattened, without speckles but minutely striate, up to about 21 in. long, .75 in. broad; leaflets usually 7, orbicular obovate or even obcordate, with a small point,

except in var. *Lawii*, grey-pubescent, up to 1.5 in. in diam. but usually much smaller.....4. *falcata*.

1. *DOLICHANDRONE SPATHACEA*, K. Schum.; Sprague in Kew Bull. 1919, 304. *D. Rheedii*, Seem.; F. B. I. iv. 379. *Spathodea Rheedii*, Wall.; Wt. Ic. t. 1339.

W. Coast, S. Canara to Travancore, on the banks of rivers and backwaters.

A moderate-sized deciduous tree with beautiful white flowers which are open at night and then fall off. Wood white, soft. Vern. *Tam.* Vilpadri; *Mal.* Nir pongilium.

2. *DOLICHANDRONE ATROVIRENS*, Sprague in Kew Bull. 1919, 304. *D. crispa*, Seem.; F. B. I. iv. 379.

Deccan, in the Ceded Districts, eastwards to the hills of Nellore, south to Tinnevely and S. Travancore, in dry deciduous forests, up to 3,000 ft.

A moderate-sized tree with pretty white flowers. Bark brown, rough; wood yellowish-brown, useful. Vern. *Tel.* Nirondidi; *Tam.* Pumbadri.

3. *DOLICHANDRONE ARCUATA*, C. B. Clarke; F. B. I. iv. 380. *Spathodea arcuata*, Wt. Ic. t. 1340.

Deccan, in Kurnool, Mysore and Coimbatore, in dry deciduous forest, west to Palghat.

A moderate-sized tree, with flowers rather larger than in the last. Bark brown, peeling off in flakes; wood white. Vern. *Tam.* Ran palai.

4. *DOLICHANDRONE FALCATA*, Seem.; F. B. I. iv. 380. *Bignonia spathacea*, Roxb. Cor. Pl. t. 144. *Spathodea falcata*, Wall.; Bedd. Fl. t. 71.

N. Circars, in Vizagapatam and Upper Godavari; Deccan, in Hyderabad, Mysore, and all other Districts; Carnatic, Nellore to S. Arcot, Shevaroy Hills, Sirumalai Hills in Madura, in dry deciduous forests, often on rocky slopes.

A small deciduous tree with white flowers. Bark bluish grey, exfoliating in scales; wood white, hard and close-grained, useful. Vern. *Tel.* Udda, Wodi, Chittivadi; *Tam.* Katuvarsana; *Kan.* Wudige.

Var. *Lawii*, Sprague in Kew Bull. 1919, 308. Nearly or quite glabrous, the leaflets more ovate, with a short point and not emarginate, the nerves 5 pairs.

Dry forest lands in Cuddapah (Gamble).

#### 4. *Heterophragma*, DC.

Trees. *Leaves* large, pinnate. *Flowers* large, in terminal woolly panicles. *Calyx* ovoid and closed when young, afterwards campanulate, irregularly 3-5-lobed. *Corolla* tubular-ventricose, rose white or yellow, glabrous or tomentose without; lobes 5, rounded, subequal. *Stamens* 4, didynamous, included; anthers glabrous, the cells linear-oblong, diverging. *Disk* cushion-shaped. *Ovary* sessile; ovules numerous, many-seriate on each placenta; style long; stigma 2-lobed. *Fruit* an elongate cylindric or more or less compressed, falcate or twisted, loculicidally 2-valved, capsule, the dissepiment flat or 4-angular. *Seeds* compressed, with a membranous wing at each end.

*HETEROPHRAGMA ROXBURGHII*, DC.; F. B. I. iv. 381.  
*Bignonia quadrilocularis*, Roxb. Cor. Pl. t. 145.

N. Circars, forests of the Godavari banks at low levels;  
W. Gháts, hills of S. Canara, in deciduous forest areas.

A large tree with fragrant rose-coloured flowers, densely tomentose calyx, imparipinnate leaves with 7-11 leaflets and narrowly oblong capsules up to 1 ft. long. Wood yellowish-white, hard. Vern. Tel. Bondgu; Tam. Baro-kala-goru.

*H. adenophyllum*, Seem., is a Burmese species with large brownish-yellow flowers frequently found in gardens in cultivation.

#### 5. *Stereospermum*, Cham.

Trees. *Leaves* opposite, imparipinnate; leaflets entire or toothed. *Flowers* in large lax terminal panicles. *Calyx* campanulate, truncate or shortly and unequally 5-lobed. *Corolla* tubular-campanulate, curved, 2-lipped, the upper lip 2- the lower 3-lobed; lobes nearly equal, rounded crisped toothed or laciniate. *Stamens* 4 didynamous with a 5th rudimentary, included; anthers glabrous, the cells divergent. *Ovary* sessile, elongate, 2-celled; ovules numerous, biseriate in each cell; style slender; stigmas 2. *Disk* cupular, fleshy. *Fruit* an elongate terete or 4-angled capsule, loculicidally 2-valved; septum thick, corky, cylindrical, pitted in alternating cavities to receive the seeds, the wings of which lie flat along it. *Seeds* trigonous, with a transverse groove without and a prominent ridge within; cotyledons folded, 2-lobed; radicle straight.

Filaments of the stamens with a tuft of woolly hair at the base; leaves and panicles nearly or quite glabrous, the leaflets elliptic, suddenly and long caudate-acuminate at apex; capsule slender, somewhat spirally twisted, 4-angled .....1. *tetragonum*.  
 Filaments of the stamens without a tuft of woolly hair at the base though sometimes villous; leaves and panicles more or less pubescent :—

Petiolules of leaflets very short, scarcely .1 in. long, leaflets broadly elliptic, shortly abruptly acuminate, often serrulate when young, rough; capsule rather stout, nearly terete, lenticellate, usually straight .....2. *suaveolens*.  
 Petiolules of leaflets longer, up to .4 in. long, leaflets oblong or oblong-lanceolate, acuminate, pubescent beneath even when old; capsule slender, terete, lenticellate, often curved 3. *angustifolium*.

1. STEREOSPERMUM TETRAGONUM, DC. *S. chelonoides*, C. B. Clarke, F. B. I. iv. 382; Wt. Ic. t. 1341; Bedd. Fl. t. 72, not of DC.

Deccan, Nallamalai Hills, Veligonda Hills of Nellore (Ramaswami); W. Gháts, in all Districts, up to about 3,000 ft., chiefly in deciduous forests.

A large tree with yellow flowers veined with red, the capsules up to 2 ft. long. Bark brown; wood hard, greyish brown with darker patches, very little used in S. India. Vern. *Hind.* Padri; *Ur.* Patuli; *Tel.* Pisul, Tagada; *Tam.* Vela-padri, Pombathiri; *Mal.* Karingkura.

2. STEREOSPERMUM SUAVEOLENS, DC.; F. B. I. iv. 382; Wt. Ic. t. 1342.

N. Circars and Deccan, in deciduous forests; W. Gháts, also in deciduous forests, in the hills of Mysore, Malabar and Travancore, scarce.

A large tree with dull crimson flowers, and rather thick straight capsules up to 18 in. long. Bark grey, exfoliating in flat scales; wood hard, yellowish-brown, useful for many purposes but little used. Vern. *Hind.* Padal; *Tam.* Padri; *Tel.* Kala goru; *Mar.* Parúl; *Kan.* Billa.

3. STEREOSPERMUM ANGUSTIFOLIUM, Haines in Kew Bull. 1922, 121.

N. Circars, near Vizagapatam (Barber); Deccan, Hyderabad Forests (Edwards).

A small tree.

## 6. Radermachera, Zoll. &amp; Moritz.

Trees. *Leaves* opposite, 1-3-pinnate, leaflets petiolulate, entire. *Flowers* large, in terminal racemes, corymbs or panicles. *Calyx* campanulate, truncate or shortly lobed. *Corolla* funnel-shaped or campanulate; tube short; limb sub-bilabiate, the lobes spreading, rounded. *Stamens* 4, didynamous, with a rudimentary fifth, included; filaments slender; anther-cells divaricate. *Ovary* cylindrical, 2-celled; ovules very numerous, in many rows in each cell; style slender; stigma linguiform. *Fruit* an elongate, often twisted capsule; valves 2, woody; septum spongy, faintly pitted and bearing on each side a double row of seeds. *Seeds* small, flat, with a membranous wing at each end; cotyledons flat, not folded; internal testa thin; radicle minute.

RADERMACHERA XYLOCARPA, K. Schum. *Stereospermum xylocarpum*, Benth. & Hook. f.; F. B. I. iv. 383. *Bignonia xylocarpa*, Roxb.; Wt. Ic. tt. 1335, 6; Bedd. Fl. t. 70. *Spathodea xylocarpa*, Brand. For. Fl. t. 43.

N. Circars, hills of Godavari; Deccan, hilly country as at Horsley-konda, Ramandrúg, etc., up to 4,000 ft.; W. Gháts, dry forests in all Districts.

A large deciduous tree with large bipinnate leaves, fragrant flowers in corymbs, a white corolla tinged with yellow or pink, and a long very woody cylindric prominently tubercular capsule sometimes up to 3 ft. long and 1.5 in. in diam. Bark light grey; wood very hard, orange-brown, tough, used for furniture, cart-poles and other purposes. Vern. *Tam.* Vadencarni, Pathiri; *Mar.* Khansing; *Mal.* Vedangkonnai.

## 7. Pajanelia, DC.

A tree. *Leaves* imparipinnate; leaflets numerous, entire, unequal at base. *Flowers* large, in large terminal thyrsoid panicles. *Calyx* large, ovoid, closed in bud, in flower ventricose-campanulate; lobes 5. *Corolla* large, tubular-ventricose; lobes 5, subequal, crisped on the margins. *Stamens* 4, didynamous, with a rudimentary fifth, sub-exsert; filaments slender; anther-cells linear, divergent. *Disk* annular. *Ovary* 2-celled; ovules many-seriate on each placenta; style long; stigma 2-lobed. *Fruit* a large, narrowly oblong, compressed, winged capsule,

loculicidally 2-valved, the septum contrary to the valves. *Seeds* compressed, with hyaline wings; cotyledons emarginate.

**PAJANELIA RHEEDII**, Wt. Ic. tt. 1343, 44; F. B. I. iv. 384.

W. Coast, S. Canara to Travancore, up to 2,000 ft. in the W. Gháts forests (Beddome); much planted as a support for the pepper plant (Bourdillon).

A large deciduous tree in the forests, moderate-sized in plantations, having leaves with 13-15 large leaflets, a large capsule sometimes nearly 2 ft. long with broad wings and corollas 2.5 in. long, white in the tube, crimson-purple on the lobes (Bourd. Trees Trav. 278). Bark pale grey, shining, rough; wood sometimes used for dugout canoes in Travancore. Vern. *Tam.* Aranthai; *Mal.* Arlantha, Payani.

Several interesting species of this Family, trees or erect or climbing shrubs, have been introduced and cultivated. The most common of these are:

*Markhamia stipulata*, Seem. (*Dolichandrone stipulata*, Benth. and Hook. f.; F. B. I. iv. 379), a tree from Burma, with yellowish-brown tomentose leaves and inflorescence, the corolla purple inside.

*Spathodea campanulata*, Beauv., a tree, introduced from Tropical Africa, with large orange-scarlet flowers, the calyx spathaceous.

*Kigelia pinnata*, DC., a small tree, introduced from Tropical Africa, with pendulous racemes of large red flowers and a long-stalked large gourd-like fruit.

*Stenolobium stans*, D. Don, a large West Indian shrub with golden-yellow flowers, common in gardens.

*Pyrostegia ignea*, Presl, a large climbing shrub, native of Brazil, commonly cultivated in gardens, and conspicuous for its showy racemes of orange-red flowers.

#### Family CXII. PEDALIACEAE.

Herbs, rarely undershrubs. *Leaves* opposite or the upper alternate, entire toothed or lobed; stipules 0. *Flowers* irregular, hermaphrodite, solitary or rarely clustered or racemose, usually axillary; bracts 0 or minute. *Calyx* usually deeply 4-5-lobed. *Corolla* tubular-ventricose; limb 5-lobed, obscurely 2-lipped; lobes imbricate. *Stamens* 4, didynamous, rarely 2. *Disk* hypo-

gynous, fleshy. *Ovary* 2- rarely 1-celled, ovules many or few, superposed; style filiform; stigma 2-lobed. *Fruit* drupaceous or capsular. *Seeds* exalbuminous.

Flowers axillary; stamens 4, didynamous, perfect:—

Fruit indehiscent, with 4 spines on the margin; seeds 2 in each cell .....1. **Pedaliium**.

Fruit capsular, 2-valved, not spinous; seeds many in each cell  
2. **Sesamum**.

Flowers in racemes; stamens 2 only perfect; fruit drupaceous with dehiscent pericarp and hard 2-clawed endocarp .....**Martynia**.

### 1. **Pedaliium**, Linn.

A glabrous annual. *Leaves* opposite or alternate, repand-dentate. *Flowers* axillary, solitary, yellow; pedicels short, 2-glandular at the base. *Calyx* small, 5-partite. *Corolla*-tube slender below, enlarged above; limb sub-bilabiate; lobes 5, round, spreading. *Stamens* 4, didynamous, with a 5th rudimentary; anther-cells ovate, pendulous, opening by short slits. *Disk* large, oblique. *Ovary* 2-celled, ovules 2 in each cell; style slender; stigma 2-lobed, the lower the smaller. *Fruit* hard, indehiscent, 2-celled; the upper part ovoid obtuse above, tetragonous below with sharp conical spines at the angles. *Seeds* 2 in each cell, superposed, pendulous, oblong; testa membranous, produced; cotyledons oblong.

**PEDALIUM MUREX**, Linn.; F. B. I. iv. 386; Wt. Ic. t. 1615.

E. Coast from the Chilka Lake southwards, on sandy shores; inland in the Carnatic, Coimbatore (Wight, etc.), Trichinopoly (King).

A branching sub-fleshy herb with minute glands, badly smelling, the leaves glaucous green, ovate, repand, long-petioled, the fruits spinous. The whole plant is used in medicine, and renders water or milk mucilaginous. Vern. *Ur*. Gokara; *Tam*. Anai-nerinji.

### 2. **Sesamum**, Linn.

Erect or prostrate herbs. *Leaves* opposite below, alternate above, entire toothed lobed or divided. *Flowers* axillary solitary or few and fascicled, shortly pedicelled. *Calyx* small, 5-partite. *Corolla* tubular-ventricose, slightly gibbous at base, 2-lipped,

the upper lip usually the smaller, often a ring of hairs at the base inside below the stamens. *Stamens* 4, didynamous, included; anther-cells oblong, parallel. *Disk* annular. *Ovary* 2-celled, with false septa making it 4-celled when mature; ovules many, 1-seriate in each cell; style filiform; stigma 2-lobed. *Fruit* an oblong or ovoid capsule, loculicidally 2-valved, 4-chambered. *Seeds* many, obliquely oblong or obovate, sub-compressed; cotyledons elliptic-oblong.

Erect herbs; leaves large, thin, the lower ones lobed or pedatisect, sparsely hairy, the lobes often serrate, up to 5 in. long; corollas whitish-pink or purplish, with yellow marks, 1-1.25 in. long; capsule oblong, 1 in. long, dehiscent from above to about halfway down

1. *indicum*.

Prostrate branching herbs; capsule ovoid, .5 in. or more long:—

Leaves variable, from elliptic or orbicular in outline and deeply pinnatifid to spatulate and coarsely lobed, 1-2 in. long, grey-hispid-pubescent; flowers 1-1.5 in. long; capsule .6 in. long, .3 in. broad, obtuse and apiculate . . . . . 2. *laciniatum*.

Leaves orbicular or obovate, crenate, densely white tomentose beneath, .3-.5 in. in diam.; flowers .75-1 in. long; capsule .5-.7 in. long, obtuse, broad at base, then contracted, apiculate

3. *prostratum*.

1. *SESAMUM INDICUM*, Linn.; F. B. I. iv. 387; Wt. III t. 163.

All districts, in the plains and lower hills, largely cultivated and often found run wild on road sides and waste land. Gingelly.

An erect annual up to 2 ft. high, branching from the base, the seeds obovate, smooth, margined, black or white. The seeds give a valuable oil, used for cooking, for lamps and for many other purposes and largely exported. Vern.

*Hind.* Til; *Tel.* Nuvvulu; *Tam.* Yellu cheddi.

2. *SESAMUM LACINIATUM*, Klein; F. B. I. iv. 387; Wt. Ic. t. 1345.

Deccan, in Cuddapah and Kurnool; Carnatic, Kambakam Hill in Chingleput, usually on dry rocky ground.

A stout herb with many prostrate branching stems from a stout central rootstock, the flowers dark purple, the seeds black and deeply reticulate.

3. *SESAMUM PROSTRATUM*, Retz; F. B. I. iv. 387; Wt. Ic. t. 1346.



E. coast from the Kistna southwards, on sandhills near the sea ; inland at Bangalore (Cleghorn) and near Coimbatore (Fischer) on dry sandy lands ; Kambakam Hill in Chingleput (Bourne).

A prostrate herb with long trailing branches from a thick taproot, the flowers purple, the seeds black and reticulate.

*Martynia annua*, Linn., the Tiger-claw plant, is a coarse clammy pubescent herb with handsome large rose-coloured blotched flowers, large deltoid-ovate cordate leaves and a curious fruit with 2 sharp anterior hooks. It is common on roadsides, rubbish heaps and waste places. It is a native of Mexico.

### Family CXIII. ACANTHACEAE.

Herbs or shrubs, rarely trees. *Leaves* opposite, usually entire, usually lineolate with prominent raphides ; stipules 0. *Flowers* hermaphrodite, usually irregular, in cymes racemes or spikes rarely solitary ; bracts large or small, sometimes 0 ; bracteoles usually 2. *Calyx* 5-, rarely 4-partite (in *Thunbergia* small, often multifid). *Corolla* 2-lipped or subequally 5-lobed ; lobes imbricate or twisted in bud. *Stamens* 4 or 2, inserted on the corolla-tube, sometimes a staminode 5th ; anthers 2- or 1-celled, the cells sometimes remote. *Disk* often conspicuous. *Ovary* superior, 2-celled ; ovules 1 or more in each cell, in one or two series, anatropous ; style simple ; stigma usually 2-lobed, the lobes often unequal. *Fruit* a loculicidal capsule, the valves often elastically recurved, the septum splitting. *Seeds* usually hard, attached, except in a few genera, to upcurved supports (*retinacula*), ovoid or compressed, the testa smooth or rugose or clothed with appressed hairs which are often elastic and spread out when wetted ; albumen none or rarely scanty ; cotyledons usually flattened.

Seeds not supported on retinacula ; leaves not lineolate :—

Climbers ; flowers usually large ; ovules 2 in each cell, collateral :—

Calyx minute, annular or 10–15-toothed ..... 1. *Thunbergia*.

Calyx 5-lobed ..... 2. *Meyenia*.

Erect or prostrate plants ; flowers usually small ; ovules more than 2 in each cell :—

Calyx 4-partite ; stamens 2 :—

Bracts rigid ; peduncle of spike covered with alternate scales

3. *Elytraria*.

Bracts herbaceous ; peduncle of spike without scales or 0

4. *Nelsonia*.

Calyx 5-partite ; stamens 4 ..... 5. *Staurogyne*.

Seeds supported on retinacula :—

Retinacula minute, straight ; lower leaves often toothed or pin-natifid ..... 6. *Cardanthera*.

Retinacula hooked :—

Corolla without an upper lip, the lower lip large, expanded, 3-lobed :—

Lower filaments with an excurrent process ..... 7. *Blepharis*.

Lower filaments without an excurrent process .... 8. *Acanthus*.

Corolla 2-lipped or with 5 subequal lobes :—

Corolla-lobes twisted to the left in bud :—

Ovules more than 2 in each cell ; the capsule normally 6- or more seeded :—

Corolla distinctly 2-lipped :—

Inflorescence spinous ; capsule 2-8-seeded

9. *Asteracantha*.

Inflorescence not spinous ; capsule 8- or more seeded

10. *Hygrophila*.

Corolla subequally 5-lobed :—

Capsule clavate with a solid base ..... 11. *Ruellia*.

Capsule seed-bearing from the base :—

Flowers capitate or axillary, subsessile

12. *Hemigraphis*.

Flowers in clusters in terminal panicles

13. *Stenosiphonium*.

Ovules 2 in each cell ; the capsule 4- or fewer-seeded :—

Placentas separating elastically from the base of the ripe capsule :—

Bracteoles very large, reticulate ; corolla large

14. *Petalidium*.

Bracteoles none ; corolla small ..... 15. *Micranthus*.

Placentas not separating elastically from the base of the ripe capsule :—

Anthers minutely mucronate at base ; stamens 4

16. *Dyschoriste*.

Anthers not spurred at the base :—

Corolla subequally 5-lobed :—

Stamens 2 ; corolla-tube long and linear

17. *Eranthemum*.

Stamens 4 or 2; corolla-tube usually short and cylindric below, ventricose above 18. **Strobilanthes.**

Corolla deeply 2-lipped; stamens 4..19. **Calacanthus.**  
Corolla-lobes imbricate in bud :—

Ovules 3–10 in each cell; capsule normally 6- or more-seeded :—

Capsule compressed at right angles to the septum; seeds ovoid hardly compressed :—

Flowers in paniced often unilateral racemes, without axillary cladodes .....20. **Andrographis.**

Flowers clustered in the midst of axillary cladodes

21. **Haplanthus.**

Capsule subterete; seed much compressed :—

Corolla-tube slender, the limb shortly 2-lipped

22. **Gymnostachyum.**

Corolla-tube short, the limb deeply 2-lipped

23. **Diotacanthus.**

Ovules 2 or rarely 1 in each cell :—

Corolla-lobes 5, subequal :—

Anthers 1-celled; 2 inner calyx-lobes smaller than the outer .....24. **Crossandra.**

Anthers 2-celled :—

Calyx 4-partite, the anterior lobe of the outer pair more or less bifid; 2 stamens only fully perfect

25. **Barleria.**

Calyx 2-partite, the upper lip 3- the lower 2-lobed; 4 stamens, one pair perfect the other imperfect

26. **Neuracanthus.**

Calyx 5-partite :—

Stamens 4; corolla-tube cylindric below, inflated above.....27. **Asystasia.**

Stamens 2; corolla-tube long and slender, limb spreading .....28. **Pseuderanthemum.**

Corolla distinctly 2-lipped :—

Stamens 4, anthers 2-celled; bracts conspicuous, often spinous.....29. **Lepidagathis.**

Stamens 2 :—

Anthers 1-celled; bracts and bracteoles linear-setaceous .....30. **Monotheceium.**

Anthers 2-celled :—

Placentas separating elastically from the valves, from the base :—

Bracts in 1-sided spikes, some of the rows barren

31. *Rungia*.

Bracts clustered in the leaf-axils or laxly cymose

32. *Dicliptera*.

Placentas not separating elastically from the valves :—

Anther-cells parallel, subequal ; bracts large, imbricate ..... 33. *Ecbolium*.

Anther-cells one higher up than the other :—

Anther-cells with a white basal spur-like appendage ..... 34. *Justicia*.

Anther-cells not appendaged spur-like at base :—

Anther-cells minutely apiculate at base ; bracts large ..... 35. *Adhatoda*.

Anther-cells muticous ; capsule at base stalked :—

Corolla-tube short, limb small

36. *Dianthera*.

Corolla-tube long and slender, the upper lip linear-oblong, the lower broad ; bracts and bracteoles small ; corolla white

37. *Rhinacanthus*.

Corolla-tube slender, often twisted ; bracts larger than bracteoles in opposite pairs ; corolla rose or purple .... 38. *Peristrophe*.

# 1. *Thunbergia*, Linn. f.

Climbers, rarely erect. *Leaves* opposite, often cordate hastate or angular palminerved. *Flowers* axillary or in racemes, large or moderate-sized ; bracts at the base of the pedicels leaf-like ; bracteoles large, enclosing the flower buds. *Calyx* small, annular or 10-16-toothed or obscure. *Corolla* conspicuous, the tube cylindric or ventricose, curved, the limb oblique ; lobes 5, twisted to the left in bud. *Stamens* 4, didynamous, inserted near the base of the corolla-tube ; anthers 2-celled, the cells parallel, sometimes spurred at the base. *Disk* annular or cushion-like. *Ovary* 2-celled ; ovules 2 in each cell ; style long ; stigma funnel-shaped 2-lobed or entire, or style bifid with capitate stigmas. *Fruit* a capsule, globose below, suddenly narrowed to a barren sword-shaped beak. *Seeds* 2 in each cell, globose, the base hollowed or flattened, the funicle minute or conic, no retinacula.

Flowers axillary, solitary or in pairs on long pedicels; calyx 10–16-toothed :—

Flowers white, leaf-petioles not winged :—

Calyx-teeth linear lanceolate, up to .15 in. long; leaves ovate or oblong, cordate or hastate at base, often angularly lobed, from nearly glabrous to softly tomentose; capsule glabrous or puberulous.....1. *fragrans*.

Calyx-teeth filiform, very villous, up to .25 in. long; leaves ovate or ovate-lanceolate, cordate to hastate with spreading lobes at base, tomentose when young afterwards nearly glabrous; capsule villous .....2. *tomentosa*.

Flowers yellow with purple-black brown or claret-coloured throat; leaf-petioles winged; leaves ovate cordate or hastate, villous; calyx-lobes short, villous; capsule villous, the beak slender

3. *alata*.

Flowers in racemes, the lower ones often axillary; calyx an entire or slightly crenulate ring :—

Flowers bright yellow or orange, the tube purplish, in long pendent racemes; anthers bearded and with a long slender spur to each cell; leaves lanceolate, acuminate, up to 6 in. long, 2 in. broad, sometimes ovate and up to 3 in. broad, slightly dentate, prominently 3-ribbed and coarsely reticulate, glabrous .....4. *mysorensis*.

Flowers pale blue :—

Racemes long, pendent, the bracteoles very prominent, orbicular-cordate, mucronate, about 1 in. in diam. and usually 7-ribbed; anthers glabrous with a long spur to each cell; leaves elliptic-ovate, long-acuminate, up to 5 in. long, 4 in. broad, repand-dentate, 5-ribbed and reticulate .....5. *Wightiana*.

Racemes stout, rather dense-flowered, with flowers also in upper axils, solitary or in pairs; bracteoles elliptic-falcate about 1.25 in. long; anthers bearded and spurred; leaves deeply cordate, angular, about 5 in. in diam. .... *grandiflora*.

# 1. THUNBERGIA FRAGRANS, Roxb. Cor. Pl. t. 67; F. B. I. iv. 390.

All Districts, but especially on the E. side, up to about 4,000 ft., in the hills, both the species and the varieties *laevis* and *vestita*.

A slender twiner with variable leaves, the end branches having them rather narrow and oblong lanceolate, the flowers not fragrant.

Var. *laevis*, C. B. Clarke. Calyx-tube rather long and stiff,

nearly glabrous, the teeth short; leaves thin and reticulate; pedicels often much thickened.

Var. *vestita*, C. B. Clarke. Calyx-tube short, teeth linear, very villous; leaves thick, tawny-villous, often tomentose.

Var. *hispidula*, Gamble. Stems and leaves hispid, sometimes nearly strigose; leaves broadly ovate, subcordate, apiculate, repand; bracteoles large; calyx teeth villous.

N. Circars, Mahendragiri in Ganjam (Fischer), Vantabla in Vizagapatam (A. W. Lushington), about 4,000 ft.

2. *THUNBERGIA TOMENTOSA*, Wall.; F. B. I. iv. 391.

W. Gháts, Nilgiri Hills, at 5,000–6,500 ft. (Wight and others), at Coonoor (Meebold); Sirumalai Hills of Madura. A slender climber with prominent large ovate bracteoles, slender cylindric corolla-tube 1.25 in. long and large rounded lobes, the mature leaves reticulately nerved and with long basal auricles.

3. *THUNBERGIA ALATA*, Bojer Ex. Sims Bot. Mag. t. 2591; F. B. I. iv. 391.

Most Districts, cultivated in gardens and apparently run wild in places in the W. Gháts, native of Tropical Africa. A slender climber.

4. *THUNBERGIA MYSORENSIS*, T. And.; F. B. I. iv. 393. *Hexacentris mysorensis*, Wt. Ic. t. 871.

W. Gháts, S. Canara and Mysore to Travancore and Tinnevely, up to 3,000 ft.

An extensive glabrous climber with long slender branches, the flowers pendent with long open corolla-lip, the bracteoles ovate-oblong, purplish-green.

5. *THUNBERGIA WIGHTIANA*, T. And.; F. B. I. iv. 393. *Schmidia bicolor*, Wt. Ic. t. 1848.

W. Gháts, Nilgiri Hills, W. side, below Sispara, about 5,000 ft.

A large climber with long pendent branches, the conspicuous bracteoles 2-coloured, half red and half green.

*Thunbergia grandiflora*, Roxb.; F. B. I. iv. 392; Wt. Ic. t. 872 is a large and beautiful blue-flowered climber, native of Eastern Bengal, frequently grown in gardens. *T. erecta*, T. And., is an erect shrub about 6 ft. high with purple or white flowers, a native of Tropical Africa, often grown in gardens.

2. *Meyenia*, Nees.

A climber. *Leaves* opposite, coriaceous. *Flowers* large, usually solitary, axillary, pedicellate; bracteoles large, ovato-oblong. *Calyx* small, obscurely 5-lobed. *Corolla* funnel-shaped, the throat gradually enlarged; lobes 5 spreading, subequal. *Stamens* 4, didynamous; anthers bearded at the apex, those of the longer pair with unequal cells, one long and narrow, the others spurred at the base, those of the shorter with subequal cells, not spurred, pollen-grains crimped on the margins. *Ovary* 2-celled; ovules 2 in each cell; style slender; stigma 2-lobed, each lobe with a fold behind. *Fruit* a capsule, swollen at the base, with a broad conical beak, 4-seeded. *Seeds* subglobose, the funicle in a small cavity, no retinacula; cotyledons unequal.

MEYENIA HAWTAYNEANA, Nees; Wt. Ic. t. 1487. *Thunbergia Hawtayneana*, Wall. Pl. As. Rar. t. 164; F. B. I. iv. 391.

Deccan and Carnatic, in hilly country, up to 4,000 ft.; W. Gháts, from S. Canara to Nilgiris and Pulneys, on E. slopes chiefly, in dry country.

A small climbing shrub with slender branches, beautiful blue-purple flowers and ovate acute sessile reticulate leaves up to 4.5 in. long, 2 in. broad.

3. *Elytraria*, Vahl.

Herbs, nearly stemless. *Leaves* alternate, crowded, subradical. *Flowers* small, in close rigid, simple or branched, spikes, the scapes closely covered by spirally imbricate bracts, the upper ones larger and flower-bearing; bracteoles small. *Calyx* 4-partite, the segments unequal. *Corolla*-tube linear; limb 2-lipped; lobes 5, the lower longest, imbricate in bud. *Stamens* 2 perfect; anthers elliptic, the cells parallel, sometimes with a minute spur. *Disk* small. *Ovary* oblong, 2-celled; ovules 6-10, superposed, in each cell; style slender; stigma shortly 2-lobed. *Fruit* an oblong acute capsule. *Seeds* small, reticulate, not on retinacula; cotyledons small, round.

ELYTRARIA ACAULIS, Lindau. *E. crenata*, Vahl; F. B. I. iv. 394. *Justicia acaulis*, Linn. f.; Roxb. Cor. Pl. t. 127.

N. Circars, Deccan and Carnatic, in dry Districts, in grassy lands and open forest undergrowth.-

A scapigerous herb with small white flowers on long bracteate scapes, the leaves obovate, crenate, obtuse, up to 8 in. long, 2.5 in. broad, the bases surrounded by woolly hairs.

#### 4. *Nelsonia*, R. Br.

Diffuse softly villous herbs. *Leaves* opposite, entire, subequal. *Flowers* small, in dense short spikes with many ovate closely imbricate glandular villous bracts; bracteoles 0. *Calyx* small, 4-partite; lobes unequal, lanceolate, the larger often bifid. *Corolla* small; tube slender; limb 2-lipped; lobes spreading, obtuse. *Stamens* 2, attached above the middle of the corolla-tube; anthers 2-celled, the cells ellipsoid, divergent, muticous or minutely spurred. *Ovary* 2-celled; ovules 8-10 in each cell; style slender; stigma shortly 2-lobed. *Fruit* an oblong, acute capsule, the lower part seed-bearing only. *Seeds* small, subglobose, granular, no retinacula.

NELSONIA CAMPESTRIS, R. Br.; F. B. I. iv. 394.

N. Circars, in undergrowth of deciduous fruit; W. Gháts, Mysore, Malabar and Travancore, at low levels.

A soft trailing herb with purplish flowers, the lower leaves large, oblong, up to 9 in. long, 2 in. broad, long-petioled, the upper ones much smaller and often sessile.

#### 5. *Staurogyne*, Wall.

Herbs or small undershrubs. *Leaves* opposite, rarely alternate, usually petioled with smaller leaves in the axils. *Flowers* small, in terminal or also axillary, simple or compound, lax or dense, spikes or racemes; bracts small or large and leafy; bracteoles 2, small. *Calyx* deeply 5-partite; segments linear or oblong, subequal or one larger than the others. *Corolla*-tube cylindric or funnel-shaped; limb 2-lipped; lobes 5, short, spreading. *Stamens* 4, didynamous, included, with sometimes a minute staminodial fifth; filaments hairy; anthers with 2 ovoid separate muticous cells. *Disk* small. *Ovary* oblong, 2-celled; ovules numerous; style slender; stigma of 2 narrow lobes, one often again 2-lobed. *Fruit* an oblong capsule with many seeds, seed-bearing throughout. *Seeds* many, globose, smooth or pitted, the hilum hollowed, no retinacula.



Stem erect, the branches not trailing, viscous-pubescent; upper leaves or nearly all alternate, spathulate; bract narrow spathulate, bracteoles 2 linear, small; seeds globose, not pitted.....1. *glauca*. Stem-branches trailing with short erect stems from the nodes, hispid, not viscous; leaves all opposite, elliptic-oblong or obovate; bract broad, obovate, bracteoles 2 linear-lanceolate; seeds pitted

2. *zeylanica*.

1. STAUROGYNE GLAUCA, O. Kze. *Ebermaiera glauca*, Nees; F. B. I. iv. 395; Wt. Ic. t. 1488. *E. ligulata*, Bedd. Ic. t. 245.

N. Circars, in Ganjam (Gamble); Deccan, in Kurnool, Nallamalai Hills (Beddome); W. Ghâts, Coorg to Travancore, in wet places.

An erect viscous herb with purplish flowers, striped rose or yellow.

2. STAUROGYNE ZEYLANICA, O. Kze. *Ebermaiera zeylanica*, Nees; F. B. I. iv. 397.

Deccan, in Mysore; W. Ghâts from S. Canara to Travancore, not common.

A herb of wet places in the forests with trailing branches.

### 6. Cardanthera, Buch.-Ham.

Aromatic, often viscid herbs. *Leaves* opposite, often lineolate, the upper toothed, rarely entire, the lower often pinnatifid, or if submerged, pectinate. *Flowers* in spikes or axillary whorls or 1-3 in the leaf-axils; bracts and bracteoles foliaceous, but often suppressed. *Calyx* 5-partite, the lobes narrow, often unequal. *Corolla*-tube straight; limb 2-lipped, the upper erect, 2-lobed, the lower 3-lobed with a transversely plaited palate. *Stamens* 4, didynamous, anthers of the posterior pair often smaller, cells parallel. *Ovary* narrow, 2-celled; ovules many; style slender; stigma linear, bent. *Fruit* a narrow 2-celled capsule, many-seeded throughout. *Seeds* very many, small, ovoid; retinacula minute, conical, straight.

Flowers in terminal spikes with ovate imbricating bracts; calyx-lobes linear; leaves ovate or oblong or spathulate, up 2.5 in. long, .5 in. broad, entire or crenate.....1. *uliginosa*. Flowers in axillary whorls :—

Glabrous or nearly so; bracts and calyx-lobes linear-lanceolate,

acuminate; leaves oblong, crenate-serrate, up to 2 in. long, .4 in. broad, the lower ones sometimes pinnatifid.....2. *balsamica*. Crispate-villous; bracts and calyx-lobes spatulate, obtuse; leaves elliptic or obovate, up to 1 in. long, .3 in. broad, crenulate

3. *verticillata*.

Flowers solitary in opposite axils, rarely in loose spikes; bracts obovate; calyx-lobes linear, often toothed; leaves deeply pinnatifid, up to 4 in. long, 1 in. broad.....4. *pinnatifida*.

1. *CARDANTHERA ULIGINOSA*, Buch.-Ham.; F. B. I. iv. 403.

N. Circars, Ganjam (Gamble), Godavari in sugar-cane gardens (Bourne); Carnatic, near Madras, in drying rice-fields (Wight); W. Ghâts, Anamalai Hills, at 800 ft. (Fischer).

An erect or decumbent branching annual herb with purplish (?) flowers.

2. *CARDANTHERA BALSAMICA*, C. B. Clarke; F. B. I. iv. 404.

*Adenosma balsamea*, Spr.; Wt. Ic. t. 446.

N. Circars, Deccan and Carnatic, in rice-fields, common.

An erect or decumbent branching annual herb with pink or lilac flowers.

3. *CARDANTHERA VERTICILLATA*, C. B. Clarke; F. B. I. iv.

404. *Adenosma verticillata*, Nees; Wt. Ic. t. 1524.

Deccan, in Mysore (Wight); S. Canara (Beddome) in rice-fields.

An erect annual herb with purplish flowers, often rooting below.

4. *CARDANTHERA PINNATIFIDA*, C. B. Clarke; F. B. I. iv. 405.

*Adenosma pinnatifida*, T. And.; Bedd. Ic. t. 246.

S. Canara (Wight), on river banks (Dalzell).

A slender glandular herb with purple flowers and pinnatifid leaves.

7. *Blepharis*, Juss.

Herbs or undershrubs, often spinous. Leaves opposite or 4 in a whorl, sometimes unequal, subentire toothed or spinous. Flowers small or moderate-sized, in terminal spikes or on suppressed lateral branches; spikes 1- or few-flowered or capitate or strobilate; bracts in several opposite decussate pairs. Calyx 4-partite; lobes unequal, in opposite pairs, the inner smaller. Corolla-tube horny, upper lip subobsolete, lower spreading, flat,

with 3-5 rounded lobes. *Stamens* 4, didynamous; filaments thick, rigid, the anterior ones produced beyond the insertion of the anthers; anthers 1-celled, the margins thickly bearded, the 2nd cell small or obsolete. *Disk* annular. *Ovary* 2-celled; ovules 2 in each cell; style linear; stigma shortly 2-fid. *Capsule* oblong; or ovoid, 2- or 4-celled. *Seeds* compressed, orbicular, echinate-papillose, on rigid retinacula.

Leaves in opposite pairs, ovate-lanceolate, acute, entire or spinous-dentate, up to 3 in. long, 1.5 in. broad, with scattered bulbous-based hairs; flowers solitary or in few-flowered terminal spikes; bracts 3 pairs, the middle pair 3-toothed; calyx with the outer lobe spatulate, 1 in. long, the opposite one nearly as long, 2-toothed, the inner pairs smaller, lanceolate; corolla lip 1 in. long; capsule oblong, 4-seeded; the seeds shortly softly echinate, on obtuse retinacula ..1. *asperrima*. Leaves 4 in a whorl; flowers solitary or 2-3 together; bracts 4 pairs, all with glochidiate spinous teeth; capsule ovoid, 2-seeded, the seeds with long processes, on sharp retinacula :—

Leaves petioled, membranous, up to 5 in. long, 2 in. broad, coarsely toothed; calyx with the outer lobe 1 in. long, oblong, the opposite one similar but smaller, the inner pair smaller still; corolla lip up to 1 in. long.....2. *boerhaaviaefolia*. Leaves subsessile, thick, obovate-oblong, up to 1 in. long, .3 in. broad, entire, with long scattered hairs; calyx with outer lobe .3 in. long, the opposite one similar, 2-toothed, the inner pair linear; corolla-lip .35 in. long .....3. *molluginifolia*.

1. BLEPHARIS ASPERRIMA, Nees; F. B. I. iv. 478; Wt. Ic. t. 1534.

W. Gháts, hills of S. Canara, Mysore and Coorg.

A diffuse, erect or prostrate, herbaceous plant with blue flowers, the bracts and calyx white with green veins.

2. BLEPHARIS BOERHAAVIAEFOLIA, Pers.; F. B. I. iv. 478; Wt. Ic. t. 458.

N. Circars, Deccan and Carnatic, in dry Districts, but usually in shady places, up to 4,000 ft.

A prostrate wiry undershrub with pale blue or pink flowers, veined darker and with a yellow spot on the lip, the bracts white veined with green.

3. BLEPHARIS MOLLUGINIFOLIA, Pers.; F. B. I. iv. 479.

N. Circars, Deccan and Carnatic, on dry stony lands, or sandy places near the sea.

A prostrate wiry undershrub with small blue flowers, the capsules always closely surrounded by the bracts and calyx-lobes.

### 8. *Acanthus*, Linn.

Erect or twining herbs or shrubs. *Leaves* pinnatifid, toothed, spinous, rarely entire, the petioles sometimes with spines at their bases. *Flowers* in terminal or pseudo-axillary, strobilate or interrupted spikes; bracts ovate, large, spinescent or small, decussate bracteoles large lanceolate, or 0. *Calyx* 4-partite, the outer 2 lobes the larger. *Corolla*-tube short, horny, upper lip obsolete, lower elongate, obovate, shortly obtusely 3-lobed. *Stamens* 4, didynamous, shorter than the lower lip; filaments stout, curved, not produced beyond the anther; anthers 1-celled, oblong, bearded. *Disk* 0. *Ovary* 2-celled; ovules 2 in each cell; style slender; stigma bifid. *Capsule* ellipsoid, compressed, shining. *Seeds* 4, compressed, orbicular; testa lax and often soft and corrugated.

*ACANTHUS ILICIFOLIUS*, Linn.; F. B. I. iv. 481. *Dilivaria ilicifolia*, Juss.; Wt. Ic. t. 459.

East and West Coasts, in tidal forests. Sea Holly.

A gregarious shrub reaching 5 feet in height with large blue flowers and spinous holly-like leaves, sharp spines also at the bases of the petioles. Vern. *Hind.* Hargoza; *Tel.* Alisi, Alchi; *Mar.* Marandi.

### 9. *Asteracantha*, Nees.

A stout herb of wet places; stems numerous, with long sharp thorns at the nodes. *Leaves* narrow, lanceolate, lineolate, in whorls of 6, the two outer leaves of each whorl the larger. *Flowers* in sessile axillary whorls, surrounded by the slightly recurved spines; bracts leafy; bracteoles linear-lanceolate. *Calyx* deeply 4-partite, the upper lobe the largest. *Corolla* 2-lipped, the upper lip 2- the lower 3-lobed with 2 crested folds on the palate; tube cylindric below, enlarged above. *Stamens* 4, didynamous; anthers 2-celled, equal, the cells parallel. *Ovary* 2-celled; ovules 4 in each cell; style pubescent; stigma simple. *Fruit* a linear-oblong capsule. *Seeds* 4-8 on hard retinacula, flat and white-hairy when wet.

*ASTERACANTHA LONGIFOLIA*, Nees; Wt. Ic. t. 449. *Hygrophila spinosa*, T. And.; F. B. I. iv. 408.

All plains Districts, in wet places, rice-fields, the margins of tanks, etc., common.

A tall hispid herb with pale blue-purple flowers and leaves up to 7 in. long, 1 in. broad. Vern. *Hind.* Talmakhana, Kantakalia; *Tam.* Nirmuli.

#### 10. *Hygrophila*, R. Br.

Herbs, usually found in wet places. *Leaves* opposite, entire, usually lineolate on the upper surface. *Flowers* bluish-purple, sessile, in terminal heads or axillary whorls; bracts elliptic or lanceolate; bracteoles linear or lanceolate. *Calyx* tubular, 5-fid; lobes linear or lanceolate. *Corolla*-tube dilated above; limb 2-lipped, nearly glabrous, lobes twisted to the left in bud. *Stamens* 4, didynamous, the posterior pair sometimes smaller or rudimentary; filaments glabrous; anthers oblong, the cells equal, divaricate or connate at the base. *Ovary* oblong, the tip pubescent; ovules few or many in each cell; style slender, hairy; stigma simple, linear. *Fruit* a narrowly oblong capsule, seed-bearing from the base. *Seeds* numerous, rarely few, ovoid, compressed, hygroscopically hairy; retinacula hard, curved, acute.

Procumbent herbs with flowers in terminal spikes, the leaves small:—

Spikes 1–5 in. long, glabrous or slightly pubescent; fertile stamens 2 only, the posterior pair reduced to slender curved staminodes; leaves usually glabrous, ovate or oblong, obtuse, 5–15 in. long; seeds 20 or more.....1. *polysperma*.

Spikes under 1 in. long, white-strigose; fertile stamens 4, the anthers of the posterior pair smaller; leaves hairy, elliptic or sub-orbicular, 25–5 in. in diam.; seeds 8–10.....2. *Serpyllum*.

Erect herbs with flowers in axillary whorls, the leaves rather large.

Bracteoles acute, lanceolate, hispid-ciliate; calyx divided halfway down, the lobes acuminate and white hispid-ciliate; leaves linear or linear-lanceolate.....3. *angustifolia*.

Bracteoles obtuse, oblong, strigose; calyx divided one-third way down, the lobes long acuminate, strigose but scarcely hispid-ciliate; leaves obovate or elliptic.....4. *quadrivalvis*.

1. *HYGROPHILA POLYSPERMA*, T. And.; F. B. I. iv. 406.

*Hemiadelphis polysperma*, Nees; Wt. Ic. t. 1492.

N. Circars, in Kimedya (Beddome).

A branching and rooting small herb of wet places with pale blue flowers.

2. *HYGROPHILA SERPYLLUM*, T. And.; F. B. I. iv. 406. *Physichilus Serpyllum*, Nees; Wt. Ic. t. 1493.

Deccan, in Mysore (J. Campbell).

A small branching herb of variable forms of leaf, from a woody rootstock.

3. *HYGROPHILA ANGUSTIFOLIA*, R. Br. *H. salicifolia*, Nees; F. B. I. iv. 407; Wt. Ic. t. 1490.

N. Circars, in Godavari; W. Gháts, in all Districts from S. Canara and Mysore southwards, up to 4,000 ft.; in swampy places and along streams.

An erect herb up to 3 ft. in height, usually rooting at the lower nodes, the stems more or less quadrangular, the leaves narrow, the flowers pale purplish-blue.

4. *HYGROPHILA QUADRIALVIS*, Nees; F. B. I. iv. 408. *H. obovata*, Wt. Ic. t. 1489.

W. Coast and W. Gháts, up to 3,000 ft., in swampy places.

An erect herb, very similar to No. 3, and, like it, rooting at the lower nodes and with subquadrangular stems, the leaves obovate or lanceolate glabrate, the flowers pale purplish-blue.

# 11. *Ruellia*, Linn. (Sect. *Dipteracanthus*, Nees.)

Herbs or undershrubs. *Leaves* opposite, entire or undulate, lineolate. *Flowers* sessile or subsessile, solitary or in clusters or racemes; bracts 0, bracteoles large, usually exceeding the calyx. *Calyx* 5-partite or 5-fid; lobes subequal, narrow, acute. *Corolla* tubular-ventricose, more or less oblique; lobes subequal, rounded, twisted to the left in bud, spreading in flower. *Stamens* 4, didynamous; filaments glabrous except at base; anthers subequal, 2-celled, cells oblong, muticous, glabrous. *Ovary* 2-celled; ovules 3-10 in each cell; style linear; stigma simple. *Fruit* a clavate capsule, solid at the base, seed-bearing upwards. *Seeds* large thin, discoid, margined, hygroscopically hairy, on strong hooked retinacula.

