FLORA

OF

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THE FLORA OF BRITISH INDIA.

BY

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ASSISTED BY VARIOUS BOTANISTS.

VOL. II.

SABIACEÆ TO CORNACEÆ.

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ADDENDA.

P. 307. Under Tribe III. Spirææ, insert:—

Seeds linear, testa membranous, albumen scanty or 0 .... 7. Spiræa.
Seeds turgid, testa crustaceous, albumen copious .... 7*. Neillia.

P. 326. Before 8. Rubus, insert:—

7*. Neillia, Don.

Perennial shrubs. Leaves alternate, simple; stipules large, deciduous. Flowers racemel or paniced, white. Calyx persistent; tube campanulate; lobes 5. Petals 5. Stamens 10 or more. Disc lining the calyx-tube. Carpels 1-5, free or connate ventrally; ovules few or many. Follicles coriaceous or membranous. Seeds few or many, turgid; testa crustaceous, albumen copious.

-Distrib. Species 4 or 5, natives of the Himalaya, Java, N.E. Asia, and N. America.

1. N. thyrsiflora, Don Prodr. 228; stipules usually serrate, racemes slender paniced, bracteoles usually toothed, calyx silky. DC. Prodr. ii. 546; Wall. Cat. 698; Hook. f. & Thoms. in Journ. Linn. Soc. ii. 75. N. virgata, Wall. Cat. 7108. Adenilema fallax, Blume Bijd. 1121.

Central and Eastern Temperate Himalaya, alt. 5-8000 ft. Khasia Mts., alt. 5-7000 ft.—Distrib. Java.

A large shrub, with drooping slender leafy branches. Leaves 2 by 1½ in., ovatecordate, 3-lobed; lobes shallow, acute, sharply irregularly toothed or serrate. Panicles 3-8 in. Flowers shortly pedicelled. Calyx-tube ⅛ in., base rounded; lobes shorter than the tube, lanceolate, acute, in fruit often clothed with long rigid gland-tipped bristles. Petals small, white, oblong or orbiculate. Fruit inclosed in the calyx, of 1 carpel.

2. N. rubiflora, Don Prodr. 229; racemes solitary or shortly paniced, stipules and bracteoles usually quite entire, calyx tomentose. DC. Prodr. ii. 547; Hook. f. & Thoms. in Journ. Linn. Soc. ii. 75; Wall. Cat. 687.

Central and Eastern Temperate Himalaya; Nipal, Wallich; Sikkim, alt. 8-10,000 ft., J. D. H.

Very similar to N. thyrsiflora in foliage, but leaves usually more deeply lobed; inflorescence always much shorter, petals larger, and calyx tomentose.
Errata in Vol. II. Pt. III.

P. 404. Hydrangea altissima is a scandent tree (J. D. H.)

,, 413. Crassula indica has the stem-leaves alternate.

,, 415. Kalanchoe brasiliensis should include K. olivacea, Dalz. in Dalz. & Gibbs, Bomb. Fl. 313.

,, 417. l. 3. Stamens 5 in some flowers, 10 in others (W. B. Hemsley).

,, 445. Terminalia bellerica should include T. attenuata, Edgew. in Trans. Linn. Soc. xx. 46.


,, 607, l. 38, under T. multiflora, in place of only half-way down read very rarely only half-way down.

,, 622. Add Bryonia dioica, Jacq. collected in Lahul by Dr. Aitchison.

,, 631. For Thladiantha dubia, Bunge read T. calcarata, C. B. Clarke in Journ. Linn. Soc. xv. 126—(Momordica calcarata, Coleb.). The Indian T. calcarata has fenestrate fruit, thus differing specifically from the Japanese T. dubia. The confusion has arisen under Bot. Mag. t. 5469, which represents the plant of T. dubia but the fruit of T. calcarata (Cogniaux).

,, 613. Begonia fallax. The type specimen of this species, lately found in Wight's private Herbarium, is B. malabarica, Lamk.

,, 705, l. 5. The Kumaon plant collected by Strachey and Winterbottom is Trachydium Roylei. Hence Pleurospermum stellatum is known (very imperfectly) only by the example of Royle. The plant described as Var. Lindleyana is a different species, but it is very doubtful whether it is the same as Royle's (W. B. Hemsley).

Hooker's Flora of India, Pt. VII.

1. S. campanulata, Wall. in Roxb. Fl. Ind. ed. Carey, ii. 311; Cat. 2; leaves oblong acuminate puberulous base acute, petals elliptic nerve,ments subulate much shorter than the petals. Hook. f. & T. Fl. Ind. i.

2 Brandis, For. Flor. 110.

Temperate Himalaya; from Simla, alt. 5000 ft., to Sikkim, alt. 9-10,000 ft. A climbing shrub. Leaves 2-4 by 3-1½ in., membranous, puberulous on both faces, nerves reticulate. Peduncles 1-2 in., subclavate. Flowers ⅓ in. diam., VOL. II.
FLORA OF BRITISH INDIA.

ORDER XLV. SABIACEAE. (By J. D. Hooker.)

Climbing or erect shrubs or erect trees, glabrous or with simple hairs. Leaves alternate, exstipulate, simple or compound. Flowers small or minute, hermaphrodite or polygalous, usually panicled. Calyx 4–5-partite, imbricate. Petals 4–5, equal or unequal, opposite or alternate with the sepals, imbricate. Disk usually small, annular. Stamens 4–5, opposite the petals, inserted at the base of or on the disk, all perfect or two only perfect and three without anthers; filaments clavate, flattened or subulate; anthers didymous, cells distant bursting transversely or by a deciduous cap. Ovary 2–3-celled, compressed or 2–3-lobed; styles 2–3, free or connate or 0, stigmas punctiform; ovules 1–2 in each cell. Ripe carpels 1–2, dry or fleshy, indehiscent. Seeds compressed or globose, basilar, hilum broad, testa membranous or coriaceous, albumen 0; embryo various, cotyledons often contorted, radicle deflexed. — Distrib. A small chiefly Indian order, with 4 genera and about 35 species.

1. SABIA, Coleb.

Climbing or sarmentose shrubs; branches with the bud-scales persistent at their bases. Leaves quite entire. Flowers axillary, solitary, cymose, 2-bracteate; bracts, calyx, corolla, stamens and carpels all opposite. Calyx 4–5-partite. Petals 4–5, with transparent ines, green, purplish or yellow. Disk annular, 4–5-lobed. Stamens 4–5, aserted at the base of the disk; anthers extrorse or introrse. Carpels 2, rarely cohering slightly; styles 2, erect, terminal, cohering slightly; ovules 2 in each carpel, collateral or superposed, horizontal. Ripe carpels 1 or 2, gibbous, with a subbasal style, dry or drupaceous. Seed reniform, testa coriaceous, cotted; embryo curved, cotyledons straight or incurved flat rugose or undulate, radicle cylindric. — Distrib. About 10 species, natives of tropical and temperate India.

* Peduncles 1-flowered.

1. S. campanulata, Wall. in Roxb. Fl. Ind. ed. Carey, ii. 311; Cat. 302; leaves oblong acuminate puberulous base acute, petals elliptic nerved, laminae subulate much shorter than the petals. Hook. f. & T. Fl. Ind. i. 90; Brandis, For. Flor. 110.

Temperate Himalaya; from Simla, alt. 5000 ft., to Sikkim, alt. 9–10,000 ft.

A climbing shrub. Leaves 2–4 by ¼–½ in., membranous, puberulous on both surfaces, nerves reticulate. Peduncles 1–2 in., subclavate. Flowers ½ in. diam.,

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subglobose or campanulate, green. *Sepals* orbicular. *Petals* \( \frac{3}{4} \) long, enlarging and persistent after flowering. *Anthers* extrorse. *Drupe* 2½ in., pale blue, orbicular, compressed.

2. *S. leptandra*, Hook. f. & T. Fl. Ind. i. 200; leaves elliptic or oblong acuminate, glabrous base rounded, petals elliptic-oblong obtuse, filaments elongate.

**Sikkim Himalaya**: alt. 5-7000 ft. J. D. H.

A shrub. *Leaves* thinly coriaceous, very variable in size and usually 3-4 by 1-1\( \frac{1}{4} \) in., rarely 6 by 3 in., beautifully reticulated between the few oblique nerves. *Peduncles* 1-2 in. *Flowers* campanulate, greenish-purple. *Sepals* 5, rounded. *Petals* \( \frac{3}{4} \) in. long, punctate. *Filaments* ligulate, anthers extrorse. *Drupe* as in *S. campanulata*.

*Flowers in 5- or more-flowered cymes or panicles.*


**Khasia Mrs.**, alt. 4-6000 ft. Wallich, etc.

*Leaves* 2-3 by \( \frac{1}{2} \) to 1 in., often 6 by 2\( \frac{1}{4} \) in. on the flowerless branches, glabrous, thinly coriaceous; nerves oblique, uniting far within the margin. *Peduncles* long, irregularly branched. *Flowers* small, purplish. *Sepals* ovate, subacute. *Petals* ovate-lanceolate, 5-nerved. *Drupe* as in *S. campanulata*.

4. *S. malabarica*, Bedd. Ic. Pl. Ind. Or. t. 177; leaves elliptic-oblong acuminate margins waved base rounded, cymes very short 2-6-flowered, petals elliptic obtuse, filaments subulate.

**Western Peninsula**: Anamallay hills, alt. 3-4000 ft., Beddome.

A climbing shrub, quite glabrous. *Leaves* 3-5 by 1-1\( \frac{3}{4} \) in., thinly coriaceous, pale, margin cartilaginous; nerves many, spreading, much reticulated beneath; petiole \( \frac{1}{2} \) to 1 in. *Peduncle* 1-2 in. *Flowers* \( \frac{1}{2} \) in. diam. *Sepals* small, ovate, acute, ciliate. *Petals* glabrous. *Stamens* shorter than the petals. *Filaments* slender. *Anthers* didymous, cells diverging. *Ovules* subcollateral. *Drupe* \( \frac{1}{4} \) in., reniform, reticulated.—Beddome figures the petals as connate at the base.


**Subtropical and Temperate Himalaya**: from Kumroon to Sikkim, alt. 3-6000 ft.

A climbing shrub; branches very slender, tips puberulous. *Leaves* 2-4 by 3-1\( \frac{1}{4} \) in., thinly coriaceous, glabrous, pale beneath, nerves almost horizontal. *Bracts* minute, ciliate. *Flowers* minute. *Sepals* ovate, ciliate. *Petals* narrowly oblong, 5-nerved. *Filaments* ligulate. *Drupe* \( \frac{3}{4} \) in., obvoboid, oblong or subglobose; stone compressed.


**Khasia Mrs.**, Silhet and Assam, from the sea level to 4000 ft.

A climbing shrub. *Leaves* 4-7 by 1\( \frac{1}{2} \) to 2\( \frac{1}{4} \) in., shining above, glaucous beneath, thinly coriaceous, nerves nearly horizontal, petiole \( \frac{1}{4} \) to \( \frac{1}{2} \) in. *Peduncles* 1\( \frac{1}{2} \) to 2 in., slender, sometimes supra-axillary. *Flowers* greenish, sweet-scented. *Sepals* ovate, acute. *Petals* \( \frac{1}{4} \) in., subacute. *Filaments* subulate. *Anthers* introrse. *Drupe* \( \frac{3}{4} \) in., pulpy, blue; stone rугose, compressed.

Tropical Sikkim, Bhutan, and the Khasia Mts., ascending to 3000 ft.; Silhet, Assam and Chittagong.

A lofty climber. Leaves 3–7 by 1½–2½ in., base rounded or acute, much reticulate when dry; nerves oblique, incurved. Panicles reddish, quite glabrous, axillary or a little supra-axillary, with persistent bud-scales at their bases. Flowers minute, yellowish. Sepals orbicular. Petals ⅔ in., shortly clawed, obovate, 5-nerved, fleshy. Filaments fleshy, incurved.—This approaches the Javanese *S. meniscocarpa*, Bl.

8. **S. paniculata**, Edw.y. in Hook. f. & T. Fl. Ind. i. 211; branches glabrous, leaves elliptic- or oblong-lanceolate acute coriaceous base rounded or acute, panicles long pilose, petals oblong, stamens included. Brandis For. Flor. 117.


9. **S. tomentosa**, Hook. f.; branches and nerves of leaves beneath tomentose, leaves elliptic or elliptic-lanceolate acute, petiole very short, panicles branched many-flowered and glabrous, petals linear-oblong, stamens included.

Upper Assam? alt. 3500 ft., Griffith. Branches slender, the younger clothed with soft spreading hairs, as are the petioles. Leaves 2½ by 1 in., rather coriaceous, bullate between the spreading nerves, which are very prominent and hairy beneath; petiole ½ in. Panicle much branched, many-flowered, peduncle puberulous; branches and pedicels slender, glabrous. Flowers ⅔ in. diam. Filaments ligulate, shorter than the petals. Fruit didymous, of two obovoid diverging rugose subcompressed carpels, each nearly ⅔ in. long.—The only specimen I have seen has but two leaves, and is remarkable for its very short petioles and tomentum. There is no habitat on the ticket, which resembles those of Griffith's journey from Upper Assam to Birma. It contains the following inscription:—

"Sabia sp., fructibus subtortundis. 15. Alt. 3500."


**Andaman Islds., Kurz.**

Leaves 6–8 in, acuminate at both ends. Flowers small, white, pedicels ¼ in., slender, thickened above. Sepals glabrous, ovate, obtuse. Petals almost ¾ in. long. Stigmas horse-shoe shaped. Fruit unknown.—I know nothing of this species beyond Kurz’s description.

2. **MELOSMA**, Blume.

(Millingtonia, Roxb., Wellingtonia, Meissn.)

Trees or shrubs, usually pubescent or tomentose. Leaves simple or odd-pinnate; leaflets subopposite, the terminal rarely wanting. Flowers in branched terminal or terminal and axillary panicles, small or minute, hermaphrodite; bracts caducous. Bracteoles and sepals 5–9, persistent, forming an uninterrupted whorl round the much larger petals, outer smaller. Petals 5; 3 large, nearly orbicular, valvate, or imbricate; 2 smaller, interior, placed behind the fertile
stamens, either membranous and nearly free, or reduced to a bifid scale adnate to the filament. *Stamens 5*; 2 fertile, opposite the smaller petals, filament short, flattened, incurved, expanded at the top into a cup, which bears two globose cells that burst transversely, springing back elastically; 3 deformed, broad, opposite the larger petals, 2-fid with 2 empty cells, together forming a cup over the pistil. *Disk* cupular or annular, with 2-5 simple or toothed teeth. *Ovary* sessile, 2- rarely 3-celled, contracted into a simple or 2-partible style, stigma simple; ovules 2 in each cell. *Drupe* small, oblique, subglobose; stone crustaceous, 1-celled, with usually a basilar rounded projection, over which the seed is curved. *Seed* globose, testa membranous; cotyledons conduplicate, radicle incurved.—**Distr.** Species about 20, natives of Tropical Asia and the Malay Archipelago, with a very few S. America.

*Leaves* simple.


1. **M. dilenliaefolia**, *Wall. miss.* (Millingtonia); leaves obovate or oblanceolate coarsely spinulose-toothed pubescent or tomentose beneath, panicles lax slender, flowers pedicelled, sepals and bracteoles ciliate, petals membranous, inner orbicular. *Brandis For. Flor. 115; Wt. & Arn. in Ed. New Phil. Journ., 1833, 179; Wt. Ill. i. 144* (Millingtonia); *Millingtonia, Wall. Cat. 8116. Himalaya;* from Simla, alt. 4-8000 ft., to Sikkim, alt. 8-10,000 ft. —**Distr.** Himalaya.

A small tree, 20 ft.; branches, petioles, and panicles covered with soft rusty pubescence. *Leaves* 6-12 by 3-5 in., membranous, cupulate-acuminate, narrowed into the petiole; nerves very many, parallel, ending in marginal teeth. *Panicle* as long as the leaves or longer, spreading, lax-flowered; bracts broad, deciduous; pedicels very short; flowers white. *Drupe* globose, ½ in. diam., sometimes didymous. —This is very near indeed to the Japan *M. myriantha* Sieb. & Zucc., which is just distinguishable by the persistent subulate bracts. Wallich’s 8116 seems to be a young state of this, with large leaves glabrous beneath.

2. **M. pungens**, *Wall. Cat. 8114 E, F* (Millingtonia); leaves ob lanceolate caudate-acuminate coarsely serrate glabrous or puberulous beneath, flowers sessile glomerated, sepals and bracteoles about 7 all suborbicular ciliate, petals membranous. *Brandis For. Flor. 116, M. acuminata, Royce II\. 130. M. integri folia, Wall. Cat. 8114 G in part* (Millingtonia). *M. rigida* and *M. ferruginea, Sieb. & Zucc. (in Herb. Hook.)*

**Subtropical and Temperate Himalaya;** alt. 3-8000 ft., from Marri to Nipal.—**Distr.** Japan.

A small tree; branches, petioles, and panicles clothed with rusty pubescence. *Leaves* 5-9 in. by 2-3 in., very coriaceous, narrowed into the petiole, almost spinulose-serrate, apex long quite entire; nerves stout, ascending, very prominent beneath; petiole ½-1 in. *Panicle* often much larger than the leaves, spreading, erect; flowers densely fascicled on the ultimate branchlets, larger than in *M. dilenliaefolia* or *simplicifolia*. *Drupe* ¼ in. diam. globose.—The Japanese specimens have usually longer petioles, but I find no other difference. The densely glomerate larger flowers at once distinguishes this from *M. simplicifolia*. The *M. integri folia* Wall. Herb. under 8114 G, consists of one specimen of this with nearly entire leaves, and one of *M. simplicifolia*, both from Nipal.

†† *Leaves* quite entire, or sub serrate when young only.

3. **M. Wightii**, Planch. in Herb. Hook; leaves coriaceous obovate elliptic-obovate or oblanceolate shortly acuminate glabrous or pubescent beneath, flowers sessile glomerate, sepals and bracteoles about 9 broad ciliate the outer pubescent on the back; petals membranous. *Brandis For. Flor. 116* (under *M. pungens*). *Millingtonia simplicifolia, Wall. Cat. 8114 A. M. pungens,*
**Meliaomma.** XLV. SABIACEE. (J. D. Hooker.)