Stems prostrate or straggling; leaves ovate or elliptic, acute, glabrous or slightly hairy, up to 1.5 in. long, 1 in. broad; calyx-lobes linear-subulate, ciliate; capsules slightly pubescent, seeds 16-20

1. *prostrata*.

Stems erect; leaves ovate, obtuse, grey-pubescent, often undulate, up to 1 in. long, .75 in. broad; calyx-lobes lanceolate, acute, pubescent; capsules glabrous, seeds about 12.....2. *patula*.

1. *RUELLIA PROSTRATA*, Poir.; F. B. I. iv. 411; Bedd Ic. t. 282.

Most dry Districts, in bushy places, on banks, in gardens, etc.

A diffuse undershrub with solitary pale blue or purple flowers.

2. *RUELLIA PATULA*, Jacq.; F. B. I. iv. 412. *Dipteracanthus patulus*, Nees; Wt. Ic. t. 1505.

Deccan and Carnatic to S. Travancore, on waste lands and by road-sides, common.

A hoary small undershrub with purplish blue flowers, solitary or 2-3 together in the leaf-axils.

*R. tuberosa*, Linn., is a tropical American plant with deep blue flowers frequently found in Madras Gardens.

## 12. Hemigraphis, Nees.

Herbs, undershrubs or shrubs. *Leaves* opposite, toothed or subentire. *Flowers* sessile, in heads or spikes, terminal or pseudo-axillary on shortened branchlets, rarely paniculate or solitary; bracts large, imbricate, each 1-flowered; bracteoles small and narrow or 0. *Calyx* 5-partite; lobes unequal, lanceolate or linear. *Corolla* tubular-ventricose or funnel-shaped; lobes 5, subequal, twisted to the left in bud. *Stamens* 4, didynamous; included or nearly so; anthers oblong, 2-celled, muticous, the bases acute. *Ovary* 2-celled; ovules 2 in each cell; style linear; stigma 2-lobed, one lobe linear, the other short. *Fruit* a linear or linear-oblong capsule, seed-bearing almost from the base. *Seeds* 6 or more compressed, discoid, hygroscopically hairy.

*Corolla* tubular-ventricose; longer filaments glabrous in the upper half, hairy below:—

Stiff herbs, hispid with jointed hairs; heads large with 4 large hispid reticulate outer bracts, inner bracts oblong or spatulate, bracteoles linear or 0; calyx-lobes linear, .4 in. long; leaves oblong-spathulate, up to 2 in. long, crenulate; capsule linear-oblong, glabrous, grooved, .5 in. long, seeds 6-8.....1. *dura*.

Soft herbs, villous with white hairs:—

Hairs soft; corolla long-cylindric below, upper part funnel-

shaped ventricose; bracts elliptic, bracteoles 0; calyx-lobes linear, obtuse, .3-.4 in. long; leaves ovate, crenate, up to 1 in. long; capsule linear-obovoid, glabrous except at tip, .3 in. long, about 12-seeded.....2. *hirta*.

Hairs scabrous; corolla short-cylindric below, upper part campanulate-ventricose; bracts obovate, bracteoles 0, calyx-lobes lanceolate, acuminate, .2 in. long; leaves ovate, crenate, up to 2 in. long; capsule not seen.....3. *venosa*.

Corolla funnel-shaped; longer filaments densely bearded in the upper half:—

Bracts of inner flowers short, ovate lanceolate; heads axillary and terminal, with many soft stiff white hairs; calyx-lobes linear, strigose at first then scarious, one longer than the rest; leaves ovate, acuminate, crenate-serrate, up to 3 in. long, 2 in. broad, petioles usually long; capsule pubescent, tetraginous, .25 in. long, 6-seeded .....4. *latebrosa*.

Bracts of inner flowers long, oblong; heads mostly terminal, glandular-hairy, with white hairs; calyx-lobes linear, one longer than the rest; leaves ovate, subobtuse, crenate, up to 1.5 in. long, 1 in. broad, petioles rather short; capsule hispid-pubescent, .3 in. long, 8-10-seeded .....5. *elegans* var. *crenata*.

1. *HEMIGRAPHIS DURA*, T. And.; F. B. I. iv. 422.

Deccan, Bellary and Kurnool, East to Guntur and Masulipatam, usually on black cotton soil; S. Canara (Hohenacker).

A procumbent hard very hispid herb with flexuose branches and blue flowers in large heads.

2. *HEMIGRAPHIS HIRTA*, T. And.; F. B. I. iv. 422.

E. Coast, in Chicacole (Gamble).

A softly pubescent herb with creeping flexuose stems and pale blue flowers in small close terminal heads.

3. *HEMIGRAPHIS VENOSA*, C. B. Clarke; F. B. I. iv. 423.

Deccan or Carnatic (locality doubtful).

A scabrous pubescent herb with creeping and rooting stems.

4. *HEMIGRAPHIS LATEBROSA*, Nees; F. B. I. iv. 423; Wt. Ic. t. 1504.

N. Circars, Deccan and Carnatic, in undergrowth of deciduous forest, up to 4,000 ft. in hilly country.

A softly pubescent branching and straggling undershrub, with blue flowers, the tube yellowish white.



Var. *Beddomei*, C. B. Clarke. Leaves smaller, ovate, crenate, nearly glabrous, fruiting sepals white scarious.

Deccan, Ramandrúg in Bellary (Beddome).

Var. *incana*, Gamble. Similar but the leaves very softly white-tomentose and thicker.

Deccan, Horsleykonda in Chittoor (Gamble, Fischer), Wt.

K. D. 2272 without locality.

5. *HEMIGRAPHIS ELEGANS*, Nees; F. B. I. iv. 424.

Var. *crenata*, C. B. Clarke.

S. Canara near Malasamudra (Hohenacker); Ramandrúg in Bellary (Beddome).

A viscid pubescent herb, the flowers blue with a pale tube.

### 13. *Stenosiphonium*, Nees.

Shrubs, often viscous and with glandular-headed hairs. Leaves opposite, usually ovate, the lower one long-petioled with decurrent blade, the upper sessile, all densely lineolate. Flowers sessile, in clusters on elongate interrupted spikes, forming leafy panicles; bract ovate or lanceolate; bracteoles 2, linear, similar to the calyx-lobes. Calyx subequally 5-fid, the lobes at first connate, later on separating, linear or lanceolate. Corolla narrowly tubular below then suddenly bent obliquely and widened to a ventricose limb; lobes 5, subequal, rounded, twisted to the left in bud. Stamens either 2 perfect with sometimes 2 small staminodes, or 4 perfect, the posterior shorter and with smaller anthers than the exsert anterior; anthers oblong, muticous. Ovary glabrous; style slender; stigma linear. Fruit a clavate capsule, seed-bearing nearly from the base, the retinacula hard. Seeds 6-8, compressed, discoid, apparently glabrous when dry, densely white hairy all round when wetted.

Stamens 2; leaves ovate, acuminate, up to 3 in. long, 1.5 in. broad, the lower petioled, the upper often sessile and cordate, nerves 5-7 pairs:—

Spikes with dense but interrupted clusters, prominently viscous-pubescent; corolla .75 in. long with lower half tubular narrow, upper broadly ventricose:—

Bracts ovate or obovate, shortly obtusely acute, .25 in. long, bracteoles linear, equal to the calyx; calyx .3-.4 in. long, lobes linear, glandular; leaves crenate-serrate.....1. *diandrum*.

Bracts linear-lanceolate, narrow, .3 in. long, bracteoles similar but narrower; calyx .3 in. long, lobes linear, hair-pointed, very glandular; leaves shallowly dentate.....2. *setosum*.  
 Spikes slender, interrupted, with small clusters, glandular pubescent; corolla under .5 in. long, lower half very narrow, upper ventricose; bracts lanceolate, acuminate, .25 in. long, bracteoles linear; calyx .25 in. long, the lobes linear glabrate but scabrous; leaves dentate  
 3. *parviflorum*.

Stamens 4, the 2 anterior longer than the 2 posterior and with anthers twice the size; leaves ovate, acuminate; corolla about .75 in. long, the tube slender :—

Spikes with close clusters especially the upper ones, white villous and viscoso-pubescent; bracts obovate, shorter than the calyx; leaves shortly acuminate, shallowly crenate, up to 3 in. long, 2 in. broad, 5-7-nerved, glabrous, the lower petioled, the upper sessile and subcordate .....4. *confertum*.  
 Spikes with distant clusters, nearly glabrous when young, very glandular hairy when old; bracts ovate or obovate, obtusely acute, as long as the calyx, 3-ribbed; leaves caudate-acuminate, strongly crenate-serrate, up to 6 in. long, 2-3 in. broad, 7-8-nerved, glabrous above, sometimes white silky beneath, the lower long-petioled, the upper rounded or subcordate at base .....5. *Russellianum*.

1. *STENOSIPHONIUM DIANDRUM*, Wt. Ic. t. 1502; F. B. I. iv. 426.

Hills of Tinnevely, at Courtallum (Wight).

An erect shrub with apparently pale blue flowers.

2. *STENOSIPHONIUM SETOSUM*, T. And.; F. B. I. iv. 427.

Deccan or Carnatic (G. Thomson).

An erect shrub with pale blue flowers and very long hair-like tips to the calyx-lobes, covered with glandular hairs.

3. *STENOSIPHONIUM PARVIFLORUM*, T. And.; F. B. I. iv. 428.

Deccan or Carnatic (G. Thomson); evergreen forests of Travancore (M. Rama Rao).

An erect shrub with small pale blue flowers.

4. *STENOSIPHONIUM CONFERTUM*, Nees; F. B. I. iv. 427; Wt. Ic. t. 873 (note under t. 1503.)

Deccan and Carnatic, hills of Kistna and Kurnool, also Chingleput, westwards to Coimbatore and the E. slopes of the Gháts down to Tinnevely.

An erect shrub with blue flowers.

5. STENOSIPHONIUM RUSSELLIANUM, Nees; F. B. I. iv. 427; Wt. Ic. t. 1503.

N. Circars, in Vizagapatam; Deccan, hills of Mysore, Cuddapah and Chittoor; W. Gháts, on E. slopes, down to Tinnevelly.

An erect shrub with blue flowers and long-acuminate leaves.

Var. *subsericeum*, T. And. The young leaves sometimes smaller, but in old plants rather large, densely white-silky beneath, becoming glabrate when older; flowers deep blue.

Deccan, N. Arcot and Chittoor, to 4,000 ft. on Horsley-konda; Carnatic, Kambakam Hills of Chingleput, southwards to the hills of Tinnevelly.

#### 14. Petalidium, Nees.

Shrubs or undershrubs. *Leaves* opposite, entire or toothed. *Flowers* shortly pedicelled, in contracted axillary cymes or racemes, often crowded on shortened lateral branchlets, sometimes reduced to a single flower; bracts narrow or 0; bracteoles large, ovate, reticulate, ultimately scarious. *Calyx* 5-partite, lobes unequal, narrowly linear-lanceolate. *Corolla* large, ventricose, straight or curved; lobes 5, subequal, twisted to the left in bud. *Stamens* 4, didynamous, anthers subsimilar, 2-celled; cells parallel, spurred or muticous at the base. *Ovary* 2-celled; ovules 2 in each cell; style long; stigma with 2 unequal lobes. *Fruit* a clavate capsule, compressed parallel to the septum; placentas separating elastically from the bottom and carrying off the seeds. *Seeds* 2 or 4, discoid, hygroscopically hairy, the retinacula rigid.

PETALIDIUM BARLERIODES, Nees; F. B. I. iv. 416.

N. Circars, Ganjam to the Kistna, in deciduous forest, common; W. Coast, in S. Canara.

A handsome shrub reaching 5 ft. in height, the leaves up to 6 in. long, 3 in. broad and long-petioled, the large flowers white or pale blue, 1-1.5 in. long with conspicuous pale reticulate bracteoles.

#### 15. Micranthus, Wendl.

Perennial glandular hairy herbs. *Leaves* opposite, membranous, lineolate, entire or obscurely crenate, ovate, petioled.

*Flowers* in dense, terminal, 1-sided spikes; bracts orbicular, imbricate, each pair with usually 3 flowers; bracteoles 0. *Calyx* 5-partite, one lobe ovate, bract-like, the others linear-subulate. *Corolla* small; tube slender, cylindric; lobes slightly unequal, rounded, twisted to left in bud. *Stamens* 4, didynamous; anthers subsimilar, 2-celled; cells parallel, oblong, the base minutely mucronate. *Ovary* 2-celled; ovules 2 in each cell; style long, villous; stigma shortly 2-lobed. *Fruit* a clavate capsule, compressed parallel to the septum, 4-seeded; placentas dehiscing with the seeds elastically from the base. *Seeds* compressed, discoid, white-hairy when wetted.

MICRANTHUS OPPOSITIFOLIUS, Wendl. *Phaylopsis parviflora*, Willd.; F. B. I. iv. 417. *Aetheilema reniforme*, Nees; Wt. Ic. t. 1533.

N. Circars, [Ganjam to Godavari, in forest undergrowth, common; W. Gháts, S. Canara to Travancore, at low levels; Shevaroy Hills.

A much-branched diffuse viscid herb with small white flowers and reniform or orbicular bracts green at first turning white and scarious with age, the leaves in unequal pairs, up to about 4 in. long and long-petioled.

#### 16. Dyschoriste, Nees.

Perennial herbs or undershrubs. *Leaves* opposite, often shortly dentate. *Flowers* in axillary clusters or short cymes; bracts and bracteoles small. *Calyx* tubular; lobes 5, lanceolate or subulate, subequal. *Corolla* tubular, mouth obscurely 2-lipped; lobes 5, obtuse, twisted to left in bud. *Stamens* 4, didynamous; anthers similar, cells parallel, minutely mucronate or spurred at base. *Ovary* glabrous, 2-celled; ovules 2 in each cell; style linear, villous; stigma linear, recurved. *Fruit* an oblong capsule, solid at the base. *Seeds* 4, orbicular, compressed, on strong retinacula, densely white-hairy when wetted; cotyledons cordate. Stiff woody much-branched undershrub with whitish bark; leaves small obovate, grey-canescens, under .5 in. in diam., subsessile; flowers solitary, the calyx appressed hirsute with short acute lobes, the corolla .75 in. long, tubular below, funnel-shaped above; anthers minutely mucronate at base ..... 1. *littoralis*. Slender undershrubs with green branches from a woody rootstock; flowers in clusters or cymes; leaves green:—

Low plant with prostrate stems often rooting at the nodes ; flowers in axillary clusters with long-acuminate nearly glabrous calyx-lobes and small funnel-shaped corolla about .25 in. long ; anthers minutely mucronate at base ; leaves elliptic or obovate, .75–1.5 in. long ..... 2. *depressa*.

Erect slender plant, subscaudent, the stems often geniculate ; flowers in shortly peduncled axillary cymes with long linear glandular hairy calyx-lobes and broadly tubular corolla, .75 in. long ; anthers prominently spurred at base ; leaves ovate or lanceolate, acute at both ends; up to 2.5 in. long, 1.5 in. broad, long-petioled

3. *vagans*.

1. *DYSCHORISTE LITTORALIS*, Nees ; Wt. Ic. t. 447. *Calophanes littoralis*, T. And. ; F. B. I. iv. 410.

Carnatic, chiefly along the coast on dry sand, also inland westwards to the foot of the Gháts on arid spots.

An undershrub with divaricate branches and rather large blue-purple flowers.

2. *DYSCHORISTE DEPRESSA*, Nees. *Calophanes Nagchana*, C. B. Clarke ; F. B. I. iv. 410.

Carnatic, near Madras, westwards to Salem and Coimbatore, in dry places, scarce.

A trailing plant with small violet-pink flowers.

3. *DYSCHORISTE VAGANS*, O. Kze. *Calophanes vagans*, Wt. Ic. t. 1526 ; F. B. I. iv. 411.

N. Circars, in Godavari ; Deccan and Carnatic, in the undergrowth of deciduous forest, up to 3,000 ft. on Kambakam Drug, Ramandrúg and other hills.

A slender diffuse plant, straggling among bushes, with blue flowers.

# 17. *Eranthemum*, Linn.

Perennial herbs or shrubs. *Leaves* opposite, petioled, entire or obscurely crenulate, very much lineolate. *Flowers* in linear, distant or close, spikes or heads ; bracts usually large and prominent ; bracteoles smaller, linear-lanceolate. *Calyx* 5-lobed, the lobes narrow, often scarious. *Corolla*-tube long and slender, cylindric, widened at the top, or sometimes at the middle ; lobes obovate, twisted to the left in bud, spreading in flower. *Stamens* 2 perfect, with usually 2 others reduced to small staminodes, close to the bases of the filaments ; anthers oblong, 2-celled,

more or less exserted. *Ovary* 2-celled; ovules 2 in each cell; style long and slender, sparsely hairy; stigma simple or slightly 2-lobed. *Fruit* a clavate capsule with solid base. *Seeds* 4, discoid, on sharp retinacula, hairy when wetted.

Bracts white with green nerves; calyx scarious:—

Bracts elliptic-ovate, cuspidate, nearly glabrous; spikes 1–3 in. long, in close panicles; lower leaves ovate, acuminate at both ends, shortly decurrent, usually up to 4 in. long, 2 in. broad, glabrous, upper many, smaller .....1. *nervosum*.

Bracts obovate, obtuse, mucronate or shortly apiculate, glandular strigose; spikes 3–6 in. long, subinterrupted, in elongate panicles, often solitary; lower leaves lanceolate or oblong-lanceolate, acuminate, long tapering and decurrent at base, up to 8 in. long, 3 in. broad, glabrous, upper smaller but fewer .....2. *roseum*.

Bracts green, rarely whitish when old:—

Bracts ovate-lanceolate, long acuminate, prominently many-nerved, white-ciliate on the margins; spikes 1–3 in. long, dense, long-peduncled, forming loose panicles; calyx scarious; lower leaves ovate acuminate, rounded at base and then decurrent, up to 8 in. long, 3–5 in. broad, nearly glabrous, but often scurfy on the nerves beneath, upper subsessile, cordate at base .....3. *purpurascens*.

Bracts lanceolate to linear, long acuminate, few-nerved, viscidly glandular-hispid; spikes 2–6 in. long, slender, often interrupted, in large very compound terminal panicles; calyx green, glandular; lower leaves elliptic, acuminate, attenuate at base or sometimes rounded, shortly decurrent, up to 5 in. long, 2 in. broad, glabrous, long-petioled, upper gradually smaller and rounded at base, subsessile .....4. *montanum*.

1. *ERANTHEMUM NERVOSUM*, R. Br. *Daedalacanthus nervosus*, T. And.; F. B. I. iv. 418.

Carnatic, in Tinnevely (Wight), perhaps only in cultivation elsewhere in S. India; frequent in gardens.

A pretty shrub reaching 5 ft. in height with bright blue flowers in short bracteate spikes in large terminal panicles.

2. *ERANTHEMUM ROSEUM*, R. Br. *Daedalacanthus roseus*, T. And.; F. B. I. iv. 419.

W. Coast, in S. Canara (Hohenacker, Wight).

A shrub reaching 6 ft. in height with rose-coloured flowers or "blue fading to purple or red" (Cooke) in long spikes forming elongate terminal panicles.

3. *ERANTHEMUM PURPURASCENS*, Nees. *Daedalacanthus purpurascens*, T. And.; F. B. I. iv. 420. *Justicia pulchella* Roxb. Cor. Pl. t. 177.

N. Circars, Ganjam to Godavari, in deciduous forest under-growth, common; Deccan, Nallamalai Hills of Kurnool, hills of Cuddapah, Ramandrug in Bellary; Shevaroy Hills of Salem.

A shrubby plant up to 4 ft. high with blue flowers in close heads.

4. *ERANTHEMUM MONTANUM*, Roxb.; Wt. Ic. t. 466. *Daedalacanthus montanus*, T. And.; F. B. I. iv. 421. *Justicia montana*, Roxb. Cor. Pl. t. 176.

N. Circars, Ganjam to Godavari, in deciduous forest; W. Gháts, on E. slopes and hills of Coimbatore to S. Travancore.

A small shrub up to about 3 ft. with very pale blue flowers.

Var. *Wightianum*. Bracts very narrow, linear, up to .6 in. long, the spikes very slender, the leaves broader.

Deccan (Russell; Wall. Cat. 2495a).

Var. *concanense*. Bracts much shorter, almost ovate, under .5 in. long, the spikes slender and much interrupted.

Mysore, at Kempkull, 1,000–2,000 ft. (Meebold).

### 18. *Strobilanthes*, Blume.

Shrubs, undershrubs or herbs, often gregarious and only flowering after a period of years and then dying off. *Leaves* opposite, often unequal, toothed or subentire, usually lineolate with raphides as are the bracts and other green parts. *Flowers* capitate or in strobilate or interrupted bracteate spikes or paniced, sessile or sometimes pedicelled, usually with 1 floral bract and 2 bracteoles. *Calyx* usually deeply 5-partite, the lobes narrow, subequal or one longer, rarely 2-lipped. *Corolla* usually white blue or purple, rather large, straight or curved, the upper part ventricose, the lower cylindric; lobes 5, rounded or ovate, twisted to the left in bud. *Stamens* 2 or, more usually, 4 didynamous; filaments monadelphous, the bases combined in a sheath more or less adherent at the middle to the corolla, the margins free; anthers oblong, muticous, 2-celled. *Disk* small or as a stalk to the ovary. *Ovary* 2-celled, ovules 2 in each cell;

style linear; stigma of one linear branch, the other suppressed or a mere point. *Fruit* a 2- or 4-seeded capsule, the placentas sometimes separating elastically. *Seeds* much compressed, glabrous or hairy on strong curved retinacula.

*Stamens* 2 fertile, hardly monadelphous, though sometimes connected at base :—

*Seeds* glabrous even when wetted, without basal areole; cylinder base of corolla long, suddenly widening :—

Flowers in elongate linear subinterrupted viscous spikes; filaments glabrous except at base, no infertile stamens or staminodes; bracts lanceolate, acuminate, up to .5 in. long, viscous-glandular; leaves elliptic, acute or acuminate, crenulate, rugose, up to 6 in. long, 2.5 in. broad, main nerves 6–7 pairs, impressed . . 1. *humilis*. Flowers in ovoid densely capitate heads supported by 4 leaves as outer bracts; filaments hirsute, infertile stamens or staminodes 2; bracts lanceolate, .7 in. long, glabrous, 7-ribbed, bracteoles linear; leaves ovate, acuminate, serrulate, up to 5 in. long, 2 in. broad, main nerves about 8 pairs, slightly impressed . . 2. *foliosus*.

*Seeds* densely hairy when wetted, with a basal areole; cylinder base of corolla short, gradually widening :—

Flowers in dense broad spikes, not interrupted, 1–3 in. long, white-villous, supported by 2 leaves as outer bracts; bracts lanceolate, acuminate, .7 in. long, bracteoles linear, like the calyx .3–.5 in. long; filaments pilose; leaves elliptic-lanceolate or obovate, acute, serrate, coriaceous, scabrid above, reticulate and white-villous in the areoles beneath, up to 3 in. long, 1 in. broad, main nerves 8–10 pairs, strong, parallel . . . . . 3. *Kunthianus*.

Flowers in narrow spikes :—

Spikes short, usually under 1 in. long, clustered with the leaves in the upper axils, not interrupted, greyish villous; bracts ovate, bracteoles short, like the calyx .25 in. long; filaments villous near the base; leaves ovate, acute, subentire, coriaceous, puberulous beneath and when young white-tomentose, up to 3 in. long, 1.5 in. broad, main nerves 8–9 pairs, curved and parallel . . . . . 4. *canaricus*.

Spikes more than 1 in. long, usually axillary or lateral, sometimes panicked :—

Spikes from the first more or less glandular hispid, not woolly, more or less interrupted :—

Spikes 1–2 in. long, often panicked, in the axils of present or fallen leaves along the stems; bracts lanceolate; bracteoles small; calyx .5 in. long with linear lobes;



corolla .5 in. long ; leaves submembranous, ovate, long cuspidate-acuminate, crenulate, the base rounded and decurrent on the long petiole, up to 7 in. long, 4 in. broad, nerves 10-11 pairs .....5. *jeyporensis*. Spikes 2-3 in. long, peduncled, single or in usually 3-branched very glandular panicles towards the ends of the branches ; bracts lanceolate, acuminate, recurved, bracteoles short ; calyx .5 in. long, with linear lobes ; corolla .75-1 in. long, glabrous or puberulous without ; leaves ovate, cuspidate-acuminate, crenulate, the base acute with long petiole, densely white-silky beneath, up to 6 in. long, 2.5 in. broad, main nerves 8-10 pairs, parallel.....6. *cuspidatus*. Spikes 2-3 in. long, short-peduncled, very slender, single or in panicles axillary or lateral, often nearly quite glabrous ; bracts ovate or lanceolate, acuminate, bracteoles linear, short ; calyx .2-3 in. long, the lobes slender ; corolla .75 in. long, glabrous without ; leaves thin, ovate, long-acuminate, dentate, the base decurrent on a long petiole, nearly or quite glabrous, up to 7 in. long, 4 in. broad, main nerves 7-8 pairs, subparallel.....7. *consanguineus*. Spikes not glandular at any rate at first but with grey or tawny wool :—

Spikes 3-5 in. long, interrupted, covered with the fulvous or greyish appressed wool when in flower, in fruit becoming also glandular hispid, single or in panicles axillary and terminal ; bracts ovate-lanceolate, glabrous within, bracteoles small, calyx-lobes acuminate, all enlarging in fruit ; leaves ovate-lanceolate, long cuspidate-acuminate, covered beneath with appressed cinnamomeous or grey wool, up to 6 in. long, 2 in. broad, main nerves 9-10 pairs, parallel .....8. *Lawsoni*. Spikes 2-3 in. long, not interrupted, covered, like the stems and the undersurface of the leaves, with soft spreading floccose tawny wool, single or in panicles ; bracts ovate acute, glabrous within, bracteoles small ; calyx-lobes linear, .25 in. long ; leaves ovate, acuminate with a twisted point, covered beneath with soft tawny wool, up to 5 in. long, 2.5 in. broad, main nerves 10-13 pairs, parallel, impressed .....9. *gossypinus*.

Stamens 4 fertile, usually monadelphous, the filaments combined below in a sheath more or less adherent to the corolla-tube, but the margins usually free :—

Flowers in capitate heads or short spikes :—

Seeds glabrous :—

Stems tetragonous, grooved, winged or not, the bases of the long petioles of the leaves swollen and often auricled ; leaves elliptic-lanceolate or -oblanceolate, base decurrent, crenate or subentire, glabrous, up to 8 in. long, 4 in. broad, prominently 7-8-nerved ; heads very close, 1-2 in. long, enlarged or glandular in fruit ; bracts ovate, cuspidate with recurved tips ; cylinder base of corolla as long as the campanulate upper part ; filament sheath long, ciliate like the stamens, inner pair shorter .....10. *barbatus*.  
Stems hardly tetragonous, not winged, the leaf-petioles not auricled :—

Flowers in heads :—

Heads very hairy, short and dense but often elongating in fruit, supported by 2 or more leaf-like involucreal bracts :—

Leaves rugose, usually with bulbous-based hairs, scabrous-hispid, subcoriaceous :—

Corolla with the cylinder base shorter than the urceolate upper part ; filaments and their sheaths glabrous :—

Filaments nearly equal, the 2 inner close and rather higher than the 2 divaricate outer ; thick low shrubs with lanceolate acute bracts and acuminate calyx-lobes ; leaves up to 2 in. long, 1 in. broad, with 6-8 pairs of main nerves impressed above

11. *Wightianus*.

Filaments unequal, the 2 on each side high up separated by a deep depression, sometimes a sterile fifth ; slender shrubs with obovate obtuse crenate bracts and linear obtuse calyx-lobes ; leaves up to 3 in. long, 2 in. broad, with about 6-7 pairs of main nerves impressed above .....12. *urceolaris*.

Corolla with the cylinder base long and slender, as long as the much curved ventricose part ; filaments long white-hairy at base :—

Heads small, flattened, densely white-hairy ; bracts leafy, suborbicular, with a broad stalk, crenate, bracteoles linear-spathulate, .5 in. long ; leaves ovate, acute at both ends, serrate, up to 4.5 in. long, 3 in. broad, main nerves 7 pairs ..13. *pulneyensis*.  
Heads large, densely bristly hirsute :—

Bracts oblong, 1-1.5 in. long, bracteoles very

long, setaceous bristly; calyx-lobes lanceolate with scarious margins; leaves ovate, acuminate, crenate, rounded at base, up to 6 in. long, 3 in. broad, with 7-8 pairs of main nerves

14. *neilgherrensis*.

Bracts leafy, obovate, acute, crenate, very silky, bracteoles linear, very white-silky; calyx-lobes narrowly lanceolate, scarious below, silky above; leaves ovate, acute, narrowed at base, up to 4.5 in. long, 2.5 in. broad, with 5 pairs of impressed main nerves . . . . . 15. *circarensis*.

Leaves stem and inflorescence softly white- or fulvous-glandular hairy, the peduncles flattened; leaves membranous, ovate or lanceolate, long-acuminate, narrowed at base, up to 5 in. long, 2 in. broad; cylinder base of corolla very short, upper part ventricose; filament sheath long, the 2 inner stamens shorter and rather higher up than the outer . . . . . 16. *anceps*.

Heads softly rufous-hairy, elongate, clavate, on bracteate often deflexed peduncles, with small involucreal bracts; cylinder base of corolla short, upper part funnel-shaped; filament sheath elongate, silky, straight, truncate at top, the stamens short; bracts membranous, ovate, .75-1 in. long, bracteoles linear; calyx-lobes linear; leaves ovate, acuminate, rounded at base, crenate, up to 4.5 in. long, 3 in. broad, with 5-6 pairs of main nerves

17. *Perrottetianus*.

Heads erect, very harshly scabrous, with 2 pairs of leafy involucreal bracts, floral bracts lanceolate, 1 in. or more long, bracteoles linear also calyx-lobes; corolla large, cylinder base .6 in. long, upper part 1 in., the lobes large; filament sheath short, the inner stamens much shorter than the outer; leaves ovate, acute, shortly cuneate at base, callous-serrate, up to 7 in. long, 4 in. broad, the main nerves 8-9 pairs . . . . . 18. *papillosus*.

Flowers in spikes, glabrous except sometimes in fruit, bracts not decurrent :—

Spikes erect, oblong :—

Bracts very conspicuous, spreading, leafy, 1-2.5 in. long, glabrous in flower, glandular-hairy in fruit as are the linear-lanceolate calyx-lobes and the small bracteoles; corolla large, cylinder base .5 in. long, upper ventricose

part .75 in. ; filament sheath short, truncate, the outer stamens the longer ; leaves ovate, acuminate, cuneate at base, serrulate, up to 3 in. long, 2 in. broad, with 7-8 pairs main nerves.....19. *Zenkerianus*. Bracts small, not conspicuous, close, glabrous or glandular-hairy, bracteoles small ; calyx-lobes .3 in. long, linear ; corolla small, .5 in. long, cylinder base as long as the campanulate upper part ; filament sheath short, truncate, villous ; leaves lanceolate, acuminate, narrowed and decurrent at base, serrate, up to 6 in. long, 2 in. broad, main nerves 7 pairs raised on upper surface

20. *Warreensis*.

Spikes deflexed, oblong or clavate, usually glabrous as are the leaves ; seeds doubtful but apparently glabrous :—

Spikes .5-.75 in. long ; corolla small, with exsert stamens :—

Heads usually single, glabrous ; bracts lanceolate, subcoriaceous ; calyx-lobes lanceolate, acuminate ; cylinder base of corolla .25 in. long, slender, the upper part campanulate, spreading ; filament sheath short, white-fringed ; leaves glabrous, lanceolate, acuminate at both ends, serrate, up to 4.5 in. long, 1.5 in. broad, main nerves 5-6 pairs, raised above.....21. *ciliatus*. Heads in racemes, white hairy ; bracts ovate, soft, hairy, subscarios ; calyx-lobes spatulate, ciliate ; cylinder base of corolla .2 in. long, upper part campanulate, longer ; filament sheath long, white-hairy ; leaves ovate or ovate-lanceolate, long-acuminate at both ends, crenate, up to 5 in. long, 2 in. broad, main nerves 6 pairs .....22. *Meeboldii*.

Spikes .75-1.5 in. long ; corolla large with included stamens, cylinder base .25 in. long, upper part funnel-shaped, .75 in. long ; filament sheath .2 in. long, sparsely hairy, the inner stamens shorter ; leaves narrowly lanceolate, acuminate at both ends, subentire, glabrous, up to 6 in. long, 1-1.25 in. broad, main nerves 6 pairs, faint

23. *adenophorus*.

Flowers in erect or rarely deflexed spikes with 2 small involu-  
cral bracts, floral bracts large, membranous, elliptic, decurrent, prominently nerved in fruit ; calyx-lobes lanceolate, .3 in. long, subscarios ; corolla with cylinder base short, upper part ventricose ; filament sheath elongate, .4 in. long, fringed,

truncate, the stamens short; leaves lanceolate, acuminate, membranous, up to 7 in. long, 2.5 in. broad, main nerves 10 pairs .....24. *decurrens*. Flowers in large oblong deflexed spikes elongating in fruit, with 2 pairs of oblong involucre bracts a little below; floral bracts lanceolate, acuminate, .5 in. long; cylinder base of corolla very short, upper part campanulate with short recurved lobes; filament sheath broad, glabrous, the stamens all equal and long-exsert; leaves thin, ovate, acuminate, broad but suddenly decurrent at base, sparsely pubescent, up to 9 in. long, 4.5 in. broad, main nerves 10-11 pairs

25. *micranthus*.

Seeds hairy:—

Seeds appressed villous, the hairs not elastic when wetted; capsule 2-seeded:—

Seeds oblong with large areoles; flowers in panicles of deflexed lanceolate 2-3-flowered heads about .75 in. long, with 2 pairs involucre bracts; bracts lanceolate, long-acuminate, ciliate, bracteoles 0 or minute; corolla 1 in. long, cylinder base short; leaves elliptic, long-acuminate at both ends, crenate, up to 7 in. long, 2.5 in. broad, main nerves 6 pairs

26. *tristis*.

Seeds elliptic with small areoles; flowers in heads, single or 1-3 together, many-flowered, up to 1 in. long, very villous, with small involucre bracts; bracts linear-oblong, obtuse, 1 in. long or less, bracteoles smaller, narrow; corolla .75-1 in. long, cylinder base short; leaves lanceolate, long-caudate-acuminate, tawny pubescent beneath, up to 6 in. long, 1.25 in. broad, main nerves 10-12 pairs....27. *caudatus*.

Seeds glabrous on the faces, the ring margin with elastic hairs when wetted:—

Seeds not areolate; stem and leaves scabrous-hirsute; heads short and close, in trichotomous panicles with a pair of spatulate involucre leaves; bracts oblong, .75 in. long, fulvous-hairy, bracteoles nearly as long, linear; calyx-lobes .6 in. long; corolla with cylinder base .4 in. long, ventricose upper part .6 in.; leaves ovate, acuminate, round and suddenly decurrent at base, rugose, serrate, up to 7 in. long, 5 in. broad, main nerves about 8 pairs, impressed

28. *heteromallus*.

Seeds areolate; stem and leaves slightly hairy; heads somewhat elongate, solitary or in terminal or axillary cymes with

1 or more small leaves on the peduncles; bracts ovate, viscous, scarious in fruit, bracteoles short, spatulate; corolla with cylinder base .2 in. long, ventricose upper part .5 in.; leaves elliptic-lanceolate, acuminate, cuneate at base, crenate, membranous, up to 6 in. long, 2 in. broad, main nerves 8-10 pairs ..... 29. *isiocephalus*.

Seeds elastically hairy when wetted, both on face and margin, except the areole; spikes 1-1.5 in. long in flower, 2-3 in. in fruit, in close panicles bracteate at the nodes; bracts ovate, acute, decurrent on a thick stalk, reddish-glandular-hairy; bracteoles linear, .2-.3 in.; corolla with cylinder base .3 in. long, ventricose upper part .5 in., hairy without; leaves variable, elliptic, acuminate, decurrent at base, crenate, membranous, with shining white hairs, up to 6 in. long, 3 in. broad, often smaller, long-petioled, main nerves 7-10 pairs ..... 30. *asper*.

Flowers in strobilate often cymose spikes or heads, the bracts usually rounded and concave :—

Seeds glabrous (those of *S. Andersonii* not known) :—

Flowers on the branches, axillary or lateral, the spikes with small bracts in pairs below, the first floral bracts usually flowerless :—

Bracteoles 0; sheath of filaments long, narrow, very hairy, inner stamens shorter :—

Bracts elliptic-obovate, obtuse, softly long-glandular-hairy, reticulate, narrowed at base; calyx-lobes oblong, obtuse or emarginate, scarious, .3 in. long; corolla .75-1 in. long, cylinder base as long as the urceolate upper part; leaves elliptic-ovate, acuminate, slightly decurrent, serrate, rugose, up to 6 in. long, 3 in. broad, main nerves about 9 pairs

31. *lupulinus*.

Bracts not glandular hairy, elliptic or orbicular, obtuse or emarginate, usually white or pink; calyx subscarious, lobes emarginate :—

Bracts not decurrent on the rhachis of the spike; filament sheath elongate :—

Leaves thick, broadly elliptic, rugose and often bullate, scabrous with bulbous-based hairs above, white-strigose beneath, up to 5 in. long, 2.5 in. broad; main nerves 8-10 pairs, much impressed as are the subparallel transverse nervules; corolla .75 in. long, cylinder base very short ..... 32. *asperimus*.

Leaves thin, ovate or elliptic, acuminate, with a few

scattered bulbous-based hairs above and many soft white hairs on both sides, up to 6 in. long, 3 in. broad, main nerves 6-8 pairs, raised, the transverse nervules inconspicuous; spikes in short, usually trichotomous cymes; corolla .75 in. long, without cylinder base

33. *Heyneanus*.

Upper bracts of each spike decurrent on the rachis; filament sheath shorter and curved; leaves ovate, sub-acute, obtuse or subcordate at base, softly villous, up to 1.5 in. long, 1 in. broad, main nerves 4-5 pairs, not prominent; spikes subglobose, solitary or few together, the small peduncle bracts obovate, deflexed; corolla about .5 in. long, campanulate, no cylinder base

34. *campanulatus*.

Bracteoles linear-oblong; sheath of filaments short, glabrous; stamens subequal; bracts suborbicular, glabrous; calyxlobes linear-oblong, acute; corolla 1.25 in. long, the cylinder base very short; leaves ovate, acuminate, rounded or subcordate at base, crenulate, loosely villous, up to 7 in. long, 4 in. broad, main nerves 7-8 pairs

.....35. *Andersonii*.  
Flowers from the old wood, often from near the ground, sometimes also terminal; stamens equal, united by pairs in a short sheath at the base:—

Bracts large, blackish-purple, orbicular, entire, glabrous or glandular-pubescent, .75 in. in diam., bracteoles ligulate, 1 in. long, scabrous; corolla somewhat bilabiate, the lobes reflexed, cylinder base very short; leaves ovate, caudate-acuminate, crenulate, up to 10 in. long, 5 in. broad, main nerves about 8 pairs

.....36. *luridus*.

Bracts large, orbicular, serrate, softly hairy but later glabrate, 1-2 in. in diam., prominently nerved, bracteoles oblong, .75 in. long, ciliate; corolla subcampanulate with broad lobes; leaves ovate, acuminate, serrulate, sparsely glandular-hairy, up to 9 in. long, 4 in. broad, main nerves 9 pairs

.....37. *bolampatianus*.

Seeds hairy when wet, except on the areoles; bracteoles 0:—

Spikes cylindric, axillary and terminal, 1-3 in. long; bracts ovate, acute or cuspidate, softly hairy; corolla 1 in. long, the cylinder base .25 in.; filament sheath straight, outer anthers larger than inner; leaves ovate, acute, subcordate at base, crenate, rugose or bullate, very softly glandular-hairy, up to 1.5 in. long, .75-1 in. broad, main nerves 6-7 pairs

38. *sessilis*.

Spikes subtetragonous, lateral and terminal, 2·5 in. long; bracts ovate, obtuse, reddish, viscous, subscarious, decurrent at base, .75 in. long; calyx-lobes scarious; corolla large; leaves ovate, acuminate, subcordate, crenate, bristly-pubescent, up to 5 in. long, 3 in. broad, main nerves 9 pairs....39. *Dupeni*.  
 Flowers in lax spikes, cymose or paniced; bracts in pairs at the nodes of the panicle-branches; no floral bracts:—

Bracts early deciduous, .3 in. long, bracteoles smaller, calyx-lobes .5 in. long, linear-oblong, obtuse, all glandular-hairy; spikes in panicles much interrupted; corolla 1–1·5 in. long, of which cylinder base about one-third; leaves ovate, acute, rounded or cordate at base, serrate, scabrous and glandular, up to 2 in. long, main nerves about 5 pairs .....40. *Newii*.

Bracts persistent:—

Spikes axillary, solitary or in cymes, covered with long soft viscid glandular hairs; bracts linear, acuminate, recurved, .5–.75 in. long, bracteoles smaller; calyx-lobes linear, unequal, .3–.5 in. long, longer in fruit; corolla 1–1·25 in. long, the cylinder base about one-third; filament sheath elongate, villous as are the outer filaments, the inner ones shorter; leaves lanceolate, long acuminate, decurrent on the petiole and then auricled, nearly entire, up to 12 or even more in. long, 3 in. broad, main nerves 6–10 pairs; seeds 2, very shaggy with white hairs

41. *integrifolius*.

Spikes in terminal more or less leafy panicles; seeds 4, hairy:—  
 Leaves oblong lanceolate, sessile or petioled with the blade decurrent and ending in an auricle:—

Spikes rather stout, flexuose, with the internodes .5–1 in. long, nodal bracts large, ovate, acute, .5 in. long, bracteoles spatulate; calyx .5 in. long, the lobes linear; corolla 1 in., curved, cylinder tube hardly any; leaves elliptic or lanceolate, long acuminate, serrate, up to 8 in. long, 1·5 in. or more broad, main nerves 8–10 pairs, very oblique

42. *homotropus*.

Spikes slender, flexuose, puberulous, the internodes .25–.5 in. long, nodal bracts small, oblong, usually under .25 in. long, bracteoles linear, short, glandular hairy; calyx .25–.35 in. long, the lobes linear, glabrous; corolla 1 in. long, curved, the cylinder tube rather short; leaves lanceolate, long acuminate, the petiole broadly winged and auricled, serrate, up to 12 in. long, 3·5 in. broad, main nerves 8–12 pairs, very oblique, regular.....43. *gracilis*.



Leaves ovate, acute, abruptly rounded at base and then shortly decurrent on the long petiole, crenulate, glandular-pubescent, the blade up to 6.5 in. long, 4 in. broad, main nerves 10-15 pairs, spreading and prominent; spikes in glandular-pubescent panicles, the nodal bracts oblong, about .2 in. long, bracteoles linear, more hairy than the obtuse calyx-lobes; corolla 1.25 in. long, urceolate, very retrorsely hairy within, cylinder base small; filament sheath curved at base, the inner stamens short .....44. *violaceus*.

Leaves not auricled and not decurrent on the long petiole:—

Stout and very viscous glandular-hairy, the leaves elliptic or oblanceolate, acuminate at both ends, glabrous, undulate, crenate, long-petioled, up to 7 in. long, 3 in. broad, main nerves 10 pairs, prominent, curved; panicles large and loose, very sticky, nodal bracts small, linear; pedicels slender, bracteoles minute, .1 in. long; calyx very glandular-villous, the lobes linear .5 in., one longer; corolla large, ventricose, no cylinder base, 1-1.5 in. long; capsule glabrous, apiculate.....45. *amabilis*.

Slender and with only a few long white glandular hairs, the leaves lanceolate, caudate-acuminate, nearly glabrous, undulate, petioled, up to 5 in. long, 1.25 in. broad, main nerves 7-9 pairs, curved; panicles much branched, nodal bracts ovate acute, spreading or reflexed; pedicels slender, bracteoles very minute; calyx subglabrous, the lobes linear .25 in., one longer; corolla funnel-shaped, .75-1 in., cylinder base very short; capsule oblanceolate

46. *rubicundus*.

1. STROBILANTHES HUMILIS, Gamble n. comb. *Endopogon viscosus*, var. *humilis*; Wt. Ic. t. 1498.

W. Gháts, Anamalai Hills, at 4,300 ft. (Beddome, No. 69 in Herb. Calc.), Courtallum, in Tinnevely (Wight).

A low shrub scarcely a foot high (Wight). Beddome's specimen was collected in 1858, Wight's in 1836.

2. STROBILANTHES FOLIOSUS, T. And.; F. B. I. iv. 433. *Endopogon foliosus*, Wt. Ic. t. 1501. *E. capitatus*, Wt. Ic. t. 1499.

W. Gháts, Nilgiri and Pulney Hills, at 4,000-7,000 ft. in Shola Forest, common; Sholas on Kudramukh, S. Canara (Beddome); Brumagiri Hills (Fischer).

A large, gregarious shrub with pale blue flowers, the stems

glabrous or glandular pilose, both often on the same plant, the hairy ones usually in the fruiting season. The leafy outer bracts are often deciduous, when the long linear bracteoles and calyx-lobes are conspicuous. It is often found in flower and perhaps does not die down at intervals.

3. *STROBILANTHES KUNTHIANUS*, T. And.; F. B. I. iv. 434. *Phlebophyllum Kunthianum*, Nees; Wt. Ic. t. 448.

W. Gháts, Nilgiris, Pulneys and hills of Travancore, above 6,000 ft., on grassy downs, common, especially in Nilgiris on the E. side; Shevaroy Hills and hills of N. Coimbatore.

A gregarious bushy shrub with blue flowers, colouring large tracts when in flower, probably at intervals of about 6 years.

4. *STROBILANTHES CANARICUS*, Bedd. Ic. t. 215; F. B. I. iv. 434.

W. Gháts, hills of S. Canara at Kudramukh 6,000 ft. (Beddome).

A stiff shrub reaching 3-4 ft. in height, with white flowers, the corolla 5 in. long, villous without.

5. *STROBILANTHES JEYPORENSIS*, Bedd. Ic. t. 214; F. B. I. iv. 436.

N. Circars, hills of Vizagapatam and Godavari, at 1,500-2,500 ft. in forest undergrowth (Beddome, Gamble, Barber). A large shrub with white flowers. It flowered in 1874, 1885 and 1902.

6. *STROBILANTHES CUSPIDATUS*, T. And.; F. B. I. iv. 435; Bedd. Ic. t. 221. *Endopogon versicolor*, Wt. Ic. t. 1497.

N. Circars, hills of Godavari at 3,000 ft. (Gamble); W. Gháts, in almost all Districts, but most common in Nilgiris on N. and E. slopes about 4,000-7,000 ft.

A large shrub with appressed white-woolly or somewhat tawny young branches and the undersurface of the leaves, mature more glabrous. The flowers are of a very pale blue and the spikes very glandular hairy. It was collected in flower in 1851, 1870, 1877, 1884. Its period seems to be about 7 years.

7. *STROBILANTHES CONSANGUINEUS*, C. B. Clarke; F. B. I. iv. 435.

W. Gháts on N. and E. slopes of Nilgiris and Pulneys, at low levels.

A large shrub, with pale blue or white flowers, the spikes glandular villous, the bracts rather short. It was collected in flower in 1884, 1897, 1909, and its period may be about 12 years.

Var. *Amomum*, C. B. Clarke; Bedd. Ic. t. 216. Spikes more slender, more interrupted, nearly glabrous; leaves more prominently toothed; bracts larger, acuminate.

Carnatic, Kambakam Hills of Chingleput (Fischer); W. Gháts, Mysore and Coimbatore to the Pulneys.

Var. *hypoleucus*, C. B. Clarke. Spikes as in var. *Amomum* but the leaves more or less covered beneath with appressed white tomentum.

Hills of the Deccan, Ramandrúg in Bellary (Beddome).

8. STROBILANTHES LAWSONI, Gamble in Kew Bull. 1923, 374.

W. Gháts, below Sispara in W. Nilgiris, at 5,000–6,000 ft. (Lawson, Gamble) in sheltered sholas; Tambracheri Ghát, Wynaad (Barber); hills of Travancore, among rocks (Bourdillon).

An erect shrub with pale blue flowers. It was collected in flower in 1883. The capsules and seeds are large and the latter very hairy when wetted.

9. STROBILANTHES GOSSYPINUS, T. And.; F. B. I. iv. 434; Bedd. Ic. t. 198; Bot. Mag. t. 7790.

W. Gháts, above Sispara in W. Nilgiris, at 7,000 ft., on open dry hillsides; Mysore? (Lobb.).

A handsome erect shrub with pale blue flowers. It flowered in 1867 to 1870 and 1883 and its period is supposed to be 6 or 7 years (Beddome).

10. STROBILANTHES BARBATUS, Nees; F. B. I. iv. 437; Bedd. Ic. t. 212. *S. tetrapterus*, Dalz.

W. Gháts, Bababudan Hills (Talbot), W. Nilgiris, Anamalais and hills of Travancore, at low levels and up to 3,000 ft.

A gregarious shrub with white flowers, flowering about every 7th year (Beddome).

11. STROBILANTHES WIGHTIANUS, Nees; F. B. I. iv. 438; Wt. Ic. t. 1514.

W. Gháts, Nilgiris above 6,000 ft., usually on grassy downs, common.

A very rough rather low gregarious shrub with pale blue flowers marked with darker veins, the tube brownish. It may be found in flower in any year.

12. *STROBILANTHES URCEOLARIS*, Gamble in Kew Bull. 1923, 374.

W. Gháts, Nilgiris about Ootacamund, 7,000–8,000 ft. (Bourne, Gamble). Pulney Hills, head of the Bodinaikanur Ghát (Beddome), in Shola forest, on grass land. An erect shrub with long internodes in the forest, a very low branching one in open places, the flowers apparently pale blue.

13. *STROBILANTHES PULNEYENSIS*, C. B. Clarke; F. B. I. iv. 438.

W. Gháts, Coorg, Nilgiris, Anamalais, Pulneys and hills of Travancore above 5,000 ft.; hills of N. Coimbatore at 5,000 ft. (Fischer); Shevaroy Hills of Salem (Bourne).

A shrub with blue flowers. It seems to have been found in flower at rather long intervals. It flowered at Cairn Hill, Ootacamund, in 1885.

14. *STROBILANTHES NEILGHERRENSIS*, Bedd. Ic. t. 196; F. B. I. iv. 438.

W. Gháts, Coorg, Wynaad, Palghát and Pulney Hills, at 3,000–6,000 ft., in evergreen forests.

A large shrub with subtetragonal stems and white flowers. It was found in flower in 1884 (Gamble), 1910 (Fischer), previously by Beddome without date.

15. *STROBILANTHES CIRCARENSIS*, Gamble in Kew Bull. 1923, 373.

N. Circars, hills of Vizagapatam at 2,000–5,000 ft. (Gamble, A. W. Lushington).

An erect shrub with subtetragonous nearly glabrous stems, rather large capsules and glabrous seeds.

16. *STROBILANTHES ANCEPS*, Nees; F. B. I. iv. 442; Bedd. Ic. t. 204.

Var. *microstachya*, C. B. Clarke. *Ruellia?* *punctata*, Nees; Wt. Ic. t. 1563.

W. Gháts, hills of S. Canara (Beddome); also Carcoor Ghát in Wynaad; hills of Tinnevely, about Courtallum (Wight) and Naterikal (Hb. Madr.).

A soft slender undershrub with white flowers and glabrous seeds without areoles.

17. *STROBILANTHES PERROTTETIANUS*, Nees; F. B. I. iv. 439; Wt. Ic. t. 1513.  
W. Gháts, Nilgiris, in Shola woods above 6,000 ft., common; Anamalais (Beddome).  
A large shrub soft with reddish-purple hairs, the flowers pale blue pink or lilac, the capsule 2-seeded. It was in flower in 1852, again in 1883-1886, since then in 1908 and 1918, but its period is uncertain, it may be 10 years.
18. *STROBILANTHES PAPILLOSUS*, T. And.; F. B. I. iv. 445; Bedd. Ic. t. 201.  
W. Gháts, Shola woods of Nilgiris at 7,000-8,000 ft.  
A large shrub with large blue flowers, and angular stems which like the leaves and inflorescence are very scabrous with bulbous-based hairs. The close heads have involucre bracts with leafy tips. The seeds are believed to be glabrous and large, without areoles. It flowered at Sispara and on Doddabetta in 1883.
19. *STROBILANTHES ZENKERIANUS*, T. And.; F. B. I. iv. 439; *Endopogon Strobilanthes*, Wt. Ic. t. 1500.  
W. Gháts, Nilgiris, in Shola woods above 6,000 ft., common; Anamalais, at 6,000 ft. (Beddome); Pulney Hills, (Bourne).  
A large handsome shrub, with blue flowers and 4-seeded capsule. It was in flower in 1883-85 and again in 1916, but its period, perhaps rather long, is doubtful.
20. *STROBILANTHES WARRENSIS*, Dalz.; F. B. I. iv. 439. *S. parviflorus*, Bedd. Ic. t. 197.  
S. Canara Gháts (Beddome, Meebold); Coorg, at 3,000 ft. (*vide* Beddome).  
An erect shrub 5-6 ft. high with white flowers in slender cottony spikes, capsule 4-seeded.
21. *STROBILANTHES CILIATUS*, Nees; F. B. I. iv. 439; Bedd. Ic. t. 211.  
W. Gháts, S. Canara to Travancore, in evergreen forest up to about 4,000 ft.  
A slender shrub reaching 4 ft. in height with white or lilac flowers, said to flower yearly.
22. *STROBILANTHES MEEBOLDII*, Craib in Kew Bull. 1910, 278. Deccan, Kempkull in Mysore, at 1,000 ft. (Meebold).  
A small shrub about 3 ft. high, the heads small somewhat

strobilate with soft subscarious bracts, the seeds not known but the ovules glabrous.

23. *STROBILANTHES ADENOPHORUS*, Bedd. Ic. t. 225; F. B. I. iv. 440.

W. Gháts, Anamalai Hills, at 4,000–5,000 ft. (Beddome, Fischer), hills of Tinnevely (Beddome).

A shrub, reaching 3–4 ft. in height, with apparently pale blue flowers and very narrow leaves, probably flowering yearly.

24. *STROBILANTHES DECURRENS*, Nees; F. B. I. iv. 440. *Goldfussia decurrens*, Wt. Ic. t. 1522.

W. Gháts, Coorg (Beddome), Anamalai Hills at 4,500 ft. (Beddome), hills of Tinnevely (Wight).

A herbaceous (Wight) plant with quadrangular stems. The large decurrent bracts and the very large seeds sometimes nearly .5 in. in diam. are characteristic.

25. *STROBILANTHES MICRANTHUS*, Wt. Ic. t. 1519; F. B. I. iv. 444.

W. Gháts, Nilgiri and Pulney Hills above 6,000 ft., in Shola woods.

An erect almost herbaceous soft shrub with thick branches, large leaves and very distinct corolla (Clarke suggests "reddish") and stamens. It flowered in 1870 and again in 1885 and 1917; the period may possibly be 15 years.

26. *STROBILANTHES TRISTIS*, T. And.; F. B. I. iv. 441. *Goldfussia tristis*, Wt. Ic. t. 1508.

W. Gháts, W. Nilgiris, Anamalais and hills of Tinnevely, below 6,000 ft. in evergreen forest.

An erect shrub with pale blue flowers.

27. *STROBILANTHES CAUDATUS*, T. And.; F. B. I. iv. 441; Bedd. Ic. t. 213.

W. Gháts, hills of S. Canara, Coorg, Wynnaad and Travancore, up to 6,000 ft., in evergreen forest.

An erect shrub, reaching 4–5 ft. high, the flowers white tinged with orange or red. The bracts in the Malabar and Travancore specimens are longer and more spreading than in those from S. Canara.

28. *STROBILANTHES HETEROMALLUS*, T. And.; F. B. I. iv. 437.

W. Gháts, Nilgiri and Pulney Hills, at about 4,000 ft. and above it.

A large shrub, reaching perhaps to 20 ft. high, with pale blue flowers, very scabrous. It was found in flower in 1884-6 (Lawson and Gamble), 1899 (Prain), 1910 (Meebold) in Nilgiris, in 1898 in Pulneys (Bourne). Its period may perhaps be about 14 years.

29. STROBILANTHES IXIOCEPHALUS, Benth.; F. B. I. iv. 444; Bedd. Ic. t. 203. *S. Neesianus*, Wt. Ic. t. 1523.

W. Coast and W. Gháts, in S. Canara (Beddome, Hohenacker).

A small straggling shrub with white flowers and very viscid bracts.

30. STROBILANTHES ASPER, Wt. Ic. t. 1518; F. B. I. iv. 452.

W. Gháts, Bababudan Hills of Mysore, W. Nilgiris, Anamalais, hills of Malabar, Cochin and Travancore, at 5,000-8,000 ft., margins of Shola woods.

A soft erect shrub about 4-5 ft. high with purplish-white flowers and a strong scent. Its period is possibly quite a short one and perhaps it may not die down at intervals.

31. STROBILANTHES LUPULINUS, Nees; F. B. I. iv. 443.

Hills of Mysore, at Aglatti, 3,500 ft. (Meebold); High Wavy Mountain, Madura, 4,000 ft. (Blatter and Hallberg); hills of Travancore and Tinnevely (Wight, Rama Row). An erect herbaceous undershrub with very glandular-hairy spikes.

32. STROBILANTHES ASPERRIMUS, Nees; F. B. I. iv. 443.

W. Gháts, forests of Mysore, North Coimbatore and Wynaad, at about 3,000-5,000 ft.

A rather stout shrub about 3 ft. high, with apparently pale blue corolla and very rough scabrous glandular branches.

33. STROBILANTHES HEYNEANUS, Nees; F. B. I. iv. 443. *S. rugosus*, Wt. Ic. t. 1619.

W. Gháts, in all Districts from S. Canara to Tinnevely, at about 3,000-4,000 ft., in evergreen forests; Bababudan Hills of Mysore.

A small gregarious shrub reaching 3 ft. in height but usually less, with pale blue flowers. It seems to remain perennial and is often found in flower. It is most variable but the varieties are very difficult to separate. Clarke's var. *fusca* has large usually solitary spikes; his var. *viridis* has the cymes more elongate, more prominently bracteate

and the spikes smaller, but they run into one another and the difference seems to be really only climatic.

34. *STROBILANTHES CAMPANULATUS*, Wt. Ic. t. 1562. *S. Heyneanus* var. *campanulata*, C. B. Clarke; F. B. I. iv. 444.

W. Gháts, in Coorg (Wight).

A very small herbaceous shrub reaching scarcely 10 in. high with small spikes and leaves.

35. *STROBILANTHES ANDERSONII*, Bedd. Ic. t. 208; F. B. I. iv. 450.

W. Gháts, Anamalai Hills, at 6,000 ft. (Beddome), in moist woods.

A very large shrub up to 20 ft. high (Beddome), with pale blue large flowers in strobilate spikes 2-2.5 in. long, the leaves membranous.

36. *STROBILANTHES LURIDUS*, Wt. Ic. t. 1515-6; F. B. I. iv. 450.

W. Gháts, W. Nilgiris from Naduvatam to Sispara at 4,000-6,000 ft., hills of Travancore at 4,000 ft. (Beddome).

A large straggling gregarious shrub with thick stems and branches, the lurid purple (sometimes white) flowers in bracteate spikes up to 10 in. long with peduncles deflexed, the spikes erect. Mr. Clarke says it flowers every year and I think this is the case, but Wight says it seems only to flower once in several years.

Var. *Bourneae*, Gamble. Bracts, bracteoles and calyx very glandular hairy, the prominent nerves on the bracts resembling those of the next species.

Pulney Hills, in Periya Shola (Bourne).

37. *STROBILANTHES BOLAMPATTIANUS*, Bedd. Ic. t. 200; F. B. I. iv. 451.

W. Gháts, Bolampatti Hills of Coimbatore, at 4,500-7,000 ft., in moist forests.

A large shrub up to 15 ft. high with brown flowers in terminal or lateral spikes up to 6 in. long, sometimes paniced. Beddome says it flowers every year.

38. *STROBILANTHES SESSILIS*, Nees; F. B. I. iv. 452; Wt. Ic. t. 1511.

W. Gháts, downs of W. Nilgiris at 6,000-8,000 ft.

A small erect plant with stems 1-1½ ft. high from a perennial rootstock. The flowers are a bright blue-



purple, and the bracts after flowering sometimes change to pale pink. It probably flowers almost every year or at any rate at short intervals, the rootstock remaining.

Var. *sessiloides*, C. B. Clarke; Wt. Ic. t. 1512. Leaves thicker, very rugose or bullate, with prominent nerves; the spikes longer.

Bababudan Hills of Mysore, at 6,000 ft. (Talbot, etc.), Nilgiris (Wight).

39. STROBILANTHES DUPENI, Bedd.; F. B. I. iv. 453.

W. Gháts, Anamalais, top of Neliampatti Ghát (Beddome).

A very little known shrub with well-marked bracts and blue flowers.

40. STROBILANTHES NEWII, Bedd. ex C. B. Clarke; F. B. I. 464. *S. extensus*, Bedd. Ic. t. 202, not of Nees.

W. Gháts, Manjerabad in W. Mysore (New).

A small shrub with quadrangular stems and deep purple flowers, with much inflated corolla, the leaves prominently serrate.

41. STROBILANTHES INTEGRIFOLIUS, O. Kze. *S. perfoliatus*, T. And.; F. B. I. iv. 458. *Leptacanthus alatus*, Wt. Ic. t. 1527.

W. Gháts, hills of S. Canara and Coorg.

A gregarious much-branched shrub up to about 4 ft. high, very viscid, with blue flowers and seeds very hairy when wetted. In the Bombay forests, it is said to flower at intervals of 7 years (Talbot). It flowered in S. Canara in 1866 (Beddome).

42. STROBILANTHES HOMOTROPUS, Nees; F. B. I. iv. 474. *S. sevenmis*, Bedd. Ic. t. 206, not of Nees.

W. Gháts, Nilgiris, in Sholas above 7,000 ft.

A large shrub with white flowers. It was in flower in 1883, but its period is probably a long one, as it has only rarely been collected.

43. STROBILANTHES GRACILIS, Bedd. Ic. t. 207; F. B. I. iv. 474.

W. Gháts, Anamalais, Pulneys and hills of Travancore, at 4,000–6,000 ft.

A very large shrub (Beddome), reaching 15 ft. in height (Bourne), the flowers white tinged with lilac; mauve-blue (Bourne)

44. *STROBILANTHES VIOLACEUS*, Bedd. Ic. t. 205; F. B. I. iv. 474.

W. Gháts, about Bangi Tappal and Sispara in the Nilgiris at 6,000–7,500 ft.

A large shrub with beautiful blue-purple flowers. It flowers rarely, probably at long intervals. It was found by Beddome in 1870 and by Lawson and Gamble in 1883, so the period may be 13 years.

45. *STROBILANTHES AMABILIS*, C. B. Clarke; F. B. I. iv. 476. *Leptacanthus Walkeri*, Wt. Ic. t. 1507, *not of* Nees.

A large very sticky shrub with jointed stems and pink flowers. Recorded flowering years are: 1838 (Gough), 1846 (Wt.), 1847 (Gardner), 1855 (Cleghorn), 1861 (T. Anderson), 1873 (Beddome), 1883 (Lawson, Gamble), 1911 (Fischer); the period has been supposed to be about 10 years.

46. *STROBILANTHES RUBICUNDUS*, T. And.; F. B. I. iv. 475. *S. paniculatus*, Bedd. Ic. t. 199, *not of* T. And.

W. Gháts, Wynaad to Travancore and Tinnevely Hills, at 2,000–3,000 ft. (Beddome, Lawson, Bourdillon).

A slender delicate shrub with pink flowers. It flowered in Wynaad in 1816 (Heyne), on the Carcoor Ghát in 1864 and 1888, near Peermerd in 1889, in Tinnevely in 1899.

### 19. *Calacanthus*, T. And.

An erect shrub. *Leaves* large, entire, lineolate. *Flowers* large, solitary and sessile in the axils of bracts, arranged in long spikes, terminal and from the upper axils; bracteoles 2. *Calyx* 5-partite, the lobes unequal, the upper and 2 lower lanceolate, the 2 lateral linear. *Corolla* purple, deeply 2-lipped; upper lip narrow, shortly bifid, lower shortly 3-lobed, the lobes all contorted in bud. *Stamens* 4, didynamous; filaments connate at base in a transverse membrane; anthers subequal, oblong, 2-celled, ciliate. *Ovary* 2-celled; ovules 2 in each cell; style long, filiform, hairy; stigma linear. *Capsule* obovoid, compressed, apiculate, pubescent, 2-seeded. *Seeds* compressed, densely hairy, on curved retinacula.

- CALACANTHUS DALZELLIANA*, T. And.; F. B. I. iv. 479. *Lepidagathis grandiflora*, Dalz.; Bedd. Ic. t. 226.

Hills of S. Canara up to 3,000 ft. (Beddome).

A leafy gregarious shrub up to 6 ft. high, with large elliptic or lanceolate acuminate leaves up to 8 in. long, 3 in. broad, large purple flowers with transversely plicate lower lip and large capsule, the seeds with brown hairs.

## 20. *Andrographis*, Wall.

Erect or procumbent herbs or undershrubs, the branches often tetragonous. *Leaves* entire, often minutely lineolate. *Flowers* in axillary and terminal, lax, often paniced, racemes, sometimes reduced to 1 flower, often unilateral; bracts small; bracteoles minute or 0. *Calyx* 5-partite, the lobes narrow. *Corolla* small, usually pale but blotched and spotted with brown and purple, tubular at base, then more or less ventricose, prominently 2-lipped, the upper slightly 2-fid, the lower usually deflexed, 3-lobed and coloured. *Stamens* 2; filaments broad, enlarged at base and sometimes in the middle; anthers 2-celled, usually bearded at base with a tuft of white hair. *Ovary* 2-celled, ovules 2-6 in each cell; style slender; stigma minutely bifid. *Fruit* an oblong or elliptic capsule compressed at right angles to the septum, 4-12-seeded, the retinacula acute or rounded. Seeds hard, deeply rugosely pitted, glabrous.

Capsule linear-oblong :—

Flowers in elongate racemes, sometimes subpaniculate but the flowers distant; stem tetragonous; retinacula acute :—

Anthers bearded at the base, the filaments also more or less hirsute; corolla prominently 2-lipped :—

Corolla under .5 in. long; anthers prominently bearded; leaves glabrous :—

Leaves lanceolate, acute at both ends, up to 3 in. long, .75 in. broad; pedicels up to .25 in. long; calyx-lobes glandular-pubescent.....1. *paniculata*.

Leaves linear, under 1 in. long; pedicels .15 in. long; calyx-lobes glabrous, lineolate .....2. *stenophylla*.

Corolla about .75 in. long; anthers bearded but not prominently :—

Stems slender as are the racemes; pedicels up to .2 in. long; leaves lanceolate, acuminate, broadest at the rounded base, nearly glabrous, up to 3 in. long, 1 in. broad; calyx-lobes glandular-pubescent and lineolate.....3. *Wightiana*.

Stems stouter as are the racemes; pedicels 0-.1 in. long;

leaves oblong-lanceolate, acute, cuneate at base, slightly pubescent, up to 3.5 in. long, 1 in. broad, calyx-lobes glandular-pubescent .....4. *macrobotrys*.

Anthers not bearded at the base, the filaments nearly glabrous ; corolla not or only obscurely 2-lipped :—

Corolla about .3 in. long :—

Filaments only slightly broadened below ; pedicels very short or 0 ; leaves ovate, acute, rounded and then decurrent at base, up to 4.5 in. long, 2 in. broad ; calyx-lobes glandular-pubescent or nearly glabrous.....5. *elongata*.

Filaments with a prominent rounded protuberance ; pedicels usually 0 ; leaves ovate, acute, attenuate or rounded and then long-decurrent at base, up to 4 in. long, 1.5 in. broad ; calyx-lobes glandular-pubescent .....6. *ovata*.

Corolla .5—·75 in. long ; filaments flattened ; pedicels .1—·25 in. long ; leaves below ovate, upper linear-oblong, acute at both ends, glabrous but much lineolate, up to 3.5 in. long, 1 in. broad ; calyx-lobes long, glandular-hispid.....7. *alata*.

Flowers in racemes, paniculate, the flowers not very distant :—

Racemes short, forming terminal subcapitate panicles ; corolla ventricose :—

Leaves elliptic, acute at both ends, glabrous except for scattered jointed hairs, drying black, up to 4 in. long, 2.5 in. broad, raphides minute ; calyx-lobes linear, .1—·15 in. long ; capsule up to 1 in. long, glandular-strigose.....8. *Neesiana*.

Leaves elliptic-lanceolate, narrowed at both ends, strigose above, softly fulvous-tomentose beneath, up to 2.5 in. long, 1 in. broad, raphides 0 ; calyx-lobes setaceous, .2—·3 in. long ; capsule about .75 in. long, glandular-strigose.....9. *stellulata*.

Racemes long, forming rather large compound terminal panicles :—

Leaves rather thick, subsessile, ovate or ovate-lanceolate, acute, the base obtuse, glabrous, up to 3 in. long, 1 in. broad, raphides minute ; calyx-lobes .1—·2 in. long, glandular hairy ; corolla ventricose ; capsule .8 in. long.....10. *lineata*.

Leaves submembranous, petioled, lanceolate, acuminate at both ends, up to 4 in. long, 1—1.5 in. broad, lineolate :—

Corolla with a prominent ventricose protuberance ; calyx-lobes .15 in. long, glandular ; leaves glabrous above

11. *producta*.

Corolla only slightly ventricose ; calyx-lobes .3 in. long, scaly and glandular ; leaves usually strigose above

12. *explicata*.

Leaves thick, very shortly petioled, ovate or ovate-oblong, rounded at base, strigose above, without raphides, up to 2 in. long, .5-.75 in. broad; corolla slightly ventricose; calyx-lobes .2-.25 in. long, glandular hairy.....13. *affinis*.

Racemes short, in short terminal panicles, sometimes single; low branching undershrubs :—

Leaves ovate or lanceolate, glabrous, narrowed at both ends, submembranous, up to 2 in. long, .75 in. broad, lineolate; panicles rarely 2 in. long; calyx-lobes .15 in. long; corolla very little ventricose.....14. *viscosula*.

Leaves small, ovate or orbicular; racemes little branched :—

Anthers very conspicuously white-bearded; corolla pale, not ventricose; calyx-lobes .15-.2 in., glandular; leaves ovate or orbicular, villous, soft, up to .5 in. in diam., the margins not recurved; capsule .6 in. long, .1 in. broad, glandular

15. *lobelioides*.

Anthers not at all bearded; corolla dark, slightly ventricose; calyx-lobes .2-.3 in. long, glandular; leaves ovate or elliptic, rounded or cuneate at base, villous only on the margins which are recurved, hard, up to .6 in. long, .3 in. broad; capsule .6 in. long, .1 in. broad, very glandular hirsute

16. *Lawsoni*.

Flowers in slender axillary racemes, sometimes bifid; anthers strongly bearded; retinacula spoon-shaped :—

Racemes long, up to 4 in., slender, spreading, the pedicels distant; calyx-lobes .2 in. long; leaves ovate or orbicular, shortly petioled, villous, up to .7 in. in diam.; capsule .75 in. long, 8-seeded

17. *Rothii*.

Racemes short, few-flowered, the pedicels close :—

Racemes up to 1.5 in. long; calyx-lobes .3 in. long, glandular-pubescent; leaves elliptic or obovate, subsessile, glabrous, up to 3 in. long, 1.5 in. broad; capsule .6 in. long, 8-seeded

18. *Beddomei*.

Racemes scarcely 1 in. long; calyx-lobes .15 in. long, glandular; leaves elliptic or ovate, subsessile, villous, up to 1 in. long, .3 in. broad; capsule .5 in. long, 4-seeded .....19. *glandulosa*.

Capsule elliptic :—

Capsule hairy, .35 in. long, .15 in. broad, 4-seeded; seeds large, dark, deeply pitted, retinacula spine-like; anthers slightly bearded; flowers erect, in slender axillary unilateral racemes, which are sometimes 2-branched and as long as or shorter than the leaves; calyx-lobes very slender, .25-.5 in. long; leaves oblong or

elliptic, subobtus, up to 3.5 in. long, 1 in. broad....20. *echioides*. Capsule, acute at both ends, glabrous, .4 in. long, .2 in. broad, 8-seeded; seeds small, pale, deeply rugose, retinacula spoon-shaped; anthers much bearded; flowers solitary axillary or in few-flowered racemes in upper axils; calyx-lobes very slender, .25-.4 in. long; leaves orbicular or subreniform, sessile, villous, up to 1 in. in diam.....21. *serpyllifolia*.

1. *ANDROGRAPHIS PANICULATA*, Nees; F. B. I. iv. 501; Wt. Ic. t. 518. *A. subspathulata*, C. B. Clarke; F. B. I. iv. 502.

N. Circars, Deccan and Carnatic to S. Travancore in dry forest undergrowth.

An erect herb with pink corolla, darker on the lower lip, the capsule usually 12-seeded. A bitter plant, used in medicine.

2. *ANDROGRAPHIS STENOPHYLLA*, C. B. Clarke; F. B. I. iv. 503.

Deccan, about Coimbatore (Wight).

An erect glabrous undershrub with very narrow leaves and stems from a stout rootstock, the corolla pale with dark red stripes.

3. *ANDROGRAPHIS WIGHTIANA*, Arn. ex Nees; F. B. I. iv. 503; Wt. Ic. t. 1558.

W. Gháts, Anamalais and hills of Travancore and Tinnevely, up to 2,500 ft., in evergreen forests.

A very slender nearly glabrous herb, the corolla pink with red-purple lower lip.

4. *ANDROGRAPHIS MACROBOTRYS*, Nees; F. B. I. iv. 503.

W. Gháts, S. Canara (Hohenacker), Anamalais, Pulneys and hills of Travancore, up to 2,500 ft., in evergreen forests.

A stouter somewhat pubescent herb with pink corolla and dark purple-red blotches on the lower lip, as in the last.

5. *ANDROGRAPHIS ELONGATA*, T. And.; F. B. I. iv. 502.

W. Gháts, hills of Tinnevely, in evergreen forests, at low levels.

An erect plant with divaricate branches and inflorescence, the corolla apparently pink.

6. **ANDROGRAPHIS OVATA**, Benth.; F. B. I. iv. 502. *Gymnostachyum ovatum*, T. And.; Bedd. Ic. t. 250.  
N. Circars, Mahendragiri Hill in Ganjam, 4,000 ft. (Gamble, Fischer and Gage), Rampa Hills of Godavari, 2,000–3,000 ft. (Gamble, V. Narayanswami); Deccan, Ananthapura in Mysore, 2,000–3,000 ft. (Meebold).  
An erect rather tall herb with glandular-pubescent stem and pink corolla.
7. **ANDROGRAPHIS ALATA**, Nees; F. B. I. iv. 502.  
W. Gháts, E. base of slopes in Nilgiris, Coimbatore and Walayar, up to 3,000 ft. in the Gundal Valley (Fischer).  
An erect herb reaching 4 ft. in height with very divaricate long branches and white corolla spotted with pink. The upper branchlets have the angles so sharp as to be slightly winged.
8. **ANDROGRAPHIS NEESIANA**, Wt. Ic. t. 1561; F. B. I. iv. 504.  
W. Gháts, Anamalais, Pulneys and hills of Tinnevely, about 7,000 ft., on grass downs at the margins of sholas and on the banks of streams.  
An erect handsome plant about 2–3 ft. high with brownish purple flowers. The heads are usually close, but the racemes elongate later on.
9. **ANDROGRAPHIS STELLULATA**, C. B. Clarke; F. B. I. iv. 504.  
W. Gháts, Nilgiris about 6,000 ft. (Hohenacker, Clarke).  
An erect herb with prominent calyx-lobes, the corolla pale pink with purple spots.
10. **ANDROGRAPHIS LINEATA**, Nees; F. B. I. iv. 504.  
Deccan, hills of Cuddapah at 3,000 ft. (Gamble); Mysore and N. Coimbatore to the N. slopes of Nilgiris, 3,000–5,500 ft.; Carnatic, Sirumalai Hills of Madura.  
An erect herb, the panicle branches very long and almost spicate in fruit. the corolla pale with purple blotches. Clarke's var. *Lawii*, seems quite a distinct plant but the material is very insufficient.
11. **ANDROGRAPHIS PRODUCTA**, Gamble n. comb. *A. Neesiana* var. *producta*, C. B. Clarke; F. B. I. iv. 504.  
W. Gháts, Malabar, Travancore and Tinnevely, up to 6,000 ft. on W. Nilgiris.  
An erect herb.
12. **ANDROGRAPHIS EXPLICATA**, Gamble n. comb. *A. viscosula*

var. *explicata*, C. B. Clarke; F. B. I. iv. 504. *A. ceylanica*, Wt. Ic. t. 1560, not of Nees.

W. Gháts, hills of Tinnevely and Travancore, up to 5,000 ft.

An erect herb.

13. *ANDROGRAPHIS AFFINIS*, Nees. *A. Neesiana* var. *affinis*, T. And.; F. B. I. iv. 504.

W. Gháts, Nilgiris and Pulneys at 5,000–7,000 ft.

A slender, many-stemmed undershrub with pale corolla streaked with purple, the inflorescence bracts prominent.

14. *ANDROGRAPHIS VISCOSULA*, Nees; F. B. I. iv. 504; Wt. Ic. t. 1559.

Hills of Tinnevely, about Courtallum (Wight, etc.).

A many-branched woody undershrub reaching scarcely more than 1–1½ ft. high, the corolla apparently lilac with a few dark streaks.

15. *ANDROGRAPHIS LOBELIOIDES*, Wt. Spic. Nilg. t. 181, Ic. t. 1557; F. B. I. iv. 505.

W. Gháts, Nilgiris, on the downs among grass, at 6,000–8,000 ft.

A low much-branched procumbent herb from a woody rootstock, the corolla white streaked with red.

16. *ANDROGRAPHIS LAWSONI*, Gamble in Kew Bull. 1923, 375. W. Gháts, Kundahs in Nilgiris about Avalanché and Sispara, 7,000–8,000 ft., in grass.

A low undershrub with erect branches and rather long often paniculate racemes, the flowers apparently dark brownish-purple.

17. *ANDROGRAPHIS ROTHII*, C. B. Clarke; F. B. I. iv. 506.

S. Carnatic, plains of Tinnevely (Beddome), lower hills (Fischer).

A straggling undershrub from a woody rootstock, the flowers pale yellow with large purple blotches on the deeply cut lobes of the lower lip.

18. *ANDROGRAPHIS BEDDOMEI*, C. B. Clarke; F. B. I. iv. 506.

Deccan, Nallamalai Hills of Kurnool, 2,000 ft. (Beddome, *vide* F. B. I.); Lankamalai Hills of Cuddapah, up to 1,000 ft. (Fischer).

A many-branched nearly glabrous undershrub, the flowers white with purple spots on the lower lip.



19. *ANDROGRAPHIS GLANDULOSA*, Nees; F. B. I. iv. 505.  
 Deccan, in Mysore, hills of Cuddapah at 3,000 ft. (Gamble),  
 on rocks.  
 A straggling small grey-pubescent undershrub, the flowers  
 nearly white with a pale purple tinge on the lower lip.
20. *ANDROGRAPHIS ECHIOIDES*, Nees; F. B. I. iv. 505; Wt. Ic. ,  
 t. 467.  
 N. Circars, Deccan and Carnatic, in all dry Districts,  
 common.  
 An erect herb, villous with whitish hairs, the corolla pink  
 or white with purple blotches on the lower lip.
21. *ANDROGRAPHIS SERPYLLIFOLIA*, Wt. Ic. t. 517; F. B. I. iv.  
 506.  
 Deccan and Carnatic, on dry soil, laterite and trap, up to  
 3,000 ft.  
 A trailing and rooting procumbent herb from a stout  
 rootstock, the flowers pale with purple blotches on the  
 lower lip.

### 21. Haplanthus, Nees.

Erect herbs. *Leaves* entire, petioled. *Flowers* axillary, in  
 false whorls, surrounded by numerous abortive branchlets  
 reduced to cladodes and ending in spinous points (reduced  
 leaves); bracts and bracteoles small. *Calyx* 5-partite, lobes  
 linear-lanceolate. *Corolla* small, tubular, the tube slightly  
 enlarged above, 2-lipped, the upper lip 2-fid, the lower 3-lobed.  
*Stamens* 2, shorter than the corolla and inserted below the  
 throat; filaments flattened; anthers 2-celled, connivent; cells  
 ovate, somewhat unequal, mucicous, one cell with the connective  
 bearded. *Disk* thick, prominent. *Ovary* 2-celled; ovules 3-8 in  
 each cell; style slender; stigma linear. *Fruit* a linear-oblong  
 capsule, compressed at right angles to the septum, 6-16-seeded.  
*Seeds* ellipsoid, densely hairy when wetted, retinacula obtuse.

Cladodes stout, quadrangular, .75-1.25 in. long, ending usually in  
 2 spinous teeth, villous and glandular-hairy; capsule glabrous, .4 in.  
 long; leaves ovate, rounded at base and decurrent on the long  
 petiole, up to 4 in. long, 2 in. broad. . . . . 1. *verticillaris*.  
 Cladodes very slender, subquadrangular, .5 in. long, ending in 2 or  
 more teeth, villous with long soft hairs; capsule pubescent, .2 in. long;

leaves ovate, rounded at base and decurrent on the long petiole, up to 5 in. long, 2.5 in. broad ..... 2. *neilgherryensis*.

1. *HAPLANTHUS VERTICILLARIS*, Nees; F. B. I. iv. 506.

Deccan, Ramandrug Hills of Bellary (Beddome).

A herbaceous plant, up to 3 ft. high, the corolla dark lilac with darker lines.

2. *HAPLANTHUS NEILGHERRYENSIS*; Wt. Ic. t. 1556. *H. tentaculatus* var. *neilgherrensis*, C. B. Clarke; F. B. I. iv. 507.

W. Gháts, Hills of Mysore, Coorg, S. Canara and Malabar, up to 3,000 ft.

An erect herbaceous plant, with the flowers and cladodes collected in conspicuous soft terminal spikes, the corolla bright blue (Hb. Madr.).

## 22. *Gymnostachyum*, Nees.

Herbs or undershrubs. *Leaves* cauline or subradical, entire or toothed. *Flowers* subsessile or shortly pedicellate, in axillary cymes or in a terminal spicate or racemose panicle; bracts and bracteoles very small. *Calyx* 5-partite, the lobes linear-lanceolate. *Corolla*-tube slender; limb short, 2-lipped, the lobes subequal, imbricate. *Stamens* 2, included or slightly exerted, filaments slender, usually villous near the base; anthers 2-celled, the cells subequal, oblong or ovate, glabrous or hairy. *Ovary* 2-celled; ovules, numerous in each cell; style slender; stigma subentire. *Fruit* a linear capsule, 16-24-seeded. *Seeds* ovoid, compressed, with soft hairs when wetted.

Inflorescence terminal; leaves chiefly at the base of the stem:—

Corolla large, 1-1.5 in. long, glabrous; leaf-blade ovate, rounded at base and then long-decurrent on the petiole, about 6 in. long; anthers bearded ..... 1. *febrifugum*.

Corolla moderate-sized, .7 in. long, puberulous; leaf-blade ovate, rounded or cordate at base, not decurrent, up to 3 in. long; anthers glabrous ..... 2. *polyanthum*.

Inflorescence axillary, sometimes also terminal:—

Corolla small, up to .7 in. long, pubescent; leaves ovate, acute and slightly decurrent at base, serrulate, 8 in. long or longer; anthers puberulous ..... 3. *canescens*.

Corolla large, 1 in. long, nearly glabrous; leaves broadly ovate,

rounded or truncate at base, not usually decurrent, entire, up to 9 in. long; anthers glabrous but the connective rough. .4. *latifolium*.

1. GYMNOSTACHYUM FEBRIFUGUM, Benth.; F. B. I. iv. 508.  
*G. alatum*, Wt. Ic. t. 1525.

W. Coast and W. Gháts, S. Canara, Malabar and Travancore.

A small nearly stemless and scapigerous herb with apparently blue flowers, the large usually long-petioled leaves lineolate and undulate crenulate.

2. GYMNOSTACHYUM POLYANTHUM, Wt. Ic. t. 1494; F. B. I. iv. 508.

W. Gháts, in Coorg (Jerdon).

A scapigerous herb with a long inflorescence of small opposite cymes in a raceme, the leaves not lineolate though minutely punctate.

3. GYMNOSTACHYUM CANESCENS, T. And.; F. B. I. iv. 509.  
*G. serrulatum*, T. And.; Bedd. Ic. t. 254. *Cryptophragmium canescens*, Nees; Wt. Ic. t. 1495.

W. Gháts, in Malabar, Nilgiris, Anamalais, Travancore and Tinnevely, up to 4,000 ft., in evergreen forests.

A shrubby glandular-hairy plant with small flowers green and yellow (Meebold), the leaves large, lineolate and parallel-nerved, white-pubescent beneath when young.

4. GYMNOSTACHYUM LATIFOLIUM, T. And.; F. B. I. iv. 509; Bedd. Ic. t. 253. *Phlogacanthus latifolius*, Wt. Ic. t. 1537.

W. Gháts, in S. Canara, Coorg and Malabar; Bababudan Hills of Mysore, up to 4,000 ft.

A glabrous undershrub up to 3 ft. high with greenish yellow flowers, the very long-petioled leaves not lineolate, parallel-nerved, the lower nerves close together.

Var. *decurrens*, Gamble. Leaves acuminate at base and decurrent on the long petiole, the nerves equally spaced, the calyx-lobes rather shorter.

W. Gháts at Manantoddy, Wynaad (Lawson).

### 23. Diotacanthus, Benth.

Shrubs. Leaves large, membranous, entire or obscurely crenate, not or obscurely lineolate. Flowers in lax cymes,

axillary or in terminal trichotomous panicles; bracts small, narrow; bracteoles minute. *Calyx* 5-partite, the lobes linear-subulate, subequal. *Corolla*-tube short; limb deeply 2-lipped, ventricose, the upper lip erect, emarginate or shortly 2-lobed, the lower spreading, 3-lobed, the bases shortly auricled. *Stamens* 2, about as long as the corolla; filaments thickened; anthers oblong, 2-celled, dorsifixed. *Disk* cupular, thick. *Ovary* 2-celled; ovules many in each cell; style filiform; stigma small, capitate. *Fruit* a linear terete capsule, 2-cleft from the base. *Seeds* many, about 24, compressed, hairy, especially when wet.

Flowers in terminal panicles axillary to upper leaves often 18 in. long; corolla crimson; leaves lanceolate or oblanceolate, acuminate, glabrous, up to 12 in. long, 3.5 in. broad, main nerves about 18 pairs; capsule 1.25 in. long ..... 1. *grandis*.

Flowers in axillary cymes about 3 in. long; corolla white; leaves lanceolate, acute or acuminate, nearly glabrous, up to 5 in. long, 2 in. broad, main nerves 7-8 pairs; capsule 1.5 in. long ..... 2. *albiflorus*.

1. *DIOTACANTHUS GRANDIS*, Benth.; F. B. I. iv. 515. *Phlogacanthus grandis*, Bedd. Ic. t. 179.

W. Gháts, hills of Tinnevely and Travancore, up to 4,000 ft., in dense moist forests.

A large shrub, reaching 12 ft. in height.

2. *DIOTACANTHUS ALBIFLORUS*, Benth.; F. B. I. iv. 515. *Phlogacanthus albiflorus*, Bedd. Ic. t. 180.

W. Gháts, hills of Tinnevely and Travancore, up to 5,000 ft., in evergreen forest.

A shrub reaching 7-10 ft. in height.

## 24. *Crossandra*, Salisb.

Undershrubs. *Leaves* opposite or whorled, entire or undulate, sometimes slightly toothed. *Flowers* sessile, yellow, in linear-oblong spikes; bracts rather large, imbricate; bracteoles linear or lanceolate. *Calyx* 5-partite to the base, upper 2-lobed, 2-nerved, 2 lower oblong, sometimes connate, 2 inner small, lanceolate. *Corolla*-tube long, linear, incurved; limb unilateral, forming a lip of 5 subequal lobes. *Stamens* 4, didynamous, included in the tube, anthers 1-celled. *Ovary* 2-celled, ovules 2 in each cell; style linear; stigma 2-lobed. *Fruit* an oblong

acute capsule. *Seeds* 4, compressed, clothed with appressed fringed scales formed of many connate hairs.

CROSSANDRA UNDULAEFOLIA, Salisb.; F. B. I. iv. 492. *C. avillaris*, Nees; Wt. Ic. t. 460.

Decan, from the Godavari southwards, west to the Gháts, in open forest land, commonly planted in gardens and about temples.

A pretty undershrub up to 3 ft. high with orange-yellow flowers and whorled leaves, lanceolate, acute, decurrent at base, up to 6 in. long, 2 in. broad.

## 25. Barleria, Linn.

Small shrubs or undershrubs, spinous or unarmed. *Leaves* opposite, entire, usually lineolate with cystoliths. *Flowers* showy, solitary or in lax or dense spikes or racemes or helicoid cymes often crowded towards the ends of the branches; bracts 1 fertile, 1 sterile, sometimes reduced to spines; bracteoles 0. *Calyx* deeply 4-partite, the lobes in opposite pairs, the outer pair the larger with the anterior lobe more or less bifid and apparently of 2 connate lobes. *Corolla* large, the tube more or less cylindric at base, funnel-shaped above; lobes 5, subequal, imbricate in bud. *Stamens* 2 long and fertile with oblong 2-celled anthers, 2 small and rudimentary with anthers having sometimes a little pollen, often a fifth quite rudimentary. *Disk* large, cupular, half embracing the ovary. *Ovary* 2-celled; ovules 2 in each cell; style long; stigma bifid or subentire. *Fruit* an ovoid or oblong capsule 2- or 4-seeded below the middle. *Seeds* compressed, usually clothed with wavy silky appressed hairs, rarely glabrous.

Shrubs or undershrubs with sharp intrapetiole spines, usually white; Capsule ovoid, with a solid beak, 2-seeded close to the base:—

Flowers sessile, solitary in lower axils, spicate above; inflorescence bracts foliaceous, oblong, sharply mucronate, floral bracts linear-subulate; leaves elliptic, acuminate, bristly mucronate, glabrous above, often pubescent beneath, up to 7 in. long, 2·5 in. broad, petioled. . . . . I. *Prionitis*.  
Flowers subsessile, mostly solitary axillary; inflorescence bracts lanceolate, mucronate, floral bracts 0 or mere bristles; leaves oblong-lanceolate, acute, bristly mucronate, glabrous, pale beneath, up to 2·5 in. long, ·5 in. broad, subsessile. . 2. *cuspidata*.

Capsule oblong or ellipsoid, the beak not solid, 4-seeded; flowers solitary, no bracts except the spines :—

Outer calyx-lobes oblong or obovate at first, about .3–.6 in. long, longer and reticulate in fruit, sometimes emarginate, sometimes with 1–2 spinous teeth, inner small; corolla-tube up to 1 in. long; leaves orbicular or ovate, spinous-mucronate, .5–.75 in. in diam.

3. *buxifolia*.

Outer calyx-lobes broadly ovate, spinous-toothed, about .75 in. long, softly hairy, scarious, nerved and reticulate in fruit, inner very small; corolla-tube up to 1.5 in. long; leaves elliptic or obovate, obtuse, mucronate, tomentose, .5–1 in. in diam.

4. *mysorensis*.

Outer calyx-lobes ovate, spinous-toothed, about .75 in. long, prominently white-scarious, nerved and reticulate in fruit, inner lanceolate, .4 in. long; leaves oblong or obovate, obtuse or acute, mucronate, .75–1 in. long.....5. *noctiflora*.

Shrubs or undershrubs without spines :—

Flowers in loose many-branched leafy panicles of solitary flowers or somewhat scorpioid cymes; bracts linear; leaves rather small, hairy; capsule 4-seeded, the seeds with appressed hairs :—

Outer calyx-lobes entire, not spinescent-toothed :—

Outer calyx-lobes ovate, obtuse at base, pale and scarious in fruit and prominently reticulate with spreading nerves, .75–1 in. long; corolla-tube very slender, cylindric to near the top, up to 6 in. long, lobes ovate, .5 in. long; leaves ovate-deltoid, acute, closely softly grey-tomentose, up to 1.75 in. long, 1 in. broad.....6. *longiflora*.

Outer calyx-lobes oblong or spatulate, acute, sometimes bifid, pale and scarious in fruit, .5–.75 in. long :—

Corolla cylindric below, then funnel-shaped, the tube 2 in. long, lobes elliptic-ovate, .75 in. long; leaves elliptic or ovate, acuminate at both ends, yellowish-hirsute with spreading hairs, up to 3 in. long, 1.5 in. broad.....7. *tomentosa*.

Corolla-tube cylindric, scarcely enlarged above, .75–1.5 in. long, lobes orbicular, .3 in. in diam.; leaves ovate, acute, obtuse at base, softly and shortly appressed-tomentose, pale beneath, up to 2 in. long, 1.5 in. broad.....8. *acuminata*.

Outer calyx-lobes ovate-orbicular, reticulate and about 5–7-nerved, with spinescent teeth, .5 in. in diam.; corolla-tube slender, gradually enlarging upwards, about 1 in. long, lobes obovate, about .6 in. long; leaves thin, ovate-acuminate, softly villous, up to 4 in. long, .2 in. broad, long-petioled....9. *pilosa*.

Flowers large, in a panicle of terminal and axillary helicoid racemes at the ends of the branches; bracts linear; leaves large and glabrescent; capsule 4-seeded, the large seeds appressed-hairy:—

Corolla-tube at first cylindric, soon widening and funnel-shaped, expanding in obovate lobes 3–3·5 in. long in all; outer calyx-lobes oblong, 1 in. long, tawny-pubescent, inner ·5 in. long; leaves elliptic, acuminate at both ends, sparsely pubescent, up to 12 in. long, 3 in. broad .....10. *involuta* var. *elata*.

Corolla-tube cylindric, funnel-shaped at top, the lobes suborbicular, emarginate, 2·5–3 in. long in all; outer calyx-lobes lanceolate, one deeply bifid, ·5–·7 in. long, inner ovate, long-apiculate, ·4 in. long; leaves membranous, elliptic, long-acuminate at both ends, pilose, up to 6 in. long, 2 in. broad .....11. *paniculata*.

Flowers medium-sized or large, in axillary and terminal spikes or racemes or sometimes solitary, closer and less leafy upwards:—

Outer calyx-lobes not spinous-ciliate:—

Flowers in tawny-pubescent racemes with very short pedicels; bracts linear-oblong, ·4–·7 in. long, glandular; outer calyx-lobes elliptic-ovate, nervose, one acuminate, the other shortly bilobed, 1 in. long, inner lanceolate, ·3 in. long; corolla long- and narrowly-funnel-shaped, pubescent, veined, 3–3·5 in. long; leaves lanceolate, acuminate at both ends, up to 4 in. long, 2 in. broad .....12. *Lawii*.

Flowers in glandular-hairy tawny spikes; bracts linear, ·3 in. long; outer calyx-lobes ovate or ovate-lanceolate, nervose, one slightly bifid at apex, ·75–1 in. long; corolla with short cylindric tube, then funnel-shaped, glabrous, lobes obovate, 1·5–2·5 in. long in all; leaves lanceolate or elliptic, acuminate at both ends, glabrous, up to 6 in. long, 3 in. broad

13. *courtallica*.