Western Peninsula; from the Concan southwards. Ceylon, Central Province, alt. 5-7000 ft.

Very similar to *M. pungens*, and perhaps only a form of that plant; but the habit is more robust, the leaves usually broader in proportion, less tapered to the base, and quite entire, often more oblong-elliptic, with rarely a caudate apex, and if toothed the teeth are less spinulose; the flowers are of the same size, and similarly aggregated; the fruit also appears to be of the same size.

4. **M. simplicifolia**, Roxb. Fl. Ind. i. 103; Cor. Pl. t. 254 (Millingtonia); leaves membranous obovate ob lanceolate or oblong-lanceolate quite entire or toothed when young glabrous or pubescent beneath, flowers sessile distinct, sepals and bracteoles about 6 ciliate outer narrow hairly on the back. Wall. Cat. 8114 B, C, D; W & A. Prodr. 115 (Millingtonia); M. integrifolia, Wall. Cat. 8114 G (Millingtonia); Thwaites Enum. 59; Griffith Notul. iv. 162; fc. Pl. As. t. 442; Bedd. Fl. Sylv. Anal. Gen. 77.

Tropical Himalaya; Nipal, Wallich; Sikkim, alt. 2-4000 ft. J. H. D.; Bhotan Griffith—Khasia Mts. ascending to 3000 ft.; Assam, Sylhet, Tenasserim at Mergui, Griffith; Western Peninsula, in subalpine forests, Beddome. Ceylon, common up to an elevation of 3000 ft. Distrib. Java?

A large tree; branchlets and petioles puberulous, panicles pubescent. Leaves 6-16 by 4-7 in., narrowed into the petiole, young sometimes obtusely toothed, usually membranous, shortly acuminate, glabrous or puberulous beneath, with strong raised nerves; petiole 4-2 in. Panicle often longer than the leaves, sometimes leafy, or panicles in the upper axil; branchlets slender. Flowers much smaller than in *M. Wightii*, not glomerated, more hairy on the bracts and sepals, which are much more acute. Fruit about ½ in. diam.—Miquel gives this as a native of Java, but I have seen no specimen from Java exactly according with it. I have seen no Western Peninsula specimens of this, but Beddome says it is common on the Ghats, about 2-3000 ft. elevation, above which its place is taken by *M. pungens* (Wightii).

5. **M. elliptica**, Hook. f.; leaves coriaceous elliptic acuminate at both ends quite entire densely rufous pubescent or tomentose beneath, panicle densely tomentose, flowers sessile distinct, sepals and bracteoles 3-6, orbicular very coriaceous subulate, petals very coriaceous subvalvate. Sabia? floribunda, Miqu. Pl. Ind. Bat. Suppl. i. 521.

Malacca, Griffith, Maingay; Singapore, Lobb.

A tree?; branchlets, petioles, leaves beneath and panicles clothed with very soft rusty dense almost velvety tomentum. Leaves 3-7 by 1½-3 in., glabrous except the pubescent midrib above, quite entire, rarely ob lanceolate, narrowed into the petiole; nerves arched, very prominent beneath; petiole ⅔ in. Panicle as in the genus, usually larger than the leaves. Flowers of the size of *M. simplicifolia*, very distinct from all the preceding in the small coriaceous glabrous sepals. Staminal scales 2-6d, ciliate at the tip (Maingay)—Kurz (Journ. As. Soc. Beng. 1870, ii. 74) refers Sabia? floribunda of Miquel to *M. simplicifolia*, meaning no doubt this species, under which I hence cite it.

6. **M. lancifolia**, Hook. f.; clothed with spreading villous pubescence, leaves very long ob lanceolate acuminate membranous, flowers sessile, aggre gated, sepals and bracteoles 5 outer lanceolate ciliate and hairy on the back inner glabrous oblong.

Malacca, Maingay.

Branchlets cylindric, clothed with a rough and much more spreading pubescence than in any of the other species, especially on the panicle and nerves of the leaves be-
neath. *Leaves* 12-18 by 3½-4 in., very long and narrow, very acuminate, but not cdraulic, very gradually narrowed into the short petiole; upper surface minutely scabrid; nerves numerous, arching. *Panicle* shorter than the leaves (in the only specimen). *Flowers* as small as in *M. simplicifolia*, crowded on the ultimate branchlets. *Inner sepals* very coriaceous, obtuse, quite glabrous. *Petals* and *fruit* not seen.

** Leaves odd-pinnate.

† Leaflets serrate or toothed.

7. **M. pinnata**, Roxb. *Fl. Ind.* i. 104 (Millingtonia); nearly glabrous, leaflets 6-12 pairs oblong or oblong- or linear-lanceolate acuminate more or less serrate glabrous, panicle puberulous very large, flowers pedicelled or sessile. *Maxim. Diagn. Fl. Jap. Dec.* iv. and v. 263; *Wall. Cat.* 8115 & 8117.


A middling-sized tree; branches smooth. *Leaves* 6-18 in.; petiole cylindric; leaflets 3-6 by 1½-1½ in. shortly petiolulate, much acuminate, sometimes nearly entire. *Panicle* as long as the leaves, terminal; branches spreading; bracts minute, caducous, subulate. *Flowers* white, minute. *Sepals* and *bracteoles* 5, broadly orbicular-ovate, minutely ciliate, otherwise glabrous. *Petals* subvalvate, glabrous. *Disk* 3-angled. *Drupe* as large as a pea.—The *M. rhoifolia*, Maxim., of Japan seems to be the same as this.

8. **M. Wallichii**, Planch. *in Herb.* Hook.; pubescent, leaflets 3-6-pairs oblong oblong-ovate or obovate-acuminate more or less spinulose-toothed, pubescent beneath, panicle tomentose, flowers very shortly pedicelled.


A small tree; branchlets rusty puberulous. *Leaves*, 6-12 in.; leaflets, 3-7 in., straight or falcate, rather coriaceous; petiole, petiolules and under-surface clothed with a spreading rusty tomentum; nerves many, curved; upper surface opaque; base rounded oblique. *Panicle* stout, much branched; hairs short spreading; bracts caducous. *Flowers* minute, on short stout pedicels. *Sepals* and *bracteoles* 5, glabrous, orbicular-ovate. *Petals* subvalvate. *Drupe* globose, the size of a small pea.—Small specimens of this from Mooflong in the Khasia seem identical with a Corean plant collected by Wilford.

†† Leaflets quite entire.


Western Peninsula; from Canara southwards, *Wight*. Ceylon; in the central province, alt. 4-7000 ft.

A tree; branchlets, petioles, petiolules, leaflets beneath and panicle clothed with a spreading subfurfuraceous or velvety rusty pubescence. *Leaves* 6-10 in.; leaflets 3-5 by 1½-1½ in., rather membranous, lower often falcate and recurved, base rounded, nerves not prominent, tips finely drawn out, upper surface opaque; petiolules ¾-¾ in. *Panicle* axillary and terminal. *Flowers* very numerous, crowded on the branchlets of the panicle. *Sepals* and *bracteoles* 5, orbicular-ovate, obtuse, ciliate, rather pubescent. *Petals* subvalvate. *Drupe* globose, the size of pea.

10. **M. sumatrana**, *Jack in Mal. Misc.* ii. 30 (Millingtonia); glabrous, leaflets 3-6 pairs elliptic- or obovate- or ovate-lanceolate acuminate base acute panicle contracted pubescent, flowers large crowded. *M. nitida*, *Blume Cat.*
Hort. Buit. 32; Rumphia, iii. 202, tab. 169; Nees in Flora, 1825, 106 (Millingtonia); Maj. Fl. Ind. Bot. i. pt. 2, 617. Irina integerrima, Blume Bijd. 231.

MALACCA, Griffith, Mainay.—Distrib. Sumatra. A moderate-sized tree; branchlets glabrous. Leaves 1-1 1/2 ft.; petiole nearly terete; leaflets 6-10 in., opposite, very variable in shape, coriaceous, shining on both surfaces; nerves arched, much reticulate; petiolules 1-2 in. Panicle stout, erect, rusty-pubescent, with rather spreading short pubescence; bracts acuminate, ciliate. Sepals and bracteoles 5, the outermost very small, broadly orbicular-ovate, rather thick, glabrous. Petals subvalvate. Filaments larger than usual in the genus, without lateral teeth, the scale (petal) behind them being larger, elliptic and entire. Fruit nearly 1/2 in. diam.—I think there can be no doubt but that this is Jack’s M. Sumatrana; and that it is the same with Blume’s M. nitida. I have in proof Java specimens of the latter named by Blume. Jack states that the terminal leaflet is sometimes absent. Griffith has a single imperfect specimen of apparently this plant from Malacca, with a few spinulose teeth on the upper part of the leaflets; it may be M. confusa, Bl. of Sumatra.

11. M. lanceolata, Blume Cat. Hort. Buit. 32; Rumphia, iii. 200, t. 168 (B. excepted), var. pubescens; pubescent, leaflets 6-8 pairs, very coriaceous linear-oblong caudate-acuminiate pubescent beneath margins recurved, panicle tomentose with very long branches.

MALACCA, Mt. Ophir, Griffith, Mainay (M. Sumatrana, Kew distrib. not of Jack).—Distrib. Sumatra, Borneo.

A tree; branchlets stout, rusty-pubescent. Leaves 1-2 ft.; petiole stout, terete; leaflets 5-7 by 1 1/2-3 in., often recurved and subfalcate, base rounded, rigidly coriaceous, shining above, opaque and pubescent beneath with much raised nerves; petiolules 1/2 in. Panicles very large, with long spreading branches, almost velvety with rusty tomentum. Flowers minute, rather scattered, sessile or nearly so. Sepals and bracteoles 4 or 5, broadly orbicular-ovate, glabrous, outer ciliate. Petals valvate. Filaments short; scales 2-fid. Fruit not seen.—The Bornean and Sumatra specimens are more glabrous on the leaflets beneath, but I find no other difference.

NAT. ORD. XLVI. ANACARDIACEAE. (By J. D. Hooker.)

Trees or shrubs; juice often milky and acrid. Leaves alternate, opposite in Bouea, extipulate, simple or compound. Inflorescence various; flowers small, regular, unisexual, polygamous, or bisexual. Calyx 3-5-partite, sometimes accrescent, spathaceous in Gluta. Petals 3-5, alternate with the sepals, free, rarely 0, imbricate or valvate in bud, sometimes accrescent. Disk flat, cup-shaped or annular, entire or lobed, rarely obsolete. Stamens as many as the petals, rarely more, inserted under, rarely on, the disk, filaments usually subulate; anthers 2-celled, basi- or dorsi-fixed. Ovary superior, half inferior in Holigarna, 1- or 2-6-celled, rudimentary or 2-3-fid in the S ; of 5-6 free carpels in Buchanania; styles 1-4, or stigma subsessile; ovules solitary in the cells, pendulous from the top or wall or from an ascending basal funicle. Fruit usually a 1-5-celled 1-5-seeded drupe; stone sometimes dehiscent. Seed exalbuminous; embryo straight or curved, cotyledons plano-convex, radicle short.—Distrib. Chiefly tropical; genera about 45; species about 450.

Sorindeia Madagascariensis, DC. (Wall. Cat. 8491), is cultivated in gardens in India.

TRIBE I. Anacardiae. Ovary 1-celled, or if 2-celled, with one cell early suppressed.

A. Ovules pendulous from a basal funicle.
XLVI. ANACARDIACEÆ. (J. D. Hooker.)

* Sepals and petals not accrescent.

Calyx 4-5-partite. Petals 4-6. Stamens 4-10. Leaves alternate, usually compound . 1. Rhus.
Calyx 5-partite. Petals 0. Stamens 3-4. Leaves alternate, compound . 2. Pistacia.
Calyx 5-partite. Petals 5. Stamens 8-10, all or a few only perfect. Torus stipitate. Style filiform. Leaves alternate, simple *3. Anacardium.
Calyx 3-5-partite, valvate. Petals 3-5. Stamens 3-5, all perfect. Leaves opposite, simple . 4. Bouea.

** Sepals or petals accrescent. Leaves simple.

Calyx spathaceous. Stamens 5 or numerous . 7. Melanorrhoea.
Calyx 5-partite. Stamens 5 . 8. Swintonia.

B. Ovules pendulous from the top of the cell or from the walls of the ovary above the middle.

* Leaves 3-foliolate or pinnate.


** Leaves simple.

Petals imbricate. Stamens 5. Style 1, Drupe superior . 15. Drimycarpus.

Tribe II. Spondieæ. Ovary 2-5-celled; ovules pendulous. Leaves pinnate.


DOUBTFUL GENUS.

Rhus.]

XLVI. ANACARDIACEÆ. (J. D. Hooker.)

9

1. Rhus, Linn.

Trees or shrubs, with often an acid juice. Leaves alternate, simple or 1-3-foliolate or pinnate; leaflets quite entire or serrate. Flowers small, in terminal and axillary panicles, polygamous. Calyx small, 4-6-parted, persistent; segments nearly equal, imbricate. Petals 4-6, equal, spreading; imbricate. Stamens 4, 5, 6, or 10, inserted at the base of the disk, free; filaments subulate; anthers short, imperfect in the 2 flower. Ovary sessile, ovoid or globose, 1-celled; styles 3, free or curvate, short or long; stigmas simple or capitate; ovule pendulous from a basal funicle. Drupe small, dry, compressed; stone cornaceous, crustaceous or bony. Seed pendulous from the funicle, testa membranous, cotyledons flat, radiate hook short, unequal.—A large genus of about 120 species, natives chiefly of warm temperate regions.


Western Subtropical Himalaya; alt. 3-5000 ft., from Marri to Kumaon.—Distrib. from Syria westwards to France.

A shrub or small tree. Leaves 2-4 in., obtuse; nerves spreading, parallel; petiole very slender, 1-2 in. Panicles axillary and terminal, very large, slender, and many-flowered. Flowers ½ in. diam.; pedicels very slender. Sepals linear-oblong, obtuse. Petals twice as long, elliptic. Stamens shorter than the petals; anthers large. Disk broad, 4-angled. Drupe ½ in., compressed, covered with white hairs.—The numerous hairy flowerless pedicels of the very large copious panicles give this bush a remarkable appearance during and after flowering. Wall. Cat. 998 C. (in Herb. Linn. Soc. only) is Rhus succedanea.

Sect. 2. Sumac. Leaves 3-foliolate or odd-pinnate. Flowers polygamous dioecious or bisexual. Drupe ovoid or orbicular.

* Leaves trifoliolate.

2. R. parviflora, Roxb. Fl. Ind. ii. 100; softly tomentose, leaflets elliptic oblong-ovate or orbicular irregularly crenate above the middle. DC. Prodr. ii. 70; Wall. Cat. 991; Dalz. & Gibbs. Bomb. Flor. Suppl. 19; Brandis For. Flor. 119.

Western Himalaya; alt. 2-5000 ft., from Kumaon to Nipal. Central India on the Pashmarchi hills, Brandis.

An unarmored shrub; branchlets, leaves beneath, petioles and panicle densely clothed with soft rusty tomentum. Leaves palmate, 3-foliolate; petiole 1-1½ in., stout; leaflets 1½-3 in., sessile or the terminal contracted into a petiole, coriaceous, tomentose on both surfaces especially beneath; nerves spreading, parallel. Panicles axillary and terminal, silky, longer than the leaves. Flowers ¼ in. diam.; pedicels very short; bracts linear. Sepals ovate, the outer hairy. Petals twice as long, oblong. Disk 5-lobed. Drupe ¼ in. diam., ovoid, compressed, red-brown, shining.—The Ceylon specimens alluded to in Brandis are no doubt cultivated ones.


North Western India; Scind, Stocks; Rohilkund, near Delhi. Western Panjab, Sulima range, alt. 2500-5000 ft. Western Peninsula; Maisor and the Dekkan.

A small shrub; branches woody, flexuous, often spinous; branchlets, petioles,
leaves beneath, and panicle clothed with a rather furfuraceous pubescence. *Leaves* palmately 3-foliate; petiole $\frac{1}{2}-\frac{2}{3}$ in.; leaflets $\frac{3}{4}-1\frac{1}{2}$ in., the terminal always much the largest, lateral often very small, all sessile and contracted at the base. *Panicles* subsimple, very slender, axillary and terminal. *Flowers* $\frac{1}{5}$ in. diam.; pedicels short; bracts minute. *Sepals* ovate, 2 smaller. *Petals* obtlong, much larger than the sepals. *Stamens* short. *Disk* obscurely 5-lobed. *Drupe* $\frac{1}{5}$ in. diam., sulpoglobose, compressed, red-brown, shining.—Brandis suspects that this may be a form of *R. parviflora*, but I cannot think so.

4. **R. paniculata**, Wall. Cat. 903; glabrous, leaflets elliptic or elliptic-oblong obtuse entire or very obscurely sinuate-lobed.

**Bhotan**, Griffith; **Birma** at Yenangheum, Wallich.—**Distrib. Yunnan.**

Probably a tree; quite glabrous except the minutely puberulous panicles. *Leaves* rather coriaceous, palmately 3-foliate; petiole 1–1$\frac{1}{2}$ in.; leaflets 3–5 by 1–2 in., rarely ob lanceolate, sessile, contracted at the base, terminal the largest and sometimes petiolulate; nerves many, spreading, parallel. *Panicles* very slender, axillary and terminal, elongate; branchlets recurved. *Flowers* $\frac{1}{5}$ in.; shortly pedicelled. *Sepals* orbicular. *Petals* not much larger, ovate-oblong, obtuse. *Disk* cup-shaped. *Drupe* $\frac{1}{5}$ in. diam., nearly orbicular, depressed.

**Leaves odd-pinnate.**

† **Leaflets pubescent or tomentose beneath.**


**Temperate Himalaya**; from Banahal to Sikkim, alt. 3–6000 ft. **Khasia Mts.**, alt. 3–5000 ft.

A small tree; branchlets, petioles, leaves beneath and panicles clothed with a dense soft pubescence. *Leaves* 10–18 in.; petiole cylindric; leaflets coriaceous, sessile, oblong, acuminate, base cuneate, terminal petiolulate, opaque above, pale reddish-white beneath; nerves many, parallel. *Panicle* large, broad, with a stout peduncle. *Flowers* $\frac{1}{5}$ in., white or pale yellow-green. *Sepals* ovate, obtuse, pubescent. *Petals* much larger, oblong, ciliate, and with a ciliate median ridge on the upper surface. *Stamens* exceeding the petals; anthers large. *Disk* cup-shaped, 10-lobed. *Styles* rather long. *Drupe* $\frac{1}{5}$ in. diam., orbicular, compressed, red, shining, acid.—I have specimens from the Bombay Presidency collected by Dr. Gilson (perhaps cultivated), and from Ritchie (Griffith's Herbarium) collected at Baraghur (probably east of the Indus) with the name "Semall-Shcorookee." The leaves are very small, the leaflets about 1 in. long, more sharply serrated; it may be a different species.