Outer calyx-lobes spinous-ciliate, ovate-lanceolate, hairy, mucronate or one sometimes bimucronate, prominently nerved and reticulate, at length white, about ·75 in. long, inner smaller; flowers in dense strigosely hairy spikes; bracts linear, usually reflexed, spinous-ciliate, ·5 in. long; corolla-tube cylindric then funnel-shaped, lobes ovate, 1–2 in. long in all; leaves variable, ovate or lanceolate or linear-oblong, up to 4 in. long, 1·5 in. broad

14. *cristata*.

Flowers large, solitary in upper leaf-axils and gradually passing into terminal spikes:—

Seeds densely silky:—

Outer calyx-lobes 1 in. long, prominently ciliate with long

hairs, one lanceolate 3-nerved, the other bifid to the middle each side 2-nerved, inner pair linear, .75 in. long; bracts oblong, longer than the calyx; corolla-tube cylindric below funnel-shaped above, lobes obovate emarginate, in all 2 in. long; leaves ovate, sessile, nearly glabrous, up to 2 in. long, 1 in. broad.....15. *Stocksii*.

Outer calyx-lobes 1.5 in. long, nearly glabrous, ovate, .75 in. broad, one sometimes slightly bifid, inner pair linear, .75 in. long; bracts linear-spathulate, shorter than the calyx; corolla tube funnel-shaped, lobes obovate, 2-2.5 in. in all; leaves ovate-lanceolate, acuminate at both ends, glabrous, petioled, up to 5 in. long, 2 in. broad.....16. *montana*.

Seeds glabrous, black; outer calyx-lobes elliptic, acute, 1.25 in. long, .5-.75 in. broad, glabrous; bracts subulate, .5 in. long; corolla-tube broadly funnel-shaped, lobes obovate, up to 2.5 in. long in all; leaves ovate or lanceolate, glaucous beneath, up to 7 in. long, 3 in. broad.....17. *Gibsoni*.

Flowers in dense unilateral spikes at the ends of the branchlets; outer calyx-lobes with 9-11 nerves radiating from the base, scarious in fruit; corolla cylindric below, funnel-shaped above, 1.5-2 in. long; capsule 4-seeded:—

Leaves large, ovate, acuminate, long-decurrent on the petiole, glabrate, up to 9 in. long, 4.5 in. broad, main nerves 6-8 pairs; bracts ovate or lanceolate, shorter than the calyx; outer calyx-lobes subequal but one sometimes shortly bifid, ovate, ciliate-denticulate, minutely strigose, 1 in. long, .75 in. broad, inner linear-lanceolate, white-hirsute, .5 in. long.....18. *strigosa*.

Leaves small, ovate, acute, shortly decurrent, strigose beneath, up to 2 in. long, 1 in. broad, main nerves 5 pairs; bracts ovate, 5-ribbed, short; outer calyx-lobes unequal, subspinosely denticulate on the margins, outside with long stiff hairs, up to 1.25 in. long, .75 in. broad, inner linear, strigose, .4 in. long

19. *nitida*.

1. *BARLERIA PRIONITIS*, Linn.; F. B. I. iv. 482; Wt. Ic. t. 452.

All plains Districts, especially the Deccan and Carnatic, chiefly on waste lands and roadsides, sometimes planted in hedges.

A prickly very variable shrub with yellow, or sometimes whitish, flowers. Vern. *Hind.* Katsareya; *Tel.* Mulu govinda.



2. *BARLERIA CUSPIDATA*, Heyne; F. B. I. iv. 483; Wt. Ic. t. 451.

Dry Districts of the Circars, Deccan and Carnatic.

A very prickly small shrub with white yellow or fawn-coloured flowers and very long straight thorns.

3. *BARLERIA BUXIFOLIA*, Linn.; F. B. I. iv. 483; Wt. Ic. t. 870.

Dry Districts of the Deccan and Carnatic, up to 4,000 ft., chiefly on roadsides and waste lands.

A small very prickly hairy shrub with pink or white flowers, sometimes with long pedicels, but more often nearly sessile. The calyx-lobes enlarge and become scarious in fruit.

4. *BARLERIA MYSORENSIS*, Roth; F. B. I. iv. 484.

W. Deccan, in Coimbatore, dry places in Malabar and Travancore.

A small prickly shrub with blue or purple flowers, the spines usually long.

5. *BARLERIA NOCTIFLORA*, Linn. f.; F. B. I. iv. 484.

Deccan and Carnatic, chiefly in somewhat hilly country, on dry waste lands.

A small very prickly shrub, colour of flowers not recorded. The spines are sometimes leafy-margined, showing their bracteate character.

6. *BARLERIA LONGIFLORA*, Linn. f.; F. B. I. iv. 485.

N. Circars, Deccan and Carnatic, especially on dry rocky hills.

A shrub with very white appearance and very long white flowers, sometimes reaching even 6 inches, usually solitary with a small branchlet opposite.

7. *BARLERIA TOMENTOSA*, Roth; F. B. I. iv. 485.

Deccan and Carnatic, from the Kistna river southwards, westwards to the drier E. slopes of the W. Gháts up to 4,000 ft.

A low shrub with rose-coloured (?) flowers and obovoid capsules.

8. *BARLERIA ACUMINATA*, Wt. Ic. t. 450. *B. tomentosa*, Roth. var. *acuminata*, C. B. Clarke; F. B. I. iv. 485.

Deccan, Carnatic and E. side of W. Gháts, up to 5,000 ft.

A low shrub with apparently blue flowers. It is near to

the last but is quite distinct in its flowers and indumentum and in the shape of the leaves. The capsules are narrower.

9. *BARLERIA PILOSA*, Wall.; F. B. I. iv. 486; Bedd. Ic. t. 256. W. Gháts, hills of Tinnevely up to 1,500 ft.

A small softly pilose undershrub with sky-blue flowers, solitary in the leaf-axils.

10. *BARLERIA INVOLUCRATA*, Nees; F. B. I. iv. 486; Wt. Ill. t. 164.

Var. *elata*, C. B. Clarke.

W. Gháts, in all Districts, in Shola forests at 3,000–6,000 ft. A handsome shrub reaching 6 ft. in height, the large flowers blue.

11. *BARLERIA PANICULATA*, Wall.

Foot of the W. Gháts, in Malabar, Cochin and Travancore, often on rocky river banks (Bourne).

A pretty shrub with rose pink flowers.

12. *BARLERIA LAWII*, T. And.; F. B. I. iv. 486. *B. Beddomei*, T. And. ex Bedd. Ic. t. 258.

Bababudan Hills of Mysore (Law *vide* T. And.).

A shrub with long white flowers, prominently veined when dry.

13. *BARLERIA COURTALLICA*, Nees; F. B. I. iv. 489; Wt. Ic. t. 1529.

N. Circars, Rampa Hills of Godavari, at 2,000 ft. (Gamble); W. Gháts, in all Districts, in open places in evergreen forests at low elevations.

A shrub reaching 3–4 ft. high with large blue flowers, yellow in the tube.

14. *BARLERIA CRISTATA*, Linn.; F. B. I. iv. 488; Wt. Ic. t. 453.

All dry plains Districts, in deciduous forest or bushy places, up to about 3,000 ft., sometimes cultivated in gardens.

A nearly herbaceous hairy undershrub with usually blue but sometimes pink or even white flowers, very variable in the leaves and calyx-lobes. The Circar specimens show usually narrow leaves, the W. Coast ones rounded leaves.

15. *BARLERIA STOCKSII*, T. And.; F. B. I. iv. 489.

Bababudan Hills of Mysore (Stocks), Kottakota and Gootoor Hills of Anantapur at 2,000 ft. (Gamble).

A small undershrub with pink (F) flowers and a beaked capsule with floccosely woolly seeds.

16. *BARLERIA MONTANA*, Nees; F. B. I. iv. 487.

N. Circars, Godavari valley (Gamble); Kambakam Hill in Chingleput (Cleghorn); hills of Coimbatore and Madura (Fischer); Cochin, at Trichoor (Wight).

A subherbaceous undershrub with blue flowers and an acuminate capsule with wavy silky seeds.

17. *BARLERIA GIBSONI*, Dalz.; F. B. I. iv. 487. *B. montana*, Bedd. Ic. t. 257.

Deccan, Nallamalai Hills of Kurnool, Ramandrúg in Bellary; W. Gháts, Coorg, Malabar, Anamalais (Beddome, etc.).

A glabrous undershrub with pink flowers and black flat glabrous seeds.

18. *BARLERIA STRIGOSA*, Willd.; F. B. I. iv. 489.

N. Circars, in all Forest undergrowth, up to 4,000 ft., common; Deccan, in the forests of the Kurnool Nallamalais and Ramandrúg in Bellary, scarce.

A shrub reaching 4 ft. high with large blue flowers, the seeds very shaggy with long white hairs when wet.

19. *BARLERIA NITIDA*, Nees; F. B. I. iv. 490; Wt. Ic. t. 454.

W. Gháts, hills of Tinnevely.

A small shrub with blue flowers, the seeds with appressed brown hairs.

## 26. *Neuracanthus*, Nees.

Herbs or undershrubs. *Leaves* opposite, entire. *Flowers* small, spicate, the spikes axillary or terminal, elongate, strobilate or capitáté; bracts ovate, imbricate, strongly nerved; bracteoles 0 or minute. *Calyx* 2-partite, the posterior lip 3-, the anterior 2-lobed. *Corolla* tubular below, funnel-shaped above; limb plicate, entire or subbilabiate. *Stamens* 4, didynamous, included, inserted on the middle of the tube; anterior anthers perfectly 2-celled, posterior with 1 perfect, 1 imperfect cell. *Disk* inconspicuous. *Ovary* 2-celled; ovules usually 2 in each cell; style short; stigma of one oblong lobe. *Fruit* an oblong glabrous capsule, 4-seeded. *Seeds* much compressed, ovoid or suborbicular, silky.

NEURACANTHUS NEESIANUS, C. B. Clarke; F. B. I. iv. 491.

Carnatic, Polur in N. Arcot, on black cotton soil (Wight).

A procumbent hoary-tomentose undershrub with thick leaves about 2 in. long, 1 in. broad, the flowers very small in dense terminal bracteate spikes.

## 27. *Asystasia*, Blume.

Herbs or undershrubs. *Leaves* opposite, entire or rarely wide-toothed; usually lineolate. *Flowers* in lax or dense, usually 1-sided, simple or compound, spikes or racemes; bracts opposite, usually very small, bracteoles usually minute. *Calyx* deeply 5-partite, the lobes equal, linear or lanceolate. *Corolla*-tube cylindric below, inflated above, ventricose or funnel-shaped; lobes 5 subequal, imbricate in bud. *Stamens* 4, didynamous, perfect; filaments connate at the base in pairs; anthers oblong, the cells parallel, approximate, minutely spurred at the base or mucous. *Ovary* 2-celled; ovules 2 in each cell; style linear; stigma 2-fid or subcapitate. *Fruit* an elliptic capsule with a contracted solid base, opening widely in a reflexed curve. *Seeds* 4, compressed, orbicular or angular, glabrous, rugose or tuberculate.

Bracts very small; inflorescence secund, of lax racemes of rather distant flowers:—

Branches and leaves grey-puberulous; leaves ovate, acute, usually rounded or subcordate or suddenly narrowed at base, 1–2.5 in. long, 1–1.5 in. broad; calyx-lobes linear, .3 in. long, hirsute; corolla with short cylindric base, the upper part ventricose, much longer, in all 1–1.25 in. long ..... 1. *gangetica*.

Branches and leaves green, glabrous or slightly pubescent:—

Leaves entire on the margins:—

Leaves elliptic, ovate or narrowly lanceolate, glabrous, the base always narrowed; inflorescence paniculate; corolla white or pale purple, about .75 in. long or less

2. *chelonoides* var. *quadrangularis*.

Leaves ovate, more or less pubescent, the base in upper branches usually rounded and then decurrent on the petiole, in the lower ones narrowed, the petioles long; inflorescence of solitary or twin terminal racemes; corolla blue, 1–1.5 in. long ..... 3. *violacea*.

Leaves linear-lanceolate, elongate, often pubescent, the base cuneate; inflorescence of few subpanicled racemes; corolla violet, 1.25–1.5 in. long ..... 4. *travancorica*.

Leaves crenulate or crispate on the margins, elliptic or ovate, often obtuse at base; inflorescence of usually solitary or twin terminal racemes; corolla white with rose or purple spots

5. *crispata*.

Bracts and bracteoles large, membranous, oblong-lanceolate; inflorescence erect, of close spikes; corolla small, .5-75 in. long, white; leaves elliptic, acute at both ends, sparsely hairy.....6. *Laviana*.

1. *ASYSTASIA GANGETICA*, T. And. *A. coromandeliana*. Nees; F. B. I. iv. 493.

N. Circars, Deccan and Carnatic, especially near the sea, westwards to the E. slopes of the Gháts; often cultivated in gardens.

A straggling, often somewhat climbing, perennial herb with smallish leaves and variable flowers, white blue purple or yellow.

2. *ASYSTASIA CHELONOIDES*, Nees; F. B. I. iv. 493.

Var. *quadrangularis*, C. B. Clarke.

W. Gháts, Nilgiris. Anamalais, Pulneys and hills of Tinnevely and Travancore, 2,000-5,000 ft.

A straggling herb with membranous leaves, sparingly strigosely hairy, up to 9 in. long, 3 in. broad.

3. *ASYSTASIA VIOLACEA*, Dalz.; F. B. I. iv. 494.

W. Gháts, from S. Canara southwards, at low levels.

An erect herb with membranous nearly glabrous leaves.

4. *ASYSTASIA TRAVANCORICA*, Bedd. Ic. t. 178; F. B. I. iv. 494.

W. Gháts, Anamalai Hills (Barber) at 3,000 ft.; hills of Tinnevely and Travancore, especially in the south.

A large shrub with narrow leaves reaching 5 in. in length and at most, though rarely, 1 in. in diam. It grows to 8 ft. in height and is the handsomest species of the genus (Beddome).

5. *ASYSTASIA CRISPATA*, Benth.; F. B. I. iv. 494. *A. coromandeliana*, Wt. Ic. t. 1506, not of Nees.

W. Gháts, Nilgiri and Pulney Hills, at 4,000-8,000 ft., in Shola forests.

A branching herbaceous undershrub with crispate or sometimes entire leaves variable in size but often up to 5 in. long, 2 in. broad.

6. *ASYSTASIA LAWIANA*, Dalz.; F. B. I. iv. 496.

W. Deccan, in Mysore and Coorg.

An erect herbaceous plant reaching 3 ft. in height, the leaves up to 3 in. long, 1.5 in. broad, the flowers white.

28. *Pseuderanthemum*, Radlkf.

Glabrous shrubs or undershrubs. *Leaves* opposite, usually lineolate. *Flowers* subsessile, solitary or 1-3 together in the axils of opposite bracts arranged in terminal dense or interrupted simple or branched spikes; bracteoles small, narrow. *Calyx* 5-fid or 5-partite, the lobes narrow subequal. *Corolla*-tube elongate, cylindric, narrow, rarely widened at the throat; limb 5-partite, the lobes elliptic, spreading, flat, unequal. *Stamens* 2 fertile with usually 2 upper small clavate staminodes; anthers 2-celled, the cells oblong, equal, parallel, the connective widened. *Disk* annular or cupular. *Ovary* 2-celled, usually glabrous; ovules 2 in each cell; style filiform; stigma entire or shortly 2-lobed. *Fruit* an oblong capsule with contracted solid stalk, 4-seeded. *Seeds* compressed, orbicular, smooth or rugose, on acute retinacula.

*PSEUDERANTHEMUM MALABARICUM*, Gamble n. comb. *Eranthemum malabaricum*, C. B. Clarke; F. B. I. iv. 497.

N. Circars, Palkonda Hills of Vizagapatam (Gamble); Deccan, in Mysore and N. Arcot; W. Gháts from S. Canara to Travancore, in evergreen forest.

An undershrub with white flowers, the leaves ovate or elliptic, acuminate, up to about 5 in. long, 2 in. broad, the capsule valves springing back, the seeds wavy-rugose.

29. *Lepidagathis*, Willd.

Herbs or undershrubs. *Leaves* entire or crenate-serrate, usually lineolate. *Flowers* sessile, usually capitate, sometimes opposite and solitary, the heads terminal or axillary, sometimes densely crowded at the base of the plant; bracts usually conspicuous, bracteoles smaller. *Calyx* deeply 5-lobed, the upper lobe large, the 2 lower opposite it and usually more or less joined, the 2 inner smaller and narrower. *Corolla*-tube cylindric below, above suddenly expanded and 2-lipped, the upper lip erect 2-fid, the lower 3-lobed, usually spotted. *Stamens* 4, didynamous;

anthers  $\frac{3}{4}$ -celled, the cells oblong, opposite or one above the other. *Disk* annular. *Ovary* 2-celled; ovules 2, rarely 1, in each cell; style slender; stigma capitate, shortly 2-lobed or entire. *Fruit* a compressed conoid or oblong capsule. *Seeds* 2 or 4, flattened, hairy.

Capsule 2-seeded, 2-valved from the subsolid tip :—

Spikes aggregated at the base of the stem in globose cushions :—

Bracts and calyx-lobes with dense soft silky hairs, no stiff ones :—

Bracts and calyx-lobes long spinous-mucronate, the bracts broadly ovate; lower calyx-lobes joined to about half-way up; leaves linear-oblong, lineolate, nearly glabrous, up to 1.25 in. long, .25 in. broad.....1. *cristata*.

Bracts and calyx-lobes shortly spinous-mucronate, the bracts broad, obtuse; lower calyx-lobes joined to near the top; leaves oblong or obovate, scabrous on the 5-6 pairs of nerves beneath, ciliate, up to 1.5 in. long, .4 in. broad.....2. *mitis*.

Bracts and calyx-lobes glabrescent but ciliate with long stiff white hairs, all long-spinous mucronate :—

Bracts ovate, suddenly long spinous-acuminate; lower calyx-lobes joined to about  $\frac{2}{3}$  the way up; leaves ovate or obovate-oblong, obtuse, up to 1.5 in. long, .6 in. broad, prominently 5-6-nerved, scabrous on the nerves beneath....3. *subarmata*.

Bracts lanceolate, long spinous-acuminate; lower calyx-lobes joined to half-way up; leaves linear or narrowly oblong, scabrous on the nerves beneath, ciliate on the margins, up to 4 in. long, .4 in. broad, nerves 5-7 pairs, distant

4. *Hamiltoniana*.

Spikes ovoid, not aggregated at the base of the stem but axillary on the branches :—

Leaves spinous-mucronate, coriaceous :—

One spine usually only at the tip of the small obovate obtuse leaf scarcely .5 in. long; lower calyx-lobes not joined; heads ovoid, .5-.75 in. long, the bracts and calyx-lobes all long, spreading or recurved spinous-acuminate .....5. *spinosa*.

Margins of the leaves spinous-serrate as well as the tip :—

Leaves ovate with about 3-4 sharp spinous-mucronate teeth on either side, up to .75 in. long, .5 in. broad; lower calyx-lobes joined to about one-third of the way up; heads broadly ovoid, about .5 in. long, the spreading bracts and the calyx-lobes long spinous-mucronate, very woolly with soft silky hairs inside .....6. *pungens*.

Leaves ovate-oblong with about 3 short spinous teeth on

either side, up to .75 in. long, .25 in. broad; lower calyx-lobes joined to about one-half of the way up; heads ovoid, about .5 in. long, the closely adpressed bracts and calyx-lobes shortly spinous-mucronate and with soft hairs....7. *Barberi*

Leaves not spinous-mucronate or coriaceous, linear or elliptic, nearly glabrous, up to 1.25 in. long, .1-3 in. broad; lower calyx-lobes joined to about one-fourth the way up; heads ovoid, .5-.75 in. long, usually axillary but sometimes also aggregated at the base of the stem, the bracts and calyx-lobes long-acuminate, mucronate, softly and long hairy.....8. *diffusa*.

Capsule 4-seeded, 2-valved, the tip not subsolid :—

Leaves entire or undulate :—

Flowers in elongate villous spikes, the bracts coriaceous, 3-ribbed, sharply mucronate; lower calyx-lobes joined about  $\frac{1}{4}$  way up, 3-ribbed as is the larger upper lobe; corolla-tube short, slightly villous within; anther-cells at rather different levels; leaves of the main stem lanceolate, acuminate, long-decurrent at base, up to 6 in. long, 2 in. broad, upper leaves smaller, sometimes almost linear.....9. *cuspidata*.

Flowers in congested heads, the bracts scarious, mucronate :—

Heads terminal ovoid, the bracts obovate, many-ribbed, lower calyx-lobes joined about  $\frac{1}{3}$  way up, 3-ribbed, upper larger, 7-ribbed; corolla-tube short, villous at the middle within; anther-cells equal and opposite, filaments long and slender; leaves ovate, tawny-pubescent beneath, long-petioled, up to 1.5 in. long, 1 in. broad.....10. *scariosa*.

Heads axillary and terminal, often clustered, small or large, the bracts hyaline, 1-nerved, ciliate; lower calyx-lobes very narrow, 1-nerved, joined to half way up, upper slightly larger; corolla-tube long, glabrous; anther-cells small, one a little above the other; filaments short; leaves variable, lanceolate, acuminate, decurrent at base, up to 6 in. long, 2.5 in. broad

11. *hyalina*.

Leaves crenate-serrate, ovate or lanceolate, acuminate, obtuse and then acuminate-decurrent at base, up to 4.5 in. long, 2 in. broad; flowers in small soft heads in axillary or terminal leafy cymes, the bracts 3-ribbed, ovate; lower calyx-lobes narrow, only joined at base, 1-nerved; corolla-tube rather long; anther-cells separated; capsule very thin, pubescent.....12. *fasciculata*.

1. *LEPIDAGATHIS CRISTATA*, Willd.; F. B. I. iv. 516; Wt. Ic. t. 455.

N. Circars and Carnatic, in dry places and on rocks.



A stiff undershrub, the branches procumbent from a hard central rootstock, sometimes with occasional globose small heads of flowers in the axils; corolla white, spotted with brown and purple.

2. *LEPIDAGATHIS MITIS*, Dalz.; F. B. I. iv. 516.

Deccan and Carnatic, in dry sandy places, especially in Nellore, Cuddapah and N. Arcot; plains of S. Canara.

A stiff undershrub, similar to the last but the globose flower heads denser and hardly spinous and more woolly; corolla white or pale pink, spotted with brown and purple.

3. *LEPIDAGATHIS SUBARMATA*, Gamble n. comb. *L. mitis* var. *subarmata*, C. B. Clarke; F. B. I. iv. 516. *L. rupestris*, Bedd. Ic. t. 229.

Deccan, Cuddapah and Kurnool to Coimbatore, chiefly on black cotton soil.

A stiff undershrub, the globose flower heads smaller.

4. *LEPIDAGATHIS HAMILTONIANA*, Wall.; F. B. I. iv. 516.

N. Circars, open places in the Ganjam Sál forests (Gamble).

A stiff undershrub, the branches sometimes bearing heads smaller than those at the base of the stem.

5. *LEPIDAGATHIS SPINOSA*, Wt. ex Nees; F. B. I. iv. 517.

S. Carnatic, plains of Tinnevely.

A stiff prostrate much-branched spinous shrub.

6. *LEPIDAGATHIS PUNGENS*, Nees; F. B. I. iv. 517.

S. Carnatic, near Palamcottah in Tinnevely.

A stiff much-branched small spinous shrub.

7. *LEPIDAGATHIS BARBERI*, Gamble n. comb. *L. pungens*, Wt. Ic. t. 456, not of Nees.

W. and S. Carnatic, plains of Coimbatore, Madura and Tinnevely (Barber, Beddome, Fischer).

A much-branched small shrub with white stems, usually erect.

8. *LEPIDAGATHIS DIFFUSA*, C. B. Clarke; F. B. I. iv. 518.

Deccan and W. Carnatic, Mysore, Bellary and Coimbatore.

A low straggling shrublet from a woody rootstock.

9. *LEPIDAGATHIS CUSPIDATA*, Nees; F. B. I. iv. 519; Bedd. Ic. t. 227.

N. Circars and Deccan, up to about 6,000 ft. in the hills, Coorg.

An erect undershrub. up to about 3 ft. high, the corolla white with purplish spots.

10. *LEPIDAGATHIS SCARIOSA*, Nees; F. B. I. iv. 520; Wt. Ic. t. 457.

Carnatic and E. slopes of the W. Gháts, from Coimbatore southwards.

A small undershrub, the corolla apparently white or pale yellow.

11. *LEPIDAGATHIS HYALINA*, Nees; F. B. I. iv. 521.

All Districts, by roadsides and in dry forest undergrowth.

A small perennial herb with a woody rootstock, very variable in its leaves and the size of the flower spikes.

All the S. Indian specimens seem, as the F. B. I. says, to be var. *mucronata*, C. B. Clarke, except a few which are var. *lophostachyoides*, but it is difficult to separate the vars.

The corolla is white with brown spots on the palate.

12. *LEPIDAGATHIS FASCICULATA*, Nees; F. B. I. iv. 522; Bedd. Ic. t. 228.

N. Circars, Ganjam to Godavari, up to 4,000 ft. in the hills; S. Canara and Mysore, in forest undergrowth and in rocky places.

A herbaceous, soft, villous plant, the corolla white with purple spots.

### 30. *Monothecium*, Hochst.

Diffuse herbs. *Leaves* entire, lineolate. *Flowers* in small sessile dense, ovate or oblong, unilateral spikes; bracts and bracteoles linear-setaceous. *Calyx* 5-lobed, lobes equal, linear-setaceous. *Corolla* small, tube short, limb deeply 2-lipped. *Stamens* 2; anthers 1-celled, muticous. *Ovary* 2-celled, hairy; style slender; stigma minutely bifid. *Fruit* a small oblong capsule, the base solid. *Seeds* 4, compressed, truncate above, testa rugosely furrowed, retinacula obtuse.

*MONOTHECIUM ARISTATUM*, T. And.; F. B. I. iv. 524; Bedd. Ic. t. 269.

W. Gháts, hills of S. Coimbatore at 1,200 ft. (Fischer), hills of Tinnevely and Travancore, in dry open forests (Beddome, Venkoba Rao).

A branching procumbent often rooting small undershrub,

the corolla white with spots on the lower lip, the leaves ovate, pubescent, up to 1.5 in. long.

### 31. Rungia, Nees.

Erect or diffuse herbs or undershrubs. *Leaves* entire, usually and prominently lineolate. *Flowers* in dense terminal or axillary one-sided spikes; bracts in 2 or 4 rows, 2 of the rows usually without flowers, sometimes similar to but often different from the flowering bracts which usually have scarious hyaline margins; bracteoles narrower than the flowering bracts. *Calyx* 5-partite, lobes linear-lanceolate. *Corolla* small, blue or white; limb 2-lipped, the upper lip acute or emarginate, the lower longer 3-lobed. *Stamens* 2; anthers 2-celled, the cells usually superposed, the lower cell often with a white basal appendage. *Ovary* 2-celled; ovules 2 in each cell; style filiform; stigma minutely bifid. *Fruit* an ovoid or oblong capsule, the placentas and retinacula elastically separating from the base after dehiscence. *Seeds* 4, compressed, orbicular, minutely tuberculate or concentrically ridged.

Barren bracts and flowering bracts similar or very nearly so; upper lip of corolla broad, emarginate:—

Spikes narrow and slender, quite 1-sided, on filiform peduncles; bracts lanceolate, mucronate, very narrowly scarious-margined; leaves lanceolate, acute, glabrous or puberulous, up to 1.5 in. long, .5 in. broad, main nerves 3–5 pairs .....1. *linifolia*.

Spikes slender, secund, one-sided, the peduncles short; bracts lanceolate, long-mucronate, narrowly scarious-margined, minutely pubescent; leaves variable, ovate or lanceolate or even linear, acute or acuminate, puberulous, up to 3.5 in. long, 1 in. broad, main nerves about 6 pairs .....2. *apiculata*.

Spikes broad and close with conspicuous broadly scarious-margined nearly orbicular bracts regularly imbricating, ciliate and apiculate, the bracteoles lanceolate, much smaller; leaves linear-oblong to lanceolate, acute or subobtuse, nearly glabrous, up to 3 in. long, .75 in. broad, main nerves 3–6 pairs .....3. *repens*.

Barren bracts and flowering bracts more or less different; upper lip of corolla acute:—

Both kinds of bracts prominently white-scarious-margined, sub-similar, the barren ones usually narrower:—

Spikes elongate, often 2–3 in. long, in panicles; leaves large and

thin, lanceolate, acuminate at both ends, up to 7 in. long, 2 in. broad, main nerves 8-12 pairs .....4. *Wightiana*. Spikes short, rarely 1 in. long, in small clusters; leaves rather small and thick, ovate-lanceolate, acuminate, rounded at base, up to 3 in. long, 1 in. broad, main nerves 6-8 pairs.....5. *latior*. Bracts rather large, scarious-margined, and usually coloured, prominently nerved :—

Barren bracts broadly attached at base to the rhachis of the spike and decurrent, imbricate in 2 series, one sided, flowering bracts not broadly attached, all shining, not mucronate, bracteoles small; leaves large, thin, oblong-lanceolate, acuminate at both ends, up to 6 in. long, 1.75 in. broad, the main nerves about 6-8 pairs .....6. *sisparensis*. Barren bracts and flowering bracts thin and chaffy, attached at a point, the latter broader and broader-margined, both ciliate and long-mucronate, not markedly 1-sided, bracteoles lanceolate, small; leaves ovate, acute, rounded at base and then decurrent, up to 5 in. long, 2 in. broad, main nerves 7-9 pairs.....7. *laeta*. Barren and flowering bracts very different, the former in 2 rows on one side of the spike, thick, elliptic, mucronate, narrowly margined, the latter with the flowers on the other side conspicuously hyaline-margined, obovate or orbicular, ciliate, variously clothed; leaves various, ovate or lanceolate or even linear-spathulate..8. *parviflora*.

1. *RUNGIA LINIFOLIA*, Nees; F. B. I. iv. 548. *Rostellularia gracilis*, Wt. Ic. t. 1541.

Mysore, at Aglati, 3,500 ft. (Meebold in Hb. Calc.).

A very slender herb, erect but often rooting from lower nodes, the anthers not appendaged at base, the flowers said to be pale purple.

2. *RUNGIA APICULATA*, Bedd. Ic. t. 247; F. B. I. iv. 548.

W. Gháts, hills of Madura and Tinnevely, at 2,000-5,000 ft., in the beds of streams.

A slender undershrub, rooting at lower nodes, then erect, the corollas white with lilac spots, the seeds minutely tuberculate.

3. *RUNGIA REPENS*, Nees; F. B. I. iv. 549; Wt. Ic. t. 465.

N. Circars, in Godavari and Kistna; Deccan and N. Carnatic, in all Districts, west to the foot of the Gháts.

A decumbent or erect, often rooting, herb with angular zigzag stems and conspicuous spikes often 4 in. long, the

bract-margins hyaline; flowers white, blue or pink; seeds concentrically ridged.

4. *RUNGIA WIGHTIANA*, Nees; F. B. I. iv. 546; Wt. Ic. t. 1549. *R. Arnottiana*, Wt. Ic. t. 1550.

W. Gháts, Anamalais and hills of Tinnevely and Travancore, 2,000–5,000 ft.

An erect undershrub with white flowers, the lower lip veined with lilac, the seeds minutely tuberculate.

5. *RUNGIA LATIOR*, Nees; F. B. I. iv. 546; Wt. Ic. t. 548. *R. longifolia* var. *latifolia*, C. B. Clarke; F. B. I. iv. 547.

W. Gháts, Nilgiris, Anamalais and hills of Travancore, at about 3,000–6,000 ft.

A stout erect herb with white or pale blue flowers, the leaves reticulately nerved.

6. *RUNGIA SISPAEENSIS*, T. And.; F. B. I. iv. 546.

W. Gháts, Nilgiris, Anamalais and hills of Coimbatore and Malabar, at 3,000–4,000 ft.

A shrubby nearly glabrous plant with one-sided spikes and purplish bracts, the seeds minutely tuberculate in concentric lines.

7. *RUNGIA LAETA*, C. B. Clarke; F. B. I. iv. 546.

W. Gháts, Pulney Hills and hills of Madura and Travancore, at 5,000–7,000 ft.

A shrubby plant with stout terete zigzag stems and white flowers with purple spots, the seeds minutely tuberculate in concentric lines.

8. *RUNGIA PARVIFLORA*, Nees; F. B. I. iv. 550. *R. longifolia*, Bedd. Ic. t. 266, not of Nees.

W. Coast and lower parts of W. Gháts in Madura, Tinnevely and Travancore, in dry forests in the low country.

A small soft herb with membranous leaves and small spikes of blue flowers, the fertile bracts glabrous except the ciliate margins. The small plant from Ceylon (Bedd. Ic. t. 266) with linear spatulate leaves has been found at Kolatoor in Travancore (Bourdillon).

Var. *pectinata*, C. B. Clarke l.c. *R. pectinata*, Nees; Wt. Ic. t. 1547. Larger and with larger and broader spikes and larger leaves, the floral bracts villous, the barren bracts prominently pectinately arranged.

All Districts, in fairly moist places, along streams and in

forest undergrowth and grassy pasture lands, up to 4,000 ft. in the hills.

Var. *muralis*, C. B. Clarke l. c. Much smaller, many branched, with very small ovate or orbicular leaves and rather long dense-flowered second strobiliform spikes, the barren bracts scarcely longer than the almost woolly fertile ones.

W. Coast, S. Canara to Travancore, on dry fields and on walls.

Var. *monticola*, Gamble. Erect, almost an undershrub, with strigosely villous stems and leaves, the latter ovate up to about 1 in. long; spikes short, about .5 in. long, barren bracts long-mucronate, longer than the very white woolly fertile ones; flowers bright blue.

N. Circars, top of Mahendragiri at 4,500 ft. (Gamble, Fischer and Gage); Karimalai and Ayamalai hills of Malabar, at 4,000–5,000 ft. (Fischer), on rocks and among grass.

### 32. *Dicliptera*, Juss.

Erect or diffuse herbs. *Leaves* entire or undulate, lineolate. *Flowers* sessile or subsessile, in axillary or terminal clusters or panicles of cymes, often with imperfect flowers or flowerless bracts added, one or more enclosed within a pair of opposite inflorescence bracts; flowering bracts smaller and in often unequal pairs; bracteoles linear, about equalling the similar calyx-lobes. *Corolla* white, pink or red, purple-spotted; tube slender, limb 2-lipped, the upper lip narrow, entire or emarginate, the lower 3-lobed recurved. *Stamens* 2; anthers 2-celled, the cells superposed, muticous. *Ovary* 2-celled; 2 ovules in each cell; style filiform; stigma bifid. *Fruit* a clavate capsule with a solid stalk; placentas separating elastically from the base after dehiscence. *Seeds* ovoid or orbicular, compressed, verrucose or glandular-papillose, the papillæ sometimes glochidiate.

Flowers in slender divaricately branched panicles, the inflorescence bracts lanceolate but gradually reduced in size to minutely linear; flowering bracts and bracteoles minute, like the calyx-lobes, .05–.1 in. long; leaves ovate, acuminate, membranous, nearly glabrous, up to 5 in. long, 2–3 in. broad, long-petioled. . . . . 1. *parvibracteata*. Flowers in lax panicles with white-hairy branches, the inflorescence bracts linear oblong, mucronate, ciliate, gradually reduced to linear,

flowering bracts spatulate, bracteoles linear lanceolate as are the rather smaller calyx-lobes; leaves ovate, acuminate, minutely pubescent, up to 5.5 in. long, 3.25 in. broad, long-petioled . . . 2. *Beddomei*. Flowers in clusters in few-flowered axillary umbels, bracts at the base of the umbel small, linear or spatulate, those below the clusters broadly ovate or subcordate, mucronate, reticulate, glabrous or pubescent, about .5 in. in diam., bracteoles linear, shorter than the scarious ciliate calyx-lobes; leaves ovate or lanceolate, acuminate at both ends, membranous, up to 5 in. long, 2.5 in. broad, long-petioled

3. *zeylanica*.

Flowers in subcapitate peduncled clusters, one or more together in the leaf-axils, bracts of the clusters small, linear, those of the flowers obovate-oblong, up to .6 in. long, bracteoles linear like the calyx-lobes; leaves ovate or elliptic, acuminate, acute or rounded at base, glabrous, up to 3.5 in. long, 1.5 in. broad, long-petioled

4. *cuneata*.

Flowers in dense terminal and axillary sessile or subsessile capitate cymes, the bracts obovate or oblanceolate, glandular-pubescent, unequal; leaves rhomboid- or elliptic-lanceolate, acuminate at both ends, undulate, membranous, up to 4.5 in. long, 2 in. broad, long-petioled . . . 5. *bupleuroides*.

## 1. DICLIPTERA PARVIBRACTEATA, Nees; F. B. I. iv. 551.

N. Circars, in Jaipur Hills (Beddome), Rampa Hills of Godavari, at 2,000 ft. (Gamble).

A tall slender herb with elongate trichotomous cymes of apparently pink flowers.

## 2. DICLIPTERA BEDDOMEI, C. B. Clarke; F. B. I. iv. 551.

Deccan, Nallamalai Hills of Kurnool (Beddome).

A slender herb with flowers in rather short trichotomous cymes.

3. DICLIPTERA ZEYLANICA, Nees; F. B. I. iv. 552. *D. bivalvis*, Nees; Wt. Ic. t. 1551.

W. Gháts, S. Canara to Travancore, in evergreen forests, at 2,000–3,000 ft.

A well-marked subscandent (Cooke) herb with conspicuous bracts and deep rose-coloured flowers, the seeds minutely glochidiate-papillose. The stems vary in pubescence from glabrous to densely white-woolly.

## 4. DICLIPTERA CUNEATA, Nees; F. B. I. iv. 552; Wt. Ic. t. 1552.

Deccan, Horsleykonda in Chittoor, at 4,000 ft. (Fischer),

hills of N. Coimbatore; Carnatic, hills of Salem, Trichinopoly and Madura to S. Travancore; W. Gháts in Wynaad, about 3,000 ft.

A branching herb with, apparently, pink flowers, the seeds glochidiate-papillose.

5. *DICLIPTERA BUPLEUROIDES*, Nees. *D. Rowburghiana* var. *bupleuroides*, C. B. Clarke; F. B. I. iv. 554.

N. Circars, hill forests of Ganjam, about 1,500 ft. (Gamble, Barber).

An erect or tufted herbaceous plant with white flowers spotted with purple.

### 33. *Ecbolium*, Kurz.

Shrubs, nearly glabrous. *Leaves* entire. *Flowers* in dense terminal spikes; bracts large, leafy, imbricate, sometimes toothed; bracteoles small, narrow. *Calyx* 5-partite, connate below; lobes linear. *Corolla*-tube very long and slender; limb 2-lipped, the upper lip narrow, shortly 2-fid, the lower 3-lobed with broad pendent lobes. *Stamens* 2, attached near the top of the tube; anthers 2-celled, linear, parallel, mucicous. *Ovary* 2-celled; ovules 2 in each cell; style filiform; stigma shortly 2-fid. *Fruit* an ovoid compressed capsule narrowed into a solid stalk. *Seeds* 4 or, more often, 2, large, compressed, tuberculate and scabrous, the retinaculo long and curved.

*ECBOLIUM LINNEANUM*, Kurz; F. B. I. iv. 544; Wt. Ic. t. 463.

Deccan and Carnatic, inland to Coimbatore, otherwise chiefly from Madras southwards.

A low shrub with bluish-green corolla, the bracts obtuse or slightly acute, the spikes short and leaves small and pubescent. The leaves are used in medicine. Vern. *Hind. Udu jati*.

Var. *rotundifolium*, C. B. Clarke l. c. Leaves small, sessile, ovate; bracts shortly aristate.

Deccan, about Coimbatore (Wight).

Var. *laetevirens*, C. B. Clarke l. c. Leaves glabrescent, longer and larger and more acuminate, more prominently nerved; spikes long, up to 8 in., bracts broadly lanceolate, aristate.

W. Gháts, in all Districts, at low levels, common.

Var. *dentatum*, C. B. Clarke l. c. Leaves glabrous, larger still



and much attenuate at base, spikes long, bracts ovate acuminate, dentate.

N. Circars, Ganjam to Godavari, in forest areas chiefly.

34. *Justicia*, Linn.

Herbs, undershrubs or shrubs. *Leaves* entire, usually lineolate with often very many raphides. *Flowers* sessile or subsessile, in spikes or panicles, rarely solitary; bracts various, bracteoles usually narrow, sometimes 0. *Calyx* 5- or 4-partite, the lobes narrow. *Corolla*-tube as long as or shorter than the limb; limb 2-lipped, the upper lip 2-lobed or sub-entire, the lower 3-lobed, the lobes imbricate in bud. *Stamens* 2; filaments often dilated; anthers 2-celled, the cells round or oblong usually more or less separate, the lower always with a white basal appendage. *Ovary* 2-celled; ovules 2 in each cell; style filiform; stigma shortly 2-fid. *Fruit* an ovoid or obovoid capsule, solid at base or not, often papery. *Seeds* 4, ovoid or suborbicular, more or less compressed, tuberculate rugose or echinate, not hygroscopically hairy.

Calyx-lobes 5, equal or nearly so :—

Erect shrubs; flowers large, in opposite clusters in elongate, often paniculate, spikes or racemes; capsule clavate, 4-seeded near the top, about 1 in. long; leaves oblong-lanceolate, obtusely acuminate at apex, acuminate at base, glabrous, up to 10 in. long, 3.5 in. broad, main nerves about 10 pairs ..... 1. *montana*.

Shrubs or herbs; flowers middle-sized, in continuous spikes with conspicuous imbricate bracts :—

Bracts white with green nerves, bracteoles similar :—

Flower spikes large and conspicuous, terminal, often panicle; bracts .5–.75 in. long :—

Tall shrub, sometimes branching and decumbent; leaves petioled, ovate or lanceolate, acuminate, shortly attenuate at base, glabrous or villous beneath, entire or crenate-dentate, up to 6 in. long, 3 in. broad; capsule .3–.5 in. long, clavate, pubescent, the seeds small, spinulose when wetted

2. *Betonica*.

Low procumbent much-branched undershrub; leaves sessile, oblong, obtuse or emarginate, nearly glabrous, entire, up to 2 in. long, .2–.5 in. broad; capsule .75 in. long, clavate, puberulous, the seeds large, echinate when wetted

3. *nilgherrensis*.

BBB

Flower spikes small and slender; bracts about .25 in. long, narrow; leaves ovate or oblong, sometimes linear, up to 1.5 in. long, .4 in. broad; capsule .5 in. long, pubescent, the seeds small, softly tuberculate when wet .....4. *trinervia*. Bracts green; bracteoles different, often 0; the seeds softly echinate when wet :—

Stiff undershrubs with white bark and small leaves :—

Branches softly white-hairy; bracts elliptic, acute, about .1–.2 in. long, bracteoles more oblong, usually longer, both minutely puberulous; spikes few-flowered; leaves oblong or spatulate, obtuse, .5–.75 in. long; capsule .5 in. long, softly pubescent .....5. *salsoloides*.

Branches glabrous except sometimes the uppermost branchlets; bracts orbicular or obcordate, short-apiculate, pubescent, .15–.25 in. in diam., bracteoles linear or slightly elliptic, shorter; spikes short or elongate, many-flowered; leaves obovate or orbiculate, pubescent, up to 1 in. in diam.; capsule .3 in. long, glabrous .....6. *tranquebariensis*.

Erect or diffuse herb with purplish bark and puberulous stems; leaves ovate or orbicular, obtuse or acute, petioled, up to 3 in. long, 2 in. broad; bracts orbicular-spatulate, bracteoles small linear, sometimes absent; spikes sometimes short, usually long and many-flowered; capsules obovoid, glabrous except at tip, .25 in. long .....7. *glauca*.

Erect undershrubs with small or middle-sized flowers in axillary or terminal branched often paniculate spikes, the bracts inconspicuous and narrow :—

Flowers clustered in the spikes; bracts linear, very small, bracteoles 0; leaves short-petioled, narrowly lanceolate, glabrous, up to 5 in. long, 1 in. broad, main nerves about 7 pairs, not conspicuous; capsule glabrous, .5 in. long, seeds unknown .....8. *Gendarussa*.

Flowers opposite in the spikes; bracts linear-lanceolate, bracteoles linear, small; leaves long-petioled, elliptic, acuminate at both ends, glabrous or pubescent, up to 8 in. long, 3 in. broad, main nerves 8–10 pairs, prominent; capsule 4-sided, clavate, very villous, .7 in. long, seeds softly round-tuberculate 9. *wynaadensis*.

Herbaceous plant with flowers in lax axillary and terminal cymes, the bracts and bracteoles very small, linear; leaves broadly ovate, acute, obtuse or even subcordate at base and then acute into the long petiole, glabrous, minutely lineolate, up to 4 in. long, 3 in. broad, main nerves about 6–7 pairs; capsule 4-sided, clavate, villous, the seeds very villous, on jointed retinacula ....10. *glabra*.

Calyx-lobes 4; herbs and undershrubs with small flowers in terminal and axillary cylindric or linear spikes :—

Spikes cylindric, hairy; bracts and bracteoles as long as or longer than the calyx-lobes :—

Bracts and bracteoles very slender and long, with distant spreading long bulbous-based white hairs; calyx-lobes similar or only apiculate, their margins scarious; spikes up to 1.5 in. long, .4 in. broad; leaves thin, ovate or elliptic, up to 2 in. long, the raphides irregular in the middle, transverse at the margins

11. *micrantha*.

Bracts and bracteoles linear, green, pectinately white-ciliate and scabrous-hirsute; calyx-lobes narrowly lanceolate, the margins only scarious, the raphides concentrically transverse and curved :—

Spikes scarcely 1 in. long, .25 in. broad, usually pale; leaves elliptic lanceolate or linear, up to 2.5 in. long; white hairs of the bracts and bracteoles short and close . . . . . 12. *procumbens*.

Spikes up to 2 in. long, .2 in. broad; leaves very small, orbicular, under .7 in. in diam., the white jointed hairs long and spreading . . . . . 13. *serpyllifolia*.

Bracts elliptic-ovate or lanceolate, the bracteoles narrower though similar; leaf raphides concentrically transverse :—

Erect, simple-stemmed, the leaves sessile, oblong, subobtuse; spikes up to 2.5 in. long, .4 in. broad; bracts, bracteoles and calyx-lobes pectinately white-setulose . . . . . 14. *Notha*.

Diffuse and branching, the branches often angled or zigzag :—

Bracts more than .1 in. broad, lineolate, bracteoles and similar calyx-lobes narrower, all scarious-margined and with soft whitish jointed hairs; leaves ovate or oblong even sometimes almost linear, up to about 1 in. long, main nerves about 6 pairs; plant pale when dry . . . . . 15. *simplex*.

Bracts less than .1 in. broad, but broader than the bracteoles and calyx-lobes, more or less pectinately ciliate; leaves ovate or elliptic, up to 2 in. long, 1 in. broad, main nerves about 4 pairs; nearly black when dry . . . . . 16. *latispica*.

Spikes linear; bracts and bracteoles usually shorter than the calyx-lobes, all with a green midrib and scarious margins :—

Bracts, bracteoles and calyx-lobes obtuse at apex; leaves elliptic-oblong or lanceolate, obtuse at apex, attenuate at base into the petiole, the raphides scattered, straight, parallel to the 4-5 main nerves; spikes slender, often very long, the whorls distant

17. *quinqueangularis*.

Bracts, bracteoles and calyx-lobes acute at apex :—

Bracts and bracteoles lanceolate nearly .1 in. long but much shorter than the calyx-lobes, more or less scabrous :—

Prostrate and rooting many-branched herbs, sometimes becoming woody; spikes short; the leaves very small, orbicular or ovate, rarely over .5 in. long, the raphides scattered ascending .....18. *prostrata*.  
Erect tall slender branching herbs; spikes long and pale; leaves narrowly linear or lanceolate, up to 3 in. long, .5 in. broad, the lower ones sometimes ovate, the raphides numerous ascending .....19. *VahlII*.

Bracts and bracteoles usually very small and ovate, scarcely .05 in. long, and with the calyx-lobes generally glabrous; spikes very slender up to 2 in. long; leaves usually thin, ovate, obtuse or acute, up to 2.5 in. long, 1.25 in. broad, the raphides irregular .....20. *diffusa*.

Bracts and bracteoles lanceolate, hirsute, a little shorter than the calyx-lobes, all with cuspidate long-ciliate tips and narrow scarious margins; leaves ovate or orbicular, obtuse, with strigose hairs above, villous beneath, up to nearly 2 in. long, 1 in. broad, the raphides irregular .....21. *orbiculata*.

1. *JUSTICIA MONTANA*, Wall.; F. B. I. iv. 525. *Hemichoriste montana*, Nees; Wt. Ic. t. 1538.

W. Gháts, Mysore, Coorg, Wynaad, to the Anamalais and hills of Travancore, at low levels in evergreen forest.

An erect bush with thick stem, the corolla white with purple spots in the throat, the seed-testa corrugately wrinkled.

2. *JUSTICIA BETONICA*, Linn.; F. B. I. iv. 525.

All Districts, except very dry ones, on waste lands and in hedges.

An erect shrub, up to 4 ft. high, the corolla white, spotted with pink.

Var. *villosa*, C. B. Clarke. Stem and leaves beneath villous, bracts large.

N. Circars, Ganjam to Godavari, up to 4,500 ft. on Mahendragiri.

3. *JUSTICIA NILGHERRENSIS*, Wall.; F. B. I. iv. 526. *Adhatoda nilgherrensis*, Nees; Wt. Ic. t. 1544.

Carnatic, Melpat, S. Arcot, at 2,500 ft. (Barber); W. Gháts, Nilgiris, in grass lands on the downs above 6,000 ft.

A low herb branching from a stout rootstock, the corolla whitish, spotted with red.

4. *JUSTICIA TRINERVIA*, Vahl; F. B. I. iv. 526.

W. Coast, S. Canara and Malabar; Deccan, in Mysore.

A low procumbent herb, branching from a woody rootstock, the bracts and bracteoles often scarcely white, the corolla small.

5. *JUSTICIA SALSOLOIDES*, T. And.; F. B. I. iv. 530.

Carnatic, on very dry lands (Wight, G. Thomson).

A woody undershrub, the corolla densely pubescent without.

6. *JUSTICIA TRANQUEBARIENSIS*, Linn. f.; F. B. I. iv. 530.

Deccan and Carnatic, from Mysore southwards, on dry lands, up to 3,000 ft. in hilly country.

A woody undershrub with many stiff branches, the corolla slightly villous without, yellowish with purple spots.

7. *JUSTICIA GLAUCA*, Rottl.; F. B. I. iv. 529. *Gendarussa tranquebariensis*, Wt. Ic. t. 462, not of Nees.

All Districts, on waste lands and in dry forests, up to 2,000 ft.

A very variable herb, with pubescent branches, the corolla whitish with purple spots.

8. *JUSTICIA GENDARUSSA*, Linn. f.; F. B. I. iv. 532. *Gendarussa vulgaris*, Nees; Wt. Ic. t. 468.

W. Gháts, valleys in the hills of Madura, cultivated and frequently found run wild.

An erect undershrub, the corolla white or rose with purple spots. The plant is used in garden hedges, and the leaves are much used medicinally. Vern. *Tel.* Nalla vavili; *Tam.* Karu nochì.

9. *JUSTICIA WYNAADENSIS*, Heyne; F. B. I. iv. 533. *Adhatoda wynaadensis* Nees; Wt. Ic. t. 1545.

W. Gháts, from S. Canara and Coorg to Wynaad, E. Nilgiris and S. Malabar Hills, up to 3,000 ft., in evergreen forests and on waste lands.

An erect undershrub, the corolla with pink upper and brown-purple lower lip, the spikes long and slender with flowers in distant pairs.

10. *JUSTICIA GLABRA*, Koen.; F. B. I. iv. 535. *Rhaphidospora glabra*, Nees; Wt. Ic. t. 1554.

N. Circars, in Godavari; Deccan. in Kurnool and the Sandur Hills of Bellary, hills of Coimbatore and Salem; Carnatic, in Tinnevely, in hedges and open forest.

An erect herb with slender divaricately branched inflorescence, the corolla pale yellow with purple spots.

11. *JUSTICIA MICRANTHA*, Wall.; F. B. I. iv. 536.

Deccan, in Bellary and Cuddapah to Chingleput.

An erect herb with trichotomous pale zigzag-branching stems and small rose-purple flowers, the small capsule pubescent.

12. *JUSTICIA PROCUMBENS*, Linn.; F. B. I. iv. 539.

W. Gháts, from the slopes of the Pulneys southwards.

W. Coast to Travancore.

A diffuse slender herb with many branches often rooting at the nodes, the flowers pale purple, the capsule pubescent at tip.

13. *JUSTICIA SERPYLLIFOLIA*, Gamble n. comb. *J. simplex* var. *serpyllifolia*, C. B. Clarke; F. B. I. iv. 539.

W. Coast, S. Canara and Malabar.

A small prostrate or straggling diffuse herb often rooting at the nodes, with slender zigzag branches, the spikes close and cylindrical.

14. *JUSTICIA NOTHA*, C. B. Clarke; F. B. I. iv. 537. *Rostellularia simplex*, Wt. Ic. t. 1542.

"Station not known (Wt)." Clarke thinks it may be Malayan, but it is not recorded by Miquel.

15. *JUSTICIA SIMPLEX*, D. Don; F. B. I. iv. 539.

Deccan, Carnatic and W. Gháts, usually in hilly country and even up to 7,000 ft., common.

A pale softly hairy herbaceous branching plant, the flowers pale pink or lilac, the capsules papery, villous at apex.

16. *JUSTICIA LATISPICA*, Gamble n. comb. *J. procumbens* var. *latispica*, C. B. Clarke; F. B. I. iv. 539. *Rostellularia procumbens*, Wt. Ic. t. 1539.

W. Gháts, Nilgiri Hills above 5,000 ft., less common in Anamalais and Pulneys.

Almost an undershrub somewhat woody below, turning nearly black when dry, covered with scattered stiff strigose hairs, the flowers apparently pale lilac spotted white, the capsules papery, glabrous.

17. *JUSTICIA QUINQUEANGULARIS*, Koen. ; F. B. I. iv. 536.  
N. Circars, Biccavol in Godavari (Bourne).  
A herbaceous undershrub with curving angular stems rooting at the nodes and giving erect branches, the flowers small, the capsules obovoid glabrous, the seeds with wavy subconcentric ridges.
18. *JUSTICIA PROSTRATA*, Gamble n. comb. ; *J. diffusa*, Willd. ; var. *prostrata*, C. B. Clarke, F. B. I. iv. 538.  
Circars and Carnatic, from Ganjam southwards to S. Travancore, usually in sandy places near the coast, but sometimes inland to Salem, Trichinopoly and Coimbatore. A small pale prostrate plant, the branches long and diffusely spreading from a stout rootstock sometimes almost woody, the flowers pale pink, the capsules small and minutely puberulous, the seeds minutely tuberculate. The leaves are small and usually orbicular or ovate, sometimes slightly lanceolate.
19. *JUSTICIA VAHLII*, Roth. *J. diffusa* var. *VahlII*, C. B. Clarke ; F. B. I. iv. 538.  
Circars and Deccan. westwards to Bellary, up to 4,000 ft. in the hills.  
A tall straggling narrow-leaved plant from a stout rootstock, the branches with long internodes angular and scabrous, the flowers pale with a reddish lip, the capsule pubescent, the seeds papillose.
20. *JUSTICIA DIFFUSA*, Willd. ; F. B. I. iv. 538.  
Circars, Deccan and Carnatic, also, but more scarce, W. Gháts, up to 7,000 ft. in places.  
A slender but sometimes in old plants quite woody branching herb, with pale flower spikes and leaves, the glabrous capsules small and pointed.  
Var. *hedyotidifolia*, C. B. Clarke ; F. B. I. iv. 538. *Rostellularia hedyotidifolia*, Nees ; Wt. Ic. t. 1540. Leaves thicker and like other parts turning nearly black in drying ; spikes broader and denser.  
Deccan, on Horsleykonda, 4,500 ft. (Gamble) ; W. Gháts, Nilgiris, Pulneys and hills of Travancore, about 3,000–5,000 ft.
21. *JUSTICIA ORBICULATA*, Wall. *J. diffusa* var. *orbiculata*, C. B. Clarke, F. B. I. iv. 538.

W. Gháts, Nilgiri and Pulney Hills, probably above 5,000 ft.; Shevaroy Hills of Salem (Bourne).

Almost an undershrub, soft and compact, with spreading dichotomous branches, the capsules nearly or quite glabrous, the seeds with lines of papillae.

### 35. *Adhatoda*, Nees.

Shrubs. *Leaves* entire. *Flowers* subsessile in the axils of opposite bracts in dense axillary and terminal often thyrsiform spikes; bracts herbaceous, bracteoles similar but usually narrower. *Calyx* 5-partite, the lobes imbricate, the 2 lowest often subconnate. *Corolla*-tube short; limb 2-lipped, the upper lip galeate subentire, the lower spreading, 3-lobed. *Stamens* 2, near the top of the corolla-tube; anthers 2-celled, the cells minutely apiculate at base. *Disk* cup-shaped. *Ovary* 2-celled; ovules 2 in each cell; style filiform; stigma entire. *Fruit* a clavate capsule with a long solid base. *Seeds* 1 or 2, suborbicular, compressed, rugose.

Branches grey-pubescent; spikes stout, about 3 in. long; bracts elliptic, up to 1 in. long, about 7-ribbed; leaves lanceolate, acuminate at both ends, minutely puberulous, up to 8 in. long, 3 in. broad, main nerves about 15 pairs, rather close .....1. *Vasica*. Branches glabrous; heads short, up to 1 in. diam.; bracts ovate, up to .5 in. long, obscurely 5-ribbed; leaves oblong-lanceolate, attenuate at both ends, minutely puberulous on the nerves, up to 6 in. long, 1.5 in. broad, main nerves about 8 pairs, rather distant...2. *Beddomei*.

#### 1. *ADHATODA VASICA*, Nees; F. B. I. iv. 540.

All plains Districts, perhaps wild in the N. Circars, elsewhere cultivated as a hedge-plant and run wild near villages.

A dense shrub with a foetid scent, the flowers white with the throat barred with red or yellow. The leaves are used in native medicine, and an infusion of them is used as an insecticide. Vern. *Hind.* Arusha; *Ur.* Basung; *Tel.* Addasaram; *Tam.* Adatodai.

#### 2. *ADHATODA BEDDOMEI*, C. B. Clarke; F. B. I. iv. 540.

Hills of S. Travancore, at 3,000 ft. (Beddome).

A very large shrub, with rather small flowers in short heads; turns black in drying.



36. *Dianthera*, Linn.

Diffuse herbs or undershrubs. *Leaves* petioled, ovate or oblong. *Flowers* in terminal and sometimes axillary spikes or panicles; bracts and bracteoles small. *Calyx* 5-partite, the lobes narrow. *Corolla* small or middle-sized, the tube short; limb 2-lipped, the upper lip suberect, emarginate, the lower 3-lobed, pendent. *Stamens* 2; anther-cells 2, ellipsoid, subopposite or superposed, muticous. *Ovary* 2-celled, 2 ovules in each cell; style minutely hairy below, nearly bifid at tip. *Fruit* a clavate capsule with subcylindric solid base. *Seeds* 4, compressed, scabrous verrucose or subhispid.

*DIANTHERA WALLICHII*, Benth. in Gen. Pl. ii. 1114. *D. leptostachya*, C. B. Clarke; F. B. I. iv. 542. *Leptostachya Wallichii*, Nees; Wt. Ic. t. 1543.

W. Gháts, hills of Tinnevely.

An erect herb with slender divaricately branched panicles of small flowers, the leaves membranous, elliptic-oblong or -lanceolate, acuminate at both ends. up to 7 in. long, 2·5 in broad.

37. *Rhinacanthus*, Nees.

Shrubs, sometimes subscandent. *Leaves* entire. *Flowers* solitary or in small cymes in dense or divaricate panicles; bracts and bracteoles small, linear-lanceolate, shorter than the calyx. *Calyx* 5-lobed, the lobes narrow. *Corolla*-tube long, very slender, scarcely enlarged above; limb 2-lipped, the upper lip linear-oblong, entire or shortly 2-lobed, twisted or recurved, the lower broad, 3-lobed. *Stamens* 2, adnate near the top of the corolla-tube; anthers 2-celled, the cells superposed, muticous. *Disk* cupular. *Ovary* 2-celled; ovules 2 in each cell; style filiform; stigma minutely 2-fid. *Fruit* a clavate capsule, contracted below in a long solid stalk. *Seeds* 1 or 2, orbicular, compressed, rugose.

*RHINACANTHUS COMMUNIS*, Nees; F. B. I. iv. 541: Wt. Ic. t. 464.

Almost all Districts, wild or cultivated, common on roadsides; also in forest glades especially in N. Circars, on the hills to 4,500 ft. as on Mahendragiri.

A shrubby plant reaching 5 ft. in height, with leaves sometimes reaching 8 in. long, 4 in. broad, the flowers white.

Var. *montana*, C. B. Clarke. Leaves ovate, very softly pubescent beneath and rounded at base.

Nilgiri Hills, near Coonoor (Wight).

### 38. *Peristrophe*, Nees.

Erect herbs. *Leaves* entire, lineolate. *Flowers* in terminal or axillary clusters, which are often in spreading lax panicles; bracts 1-4 together, decussate, longer than the calyces or the similar bracteoles. *Calyx* 5-partite; lobes linear-lanceolate. *Corolla*-tube slender, often twisted; limb 2-lipped, the upper lip subentire, the lower shortly 3-lobed. *Stamens* 2; filaments pubescent below; anthers 2-celled, cells linear or ovoid, one higher than the other, muticous. *Ovary* 2-celled; ovules 2 in each cell; style filiform; stigma shortly bifid. *Fruit* an ellipsoid stalked capsule, usually 4-seeded, the placentas not separating elastically. *Seeds* discoid, compressed, papillose.

A laxly paniculate spreading herb with angular hispid stems, the leaves chiefly near the base, ovate, acuminate, up to 2 in. long, pubescent; cymes trichotomous; bracts 2, unequal, opposite, linear or linear-spathulate, up to .5 in. long; corolla pink, villous without, up to .5 in. long; anther-cells short; seeds glochidiate-papillose

#### 1. *bicalyculata*.

An erect herb or undershrub with nearly terete stems, the leaves chiefly near the top, elliptic, long-acuminate, subglabrous, up to 7 in. long, 2.5 in. broad, the flower-clusters in axillary or terminal 3-5-branched cymes; bracts 2, conspicuous, elliptic, glabrous or slightly villous, nerved, up to .75 in. long; corolla pink, villous without, 2-2.5 in. long; anther-cells linear; seeds granular-papillose

#### 2. *montana*.

#### 1. *PERISTROPHE BICALYCULATA*, Nees; F. B. I. iv. 554.

All Districts, common in forest undergrowth, in hedges and on waste land, even as a weed in gardens.

A hispid herb 3-6 ft. high with unattractive very spreading flower panicles and rather small leaves.

#### 2. *PERISTROPHE MONTANA*, Nees; F. B. I. iv. 556; Wt. Ic. t. 1553.

W. Gháts, Wynaad, Anamalais, hills of Travancore and Tinnevely, in evergreen forests at low levels up to 3,000 ft. A handsome erect undershrub with large leaves and flowers, the bracts often also coloured.

*Graptophyllum hortense*, Nees, is a glabrous shrub with crimson flowers and leaves mottled with white patches. It is largely cultivated in gardens and has occasionally run wild.

**Family CXIV. VERBENACEAE.**

Herbs, shrubs or trees. *Leaves* opposite or whorled, simple digitate or pinnate; stipules 0. *Inflorescence* cymose racemose or spicate, often paniculate; bracts usually small; flowers hermaphrodite, rarely polygamous, generally irregular, often brightly coloured, sometimes with coloured calyx or enlarged coloured involucre. *Calyx* inferior, gamosepalous, 5-4- rarely more-lobed, persistent. *Corolla* gamopetalous; tube usually cylindric or dilated above, often curved; limb 2-lipped or subequally lobed, lobes 5-4, rarely more. *Stamens* usually 4 didynamous, rarely 2, rarely more, inserted on the corolla-tube; filaments free; anthers 2-celled. *Ovary* superior, sessile, 2-4-celled, entire or 4-lobed; ovules variously attached, 2, sometimes 1 in each cell; style terminal; stigma entire or bifid. *Fruit* drupaceous with bony pyrenes, or capsular, 1-4-celled; mesocarp usually fleshy; endocarp usually bony. *Seeds* erect or pendulous, separate in distinct cells; albumen usually 0, embryo straight, radicle inferior.

Inflorescence spicate, centripetal (the lowest flowers opening first):—

Fruit with 2 or 1 1-seeded pyrenes:—

Spikes capitate ovoid or cylindric, calyx small; stamens 4.

Calyx truncate or obscurely lobed; fruit drupaceous, succulent

1. *Lantana*.

Calyx 2-4-lobed; fruit dry, hard . . . . . 2. *Lippia*.

Spikes long, slender; calyx long, tubular:—

Stamens 4 didynamous . . . . . 3. *Bouchea*.

Stamens 2 . . . . . 4. *Stachytarpheta*.

Fruit with 2 2-seeded pyrenes . . . . . 5. *Priva*.

Fruit with 4 1-seeded pyrenes; calyx tubular . . . . . *Verbena*.

Inflorescence cymose, centrifugal (the end flower opening first):—

Cymes paniculate, drupes fleshy:—

Leaves simple:—

Corolla regular, stamens equal:—

Flowers 4-merous; drupe with 4 pyrenes . . . . 6. *Callicarpa*.

Flowers 4-6-merous; drupe with 4-celled endocarp

7. *Tectona*

Corolla 2-lipped ; stamens 4 didynamous :—

Drupe with 1 pyrene, normally 4-celled :—

Flowers small ..... 8. *Premna*.

Flowers large ..... 9. *Gmelina*.

Drupe with 4 pyrenes, 1-3 often suppressed 10. *Clerodendron*.

Leaves digitate ; pyrene 1 ..... 11. *Vitex*.

Cymes capitate, bracts of the heads forming an involucre :—

Corolla 6-16- or more-merous ; stamens long-exsert

12. *Symphorema*.

Corolla 5-6-merous ; stamens included or shortly exsert

13. *Sphenodesme*.

Inflorescence capitate or shortly spicate, centripetal ; calyx 5-partite, the lobes concave, imbricate, fruit capsular..... 14. *Avicennia*.

### 1. *Lantana*, Linn.

Erect or subscandent, often rambling, often strong-smelling, pubescent or scabrous shrubs ; branches 4-angled, sometimes prickly. *Leaves* simple, opposite or ternate, crenate, often rugose. *Flowers* in pedunculate capitate ovoid or cylindric spikes ; bracts conspicuous, persistent, bracteoles 0. *Calyx* small, membranous, truncate or obscurely toothed. *Corolla*-tube cylindric, slender ; limb salver-shaped ; lobes 4 or 5, spreading. *Stamens* 4, didynamous, included in the corolla-tube and inserted at its middle ; anthers oblong, the cells parallel. *Ovary* 2-celled ; ovules 1 in each cell ; style short ; stigma oblique, subcapitate. *Fruit* a drupe with more or less fleshy mesocarp ; endocarp hard, separating into 2 1-celled, 1-seeded pyrenes. *Seeds* exalbuminous ; testa reticulate.

Erect shrubs, the stems not prickly :—

Leaves usually opposite, sometimes ternate :—

Lower bracts of the spike broadly ovate, usually abruptly acuminate, villous, 7-ribbed ; spikes .5-.75 in. long in flower, elongating in fruit ; corolla-tube .3 in. long ; leaves ovate, acute, rounded and then cuneate at base, crenate, rugose above, usually white-pubescent beneath, up to 3 in. long, 1.5 in. broad

1. *indica*.

Lower bracts of the spike leafy, ovate, gradually acute, 5-7-ribbed, softly villous ; spikes small, about .5 in. long or less, in fruit up to 1 in. ; corolla-tube short, .15 in. long ; leaves small, ovate or orbicular, obtuse or obtusely acute, crenulate, often

very white villous or tomentose, up to 1·5 in. long, but usually much less .....2. *Wightiana*.

Lower bracts of the spike lanceolate, 3-ribbed; spikes short, subumbellate, 25 in. long in fruit, up to 5 in.; corolla-tube long; leaves ovate-lanceolate, acuminate, rounded and then cuneate at base, scabrous above, crenulate, up to 3·5 in. long, 1·5 in. broad, the petiole long and slender.....3. *crenulata*.

Leaves usually ternate, sometimes only opposite, lanceolate, acute, cuneate at base, crenate, hispid-pubescent, up to 4 in. long, 1·5 in. broad; lower bracts of the spike ovate, cuspidate-acuminate; spikes 5-1·5 in. long, elongate in fruit; corolla-tube very white-villous.....4. *trifolia*.

Straggling or climbing shrubs, the stems with many recurved prickles: bracts of the spike lanceolate 3-5-ribbed; spikes short, subumbellate, corolla-tube slender; scabrous-pubescent; leaves ovate or ovate-oblong, acute, cuneate rounded or cordate at base, crenate, rugose and scabrous, up to 4 in. long .....5. *aculeata*.

1. *LANTANA INDICA*, Roxb.; F. B. I. iv. 562; Wt. Ic. t. 1464.  
Deccan, Carnatic and W. Ghâts, in hilly country up to 4,000 ft., often planted in gardens.  
An erect shrub reaching 3-8 ft. high, the flowers pink or purplish with a yellowish tube.
2. *LANTANA WIGHTIANA*. Wall. *L. indica*, Roxb.. var. *albiflora*, Wt.; F. B. I. iv. 562.  
Carnatic and E. slopes of W. Ghâts, in or near the hills.  
A woody shrub with very pale branches, small leaves and long slender peduncles, the flowers white.
3. *LANTANA CRENULATA*, Otto & Dietr.; F. B. I. iv. 563.  
Coast of the Carnatic, Pulicat (Wight), Madras (Barber), perhaps introduced only.  
An erect shrub with yellow and orange flowers, the leaves with long slender petioles, the peduncles up to 3·5 in. long.
4. *LANTANA TRIFOLIA*, Linn.; F. B. I. iv. 563.  
Travancore (Heyne); Bangalore (Cleghorn), an introduced plant.  
An erect hispid shrub resembling *L. indica*, the rather large ternate leaves subsessile.
5. *LANTANA ACULEATA*, Linn. *L. Camara*, Linn.; F. B. I. iv. 562.

W. Deccan and lower hills of W. Gháts, up to perhaps 6,000 ft., especially common in Coorg and Wynaad, introduced from tropical America and run wild. The *Lantana*. A very aromatic plant with the scent of black currants, the corollas normally orange, but plants found in gardens have them of various hues, from white to dark red. The plant is most troublesome and measures for its destruction are often necessary though difficult (see Troup, 'Sylv. Ind. Trees,' ii, 780).

## 2. *Lippia*, Linn.

Shrubs or undershrubs, rarely herbs. *Leaves* opposite or ternate, rarely alternate, often aromatic, entire or toothed. *Flowers* small, in elongate or cylindric or capitate spikes; bracts small, imbricate, bracteoles 0. *Calyx* small, membranous, 2-4-lobed, ultimately 2-valved. *Corolla* small, salver-shaped, tube cylindric, straight or curved; limb oblique, 2-lipped, the upper lip bifid or emarginate, the lower 3-lobed. *Stamens* 4, didynamous, included at the middle of the corolla-tube; anthers ovate with parallel cells. *Ovary* 2-celled, ovules in each cell solitary; style short; stigma oblique, subcapitate. *Fruit* small, with a dry epicarp enclosed in the calyx valves; mesocarp granular; endocarp hard and bony, separating into 2 1-seeded pyrenes. *Seed* exalbuminous.

Prostrate, widely creeping and rooting, minutely hairy; leaves cuneate-spathulate, serrate towards the apex, up to 2 in. long; spikes dense, globose at first, afterwards elongating, peduncles usually single; bracts broadly obovate, apiculate.....1. *nodiflora*. Erect and shrubby, softly white-strigose; leaves ovate, subobtusely, obtuse at base and somewhat decurrent, rugose, crenulate, up to 2 in. long '75-1 in. broad; spikes dense, cylindric, elongating to 1 in. long, peduncles in one or two pairs; bracts ovate, apiculate, white-villous

2. *geminata*.

1. *LIPPIA NODIFLORA*, Mich.; F. B. I. iv. 563; Wt. Ic. t. 1463.  
All Districts, a weed of wet ground and grassy pastures, common.

A prostrate herb with small white flowers.

2. *LIPPIA GEMINATA*, H.B. & K.; F. B. I. iv. 563.

Nilgiris, on Sigúr Ghát, at 3,000 ft. (Lawson, Gamble); Anamalais (Beddome). Wild Sage.

A strongly aromatic shrub of wet places, the flowers pink.

*Lippia citriodora*, H.B. & K. is the Lemon-scented Verbena, commonly planted in gardens, especially in the hills, where it sometimes grows to a considerable size. It is a native of S. America, and has very fragrant lanceolate leaves and small lilac flowers in terminal panicles.

### 3. Bouchea, Cham.

Herbs or undershrubs. *Leaves* opposite or subopposite, petioled, toothed. *Flowers* sessile or shortly pedicelled in terminal spikes or racemes; bracts small; bracteoles minute or 0. *Calyx* narrowly tubular, prominently 5-ribbed and 5-toothed, at length splitting longitudinally to the base between the 2 longer teeth. *Corolla*-tube slender, cylindric below, gradually widening; limb spreading, oblique, 5-lobed. *Stamens* 4, didynamous, included in the upper part of the tube; anthers oblong, the cells parallel. *Ovary* 2-celled; cells 1-2-ovuled; style slender; stigma oblique, subbilobed. *Fruit* enclosed in the calyx, of 2 elongate 1-seeded pyrenes, each with an interior basal hollow. *Seed* cylindric; testa thin; cotyledons oblong.

BOUCHEA HYDERABADENSIS, Walp.; F. B. I. iv. 564; Wt. Ic. t. 1462.

Deccan and Carnatic, in hilly country from Cuddapah to Tinnevely.

A tall subshrubby plant with pink-purple flowers in long narrow spikes reaching 1 foot or more, ovate-lanceolate leaves deeply serrate in the upper three-fourths, cuneate and entire at the base, up to nearly 6 in. long, 2 in. broad, the hard pyrenes flattened on the inner face.

### 4. Stachytarpheta, Vahl.

Herbs or shrubs. *Leaves* usually opposite, toothed. *Flowers* in terminal spikes in the axils of bracts often closing an excavation of the rhachis in which they lie; bracts usually lanceolate, bracteoles 0. *Calyx* narrowly cylindric, shortly 4-5-lobed, often slit at the back when in fruit. *Corolla* salver-shaped; tube slender, cylindric, usually curved; limb spreading, 5-lobed, the lobes rounded. *Stamens* 2 perfect, included, with 2 or no

staminodes; filaments short; anthers with divaricate cells. *Ovary* 2-celled; ovule solitary in each cell, attached laterally near its base; style filiform; stigma capitate. *Fruit* cylindric, enclosed in the calyx-tube, separating into 2 hard 1-seeded usually plano-convex pyrenes. *Seeds* oblong; testa membranous; cotyledons fleshy.

Spikes slender, about .1–.15 in. in diam., glabrous, the flowers blue; bracts lanceolate, acuminate, appressed; leaves elliptic-ovate, obtuse or acute, cuneate and decurrent at base, serrate or crenate-dentate except at base, up to 4 in. long, 1.5 in. broad, nearly glabrous

1. *indica*.

Spikes stout, about .2–.25 in. in diam., very villous, the flowers pink; bracts lanceolate, long-acuminate and spreading; leaves ovate, acute, decurrent at base, crenate except at base, up to 5 in. long, 2.5 in. broad, softly tomentose beneath ..... 2. *mutabilis*.

1. *STACHYTARPHETA INDICA*, Vahl; F. B. I. iv. 564. *S. urticæ-folia*, Bot. Mag. t. 1848.

Hills of the Carnatic, Shevaroy's (Perrottet, Bourne), introduced probably.

A tall herb with long slender spikes of blue flowers, the leaves serrate.

Var. *jamaicensis*, Trimen. *S. jamaicensis*, Vahl; Bot. Mag. t. 1860.

All plains Districts, on roadsides, and in wet places, common and probably only naturalized.

A tall herb with very long slender spikes, the blue flowers in excavations of the rhachis, the leaves coarsely crenate-serrate.

2. *STACHYTARPHETA MUTABILIS*, Vahl.

Hills of the Deccan, Carnatic and W. Ghâts, in places, introduced to gardens from tropical America and run wild.

A tall herb, shrubby, with very long stout spikes and pink flowers (scarlet and rose, *Haines*).

5. *Priva*, Adans.

Erect herbs. *Leaves* opposite, thin, toothed. *Flowers* solitary, in simple terminal or axillary spikes or racemes; bracts small, narrow; bracteoles 0. *Calyx* tubular, becoming inflated in fruit,



5-ribbed, the ribs ending in short teeth. *Corolla*-tube cylindric, straight or curved; limb 5-lobed, spreading, slightly 2-lipped; base of tube with spiral lines. *Stamens* 4 didynamous, included; anther-cells parallel or slightly divergent; staminode minute or 0. *Ovary* 2-celled; ovules 2 in each cell; style long, filiform; stigma oblique, subclavate. *Fruit* enclosed in the loose dilated calyx-tube, separating when ripe into 2 2-seeded pyrenes, usually hollowed out on the inner side. *Seed* smooth; testa thin.

PRIVA LEPTOSTACHYA, Juss.; F. B. I. iv. 565. *Streptium asperum*, Roxb. Cor. Pl. t. 146.

Deccan and Carnatic, from the Kistna southwards and up to 3,000 ft., W. to E. slopes of the Ghâts, on old walls, rocks, etc. An erect herb with quadrangular stem, ovate obtuse long-petioled soft leaves truncate or subcordate at base, 3 in. long, and white flowers in very long racemes covered with hooked hairs, the pyrenes echinate.

## 6. Callicarpa, Linn.

Trees or shrubs, the young branches more or less densely stellately hairy. *Leaves* opposite, rarely ternate, entire or toothed. *Flowers* small, in axillary sessile or pedunculate many-flowered cymes; bracts linear, inconspicuous. *Calyx* small, campanulate, truncate or minutely 4-lobed, not enlarged in fruit. *Corolla* small, campanulate, purple or red; lobes 4; spreading. *Stamens* 4 equal, exserted; anthers oblong, glandular on the back, the cells parallel. *Ovary* imperfectly 2-celled, 2 ovules in each cell; style linear; stigma dilated, obscurely bifid. *Fruit* a small globose drupe, supported by the persistent calyx, containing 4 pyrenes with bony endocarp, each 1-seeded. *Seed* shortly oblong; albumen 0.

Under-surface of leaves with close hard finely stellate pale tomentum; leaves ovate to oblong, acuminate, acute or cuneate at base, entire or slightly denticulate, up to 10 in. long, 6 in. broad, calyx subtruncate

1. *arborea*.

Under-surface of leaves with dense soft stellate grey or fulvous tomentum; leaves ovate or elliptic, acuminate, truncate or rounded, or cuneate at base, entire or serrate, up to 12 in. long, 8 in. broad; calyx shortly 4-lobed

2. *lanata*.

1. *CALLICARPA ARBOREA*, Roxb. ; F. B. I. iv. 567.

N. Circars, forests of the Eastern Gháts, Ganjam to Godavari, in rather open spots.

A moderate-sized tree with lilac purple flowers and small black drupes. Bark brownish, rough; wood light brownish-white, even-grained. Vern. *Ur*. Boropatri.

2. *CALLICARPA LANATA*, Linn.; F. B. I. iv. 567. *C. Wallichiana* Walp. ; Wt. Ic. t. 1480.

W. Gháts, in all Districts, at 2,000–4,000 ft., especially at the edges of clearings.

A small tree or large shrub reaching 25 ft. high, the flowers purple, the small drupes black. Bark brown, rough; wood pale brown, smooth, moderately hard, used for carving and the legs of, cots. Vern. *Tam*. Vettilai patta; *Mal*. Thin perivelam.

7. *Tectona*, Linn. f.

Trees, stellately tomentose. *Leaves* large, opposite or whorled, entire, petioled. *Flowers* numerous, in dichotomous cymes in large terminal panicles; bracts small, narrow. *Calyx* campanulate, shortly 5–6-lobed, enlarged and bladder-like in fruit. *Corolla* small, white; tube short; limb with 5–6 short subequal spreading imbricate lobes. *Stamens* 5–6, inserted near the base of the corolla, equal, exserted; anthers ovate or oblong with distinct parallel cells. *Ovary* fleshy, 4-celled, each cell 1-ovuled; style linear; stigma shortly bifid. *Fruit* a drupe enclosed in the enlarged calyx; exocarp spongy or nearly dry; endocarp bony thick, 4-celled. *Seeds* erect, oblong; testa membranous; albumen 0; cotyledons fleshy and oily; radicle short.

*TECTONA GRANDIS*, Linn. f.; F. B. I. iv. 570; Roxb. Cor. Pl. t. 6; Bedd. Fl. t. 250; Brand. For. Fl. t. 44.

N. Circars, forests on both sides of the Godavari; Deccan and Carnatic in Hill forests in all forest Districts, but in scattered localities; W. Gháts, in all Districts, but most especially in the Wynaad, the Anamalais and in dry forests at low levels in Cochin and Travancore. It has been much planted, the most notable plantation being that of Nilambur in Malabar. Teak.

A very large deciduous tree with quadrangular stems,

covered, like the inflorescence and under-surface of the leaves, with tawny stellate tomentum. The leaves are very large as are the flower panicles. Bark light brown or grey; wood moderately hard, golden yellow, darkening on exposure, very valuable and in great demand as the principal timber of India, both for local use and for export. Vern. *Hind.* Sagun; *Ur.* Singuru; *Tel.* Teku; *Tam.* and *Mal.* Thekku; *Can.* Tadi.

### 8. Premna, Linn.

Trees or shrubs, sometimes climbing, rarely herbaceous under-shrubs. *Leaves* opposite or sometimes whorled, entire or toothed. *Flowers* in corymbose paniced or thyrsoïd terminal cymes; bracts small, narrow, bracteoles 0. *Calyx* small, campanulate, truncate 2-lipped or shortly 2-5-lobed, somewhat enlarged in fruit. *Corolla* small; tube short, often villous within; limb 2-lipped, 5- or subsequently 4-lobed. *Stamens* 4, didynamous, inserted below the throat of the corolla-tube, rarely exserted; anthers ovate or rounded, the cells parallel or divergent. *Ovary* 2- or 4-celled, 4-ovuled; style linear; stigma shortly bifid. *Fruit* a small drupe, seated on the calyx, globose or obovoid, mesocarp thin, fleshy, endocarp of 1 pyrene, rugose or verrucose, often with a central cavity. *Seeds* oblong, testa thin, albumen 0, cotyledons flat.

#### Climbing shrubs :—

Leaves coriaceous, glabrous, ovate or ovate-oblong, abruptly cuspidate-acuminate at apex, rounded or cordate at base, entire or shortly serrate, prominently 4-7-nerved, the nerves and reticulations raised beneath, up to 8 in. long, 4 in. broad; corymbs large and spreading, often 8 in. in diam.; calyx truncate, scarcely lipped

1. *coriacea*.

#### Leaves membranous :—

Leaves densely softly villous beneath, puberulous above, ovate, acute or shortly acuminate at apex, truncate or cordate at base, entire, 6-8-nerved, the nerves slightly raised beneath, up to 7 in. long, 4.5 in. broad; corymbs up to 4 in. in diam.; calyx truncate or very slightly waved.....2. *villosa*.

Leaves merely villous along the nerves beneath, otherwise glabrous, ovate-oblong, abruptly acuminate, rounded at base,

entire, about 3-5-nerved, up to (when young) scarcely 4 in. long ;  
corymbs about 2 in. in diam. ....3. *paucinervis*.

Erect trees or shrubs :—

Cymes in panicles :—

Calyx deeply 2-lipped, enlarged and prominent in fruit, the upper lip sometimes minutely 3-lobed ; panicles small, under 1 in. broad, dense ; leaves ovate, acuminate, truncate or subcordate at base, nearly glabrous, entire, 4-nerved, up to 4 in. long, 2 in. broad, petiole .5-1 in. long ; drupe obovoid .....4. *corymbosa*.  
Calyx shortly 5-lobed, somewhat enlarged and widened in fruit ; panicles pyramidal, up to 4 in. broad ; leaves ovate, acuminate, obtuse or cordate at base, densely (like the branches and inflorescence) tawny-yellow stellately tomentose, up to 8 in. long, 5 in. broad, petiole 1-2 in. long ; drupe subglobose ..5. *tomentosa*.

Cymes in corymbs :—

Corymbs terminal to main branches only, broad ; calyx obscurely 2-lipped, one lip 2-lobed, the other 3-lobed or subentire, in fruit saucer-shaped :—

Leaves oblong-elliptic or oblanceolate, abruptly acuminate at apex, somewhat rounded at base, glabrous, entire or slightly serrate, 5-8-nerved, the nerves looped and, with the transverse nervules, prominent beneath, up to 9 in. long, 4.5 in. broad, petiole .6 in. ; drupe globose .....6. *glaberrima*.  
Leaves ovate, acuminate, rounded at base, pubescent (especially beneath) and gland-dotted, entire or undulate, 6-8-nerved and with subparallel transverse nervules, up to 8 in. long, 4.5 in. broad, petiole 1-4 in. ; drupe globose ....7. *flavescens*.  
Leaves broadly elliptic-ovate, obtuse at apex with a very short point, rounded at base, glabrous or slightly villous beneath, entire or dentate towards the apex, 4-5-nerved, up to 4 in. long, 2.5 in. broad, petiole about .5 in. ; drupe globose or obovoid .....8. *serratifolia*.

Corymbs terminal to side branchlets as well as main branches, small ; calyx 2-lipped, the upper lip 2-, the lower 3-lobed ; leaves ovate, shortly acuminate at apex, obtuse and then cuneate at base, glabrous or pubescent, entire, about 4-nerved, up to 3 in. long, 2 in. broad, petiole .5-1.5 in. ; drupe globose ..9. *latifolia*.  
Corymbs lateral on old wood or sometimes terminal on side branchlets ; calyx campanulate but very shallow in fruit ; leaves ovate-lanceolate, acuminate, cordate or truncate at base, serrate, up to 3.5 in. long, 1.5 in. broad ; drupe obovoid

10. *procumbens*.

Cymes in thyrsoid panicles, terminal; calyx obscurely 2-lipped, upper lip 2-, lower 3-lobed; leaves ovate, acuminate, obtuse at base, entire or serrate in the upper half, glabrous or slightly pubescent, 4-5-nerved, up to 3·5 in. long, 2 in. broad, petiole slender, ·5-1 in. long, grooved; drupe obovoid, verrucose-tubercular

11. *Wightiana*.

Small herbaceous plant from a woody rootstock, the flowers in small corymbs; calyx obscurely 2-lipped, the upper lip 2-, the lower 3-lobed; leaves sessile obovate, coarsely crenate or serrate in the upper half, pubescent on the nerves, up to 4·5 or more in. long, 3 in. broad; drupe globose.....12. *herbacea*.

## 1. PREMNA CORIACEA, C. B. Clarke; F. B. I. iv. 573.

W. Gháts, from Mysore and Canara to Cochin and Travancore, at low levels, up to 3,000 ft.

A large climber with pale brown bark with corky lenticels, the corymbs purplish, the flowers white. The petioles have a cup-shaped scar at their base.

## 2. PREMNA VILLOSA, C. B. Clarke; F. B. I. iv. 573.

Deccan, Sandúr Hills of Bellary, at 2,000 ft. (Brougham, Gamble); W. Gháts, Coorg and Wynaad, at 3,000 ft. (G. Thomson, Beddome).

A large climber with pale brown smooth bark, white flowers and hairy leaves with long petioles.

3. PREMNA PAUCINERVIS, Gamble, *n. comb.* *P. purpurascens*, Thw., var. *paucinervis*, C. B. Clarke; F. B. I. iv. 574.

W. Gháts, Anamalais at 3,000 ft. (Beddome).

A gigantic climber and epiphyte (Beddome), the flowers supposed to be red. A very little known species.

4. PREMNA CORYMBOSA, Rottl. & Willd.; F. B. I. iv. 573. *P. cordifolia*, Wt. Ic. t. 1483, *not of* Roxb.

Deccan, forests about Kodúr in Cuddapah; Carnatic, Nellore, Chingleput and Madras to the Javadis, in hedges and among bushes.

A shrub from 3 to 6 ft. high with slender branches and yellowish flowers. Vern. *Tel.* Pomanti, Pedda narva.

## 5. PREMNA TOMENTOSA, Willd.; F. B. I. iv. 576; Wt. Ic. t. 1468; Bedd. Fl. t. 251.

N. Circars, Deccan and Carnatic down to S. Travancore in deciduous forest, up to about 4,000 ft., common.

A moderate-sized deciduous tree with greenish-yellow

flowers. Bark light greyish-brown; wood light brown smooth and close-grained, of good quality but little used.

Vern. *Tel.* Nagal, Narvu; *Tam.* Kolakatta; *Kan.* Ije.

6. *PREMNA GLABERRIMA*, Wt. Ic. t. 1484; F. B. I. iv. 577 (by error *integerrima*).

W. Gháts, hills of Tinnevely (Wight).

A shrub, 6-8 ft. high, quite glabrous and with characteristic distantly nerved leaves, the branchlets pale brown.

7. *PREMNA FLAVESCENS*, Ham.; F. B. I. iv. 578.

N. Circars, Rampa Hills of Godavari (V. Narayanswami).

A large tree with large soft leaves and large spreading corymbs of whitish flowers.

8. *PREMNA SERRATIFOLIA*, Linn. *P. integrifolia*, Linn.; F. B. I. iv. 574; Wt. Ic. t. 1469.

Plains of S. Carnatic, near the coast.

A small tree or shrub with the trunk and older branches with opposite spines, the greenish-yellow flowers unpleasantly scented. Bark thin, pale; wood light brown, scented. Vern. *Tam.* Pay minnay.

9. *PREMNA LATIFOLIA*, Roxb.; F. B. I. iv. 577; Wt. Ic. t. 869.

N. Circars and Carnatic to Tinnevely, near the coast, in dry forest areas.

A small tree reaching 25 ft. in height, the leaves usually drying blue or black, the flowers greenish-white. Vern. *Tel.* Pedda nella kura.

Var. *mollissima*, C. B. Clarke. Leaves softly pubescent beneath usually smaller as are the corymbs.

Deccan, in deciduous forest.

Var. *viburnoides*, C. B. Clarke. Leaves ovate, rhomboid at base, glabrate, drying green.

Carnatic, Madras and S. Arcot to Tinnevely; W. Coast at Cochin.

10. *PREMNA PROCUMBENS*, Moon; F. B. I. iv. 580.

Tinnevely, at Mundanthorai, 675 ft. (Fischer).

A small undershrub with yellowish terete branches and flowers in small usually lateral corymbs.

11. *PREMNA WIGHTIANA*, Schauer; F. B. I. iv. 578. *P. thyrsoidea*, Wt. Ic. t. 1485; F. B. I. iv. 579.

W. Gháts, Pulneys and hills of Tinnevely and Travancore, at low levels.

A small tree or large shrub with yellowish-brown branches and white flowers very long-hairy in the throat. Vern. Tam. Pinja.

12. PREMNA HERBACEA, Roxb.; F. B. I. iv. 581.

N. Circars, forests of Ganjam (Barber), hills of Vizagapatam at 2,500 ft. (A. W. Lushington); W. Ghâts, Mudumalai in S. E. Wynaad (Beddome), usually on clay in open ground, especially where fires have been.

A small plant, a few inches high only, with the leaves pressed close to the ground, the flowers small and white.

9. Gmelina, Linn.

Trees or shrubs, unarmed or armed with axillary divaricate spines (abortive branchlets). Leaves opposite, entire toothed or lobed. Flowers large, yellow or brownish-yellow, often tomentose, in dense or lax sessile or pedunculate racemes along the branches of a terminal panicle; bracts usually small, sometimes large and leafy. Calyx campanulate, shortly 4-5-lobed or subentire, persistent. Corolla obliquely campanulate or funnel-shaped; limb oblique spreading 4-5-lobed. Stamens 4, didynamous, inserted below the throat, included; anthers pendulous, with oblong subseparate cells. Ovary 4-celled, the cells 1-ovuled; style slender; stigma shortly bifid. Fruit a succulent drupe. the endocarp bony, 2-4-celled, usually with a conical hollow in the middle open on one side. Seeds oblong; testa thin; albumen 0; cotyledons fleshy.

An unarmed tree; leaves large, deltoid-ovate, acuminate, cordate and then slightly decurrent at base, fulvous-tomentose beneath, up to 9 in. long, 8 in. broad, long-petioled; calyx-lobes 5; corolla brownish-yellow densely pubescent without, tube stout . . . 1. *arborea*. Shrub, often spinous from divaricate abortive branchlets; leaves small, ovate, often irregularly lobed, glabrous but glaucescent beneath with minute round glands, up to 1.5 in. long, 1 in. broad, short-petioled; calyx-lobes 4; tube with large glands; corolla bright yellow, pubescent without, tube slender. . . . . 2. *asiatica*.

1. GMELINA ARBorea, Roxb. Cor. Pl. t. 246; F. B. I. iv. 581; Wt. Ic. t. 1470; Bedd. Fl. t. 253.

All Districts, in deciduous forests and up to 5,000 ft. in the hills though sporadic and not abundant; often planted in avenues and gardens.

A large or moderate-sized deciduous tree with handsome panicles of brownish-yellow flowers and a large yellow fleshy drupe. Bark smooth, white or whitish-grey; wood greyish-white, glossy, smooth and even grained, useful for planking, furniture and many other purposes and not liable to warp or contract. Vern. *Hind.* Gumhar; *Ur.* Gambari; *Tel.* Gumar tek; *Tam.* Gumadi, Umi; *Kan.* Shivani; *Mal.* Kumbil.

2. *Gmelina ASIATICA*, Linn.; F. B. I. iv. 582; Wt. III. t. 174. *G. parvifolia*, Roxb. Cor. Pl. t. 162.

N. Circars, E. Deccan and Carnatic in scrub forest, sometimes planted.

A large straggling shrub, sometimes climbing, spinescent. On poor land, it is often with very small leaves. Bark brownish-white, thin; wood hard, grey, used for fuel and fencing. Vern. *Tel.* Gumadi; *Tam.* Kumil.

*G. Hystrix*, Schult., is a thorny shrub, frequently met with in gardens, a native of Tenasserim Siam and Malaya. It has large yellow flowers and conspicuous large coloured bracts.

#### 10. *Clerodendron*, Linn.

Trees and shrubs, sometimes straggling or climbing. *Leaves* opposite, rarely verticillate, simple, entire or toothed or lobed. *Flowers* small or large, in axillary cymes or terminal panicles, often leafy below; bracts conspicuous or small; bracteoles 0 or very small. *Calyx* campanulate, rarely tubular, truncate 5-lobed or almost 5-partite, persistent, often accrescent, often coloured in fruit. *Corolla* salver-shaped or funnel-shaped; tube usually long and slender, limb more or less oblique with 5 spreading lobes. *Stamens* 4, didynamous, long-exserted; filaments filiform, involute in bud; anthers ovate or oblong, the cells parallel. *Ovary* imperfectly 4-celled, 1-ovuled; style filiform; stigma shortly bifid. *Fruit* a globose drupe, succulent or rarely dry, 4-grooved, separating into 4 pyrenes of which 1-3 sometimes suppressed; endocarp bony or crustaceous. *Seeds* oblong or pyriform, albumen 0; cotyledons fleshy.