6. **R. punjabensis**, Stewart in Brandis For. Flor. 120; petiole not winged pubescent, leaflets 5–6-pairs sessile quite entire or serrate towards the tip slightly pubescent beneath, panicles much smaller than the leaves, flowers sessile, pericarp indehiscent.

**North Western Himalaya**; Kunawur, alt. 6000 ft., Thomson. Rajaor and Bussahir, alt. 2500–8000 ft., Brandis.

A tree 30–40 ft.; branchlets, petioles, leaves beneath and panicles covered with a very fine pale pubescence. *Leaves* 12–18 in.; petiole slender, terete; leaflets sessile, oblong or ovate-oblong, acuminate, membranous, opaque above, base rounded; nerves numerous, slightly arched, simple. *Panicles* about half the length of the leaves, subsessile; branches dense, spreading. *Flowers* unknown. *Drupe* $\frac{1}{5}$ in. diam., orbicular, compressed, red, tomentose.

7. **R. khasiana**, Hook. f.; petiole very slender glabrous, leaflets 8–12-
pairs membranous subsessile lanceolate incised-serrate long-accumulate hairy chiefly on the nerves beneath, pericarp dehiscent.

Khasia Mts.; at the Borpane, and at Chittagong. H. f. & T.

A large tree. Leaves 1-13 ft.; petiole terete, soft, pubescent towards the tip; leaflets 3-4 by $3/4$ in.; base cuneate, oblique, glaucous beneath; nerves very slender, about 15 pairs, arched, clothed with soft white spreading hairs. Flowers not seen. Drupes $1/4$ in. diam., in open panicles, pedicelled, orbicular-ovate, compressed; epicarp papery, pale, irregularly torn, exposing a fibrous endocarp.—I have only examined imperfect specimens of this very distinct plant, which approaches R. punjabensis in habit.

8. R. Wallichii, Hook. f.; petiole tomentose not winged, leaflets 3-5 pairs subsessile quite entire densely softly tomentose beneath, panicles much shorter than the leaves, pericarp dehiscent. R. vernicifera (in part), DC. Prodr. ii. 68; Royle Ill. 175; Brandis For. Flor. 120. R. juglandifolia, Wall. Cat. 906 (not of Willdenow).

Temperate Himalaya; from Garwhal to Nipal, alt. 6-7000 ft. A tree; branchlets stout, petioles and leaves beneath and panicles, clothed with a soft dense rusty tomentum. Leaves 12-18 in.; petiole terete; leaflets 6-9 by 2-3 in., coriaceous, elliptic or oblong, acuminate, shortly petiolulate; base rounded, upper surface pubescent or glabrous; nerves 20-25 pairs, parallel. Panicles much shorter than the leaves, axillary; branches short, stout. Flowers subsessile, $1/4$ in. diam. Sepals small, broadly ovate, obtuse. Petals much larger, obovate, concave, white? with very broad dark veins. Filaments short; anthers large. Disk broad, cup-shaped, obscurely lobed. Drupes densely crowded, $1/3$ in. diam., globose, puberulous; epicarp dry, crustaceous, bursting irregularly; stone globose, very thick, bony, surrounded by wax.—I agree with Brandis in regarding this as quite distinct from the Japanese wax tree (R. vernicifera), from which it differs in the sessile flowers and laxer and longer panicles; juice corrosive. The Sikkim specimens referred to this species by Brandis have glabrous petioles, and belong to R. insignis.

9. R. insignis, Hook. f.; petiole not winged glabrous, leaflets 3-4 pairs, petiolulate glabrous above tomentose beneath, panicles shorter than the leaves, drupe pedicelled, pericarp dehiscent.

Sikkim Himalaya, interior valleys, alt. 3-6000 ft. J. D. H. Khasia Mts. at Nurtung, alt. 4000 ft. H. f. & T.

A small beautiful tree. Leaves 12-18 in.; petiole terete; leaflets 6-9 by 3-4$1/4$ in., coriaceous, quite entire, elliptic or oblong, abruptly acuminate, glabrous and shining above, rusty, softly tomentose beneath; nerves very numerous, as in R. Wallichii. Flowers not seen. Fruiting panicles axillary, stout, 10 in. long-peduncled; branches spreading. Drupes scattered on the panicle, globose $1/3$ in. diam.; epicarp thin, dry, bursting irregularly and enclosing a globose white mass of wax containing a very small flattened crustaceous stone.—Similar in many respects to R. Wallichii, but very different in the glabrous petiole and panicle, petioluled leaflets that are often cordate at the base, large lax glabrous panicles, and smaller very different fruit. The panicles and petioles are crusted with lenticels in some Sikkim specimens.

10. R.? Dhuna, Hamilton in Wall. Cat. 8502 (Terebinthaceæ?); petiole not winged and leaflets beneath softly tomentose; leaflets 4 pairs petiolulate oblong abruptly acuminate.

Nipal at Patgong, Hamilton.

Leaves 2 ft.; petiole stout, cylindric, grooved; leaflets 6-10 by 3-4 in., coriaceous, terminal obovate, with a cuneate base, the rest oblong with a cordate base; midrib stout; nerves 25 pairs slightly arched; under surface clothed with soft spreading hairs, upper smooth, glabrous, with a slender midrib; petiolule robust, cylindric $1/4$ in.—I have only leaves of this very fine plant, which appear to be closely allied to R. Wallichii, and R. insignis, differing from the former in the much less tomentose leaves and petiolulate leaflets, and from the latter in the pubescent petiole.
†† Leaflets quite glabrous beneath.


**TEMPERATE HIMALAYA,** from Kashmir, alt. 3–6000 ft.; to Sikkim, alt. 5–8000 ft. and Bhotan; **Khasia** Mts., alt. 2–6000 ft.—Distrih. Japan.

A tree about 30 feet high, everywhere glabrous, except the panicle in some varieties. **Leaves** crowded at the ends of the branches, 6–18 in.; petiole terete, slender; leaflets 2–5 by 1½–2½ in., petiolulate, elliptic-oblong or oblong- or ovate-lanceolate, tip very slender; base rounded or acute, straight or oblique; nerves numerous, slightly arched, slender. **Panicales** axillaries, half the length of the leaves, slender, lax, with a very few scattered hairs, or glabrous. **Flowers** ½ th in. diam., yellow-green; pedicel slender. **Sepals** broadly ovate, obtuse. **Petals** much larger, oblong or obtuse. **Disk** 5-lobed. **Drupes** ⅓ in. diam., in drooping panicles, gibbous, compressed, epicarp very thin, bursting irregularly; stone compressed, bony, surrounded with wax. —Perhaps two or three species are mixed up here, but I cannot satisfactorily distinguish them without more complete specimens than I possess.

**Var. 1. himalaica**; shoots glabrous, leaves scattered, petiole 1–2 ft., leaflets 6–8 pairs, 4–6 by 1½–2½ in. petiolulate obliquely ovate-lanceolate acuminate very membranous, midrib often pilose beneath, nerves 10–15 pairs, much arched, panicle pubescent in flower, fruiting glabrous very lax, drupes pedicellate laterally compressed.—N.W. Himalaya, alt. 3–6000 ft., from Kashmir to Nipal. This differs from the Japanese plant in the pubescent panicle and fewer more-arched nerves. There are fruits of it from Nipal in Wallich’s Herbarium on the sheet with var. 3.

**Var. 2. sikkimensis**; shoots pubescent, leaves as in var. 1, flowering panicle lax glabrous, fruit unknown.—A large tree of the Sikkim inner valleys, Lachen-Lachoong, etc., alt. 5–8000 ft.

**Var. 3. acuminata, DC. Prodr.** ii. 68 (sp.); leaves usually crowded at the ends of the branches, petiole 6–10 in., leaflets 2–5 pairs, 2–5 by 1½–2 in. elliptic or elliptic-ovate or -oblong often abruptly caudate-acuminate at length coriaceous, nerves 25–30 pairs horizontal straight parallel, panicle glabrous in flower, fruiting panicle more dense, drupes on very short stout pedicels laterally compressed.—Himalaya from Nipal to Bhotan, **Khasia** Mts.

**Var. 4. sphaerocarpa**; leaves of var. 3, drupes depressed spheres.—Khasia, **Griffith**.


**Khasia** Mts. alt. 4–6000 ft., *Simons*, etc.; **Mishmi Hills**, **Griffith**.

A small tree. **Leaves** towards the ends of the branches, 1–2 ft.; petiole stout, terete; leaflets 5–10 by 2½–4½ in., coriaceous, quite entire, rounded or cordate, rarely acute at the base, glabrous and opaque above, very obscurely puberulous on the midrib and principal nerves beneath; petiolules ¾ in., very stout; nerves strong. **Panicales** 5–6 in. long, axillary; peduncle and branches stout, pubescent. **Flowers** 1½ in. diam., almost sessile. **Sepals** broadly ovate, obtuse, pubescent. **Petals** much larger, linear-oblong, obtuse. **Stamens** exserted. **Disk** broad, sinuate-lobed. **Drupes** on short stout pedicels, about ¾–1 in. diam., nearly orbicular, compressed; epicarp thin, bursting irregularly; stone compressed, surrounded with wax.—A very distinct species, closely allied to *R. succedanea*, from which it differs in its much larger size, stouter habit, larger leaflets often cordate at the base, pubescent stout panicle, nearly sessile flower and smaller drupes.
2. PISTACIA, Linn.

Trees or shrubs. Leaves alternate, exstipulate, pinnate, or 3-foliolate. Flowers small, apetalous in axillary racemes or panicles, dioecious. Male Fl. Calyx 3-5-fid. Stamens 3-7. Disk small. Rudiment of Ovary minute or 0. Fem. Fl. bracteate. Sepals 3-4. Stamens and Disk 0. Ovary sessile, 1-celled; style short, 3-fid, stigmas capitulate, recurved; ovule pendulous from a basal funicle. Drupe dry; stone bony. Seed with a membranous testa; cotyledons thick, oily, curved. Distribution. Species about 6, natives of Western Asia and the Mediterranean region, and one Mexican.

Several species of this genus, allied to Mediterranean forms, are found in Afghanistan and Beluchistan, but do not cross the frontier. The seeds of P. vera, L. the Pistacio-nut, are imported into N. Western India.


North-Western Frontier; Peshwur valley and Salt range. Western Himalaya; alt. 1200 to 8000 ft., from the Indus to Kumaon, usually on hot slopes.

A nearly glabrous tree, 40 ft. and upwards. Leaves 6-9 in., with or without a terminal leaflet; petiole terete, puberulous; leaflets sub-opposite, petiolulate, coriaceous, quite entire, base oblique; nerves many, arched. Panicles lateral; ± compact, pubescent; 6 lobed, elongate; flowers pedicelled, with 2 ovate bracts. Stamens 5-7, filaments short; anthers large, dark red. Fem. Fl. Sepals 4, linear, and bracts deciduous. Style almost 3-partite. Drupe ½ in., broader than long, glabrous, rugose, grey.—Wood very hard and handsome.

3. MANGIFERA, Linn.

Trees. Leaves alternate, petioled, quite entire, coriaceous. Flowers small, polygamous in terminal panicles, pedicel articulate; bracts deciduous. Calyx 4-5 partite; segments imbricate, deciduous. Petals 4-5, free or adnate to the disk, imbricate; nerves thickened, sometimes ending in excrescences. Stamens 1-5, rarely 8, inserted just within the disk, or on it, 1 rarely more perfect and much larger than the others, the others with imperfect or smaller anthers, or reduced to teeth. Ovary sessile, 1-celled, oblique; style lateral; ovule pendulous, funicle basal, inserted on the side of the cell above its base, rarely horizontal. Drupe large, fleshy; stone compressed, fibrous. Seed large, compressed, testa papery; cotyledons plano-convex, often unequal and lobed. Distribution. A tropical Asiatic, chiefly Malayan genus, of about 30 species.

Of the species here described some may be referable to Malayan ones that are imperfectly described by Blume and others. The genus is a very difficult one, and the Malayan species want careful revision with many specimens.

Sect. 1. Disk tumid, usually 5-lobed, broader than the ovary. Petals free from the disk, inserted at its base.

* Petals with 1-5 free or confluent ridges that do not end in wart-like excrescences.

† Panicule pubescent or tomentose.

1. M. indica, Linn.; leaves oblong or linear-oblong or elliptic or obovate-lanceolate obtuse acute or acuminate, panicle usually tomentose, petals with 3 ridges, stamens 1 fertile and 4 reduced to short capitate subulate filaments, style sub-terminal. Roxb. Fl. Ind. i. 641; W. & A. Prodr. 170;
Tropical Himalaya; alt. 1-3000 ft. from Kumaon to Bhotan Hills and valleys of Behar, the Khasia Mrs., Birma, Oudh, and Western Peninsula from Kan¬
deish southwards.—District. Cultivated as far west as Muscat, in all Eastern tropical Asia, and generally in the tropics.

A large tree, glabrous, except the panicle; branches widely spreading. Leaves 6-16 in., very variable in breadth, crowded at the ends of the branches, acute, acu¬
minate or obtuse, shining, nerved, quite entire, margins often undulate; petiole 1-4 in., swollen at the base. Panicles a foot and more, pubescent, rarely glabrate; bracts elliptic, concave. Flowers yellow, odorous, subsessile, rarely pedicelled, 3 and 9 on the same panicle. Sepals ovate, oblong, concave. Petals twice as long, ovate, ridges 3-5, orange. Disk fleshy, 3-lobed. Stamens 1, inserted upon the disk, filament subulate; anther purple. Ovary glabrous. Drupe 2-6 in., compressed, yellow. It is often difficult to say whether so common a tree is wild or not in a given locality, but there seems to be little doubt but that it is indigenous in the localities enume¬
rated above. Amongst the varieties, those with an almost glabrous panicle from the Western Peninsula look the most unlike the ordinary cultivated form. One Maisor specimen has leaves 10 by 1½ in., much resembling those of M. oblongifolia. Wallich's 8487 D. is a Sorantinea, a Madagascar plant accidentally intermixed; 8487 G. is Buchanania? acuminata (Wall. Cat. 981), and 8487 I. is, I suspect, M. sylva
tica.

2. M. caloneura, Kurz in Beng. As. Soc. Journ. 1873, ii. 66; leaves oblong or oblong-lanceolate finely reticulated between the nerves acuminate, panicle spreading tomentose, flowers crowded sessile, petals 5 with 3 ridges, stamens 1 or 2 fertile, ovary rough, style lateral or basal.

Martaban, Kurz.

A moderate sized tree. Leaves 4-6 by 1½-1½ in., equally reticulated on both sur¬
faces between the 16-20 pairs of arching nerves; petiole 3-½ in., much thickened at the base. Panicle tomentose throughout. Flowers much as in M. indica, the re¬
flexed petals having 3 ridges. (Fruit as large as a hen's egg, subreniform, smooth, obtuse, yellow, sweet and acid, Kurz).—My specimens of this are imperfect; it is evidently very nearly indeed allied to M. indica, differing chiefly in the very fine re¬
ticulation of the leaves, as pointed out by Kurz. Wallich's M. indica, 8487 H. from Tavoy is possibly the same.

3. M. pentandra, Hook. f.; leaves oblong or oblong-lanceolate acumin¬
ate reticulated on both surfaces, panicle spreading tomentose, flowers crowded subsessile, petals 5 with 3 ridges, stamens 5 perfect, ovary smooth, style subter¬
nal.

Malacca, Griffith, Maingay.

A tree. Leaves 6-12 by 2-4 in., quite similar to those of M. indica, as are the panicles and flowers, except that Maingay describes the disk as more fully and fairly developed than in any form he had figured. The 5 stamens are all perfect and unequal. The petals are yellowish-white, with yellow brown ridges. Maingay figures the style as nearly terminal, and the ovule as quite laterally suspended.—The Malay name is 'Mam ploni,' which means mango ripened artificially.


Malacca, Griffith.

Branches stout. Leaves 3-5 by 1½-2 in.; nerves about 10 pairs; base narrowed; petiole stout, ¾ in. Racemes (branches of a reduced panicle), not much if at all longer.
than the leaves, stout, finely pubescent. *Flowers* very small, \( \frac{1}{4} \) in. diam., subsessile. *Sepals* broadly ovate, tomentose. *Petals* orbicular-ovate, with 2 short or more confluent ridges. *Disk* with 5 or 6 subulate points. *Stamens* short.

5. **M. sclerophylla**, Hook. f.; leaves glabrous broadly elliptic with obtuse narrowly tipped most thickly coriaceous base acute or rounded nerves obscure, petioles much thickened at the base, panicle pubescent of many erect stout spiciform branches, petals not much exceeding the sepals, stamen 1.

MALACCA, Mainagay.

*Branches* very thick, woody, glabrous, angled, and channelled. *Leaves* 4–5 by 2–2\( \frac{1}{2} \) in., alternate, not approximate at the ends of the branches, exceedingly thick and hard when dry, smooth on both surfaces; midrib strong; nerves about 10, faint; reticulations very obscure; petiole 1 in., of the upper leaves \( \frac{1}{2} \) in., extremely thickened at the back especially, the thickening sometimes extending up the midrib. *Panicle* 4–6 in. long. *Flowers* sessile, \( \frac{1}{8} \) in. diam.; bracts ovate. *Sepals* ovate, pubescent. *Petals* ovate-oblong, with 3 short ridges. *Disk* small. *Young drupe* nearly orbicular.—No other *Mangifera* has foliage at all like this.

†† *Panicle* quite glabrous.

6. **M. sylvatica**, Roxb. *Fl. Ind*. i. 644; leaves lanceolate or oblong-lanceolate usually long-petioled, panicle ample glabrous, branches slender, flowers pedicelled, petals 5 with 3 ridges, stamen 1 with no imperfect ones, ovary smooth, style lateral. *M. indica*, Wall. *Cat*. 8487 I.