Corolla irregularly salver-shaped, 1.5 in. long or less :—

Panicles axillary, occasionally also terminal; flowers white :—

Calyx minutely toothed, in fruit enlarged, subtruncate, at the base of the spongy drupe :—



Leaves obovate or elliptic, even orbicular, obtuse or emarginate, opposite or rarely ternate, up to 2 in. long, 1·5 in. broad

1. *inerme*.

Leaves elliptic, acute or acuminate, frequently ternate, up to 3 in. long.....*neriifolium*.

Calyx lobed about half-way down, the lobes caudate-acuminate, in fruit enlarged and rigid; leaves ovate-deltoid, sinuate or serrate, up to 3 in. long, and broad, puberulous beneath

2. *Phlomidis*.

Panicles terminal :—

Calyx subtruncate, the lobes very short; corolla blue to white; ·5–1·5 in. long, obovate to lanceolate, often coloured; leaves elliptic or oblong, acuminate, coarsely serrate, up to 12 in. long, 6 in. broad, but usually smaller.....3. *serratum*.

Calyx deeply 5-lobed, the lobes lanceolate, acute; corolla pinkish white; bracts small; leaves ovate or almost orbicular, acuminate, cordate or obtuse at base, entire denticulate or serrate, villous or tomentose, up to 10 in. long, 8 in. broad.....4. *infortunatum*.

Calyx small, with subulate lobes; panicle dense, corymbose; corolla white to purple, usually double; leaves ovate, acute, subcordate, up to 6 in. in diam.....*fragrans*.

Corolla narrowly funnel-shaped, 3 in. or more long; calyx ·5 in. long, lobes lanceolate, acute; panicle lax, terminal, much elongate; leaves narrowly lanceolate, subsessile, subentire, up to 9 in. long, 1·5 in. broad ..... 5. *Siphonanthus*.

1. CLERODENDRON INERME, Gaertn.; F. B. I. iv. 589.

Sea-coasts on both sides, in tidal forests, often planted in gardens, and so perhaps run wild inland.

A straggling shrub, with corolla-tube usually 1–1·5 in. long and a dry brown drupe. Vern. *Hind.* Batraj; *Tel.* Pisung; *Tam.* Pinchil, Sangam.

2. CLERODENDRON PHLOMIDIS, Linn. f. *C. phlomoides*, Willd.; F. B. I. iv. 590; Wt. Ic. t. 1473.

N. Circars, Deccan and Carnatic, usually in hedges and near villages.

A large often rambling shrub with hoary pubescence on the branchlets, the flowers sometimes pink, the corolla-tube ·75–1 in. long, the drupe obovoid nearly dry. Bark of the branches nearly white with brown lenticels. Frequently used in medicine. Vern. *Hind.* Urni; *Tel.* Telaki; *Tam.* Taludala.

3. *CLERODENDRON SERRATUM*, Spreng.; F. B. I. iv. 592; Wt. Ic. t. 1472.

All Forest Districts, up to 5,000 ft. in the hills, chiefly in rather damp places.

A shrub, usually herbaceous but occasionally woody, with 4-angled stems, pretty blue flowers in a long cylindrical thyrus and a 4-lobed purple drupe, the corolla-tube short. Often used in medicine. Vern. *Hind.* Barangi; *Tam.* Chiru dekku.

4. *CLERODENDRON INFORTUNATUM*, Linn.; F. B. I. iv. 594; Wt. Ic. t. 1471.

All Districts, especially the moister ones and up to 6,000 ft. in the hills; common in forest undergrowth, in mango and other topes and near villages.

A large tawny-villous shrub, occasionally a small tree up to 30 ft. high (Bourdillon) with 4-angled branches and large terminal panicles of pedunculate cymes. In the Southern Districts the leaves are cordate tomentose and entire, proceeding northwards they become less cordate, less tomentose and gradually serrate. It reproduces well by suckers. It is frequently used in medicine. The drupe is black, in an enlarged pink calyx. Vern. *Hind.* Bhánt; *Ur.* Bania; *Tel.* Bockada; *Tam.* Perugilai; *Mal.* Paragu, Vatta perivelam.

5. *CLERODENDRON SIPHONANTHUS*, R. Br.; F. B. I. iv. 595; Wt. Ill. t. 173.

Deccan and Carnatic, in grass lands and near streams; W. Coast Districts.

A tall shrub with erect hollow stems up to 6 ft. high or more, conspicuous for its very long-tubed flowers and blue drupes in a persistent red enlarged calyx. Vern. *Hind.* Barangi.

*C. nerifolium*, Wall., is a Malay coast shrub, occasionally found in cultivation and run wild. *C. fragrans*, R. Br., is a Chinese shrub with sweet-scented double flowers and bad-smelling leaves, often met with in gardens and run wild in topes and on roadsides. Some other species are also to be found in gardens, the most conspicuous of which is the climbing *C. Thomsonae*, Balf., an African plant with a white calyx and crimson corolla.

## 11. Vitex, Linn.

Trees or shrubs. *Leaves* opposite, digitately 3-7-foliolate, sometimes 1-foliolate; leaflets usually entire sometimes dentate. *Flowers* in sessile or pedunculate cymes forming terminal and axillary or wholly axillary panicles or corymbs; bracts small, often caducous. *Calyx* campanulate or tubular-funnel-shaped, truncate or shortly 5-lobed. *Corolla* small, 2-lipped; tube usually short; upper lip of 2, lower of 3 lobes, the midlobe much the longest. *Stamens* 4, didynamous, usually exserted; anther-cells at first parallel and pendulous afterwards divaricate, always attached at the tip only. *Ovary* 2-4-celled, 4-ovuled; style filiform; stigma bifid. *Fruit* a globose ovoid or obovoid drupe supported by the somewhat enlarged calyx; mesocarp fleshy; endocarp a bony pyrene, normally 4-celled and 4-seeded but often with some cells suppressed, the centre and base sometimes hollowed. *Seeds* obovate or oblong; testa rather thick; albumen 0; cotyledons fleshy.

Inflorescence terminal, with occasional additional branches in upper leaf-axils :—

Shrubs or small trees; leaves membranous, white- or grey-pubescent beneath, entire or sometimes toothed :—

Leaves 1-3-foliolate, the leaflets sessile, obovate-oblong, the middle one cuneate at base, usually subobtusate but sometimes acute at apex; panicles 1-5 in. long; calyx-teeth very short

1. *trifolia*.

Leaves 3-5-foliolate, the leaflets lanceolate, all with petiolules, the middle one long; panicles up to 12 in. long; calyx-teeth triangular ..... 2. *Negundo*.

Trees; leaves chartaceous or coriaceous, not grey-pubescent beneath :—

Leaves 3-, occasionally 5-foliolate, the leaflets sessile or subsessile, the side ones lanceolate the middle one lanceolate or oblanceolate, acuminate, all nearly glabrous above, thinly pubescent beneath, up to 6 in. long; petiole angular or winged with an auricled base; panicles with racemose branches of small grey-pubescent cymes, bracts small and caducous; corolla very small, scarcely .2 in. long; drupes small, .2 in. in diam. .... 3. *altissima*.

Leaves 3-, sometimes 4- or 5-foliolate, the leaflets sessile, ovate or elliptic, abruptly acuminate, rounded at base, broad, glabrate above, fulvous pubescent beneath, up to 9 in. long; petiole not

winged; panicles pyramidal, fulvous, with short racemose branches, bracts foliaceous, conspicuous and persistent; corolla .4-.5 in. long; drupe shining, about .4 in. in diam...4. *pubescens*.

Inflorescence axillary:—

Flowers in slender lax panicles of dichasia, often 8 in. long; leaves submembranous, 3-foliolate, the leaflets petioluled, elliptic or lanceolate, acuminate, nearly glabrous, but yellow-gland-dotted beneath, entire or (when young) coarsely serrate, petiole in young trees frequently winged; corolla .3 in. long, puberulous and glandular; drupe obovoid about .3-.4 in. long.....5. *peduncularis*. Flowers in divaricate corymbose dichasia about 4 in. long; leaves coriaceous, 3-5-foliolate, the leaflets long-petioluled, elliptic or lanceolate, obtuse or acuminate, glabrous except along the midrib beneath, entire or sometimes shortly dentate near the tip, petiole not winged; corolla with large lower lip, long-villous on the palate; drupe ellipsoid, .75 in. long, succulent, the pyrene with large basal cavity and usually 1-seeded.....6. *Leucoxylon*.

1. *VITEX TRIFOLIA*, Linn. f.; F. B. I. iv. 583.

Coast Districts, especially the West in S. Canara and Malabar.

A shrub, rarely more, sometimes quite small, the flowers pale purple, the leaves often with only 1 leaflet which may then be ovate or orbicular, up to 2 in. long, 1.5 in. broad.

Vern. *Tam.* Nir nocchi; *Tel.* Vavili.

2. *VITEX NEGUNDO*, Linn.; F. B. I. iv. 583; Wt. Ic. t. 519.

All Districts, in the dry region, up to 5,000 ft. in the hills, on waste lands round villages, on roadsides and the banks of streams, common.

A large shrub, rarely a small tree, with bluish-purple flowers and narrow long-acuminate leaflets. Bark thin, grey; wood greyish-white, hard. The plant is used in medicine. Vern. *Hind.* Nisinda, Shambalu; *Ur.* Beyguna; *Tel.* Vavili; *Tam.*, *Mal.* Nocchi.

3. *VITEX ALTISSIMA*, Linn. f.; F. B. I. iv. 584; Wt. Ic. t. 1466; Bedd. Fl. t. 252. *V. alata*, Heyne; F. B. I. iv. 584.

All Forest Districts, in deciduous and dry forests of the Deccan and Carnatic, also on W. coast, sometimes but scarce in evergreen forests, up to 4,000 ft. in hilly country. A large and lofty tree with white flowers tinged with blue or violet. Bark yellowish-grey; wood grey to yellowish-

brown, hard and close-grained, valuable for building, furniture, carts, etc. The winged petioles are most conspicuous in young plants and coppice shoots. Vern. *Tel.* Nemili adaga; *Tam.* Maila; *Kan.* Myrole; *Mal.* Mayilai.

4. *VITEX PUBESCENS*, Vahl; F. B. I. iv. 585. *V. arborea*, Roxb.; Wt. Ic. t. 1465.

N. Circars, in deciduous forest, common; Deccan and Carnatic to S. Travancore, less so, up to 3,000 ft. in hilly country, often on the banks of streams.

A large tree with 4-angled branchlets and blue or purple flowers. Bark greyish; wood reddish- or olive-brown, very hard, close-grained, durable and useful for building and other purposes. Vern. *Ur.* Dhalasingha; *Tel.* Nowli eragu; *Tam.* Myladi; *Mal.* Atta mayila.

5. *VITEX PEDUNCULARIS*, Wall.; F. B. I. iv. 587.

N. Circars in deciduous forest, in the hills up to 3,000 ft., usually near streams, fairly common in Ganjam with Sál. A small or moderate-sized tree, the flowers white with a yellow palate. Bark thick; wood reddish-grey, hard and close-grained.

6. *VITEX LEUCOXYLON*, Linn. f.; F. B. I. iv. 587. *Wallrothia Leucoxylon*, Roxb.; Wt. Ic. t. 1467.

All Forest Districts at low levels, on the banks of streams.

A deciduous tree with spreading head and white rather large flowers with purple hairs on the long palate, the drupe large and dark purple. Bark grey, smooth; wood light greyish-brown, moderately hard and useful for furniture and carts. Vern. *Tel.* Luki; *Tam.* Nir nocchi; *Kan.* Sengeni; *Mal.* Atta nocchi.

## 12. Symphorema.

Rambling or climbing shrubs. *Leaves* opposite, entire or toothed. *Flowers* in pedunculate, capitate, usually 7-flowered cymes, with an involucre of 6 oblong or obovate foliaceous bracts accrescent in fruit. *Calyx* obovoid, 4-8-lobed, somewhat accrescent in fruit. *Corolla* with cylindric tube, the limb with 6-16 or more subequal narrowly oblong lobes. *Stamens* as many as the corolla-lobes, exserted; anthers ovate with parallel cells. *Ovary*

2- or imperfectly 4-celled, 4-ovuled, the ovules pendulous. *Fruit* nearly dry, included in the calyx, 1-seeded. *Seed* erect; cotyledons fleshy, concave, enclosing a cavity.

*Corolla* (tube and lobes) .25 in. long, lobes 6-8; bracts in flower .25-.75 in. long, in fruit 1-1.25 in., spatulate, papery, thinly pubescent; leaves ovate or elliptic, subacute, crenate-dentate, stellate-pubescent beneath, up to 6 in. long, 4 in. broad....1. *involutratum*.

*Corolla* (tubes and lobes) .5-.75 in. long, lobes 12-16 or more; bracts in flower 1 in. long, in fruit 1.5 in., obovate, soft, tomentose; leaves ovate or suborbicular, acute, crenate-dentate, stellate-tomentose on both surfaces, up to 6 in. long, 4 in. broad .....2. *polyandrum*.

1. SYMPHOREMA INVOLUCRATUM, Roxb. Cor. Pl. t. 186; F. B. I. iv. 599; Wt. Ic. t. 362.

N. Circars, Deccan and E. slopes of W. Gháts.

A deciduous climbing shrub with white flowers.

2. SYMPHOREMA POLYANDRUM, Wt. Ic. t. 363; F. B. I. iv. 599.

Deccan, Nallamalai Hills of Cuddapah and Kurnool (Beddome, Gamble); Kanbakam Hill in Chingleput (Hb. Madr.).

A climbing shrub with densely fulvous-tomentose branches and young leaves, the flowers white.

### 13. *Sphenodesme*, Jack.

Climbing shrubs. *Leaves* opposite, entire, shortly petioled. *Flowers* in capitate 3- or about 7-flowered cymes in an involucre of 6 foliaceous bracts, the cymes in pairs on the branches of large terminal or axillary thyrsoid panicles, leaves at the panicle nodes small and bract-like. *Calyx* ovoid or campanulate, lobes 4-5 short. *Corolla* funnel or salver-shaped, lobes 4-6, oblong or lanceolate. *Stamens* as many as the corolla-lobes, inserted on the corolla-tube, included or exserted; anthers small, ovate or reniform, the cells parallel or divergent. *Ovary* 2-celled, the cells 2-ovuled, the ovules pendulous from an axile placenta; style filiform; stigma 2-lobed. *Fruit* a globose or obovoid drupe, included in the calyx, 1-seeded. *Seed* globose, included in the calyx; cotyledons fleshy.

SPHENODESME PANICULATA, C. B. Clarke; F. B. I. iv. 600.

W. Gháts, evergreen forests of Cochin and Travancore; Coorg (Rottler); Shevaroy Hills (Perrottet).

A large climber, the branches and inflorescence covered with a golden-brown tomentum, the leaves ovate or elliptic, acute, up to about 5 in. long, 3 in. broad, the main nerves 4-5 pairs. Bracts spatulate, obtuse or emarginate in fruit.

#### 14. *Avicennia*, Linn.

Shrubs or small trees with long creeping roots which give out at intervals narrow conical leafless suckers (pneumatophores). *Leaves* opposite, coriaceous, entire. *Flowers* small, yellow, sessile in capitate peduncled heads of close cymes, sometimes forming terminal trichotomous panicles; bracts small. *Calyx* short, 5-partite; lobes ovate, concave, imbricate. *Corolla*-tube short, cylindric; lobes 4, subequal, or the posterior slightly the larger. *Stamens* 4, adnate to the corolla-throat; filaments short; anther-cells ellipsoid, parallel. *Ovary* imperfectly 4-celled, the central axis 4-winged; ovules 4, pendulous between the axial wings; style tapering; stigma bifid. *Fruit* a compressed capsule, dehiscing by 2 leathery valves. *Seed* solitary, erect; albumen 0; cotyledons large, longitudinally plicate; radicle villous; seed often germinating on the plant.

Leaves obtuse at apex, elliptic-oblong or obovate, attenuate at base, glabrous and shining above, minutely and closely brownish-pubescent beneath, up to 4 in. long, 2 in. broad; anthers exserted; style elongate, tapering; capsule ovoid, 1-1.5 in. long . . . . . 1. *officinalis*.  
Leaves acute at apex; anthers included; style very short, conical:—

Leaves ovate or lanceolate, cuneate at base, glabrous and shining above, minutely and closely tawny-pubescent beneath, up to 3 in. long, 1.5 in. broad; capsule ovoid, about .75-1 in. long

2. *marina*.

Leaves lanceolate, very acute or acuminate, alternate and decurrent at base, glabrous and shining above, closely whitish-pubescent beneath, up to 4.5 in. long, 1.5 in. broad; capsule when young conical and beaked, when old ovoid, .75 in. long . . . . . 3. *alba*.

1. *AVICENNIA OFFICINALIS*, Linn.; F. B. I. iv. 604. *A. tomentosa*, Jacq.; Wt. Ic. t. 1481.

W. Coast, in S. Canara, Malabar, Cochin and Travancore, along the coast, in creeks and tidal marshes, E. Coast, in the Godavari Delta (Homfray, Foulkes); White Mangrove.

A small tree. Bark greyish-brown, thin; wood brown or grey, hard, of peculiar structure and used only for fuel when other and better kinds are not available. Vern. *Tel.* Mada; *Tam.* Upattha; *Mal.* Orei.

2. *AVICENNIA MARINA*, Vierh. in Denkschr. Akad. Wien, lxxi, 435. *Sceura marina*, Forsk. Fl. Æg.-Ar. Cent. i. 37.

E. Coast, from the Kistna southwards, along the coast in tidal waters and salt swamps.

A large shrub, the wood of similar peculiar structure and used for fuel. Vern. *Tel.* Mada; *Tam.* Venkandan.

3. *AVICENNIA ALBA*, BC.; Wt. Ic. t. 1482. *A. officinalis*, var. *alba*, C. B. Clarke; F. B. I. iv. 604.

E. Coast, delta of the Kistna river (A. W. Lushington, Foulkes). Tummalapenta in Nellore (Fischer).

A shrub, apparently scarce. Vern. *Tel.* Gundu Mada.

*Verbena venosa*, Gill and Hook., and *V. bonariensis*, Linn., are S. American plants with purple flowers, cultivated sometimes in gardens and sometimes found run wild, especially in Nilgiris. The garden *Verbenas* of various colours are believed to be hybrids of the S. American *V. chamædrifolia*, Jun.

*Duranta Plumieri*, Jacq., is a pretty blue-flowered shrub of the W. Indies commonly found in gardens in the plains.

*Petrea volubilis*, Linn., is a beautiful climbing shrub of tropical America with pendulous racemes of violet flowers in a large purplish persistent calyx, commonly grown in gardens.

*Congea tomentosa*, Roxb., var. *azurea*, is another beautiful climbing shrub of Burma and Siam, conspicuous by its large pink or lilac bracts.

*Holmskioldia sanguinea*, Retz, is a straggling shrub of N. India with a large scarlet calyx and corolla often found in Madras Gardens.

### Family CXV. LABIATAE.

Herbs or undershrubs rarely shrubs, usually with aromatic oil-glands; branches opposite or verticillate, usually 4-angled. Leaves opposite or whorled, simple or rarely pinnatisect; stipules 0. Flowers hermaphrodite, more or less zygomorphic, solitary or in pairs or fascicled and axillary, or in centrifugal cymes which by union in pairs form false whorls; bracts and bracteoles



usually small. *Calyx* inferior, persistent, more or less tubular, 4-5-lobed, the lobes often forming 2 lips. *Corolla* hypogynous, tubular at base, the limb 4-5-lobed or 2-lipped, the lobes imbricate in bud. *Stamens* inserted in the corolla-tube, 4 didynamous or only 2 perfect; anther-cells connate separate or confluent, dehiscing longitudinally. *Disk* prominent. *Ovary* deeply 4-lobed; ovules solitary anatropous in each lobe; style simple, from the centre of the ovary between the lobes, slender, 2-fid, sometimes unequally. *Fruit* of 4 dry (rarely fleshy) 1-seeded nutlets, sometimes 1 or more suppressed, scarred at the base. *Seed* small, erect; albumen scanty or 0; radicle inferior.

Ovary 4-partite; nutlets with small scar, basilar or slightly oblique:—

Nutlets dry:—

Stamens 4, all perfect and declinate; anther-cells at length confluent:—

Attachment of nutlets basilar:—

Lower lip of corolla declinate, flat or slightly concave, generally narrower, but hardly longer than the 3-4-lobed upper lip:—

Calyx deflexed in fruit; upper lobe widest, large, ovate, recurved, the margins decurrent on the tube:—

Corolla-tube short; lower lip flat; stigma 2-fid

#### 1. *Ocimum*.

Corolla-tube usually long, lower lip concave; stigma entire .....

#### 2. *Orthosiphon*.

Calyx suberect or declinate in fruit; upper lobe widest, the margins not decurrent on the tube:—

Whorls crowded in globose or ovoid heads; calyx suberect .....

#### 3. *Acrocephalus*.

Whorls racemose or spicate; calyx usually declinate:—

Racemes simple:—

Bracts conspicuous; lower lip of calyx not inflexed

#### 4. *Geniosporum*.

Bracts small; lower lip of calyx inflexed

#### 5. *Platystoma*.

Racemes paniculate .....

#### 6. *Moschosma*.

Lower lip of corolla deflexed, concave boat-shaped or saccate, much longer than the upper lip:—

Upper lip of corolla very short, obtusely 3-4-toothed, lower lip elongate, boat-shaped:—

Calyx equally 5-toothed or somewhat 2-lipped, the  
DDDD

upper 3-, the lower 2-toothed, or with upper lip large rounded reflexed, the others narrow, subulate :—

Filaments free .....7. **Plectranthus.**

Filaments connate in a sheath at their bases, round the style .....8. **Coleus.**

Calyx very oblique, 2-lipped, the upper lip large entire and nearly or quite closing the mouth, the lower truncate, obscurely 4-toothed; or calyx 1-lipped, 5-toothed, not quite closing the mouth....9. **Anisochilus.**

Corolla obscurely 2-lipped, the 2 upper lobes flat, the lower lip deflexed, saccate; calyx-teeth subequal

10. **Hyptis.**

Attachment of nutlets slightly oblique to the outer side; calyx-lobes subequal; corolla 2-lipped; stamens included in the tube .....11. **Lavandula.**

Stamens erect or spreading or ascending :—

Stamens 4 perfect :—

Corolla-lobes 4; stamens equal or subequal :—

Calyx 5-toothed; stamens exserted :—

Corolla-lobes unequal; whorls in glomerate or paniculate or solitary interrupted spikes; filaments bearded or naked .....12. **Pogostemon.**

Corolla-lobes equal; whorls in slender continuous spikes; filaments bearded.....13. **Dysophylla.**

Calyx 5-partite, the lobes plumose; filaments naked, included.....14. **Colebrookea.**

Corolla lobes 5, 2-lipped; stamens didynamous :—

Anterior pair of stamens the longer :—

Calyx 13-nerved; anthers 2-celled, the cells short :—

Calyx equally 5-toothed .....15. **Micromeria.**

Calyx distinctly 2-lipped.....16. **Calamintha.**

Calyx 5–10-nerved; anthers 2-celled, the cells linear :—

Upper lip of corolla short, nearly flat; stamens exserted, the cells of the upper pair dimidiate, of the lower transverse .....17. **Anisomeles.**

Upper lip of corolla hooded :—

Upper lip of corolla not woolly :—

Calyx 2-lipped with a broad plate or pouch at the back, the mouth closed after flowering

18. **Scutellaria.**

Calyx tubular, upper lip 3-, lower 2-toothed

19. **Brunella.**

Upper lip of corolla densely woolly :—

Calyx 5-toothed, the teeth spinescent ; stamens more or less exserted ; anther-cells parallel

20. **Leonurus.**

Calyx 6–10-toothed ; stamens included ; anther-cells divergent :—

Lower lip of corolla longer than the hood

21. **Leucas.**

Lower lip of corolla shorter than the hood

22. **Leonotis.**

Posterior pair of stamens the longer ; calyx tubular, 15-ribbed, 5-toothed ; stamens not exserted ..... **Nepeta.**

Stamens 2, anterior pair only perfect ; anther-cells linear, separated by an elongated connective or one cell abortive ; calyx 2-lipped :—

Corolla 4-lobed ; anthers 2-celled, the cells pendulous from a long connective ..... **Meriandra.**

Corolla 2-lipped, the upper lip entire or emarginate, concave, the lower spreading, 3-fid ; anther-cells very unequal or solitary, on a long transverse connective ..... 23. **Salvia.**

Nutlets succulent ; corolla 2-lipped, the upper lip hooded ; anther-cells parallel, the anterior pair of stamens the longer

24. **Gomphostemma.**

Ovary 4-lobed ; nutlets with a large oblique or lateral scar on the inner side ; stamens 4 perfect, erect, exserted from the fissure of the upper lip :—

Corolla apparently 1-lipped, the 2 small upper lobes and the lateral pair springing from the contracted base of the large lower lobe

25. **Teucrium.**

Corolla distinctly 2-lipped, the upper lip short, 2-lobed, notched, the lateral pair of lobes very small, springing from the sides of the large lower lobe ..... 26. **Ajuga.**

### 1. **Ocimum, Linn.**

Herbs, undershrubs or shrubs, strongly aromatic from oil-glands. *Leaves* opposite or whorled, usually toothed, petioled ; floral leaves small, bract-like, usually caducous. *Flowers* small, in whorls of 6–10 on the axis of elongate spikes or racemes which are sometimes paniced ; pedicels with recurved tips ; bracts small, caducous. *Calyx* ovoid or campanulate, deflexed in fruit and then usually enlarged and hardened, 2-lipped ;

upper lip broad, flat, decurrent, lower lip with 4 mucronate teeth, the 2 middle ones usually the longest. *Corolla* 2-lipped; tube short, not annulate within; upper lip subequally 4-lobed. Lower lip hardly longer than the upper, declinate, entire. *Stamens* 4 didynamous, declinate, exserted; filaments free or the lower connate below, the upper often with a tooth or hairy below; anthers 1-celled, later on flattened out. *Disk* entire or 3-4-lobed. *Ovary* 4-partite; style slender, bifid at apex. *Fruit* of 4 dry, smooth or subrugose, nutlets, often mucilaginous when wetted.

Shrubs; leaves membranous, ovate, acute, cuneate and decurrent at base, coarsely crenate-serrate, nearly glabrous except on the nerves, long-petioled, up to 4 in. long, 2 in. broad; racemes often 6 in. long, the whorls close and about .3 in. apart; upper calyx-lip longer than the lower, rounded and curved upwards in fruit, teeth of the lower short; nutlets large, not mucilaginous when wetted. .1. *gratissimum*. Herbs or slightly woody undershrubs:—

Racemes elongate, the whorls close; two lower teeth of the calyx longest:—

Fruiting calyx large, hairy or glabrous, the upper lip often .25 in. in diam. and saucer-shaped; racemes long and closely whorled, or shorter and much panicled, the floral leaves conspicuous till they fall; leaves variable, ovate or lanceolate, acute, cuneate at base, entire or dentate, usually glabrous, up to 3 in. long, 1.5 in. broad, but usually smaller; nutlets large, pitted, very mucilaginous when wetted ..... 2. *basilicum*.

Fruiting calyx small, villous and pilose without, the upper lip recurved often to nearly erect, middle teeth of lower lip long and curved:—

Fruiting calyx villous within, the pedicel shorter and erect except at tip; leaves elliptic-lanceolate, entire or slightly serrate, long-petioled, pubescent, up to 1.5 in. long, .5 in. broad; nutlets small, pitted, mucilaginous when wetted

3. *canum*.

Fruiting calyx glabrous within, the pedicel as long or longer, spreading; leaves elliptic-oblong, obtuse or acute, entire serrate or dentate, pubescent, petioled, up to 2 in. long, 1 in. broad; nutlets small, nearly smooth, not mucilaginous when wetted

4. *sanctum*.

Racemes lax, the whorls distant, often .5–1 in.; fruiting calyx papery, the upper lip obovate, mucronate, the lower as long, the

two lower teeth long, the side ones very short, bimucronate, all nearly glabrous within and without; leaves ovate, obtuse, entire or repand, cuneate at base, up to 1 in. long, .75 in. broad; nutlets orbicular, compressed, mucilaginous when wetted. . . . 5. *adscendens*.

1. *OCIMUM GRATISSIMUM*, Linn.; F. B. I. iv. 608.

Deccan and Carnatic, in low country, cultivated and probably introduced only, chiefly found on waste land and near villages. Shrubby Basil.

A shrub reaching 4-6 ft. in height, much branched, the flowers pale greenish-yellow, the leaves strongly aromatic and used in medicine. Vern. *Hind.* Ram tulsi; *Tel.* Rama tulasi.

2. *OCIMUM BASILICUM*, Linn.; F. B. I. iv. 608.

Carnatic, cultivated. Sweet Basil.

A large herbaceous plant with large leaves and long close racemes of white or pale purple whorled flowers. Vern. *Hind.* Babui tulsi, Kali tulsi.

Var. *thyrsiflorum*, Benth.; Wt. Ic. t. 868.

Deccan, probably cultivated only.

A stout, nearly glabrous, herbaceous plant with the racemes short and collected in terminal thyrsoïd panicles, the flowers pink.

Var. *purpurascens*, Benth.

Carnatic, introduced.

A slender herb with nearly single racemes, narrow lanceolate leaves and a generally purple colour.

Var. *pilosum*, Benth.

Deccan and Carnatic, cultivated and run wild.

A slender hispid-pubescent herb with small leaves and narrower racemes, the fruiting calyces much smaller.

3. *OCIMUM CANUM*, Sims.; F. B. I. iv. 607.

Most plains Districts, near villages and on waste lands, probably introduced; also in Nilgiris. Hoary Basil.

An erect much-branched herb, with white, pink or purplish flowers, used in medicine. Vern. *Tel.* Kukka tulasi.

4. *OCIMUM SANCTUM*, Linn.; F. B. I. iv. 609.

All plains Districts, cultivated in pots or on pedestals at all Hindu houses and in temples and frequently found run wild. Sacred Basil.

An erect much-branched softly pubescent undershrub with red or purple small flowers. As the most sacred of plants to Hindus it is carefully looked after, and when large enough to form wood, it is made into beads for rosaries. It is also used medicinally. Vern. *Hind.* Tulsi; *Tam.*, *Tel.* Tulasi.

5. *OCIMUM ADSCENDENS*, Willd.; F. B. I. iv. 609.

N. Circars, Deccan and Carnatic from the Godavari to Tinnevely and S. Travancore, in sandy places and up to 3000 ft. in hilly country.

An annual (?) herb, erect or prostrate with ascending branches, the flowers pale rose, the fruiting calyx yellow and papery.

2. *Orthosiphon*, Benth.

Shrubs, undershrubs or herbs with a woody rootstock, the roots sometimes tuberous. *Leaves* opposite, floral leaves bract-like, usually short and reflexed, sometimes large and coloured. *Flowers* usually in whorls of 6 or less, in terminal racemes. *Calyx* ovoid campanulate or tubular, deflexed in fruit, 5-lobed, the upper lobe broad, membranous, with decurrent margins, the lateral and lower lobes distinct or shortly connate, subulate or aristate. *Corolla* 2-lipped; tube as long as or longer than the calyx, sometimes very long, often slender, straight or incurved; upper lip subequally 4-lobed, lower declinate, entire, concave. *Stamens* 4, didynamous, declinate; filaments free, without appendages at the base; anther-cells confluent. *Disk* usually gibbous. *Ovary* 4-partite; style slender, with a capitate or clavate stigma. *Fruit* of 4 dry ovoid globose or ellipsoid nutlets, usually smooth, the basal scar small.

Stamens included in the corolla-tube :—

Calyx-throat villous within; corolla-tube rather longer than the calyx; leaves ovate or elliptic, obtuse, rounded or cuneate at base, crenate, viscidly tomentose on both surfaces, up to .75 in. long, petiole to .5 in. .... 1. *diffusum*.

Calyx-throat not villous within :—

Corolla-tube about equal to the calyx; leaves ovate, obtuse or acute, cuneate and entire at base, crenate or serrate above, nearly glabrous, glandular, up to 1.5 in. long, 1 in. broad, petiole to .5 in. .... 2. *pallidum*.

Corolla-tube longer than the calyx, in all .25—.75 in. long :—

Leaf-petioles up to 2.5 in. long, leaves broadly ovate, acute obtuse or subcordate or often shortly cuneate at base, coarsely crenate or serrate, nearly glabrous, up to 3.5 in. long, 2 in. broad; corolla .25—.5 in. long, slender, pubescent without

3. *glabratus*.

Leaf-petioles only up to .75 in. long, leaves ovate, subobtuse, rounded or cordate at base, crenate, viscous-pubescent and glandular-punctate, up to 3 in. long, 2 in. broad; corolla .5—.7 in. long, puberulous without ..... 4. *viscosus*.

Lower leaves petioled, upper sessile, ovate-oblong, obtuse, long-cuneate at base, nearly glabrous and sometimes glaucous, coarsely serrate-dentate, up to 4.5 in. long, 2 in. broad; corolla .3—.5 in. long ..... 5. *rubicundus*.

Stamens exerted from the long and slender corolla-tube :—

Stamens shorter than the spreading corolla-lobes; corolla-tube 1.25 in. long, villous; fruiting calyx .5 in. long, tubular, hispid and glandular, the upper lip orbicular, the 4 lower teeth subulate, equal; leaves sessile, oblong or obovate, obtuse, crenulate, up to 2.5 in. long, 1 in. broad, rugose and tomentose, strongly nerved

6. *comosus*.

Stamens much longer than the corolla-lobes; corolla-tube .5 in. long puberulous; fruiting calyx .3 in. long, campanulate, the upper lip spreading, the 4 lower teeth aristate, the 2 lowest longest and curved; leaves petioled, ovate, acuminate, cuneate at base, coarsely toothed, up to 4 in. long, 2 in. broad, glabrous except on the nerves

7. *stamineus*.

1. *ORTHOSIPHON DIFFUSUS*, Benth.; F. B. I. iv. 613.

Deccan, hilly country of N. Arcot and Cuddapah, up to 3,000 ft., most usually in rocky places; W. Gháts, N. and E. slopes of Nilgiris and Pulneys in similar localities.

A diffuse undershrub with many branches from a stout woody rootstock, short and with short racemes in very dry places, longer and with more slender racemes and larger leaves (var. *hispidus*, Hook. f.) in better soils.

2. *ORTHOSIPHON PALLIDUS*, Royle; F. B. I. iv. 613.

N. Circars, in Godavari and Kistna; Carnatic, about Madras, in wet places near streams and in rice-fields; Nilgiris to 4,000 ft. (Clarke).

A low diffuse undershrub with many branches from a woody rootstock, the flowers white or pale lilac.

3. *ORTHOSIPHON GLABRATUS*, Benth. *O. tomentosus*. var. *glabratus*, Hook. f.; F. B. I. iv. 614.

N. Circars, in Godavari; W. Deccan, in Mysore, Bellary and Salem; hills of the Carnatic and E. slopes of the Gháts to S. Travancore, up to 3,000 ft., chiefly in dry open forests.

An erect herb, reaching about 2 ft. in height, with pale purple flowers of medium size.

Var. *parviflorus*, Benth. Corolla small and narrow, .25 in. long; leaves ovate, coarsely serrate, under 1 in. long, petioles slender, .75 in.

W. Gháts, Nilgiris to hills of Tinnevely, scarce.

4. *ORTHOSIPHON VISCOSUS*, Benth. *O. tomentosus* var. *viscosus*, Hook. f.; F. B. I. iv. 614.

Deccan, Nagar Hills of N. Arcot; W. Gháts, in all Districts at low levels, in forest glades.

An erect glandular pubescent herb with, apparently, pale purple flowers, the corolla usually large. Var. *rubiginosus* seems to differ only by being less pubescent and having rather longer petioles to the leaves.

5. *ORTHOSIPHON RUBICUNDUS*, Benth.; F. B. I. iv. 614.

N. Circars, Ganjam to Godavari, in deciduous forest undergrowth, but in somewhat open places; Deccan, in the hills of the Ceded Districts, westwards to Coimbatore; W. Gháts, N. and E. slopes of the Nilgiris up to 6,000 ft. An erect much branching herb from a stout rootstock, the root often furnished with fusiform root-tubers. The flowers may be white lilac or rose, and the racemes 6 in. long or more, usually with distant whorls of flowers.

Var. *Hohenackeri*, Hook. f. A smaller plant with many branches from a stout rootstock and with smaller leaves and flowers, the calyx-tube very hispid.

Nilgiri Hills, at about 6,000 ft. (Hohenacker, Gamble).

6. *ORTHOSIPHON COMOSUS*, Wt. ex Benth.; F. B. I. iv. 615. *O. bracteatus*, Wt. Ic. t. 1428.

W. Gháts, hills of Tinnevely and Travancore, about 2,000-3,000 ft.

A striking and handsome shrubby plant conspicuous for the comose tuft of mauve-coloured floral leaves at the ends of the racemes. The upper lip of the corolla has 2 end



and 2 side lobes, the lower is oblong. The ellipsoid nutlets are smooth and shining.

7. *ORTHOSIPHON STAMINEUS*, Benth.; F. B. I. iv. 615.

W. Gháts, Anamalai Hills, at 2,000–3,000 ft.

An erect herb with white or lilac flowers, conspicuous for the very long filiform stamens. The broad upper lip of the corolla is 4-lobed, the lower lip linear-oblong, entire; the floral leaves are small and persistent. The nutlets are ellipsoid, marked with labyrinthiform wavy lines.

3. *Acrocephalus*, Benth.

Herbs. *Leaves* small, opposite or whorled, petioled. *Flowers* very small, in dense whorls collected in terminal or axillary, globose or ovoid, heads with a pair of floral leaves and imbricate bracts. *Calyx* in flower ovoid, in fruit tubular, gibbous at base, 2-lipped, the upper lip flat, entire, the lower entire emarginate or 4-toothed, throat naked. *Corolla* small, somewhat 2-lipped, the upper lip subequally 4-lobed, the lower entire, scarcely longer. *Stamens* 4, didynamous, declinate; filaments free, filiform, not appendiculate at base; anthers 1-celled. *Disk* small. *Ovary* 4-partite; styles slender, shortly bifid at apex. *Fruit* of 4 smooth dry nutlets.

*ACROCEPHALUS INDICUS*, Briq. *A. capitatus*, Benth.; F. B. I. iv. 611.

N. Circars, forests from Ganjam to Godavari, in damp places; W. Gháts and W. Coast in damp grassy places up to 3,000 ft.

An annual erect herb, sometimes quite small, but in places reaching 2 ft. in height, the flowers pale purple, the leaves ovate or lanceolate, acute, cuneate at base to the petiole, serrate, up to 1.5 in. long, .5 in. broad, the heads .25–.75 in. long.

4. *Geniosporum*, Wall.

Herbs, erect or procumbent. *Leaves* opposite or whorled, toothed, floral leaves bract-like, often coloured. *Flowers* small, many, in whorls in long terminal lax or stiff spikes or racemes; bracts small, caducous. *Calyx* in flower ovoid, in fruit tubular, the tube constricted above, 10-nerved and often with transverse

bars; lobes 5, subbilabiate, the uppermost larger, not decurrent. *Corolla* small, 2-lipped; tube short; upper lip 4-lobed; lower lip entire, declinate. *Stamens* 4, didynamous, declinate; filaments free, often flattened, not appendiculate; anthers 1-celled, later flattened out. *Disk* swollen, gibbous. *Ovary* 4-partite; style slender, bifid at apex, the lobes usually flattened. *Fruit* of 4 dry, ovoid or oblong, smooth or slightly punctate nutlets, not or very slightly mucilaginous when wetted.

Prostrate herbs with many branches from a woody rootstock, glabrous or hispid with soft deflexed hairs; racemes slender, up to 6 in. long with many pedicelled flowers in whorls usually closely packed; fruiting calyx with the uppermost lobe ovate-reniform, mucronate, the rest triangular, the 2 lowest slightly longer, tube .075 in. with a ring of hairs within; floral leaves broadly ovate acuminate, reflexed; leaves ovate or oblong or linear, spatulate, up to 1 in. long, serrate

1. *prostratum*.

Erect herbs, usually unbranched, slightly hispid-pubescent; racemes almost spicate, up to 5 in. long, the whorls closely packed; fruiting calyx ovate, the uppermost lobe large, erect and broadly rounded, the side lobes triangular, the 2 lowest longer and narrow, tube prominently 10-nerved with transverse base, hispid; floral leaves large, reflexed, white and persistent; leaves linear-oblong, up to 2 in. long, scarcely .25 in. broad, distantly serrate.....2. *indicum*.

1. GENIOSPORUM PROSTRATUM, Benth.; F. B. I. iv. 610.

Carnatic, on sandy ground, especially near the sea, common near Madras.

A many-branched herb, very variable in pubescence, also in the shape of the leaves, which, in the prostrate more glabrous forms are small and ovate, in the more erect and hispid ones (*ocimoides*) elongate, up to 1 in. long, .4 in. broad. Flowers red.

Var. *gracile*, Thw. Nearly quite glabrous, the racemes panicled, the leaves very narrow .1 in. broad and up to 1.5 in. long, the side calyx-lobes broader, ovate like the upper one, the 2 lowest small. Coast of the Carnatic.

2. GENIOSPORUM INDICUM, Briq. *G. elongatum*, Benth.; F. B. I. iv. 610.

N. Circars, Jeypore Hills of Vizagapatam (Beddome).

A very slender plant, chiefly found in Ceylon.

5. *Platystoma*, Beauv.

Small annual herbs. *Leaves* opposite, petioled, serrate. *Flowers* minute, in many-flowered whorls in slender racemes terminal to the stem and branches with a pair of floral leaves at the base; bracts broad, caducous. *Calyx* campanulate, deflexed in fruit, 2-lipped, the upper lip ovate, not decurrent, with a tooth at each side near the base; lower lip ovate, obtuse, slightly concave. *Corolla*-tube very short, widely campanulate at the mouth; upper lip broad, 4-lobed, lower entire, scarcely longer. *Stamens* 4 declinate; filaments free; anthers 1-celled, at length flattened. *Disk* swollen, gibbous. *Ovary* 4-partite; style shortly bifid at apex. *Fruit* of 4 ovoid, smooth nutlets.

PLATYSTOMA FLACCIDUM, Benth.; F. B. I. iv. 611.

Mysore, at Sagar, 2,000 ft. (Meebold).

An erect herb up to 12 in. high with pale lilac flowers, the leaves ovate, acute, narrowed at base into the petiole, serrate, up to 1.5 in. long, .75 in. broad, nearly glabrous

6. *Moschosma*, Reichb.

Herbs. *Leaves* opposite, crenate or dentate, petioled. *Flowers* very small, in whorls of 6-10, pedicelled, in slender axillary and terminal racemes; bracts small. *Calyx* ovoid or campanulate, 2-lipped, the upper lobe or 3 upper lobes larger than the 4 or 2 lower, not decurrent, throat naked. *Corolla* 2-lipped, the upper lip 4-lobed, the lobes subequal or the 2 middle ones rather longer, the lower entire, longer than the upper. *Stamens* 4, didynamous, declinate; filaments filiform, not appendiculate; anther-cells confluent. *Disk* uniform. *Ovary* 4-partite; style 2-fid. at tip. *Fruit* of 4 compressed smooth nutlets; basal scar small.

MOSCHOSMA POLYSTACHYUM, Benth.; F. B. I. iv. 612.

Carnatic, from Nellore southwards to S. Travancore, common, more scarce inland.

A slender erect annual herb with sharply quadrangular stems, pale pink or flesh-coloured very small flowers, ovate deltoid acuminate leaves, entire at the truncate base, crenate above, and very slender racemes about 2 in. long.

7. *Plectranthus*, L'Hér.

Herbs, undershrubs or shrubs, the stems usually more or less 4-angled, sometimes succulent. *Leaves* opposite or ternate. *Flowers* usually small, in paniced or racemed 6-8-flowered cymes or whorls, with pairs of floral leaves; bracts usually small but sometimes large and caducous. *Calyx* usually 2-lipped, enlarged in fruit; lobes 5, subequal or the uppermost widest and sometimes decurrent. *Corolla* 2-lipped; tube exserted, straight or decurved, the throat equal or obliquely swollen, the upper lip short, 4-fid, recurved, the lower entire, boat-shaped, narrow or stipitate at the base. *Stamens* 4, didynamous, declinate; filaments free; anther-cells usually confluent. *Disk* usually enlarged in front. *Ovary* 4-partite; style slender, 2-fid at tip. *Fruit* of 4 orbicular ovoid or oblong nutlets, smooth or punctate.

Fruiting calyx decurved, more or less 2-lipped, the upper lip 3-, the lower 2-lobed, sometimes subequally 5-lobed; slender herbs, never succulent:—

Lips of the fruiting calyx prominent, ribs also prominent:—

Leaves narrowly linear-lanceolate, shallowly serrate in the upper half only, the lower half entire and attenuate to a short petiole, up to 3 in. long, .4 in. broad, nearly or quite glabrous; corolla short, .15 in. long, the lobes short.....1. *Walkeri*.

Leaves lanceolate, acute, strongly crenate in the upper two-thirds, the lower part entire, cuneate, the petiole long and slender, blade 2.5 in. long, nearly 1 in. wide, nearly glabrous; corolla short, .15 in. long.....2. *rivularis*.

Leaves ovate, acute, crenate-serrate almost to the base, glandular-pubescent, up to 1.75 in. long, 1 in. broad, petiole short; corolla-tube funnel-shaped, .2 in. long, the lower lip .1 in.; fruiting calyx .2 in. with scattered glands.....3. *nigrescens*.

Lips of the fruiting calyx not prominent, ribs prominent, with glands between:—

Fruiting calyx slightly curved, minutely scabrous, the teeth usually acute, .2 in. long; corolla-tube campanulate, the lower lip long, concave; leaves broadly ovate, acute, cordate or rounded at base, crenate or dentate, pubescent or glabrate, up to 5 in. long, 3 in. broad, petioled.....4. *Wightii*.

Fruiting calyx much curved, slightly scabrous, the teeth rounded, .15 in. long; corolla-tube straight, lower lip short; leaves ovate, obtuse, truncate and then slightly cuneate at base, deeply crenate-

dentate, membranous and nearly glabrous, up to 1·5 in. long and broad, petioled .....5. *Stocksii*.

Fruiting calyx gibbose at base and slightly curved, densely woolly, the short teeth rounded, ·15 in. long; corolla-tube cylindric, lobes hispid-ciliate, short and spreading; leaves broadly ovate, acute, cordate at base, crenate, thick, rugose and densely tawny-pubescent or tomentose, up to 5 in. long, 3 in. broad, the lower ones petioled, the upper sessile .....6. *nilgherriensis*.

Fruiting calyx subequally 5-lobed, small and curved, declinate; corolla-tube short, curved, upper lip reflexed, 4-lobed, lower entire, concave; leaves ovate, acute, obtuse at base but shortly cuneate and decurrent, crenate, tomentose, white beneath, up to 4 in. long, 2 in. broad .....7. *Coetsa*.

Fruiting calyx 2-lipped, the upper lip entire, the lower 4-lobed; stout plants, often succulent or fleshy:—

Fruiting calyx nearly ·5 in. long, the lower lip longer than the small round upper, the teeth incurved and aristate; corolla ·3 in. long, the lower lip obtuse; leaves broadly ovate, cordate, deeply and usually doubly crenate, pale, nearly glabrous above, puberulous beneath and villous on the nerves, up to about 6 in. in diam.

8. *incanus*.