I am in some doubt about this plant, which is well figured in Roxburgh's drawings, but of which I have seen no flowering or fruiting specimen. I believe it to be a common tree in the Silhet, Khasia and Sikkim jungles, with usually longer more membranous young leaves than the Mango, and a more open lax perfectly glabrous panicle, and loose pedicelled flowers. Roxburgh contrasts it with the cultivated sorts as having a much larger panicle, with the numerous ramifications more erect and slender, flowers more completely monandrous, disk villous. The leaves he describes as in the common Mango. The drupe he figures as ovoid, gradually narrowed at the top into a sharp curved beak. Graham (Cat. Bomb. Pl.) states that is a native of the Bombay Ghats, but no one has confirmed this. Kurz's specimens, thus named from the Andaman Islands, have leaves 10–12 by 2\( \frac{1}{2} \)–3\( \frac{1}{2} \) in., membranous, much reticulated, elliptic-lanceolate, acuminate, petiole very slender \( \frac{1}{2} \)–2 in.; nerves 16–20 pairs, slender, arched. I have gathered similar specimens in Sikkim and Silhet, with petioles 4 in. long, and Wallis's 8487 I. quite agrees with these. My Khasia ones, with slender branched panicles (as in Roxburgh's description and figure), but flowers all dropped, have leaves like those of *M. indica*. Kurz (Journ. As. Soc. Beng. 1870, ii. 75), observes that Miquel has incorrectly identified this plant with *M. indica*, from which it is at once distinguished by the very different white flowers, the disk and acuminated fruit.

7. **M. longipes**, Griff. *Notul*, iv. 419; leaves oblong- or elliptic-lanceolate acuminate faintly reticulate, panicle very lax spreading branches slender, flowers pedicelled, petals 5 narrow with one slender basal ridge branching into 5 nerves, stamen 1, imperfect ones minute.

MALACCA, *Griffith*, Mainagay.

A tree. *Leaves* 6–10 by 1\( \frac{1}{2} \)–3 in., with 14–10 pairs of nerves, reticulation obscure above, more distinct beneath; petiole 3–1\( \frac{1}{2} \) in. *Panicles* usually longer than the leaves, branches widely spreading, pedicels \( \frac{1}{4} \) in. *Flowers* \( \frac{1}{8} \)–\( \frac{1}{5} \) in. diam. *Sepals* ovate, subacute. *Petals* white, with yellow veins, very narrow, recurved. *Disk* broadly conical, papillose, 5-lobed. *Stamen* far exerted, filament elongated. *Ovary* smooth; style lateral, long, slender; ovule obliquely ascending.—This, as
Griffith remarks, is very near M. sylvestra, and as far as I can see may be a form of that plant, differing chiefly in the smaller disk and very narrow petals. Griffith describes the calyx and pedicels as puberulous, but I find no trace of this. The Malay name is 'Boa Pow.'—Griffith.

8. M. zeylanica, Hook. f.; leaves oblong-ovate oblong or elliptic-lanceolate obtuse or rounded at the tip reticulated, panicle glabrous stout narrow, sepals orbicular, petals 5 oblong with 5 ridges, stamen 1 with 6–8 minute subulate filaments, style subterminal. M. indica, Thwaites Enum. 75; Buchanania? zeylanica, Blume Mus. Bot. i. 155.

Ceylon; abundant up to an elevation of 3000 ft.
A tree, everywhere quite glabrous. Leaves small, 2–3½ by 1–1½ in., coriaceous, usually rounded at the tip, nerves 12–15 pairs, arching; petiole ½–¾ in. Panicle stout, erect, much longer than the leaves. Flowers ½ in. diam.; pedicel slender. Petals short, elliptic-oblong, with 5 nerve-like ridges. Disk large. Stamens short. Ovary obscurely pubescent.—Thwaites identifies this specifically with the cultivated M. indica, but it appears to me to differ much in habit and foliage, in the contracted panicle, more pedicelled flowers, perfectly glabrous sepals, and short petals.

9. M. gracilipes, Hook. f.; leaves small elliptic-lanceolate acuminate obscurely reticulate, petiole very slender, inflorescence of many slender erect glabrous compound racemes, pedicels very slender, petals 5 lanceolate with 3–5 ridges, stamen 1 perfect slender with 4 short subulate filaments, style lateral.

Malacca, Maingay.
A large tree, everywhere perfectly glabrous; branches very slender for the genus. Leaves 3–4 by 1–1½ in., undulate, much narrowed at both ends, nerves faint, arching; petiole remarkably slender, ½ in., not much thickened at the base. Racemes (branches of a sessile panicle which start in a fascicle from the tips of the branches), long, very slender, much exceeding the leaves, and bearing short lateral branches throughout their length; pedicels very slender. Flowers about ¼ in. diam. Sepals ovate, obtuse. Petals twice as long, pale green with purplish ridges. Filament slender, exserted. Disk rugose. Ovary quite smooth; ovule pendulous from a basal funicle.

10. M. oblongifolia, Hook. f.; leaves linear-oblong obtuse or subacute very coriaceous not reticulated beneath, petiole long, panicle large spreading quite glabrous, flowers pedicelled, petals 5 elliptic-oblong with a basal tubercle and 3–5 more or less confluent ridges, stamen 1 perfect with 4 shorter antheriferous ones, style subterminal.

Malacca, Griffith, Maingay (cult.).
A very large tree, glabrous throughout; branchlets stout. Leaves 8–12 by 1½–2½ in., very coriaceous, with undulate margins, faintly reticulate above, not at all or very obscurely so beneath; base usually rounded; nerves 20–25 pairs. Panicle very large, branches widely spreading, 2–3-chotomously divided. Flowers distant, ¼ in. diam.; pedicel rather stout, ¼ in. Sepals veined. Petals rather short, yellow, ridges tipped with red. Fruit 4 in. long, ovoid, dull green.—Maingay, from whom this description of the fruit is taken, says that this is cultivated at Malacca as the Queney Mango.

** Petals 4, with 1–5 free or confluent ridges that terminate in wart-like excrescences.

11. M. quadrifida, Jack in Roxb. Fl. Ind. ed. Carey, ii. 440; leaves elliptic-oblong or oblong-lanceolate obtuse narrowed into long petioles reticulate beneath inflorescence of many erect stout glabrous compound racemes, petals 4
short ovate with 3 short confluent ridges, stamen 1, the others reduced to minute teeth. *Wall. Cat.* 8480.

**Penang, Jack; Malacca, Maingay.—Distrib. Sumatra.**

A lofty tree, perfectly glabrous throughout; branchlets very stout. *Leaves* 4-8 by \(\frac{1}{2}-\frac{3}{2}\) in., rarely acute, very coriaceous; nerves 15-20 pairs, reticulation above obsolete; petiole 1-2 in. *Racemes* equalling or exceeding the leaves, collected on a short peduncle, rachis stout, branchlets 1-9 flowered. *Flowers* small, \(\frac{1}{2}\) in. diam.; pedicle longer than the petals. *Sepals* broadly orbicular-ovate. *Petals* twice as long, pearly-white (Maingay); the ridges raised at their ends. *Stamens* very short, inserted on the disk. *Disk* turgid, 4-lobed. *Style* lateral. (*Drupe* roundish, becoming very dark-coloured, *Jack*).—Maingay in his MSS. describes the petals as 5, and stamens as usually 2, but I find the flower to be uniformly 4-merous and monandrous; Jack however states that a small superfluous fifth petal is sometimes placed within the rest. This is allied in flower and inflorescence to *M. griffithii*.

**12. M. Maingayi, Hook. f.**; leaves elliptic-oblong acute or acuminate not reticulate on either surface or obscurely so beneath only, panicle glabrous spreading, flowers pedicelled, petals 4 oblong with 3-5 confluent ridges, stamen 1 perfect, the others reduced to teeth.

**Malacca, Maingay.**

A tree, everywhere quite glabrous. *Leaves* 4-9 by \(\frac{1}{3}-\frac{2}{3}\) in., coriaceous, nerves 15-20 pairs, not strong, arched; petiole 1-2 in. *Pedicile* equalling or exceeding the leaves, branches pale green (when dry), rather slender. *Flowers* \(\frac{1}{2}\) in. diam., pedicel slender. *Sepals* ovate, obtuse. *Petals* about twice as long. *Stamen* short. *Style* subulate, subterminal. There appear to be two varieties of this in Maingay's Herbarium; one (called Sapoong or Sampong), with larger leaves not narrowed into the petiole, opaque above, with sunk nerves, turgid between the nerves; the other (marked as truly wild) with brown (when dry) more shining leaves, narrowed into the petiole, more reticulated beneath, and the nerves not sunk; its leaves are like those of *M. indica*, from which its glabrous pedicelled flowers and warted petals at once distinguish it; both differ from *M. quadrifida* in the inflorescence. The first variety has, according to Maingay, globose green fruit 3-4 by \(\frac{1}{2}-\frac{3}{2}\) in.

**13. M. microphylla, Griff. MSS.**; leaves small elliptic acuminate reticulate beneath, panicle stout contracted puberulous, flowers very shortly pedicelled, sepal broadly ovate, petals 4 oblong with 3 ridges, stamen 1 without rudiments of others.

**Malacca, Griffith; in orchards.**

A small tree (Griffith). *Leaves* 1\(\frac{3}{4}-\frac{5}{4}\) by \(\frac{1}{2}-\frac{1}{2}\) in., shining above; nerves 8-10-pairs; petiole slender, \(\frac{1}{2}\) in. *Pedicile* short, stout, rather irregular, sometimes reduced to erect compound racemes, by the abbreviation of the peduncle and the branches being erect. *Flowers* about \(\frac{1}{2}\) in. diam., on short stout pedicels. *Sepals* pubescent. *Petals* about twice as long, the ridges distinct. *Filament* slender. *Style* lateral. *Fruit* oviform, green, very turpentine, *Griffith*.—Griffith has what appears to be a small state of this, with small very shining leaves, quite polished on the upper surface.

**Sect. 2. Disk** narrow, often reduced to the form of a stalk to the ovary, rarely obsolete in the 3 fl.

* Petals free from the disk.


**Malacca, Griffith.—Distrib. Java (Zollinger, 430).**

**Vol. II.**
A tree, everywhere quite glabrous, or very obscurely pubescent on the panicle. 

**Leaves** 6-12 by 2-4 in., very coriaceous, reticulate on both surfaces; nerves about 20-pairs, very strong; petiole stout, 1½-1½ in., much thickened from below the middle to the base. **Panicle** with stout green branches that turn black when dry. **Flowers** ⅓ in. diam., odorous, flesh-coloured. **Sepals** ovate-oblong. **Petals** three times as long, reflexed, greenish, suffused with blood-red. **Perfect stamens** sometimes 2 (Griffith), the imperfect ones slender, subulate, capitate. **Ovary** glabrous. **(Drupe** oblong, stinking, yellow-green, with yellow spots, filled with a sticky gum; flesh yellow, fibrous, sweet, not turpentine; stone compressed, fibrous; cotyledons rugose, equal at the base, one overlapping at the top. Griffith.)—Malay name “Koeone” or “Kohini,” according to Griffith, which is the name Maingay gives to *M. oblongifolia* (a totally different plant). This much resembles *M. Parth, Miq.*, of Java, which has a more effuse panicle with long tertiary branchlets and very long pedicels.

15. **M. lagenifera**, *Griff. Notul. iv. 414, t. 567, f. 3;* leaves small obovate-oblong or -spathulate obtuse or rounded at the tip, panicle large spreading pubescent, petals 5 linear-oblong obscurely thickened in the middle, stamens 5 perfect.

**Malacca, Griffith, Cumming (2330), Maingay.**

A very lofty tree (Griffith); branchlets stout, with pale bark. **Leaves** 3-6 by 1½-1½ in., very thickly coriaceous, gradually narrowed into a very stout petiole ⅓-⅓⅓ in., not reticulate on either surface; nerves about 20 pairs, very faint, spreading and parallel. **Panicle** on a long and stout peduncle, much exceeding the leaves. **Flowers** ½ in. diam.; pedicels very short. **Sepals** many, orbicular, tomentose. **Petals** three times as long, concave, purple, erect till a late period. **Diak** a slender stipes. **Filaments** very slender (purple, alternating with short horns, Maingay). **Ovary** glabrous; style capillary, lateral. **(Drupe** pyriform, ⅔ by ⅔ in., pale green, with a pink blush, flesh livid or purplish flesh-colour; stone fibro-coriaceous, adherent to the membranous testa; radicle basal, very large. **Maingay.**)—Called Lanjoot by the Malays, according to Maingay and Griffith. The latter describes the drupe as smooth, glaucous, fleshy, fetid, exuding a black varnish, traversed by innumerable fibres; stone ovate-lanceolate, fibro-coriaceous. **Seed** erect, adhering to the black tegument on the one side, on the other smooth; cotyledons with one half the surface smooth, the other wrinkled. Maingay describes the disk as hemispherical, but I do not find it so.

16. **M. fragrans, Maingay MSS.;** leaves very narrowly linear-oblong- or lanceolate acute acuminate or rounded at the tip, panicle spreading quite glabrous, petals narrow linear, stamens 5, one much longer than the others whose anthers are imperfect.

**Malacca, Maingay.**

A tree, everywhere quite glabrous. **Leaves** much longer and narrower than in any other species, 6-10 by 1⅓-1⅓⅓ in., coriaceous, reticulated on both surfaces, margins waved, base acute abruptly contracted into a very slender petiole 1-2 in.; nerves 25-35 pairs, slender, almost horizontal. **Panicle** longer than the leaves, peduncle long and branches thick, black when dry. **Flowers** erect, almost ⅓ in. long; pedicel turbinate. **Sepals** unequal, ovate-lanceolate. **Petals** very narrow, erect, reflexed sharply from the middle, 1-nerved (Maingay), 3-nerved in a young state. **Diak** a slender pedicel. **Filaments** very slender, shorter than the capillary style, which is lateral. **(Drupe** obliquely broadly oblong-globose; flesh yellow, acid and terebinthine; stone thin, fibrous; testa coriaceous, Maingay.)—This in foliage approaches very closely Blume’s *M. macrocarpa* of Java, which has still narrower leaves with crimped edges, 40 pairs of nerves, and a bitter-sweet fruit as large as a child’s head.

**Petals** adnate to or inserted on the disk.

17. **M. foetida**, Lour. *Fl. Coch.* 160; leaves large elliptic-oblong or -obovate obtuse or acute not reticulate, nerves strong, panicle very stout glabrous
spreading, flowers subsessile, petals 5 linear-lanceolate 3-ridged inserted on the dish, stamens 5 one perfect the rest shorter imperfect. Roxb. Fl. Ind. ed. Carey, ii. 440; Wall. Cat. 8488; Griff., Notul. iv. 419. M. Horsfieldii & M. foetida, Miq. Fl. Ind. Bat. i. pt. 2. 632.—Rumph. Amb. i. 98. t. 28.

Malacca, Penang, and Singapore, Jack, &c.—Distrib. Throughout the Malay Archipelago.

A large tree; branchlets very stout. Leaves very large, 10-12 by 3-4 in., very coriaceous, pale when dry; surface raised above between the stout nerves, of which there are about 20 pairs; base acute; petiole stout, 1-2 ½ in. Panicle large, stout, with very spreading branches, and these again with short tertiary cymose branchlets (deep blood-red, Mainay), black when dry. Flowers ½ in. diam., pink or dark red. Sepals ovate, obtuse. Petals reflexed from the middle, inserted on the pedicel-like disk above its base, but not decurrent on the disk. Ovary glabrous; style slender, lateral. (Drupes variable in form, not compressed, oblique, green, smooth, very fetid; flesh yellow, thick; stone almost 2-edged, chartaceous, fibrous; cotyledons equal, auricled at the base; radicle short. Griffith.)—Mainay describes the fruit as coarse-flavoured, and not unlike Lannoot (M. lagenifera), stringy. Malay name Bachang or Bachong. Rumph and Loureiro describe the drupe as hairy, but no one else does so; possibly the fibres of the stone are alluded to by these authors.

18. **M. caesia**, Jack in Roxb. Fl. Ind. ed. Carey, ii. 441; leaves cuneate-obovate or —oblong or —elliptic with very short thick petioles, panicle branched tomentose very stout, petals 5 erect adnate to the disk long narrow with one central ridge, stamen 1. Griff. Notul. iv. 415. M. foetida, Blume (according to Miquel in Herb.).

Malacca, Mainay (cult.).—Distrib. Sumatra, Java.

A large stately magnificent tree (Griffith); branchlets very stout. Leaves 6-16 by 2½-3½ in., very thickly coriaceous, smooth, rather shining, obscurely reticulated beneath, decurrent on the petiole, which is ½-1 in.; nerves about 20-30 pairs, slightly arched. Panicle very stout and much branched (of a glaucous reddish colour, Jack). Flowers in dense heads on the tertiary branchlets, ⅜ in. long; bracts broad; pedicel very thick, short. Sepals short, broadly ovate, pubescent. Petals erect, adnate by the ridge to the disk, linear, concave, purple. Disk slightly lobed, Imperfect stamens reduced to mere teeth; filament of perfect one slender. Style lateral, slender. (Drupes oblong-obovate, reddish-white, Jack.)—Griffith says that the corolla is more connate with the disk in the female, and that the panicle is cream-coloured and petals white outside and lilac inside, and that the larger cotyledon alone is auricled. Malay name Beenjai or Binjaae.

19. **M. superba**, Hook. f.; leaves very large subsessile cuneate-oblancoolate not reticulate, panicle spreading pubescent, flowers subcapitate very large, petals 5 lanceolate acuminate adnate to the disk with a flat central ridge, stamens 5, 1 perfect.

Malacca, Mainay.

A gigantic tree (Mainay); branchlets as thick as the thumb. Leaves 10-16 by 3-5 in., very thickly coriaceous and hard, obtuse, narrowed below into the short very thick petiole, not reticulate; nerves about 35 pairs, spreading, not sharply defined but prominent, midrib very stout beneath. Panicle hoary-pubescent, probably 2 ft. long, peduncle very thick; primary branches strict, ascending, branched at the tips and there bearing heads of flowers two inches across; bracts large, concave. Flowers ⅔ in. diam., lilac. Sepals hoary, ½ in. long, ovate-lanceolate. Petals adnate to the torus by the central ridge, concave, recurved. Filaments all slender, one anther-ferous. Ovary oblique; style slender, subterminal; ovule laterally attached, horizontal.—This is a grand species, allied to **M. caesia**, but far larger in all its parts than any other of the genus. It is curious that no one but Mainay should have met with so conspicuous a tree. Large sheathing stipule-like scales occur amongst the leaves, whose nature I cannot ascertain.
20. **M. policarpa**, Griff. *Notul.* iv. 416 (polycarpa), t. 167, f. 2 (caesia); leaves large sessile oblanceolate obtusely acuminate faintly reticulated undulate.

**Mallaca**, Griffith.

A large tree, like *M. fetida*; branches stout. Leaves nearly 1 foot long, very coriaceous, nerves 20–30 pairs, arched; petiole ½ in., winged, flattened. Flowers unknown. Drupe oblong, base rather broader, brown, dusty all over, of a strong Dorial or Mango taste; flesh and juice copious acid and pleasant; stone lanceolate, compressed, coriaceo-fibrous; embryo obclavate.—Griffith, from whom most of the above description is taken, says that this is the 'Camang,' and that he proposes for it the name of *Mangifera? policarpa* (misprinted *polycarpa*, at p. 416 of the Notulae), in allusion to the russet-coloured fruit, which is unique in the genus. Judging from the foliage, this is probably allied to *M. caesia*.

**Doubtful Species.**

**Mangifera.** Pegu, Kurz n. 2021; leaves very like those of *M. fragrans* in shape and size and with equally slender petioles; but the nerves are far less numerous, about 20 pair, arched, very slender, and the under-surface is far less finely reticulate, pale brown and quite opaque.

**Mangifera.** Pegu, Kurz n. 2020; leaves 14–18 by 3½–4 in., narrowly elliptic-lanceolate acuminate membranous glaucous beneath, finely but not closely reticulate, nerves about 30 pair slender well defined slightly arched, petiole 2–4 in. very slender.—I give this as a *Mangifera* on Kurz's authority.

*3. Anacardium*, Rottb.

Shrubs or trees. Leaves alternate, petaled, simple, quite entire. Panicles terminal, bracteate. Flowers small, polygamous. Calyx 5-partite, segments erect, imbricate, deciduous. Petals 5, linear-lanceolate, recurved, imbricate. Disk filling the base of the calyx, erect. Stamens 8–10, all or some fertile; filaments connate and adnate to the disk. Ovary obovoid or obcordate; style filiform, excentric, stigma minute; ovule 1, ascending from a lateral funicle. Nut kidney-shaped, seated on a large pyriform fleshy body formed of the enlarged disk and top of the peduncle; pericarp cellular and full of oil. Seed kidney-shaped, ascending, testa membranous, adherent; cotyledons semi-lunar; radicle short, hooked.—Distrib. A small tropical American genus, of which one species is naturalised in Asia.


Hotter parts of India, especially near the sea. Naturalised from America. Ceylon.

A small tree; trunk short, thick, crooked. Leaves 4–8 by 3–5 in., hard; nerves about 10 pair, nearly horizontal; petiole ¼ in. Panicles 6–10 in., pubescent; branches long naked to the tips where the flowers are collected; bracts lanceolate, gibbous, hoary. Flowers ½ in. diam., yellow with pink stripes. Stamens usually 9, all fertile, one larger than the rest. Fruit 1 in., on a pyriform fleshy receptacle 2–3 inches long.—The Cashew-nut.


Trees. Leaves opposite, petaled, coriaceous, glabrous, quite entire. Flowers small, in axillary and terminal panicles, polygamous. Sepals 3–5, deciduous,
valvate. Petals 3-5, imbricate. Disk very small. Stamens 3-5, inserted within the disk, all fertile. Ovary sessile; style short, terminal, stigma obscurely unequally 3-lobed; ovule ascending from the wall of the cavity. Drupe fleshy; stone thin, fibrous, 1-celled, 1-seeded. Seed suberect; cotyledons fleshy; radicle very short, inferior.—Distrib. Species 5, natives of Tropical Asia and the Malay Archipelago.


Pegu, Tenasserim and the Andaman Islands.—Distrib. Java.

Leaves very coriaceous, pale; nerves above sunk, very slender, beneath raised with a slender incised line along the ridge. Panicles much shorter than the leaves, slender, spreading, lax, few-flowered. Flowers about ½ in. diam., yellow, pedicelled, quite glabrous. Sepals rounded. Petals oblong, keeled on the face. Stamens usually 4. Ovary obliquely ovoid. Drupe 1-2 in., broadly ovoid, compressed, yellow, eatable.—‘Mariam’ or ‘Mai-een’ of the Burmese. Kurz states that the stamens are usually 8, perhaps a misprint for 3.

2. B. microphylla, Griff. Plant. Cantor 15; Notul. iv. 423; leaves 2½-3½ in. elliptic-lanceolate obtuse or obtusely acuminate, panicles denselyflowered obscurely puberulous, flowers 4-merous. B. diversifolia, Miq. Fl. Ind. Bat. Suppl. i. 522. ?B. myrsinoides, Blume Mus. Bat. t. i. 204; Miquel l. c. i. pt. 2, 635.

Malacca, Griffith, Maingay.—Distrib. Sumatra.

Very similar to B. burmanica, but much smaller in all its parts and usually triandrous.—Roomaniya Paigo’ of the Burmese.

3. B. macrophylla, Griff. Plant. Cantor 15; Notul. iv. 420, t. 567, f. 4; leaves 6-10 in. oblong-lanceolate obtuse or obtusely acuminate, panicle much branched dense-flowered very pubescent, flowers usually 3-merous. ?B. gandaria, Blume Mus. Bat. t. 204, in note; Miquel Fl. Ind. Bat. i. pt. 2, 635.

Malacca, Griffith, Maingay.—Distrib. Java, Borneo.

A much larger plant than B. oppositifolia, with more oblong glossy leaves, the nerves 12-20 pairs sunk on the upper surface, raised on the lower but not grooved on the ridge. Pedicle 2-3 in. long; branches stout, spreading horizontally and bearing densely crowded cymes of flowers about ½ in. diam. Sepals 3 in the (Griffith). Stamens 3-5. Drupe ovoid oblong, a little oblique, as large as a hen’s egg; pulp yellowish, acid, not terebinthine; stone leathery, fibrous, adherent to the testa. Cotyledons lilac, equal, reticulate, rugose (Griffith). ‘Roomaniya Baitool’ of the Malays.

5. GLUTA, Linn.

Trees with caustic juice. Leaves crowded at the ends of the branchlets, short-petioled, simple, oblong, coriaceous. Panicles axillary and terminal. Flowers small, hermaphrodite. Calyx spathaceous, bursting irregularly, caducous. Petals 4-6, adnate to the disk, imbricate. Disk elongate, rarely short. Stamens 4-6, inserted on the disk, filaments capillary. Ovary sessile on the disk or stipitate, oblique, 1-celled; style lateral, filiform, stigma simple; ovule 1, pendulous from a basal funicule. Berry stalked, dry, deformed, tubercled or ridged. Seed with the testa adherent to the pericarp and full of black juice; cotyledons large, connate, fleshy; radicle short, obtuse, incurved.—Distrib. About 8 species, all Malayan.

**Penang, Porter, Mainagay.**
A small tree, perfectly glabrous throughout; much branched; trunk stout. *Leaves* 3–5 in., tapering at both ends, shining, reticulate beneath; nerves 8–12 pairs, arched; petiole $\frac{1}{2}$–$\frac{3}{4}$ in. *Panicles* much shorter than the leaves, slender. *Flowers* $\frac{1}{3}$ in. long, subcoriaceous. *Calyx* tubular, membranous, scarlet, split, mouth 2-toothed. *Petals* linear-lanceolate. *Disk* elongate. *Stamens* 4–5, as long as the petals. *Drupes* $\frac{3}{4}$ in. long, when dry, gibbous-oblong, smooth, style-scar nearer the base than top.

—A most beautiful and fragrant tree.

**Var. Helferi;** leaves linear-oblong obtuse, nerves more oblique. Tenasserim or Andaman Islands, *Helfer.*—Probably a different species.


**Tenasserim, at Tavoy, Gomez;** Mergni, *Giffuth.*
A small tree with white branches. *Leaves* 4–12 by $\frac{1}{2}$–3 in., very coriaceous, brown, rather waved; nerves 15–20 pairs, arched; petiole usually $\frac{1}{3}$ in., stout. *Panicles* slender; peduncle 1–3 in.; flowers loosely coriaceous, like those of *G. elegans,* but smaller, about $\frac{1}{2}$ in. long; pedicel stouter; *calyx* (scarlet) shorter, puberulous, not toothed. *Petals* linear-spathulate, white.

3. **G. coarctata**, *Giff. Notul. iv.* 409, t. 507, f. 1 (Syndesmis); leaves recurved conduplicate short-petioled linear- or obovate-oblong obtuse or subacute reticulate on both surfaces, margins waved, panicles pubescent, flowers large.

**Malacca, Griffith, Mainagay.**
A small tree. *Leaves* 5–10 by 2–3 in., coriaceous, bright brown when dry; nerves 15–22 pairs, very slender; petiole $\frac{1}{4}$–$\frac{1}{3}$ in. *Panicles* much branched, 3–5 in.; flowers crowded at the tops of the branches, $\frac{1}{2}$ in. diam. *Calyx* short, almost campanulate, split and lobed, very pubescent. *Petals* 5, obovate-lanceolate tipped with red. *Stamens* 5. *Drupes* subglobose, with an irregular raised ridge round the base, others down the sides; rind dry, papillose, coriaceous; flesh white, fibrous and spongy; stone coriaceous, adnate to the testa. *Seed* erect; embryo very large, cotyledons subhemispheric unequal fleshy, opposite faces pink, radicle short.—The description of the fruit is taken from Griffith’s *Notulae* and figure. The recurved subsessile leaves and large flowers at once distinguish the species.


**Western Peninsula;** Ghats of Tinnevelly and Travancor, *Beddome.*
A very tall timber tree. *Leaves* 4–6 by $\frac{1}{2}$–1$\frac{1}{2}$ in., coriaceous, reticulate on both surfaces but especially beneath; petiole very short, dilated. *Panicles* crowded, terminal and in the upper axils, subcoriaceous, shorter than the leaves; bracts ovate, boat-shaped. *Calyx* truncate at the base, very short, coriaceous, irregularly toothed or lobed, split on one side, less deciduous than in the other species. *Petals* 5, elliptic-obovate, obtuse, downy on both surfaces. *Disk* very short. *Stamens* 5, filaments subulate. *Drupes* 1 in. diam., depressed-globose, stipitate.


3-5-toothed or -lobed, persistent, imbricate. Petals 4-5, oblong, recurved, imbricate. Disk orbicular, 5-lobed. Stamens 8-10, free, inserted at the base of the disk. Carpels 5-6, free, seated in the cavity of the disk, one fertile, the rest imperfect; style short, stigma truncate; ovule 1, pendulous from a basal funicle. Drupe small, flesh scanty; stone crustaceous or bony, 2-valved. Seed gibbous, acute at one end; cotyledons thick; radicle superior.—DISTRIB. A tropical Asiatic, Australian and Pacific Island genus; species about 20.


Hot, drier parts of India, from Kumaon ascending to 1500 ft., and Oudh, through Central India and to the Western Peninsula, Burma and Tenasserim.

A tree 40-50 ft., subdeciduous; branchlets as thick as the finger. Leaves 6-10 in., very coriaceous or hard, nerves 15-20 pairs, stout, nearly straight; petiole 1-1 1/2 in., stout, pubescent. Panicles terminal and axillary, shorter than the leaves, pyramidal, branches stout; bracts small, caducous. Flowers 1/2 in. diam., sessile, greenish white. Calyx 5-toothed. Petals oblong. Disk fleshy. Stamens 10, spreading, as long as the petals. Ovaries one perfect, conical, pubescent, 4 others reduced to filaments. Drupe 1/2 in., subgibbose, slightly compressed, black; stone hard, 2-valved.—There is a specimen marked from Malacca in Griffith's Herbarium.

2. **B. angustifolia**, Roxb. Fl. Ind. ii. 386; *Cor. Pl.* iii. t. 262; leaves linear-oblong or elliptic or elliptic-lanceolate obtuse or rounded at the tip base not narrowed into the petiole glabrous on both surfaces, nerves very slender, panicles quite glabrous, flowers sessile. *Wall. Cat.* 982; *W. & A. Prodr.* 169; *Grah. Cat. Bomb. Pl.* 41; *Wight Ic.* t. 101. Spondias simplicifolia, Rottl. Mangifera axillaris, Lamk.

Western Peninsula; the Concan, from the Adjunta Jungles, Graham, southwards. Ceylon, in the northern parts of the island.

A tree, perfectly glabrous throughout, branchlets stout. Leaves 4-6 by 1 1/2-2 in., thinly coriaceous, shining above, delicately reticulate beneath, rounded or acute at the base; nerves 12-15 pairs, very slender; petiole 3/4-1 1/2 in., slender. Panicles axillary and terminal, about as long as the leaves, peduncle and branches slender, spreading. Flowers in small clusters 1/2 in. diam., quite glabrous, nearly sessile. Drupe 1/2 in. diam., obliquely spherical.—The Malayan and Australian forms referred to this appear to me to differ much in the leaf-base, narrowed into the shorter stouter peduncle, and other points.

3. **B. glabra**, *Wall. Cat.* 984; leaves broadly elliptic or oblong or almost orbicular obtuse or rounded at the tip quite glabrous, base rounded, nerves strong, panicle spreading puberulous, flowers sessile.

Tenasserim; at Moulmein, Wallich.

A tree. Leaves 4-6 by 2-3 in., usually quite elliptic and rounded at both ends, sometimes more acute at the base, very coriaceous, upper surface raised between the nerves, faintly reticulate, lower strongly reticulate shining; nerves 12-15 pairs; petiole always short, 1/2 in. Panicle shorter than the leaves, rusty puberulous, glabrate in fruit; branches spreading, rather stout. Flowers 1/2 in. diam., rather crowded, very shortly pedicelled. Fruit unripe, glabrous.—Wallich's are the only specimens of this that I have seen; it is nearest *B. angustifolia*, but differs materially in the broad almost rounded leaves, very short petiole, and puberulous panicle.

4. **B. lucida**, *Blume Mus. Bot.* i. 184; quite glabrous throughout, leaves

**EASTERN PENINSULA;** from Tenasserim to Malacca, and Penang.—Distr. Sumatra, Borneo, Australia?

A tree, quite glabrous throughout. *Leaves* 4–7 by 1½–2 in., coriaceous, very brown when dry and rather shining; nerves 12–15 pairs slender, arched; petiole 1–1½ in., gradually dilated upwards. *Panicles* usually longer than the leaves, very many-flowered. *Flowers* ½ in. diam. (4–5-merous, white, disagreeably-scented, *Griffith*). *Sepals* orbicular. *Petals* elliptic, obtuse. *Filaments* subulate, white. *Drupe* ½ in. diam., orbicular, compressed with a sharp edge.—*Blume’s* *B. arborescens*, and perhaps *B. longifolia*, are hardly distinct from this, as is *Miquel’s* *petiolaris* and *bancana*. I should refer hither also the glabrous paniceded Australian plant placed under *angustifolia*, *Roxb.*, in the *Flora Australiensis*.

**VAR. intermedia**, leaves obovate-spathulate membranous. B. intermedia, *Wight* *Ic.* t. 81.—Naggarie hills, Madras.


**Tenasserim;** at Moulinein, *Lobb; Penang, Porter; Malacca, Griffith, Maingay.* Distr. Sumatra.

A small tree. *Leaves* 4–7 by 2–2½ in., thinly coriaceous, tips very acute, base much narrowed, reticulate on both surfaces, quite sessile in Penang specimens, with slender petioles sometimes 1½ in. in Malacca and Tenasserim ones, bright brown when dry; nerves about 15 pairs, slender. *Panicles* chiefly axillary, branches divaricating. *Flowers* ¼ in. diam. *Sepals* small, orbicular. *Petals* oblong. *Filaments* compressed. *Drupe* as in *B. lucida.*—I think there is no doubt of *Blume’s* *B. sessilifolia* being a sessile-leaved form of this, which is far more frequently a petioled plant, and therefore better fitted to Turczaninoff’s name than to *Blume’s*, though against the laws of priority.


**WESTERN PENINSULA;** near Quilon, *Wight*.

A tree. *Leaves* 4–5 by 1½–1½ in., reticulate and shining on both surfaces, margin waved, base acute but not contracted into the petiole; nerves 16–20 pairs, slender arched; petiole ½–¾ in., stout. *Panicles* shorter than the leaves, numerous, stout, axillary and terminal. *Flowers* ½ in. diam., crowded on the short stout lateral branches. *Sepals* rounded. *Petals* broadly oblong. *Filaments* subulate. *Fruit* unknown.—*Wallich’s B.? acuminata*, from Tavoy (Cat. 981), is very similar to this; it has fruit only, and the nervation is a little different.

**DOUBTFUL SPECIES.**

B. LANCIIFOLIA, *Roxb. Fl. Ind.* ii. 386; ‘a large tree, leaves lanceolate obtuse pointed lucid entire, panicles terminal.’—Chittagong.


B. LAXIFLORA, *Kurz in Journ. As. Soc. Beng.* 1872, pt. 2, 304; ‘leaves 6–7 in. ovate-oblong coriaceous finely tomentose glabrescent above, petiole ½ in. stout, panicle terminal lax diffuse much branched hoary or yellowish pubescent, flowers minute,
pedicels short slender, bracts minute subulate, calyx hoary, lobes $\frac{1}{4}$ in. long oblong acute, petals $\frac{1}{2}$ in. obovate-oblong, filaments subpuberulous, ovary glabrous.—Martaban, Kurz.

7. **Melanorrhoea**, Wall.