Fruiting calyx about ·25 in. long, the upper and lower lips nearly equal:—

Inflorescence of elongate panicles of racemes with whorls of about 6 flowers on slender pedicels; corolla very small, about ·15 in. long, villous, the lower lip obtuse; leaves broadly ovate or orbicular, cordate, lobulate, the lobules crenate, about 4 in. in diam., flaccid and glabrous; petiole very long ....9. *subincisus*.  
Inflorescence paniced, of racemes about 1 in. or more long in elongate thyrsi:—

Corolla ·5 in. long, the lower lip elongate, acute, ciliate; leaves broadly ovate or orbicular-ovate, acute, cordate, glandular-pubescent, crenate, up to 4 in. in diam., fleshy; petiole long

10. *coleoides*:

Corolla ·3—5 in. long, the lower lip acute, glabrous; leaves large, broadly ovate, acuminate, rounded at base, deeply lobulate, the lobules crenate, glabrous, up to 6 in. in diam., petiole very thick, 2—3 in. long .....11. *urticifolius*.

Fruiting calyx under ·2 in. long; inflorescence paniced, of racemes about 1 in. long or more in elongate thyrsi; more or less fleshy undershrubs:—

Leaves large, broadly ovate, obtuse, cordate or rounded at base,

villous on the nerves above, densely tawny tomentose beneath, margins lobulate, the lobules often crenate, up to 10 in. in diam., petioles long; fruiting calyx thick and glandular; corolla elongate, .75 in., the lower lip acute; flowers close, in racemes 1-2 in. long ..... 12. *fruticosus*.

Leaves rather small, not over 3 in. long, petioled :—

Leaves orbicular, 1-1.5 in. in diam., obtuse, base slightly cuneate and not toothed, upper part crenate, tawny-pubescent; thyrsoid panicles up to 10 in. long, the racemes 1-1.5 in. long, the flowers close; fruiting calyx nearly .2 in. long, tawny villous; corolla .5-.75 in., the lower lip acute ..... 13. *Bourneae*.

Leaves ovate, up to 3 in. long, 2 in. broad, acute, base rounded or slightly cuneate, not toothed, upper part crenate, minutely puberulous; thyrsoid panicles up to 10 in. long, the racemes very slender, single or in pairs on a peduncle, up to 3 in. long, the flowers distant; fruiting calyx scarcely .125 in. long, villous at base; corolla .6 in. long, the lower lip subobtusely

14. *Bishopianus*.

1. *PLECTRANTHUS WALKERI*, Arn.; F. B. I. iv. 617.

W. Gháts, hills of Tinnevely at 4,000 ft., on the banks of streams.

A herb, decumbent at base, then erect, the flowers pink (Trimen), the narrow leaves very characteristic.

2. *PLECTRANTHUS RIVULARIS*, Wt.; F. B. I. iv. 617.

W. Gháts, Nilgiris and Anamalais, about 6,000 ft., in wet places; Atraimalai Hills, 3,000-4,000 ft. (Beddome).

A tall herb, with long racemes of many-flowered short cymes in distant whorls.

3. *PLECTRANTHUS NIGRESCENS*, Benth.; F. B. I. iv. 617.

W. Gháts, hills of Mysore (Talbot, Meebold); Shembaganur in Pulneys at 6,000 ft. (L. Anglade).

A slender herb with many-branched slender panicles of white flowers spotted with red, long-pedicelled in dichasioid cymes.

4. *PLECTRANTHUS WIGHTII*, Benth.; F. B. I. iv. 619; Wt. Ill. t. 194; Wt. Ic. t. 1429. *P. pulneyensis*, Hook. f.; F. B. I. iv. 617. *P. nepetaefolius*, Benth.; F. B. I. iv. 619.

W. Gháts, Nilgiris, Anamalais and Pulneys up to 8,000 ft. and chiefly at higher levels, common; Shevaroy Hills of Salem.

A tall herb with white flowers speckled with red points and large panicles of prominently small-bracted cymes. The leaves are normally cordate at base, but many Pulney specimens (chiefly *P. pulneyensis*, Hook. f.) have them straight or slightly cuneate. Fyson ('Hill. Flora,' i. 322) seems to be right in considering the three as one variable species. In the form *nepetaefolius* the corollas are usually longer and narrower and the panicles more slender.

5. *PLECTRANTHUS STOCKSII*, Hook. f.; F. B. I. iv. 618.

Bababudan Hills of Mysore, at 6,000 ft. (Heyne, *vide* 'F. B. I.,' Meebold).

A slender annual, decumbent and rooting at base, the stems thin, erect, the corollas white with purple spots.

6. *PLECTRANTHUS NILGHERRICUS*, Benth.; F. B. I. iv. 619.

W. Gháts, Nilgiris, from Wynaad upwards, 4,000–7,000 ft. A tall herb, reaching 3 ft. high or more from a large root-stock, the whole plant tawny villous and the large panicles very (especially the calyces) yellowish woolly. The corollas are apparently white with red spots and the whole plant is usually covered with red glands.

7. *PLECTRANTHUS COETSA*, Buch.-Ham. ex D. Don; F. B. I. iv. 619. *P. menthoides*, Benth.; F. B. I. iv. 620.

W. Gháts, Nilgiris and Pulneys, at 5,000–8,000 ft., edges of Shōla Forest; N. Circars, Mahendragiri Hill in Ganjam, at 4,500 ft. (Gamble).

A tall herb with more or less tomentose leaves white beneath and lavender-blue flowers.

Var. *Macraei*, Hook. f. in Herb. Kew. *P. Macraei*, Benth.; Wt. Ic. t. 1430. Leaves rounded at base, smaller, especially on the branches, softly tomentose, cymes denser and more closely-flowered, but in many cases running into the type.

W. Gháts, Nilgiris and Pulneys, at 5,000–8,000 ft., in moist places and on the banks of ditches (Wight).

8. *PLECTRANTHUS INCANUS*, Link; F. B. I. iv. 621.

Deccan, Carnatic and W. Gháts, in hilly country, at about 3,000–6,000 ft.

An erect herb, reaching 2.5 ft. high with pale leaves and fleshy stem and branches, the racemes up to 9 in. long, the flowers pale lilac or light blue, the nutlets spotted.

9. *PLECTRANTHUS SUBINCISUS*, Benth.; F. B. I. iv. 621.  
Hills of Tinnevely and Travancore, scarce.  
A small erect flaccid herb, the racemes reaching 10 in. long, the nutlets pitted.
10. *PLECTRANTHUS COLEOIDES*, Benth.; F. B. I. iv. 622. *Coleus Wightii*, Benth.; Wt. Ic. t. 1433.  
W. Gháts, Nilgiris, Anamalais and hills of Travancore, at 4,000-7,000 ft., in wet places.  
A succulent herbaceous plant reaching 3 ft. in height, the stems purple, the panicles reaching 12 in. long and up to 8 in. in diam., the flowers lilac, the nutlets black and shining. When young the upper parts of the racemes have conspicuous large rounded bracts which are very early deciduous.
11. *PLECTRANTHUS URTICIFOLIUS*, Hook. f.; F. B. I. iv. 622.  
W. Gháts, hills of Tinnevely, at about 4,500 ft.  
A succulent herb with short stem and large panicles, the flowers apparently purple, the nutlets brown and shining.
12. *PLECTRANTHUS FRUTICOSUS*, Hook. f.; F. B. I. iv. 623.  
W. Gháts, Nilgiri and Pulney Hills, about 7,000 ft., banks of lakes and streams.  
A large succulent undershrub with thick spongy stem, the flowers mauve, the inflorescence often 12 in. long and very dense. Lady Bourne says that it is planted for hedges in the Pulneys.
13. *PLECTRANTHUS BOURNEAE*, Gamble in Kew Bull., 1924, ined.  
W. Gháts, Pulney Hills, about 6,000-7,000 ft., near Kodaikanal, along streams, especially in rocky places (Bourne); Coonoor, in Nilgiris 6,500 ft. (Gamble).  
A large succulent undershrub with thick stem, the flowers lilac, the leaves whitish or tawny tomentose.
14. *PLECTRANTHUS BISHOPIANUS*, Gamble in Kew Bull., 1924, ined.  
W. Gháts, Pulney Hills, near Pillar Rocks, Kodaikanal, about 7,000 ft. (Bourne), drawing in Hb. Kew by Mrs. Bishop.  
A large erect slightly fleshy undershrub with lilac flowers, the lower leaves often rather large and more rounded and purplish, the branches of the inflorescence very slender.



## 8. Coleus, Lour.

Herbs or undershrubs, usually aromatic, often fleshy. *Leaves* opposite. *Flowers* in close or lax paniculate or racemose cymes, with pairs of very caducous floral leaves; bracts also very caducous. *Calyx* 2-lipped, the tube usually decurved, the throat often oblique; upper lip broad, the lower of 4 usually acuminate lobes. *Corolla* 2-lipped; tube exserted, decurved; upper lip short and slightly 4-lobed, recurved; lower lip long, entire, boat-shaped, narrow or stipitate at base. *Stamens* 4, didynamous, connate below in a sheath around the style; anther-cells confluent. *Disk* enlarged in front. *Ovary* 4-partite; style slender, 2-fid at tip. *Fruit* of 4 orbicular or ovoid nutlets, smooth, the basal scar small.

Calyx-throat villous with a ring of white hairs :—

Fruiting calyx with upper lip broad, very obtuse, shorter than the lower; floral leaves ovate, acute; whorls of flowers densely packed; leaves subsessile, glabrous, very fleshy, obovate, obtuse, entire or crenate, up to 2 in. long, 1 in. broad; nutlets black....1. *spicatus*.

Fruiting calyx with upper lip ovate acuminate, a little longer than the lower; floral leaves broadly ovate, long acuminate; whorls of flowers close at first afterwards up to 1 in. distant; leaves petioled, villous, not fleshy, ovate, obtuse, crenate, up to 5 in. long, 1.5 in. broad; nutlets brown.....2. *barbatus*.

Calyx-throat glabrous within :—

Flowers shortly pedicelled, in dense whorls at distant intervals in a long rather slender raceme; leaves petioled, thick and fleshy, very villous, broadly ovate, crenate, up to 3 in. long, 2 in. broad; calyx hispid, small, the upper lip ovate acute, the lower of 4 acuminate lobes.....3. *amboinicus*.

Flowers in short cymes in pairs or whorls at distant intervals in long racemes often paniculate; leaves long-petioled, membranous, glabrous, ovate, acute, cordate rounded or slightly acute at base, up to 7 in. long, 5 in. broad; calyx glabrous, fruiting large, the upper lip rounded and reflexed, the lower of 4 acuminate sharp lobes

4. *malabaricus*.

1. COLEUS SPICATUS, Benth.; F. B. I. iv. 624; Wt. Ic. t. 1431.

Deccan, especially in Salem and Coimbatore, in arid places on rocky ground among bushes.

A perennial fleshy herb with subquadrangular softly hairy

stems ascending from a procumbent base and with a strong scent. Flowers pale lilac.

2. *COLEUS BARBATUS*, Benth.; F. B. I. iv. 625; Wt. Ic. t. 1432.

Deccan and Carnatic, in hilly country; W. Gháts, Nilgiris and Pulneys up to 7,000 ft.; often cultivated in gardens.

A perennial aromatic herb with branches from a thick rootstock, very softly-generally white-hairy, the flowers blue.

3. *COLEUS AMBOINICUS*, Lour. *C. aromaticus*, Benth.; F. B. I. iv. 625; Wt. Ill. t. 175.

Circars, Deccan and Carnatic, a Malay species cultivated and found run wild.

A rather large succulent very aromatic herb with small pale purple flowers, said to be known as Indian Borage and used for flavouring drinks and in medicine. Vern. Hind. Pathor chur.

4. *COLEUS MALABARICUS*, Benth.; F. B. I. iv. 626.

W. Gháts, Nilgiris, Pulneys and hills of Travancore and Tinnevely up to 6,000 ft.

A large erect herbaceous plant reaching 3 ft., with often purple stems and leaves, the flowers pale lilac with dark blue upper lip.

*Coleus parviflorus*, Benth., F. B. I. iv. 625, is a species sometimes cultivated in Southern Districts for its edible tubers. *C. Blumei*, Benth., is a beautiful species with the leaves mottled with deep purple or sanguineous stains (see 'Bot. Mag.', t. 4754), which is commonly cultivated in gardens.

### 9. *Anisochilus*, Wall.

Herbs or undershrubs, often fleshy. Leaves opposite or whorled. Flowers small, in dense tetragonal or cylindrical or slender whorled spikes, the floral leaves and bracts often caducous, red glands often covering especially the corollas. Calyx suberect, inflated below the middle, 2-lipped or 5-lobed, rarely 1-lipped, the upper lip often entire and much deflexed, the lower short, truncate or minutely lobed. Corolla 2-lipped, the tube slender below, inflated above and decurved; upper lip entire or 3-4-lobed, lower elongate, concave. Stamens 4, didynamous,

declinate, filaments free. *Disk* lobed. *Ovary* 4-partite; style bifid at apex. *Fruit* of 4 ovoid dry nutlets, basal scar small.

Upper lip of fruiting calyx entire, deflexed, concealing the mouth, lower lip truncate obscurely toothed :—

Upper lip large and conspicuous in the spikes ; spikes .5 in. in diam., usually 1–2 in. long in fruit :—

Upper lip ovate, acute at apex, .1 in. long, tube swollen and curved, .2 in. long :—

Calyx-tube pubescent without, not silky-villous at the mouth ; leaves broadly ovate, obtuse, cordate or rounded at base, deeply crenate, glabrous or villous above, puberulous beneath, up to 3.5 in. long, 2 in. broad, petiole up to 2 in. long

1. *carnosus*.

Calyx-tube densely white silky-villous at the mouth, glabrous towards the base ; leaves thick, orbicular-ovate, obtuse, cordate, shallowly crenate, glandular puberulous, up to 2 in. long, 1.5 in. broad, but usually smaller, petiole under 1 in. long

2. *eriocephalus*.

Upper lip obtuse and broad glabrous, prominently reticulate, ciliate, tube not much curved, very villous, .2 in. long ; leaves thick, ovate, obtuse rounded or attenuate at base, crenulate, densely softly hoary tomentose, up to nearly 2 in. long, 1 in. broad, petiole .5–.75 in. long.....3. *scaber*.

Upper lip small and inconspicuous in the spike ; spikes .25–.5 in. in diam. :—

Upper lip obtuse, ciliate ; spikes short, in many-branched trichotomous panicles ; leaves thick, ovate or orbicular, obtuse, cordate or rounded at base, crenulate, hoary-tomentose, up to 2.5 in. long, 1.5 in. broad, ; petiole .5 in. long....4. *paniculatus*.

Upper lip acute, white-puberulous ; spikes long and narrow, 3–6 only in a very long-peduncled panicle ; leaves ovate, obtuse, cuneate at base, crenate, hoary-tomentose, up to 2 in. long, 1.5 in. broad, petiole short.....5. *Wightii*.

Upper lip of fruiting calyx short, entire or notched, not concealing the mouth, lower lip truncate :—

Spikes solitary, terminal on the branches :—

Spikes shortly peduncled (1–1.5 in.), very slender, .1–.15 in. in diam., 2–3 in. long ; leaves obovate, obtuse, sessile, slightly crenate, .75 in. long, with 3–4 pairs of very oblique impressed main nerves, collected close under the spikes ; corollas much curved .....6. *plantagineus*.

Spikes long-peduncled in fruit :—

Spikes 2-4 in. long, .3-.4 in. in diam., cylindrical, densely white villous on the bracts and calyces; leaves opposite or whorled, sessile, oblanceolate, acute, entire, almost parallel-nerved, densely silvery- or tawny-tomentose, up to .75 in. long, .25 in. broad; corollas very small, short..... 7. *argenteus*.

Spikes 3-9 in. long, up to .5 in. in diam., cylindrical, with inconspicuous lanceolate bracts; leaves in whorls, sessile, oblong lanceolate or oblanceolate, acute, entire or crenulate, with 5-6 pairs of oblique main nerves, silky-villous, up to 3 in. long, .5 in. broad; corolla large, the tube much enlarged above, the lips spreading ..... 8. *verticillatus*.

Spikes short-peduncled, terminal and axillary on the branches of a leafy panicle :—

Spikes 1-3 in. long, .2-.3 in. in diam., cylindrical, the bracts inconspicuous; leaves subsessile, opposite, obovate, obtuse, entire or obscurely crenate, fulvous-tomentose, with 3-4 pairs of very oblique main nerves, up to 2 in. long, .5 in. broad; corolla very minute, the lips spreading..... 9. *dysophylloides*.

Spikes 1-3 in. long, .1-.2 in. in diam., slender, the bracts imbricating; leaves sessile, whorled, oblong or obovate, entire or slightly crenate, densely white- or fulvous-silky tomentose, with 3-4 pairs of nearly parallel main nerves, up to 2 in. long, .6 in. broad; corolla very minute, the upper lip incurved ..... 10. *sericeus*.

Spikes in terminal long-peduncled racemes on stout branches covered with broad scars; leaves short-petioled, ovate-lanceolate, subacute, entire, tomentose, prominently closely nerved beneath, 1-1.5 in. long, .5 in. broad; corolla-tube long and much deflexed

10. *suffruticosus*.

Upper lip of fruiting calyx erect or recurved or deflexed, entire or emarginate, not quite concealing the mouth, lower reflexed, bifid, tube ventricose, very red-glandular; spikes very long and slender in terminal panicles, the flowers in whorls; corolla-tube bent in the middle and broad above, the upper lip incurved, the lower deflexed; leaves petioled, very large, ovate, acute, rounded at base, crenulate, but lower ones sometimes deeply crenate, 12-15-nerved, tomentose beneath, up to 15 in. long, 8 in. broad..... 12. *robustus*.

# 1. ANISOCHILUS CARNOSUS, Wall.; F. B. I. iv. 627.

N. Circars, Deccan and Carnatic, in rocky places on the hills, up to 3,000 ft. or more, less common on W. Coast.

An erect herb with tetragonous stems, and flowers in long-

peduncled spikes, small in flower but large and strobilate in fruit, and covered with red glands. Corolla pale purple, nutlets orbicular, compressed, shining, brown.

2. *ANISOCHILUS ERIOCEPHALUS*, Benth.; F. B. I. iv. 627.

Deccan, in Cuddapah, N. Arcot and Chittoor, up to 4,000 ft. on Horsleykonda (Gamble), Bellary fort (Wight); Mysore or Canara (Law).

An erect herb similar to the last but with smaller heads and more slender peduncles.

3. *ANISOCHILUS SCABER*, Benth.; F. B. I. iv. 627.

W. Gháts, hills of Tinnevely and Travancore.

A herb with woody stems, rooting at the nodes, the branches ascending, usually with only single heads, sometimes reaching 3 in. long and purplish when dry, the corolla with long boat-shaped lower lip.

4. *ANISOCHILUS PANICULATUS*, Benth.; F. B. I. iv. 628.

Trimen, Fl. Ceyl. t. 75.

Deccan, in Mysore? (G. Thomson); W. Gháts, Eachadi Hills in S. Travancore (K. Venkoba Row), in dry forests.

An erect herb with stout stem and pale nearly white flowers.

5. *ANISOCHILUS WIGHTII*, Hook. f.; F. B. I. iv. 628.

W. Gháts, Anamalai Hills (Wight, Barber).

An erect herb with narrow spikes, a small calyx and much bent, apparently pale, corolla.

6. *ANISOCHILUS PLANTAGINEUS*, Hook. f.; F. B. I. iv. 628.

Bababudan Hills of Mysore (Law).

A dwarf undershrub with a very thick rootstock and decumbent stems giving out short erect flower-bearing spikes, the fruiting calyx minute, villous.

7. *ANISOCHILUS ARGENTEUS*, Gamble in Kew Bull, 1924, ined.

W. Gháts, Kodaikanal Ghát new road in the Pulneys (Bourne).

A rather stout undershrub with erect silvery branches and long spikes, the fruiting calyx minute, very tomentose, with rounded upper lip and incurved lower lip.

8. *ANISOCHILUS VERTICILLATUS*, Hook. f.; F. B. I. iv. 629.

Hyderabad, Golconda Hills (Beddome); Gairsoppa Falls, Mysore, 2,000-3,000 ft. (Meebold).

An erect herb, reaching 3 ft. in height, with deeply

grooved stems and pale blue flowers, the fruiting calyx very small, truncate.

9. *ANISOCHILUS DYSOPHYLLOIDES*, Benth. ; F. B. I. iv. 628 ; Wt. Ic. t. 1434. *A. albidus*, Wt. Ic. t. 1436.

W. Gháts, about Coonoor, 6,000 ft. in Nilgiris.

A thick undershrub with decumbent tomentose stems sending up short erect branchlets bearing spikes of usually white flowers.

- Var. *purpureus*, Gamble. *A. purpureus*, Wt. Ic. t. 1435 ; Spic. Neilg. t. 195.

Leaves shorter and rather broader, often orbicular, the spikes stouter and more silky, the flowers white streaked with pink.

About Coonoor, on rocks (Wight), Pykara (Bourne).

10. *ANISOCHILUS SERICEUS*, Benth. ; F. B. I. iv. 629.

W. Gháts, Pulney Hills and hills of Tinnevely.

A stout undershrub with long erect stems and slender conspicuously bracteate spikes. It is very near to the last species, but is evidently a much larger plant and the young shoots have dense rather large leaves.

11. *ANISOCHILUS SUFFRUTICOSUS*, Wt. Ic. t. 1437 ; F. B. I. iv. 628.

W. Gháts, Nilgiri Hills, at Sispara, on rocky cliffs among grass, about 7,000 ft. (Wight, Gardner).

An erect thick woody undershrub reaching 3 ft. in height, the corollas whitish with pale lilac at the ends of both lips ('Wt. Spic. Neilg.' t. 196).

12. *ANISOCHILUS ROBUSTUS*, Hook. f. ; F. B. I. iv. 629.

W. Gháts, hills of Tinnevely, apparently about 6,000 ft. (Wight, Beddome, etc.).

A tall stout plant, perhaps shrubby, the stems sub-tetragonous, the leaves soft and thick, a very distinct species.

#### 10. *Hyptis*, Jacq.

Herbs or shrubs. Leaves opposite. Flowers small or medium-sized, variously arranged, often capitate. Calyx ovoid campanulate or tubular, subequally 5-lobed, often accrescent. Corolla-tube cylindric ; lobes 5, the lower lobe or lip deflexed and saccate, the others erect and spreading, flat. Stamens 4,

didynamous, declinate; filaments free; anther-cells confluent. *Disk* entire or glandular. *Ovary* 4-partite; style with a sub-entire or shortly bifid stigma. *Fruit* of 4 dry ovoid or oblong nutlets, smooth or rugulose; basal scar small.

*HYPTIS SUAVEOLENS*, Poit.; F. B. I. iv. 630.

Most plains Districts, on roadsides and waste ground, introduced from Tropical America and run wild.

A tall sweet-smelling herb with tetragonal hispid stems, ovate, cordate, denticulate leaves reaching 4·5 in. long and small blue flowers, the fruiting calyx campanulate and ribbed with 5 aristate teeth. Vern. *Hind.* Wilayati tulsi.

### 11. *Lavandula*, Linn.

Herbs or shrubs, often aromatic. *Leaves* opposite or whorled, entire dentate or pinnatisect. *Flowers* in 2-10-flowered whorls collected in simple or paniced spikes; bracts persistent. *Calyx* erect, tubular, 10-15-ribbed, shortly and equally 5-toothed. *Corolla* oblique, 2-lipped, the upper lip 2-fid, the lower 3-partite, the lobes all spreading. *Stamens* 4, didynamous, declinate, included; filaments free, anther-cells confluent. *Disk* with 4 lobes, opposite the ovary lobes. *Ovary* 4-partite; style 2-fid, the lobes flattened. *Fruit* of 4 dry smooth nutlets, the basal scar somewhat oblique, the back marked by a large white areole.

*Leaves* petioled, pinnatisect, the lobes broad, oblong; bracts ovate-lanceolate not awned, ribbed; fruiting calyx tubular, 2-3 in. long, villous with long hairs; corolla 25 in. long.....1. *Gibsoni*. *Leaves* sessile or nearly so, pinnatipartite, the lobes linear; bracts shortly ovate with a long capillary awn; fruiting calyx 2 in. long, hoary-pubescent; corolla up to 5 in. long.....2. *bipinnata*.

1. *LAVANDULA GIBSONI*, Grah.; F. B. I. iv. 631. *L. Lawii*, Wt. Ic. t. 1439.

Nilgiri Hills (Perrottet).

A tall undershrub with flowers in compact woolly spikes.

2. *LAVANDULA BIPINNATA*, O. Kze. *L. Burmanni*, Benth.; F. B. I. iv. 621; Wt. Ic. t. 1438.

Deccan, in Canara, Mysore and Coorg; Ramandrug Hills in Bellary.

A slender erect herb with blue or white flowers in solitary or paniced spikes.

12. *Pogostemon*, Desf.

Herbs, undershrubs or shrubs, often aromatic. *Leaves* opposite, rarely ternate. *Flowers* small, in clusters or racemules in whorls on usually elongate spikes or racemes; the lower whorls often with floral leaves, the upper with bracts and bracteoles, the latter usually very small. *Calyx* more or less tubular, equally 5-lobed, the tube naked within, often enlarged in fruit. *Corolla*-tube included or exserted, 2-lipped, the upper lip 3-lobed, the lower narrower and longer. *Stamens* 4, exserted, subequal; filaments usually bearded; anther-cells confluent. *Disk* subentire. *Ovary* 4-partite; style slender, 2-fid with slender stigmatic lobes. *Fruit* of 4 smooth, ovoid or ellipsoid, dry nutlets, one face often angled. Spikes or racemes of clusters terminal and axillary, forming a paniced inflorescence :—

Clusters interrupted in the spikes, except sometimes at the top :—

Clusters one-sided in the spikes with a pair of unequal small floral leaves, the rhachis usually elongate (even to 1 in. long), secund and curved, with many pairs of obliquely ovate imbricating ciliate bracts, enclosing the flowers and their narrower bracteoles; leaves in unequal pairs, membranous, ovate, acuminate, irregularly inciso-serrate, cuneate at base, appressed-pubescent, up to 5 in. long, 3 in. broad.....1. *paniculatus*. Clusters not one-sided, globose; small, single or in pairs with small floral leaves, the rhachis not elongate, the bracts ovate or lanceolate, ciliate; leaves in usually equal pairs, membranous, glabrescent, ovate, acute or obtuse, simply or doubly crenate-serrate, cuneate at base, up to 4 in. long, 3 in. broad

2. *Heyneanus*.

Clusters close, interrupted towards the base of the not very paniculate spikes but continuous and regular and close above, the floral leaves reflexed; bracts ovate lanceolate, slightly falcate, ciliate, .2 in. long, shorter than the calyx; calyx teeth about equal to the tube; leaves membranous, ovate or ovate-lanceolate, cuneate at base, inciso-serrate, softly hairy, up to about 5 in. long, 2 in. broad

3. *purpurascens*.

Clusters usually close but occasionally interrupted especially in the terminal spikes of the panicle, the floral leaves mostly reflexed; bracts oblong-lanceolate, membranous, ciliate, .2 in. long, usually longer than the calyx; calyx-teeth much shorter than the tube; leaves membranous, ovate, acuminate, cuneate at base, inciso-crenate, softly pubescent, up to 3 in. long, 1.5 in. broad 4. *Gardneri*.



Clusters close and densely packed on the branches of large panicles ; leaves chartaceous, long-petioled, often doubly crenate, but scarcely incised :—

Stems and leaves nearly glabrous, also the floral leaves ; imbricating short bracts slightly longer than the calyx ; calyx-teeth much shorter than the tube ; leaves ovate or ovate-lanceolate, acuminate, rounded or slightly cuneate at base, singly or doubly crenate-serrate, up to 3·5 in. long, 1·5 in. broad....5. *pubescens*. Stems hoary-puberulous, leaves also on the under-surface ; floral leaves and imbricating large and prominent bracts softly white- or tawny-pubescent ; calyx-teeth much shorter than the rather slender tube ; leaves ovate or ovate-lanceolate, acute, rounded or slightly cuneate at base, singly or doubly crenate, up to 6 in. long, 3 in. broad .....6. *plectranthoides*.

Spikes or racemes of clusters terminal or axillary, solitary, not paniced :—

Filaments of the stamens bearded :—

Leaves thin, coarsely crenate or serrate, the petioles long ; herbaceous plants with slender branches :—

Leaves ovate, crenate, rounded or slightly cuneate at base, nearly glabrous as are the branchlets, about 2 in. long, 1·5 in. broad, racemes up to 4·5 in. long, ·3 in. in breadth, with distant whorls of clusters ; fruiting calyx tubular, narrow, villous, deflexed, ·1 in. long, the lobes short ; bracts and bracteoles minute.....7. *paludosus*.

Leaves ovate, acute, singly or doubly crenate or incised, rounded or broadly cuneate at base, hispid as are the branchlets with long cellular hairs, up to 2 in. long, 1·5 in. broad ; racemes up to 6 in. long, ·5 in. broad, the whorls of clusters close above, sometimes interrupted below, especially the lowest when the floral leaves are large ; fruiting calyx nearly glabrous, inflated, contracted at the much ciliate mouth, sometimes with straggling hairs, ·15 in. long, the lobes short ; bracts and bracteoles linear

8. *Wightii*.

Leaves orbicular, obtuse, doubly crenate, rounded or cordate at base, villous with scattered hairs, 2 in. in diam. ; racemes up to 4 in. long, ·75 in. broad, the whorls of clusters slightly interrupted ; fruiting calyx tubular, villous, ·25 in. long, the lobes lanceolate ; bracts and bracteoles linear-subulate..9. *rotundatus*. Leaves ovate, subacute, crenate, rounded at base, very long tawny-villous or tomentose with shining hairs, up to 2 in. long, 1·25 in. broad ; racemes 3–4 in. long, ·5 in. broad, the whorls

of clusters close; fruiting calyx tubular, villous like the leaves, the lobes acuminate; bracts lanceolate, bracteoles linear .....10. *nilagiricus*.

Leaves thick and tomentose, shortly crenate, the petioles short; undershrubs, woody at base and with short branches; bracts and bracteoles linear :—

Tomentum on the branchlets, leaves and racemes dark tawny; leaves ovate or orbicular, obtuse, rounded or shortly cuneate at base, crenate, .5–1 in. rarely to 1.5 in. long; racemes up to 7 in. long, .4 in. in diam., the whorls of clusters or short racemes usually crowded; fruiting calyx tubular, villous, .15 in. long, the lobes short .....11. *mollis*.

Tomentum on the leaves and racemes pale tawny to nearly white, the branches with much soft woolly hair; leaves ovate, obtuse, truncate or cordate at base, crenate, rugose and impressed above, up to 1.5 in. long, 1 in. broad; racemes up to 3 in. long, .75 in. in diam., the whorls of racemules rather crowded; fruiting calyx tubular, very tomentose, .25 in. long, the lobes sharp .....12. *vestitus*.

Filaments of the stamens not bearded, but usually slightly villous at base :—

Calyx very densely villous, tubular, .25 in. long, lobes short; corolla-tube slender, exserted; racemes up to 8 in. long, nearly 1 in. in diam., the whorls of racemules very crowded except one or two lower, spreading or reflexed; leaves ovate, acute, cuneate often unequally at base, doubly crenate, dark velvety on both sides, long-petioled, up to 4 in. long, 2 in. broad . . 13. *atropurpureus*.

Calyx glabrescent or with scattered long strigose hairs, .25 in. long, lobes long-setaceous; corolla-tube slender, not exserted; racemes up to 6 in. long .75 in. in diam., the whorls of racemules crowded except sometimes in the axils of separate large floral leaves below; leaves broadly ovate, acute, cordate at base, doubly crenate, sparsely hairy, long-petioled, up to 4 in. long, 3 in. broad .....14. *speciosus*.

Calyx glabrous, terete, .2 in. long, the lobes triangular; corolla-tube funnel-shaped, exserted; racemes up to 6 in. long, the flowers reflexed on slender pedicels with minute bracts; leaves ovate, acute, rounded or slightly cuneate at base, doubly serrate, nearly glabrous, long-petioled, up to 5 in. long, 2 in. broad . . . 15. *travancoricus*.

1. *POGOSTEMON PANICULATUS*, Benth.; F. B. I. iv. 631.

W. Coast, from S. Canara to Travancore, up to about 3,000 ft. on the Gháts.

An erect herb reaching 4 ft. in height, the flowers apparently white and small, the clusters sometimes, especially in young flowers, quite small and round, but in older plants much elongate and curved almost to a circle.

2. *POGOSTEMON HEYNEANUS*, Benth.; Wt. Ic. t. 1440. *P. Patchouli*, Hook. f. in F. B. I. iv. 653, *not of* Pelletier.

W. Gháts, S. Canara southwards, in open forest land, often cultivated and then run wild; about Kotagiri in Nilgiris, 6,000 ft. (Wight).

A strongly aromatic herb with small flower clusters. The dried leaves are used to keep off insects.

3. *POGOSTEMON PURPURASCENS*, Dalz.; F. B. I. iv. 632.

W. Coast and W. Gháts, S. Canara, Bababudan Hills of Mysore (Law).

An erect herb, the stems and branches covered with very soft spreading hairs, the leaves also soft and often in unequal pairs, sometimes tinged with purple, the corollas with purple upper lip and white lower lip.

4. *POGOSTEMON GARDNERI*, Hook. f.; F. B. I. iv. 632.

W. Gháts, Wynaad (Gardner), Sispara in Nilgiris at about 5,000 ft. (Wight), Mankulam in Travancore Hills, 2,500 ft. (Venkoba Row).

A soft branching herb with reddish stems, all parts very villous.

5. *POGOSTEMON PUBESCENS*, Benth. *P. parviflorus*, Benth.; F. B. I. iv. 632 *in part*.

W. Gháts, Nilgiris, Anamalais and hills of Travancore, at about 3,000–5,000 ft.; Kollimalai Hills of Trichinopoly.

A stout erect nearly glabrous herb. The corollas have the upper lip "white, shot with purple, the lower white, the filaments purple with purple hairs (T. Cooke)."

6. *POGOSTEMON PLECTRANTHOIDES*, Desf.; F. B. I. iv. 632.

N. Circars, Ganjam to Godavari, up to 3,000 ft. on Mahendragiri, in open places in deciduous forests; Deccan, Nallamalai Hills of Kurnool; W. Gháts, S. Canara to Wynaad.

A large erect branching aromatic shrub, with conspicuous flower panicles and long-petioled leaves, the corollas pink or white, the filaments bearded with lilac moniliform hairs. The leaves have the scent of black currants.

7. *POGOSTEMON PALUDOSUS*, Benth.; F. B. I. iv. 635.  
W. Gháts, Nilgiris, in wet places near Ootacamund, 7,000 ft. (Wight), at Sispara, 6,000 ft. (Lawson).  
A slender erect herb with nearly black stems, leaves also turning black when dry.
8. *POGOSTEMON WIGHTII*, Benth.; F. B. I. iv. 635. *P. hirsutus*, Wt. Ic. t. 1442, *not good and not of Benth.*  
W. Gháts, Nilgiris, Pulneys and Anamalai Hills, about 7,000 ft., in wet places.  
An erect herb about 2 ft. high with reddish branches, the leaves black when dry. Flowers apparently white, with purple tufts of hair on the filaments.
9. *POGOSTEMON ROTUNDATUS*, Benth.; F. B. I. iv. 636.  
Deccan (Heyne), locality not known.  
A herb with erect branches from a procumbent base, two branches villous with white cottony hair, the leaves greenish-brown when dry.
10. *POGOSTEMON NILAGIRICUS*, Gamble n. comb. *P. rotundatus*, Wt. Ic. t. 1441, Spic. Neilgh. t. 197, *not of Benth.*  
Nilgiris, on the downs at Ootacamund, 7,000 ft. (Bourne).  
A soft herbaceous plant with white woolly hair on the stems.
11. *POGOSTEMON MOLLIS*, Benth.; F. B. I. iv. 635.  
W. Gháts, Nilgiri Hills, on the plateau above 6,000 ft., in rough places and the edges of shola forests, Pulney Hills and hills of Tinnevely; Shevaroy Hills of Salem (Bourne).  
A much branched low woody undershrub with white flowers.
12. *POGOSTEMON VESTITUS*, Benth.; F. B. I. iv. 636.  
Deccan (Heyne), locality not known; W. Gháts, Palghat (Wight).  
A densely woolly undershrub with ascending branches up to about 18 in. long, the flowers lilac.
13. *POGOSTEMON ATROPURPUREUS*, Benth.; F. B. I. iv. 636.  
W. Gháts, Sispara Ghát in Nilgiris, at 6,000 ft., in moist forest.  
An erect shrubby plant with velvety tawny branches having the hair reflexed, the flowers dark purple, the leaves and inflorescence dark rusty black when dry.
14. *POGOSTEMON SPECIOSUS*, Benth.; F. B. I. iv. 637; Wt. Ic. t. 1443.

W. Gháts, Nilgiris and Anamalais, at 6,000–8,000 ft., on the edges of Shola forest.

A shrub, reaching 3 ft. in height with pilose-hispid brown branches, white flowers tinged with pink and leaves and inflorescence nearly black when dry. The very long stamens give a bottle-brush appearance to the racemes.

15. *POGOSTEMON TRAVANCORICUS*, Bedd. Ic. t. 159; F. B. I. iv. 637.

W. Gháts, Atrimalai Ghát, Travancore, at 3,500 ft., Mankulam, 2,500 ft. (K. Venkoba Rao).

A subshrubby plant reaching 2 ft. in height, the branches smooth, the leaves and inflorescence black when dry.

### 13. *Dysophylla*, Blume.

Herbs. *Leaves* opposite or whorled. *Flowers* minute, in dense long spikes or racemes of many whorled cymes; bracts and bracteoles many, usually small. *Calyx* ovoid or campanulate, equally 5-lobed, the throat naked within. *Corolla* very small, equally 4-lobed, the tube exserted or included. *Stamens* 4, exserted, straight or subdeclinate; filaments long, bearded; anther-cells confluent. *Disk* equal, subentire. *Ovary* 4-partite; style slender, 2-fid, the stigmatic lobes subulate. *Fruit* of 4 ovoid or oblong, smooth or rough, dry nutlets, the basal scar small.

*Leaves* opposite :—

Stems and leaves clothed with long soft tawny hair; leaves sessile or shortly petioled, elliptic-oblong or ovate-lanceolate, acute or obtuse, rounded at base, serrate, up to 3 in. long, nearly 1 in. broad; racemes spicate, 2–4 in. long, .3–.5 in. broad, the flowers with slender pedicels and lanceolate or spathulate long-ciliate bracts; calyx minute, turbinate; corolla-tube exserted.....1. *auricularia*.

Stems and leaves closely pale-tawny or white silky tomentose :—

Spikes very slender, 1.5–4 in. long, about .2 in. broad, the flowers minute with linear bracts; calyx very small, the lobes triangular; corolla-tube included; leaves subsessile, thick, linear-oblong, denticulate in the upper half, up to 1.5 in. long, .3 in. broad

2. *myosuroides*..

Spikes about 2 in. long, .25 in. broad, the flowers minute with oblong small bracts; calyx .05 in. long, turbinate, gland-dotted, the teeth triangular, ciliate; corolla-tube included; leaves subsessile, linear-oblong, obtuse, crenate or subentire, up to 1.25 in. long, .4 in. broad, fulvous-pubescent.....3. *rugosa*..

Leaves in whorls, plants of wet places :—

Erect plants, not floating :—

Racemes single or in leafy panicles, dense, more or less closely grey-pubescent, up to 6 in. long, .3 in. in diam. ; leaves linear-oblong or linear-lanceolate, shortly petiolate, serrate, the nerves oblique, up to 4 in. long, .5 in. broad.....4. *quadrifolia*. Racemes single, very dense, up to about 4 in. long, .4 in. in diam. with a pair of short floral leaves at the base ; leaves in distant whorls, linear or narrowly linear-lanceolate usually entire, the margins revolute, strigosely hispid especially beneath, up to 2 in. long .....5. *cruciata*.

Water plants, often floating :—

Stems decumbent at base, glabrous, often geniculate ; leaves 4–5 in a whorl, sometimes more, soft and glabrous, linear, usually entire, up to 3 in. long, .2 in. broad ; spikes very dense and villous, up to 2.5 in. long, .2 in. in diam., the calyx tube 5-angled, glabrous, with incurved villous lobes .....6 *Griffithii*. Stems creeping at base, then with many stiff erect branches with very short internodes ; leaves many in a whorl, very short, narrowly linear, entire, puberulous, up to .5 in. long, .1 in. broad ; spikes very dense and villous, up to 2.5 in. long, .2 in. in diam., the calyx campanulate .....7. *stellata*.

1. *DYSOPHYLLA AURICULARIA*, Blume ; F. B. I. iv. 638 ; Wt. Ic. t. 1445.

Deccan, hills of Mysore and Bellary ; Carnatic, Kollimalai Hills of Trichinopoly ; W. Gháts, Nilgiris and Pulneys at 3,000–6,000 ft.

An erect annual with pale lilac flowers.

2. *DYSOPHYLLA MYOSUROIDES*, Benth. ; F. B. I. iv. 638.

Deccan, Ramandrúg in Sandur Hills, Bellary, at 3,500 ft. ; Bababudan Hills of Mysore ; Carnatic, base of Kambakam Hill, Chingleput.

A much-branched perennial herb with a woody rootstock, the flowers red ; the main nerves of the leaves slender, very oblique.

3. *DYSOPHYLLA RUGOSA*, Hook. f. ; F. B. I. iv. 638.

Carnatic, hills near Pallamcottah, Tinnevely (Heyne).

An erect perennial herb similar to the last and perhaps scarcely distinct, the main nerves of the leaves more distant and less oblique.

4. *DYSOPHYLLA QUADRIFOLIA*, Benth.; F. B. I. iv. 639.

N. Circars, hills of Godavari, up to 3,500 ft., in rocky places near streams and in grass savannahs; W. Gháts, and W. Coast, S. Canara and Malabar to the Anamalais.

An erect aromatic undershrub reaching 4 ft. in height with rose-coloured flowers. There are two forms, one with long leaves drying nearly black and subglabrous, the other grey pubescent when dry with the leaves shorter. Vern. *Tel.* Konda-jajain.

5. *DYSOPHYLLA CRUCIATA*, Benth.; F. B. I. iv. 639. *D. tetraphylla*, Wt. Ic. t. 1444.

W. Coast, *perhaps* Malabar (Wight), in wet places.

A pretty erect herb with lilac or pale purple flowers, easily recognized by the regularly spaced whorls of usually 4 leaves with revolute margins. The stamens are bearded with pink or purple.

6. *DYSOPHYLLA GRIFFITHII*, Hook. f.; F. B. I. iv. 641.

N. Circars, wet places at Bamunpodor in Ganjam (Gamble).

An aquatic herb, rooting in mud or floating in water, the many spikes at the ends of the branches erect, the flowers pink.

7. *DYSOPHYLLA STELLATA*, Benth.; F. B. I. iv. 640.

W. Coast, S. Canara to Travancore, in rice-fields.

A pretty water plant with minute pink flowers and the stamens bearded with purple hairs.

Var. *gracilis*, T. Cooke. *D. gracilis*, Dalz.; F. B. I. iv. 641, taller and with rather more distant whorls or leaves, the stem also thicker with prominent nodal scars.

Canara and Mysore (Law).

14. *Colebrookea*, Smith.

A shrub, densely hoary or woolly. *Leaves* opposite or ternate, petioled, elliptic-oblong or -lanceolate, crenulate. *Flowers* small, functionally dioecious, in bracteate clusters on elongate spikes arranged in panicles. *Calyx*-tube very short; teeth subulate, in fruit elongate, capillary and feathery. *Corolla* small, tube very short, lobes 4, subequal. *Stamens* 4, exserted in ♂ flowers, included in ♀; filaments naked; anthers orbicular, the cells confluent. *Disk* uniform. *Ovary* 4-partite; style bifid, the lobes

subulate. *Fruit* of 1-4 obovoid dry nutlets with hairy tips, the basal scar small.

COLEBROOKEA OPPOSITIFOLIA, Sm.; F. B. I. iv. 642. *C. ternifolia*, Roxb. Cor. Pl. t. 245.

N. Circars, common in hilly forests up to 3,500 ft., chiefly in ravines; Deccan, in hill forests in Mysore; W. Gháts, S. Canara to Travancore in dry forest localities.

An erect much-branched very white-tomentose shrub up to 10 ft. high, the flowers white, the fruiting panicles long-plumose, the leaves up to 8 in. long, 3 in. broad, variable in pubescence. Bark grey, rather corky; wood greyish-white, close-grained.

### 15. Micromeria, Benth.

Herbs or undershrubs. *Leaves* usually small, entire or toothed. *Flowers* small, in axillary few-flowered cymes or in whorls sessile or peduncled on a terminal sometimes panicled raceme; bracts small. *Calyx* 10-13-nerved, 5-lobed or 2-lipped. *Corolla* 2-lipped, the tube straight, annulate within, the upper lip entire or emarginate, the lower spreading, 3-lobed. *Stamens* 4 didynamous, the lower pair the longer, ascending, incurved; anther-cells distinct, parallel, at length divergent, the connective usually thickened. *Disk* cup-shaped. *Ovary* 4-partite; style slender, 2-lobed at apex, the stigmatic lobes equal or the upper short and lower recurved, flattened. *Fruit* of 4 smooth, dry, ovoid or oblong nutlets, the basal scar small.

Stems short, dense, leafy, glabrous or slightly pubescent; leaves very small, ovate, nearly sessile, gland-dotted, 15-25 in. long; cymes. 2-4-flowered, axillary, with slender pedicels.....1. *biflora*.  
Stems tall, slender, pubescent; leaves shortly petioled, ovate or oblong, obtuse, serrate, 5-1 in. long, 5 in. broad; whorls dense-flowered, lower ones often peduncled, in long terminal racemes or spikes, tawny-villous .....2. *capitellata*.

1. MICROMERIA BIFLORA, Benth.; F. B. I. iv. 650; Wt. Ic. t. 1446.

N. Circars, hills of Vizagapatam, 3,500 ft. (A. W. Lushington); W. Gháts, Nilgiris and Pulneys above 6,000 ft. common.

An aromatic herb with a very stout rootstock and many tufted ascending wiry stems, the flowers pink.



## 2. MICROMERIA CAPITELLATA, Benth.; F. B. I. iv. 649.

N. Circars, hills of Ganjam (Barber); W. Gháts, Nilgiri Hills at 5,000-6,000 ft.

A very aromatic herb with long slender stems and small purplish flowers in very dense villous whorls.

## 16. Calamintha, Moench.

Herbs or shrubs. *Leaves* entire or toothed. *Flowers* small, in whorls, the whorls dense and axillary or loose and paniced or spicate; bracts small. *Calyx* ribbed, ribs usually 13, 2-lipped, the upper lip 3-, the lower 2-lobed and with narrower teeth; throat naked or villous. *Corolla* 2-lipped, the tube straight, the throat villous, the upper lip erect, entire or emarginate, the lower spreading, 3-lobed. *Stamens* 4, didynamous, the lower pair longer, ascending under the upper lip; anther-cells distinct, parallel or diverging. *Ovary* 4-celled, style slender, 2-fid, the stigmatic lobes equal or the lower larger. *Fruit* of 4 minute subglobose dry smooth nutlets; basal scar small.

CALAMINTHA UMBROSA, Benth.; F. B. I. iv. 650. *Melissa umbrosa*, Bieb.; Wt. Ic. t. 1447.

W. Gháts, Nilgiri and Pulney Hills, on the downs and in moist woods at high levels.

A slender straggling laxly hairy herb procumbent at base, then ascending, with purplish or sometimes white flowers in axillary whorls, the leaves ovate, serrate, up to 1.5 in. long.