Trees with a varnish juice. Leaves alternate, simple, quite entire, coriaceous. Panicles axillary. Flowers rather large, hermaphroditic. Sepals 5, cohering into a pointed cap, deciduous. Petals 5–8, linear-oblong, imbricate, much enlarged in fruit. Disk hemispheric or columnar. Stamens 5 or very numerous, inserted all over the disk; filaments capillary. Ovary stalked, lenticular, oblique, 1-celled; style sublateral, stigma simple; ovule 1, pendulous from a basal funicle. Fruit dry, subsessile on a long pedicel rising from the stellately spreading persistent petals, globose coriaceous. Seed subglobose or oblong; testa papery; cotyledons thick, plano-convex; radicle ascending.—The following are the only species.

* Stamens many. Fruit pedicelled.

1. **M. usitata**, Wall. Pl. As. Rar. i. 9. t. 11, 12: Cat. 507; leaves obovate or elliptic obtuse softly tomentose on both surfaces.

Munnyfong, Birma and Tenasserim, Wallich, &c.

A large deciduous tree; branchlets very stout, velvety. Leaves 6–14 by 4–6 in.; base cuneate; nerves 28–30 pairs, stout, straight; petiole flattened, winged, $\frac{1}{2}$–1 in. Panicles 1 ft. long, peduncled, tomentose. Flowers lax $\frac{1}{2}$ in. diam.; pedicels slender. Calyx calyptrifid, beaked, pubescent. Petals 5–6, eventually 2–4 in. long, linear-oblong, obtuse, coriaceous, reticulated, gland-dotted, pubescent. Stamens 20–30. Drupe the size of a cherry, red, glaucous; pedicel $\frac{3}{4}$ in.—The varnish tree.


Tenasserim, at Tavoy, Gomes; Mergui, Griffith.

A tree; branchlets hoary. Leaves 6–10 in., undulate, coriaceous, shining above, reticulate on both surfaces; base cuneate; nerves 16–20-pairs, slender, arched, very different from *M. usitata*; petiole $\frac{1}{2}$ in. flattened, winged. Panicles lax, slender, sparingly branched, about equaling the leaves, puberulous. Flowers on slender pedicels, white, $\frac{1}{3}$ in. diam. Calyx membranous, calyptrifid, acute pubescent. Petals linear-oblong, acute, puberulous, eventually 2–2$\frac{1}{2}$ in. long, linear-oblong or -spathulate, coriaceous, veined. Drupe $\frac{3}{4}$ in. diam., depressed or globose, quite smooth; pedicel very slender, 1–1$\frac{1}{4}$ in.

**Stamens** 5. *Fruit subsessile.*


Malacca, Maingay.

A gigantic tree (Maingayi); branchlets rather slender. Leaves 4–6 by 2–3 in., very coriaceous, deeply reticulate on both surfaces; nerves 18–20-pairs, strong-parallel; petiole 1–2 in. Panicles terminal and axillary, longer than the leaves, long-peduncled, pubescent, curved, lax-flowered. Flowers $\frac{1}{2}$ in. diam. Calyx calyptrifid, membranous, veined, split on one side as in Gluta, pubescent. Petals linear, oblong, obtuse, tomentose. Stamens 5; filaments filiform, hairy. Disk elevated. Ovary tomentose. Drupe $\frac{3}{8}$ in., oblong, obtuse, smooth.

8. SWINTONIA, Griff.

A tall tree, quite glabrous. Leaves alternate, long-petioled, simple, quite entire. Panicles terminal and axillary, very large and broad. Flowers small hermaphrodite or unisexual. Calyx small, 5-lobed, lobes rounded imbricate. Petals 5, adnate to the middle of the disk, linear-oblong, imbricate, much enlarged and reflexed in fruit. Disk short or elongate or cylindric. Stamens 5, inserted on the top of the disk, free. Ovary sessile, ovoid, 1-celled, narrowed into the slender style; stigma capitellate; ovule pendulous from a basal funicle. Drupe ovoid, smooth, sessile, coriaceous, subtended by the 5 reflexed enlarged petals. Seed erect, testa thin; cotyledons amygdaloid.—Distr. The following are the only species known.

1. S. Griffithii, Kurz in Jour. Beng. As. Soc. 1870, ii. 75; leaves elliptic-lanceolate acuminate at both ends, petiole long slender, panicule much larger than the leaves lax spreading quite glabrous, branches very slender, flowers pedicelled. Swintonia, Griff. in Proc. Linn. Soc. 1846, 283. Astropetalum 1, Griff. Notul. iv. 411, t. 565, f. 2, b. c. d.

Tenasserim, at Mergui, Griffith; Helfer.

A lofty tree, glabrous throughout; branchlets very slender. Leaves 4–7 by 1–1½ in., sometimes subopposite or 3-nate; tip obtuse; margin waved, obscurely reticulate above and beneath; nerves 16–20-pairs, very slender; petiole 1½ in. Panicle copiously branched from near the base. Flowers long-pedicelled, ¼ in. diam. Petals linear-oblong, quite glabrous, rapidly enlarging. Fruit unknown.—I do not find the irregular pellucid dots which Griffith describes. Habit of a Mango, conspicuous for its dense masses of flowers which, when bruised, emit a peppery smell.

2. S. Helferi, Hook. f.; leaves narrow-lanceolate obtusely acuminate, base acute, margins undulate, petiole long slender, panicles much longer than the leaves lax spreading quite glabrous, flowers pedicelled.

Tenasserim of Andaman Islands, Helfer.

Very nearly allied to S. Griffithii, but branchlets stouter. Leaves much longer, 6–10 by 1–1½ in., drawn out into longer points, with more numerous (25–30) pairs of nerves, rather stouter petioles, and more waved margins; they are also of a dark brown colour when dry, whereas those of S. Griffithii are pale greyish-brown. Drupe. (ripe) obovoid, ½ in. The reflexed petals 2 in. long, linear, obtuse, veined, glabrous.

MALACCA, Griffith : Maingay.—Distrib. Sumatra.

A tall tree; branchlets rather slender. Leaves 3–5 in., usually obtusely acuminate, rather thin; margins hardly undulate; nerves about 15-pairs; petiole very slender, 2–2½ in. Panicles numerous from the upper axils, branched, peduncles and branches and pedicels excessively slender and spreading. Flowers the smallest of the genus, when first expanded, ¼ in. diam., shortly pedicelled. Calyx-lobes orbicular, glabrous. Petals oblong on expansion, very rapidly enlarging, finally 2½ in. long, linear, obtuse coriaceous, veined. Drupe ⅛ in. long, oblong, smooth. Cotyledons oblong, amygdaloid; radicle lateral, minute.—Kurv refers to this Astropetalum 1 of Griffith's Notulae, which, as it appears to me from Griffith's notes and specimens, is his original Swintonia, to which he attached the MS. name of S. floribunda, but for which I have adopted Kurz's S. Griffithii. The reference to "Cat. Hort. Bego" is taken from Kurz. I do not find the name in the edition of that work at Kew.

4. S. spicifera, Hook. f.; leaves obovate or elliptic-obovate tip rounded base cuneate, panicles longer than the leaves branches strict, flowers forming pubescent spikelets at the tips of the branchlets.

Penang ? Maingay.

A lofty thick-stemmed tree (Maingay). Leaves 3½–7 by 1½–2 in., coriaceous, upper surface shining with very obscure nerves, under glaucous with 12–15 pairs of very slender nerves, reticulation very indistinct; petiole ⅜–1 in. Panicles subcorymbose, sometimes leafy, repeatedly trichotomously forked; branches angular, strict, suberect, glabrous, articulate, ultimate divisions ⅛ in., stout, clothed with imbricating small bracts and flowers; rachis with close-set deep scars; bracts orbicular, concave, pubescent. Flowers ⅛ in. diam. when first expanded, apparently polygamous, most of them males and caducons; pedicle very short. Calyx hemispheric, 5-lobed, lobes orbicular, pubescent. Petals 5, oblong, obtuse, hoary, eventually 1–2½ in. reflexed, linear-oblong, obtuse, coriaceous in fruit. Stamens 5, filaments subulate; anthers oblong. Disk confluent with the thickened base of the filament in the male. Drupe ⅛ in. long, obliquely ovoid, smooth; pericarp thin. Cotyledons amygdaloid.—I assume this to be a Penang plant from the tickets and writing being of the same kind as is attached to Maingay's other Penang plants. A very different species from the rest, the imbricating flowers on the thick tips of the branchlets of the panicle is a curious character.

9. SOLENOCARPUS, Wt. & Arn.


1. S. indica, Wt. & Arn. Prodr. i. 171; Beddome Fl. Sylv. t. 233; Anal. Gen. 79.

Western Peninsula; Malabar and Travancor, ascending to 2500 ft. on the Anamally hills, Beddome.

Leaves 6–12 in.; petiole angled, slender, pubescent; leaflets 4–6 pairs, 2–4 in., subopposite, sessile, except the terminal, which is long-petiolate, oblong or oblong-lanceolate acuminate; base obliquely cordate, quite entire or remotely crenate, rather coriaceous, glabrous, nerves 8–10 pairs, faint. Panicles much branched; branches erect.
XLVI. ANACARDIACEAE. (J. D. Hooker.) [Tapiria.

patent, pubescent, at length glabrate. Flowers shortly pedicelled, \( \frac{1}{6} \)–\( \frac{1}{3} \) in. diam. Drupe \( \frac{1}{4} \) in. long, pedicelled.

10. TAPIRIA, Juss.

Erect or scandent shrubs or trees. Leaves alternate, odd-pinnate; leaflets numerous, subopposite, serrate. Panicles axillary and terminal. Flowers small, green, polygamous. Calyx 5-partite; segments imbricate, persistent. Petals 5, small, oblong, imbricate. Disk broad, 5-lobed. Stamens 10, inserted at the base of the disk; anthers globose. Ovary in the \( \mathcal{g} \) immersed in the disk, 4–5-lobed, with 4–5 styles; in the \( \mathcal{f} \) ovoid, more free, 1-celled; style short, conic, stigma simple; ovule pendulous from the top of the cell. Drupe obliquely oblong, fleshy; stone rugose, crustaceous. Seed oblong, testa membranous; cotyledons large, plano-convex; radicle superior.—DISTRIB. Species 8 or 10, chiefly American.


Central and Eastern tropical Himalaya, from Nipal and Sikkim, ascending to 4000 ft.; to Bhotan, Griffith. Assam, Silhet, and Chittagong.

A scandent shrub, more or less clothed with soft villous tomentum. Leaves 8–12 in.; petiole villous, slender; leaflets petiolulate, 5–7 pairs, 1-4 in., oblong, acuminate, membranous, rarely quite entire, base cordate. Panicles villous; bracts ovate. Flowers \( \frac{3}{4} \) in. diam., pale, sweet-scented. Drupe the size of a currant, black; flesh next the stone cellular and full of viscid brown balsam.

11. PENTASPADON, Hook. f.

Trees. Leaves odd-pinnate; leaflets opposite subsessile, quite entire. Panicles axillary, peduncled, branched, branchlets very slender. Flowers pedicelled, minute, hermaphrodite. Calyx-lobes 5, imbricate. Petals 5, oblong-obovate, strongly imbricate. Stamens 5, minute, inserted at the base of the disk; alternate with 5 short subulate staminodes which are free or adnate to the side of the disk, filaments short, broadly subulate; anthers didymous. Disk cupular, obscurely 10-lobed. Ovary seated on the disk, very minute, 1-celled, contracted into a stout short style, stigma globose or obliquely oblong, large; ovule 1, pendulous from the upper part of the cavity.


MALACCA, Maingay.

Branchlets stout, woody, cylindric, covered with close-set sears of fallen leaves, tips velvety. Leaves crowded at the ends of the branches; petiole 6–10in. stout, cylindric, velvety, bearing no leaflets on the lower third or fourth; leaflets 2–3\( \frac{1}{2} \) in. subsessile except the petiolulate terminal one, oblong, acute or acuminate, base rather oblique and rounded, thinly coriaceous, opaque above with pubescent midrib, thickly tomentose beneath; nerves 12–14 pairs, slender, arched. Panicles usually shorter than the leaves, triangular, densely velvety, except the flowers, peduncle 2–4 in.; branchlets very numerous, erecto-patent, strict, very slender indeed, much divided and spreading. Flowers \( \frac{1}{4} \) in. diam. on short glabrous pedicels; bracts minute. Calyx lobes ovate. Petals spreading, minutely pubescent. Stamens and Ovary very minute, as compared to the petals. Drupe 1 in. long, rather scurfy outside, compressed, ovoid, obliquely beaked, 1-celled; pericarp cellular and full of black varnish, endocarp thin.
Seed pendulous, oblong, compressed; testa thin; cotyledons thin, flat; radicle superior.—Maire notes that this tree is polygamo-dieciocious, but all the flowers I have examined seem to be hermaphrodite. Owing to the minuteneness of the parts of the flower he states he was unable to make out the structure of the ovary, and ovules. That I have given is, I think, correct.

The genus Pentaspadon was founded on a Bornean plant (Trans. Linn. Soc. xxiii. 168 t. 24), afterwards published from Sumatran specimens as Nothoprotium by Mi¬quel (Fl. Ind. Bat. Suppl. 527), who referred it to Burseraceae. Miquel's description is most imperfect, and I added it to the Genera Plantarum the character of having two styles, taken from flowers sent to me by Miquel as belonging to his plant, but which prove to belong to a totally different one. Marchand (Rev. Anacard. 90, 183) was the first to identify Nothoprotium with Pentaspadon, and his identification I have confirmed by specimens subsequently received from Miquel. The fruit of the original species being unknown, it is possible that that here, described may not be con¬generic.

12. ODINA, Roxb.

Trees with few stout soft branches. Leaves few at the ends of the branches, alternate, odd-pinnate, deciduous; leaflets opposite, quite entire. Racemes simple and panicked, terminal, fascicled. Flowers small, monoeocious or dioecious, fascicled, shortly pedicelled. Calyx 4-5-lobed, persistent; lobes rounded, imbricate. Petals 4-5, imbricate. Disk annular, 4-5-lobed. Male Fl. Stamens 8-10, inserted within the disk. Ovary 4-5 parted. Fem. Fl. Ovary sessile, oblong, 1-celled; styles 3-4, stout, stigmas simple or capitate; ovule pendulous from near the top of the cell. Drupe small, compressed, reniform, crowned by the distant styles; stone hard. Seed compressed; embryo curved, cotyle¬dons flat fleshy, radicle superior. Distrib. About 12 species, of which most are African.

1. O. Wodier, Roxb. Fl. Ind. ii. 293; W. & A. Prodr. i. 171; Thwaites Enum. 78; Grah. Cat. Bomb. Fl. 42; Wt. & t. 60; Bedd. Fl. Sylv. t. 123; Wall. Cat. 8475; Royle Ill. t. 31; Dalz. & Gibbs. Bomb. Fl. 51; Brandis For. Flor. 123.—Rheed Hort. Mal. iv. t. 32.

Throughout the hotter parts of India, from the extreme N.W. and along the foot of the Himalaya (ascending to 4000 ft.) to Assam, Birma, Tenasserim, the Andaman Islands, and Ceylon.

A deciduous ugly tree 40-50 ft.; trunk very thick; branches few; bark exfoliating; young parts clothed with stellate down. Leaves 12-18 in.; petiole terete; leaflets 3-4 pairs, petiolulate, 3-6 in., oblong-ovate, ciliate-acute, minute. Racemes slender, 2 compound, 2 simple pubescent. Flowers 4-merous, fascicled, shortly cymose, inodorous; bracts ciliate. Sepals obtuse, ciliate. Petals twice as long, oblong, spreading, purplish and greenish-yellow. Stamens equalling the petals in the 2. Drupe red.—The tissues abound in starch, whence it is most easy to increase this tree by cuttings of almost any part.

13. PARISHIA, Hook. f.

Beautiful flowering trees. Leaves alternate, odd-pinnate; leaflets numerous, quite entire, coriaceous. Panicles ample, nodding. Flowers dieciocious. Male Calyx cupular, 4-lobed; lobes ovate, valvate. Petals 4, oblong, imbricate. Disk short, annular, obscurely 4-lobed. Stamens 4, inserted below the margin of the disk. Rudimentary ovary columnar. Fem. Fl. Calyx 4-lobed, lobes greatly enlarged in fruit. Petals 4. Disk? Stamens 4? Ovary sessile, ovoid, 1-celled; style terminal, unequally 3-fid, stigmas capitate; ovule pendulous from near the top of the cell. Fruit dry, globose, pubescent, pointed by the style-base, pericarp thin. Seed pendulous, testa membranous; cotyledons amygdaloid; radicle superior.—Distrib. The following are the only species.

**Tenasserim**, at Mergui, Griffith; **Andaman Islds., Parish, Kurz.**

Leaves 1–2 ft., petiole cylindrical, glabrous; leaflets petiolulate, 5–8 in., variable in shape, often gradually narrowed to the tip from just above the base, shining above, reticulated beneath; midrib quite excentric; nerves 12–20 pairs, slender, arched. Panicles as long as the leaves, villous with spreading hairs. *Flowers* ½ in. diam., broadly campanulate. Sepals pubescent. Disk tomentose. Drupe the size of a large pea, globose, pointed, tomentose; enlarged sepalas puberulous, acute or rounded at the tip.


**Malacca, Maingay.**

A tree abounding in a resinous slightly viscid secretion (Maingay). Leaves crowded at the ends of the branches; petiole 12–18 in., pubescent woody terete; leaflets 3–5 in., shortly petiolulate, base rounded, hard, shining above, with obscure nerves; beneath minutely puberulous, and minutely reticulated; nerves 15–30 pair, slender, spreading, nearly straight. Panicles apparently shorter than the leaves, pubescent. Petals linear-oblong. Disk pilose. Young fruit densely clothed with hispid ferruginous bristles; fruiting sepalas puberulous, nearly 1 in. broad, tip rounded.—I have assumed that the fruits belong to the leaves of the plant with which Maingay has placed them; but in one of his Herbarnium specimens, the leaves of *P. Maingayi* are fastened down with the fruit of a species with pubescent pericarp and acute fruiting sepalas 4½ by 1½ in.

3. **P. pubescens**, Hook. *f.*; leaflets 5 pair thickly coriaceous oblong acute or acuminate pubescent beneath, fruiting sepalas 5 in.

**Malacca, Maingay.**

A lofty tree. Leaves 8–14 in.; petiole pubescent, terete; leaflets 3–5 in., sub-sessile, base rounded, above glabrous except the midrib, shining, beneath lurid thickly pubescent much reticulate; nerves 10–12 pairs, very strong, arched. Panicle divided to the base into numerous fascicled pairs, densely softly tomentose. *Flowers* ½ in. diam., pedicelled. Ovary conical, pilose; styles 3. Drupe ½ in. long, between conical and spherical, densely tomentose. Pericarp cartilaginous; fruiting sepalas ½ in. diam., tip rounded.


Trees. Leaves alternate, simple, quite entire, coriaceous. *Flowers* small, polygamous or dioecious, in terminal, rarely axillary panicles. Calyx 5–6-fid, segments deciduous. Petals 5–6, imbricate. Disk broad, annular. Stamens 5–6, inserted at the base of the disk, imperfect in the 2 flowers. Ovary 1-celled; styles 3; ovule pendulous from a basal funicle. Drupe fleshy, oblong or sub-globose, oblique, seated on a fleshy receptacle formed of the thickened disk and calyx base; pericarp loaded with acrid resin. Seed pendulous, testa coriaceous, inner coat somewhat fleshy; embryo thick, cotyledons plano-convex, radicle superior.—Distr. About 20 species, tropical Asiatic and Australian.

* Leaves more or less pubescent beneath. Panicles pubescent (see also 7. *S. marginata*).

1. **S. Anacardium**, Linn. *f.*; leaves very large oblong or obovate-oblong tip rounded, base rounded cordate or cuneate opaque above brown minutely pubescent beneath, panicle tomentose, drupe 1 in. *Roxb. Flor. Ind.*
Semecarpus.] XLVI. ANACARDIACEÆ. (J. D. Hooker.)

ii. 88; Cor. Pl. i. t. 12; W. & A. Prodr. i. 168; Wt. Ind. t. 558; Grah. Cat. Bomb. Pl. 41; Dalz. & Gibbs. Bomb. Fl. 52; Bedd. Fl. Sylv. t. 166; Brandis For. Flor. 124; Wall. Cat. 8473. S. latifolius, Pers. (ex Marchand). Anacardium latifolium, Lamk. Ill. t. 208. A. officinarum, Gartn.

Tropical outer Himalaya, from Sirmore to Sikkim, ascending to 3500 ft.; and throughout the hotter parts of India, as far east as Assam (absent in the Eastern Peninsula and Ceylon).—Distr. Eastern Archipelago and N. Australia. A moderate-sized dioecious deciduous tree, exuding a dark juice; young parts petioles leaves beneath and panicle clothed with a fine pale pubescence. Leaves 9–30 by 5–12 in., very coriaceous, flat, margin cartilaginous, rarely linear-oblong, usually contracted below the middle; nerves 16–25 pairs, stout, slightly arched; petiole 1–2 in., rounded, not winged. Panicle equalling or shorter than the leaves, stout; branches spreading; bracts lanceolate. Flowers 1/4–1/3 in. diam., subsessile, fasicled. Petals much longer than the calyx, oblong, greenish-white. Filaments subulate. Drupe 1 in. long, obliquely ovoid or oblong, smooth, shining, black; cup orange-red.


2. S. microcarpa, Wall. Cat. 989; leaves large obovate or subpanduriform tip rounded base acute obtuse or rounded glabrous and opaque above pale with fine subscabrid pubescence beneath, drupe 3/4 in.

Birma; on the Irrawaddy, Walliech.
Very similar in habit and foliage to S. Anacardium, but the drupes are less than half the size.—Kurz's S. albecens (see p. 35), which he describes as having the petals valvate or subvalvate, a glabrous disk, pubescent ovary and 3 thick styles; found in the Moung forests, Pegu, by Dr. Brandis, may possibly be this.

3. S. pubescens, Thwaites Enum. 77; leaves lanceolate finely acuminate under surface and petiole velvety-tomentose nerves nearly straight, panicles slender velvety, drupe 3/4 in.

Ceylon, at Ratnapoora, Walker, Thwaites.
A small tree (Thwaites). Leaves 6–12 by 2–2 1/2 in., opaque and glabrous above except the pubescent midrib, densely clothed with rusty brown tomentum beneath, base acute or rounded; nerves 16–20 pairs, somewhat arched; petiole 1/2–1 in. Panicle with very spreading branches. Flowers glabrous. Drupe oblong, slightly oblique, as broad as the short cup.

4. S. Thwaitesii, Hook.f.; leaves lanceolate finely acuminate under surface and petiole laxly pubescent or glabrata nerves much arched, panicles glabrate.

Ceylon, at Morowe Corle, Thwaites.
This, which is regarded by Thwaites as a glabrous form of S. pubescens, seems to me to be at once distinguished not only by the different pubescence, but by the much arched nerves.

** Leaves glabrous on both surfaces. Panicles glabrous.

5. S. travancorica, Bedd. Flor. Sylv. t. 232; leaves very large oblong or obovate-oblong thickly coriaceous, shining and reticulate on both surfaces, tip rounded, base rounded or acute, petiole 2 in.

Western Peninsula; Travancor Ghats, alt. 2–3000 ft., Beddome.
A very large tree. Leaves 12 by 5–6 in., occasionally lanceolate and acuminate, very coriaceous, dark green and shining above, paler beneath; nerves 16–18 pairs, much reticulated beneath; petiole 2 in. Panicles axillary and terminal, compound, spreading, about equalling the leaves. Flowers dioecious, 5–6-merous. Calyx pubes-
cent, and ciliate, with a large turbinate rudiment of an ovary. Drupe 1 in., obliquely oblong, rounded at the tip; cup broad, short. Beddome.

6. S. auriculata, Beddome Fl. Sylv. under t. 232; Ic. Plant. Ind. Or., t. 187; leaves sessile oblanccolate tip obtuse reticulate on both surfaces nerves strong beneath.

Western Peninsula; Travancor and Tinnevelly Mountains, Hayne, Beddome.

A good-sized dicoces tree. Leaves 7 by 1½ in., oblanccolate, obtusely acuminate, very gradually narrowed at the base and thence furnished with 2 rounded lobes just above the petiole, dull green, glabrous, midrib slightly rusty, margin membranous, reticulations prominent beneath; petiole 1½ in. Flowers 3–6-merous. Drupe obliquely obovate, ½ in. diam., broader than long, very oblique; cup short, broad.—Beddome.

7. S. marginata, Thwaites Enum. 77; leaves 6–14 in. elliptic-ovobate or oblanccolate abruptly obtusely acuminate glabrous or pilose beneath, base contracted auricled margin broadly cartilaginous, petiole very short and thick, panicle from the old wood glabrous or pilose, nut ½ in.

Ceylon; damp forests in the Galle, Ratnapura and Ambagamowa districts, Walker, Thwaites.

An erect shrub, 6–8 ft., sparingly branched. Leaves 2½–5 in. broad, bright brown when dry, but hardly shining, white margin ½ in. broad, reticulate beneath; nerves about 12 pairs, slender, arched; midrib grooved beneath; petiole ½ in., remarkably thick. Panicle short, slender. Nut ovoid, subcompressed, oblique, reddish; cup half as long, scarlet.—Described chiefly from Thwaites, who states that there is a form with the leaves beneath clothed with spreading rigid hairs.

8. S. obovata, Moon Cat. 22; leaves 3–7 in. subscisile very broadly obovate or oblong thickly coriaceous shining on both surfaces, tip rounded or retuse, base cordate, panicles quite glabrous. Thwaites Enum. 77.

Ceylon; at Caltura and Ratnapoora.

A moderate-sized tree, glabrous throughout. Leaves 2½–3½ in. broad, very thick, dark brown above when dry, paler beneath, reticulated on both surfaces, but the nerves not well defined; nerves 6–8 pair; petiole ½ in. Panicles rather slender, branches spreading. Flowers minute. Unripe nut oblong, with a rather elongate narrow cup.

9. S. Moonii, Thwaites Enum. 77; leaves 6–12 in. oblong or oblong-lanceolate shortly acuminate thickly coriaceous many-nerved much reticulate beneath, petiole very short, panicle terminal large spreading.

Ceylon, south part of the island, Thwaites.

A moderate-sized perfectly glabrous tree. Leaves 2½–3½ in. broad, hard, rather shining grey-green above, with distinct and rather broad reticulations, which are stronger on the brown undersurface; nerves 18–20 pairs, very spreading, shining beneath, with the midrib grooved; petiole ½ in., very thick. Panicle with a stout peduncle and spreading branches. Flowers numerous, ½ in. diam.

10. S. coriacea, Thwaites Enum. 76; very robust, leaves 3–7 in. obovate or obovate-oblong thickly coriaceous tip rounded much reticulate beneath base subacute not narrowed into the very short petiole, panicles very robust with spreading branches, drupe large broader than long.

Ceylon; central province, alt. 5–7000 ft., Thwaites.

A moderate-sized tree, glabrous throughout; branchlets as thick as the finger. Leaves 1½–3 in. broad, hardly shining, pale above when dry, brown beneath, nerves 10–12 pairs, slightly arched, not well defined, as is the case with the reticulations beneath; midrib beneath grooved; petiole ½ in. long, and broad. Panicles fascicled,
rachis very stout. Flowers ½ in. diam., sessile, clustered. Nut 1½ in. diam., obliquely cordate, compressed, apiculate; cup short, narrow.

11. S. subpeltata, Thwaites Enum. 75; leaves peltate 10–15 in. oblong or ovate- or obovate-oblong abruptly obtusely acuminate thickly coriaceous broadly margined shining and reticulate above opaque and minutely closely dotted beneath, panicle terminal stout, nuts transversely oblong.

Ceylon; forests between Galle and Ratnapura, Thwaites.

A large tree, glabrous throughout; branchlets as thick as the finger. Leaves 4–6½ in. broad, very thick, polished above and reticulate on both surfaces, base rounded with the petiole inserted ½ in. within it; nerves 16–20 pairs, nearly horizontal; midrib grooved on both surfaces; petiole 1½–2 in., very stout indeed. Panicle small for the size of the plant, branches spreading. Flowers ½ in. diam. Nut 1½ in. broad, much shorter; cup large, kidney-shaped, fleshy.—A very handsome plant.

12. S. Gardneri, Thwaites Enum. 76 & 410; leaves 6–15 in. lanceolate or elliptic or linear-lanceolate obtusely acuminate strongly closely reticulate and dark beneath, midrib broad above, petiole 1–2 in., panicles axillary and terminal, nuts ⅔ in. obliquely oblong broader than long.

Ceylon, common in the central province, ascending to 3000 ft.

A moderate-sized tree, glabrous throughout; branchlets not very stout. Leaves usually narrowly elliptic-lanceolate, coriaceous, opaque above, dark and densely reticulate beneath; base not decurrent on the petiole; margin cartilaginous, waved; midrib very broad and flat; nerves 10–15 pairs, nearly horizontal or arched and ascending; ultimate venules curved with free ends, pale on a dark green ground. Panicles numerous, axillary and terminal. Nuts oblique, broader than long; cup shallow.—The minute reticulation of the undersurface of the leaf of this species is quite peculiar. Thwaites' original 1257 (of first distribution) has leaves of the following species and fruit of this. Marchand (Rev. Anacard. 169) refers this to S. Anacardium var. angustifolium DC. (Prodr. ii. 62), an Amboynia plant, I know not on what authority.

13. S. Walkeri, Hook. f.; leaves 4–7 in. elliptic or oblong-lanceolate acuminate transversely strongly reticulate and pale beneath, midrib slender above, petiole 1–2 in., panicles terminal axillary and on the old wood, nut ovoid-oblong erect half sunk in the cup.—S. obscura, Thwaites Enum. 410.

Ceylon; Walker, Thwaites (C. P. 2940).

This, which was first sent out by Thwaites with S. Gardneri, and afterwards referred by him to S. obscura, differs from the latter in the leaves not being decurrent and the long petioles, and from the former in the very different reticulation of the pale undersurface of the leaf, as well as in the form of the nut.

14. S. obscura, Thwaites Enum. 76; leaves 3–6 in. obovate-oblong narrowed into the very short petiole tip obtuse or rounded pale and strongly reticulate beneath, midrib slender above, petioles terminal, nut ovoid-oblong. 


Ceylon; in the central province alt. 3000 ft., Macrae, Thwaites, Gardner.

A moderate-sized tree, glabrous throughout. Leaves 1½–2 in. broad, gradually decurrent on the petiole, undersurface and its reticulations like those of S. Walkeri; petiole ⅔ in. Nut ⅔ in, half sunk in the cup.

15. S. acuminata, Thwaites Enum. 76; leaves 4–12 in. elliptic-ovate- or obovate-lanceolate finely caudate-acuminate closely reticulate and dark beneath, petiole ⅓ in., panicles terminal and axillary, nut 1 in. obcordate broader than long. S. oblongifolia, Thwaites Enum. i.e. S. oblongifolia, var. 2, Marchand Rev. Anacard. 169.
Ceylon; forests in the Galle, Ratnapoora and Ambagamowa districts, Thwaites.

I retain this species with great hesitation, having only a flowery specimen, and finding it referred to a variety of *S. oblongifolia*, by Thwaites, in his *Addenda*. From the latter it appears to me to be wholly distinct, having precisely the peculiar reticulation and undersurface colouring of *S. Gardneri*, from which it differs in the long acute tail to the apex of the leaf and slender midrib above. According to Thwaites's description, it further differs in the less coriaceous leaves, smaller panicle, and differently shaped fruit. From *S. nigro-viridis* and *S. obscura* it seems to me to differ in the leaf not being decurrent into the petiole, and in its very long acute tip.

16. *S. nigro-viridis*, Thwaites Enum. 76 & 410 (excl. var. acuminata); leaves 3-6 in. ovobinate-cuneate or oblong-ovobate narrowed into the petiole, tip rounded or abruptly obtusely acuminate, pale and reticulate beneath, midrib above slender, panicles terminal short, nut broader than long. *S. oblongifolia*, var. nigro-viridis, Thwaites (C.P. 631, 641, 2444, 2586); Marchand Rev. Anacard. 169.

Ceylon, central province, alt. 2-4000 ft., Thwaites.

A moderate-sized tree, glabrous throughout. *Leaves* 1½-2 in. broad, very variable in breadth, but almost always cuneate-ovobate and decurrent on the petiole, which is ½-1 in., very dark green; nerves 6-10 pairs, much arched, reticulate as *S. obscura* and *S. Walkeri*. *Panicles* short, reduced to racemes. *Flowers* large, ½ in. diam. *Nut* described by Thwaites as obliquely rounded or obcordate, compressed, with a hooked apiculus, and narrower cup; and this they are in his No. 2586, but in one specimen of 631 they are ovoid and erect, and quite 1 in. long. Thwaites's 631 *bis*, with 3 flowers only, also sent as *S. nigro-viridis*, has elliptic-lanceolate leaves finely acuminate and not narrowed into the petiole, which is longer, with very large spreading panicles. It is probably identical with his original 1267, mentioned under *S. Gardneri*.

17. *S. parvifolia*, Thwaites Enum. 77; leaves 1½-3½ in. ovobate or elliptic decurrent on the slender petiole tip rounded or obtusely abruptly acuminate, margin cartilaginous, strongly closely reticulate beneath with thick nervules, racemes terminal slender few-flowered, flowers pedicelled. *S. oblongifolia* var. 4, Marchand Rev. Anacard. 169.

Ceylon; Galle district, at Hinidoon Corle, Thwaites.

A moderate-sized tree, glabrous throughout. *Leaves* the smallest of the genus, ¾-1½ in. broad, very thickly coriaceous, and with a remarkably strong cartilaginous border, shining above with a slender midrib, undersurface pale; nerves 7-12 pairs, nearly horizontal; petiole ½ in., much more slender than usual in the genus. *Racemes* shorter than the leaves. *Nut* unripen, elongate-conic with a curved acuminate tip and a turbinate narrow cup.

18. *?S. lurida*, Hook. f.; leaves 5-8 in. narrowly elliptic-oblong or lanceolate obtuse very coriaceous decurrent on the petiole opaque and reticulated beneath with many spreading nerves, midrib above broad, panicles terminal black when dry shorter than the leaves, flowers minute pedicelled.

Malacca, Maingay.

A tree, quite glabrous throughout. *Leaves* 1½-2½ in. broad, almost shining above, very opaque and lurid (as if glauces when fresh) beneath, usually suddenly contracted into an obtuse tip; nerves 30-40 pairs, very slender, but not much raised beneath; midrib convex and much broader above; petiole ¾-1 in., stout. *Panicles* terminal and axillary, much branched, the lateral branches ½-1 in. long, bearing loose cymes of 2 flowers not ½ in. diam. *Calyx* obtusely 5-lobed. *Petals* broadly oblong, obtuse. *Stamens* 5, anthers subglobose. *Disk* broad, fleshy, margin lobed. *Ovary* imperfect.

—I am very doubtful of the genus of this plant, of which I have seen no fruit.

*** Leaves glabrous on both surfaces. Panicles pubescent.

**CHITTAGONG, Wallis (cult. in Calcutta Bot. Gardens).**

Branchlets stout. Leaves 1 ft. and upwards by 3½–4 in., broadest much above the middle, thence rapidly narrowing upwards to a very acuminate point and downwards to the petiole but dilating again for one-fourth above the base, exceedingly thin and membranous, opaque above, beneath brownish white, with faint indications of pubescence on the nerves and midrib, reticulations very delicate; nerves 16–30, very slender, straight; petiole ½–1 in. Panicles as long as the leaves, very robust and much branched, finely pubescent. Flowers unknown. Fruit immature, obliquely orbicular, compressed, with a small cup.


**TENASSERIM OR ANDAMAN ISLANDS, Helfer.—Distrib. Sumatra, Java.**

Perfectly glabrous except the panicle. Leaves very variable according to Javanese specimens, 1–4 in. broad, thick, hard, and leathery, reticulated on both surfaces, whitish beneath, margin thickened, cartilaginous, base acute but not decurrent on the petiole; nerves 12–15 pairs, shining, somewhat arched. Panicle of the very large, a foot long and more, and as broad; branches strict, pale, the ultimate slender with small clusters of minute sessile flowers. Nut in Java specimens transversely oblong, 1 in. diam.; cup much narrower, shallow, pubescent when young.