## 17. Anisomeles, R. Br.

Erect, branching coarse herbs, often very aromatic, the stems usually tetragonous. *Leaves* opposite, the floral leaves sub-similar. *Flowers* in axillary whorls of short spikes usually elongating in fruit, or of lax branching cymes, the whole often paniced; bracts linear, 2 to each flower. *Calyx* ovoid or tubular, straight, equally 5-lobed. *Corolla* 2-lipped, the tube short, annulate within; upper lip short, erect, entire; lower broad, spreading, 3-lobed, the midlobe large, bifid or emarginate. *Stamens* 4, didynamous, exserted, the lower pair longer; anthers of upper pair 2-celled, of lower 1-celled, the cells transverse and parallel. *Disk* equal. *Ovary* 4-partite; style slender, 2-fid, the

stigmatic lobes equal, subulate. *Fruit* of 4 smooth dry lenticular nutlets, the basal scar small.

Stem and branches acutely tetragonous; fruiting calyx prominently reticulate; filaments bearded :—

Cymes in the whorls pedunculate, in fruit elongate and unilateral; fruiting calyx scabrous and with scattered bulbous-based hairs, the lobes acuminate; leaves ovate, acuminate, cuneate at base, crenate-serrate, glabrous or sparsely hairy, up to 3 in. long, 1.5 in. broad .....1. *Heyneana*.

Cymes in the whorls sessile, shortly elongate in fruit; fruiting calyx hispid, the lobes caudate; leaves ovate, acute or acuminate, rounded or slightly cuneate at base, crenate, tomentose, up to 6 in. long, 3 in. broad .....2. *indica*.

Stem and branches obtusely tetragonous and softly white-tomentose as are the under-surfaces of the leaves; cymes in the whorls dense, shortly but sometimes much (up to 2 in.) elongate in fruit; fruiting calyx softly villous with shining hairs, the lobes narrowly lanceolate; leaves thick, lanceolate, acute, rounded at base, crenate-serrate, tomentose, up to 5 in. long, 2 in. broad .....3. *malabarica*.

1. *ANISOMELES HEYNEANA*, Benth.; F. B. I. iv. 672.

W. Gháts, Nilgiri Hills (Wight), probably from Wynaad.

A tall erect herb reaching 5 ft. in height (Cooke), the corolla white or greenish-white.

2. *ANISOMELES INDICA*, O. Kze. *A. ovata*, R. Br.; F. B. I. iv. 672; Wt. Ic. t. 865.

All Districts, except very dry ones, in open forests, on waste land and by roadsides, up to about 5,000 ft., common. An almost shrubby herb reaching 6 ft. in height and smelling strongly of camphor. The corollas have a pale upper lip and purple lower lip and the stems and leaves vary from softly pubescent to velvety tomentose (var. *mollissima*, Benth.) and nearly white beneath. It is used in medicine.

3. *ANISOMELES MALABARICA*, R. Br.; F. B. I. iv. 673; Wt. Ic. t. 864.

S. Carnatic from Madras southwards to S. Travancore, West to the E. foot of the Gháts, in low country.

An almost shrubby herb reaching 6 ft. in height, densely white woolly and with pale purple flowers. It is used in medicine. Vern. *Tel. Moga-bira*; *Tam. Peyameratti*.

18. *Scutellaria*, Linn.

Herbs or undershrubs. *Leaves* opposite; floral leaves usually small and bract-like. *Inflorescence* various, but often in pairs or whorls in a terminal raceme. *Calyx* campanulate, 2-lipped, the lips closed in fruit, the upper lip then deciduous, furnished on the back with a large shield or pouch, the lower lip persistent. *Corolla* 2-lipped, the tube usually sharply recurved above the calyx and then ascending, dilated at the throat, not annulate within; upper lip galeate, entire or notched, lower broad, 3-lobed. *Stamens* 4, didynamous, the lower pair longest; anthers connivent, those of upper pair 2-celled, of lower 1-celled. *Disk* elongate. *Ovary* 4-partite, oblique, on a curved gynophore; style slender, 2-fid, one stigmatic lobe very short. *Nutlets* 4. subglobose, smooth granular or tubercular.

Leaves chiefly radical, with sometimes a few distant pairs on the stem, elliptic, obtuse, rounded or cordate at base, crenate, pubescent, sometimes purple beneath, up to 4 in. long, 2.5 in. or more broad; petioles 1-3 in. long; racemes elongate, solitary or paniced, the floral leaves very small; nutlets minutely tuberculate ..... 1. *discolor*. Leaves cauline, the floral leaves much smaller and bracteate:—

Erect, stiff plants, pubescent or hispid; leaves ovate, acute, cordate or rounded at base, crenate-serrate, hispid, often purplish beneath, up to 2 in. long, 1-1.5 in. broad, petiole slender, up to about 1 in. long; floral leaves ovate; racemes erect, up to 6 in. long; nutlets granulate..... 2. *Wightiana*.

Straggling weak plants, glabrous or minutely pubescent:—

Slender branching flaccid flexuous herbs; leaves ovate, subacute, rounded or cordate at base, membranous, broadly crenate, up to 3.5 in. long, 2.5 in. broad, petiole 1-3 in., floral leaves lanceolate; racemes lax, up to 6 in. long; nutlets spinulose.... 3. *violacea*. Many-branched soft thinly pubescent herbs; leaves deltoid. acute, truncate or cordate at base, rather thick, repand-crenate, minutely tomentose, 1-1.25 in. long and nearly as much broad, petiole .5-1 in.; floral leaves very small, ovate; racemes elongate, up to 6 in. long; nutlets minutely tuberculate

4. *Colebrookiana*.

Leaves cauline gradually smaller upwards as they pass into floral leaves, the lower shortly petioled, the upper sessile, ovate or lanceolate, obtuse, cordate or rounded at base, entire or slightly crenate, up to 1 in. long, .5 in. broad; pedicels very short; nutlets granulate

5. *rivularis*.

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1. *SCUTELLARIA DISCOLOR*, Coleb. ; F. B. I. iv. 667.  
 Bababudan Hills of Mysore (Law), Marnhalli, 2,000 ft. (Meebold).  
 An annual herb, the stems rooting at the base, the flowers with pale blue corolla about .5 in. long, the pouch of the upper fruiting calyx-lip short and broad.
2. *SCUTELLARIA WIGHTIANA*, Benth. *S. violacea*, Heyne, var. *hispidior*, Benth. ; F. B. I. iv. 668 ; Wt. Ic. t. 1449.  
 W. Gháts, Nilgiri Hills, at about 5,000-7,000 ft.  
 A stiff-branched but erect herb, the stems rooting at base, the corollas white or rose (Wight), .5 in. long, the pouch of the upper fruiting calyx-lip deep and hooded.
3. *SCUTELLARIA VIOLACEA*, Heyne ; F. B. I. iv. 668 *in part* ; Bot. Mag. t. 8320.  
 N. Circars, hills of Vizagapatam at 2,500 ft. (Beddome, A. W. Lushington), Rampa Hills of Godavari, at 4,000 ft. (V. Narayanswami) ; W. Gháts, Nilgiris, Pulneys and hills of Travancore, up to 7,000 ft.  
 A flaccid straggling herb, the pouch of the upper fruiting calyx-lip concave without, the corolla-tube long, blue with white patches on the lip.
4. *SCUTELLARIA COLEBROOKIANA*, Benth. *S. violacea* var. *Colebrookiana*, Hook. f. ; F. B. I. iv. 668.  
 W. Gháts, Pulney Hills and hills of Tinnevely, apparently at low levels.  
 A straggling herb of characteristic aspect and soft thick deltoid leaves, the pouch of the upper fruiting calyx-lip usually concave without, the corolla large, especially the broad lower lip.
5. *SCUTELLARIA RIVULARIS*, Benth. ; F. B. I. iv. 670 ; Wt. Ic. t. 1450.  
 W. Gháts, Nilgiris, in wet places near streams at about 7,000 ft., Pykara (Wight), Cairn Hill Swamp (Gamble).  
 A nearly glabrous tufted herb with many branches, the lower one rooting below, the corolla lilac or blue and short, the pouch of the upper lip of the fruiting calyx broad and curved forward.

#### 19. *Brunella*, Linn.

Perennial herbs. *Leaves* opposite ; floral leaves bract-like. *Flowers* in whorls of 6, closely packed in terminal cylindric

heads. *Calyx* reticulate, white-strigose, 2-lipped, above a short tube closed in fruit; upper lip broad, 3-toothed, lower 2-lobed, the lobes lanceolate, aristate. *Corolla* ascending, tube annulate at the base within; upper lip erect, galeate; lower lip spreading, the side lobes oblong deflexed, the middle lobe rounded, concave, crenulate. *Stamens* 4, didynamous, exserted; filaments bifid, especially the upper, at apex, the lower arm anther-bearing; anthers conniving, 2-celled, the cells divaricate. *Disk* erect. *Ovary* 4-partite, on a gynophore; style slender, 2-lobed, the stigmatic lobes subulate. *Fruit* of 4 smooth oblong nutlets.

BRUNELLA VULGARIS, Linn.; F. B. I. iv. 670. Var. *hispida*, Benth.; Wt. Ic. t. 1448.

W. Ghâts, Nilgiris, Pulneys and hills of Travancore, above 5,000 ft., in grass, on the downs.

A herb with creeping rootstock, the stems and ovate obtuse leaves hispidly hairy, the corollas deep purple-blue or sometimes white, the bracts broadly ovate-cordate, apiculate, often purple on the margins.

## 20. Leonurus, Linn.

Erect stout herbs. *Leaves* opposite, lobed, floral leaves similar. *Flowers* in dense axillary whorls; bracts subulate. *Calyx*-tube turbinate, 5-nerved; teeth 5, spreading, spinescent. *Corolla* 2-lipped; tube cylindric, annulate within; upper lip erect, entire, lower 3-lobed, the midlobe obcordate. *Stamens* 4, didynamous, the lower pair the longest; anthers conniving, the cells transverse. *Disk* uniform. *Ovary* 4-partite; style 2-fid, the stigmatic lobes obtuse or subulate. *Fruit* of 4 3-quetrous truncate, smooth nutlets, the basal scar small.

LEONURUS SIBIRICUS, Linn.; F. B. I. iv. 678.

Coorg, Nilgiri Hills and other localities, in waste places.

An annual weed with 4-gonous stems and long-petioled pinnati-partite leaves having linear-lanceolate segments. The flowers are red.

## 21. Leucas, R. Br.

Herbs, undershrubs or shrubs, nearly always pubescent or villous; branches usually 4-gonous. *Leaves* opposite or whorled; floral leaves usually similar. *Flowers* usually white, in axillary

few- or many-flowered whorls, rarely quite terminal; bracts usually many, linear or lanceolate, frequently enclosing the base of the whorls. *Calyx* tubular, 10-ribbed, the mouth straight or oblique, equally or unequally 6-10-toothed, often with a ring of hairs within the teeth, fruiting calyx often elongated. *Corolla* 2-lipped; tube included, annulate or naked within; upper lip erect concave externally, often densely and white- or tawny-villous, lower lip spreading, 3-lobed, the midlobe very large. *Stamens* 4, didynamous, the lower pair the longer; filaments ascending under the upper lip; anthers connivent, the cells divaricate, at length confluent. *Disk* entire or lobed, equal or glandular in front. *Ovary* 4-partite; style subulate at the apex, the upper lobe obsolete. *Fruit* of 4 ovoid triquetrous obtuse dry nutlets, the basal scar small.

Mouth of the calyx oblique :—

Longer side of the calyx-mouth anterior, tube prominently ribbed, reticulate and curved; bracts linear-lanceolate, ciliate; corolla-tube slender, .2 in. long, the upper lip .05, the lower .1 in.; whorls up to 1 in. in diam. in most axils; leaves thin, ovate, acute, rounded or slightly cuneate at base, more or less pubescent, coarsely crenate-serrate, up to 2.5 in. long, 1.5 in. broad, petiole to 1 in.

1. *urticaefolia*.

Longer side of the calyx-mouth posterior :—

Calyx-tube bent in the middle to curve outwards or downwards, the teeth long and slender :—

Calyx-tube sigmoidly curved, pubescent, ribbed and reticulate, the uppermost tooth nearly twice as long as the rest; bracts linear-lanceolate, villous, spinous-awned; corolla-lips nearly equal, short; whorls in most axils about 1 in. in diam.; leaves ovate or lanceolate, acuminate, cuneate at base, coarsely crenate-serrate, pubescent, up to 3.5 in. long, 1.5 in. broad, petiole to .75 in. .... 2. *martinicensis*.

Calyx-tube abruptly deflexed, villous, strongly ribbed, the teeth subequal; bracts thin, foliaceous, lanceolate, ciliate, .2-3 in. long; corolla with lower lip longer than upper; whorls in upper axils about .75 in. in diam.; leaves oblong-lanceolate, obtuse, shallowly serrate, hispid, up to 2 in. long, .5 in. broad, petiole very short. .... 3. *nulans*.

Calyx-tube erect, not bent in the middle :—

Mouth of the calyx-tube very oblique, the upper tooth long, the rest smaller :—

Bracts linear, finely pubescent, .2-.3 in. long, not long-ciliate; calyx-tube with upper and lower halves similar, glabrous or short-pubescent, .25 in. long; corolla with lower lip long and broad; whorls terminal and few at the ends of the branches, .5-.75 in. broad; leaves linear or narrowly linear-lanceolate, obtuse, entire or slightly serrate, pubescent, up to 3.5 in. long, .4 in. broad, petiole very short. .4. *linifolia*. Bracts linear, villous and long-ciliate :—

Calyx-tube uniform :—

Calyx prominently nerved and hispid, .25 in. long, the teeth all sharp; corolla very small, the upper and lower lips nearly equal; whorls close together in the uppermost axils, scarcely .5 in. in diam.; leaves sessile, linear, obtuse, entire or very distantly obscurely serrate, up to 2.5 in. long, .25 in. broad.....5. *Wightiana*.

Calyx not prominently nerved, hispid, .25 in. long, the teeth small; corolla large, the lower lip much longer than the upper, the midlobe broad; whorls terminal with one or more in adjacent axils as well, .5-.75 in. in diam., leaves subsessile, linear or linear-lanceolate, entire or distantly obscurely serrate, up to 4 in. long, .75 in. broad .....6. *zeylanica*.

Calyx-tube glabrous and membranous in the lower half, ribbed and hispid and with long bulbous-based hairs in the upper; corolla large, the lower lip twice as long as the upper, the midlobe obovate; whorls terminal and also sometimes in upper axils, dense, up to 1 in. in diam.; leaves linear- or oblong-lanceolate, obtuse, entire or crenate, pubescent, up to 3 in. long, .5 in. broad, petiole short

7. *aspera*.

Mouth of the calyx-tube slightly oblique, the teeth subequal :—

Whorls very large, terminal, globose, 1-2 in. in diam.; bracts foliaceous, imbricate, lanceolate, green, membranous, ciliate, .5-.75 in. long; calyx tubular, .75 in. long, glabrous below, villous above; leaves ovate or ovate-lanceolate, obtuse, membranous, crenate, pubescent, up to 4 in. long, 1.5 in. broad, petiole to .5 in.....8. *Cephalotes*.

Whorls small, under 1 in. in diam., mostly terminal; bracts stiff, linear, hispid and with few but prominent long bulbous-based bristles as on the calyx-tube :—

Calyx-teeth about .1 in. long or longer, subulate, the tube white-villous, ribbed and bristly near the mouth, often

nearly glabrous below ; leaves variable, linear or oblong, obtuse, hispid, up to 2 in. long, .5 or sometimes .75 in. broad, petiole very short.....9. *stricta*.  
 Calyx-teeth about .025 in. long, triangular, the tube curved, ribbed, hispid and bristly ; leaves linear or linear-oblong, obtuse, up to 1.5 in. long, .3 in. broad, sessile  
 10. *diffusa*.

Mouth of the calyx straight :—

Calyx-teeth erect, rarely spreading, throat naked ; whorls axillary :—  
 Whorls few-flowered, usually about 1-4 at any rate on each side ; bracts setaceous :—

Calyx-teeth very short, .05 in. long, triangular, tube obconical, ribbed, .3 in. long, villous ; leaves orbicular-ovate, obtuse, coarsely crenate, pubescent, 1 in. long, petiole to .5 in., slender  
 11. *nepetaefolia*.

Calyx-teeth subulate, .1 in. long, ciliate, tube campanulate, ribbed, .2-.25 in. long, villous, leaves variable, ovate or elliptic, obtuse or acute, rounded or cuneate at base, crenate-serrate, rarely over 1 in. long, .5 in. broad, the petiole short  
 12. *biflora*.

Whorls about 6- many-flowered, fewer on the branches than on main stems :—

Hairs on the branches erect or spreading, not deflexed, whole plant densely white-silky tomentose except the upper surface of the mature leaves usually softly villous only ; calyx-teeth very short, about .05 in., the tube .25-.35 in. ; leaves subsessile, thick, ovate or suborbicular, rounded at base, crenate-serrate, up to 2.5 in. long, 1.5 in. broad .....13. *lanata*.  
 Hairs on the branches deflexed :—

Calyx-teeth short, under .1 in. long ; bracts minute, linear.

Calyx-teeth subulate, about .05 in. long, the tube campanulate, ribbed, softly white villous, slightly curved, .25-.35 in. long :—

Leaves thick, ovate, obtuse, rounded at base, crenate, nearly glabrous above, densely white velvety tomentose beneath, up to 1.5 in. long, 1 in. broad, petiole very short.....14. *montana*.

Leaves rather thin, ovate or ovate-lanceolate, acute, cuneate at base, serrate, somewhat strigosely villous above, hoary-tomentose beneath, up to 4 in. long, 2 in. broad, petiole sometimes to nearly 1 in.

15. *mollissima*.



Calyx-teeth triangular, spreading, the tip spinulose, the tube funnel-shaped, ribbed, densely softly white-silky with a few long hairs, .3—5 in. long; leaves broadly ovate, acute or obtuse, cuneate at base, crenate or dentate, softly pubescent or tomentose, up to 2.5 in. long, 1.5 in. broad, petiole slender, .25—1.25 in. .... 16. *chinensis*.

Calyx-teeth usually over .1 in. long, but unequal, so some shorter, all slender and subulate :—

Bracts subulate, .25 in. long, shortly hispid; calyx-tube cylindric, hispid on the ribs, the teeth unequal, up to .15 in. long; leaves triangular-ovate or lanceolate, thin, acute, truncate rounded or almost cordate at base, coarsely crenate or serrate, pubescent, up to 3 in. long, 1.5 in. broad

17. *angularis*.

Bracts narrowly lanceolate or spatulate, acuminate, .4 in. long, long-ciliate; calyx-tube campanulate, hispid on the ribs, the teeth subequal, up to .1 in. long; leaves ovate or orbicular, thin, usually obtuse, truncate at base, coarsely crenate, pubescent, 1—1.5 in. in diam., petiole to .5 in. .... 18. *pubescens*.

Bracts filiform with long soft silky hairs, .5 in. long; calyx tubular, softly silky, the teeth unequal, up to .15 in. long, filiform; leaves thick, often tawny and rugose or bullate beneath when old, thinner and white-tomentose when younger, rounded or cordate at base, crenate, up to 2 in. long, 1.5 in. broad, petiole slender, .25—.5 in. long

19. *marrubioides*.

Calyx-teeth erect and usually stellately spreading, throat villous; whorls chiefly terminal, but sometimes also in upper axils :—

Leaves quite entire :—

Leaves at most 1—1.5 in. long, narrow, obtuse, coriaceous, with revolute margins :—

Branches fulvous, calyx fulvous or white-tomentose :—

Leaves linear, .5—1 in. long, .1—2 in. broad, white-tomentose beneath :—

Stems and leaves scaly and hispid with erect or spreading hairs; whorls 1—2 at the top of scapiform branches 6—10 in. long; bracts setaceous, villous, .125 in. long; calyx-teeth minute, about .025 in. long, the throat ring of hairs as long .... 20. *suffruticosa*.

Stems and leaves closely appressed-villous; whorls usually 2 at the ends of slender subterminal internodes

1-2 in. long; bracts subulate, .1 in. long; calyx-teeth minute, .025 in. long, the throat ring of hairs as long

21. *ternifolia*.

Leaves linear-oblong, 1-2 in. long, .2-.4 in. broad, white or tawny beneath; above fulvous-villous like the stems, with erect hairs; whorls many, crowded at the ends of the branches; bracts subulate, .25 in. long; calyx-teeth minute, .025 in. long, the throat ring of hairs long and dense .....

22. *helianthemifolia*.

Branches greenish-grey, strigose with erect hairs; leaves linear, obtuse, 1-2 in. long, .1-.15 in. broad, grey-villous beneath; whorls usually single, terminal or axillary on short peduncles; bracts linear-oblong, strigose, .2-.3 in. long; calyx-teeth triangular, .04 in. long, shorter than the prominent throat ring of hairs.....

23. *rosmarinifolia*.

Leaves up to 4 in. long, 1 in. broad, soft, chartaceous, lanceolate, scaberulous above, white-tomentose beneath, the margins very slightly revolute; whorls about 1 in. in diam., axillary to the 3-5 uppermost nodes; bracts linear, thick, .4 in. long; calyx-teeth very small but longer than the ring of hairs ..

24. *lanceaefolia*.

Leaves more or less serrate or crenate :—

Upper lip of corolla densely bearded with rufous hairs, villi of the calyx-throat white; whorls usually 1 or 2 terminal, large; bracts linear :—

Leaves lanceolate, acute, narrowed at base, crenate-serrate, tawny-villous, up to 4 in. long, 1.5 in. broad, petiole short; calyx-teeth short .....

25. *vestita*.

Leaves membranous, ovate, acute, narrowed at base, coarsely serrate, pubescent or glabrate, up to 5 in. long, 2.5 in. broad, petiole to 1 in.; calyx-teeth slender, spreading, ciliate, .1 in. long or longer.....

26. *ciliata*.

Upper lip of corolla densely bearded with white hairs; hairs of the stem and branches usually stiff, spreading or reflexed :—

Leaves thick, 3-5 in. long, ovate, acute, rounded or cordate at base, crenate, tawny-villous above, softly whitish-tomentose beneath, 1.5-2.5 in. broad; whorls large, usually 1-2 terminal, 1 in. in diam.; bracts linear-lanceolate, .4 in. long; calyx-teeth slender, .075 in. long, spreading..

27. *lamiifolia*.

Leaves narrow, usually under 1 in. broad, subobtusely, distinctly and shallowly crenate, the nerves few, very oblique :—

Leaves rather thick, oblong, tawny-pubescent, 1-3 in. long, shortly petioled; whorls 1-2 terminal, .75-1 in. in

diam. ; calyx-teeth subulate, spreading, about .05 in. long ; bracts linear-lanceolate .....28. *hirta*.  
 Leaves thick, linear-oblong or lanceolate up to 4 in. long, 1 in. broad, crenate, the 5-7 pairs of main nerves very oblique, impressed above, brown-hispid-pubescent, the hairs spreading ; whorls many, in upper axils, up to 1 in. in diam. ; calyx-teeth short, subulate, the villi conspicuous ; bracts linear, pectinately ciliate ..29. *eristoma*.  
 Leaves thin, linear-oblong, nearly glabrous, up to 4 in. long, shortly petioled ; whorls several in upper axils, .75 in. in diam. ; calyx-teeth recurved, very short, about .025 in. long ; the tube much constricted in the middle ; bracts filiform.....30. *stelligera*.  
 Leaves small, ovate, obtuse, rounded at base, crenate, tawny-hispid-pubescent, up to 1 in. long, .5 in. broad, the nerves about 4-5 pairs, not oblique, petiole to .3 in. ; whorls single, terminal, .75 in. in diam. ; bracts subulate, .3 in. long, ciliate ; calyx-teeth stiff and with stiff hairs, .1 in. long, as long as the dense villi ; the tube .25 in. long..31. *prostrata*.

1. *LEUCAS URTICAEFOLIA*, R. Br. ; F. B. I. iv. 680 ; Wt. Ic. t. 1451.

Deccan and Carnatic, on dry waste lands, often on black-cotton soil, common about Coimbatore, also about Tadpatri in Anantapur.

A soft annual herb with white flowers, the nutlets trigonous with the truncate top glandular.

2. *LEUCAS MARTINICENSIS*, R. Br. ; F. B. I. iv. 688.

Deccan and Carnatic, Horsleykonda at 4,000 ft., Ramandrúg in Bellary at 3,000 ft., hills of Salem and Coimbatore Districts, doubtfully indigenous.

A large herb with angular stems and white flowers, the nutlets trigonous with rounded back.

3. *LEUCAS NUTANS*, Spreng. ; F. B. I. iv. 688.

N. Circars, in Ganjam (Barker) ; Deccan, in Cuddapah (Gamble).

A dwarf trailing herb, diffusely branched, with angular stems and white flowers.

4. *LEUCAS LINIFOLIA*, Spreng. ; F. B. I. iv. 690.

N. Circars, Deccan and Carnatic, in pastures, waste lands and fallow fields, common.

An erect herb with rather large white flowers.

5. *LEUCAS WIGHTIANA*, Benth.; F. B. I. iv. 690.  
Carnatic and S. Travancore, at Cape Comorin (Lawson).  
A small erect scabrid herb.
6. *LEUCAS ZEYLANICA*, R. Br.; F. B. I. iv. 689; Wt. Ill. t. 176.  
W. Gháts, Nilgiris, Pulneys and hills of Travancore  
3,000–7,000 ft.; Shevaroy Hills of Salem.  
A large erect pubescent or hispid herb with white flowers.
7. *LEUCAS ASPERA*, Spreng.; F. B. I. iv. 690.  
Most plains Districts, and up to 3,000 ft., in fields and on  
waste land and roadsides, common.  
A coarse erect diffusely branched annual herb with white  
flowers, the stems hispid or scabrid.
8. *LEUCAS CEPHALOTES*, Spreng.; F. B. I. iv. 689; Wt. Ic. t.  
337 (not good).  
All plains Districts; a weed of cultivated land.  
A stout coarse herb with large terminal many-bracted  
conspicuous heads of white flowers, the corollas with the  
lower lip not much longer than the white-bearded upper.  
Vern. *Hind.* Dhurpi Ság.
9. *LEUCAS STRICTA*, Benth.; F. B. I. iv. 688.  
N. Circars, Ganjam to Godavari, near the coast; Deccan,  
in the Ceded Districts, Mysore and Salem.  
A small herb with 4-angled hispid slender stems and white  
flowers, the corollas with large obovate lower lip, much  
longer than the white-bearded upper.
10. *LEUCAS DIFFUSA*, Benth.; F. B. I. iv. 689.  
E. Coast Districts, from the Godavari southwards, usually  
on sandy pastures near the sea; Shevaroy Hills (Perrottet).  
A small diffuse herb with trailing branches and rather  
large white flowers.
11. *LEUCAS NEPETAEFOLIA*, Benth.; F. B. I. iv. 681.  
Deccan, Hyderabad journey (Heyne); Guntur District, at  
Bellamkonda (Cleghorn).  
A shrubby plant with hoary branchlets, the flowers white,  
the lower lip of the corolla hardly longer than the  
white-bearded upper.
12. *LEUCAS BIFLORA*, R. Br.; F. B. I. iv. 683; Wt. Ic. t. 866.  
Deccan and Carnatic and the lower E. slopes of the  
Gháts, southwards to S. Travancore; dry places on the  
W. Coast.

A slender procumbent softly pubescent herb, often straggling up and apparently climbing, the branches long, 4-angled, the flowers usually in pairs, corollas white.

Var. *procumbens*. *L. procumbens*, Desf.; F. B. I. iv. 683. Glabrous and with usually narrower leaves, shorter calyx-teeth and longer pedicels, but scarcely separable from the species.

Hills of S. Canara and Mysore.

13. *LEUCAS LANATA*, Benth.; F. B. I. iv. 681.

Hills of the Deccan and Carnatic, in dry places at low levels. N. slopes of Nilgiris, up to 3,000 ft.

An erect plant with many silky branches from a stout rootstock, the corollas rather large, white, with broad lower lip, longer than the white-bearded upper.

14. *LEUCAS MONTANA*, Spreng.; F. B. I. iv. 682.

N. Circars, on Mahendragiri, 4,500 ft. (Gamble), hills of Vizagapatam; Deccan, Kambakam Drúg, Ramandrúg in Bellary, at 3,000 ft.; N. side of Nilgiris at 3,000 ft.

A straggling undershrub with white flowers.

Var. *Wightii*, Hook. f. Calyx funnel-shaped, nearly 5 in. long, upper surface of leaves strigose, whorls many-flowered. Locality doubtful (Hb. Wight).

15. *LEUCAS MOLLISSIMA*, Wall.; F. B. I. iv. 682.

Var. *scaberula*, Hook. f.

N. Circars, forests of Ganjam and Vizagapatam; Rampa and Bison Hills of Godavari, to 2,000 ft.; hills of Mysore (Meebold).

A straggling slenderly branched herb, sometimes climbing among bushes, the flowers white. Young leaves are often very silky, but the tomentum disappears as they get older and larger.

16. *LEUCAS CHINENSIS*, R. Br.; F. B. I. iv. 681.

W. Gháts, hills of Malabar, Anamalai and Pulney Hills, at 3,000–4,000 ft. or higher.

A somewhat shrubby straggling plant very variable in thickness of leaf and clothing, probably according to light and shade, the corollas white with the lower lip rather longer than the upper. The calyx-tube is villous on the upper half within but is not fringed at the mouth.

17. *LEUCAS ANGULARIS*, Benth.; F. B. I. iv. 684. *L. marrubiioides*, var. *pulneyensis*, Hook. f.; F. B. I. iv. 684.

W. Gháts, Nilgiris, Pulneys and hills of Travancore, in evergreen forests at 3,000–5,000 ft. and perhaps higher.

A herbaceous plant with long straggling branches and rather large white flowers.

18. *LEUCAS PUBESCENS*, Benth.; F. B. I. iv. 684.

Without locality (Wight); Nilgiris, at 5,000 ft. (Clarke) ?

An erect herb with characteristic round broadly crenate leaves and white flowers.

19. *LEUCAS MARRUBIODES*, Desf.; F. B. I. iv. 683.

W. Gháts, hills of Mysore and N. Coimbatore, Nilgiris, at 3,000–7,000 ft., less common in Pulneys (Wight).

A stout straggling herb, the flowers white and large in very white-silky whorls with rather long internodes, the old leaves with the nerves impressed.

20. *LEUCAS SUFFRUTICOSA*, Benth.; F. B. I. iv. 685; Wt. Ic. t. 1454.

W. Gháts, Nilgiri Hills, on the downs at and about 7,000 ft.

A low undershrub with many slender stems from a thick woody rootstock, the corolla white, the upper lip prominently white-bearded.

21. *LEUCAS TERNIFOLIA*, Desf. *L. helianthemifolia*, Hook. f.; F. B. I. iv. 685 *in part*.

W. Gháts, Anamalais, Pulneys and hills of Travancore, at high levels, above 6,000 ft.

An undershrub with conspicuous smooth golden pubescence, having many slender branches from a stout rootstock. The whorls resemble those of the last species but they have not the long peduncle-like internodes.

22. *LEUCAS HELIANTHEMIFOLIA*, Desf.; F. B. I. iv. 685 *in part*. *L. ternifolia*, Wt. Ic. t. 1453, *not of Desf.*

W. Gháts, Nilgiri Hills, at 5,000–7,000 ft., Pulneys scarce.

A small shrub, with very white or tawny wool on the inflorescence, only the upper surface of the leaves green. The corollas are white and the white wool of the upper lip very thick. The leaves are usually ternate or, as Wight says, ternate below, opposite above.

23. *LEUCAS ROSMARINIFOLIA*, Benth.; F. B. I. iv. 685; Wt. Ic. t. 1455.

W. Gháts, Nilgiri Hills, above 6,000 ft., often on roadsides.

A grey-green rather compact small shrub with the narrow leaves fascicled, many together, at the nodes. Flowers white in very silky whorls with rather large bracts.

24. *LEUCAS LANCEAEFOLIA*, Desf.; F. B. I. iv. 685; Wt. Ic. t. 1452.

W. Gháts, Nilgiri and Pulney Hills, above 6,000 ft., more or less gregarious on the margins of Shola woods.

A shrub, reaching 6-8 ft., and very bushy. Flowers white, rather small. Bark thin, grey; wood light brown. Some of the Pulney specimens show very faint shallow crenatures to the leaves.

25. *LEUCAS VESTITA*, Benth.; F. B. I. iv. 686; Wt. Ic. t. 338. S. E. Wynaad (Lawson); Pulney Hills and hills of Tinnevely and Travancore, at low levels.

A tall tawny-villous soft herb with white lower lip to the corolla, the rufous upper lip characteristic.

26. *LEUCAS CILIATA*, Benth.; F. B. I. iv. 687.

W. Gháts, hills of S. Canara, Coorg, Mysore, to the S.E. Wynaad at 3,000 ft.

A straggling aromatic loosely branched herb, the corolla with upper lip clothed with yellowish-brown hairs (Cooke). the whorls very scabrous hispid.

27. *LEUCAS LAMIIFOLIA*, Desf.; F. B. I. iv. 686.

W. Gháts, Nilgiris, at 6,000 ft.; common in "Old Forest," Coonoor.

A large straggling herb with tawny villous stem and leaves.

28. *LEUCAS HIRTA*, Spr.; F. B. I. iv. 687.

Deccan, in hilly country, up to 4,000 ft. on Horsley-konda; W. Gháts, in all Districts from S. Canara to Tinnevely.

A sub-shrubby branching herb from a stout rootstock, the leaves and stems variable in pubescence.

Var. *Beddomei*, Hook. f. Softly villous with spreading hairs the whorls more numerous, the villi of the calyx-mouth fewer and shorter. The hairs on the corolla upper lip seem to have a brown tinge.

Hills of S. Canara and Wynaad at 5,000–6,000 ft. (Beddome).

29. *LEUCAS ERIOSTOMA*, Hook. f.; F. B. I. iv. 686.

W. Gháts, in S. Canara (Barber), Wynaad (Heyne, de Montholon), Brumagiri Hills, 4,000–5,000 ft. (Fischer).

An undershrub with long narrow leaves, probably not very distinct from *L. hirta*, Spr.

Var. *latifolia*, Hook. f. Stouter and with many and larger whorls, the leaves broader. Nilgiri or Coorg (G. Thomson).

Var. *lanata*, Hook. f. Branches and inflorescence clothed with long soft white spreading hairs, the whorls smaller.

Bababudan Hills of Mysore, also Nilgiris (Wight, Meebold).

30. *LEUCAS STELLIGERA*, Wall.; F. B. I. iv. 686. *L. eriostoma*, var. *longifolia*, Hook. f.; F. B. I. iv. 686.

W. Gháts, hills of S. Canara and Mysore to Nilgiris, up to 3,000 ft.

An erect branching herb with usually simply pubescent stems, sometimes with long spreading hairs.

31. *LEUCAS PROSTRATA*, Gamble n. comb. *L. hirta*, Spr., var. *prostrata*, Hook. f.; F. B. I. iv. 687.

W. Gháts, Nilgiris, above 5,000 ft., Anamalais (Beddome); Shevaroy Hills.

A low herb, with many hispid prostrate branches from a knotty rootstock, often rooting at the nodes, the scapes sometimes long and slender.

## 22. *Leonotis*, R. Br.

Herbs or shrubs, stems 4-gonous. *Leaves* opposite; floral leaves similar but smaller. *Flowers* large, scarlet or yellow, in axillary dense many-flowered whorls; bracts numerous, slender. *Calyx* 10-ribbed, tubular, the tube often incurved; mouth oblique with 8–10 rigid teeth, the upper tooth the largest. *Corolla* 2-lipped, the upper lip long, concave, with a villous crown, the lower lip small, 3-lobed, the mid-lobe largest. *Stamens* 4, didynamous, the lower pair longer, ascending; anthers connivent, the cells divaricate. *Disk* equal. *Ovary* 4-partite; style subulate, the upper lobe very short. *Fruit* of 4 oblong ovoid or obovoid, triquetrous, obtuse or truncate, dry nutlets, the basal scar small.



Calyx 1 in. long in all, the tube curved, the teeth very unequal and tipped with slender spines, the uppermost much the largest; corolla 1 in. long, the upper lip .5 in.; leaves broadly ovate, long-petioled, up to 8 in. long, 5 in. broad, coarsely serrate.....*L. nepetaefolia*. Calyx .5-.75 in. long, the tube straight, the teeth very small subequal; corolla 2 in. long or more, the upper lip nearly 1 in.; leaves oblong-lanceolate, short-petioled, obtuse and shortly serrate.....*Leonurus*.

LEONOTIS NEPETAEFOLIA, R. Br.; F. B. I. iv. 691; Wt. Ic. t. 867.

Most plains Districts, on roadsides and in waste places, chiefly near villages, often cultivated, doubtfully indigenous. A tall herb reaching 6 ft. high with obtusely 4-angled stems, long internodes and spinous whorls of orange-scarlet flowers, the upper lip densely woolly.

*L. Leonurus*, R. Br., is sometimes found in gardens and is easily recognized by the very long orange-scarlet handsome corolla. It is native of S. Africa.

### 23. Salvia, Linn.

Herbs or shrubs of various habits. *Flowers* small or large and showy, whorls usually racemose or spicate; bracts small or large and often coloured. *Calyx* tubular or campanulate, 2-lipped, throat naked; upper lip entire or 3-lobed, lower 2-fid. *Corolla* 2-lipped; tube naked or with a ring of hairs inside; upper lip erect, entire; lower 3-lobed, the lateral lobes spreading. *Stamens* 2 (the lower pair) perfect, the upper pair reduced to staminodes or obsolete; filaments short, articulate with the slender connective, sometimes produced beyond the joint; anthers dimidiate, connective linear, transverse. the posterior arm ascending and bearing a linear fertile cell, the anterior arm straight or deflexed, with a fertile or empty cell or naked. *Disk* usually enlarged in front. *Ovary* 4-partite; style shortly bifid, the lobes equal or the anterior longer. *Fruit* of 4 ovoid-triangular dry smooth nutlets, the basal scar small.

SALVIA PLEBEIA, R. Br.; F. B. I. iv. 655.

Most plains Districts, a weed of roadsides and waste land.

An erect pubescent herb with very small lilac or white flowers in whorls in panicles of slender racemes especially

in fruit when the calyx is much enlarged. Leaves petioled, oblong-lanceolate or -spathulate, crenate, 2-5 in. long. Nutlets mucilaginous when wetted.

*Salvia officinalis*, Linn., is the Sage plant occasionally cultivated in gardens. Several species are also cultivated in gardens for their showy flowers.

#### 24. *Gomphostemma*, Wall.

Herbs or undershrubs, stellately pubescent or tomentose, the roots often bearing tubers. Leaves opposite, large, entire or dentate or crenate, floral leaves similar or bract-like. Flowers rather large, usually yellow, in short cymes forming whorls which are axillary or in dense terminal spikes; bracts many, usually linear. Calyx campanulate, equally 5-lobed, 10-ribbed. Corolla 2-lipped; tube slender, the throat more or less dilated; upper lip hooded, lower broadly 3-lobed, the lobes spreading. Stamens 4, didynamous, ascending, the lower pair the longer; anthers approximate in pairs, 2-celled, the cells parallel. Disk uniform or slightly swollen. Ovary 4-partite, style slender, 2-fid, the lobes subulate, nearly equal. Fruit of 4, or, by reduction, 3-1 glabrous or pubescent, corky or fleshy nutlets, the basal scar broad.

Whorls combined in terminal spikes, sometimes with others axillary in upper nodes as well; floral leaves elliptic-ovate, cordate; calyx-lobes lanceolate, acuminate, .5 in. long; corolla-tube .4 in. long, slender, lower lip as long, broad; leaves elliptic ovate, subacute, rounded and then abruptly and acuminately decurrent on the petiole, closely serrate, shortly hirsute above, densely tomentose beneath, up to 9 in. long, 5 in. broad.....1. *Heyneanum*.  
Whorls axillary; calyx-teeth slender, corolla-tube elongate:—

Cymes of the whorls pedunculate; calyx-teeth subulate, very grey stellate hairy, .2 in. long; corolla 1 in. long, glabrate; floral leaves lanceolate; bracts linear; leaves elliptic to oblanceolate, acuminate, distantly shallowly crenate, up to 9 in. long, 4-5 in. broad.....2. *parviflorum*.  
Cymes of the whorls sessile; calyx-teeth very slender, .15-.25 in. long, subglabrous; corolla 1 in. long, villous without; floral leaves ovate; bracts lanceolate; leaves elliptic-oblong or lanceolate, acute, sharply dentate, up to 6 in. long, 2 in. broad

3. *eriocarpon*.

1. GOMPHOSTEMMA HEYNEANUM. Wall.; Wt. Ic. t. 1456; Prain, Ann. Calc. iii. t. 79. *G. strobilinum*, Wall., var. *Heynema*, Hook. f; F. B. I. iv. 696.

W. Gháts, S. E. Wynaad at 3,000 ft. (Lawson), Anamalai Hills at 3,000 ft. (Gamble), evergreen forests of Travancore (K. Venkoba Row), hills of Tinnevely.

A tall shrubby herbaceous plant, covered with stellate hairs, the flowers yellow (Lawson, Gamble), blue with purple tinge (Wight), the nutlets glabrous.

Var. *Rottleri*, Prain, Ann. Calc. iii. t. 80. Leaves crenate, the upper surface less hirsute, the stems furrowed.

W. Gháts, Mudumalai forest at 2,000 ft. (Gamble), Anamalai Hills (Barber), hills of Travancore and Tinnevely (Rottler, Wight).

2. GOMPHOSTEMMA PARVIFLORUM, Wall.; F. B. I. iv. 697; Prain, Ann. Calc. iii. t. 87 (var. *farinosa*).

N. Circars, hills of Ganjam at 3,000 ft. (Barber), Rangalu in Vizagapatam at 3,400 ft. (A. W. Lushington).

An erect large herb, softly stellate tomentose, the flowers yellow.

3. GOMPHOSTEMMA ERIOCARPON, Benth.; F. B. I. iv. 698; Prain, Ann. Calc. iii. t. 90. *G. oblongum*, Wt. Ic. t. 1457, not of Wall.

W. Gháts, Anamalai Hills and hills of Travancore and Tinnevely, at about 2,000 ft., in evergreen forests.

A slender erect herbaceous plant with simple or stellate hairs, the flowers yellow, the nutlets tomentose.

## 25. Teucrium, Linn.

Herbs or shrubs. *Leaves* opposite, entire serrate or lobed, floral leaves often bract-like. *Flowers* usually small, in whorls of 2-6, in axillary or terminal spikes, racemes or heads. *Calyx* 2-lipped, 10-ribbed; teeth 5, the uppermost usually largest. *Corolla*-tube not annulate; limb 1-lipped, the 2 upper and the lateral lobes short or even obsolete, the end lobe large. *Stamens* 4, didynamous, the lower pair longest, all exserted; anthers reniform, the cells short, at length confluent. *Disk* equal. *Ovary* 4-lobed; style bifid, the lobes subequal. *Fruit* of 4 obovoid rugosely reticulate nutlets, the scar oblique or lateral, large.

Inflorescence densely villous with tawny often glandular hairs, the racemes in close panicles; bracts lanceolate; upper and side lobes of corolla-lip short and rounded:—

Leaves thin, ovate, acute, truncate or cuneate and entire at base, rest serrate or crenate, often doubly, sparsely pubescent above, more so beneath, up to 3 in. long, 2 in. broad, petiole slender, .5–1.5 in. long.....1. *tomentosum*.

Leaves thick, ovate, obtuse, rounded or cordate at base, crenulate, rugose and strigosely hairy on both surfaces, up to 1.5 in. long, 1 in. broad, petiole stout, .25–.5 in. long.....2. *Wightii*.

Inflorescence with few glandular hairs, glabrescent, the racemes in slender leafy panicles; bracts linear-lanceolate; upper lobes of corolla lip curved acuminate, side lobes acute; leaves thin, ovate, acute, rounded or cordate at base and then often acutely decurrent, sharply serrate, nearly glabrous above, minutely puberulous beneath, up to 2 in. long, 1.5 in. broad, petiole slender, .5–.75 in. long

3. *plectranthoides*.

1. *TEUCRIUM TOMENTOSUM*, Heyne; F. B. I. iv. 700.

W. Gháts, Nilgiris, Pulneys and hills of Tinnevely and Travancore, up to about 5,000 ft.; Bababudan Hills of Mysore; Kollimalai Hills of Trichinopoly.

An erect copiously flowering herb reaching 3 ft. in height, the flowers apparently yellowish (Benth.), the nutlets globose, granulate.

2. *TEUCRIUM WIGHTII*, Hook. f.; F. B. I. iv. 701. *T. tomentosum*, Wt. Ic. t. 1458, *not of* Heyne.

W. Gháts, Nilgiri Hills about Doddabetta at 7,000–8,000 ft., in dry rocky places.

A thick stout herb with short branches and pale purple flowers (Fyson).

3. *TEUCRIUM PLECTRANTHOIDES*, Gamble in Kew Bull., 1924, ined.

W. Gháts, near Sengalteri, Tinnevely (Hb. Madr.).

A slender erect herb with 4-angled stems, almost glabrous and with the flowers in spreading panicles of open racemes, the corolla rather large.

26. *Ajuga*, Linn.

Herbs, often decumbent or stoloniferous. *Leaves* opposite, usually coarsely toothed, floral leaves subsimilar. *Flowers* sessile

in 2- or more-flowered whorls, axillary or in terminal leafy spikes. *Calyx* 5-lobed, lobes subequal. *Corolla* 2-lipped; tube often annulate within, straight or dilated and curved; upper lip short, 2-fid, lower lip spreading, the mid-lobe largest. *Stamens* 4, didynamous, ascending, the lower pair longest, exerted or included; anthers 2-celled, the cells divaricate, at length confluent. *Disk* uniform or swollen behind. *Ovary* 4-lobed; style slender, 2-fid, the stigmatic lobes nearly equal. *Fruit* of 4 obovoid rugosely reticulate nutlets, the scar lateral, large.

*AJUGA MACROSPERMA*, Wall.; F. B. I. iv. 704.

N. Circars, in Ganjam, up to 4,500 ft. on Mahendragiri (Beddome, Gamble, Barber).

A decumbent villous herb with blue flowers, the leaves soft, ovate or ovate-oblong, coarsely dentate, up to 4 in. long, 2 in. broad.

*Nepeta ruderalis*. Ham., is an aromatic herb believed to be occasionally found on roadsides and waste lands in Northern Districts, though actual Madras specimens have not been examined.

*Meriandra bengalensis*, Benth., is the Bengal Sage, a pretty though straggling shrub with leaves like those of the cultivated sage (*Salvia officinalis*, Linn.) but strongly smelling of camphor. It is often cultivated and frequently found run wild. Its home is Abyssinia.

#### Family CXVI. PLANTAGINACEÆ.

Scapigerous herbs. *Leaves* usually radical. *Flowers* small, greenish, spicate, often dimorphic, bracteate. *Sepals* 4, imbricate in bud, persistent. *Corolla* hypogynous, scarious, salver-shaped; lobes 4, short, imbricate in bud. *Stamens* 4, inserted on the corolla-tube; filaments capillary, persistent; anthers large, pendulous, versatile. *Ovary* superior, 1-4-celled; ovules 1 or more in each cell; style filiform with 2 lines of stigmatic hairs. *Fruit* a small membranous capsule, 1-4-celled, dehiscence circumscissile. *Seeds* usually peltate, attached by the centre; testa thin, mucilaginous; albumen fleshy; embryo cylindric, transverse; radicle inferior.

**Plantago, Linn.**

## CHARACTERS OF THE FAMILY.

PLANTAGO ASIATICA, Linn.; Wt. Ill. t. 177. *P. major*, Hook. f.; F. B. I. iv. 705 *in part*.

Nilgiri and Pulney Hills, at high levels, in waste places and by roadsides. Plantain.

A perennial herb with erect stout rootstock and radical leaves, these are ovate, entire or more usually coarsely dentate or lobed, 3-5-ribbed, long-petioled, the flowers in long spikes with rather large bracts, the capsules many-seeded. It differs somewhat from the common European weed *P. major*, Linn.

*P. lanceolata*, Linn., the Ribwort Plantain, is occasionally found in the Nilgiris, probably introduced, as suggested by Trimien for Ceylon, with British grass-seed.