**SPECIES UNKNOWN OR IMPERFECTLY KNOWN TO ME.**

**S. subrakemosa**, Kurz in *Jour. As. Soc. Beng.* 1872, ii. 304; young parts puberulous, leaves deciduous? distant 3–4 in. oblong or oblong-lanceolate obtuse or subobtuse subdecurrent into a broad glabrous petiole ½–1 in. thinly chartaceous glaucous glabrous and shining above, glaucous beneath and minutely puberulous when young, midrib thick, nerves parallel, reticulations lax and conspicuous, panicles axillary and terminal graceful puberulous, flowers small in fascicled cymes, pedicels very short densely pubescent, calyx puberulous, petals valvate, filaments capillary, disk hispid, styles 3 thick.—Pegu, Kurz. Probably a *Holigarna.*

**S. acuminata**, Kurz in *Jour. As. Soc. Beng.* 1870, ii. 75; perfectly glabrous, leaves 6–12 in. cuneate-ovate or -oblong acuminate, base narrowed acute or acuminate glaucous beneath, nerves slender acutely prominent, reticulations lax conspicuous, panicles terminal slender shorter than the leaves, lax quite glabrous, calyx-teeth broad acute, petals oblong-lanceolate acuminate, disk hispid, ovary glabrous, drupe obliquely oblong broader than long, cup as broad, scarlet.—Frequent in the forests of Arracan on sandstone; also in Chittagong, Kurz.

**S. leviata**, *Thwaites in Herb.* (Coll. 3948); a small species in a very imperfect state, with glabrous elliptic-ovate obtusely acuminate leaves 2–4 in. long shining above transversely strongly reticulated beneath.—South parts of Ceylon. S. obtongifolia var. 5, *Marchand Rev. Anacardi.* 109.

**S. albenscens**, Kurz in *Beng. As. Soc. Jour.* 1871, ii. 51; ‘a large tree, young parts velvety-tomentose, leaves 7–12 in. elongate-ovate or cuneate-lanceolate shorted and obtusely acuminate, base cuneate rounded or obtuse shining and glabrous above except the pubescent nerves, thinly clothed with white tomentum and sparingly hairy beneath, nerves yellow conspicuous yellowish pilose not tomentose. reticulations
lax, petiole \( \frac{1}{2} - 1 \) in. thick tomentose, panicle densely yellow tomentose usually shorter than the leaves, flowers small racemulose, pedicels \( \frac{1}{3} - \frac{1}{2} \) in., calyx minute pubescent, petals valvate or subvalvate \( \frac{1}{2} \) in. shortly pubescent, ovary densely appressed hairy, stigmas 3 thick glabrous, disk glabrous, stamens 5, filaments short rather broad 1 or 2 longer and abortive.'—Kurz.

 Pegu; in the Moung forest. Brandis.

15. **Drimycarpus**, Hook. f.

Lofty trees. Leaves alternate, petioled, simple, quite entire. Racemes or panicles axillary. Flowers small, subglobose, polygamous. Calyx superior; lobes 5, rounded, imbricate. Petals 5, erect, orbicular, imbricate. Disk broad, annular. Stamens 5, inserted at the base of the disk. Ovary inferior, 1-celled; style 1, very short; stigma capitate; ovule attached to the wall of the cell. Drupe transversely obliquely ovoid, fibrous, flesh resinous; stone coriaceous. Seed attached to the wall of the cell, testa membranous; embryo thick, cotyledons plano-convex radicle minute opposite the hilum; plumule hairy.—**Distrib.** 2 or 3 Indian species.


Sikkim and Bhotan Himalaya, alt. 2–5000 ft.; Silhet and Khasia Mts., alt. 0–4000 ft.

A large tree; branchlets glabrous. Leaves 4–12 in., coriaceous, shining above, opaque and grey beneath; nerves 20–30 pairs, strongly arched; reticulations delicate; midrib above rather broad; petiole \( \frac{1}{2} \) in., stout. Racemes branched in axillary fascicles, shorter than the leaves, pubescent or glabrate. Flowers \( \frac{1}{2} \) in. diam., crowded, the males most so, greenish-white. Drupe red, 1 in. diam.—Marchand (Rev. Anacard. 172) mentions a Holigarna angustifolia Roxb. as identical with this, but I find no such name published by Roxburgh.


Lofty trees. Leaves alternate, simple, petioled, entire, coriaceous; petiole furnished with 2 or 4 spur-like deciduous appendages. Racemes or panicles axillary and terminal. Flowers small, crowded, polygamous. Calyx superior; tube cup-shaped; teeth 5, imbricate. Petals 5, densely villous in front, cohering with the edge of the disk and at the base, persistent, valvate. Disk lining the calyx-tube, obscure in the 2. Stamens 5, inserted on the edge of the disk, coherent at the base with the petals, filaments subulate, glabrous; anthers small, subglobose. Ovary inferior, 1-celled; styles 3–5, terminal, stigmas capitate or clavate; ovule pendulous from near the top of the cell. Drupe subcompressed, oblong or ovoid, resinous, acid; stone coriaceous. Seed parietal, testa membranous; embryo thick, cotyledons plano-convex; radicle minute next the hilum.—**Distrib.** 7 species, all Indian.

* Leaves quite glabrous beneath.


Western Peninsula; from the Concan southwards on the Ghats.
A tree, branches stout. Leaves 6-9 by 2-3 in., coriaceous, shining above, reticulated and glaucous or not beneath; nerves 16-20 pairs, strong, nearly straight, prominent on both surfaces; petiole 4-1 in., rather slender; petiolar spurs early deciduous. Panicles of compound racemes, axillary and terminal, shorter or longer than the leaves, thickly rufous-tomentose when dry. Flowers crowded, minute, 2 to 3 in. diam., enveloped in tomentum. Drupes 1 in., obliquely oblong, rounded at the top, quite glabrous, long pedicelled.—Wight's originally distributed specimens (No. 526) have leaves pubescent beneath.

2. **H. ferruginea**, Marchand Rev. Anacard. I. 71; leaves cuneate-obovate rounded at the tip quite glabrous decurrent on the petiole, petiole with two tubercles at the top, racemes robust clothed with dark rusty tomentum. Terebinthacea, Wall. Cat. 3503.

Western Peninsula: Coorg, Herb. Stocks; Travancor, Herb. Wall.; Mangleore, Wight.

Very similar to *H. Arnottiana*, but the racemes are short and very robust, less branched and clothed with a deeper red (when dry) tomentum, and the flowers are much larger, being fully 4-5 in. diam. Stamens longer than the petals. Styles 3-4 in., elongate.—The terminal bud of this species seems more glabrous than in *H. Arnottiana*.

3. **H. longifolia**, Roxb. Cor. Pl. iii. 79, t. 282; Fl. Ind. ii. 80; leaves 1-2 ft. very narrowly cuneate-oblancoate acuminate membranous glabrous and glaucous beneath, petiole very short and thick, petiolar spurs 2 or 4 persistent or deciduous, ♀ panicle finely pubescent. DC. Prodr. ii. 63.

Chittagong, Roxburgh, &c.; Pegu, Kurz.

A tall tree; bark white. Leaves thinly coriaceous, hardly shining above, ciliate when quite young, ending in a long acuminate point, gradually narrowed from above the middle to the base which is hardly decurrent on the petiole; nerves 20-25 pairs, erecto-patent, slender, reticulations large; petiole 4-5 in. Panicle very large and spreading, tomentose. Flowers 1 in. diam., clustered. Fruiting panicle 18 in. long, with spreading decurved branches. Drupes (immature) oblong.—Specimens from Kurz.

4. **H. Helferi**, Hook. f.; leaves 8-16 in. cuneate-oblancoate acute or acuminate glaucous beneath rather coriaceous, decurrent on the very short petiole, spurs two on each side slender persistent, ♀ panicle much branched softly densely tomentose, ♂ simple racemose.

Tensasserim; at Mergui, Helfer.

Branchlets stout, as thick as the finger. Leaves very variable in size, the smaller 7 by 2 in., with 10-12 pairs of nerves; the large 16 by 4 in., with 26 pairs of nerves; upper surface opaque, under purplish-brown when dry; midrib very prominent, grooved, nerves slightly arched, slender; transverse venules reticulated. Panicles ♀ rather slender, clothed with soft lax ferruginous tomentum. Flowers 1 in. diam., in small glomerules; ♂ in stout simple racemes, pedicelled, very much larger than the ♀. Drupe subcylindric, truncate, 4 in.—This may prove to be a form of *H. longifolia*, but I do not think so.

**Leaves pubescent beneath.**

5. **H. Grahamii**, Hook. f. (not of Kurz); leaves 12-16 in. oblancoate-cuneate triangular above the middle and acuminate finely pubescent beneath, petiole very short and thick, petiolar spurs 2 or 4 persistent. Semecarpus Grahamii, Wt. t. 235; Ill. i. 185; Dalz. & Gibbs, Bomb. Fl. 52.

Western Peninsula; Cocan, Graham, &c.

A tree 20-30 ft.; branchlets very robust. Leaves 4-6 in. diam., gradually narrowed from above the middle to the base, hardly decurrent on the petiole, very rigidly
coriaceous, shining above, pale and reticulated beneath; nerves 20-30 pairs, very prominent beneath; petiole \( \frac{1}{2} \) in., spurs 1 or 2 on each side \( \frac{1}{16} \) in. Panicles terminal, \( \mathcal{Q} \) a foot long, much branched, clothed with ferruginous tomentum, \( \mathcal{Q} \) shorter. Flowers clustered, \( \mathcal{Q} \) about \( \frac{1}{4} \) in. diam. Styles 3. Drupes ovoid, glabrous, \( \frac{3}{10} \) in. long, upper \( \frac{1}{4} \) or \( \frac{1}{8} \) exserted.—Kurz gives this as a native of Pegu, but the plants he sends to Kew under this name are in part the true \( H. \) longifolia of Roxburgh, and in part \( H. \) albicans. \( H. \) Grahamii differs from \( H. \) longifolia in the leaf being more triangular at the top, not rounded and suddenly acuminate.

6. \( H. \) Beddomei, Hook. f.; leaves 10-22 in. cuneate-oblongeolate sometimes much produced below acute or acuminate densely velvety beneath young membranous and ciliate.

**Western Peninsula; Anamallay hills, Beddome.**

An enormous tree, Beddome. Leaves when old 10 in. long, coriaceous, densely velvety, rufous; nerves 18-22 pairs, stout, ferruginous, those of young plants 20 in. long, membranous, ciliate with long hairs on the margin midrib and under surfaces; nerves slender 40-50 pairs, horizontal in the lower very elongated portion, more arching above; petiole short; stipular spurs capillary, caducous.—A very fine species of which the leaves only are known.

7. \( H. \) albicans, Hook. f.; leaves 6-16 in. oblongeolate-cuneate or oblong coriaceous acuminate shining and reticulate above white beneath and glabrous or very minutely pubescent in the midrib only laxly reticulate, panicle pubescent as long as the leaf much branched, branches slender, \( \mathcal{Q} \) flowers shortly pedicelled \( \frac{1}{4} \) in. diam., drupe broader than long oblique. \( H. \) Grahamii, Kurz in Journ. As. Soc. Beng. 1872, ii. 205.

Pegu, Martaban, Kurz, McLelland, Scott.

Branchlets as thick as the thumb. Leaves 2-4 in. broad, base not deciduous on the petiole, obtuse; midrib stout faintly grooved; nerves 14-18 pairs all raised, arched; petiole \( \frac{1}{2} \) in. Panicle of \( \mathcal{Q} \) peduncled, rachis curved, branches very slender, spreading; of \( \mathcal{Q} \) also much branched and spreading. Flowers \( \mathcal{Q} \) only seen. Sepals small. Petals obtuse, pubescent. Filaments very slender. Disk pubescent. Drupe pedicelled, \( \frac{1}{10} \) in. diam. when dry, turgid, somewhat compressed, very oblique, the exposed portion much smaller, convex, puberulous.—Apparently a very distinct species, of which a large-leaved specimen from Kurz is marked \( H. \) Grahamii, Kurz (Sameecarpus, Wight.) I find no trace of spurs on the petiole, but have seen no very young leaves. Kurz describes this as beard-like.

17. **MELANOCYHLA**, Hook. f.

Trees. Leaves simple, very coriaceous, exstipulate, quite entire. Panicles branched, axillary and terminal. Flowers small, unisexual. Calyx-tube persistent, enlarged in fruit and adnate to the very base of the drupe, cupular, lobes 5, erect. Petals 5, inserted on the edge of the disk, very coriaceous, persistent, erect or suberect, villous in front, valvate. Disk lining the calyx-tube. Stamens inserted on the edge of the disk, filaments stout, sometimes coherent at the base with the petals villous; anthers oblong. Ovary globose, 1-celled; style short, stigmas 3; ovule 1, pendulous from near the top of the cell. Drupe globose, areolate at the base by the enlarged calyx, flesh full of black varnish; stone thick, hard. Seed oblong, testa thin; cotyledons amygdaloid, radicle superior.—Disturb. The following are the only known species.

1. \( M. \) tomentosa, Hook. f.; branchlets petiole panicle and midrib beneath velvety-tomentose, leaves oblong acuminate rounded or subcordate at the base.
MALACCA, Maingay.

Branchlets rather stout, densely clothed with soft spreading ferruginous tomentum. Leaves 6-14 by 2-4 in., hard, smooth but hardly polished above, with a slender midrib, not reticulated; beneath pale with 30-35 pairs of strong arched pubescent nerves, and faint reticulations; petiole very thick, ¼-⅓ in. Panicle exceeding the leaves, racis almost villous, branches spreading pubescent. Flowers 3 minute, ½ in. diam., in small lateral cymes, shortly pedicelled. Calyx lobed for half way down, lobes obtuse. Petals oblong, obtuse, pubescent outside, villous within, very coriaceous. Filaments rigid nearly as long as the petals. Drupe elliptic, globose, 1-1½ in. diam., orange-yellow, clothed with ferruginous (when dry) pubescence, and full of black varnish.

2. M. angustifolia, Hook. f.; leaves linear-lanceolate or -oblanceolate acuminate quite glabrous, petiole long slender, panicles slender puberulous.

MALACCA, Maingay.

Branchlets rather slender, minutely puberulous, as are the panicles. Leaves 6-10 by 1¼-1½ in., hard, base acute often unequal, margin rather waved, shining on both surfaces, reticulations not well defined; midrib slender above, strong beneath; nerves 15-20 pairs, arched; petiole 1-1½ in. very slender, greatly thickened from ¼ in. above the base. Panicles chiefly axillary, very slender, longer or shorter than the leaves. Flowers in lateral cymes, ⅛ in. diam.; like those of M. tomentosa, but much less tomentose. Drupe unripe ½-¾ in. diam, globose, apiculate, puberulous.—Maingay describes the corolla as imbricate, but I find it to be quite valvate.

3. M. Maingayi, Hook. f.; leaves narrowly elliptic-oblong or -oblanceolate abruptly acuminate pubescent beneath, panicle stout tomentose.

MALACCA, Maingay.

A tree yielding a copious black varnish, Maingay. Branchlets rather slender, glabrous or pubescent. Leaves 5-8 by 2½-3½ in., rigidly coriaceous, narrowed into the petiole, smooth but hardly shining above, beneath minutely pubescent; nerves 20-25 pairs, strong, arched; reticulations beneath distinct, transverse; petiole ⅛ in. Panicle terminal, stout, ferruginous. Flowers pubescent, ⅛ in. diam. subsessile; more than twice as large, with an almost urceolate calyx. Filaments rather broad. Ovary globose, hairy. Fruit not seen.

4. M. auriculata, Hook. f.; leaves narrowly linear-oblong from an auricled tapering base recurved acuminate glabrous polished sessile or with a very short enlarged petiole, panicle ⅛ stout pubescent.

MALACCA, Maingay.

Branchlets very thick and woody. Leaves 18 by 3-4 in., rigidly coriaceous, apparently folded down the middle, recurved, polished on both surfaces, base ¼-⅓ in. broad, auricles recurved; nerves about 30 pairs, slightly arched, more prominent above than beneath, transverse reticulations faint beneath; midrib at the base suddenly expanding into a petiole ¼ in. long and as broad, which is adnate to the branch. Panicles terminal, smaller than the leaves, rusty-pubescent, racis very stout. Flowers ⅛ clustered about ⅛ in. diam. Drupe oblong-globose, 1¼-⅔ in. diam., puberulous, ribbed when dry; stone very thick.

18. NOTHOPEGIA, Blume.

Small tree. Leaves alternate or opposite, petioled, entire. Racemes short axillary. Flowers small, bracteate, white, polygamous. Calyx small, 4-5-lobed, persistent. Petals 4-5, spreading, imbricate. Disk annular, 4-5-lobed. Stamens 4-5, inserted on the margin of the disk, filaments free hairy. Ovary free, sessile, ovoid, 1-celled; style very short, stigma simple; ovule pendulous
from near the top of the cell. Drupe depressed-turbinate, striate, tipped with the style, flesh cellular. Seed pendulous; cotyledons thick, plano-convex, radicle short sublateral.—DISTR. The following are the only species.


**Western Peninsula**; on the Ghats from the Southern Concan southwards. Ceylon; ascending to 3000 ft. Common.

A small tree, about 15 ft. high, with milky acrid juice. Leaves 2-8 by 1-2½ in., usually elliptic-oblong with a tendency to be more narrow below than above, rarely narrower and 8 by 1½ in., base decurrent on the petiole, shining above, usually white beneath; nerves 15-20 pair, not prominent beneath, arched, reticulations also not sharply defined; petiole ¾-2 in. Racemes much shorter than the leaves, solitary and fascicled, strict; 3 branched, much longer and more branched than the 2, more or less pubescent. Flowers minute; 3 sessile or nearly so, ⅛ in. diam. Petals suberect with recurved tips, hairy on the back. Sepals almost orbicular. Filaments almost glabrous. Drupe ¾ in. diam., red, top depressed.

Var. 1. **Heyneana**; leaves smaller 2-3 in. more shortly petioled obtuse, drupe blue. —Terebinthacea? Wall. Cat. 8500.

Var. 2. **macrorcarpa**; leaves 3-4 in. obovate-oblong shortly obtusely acuminate very coriaceous, drupe ⅝-⅝ in. diam., top not depressed.—Shevagerry hills, Wight.

2. **N. travancorica**, Beddome MSS.; branchlets petiole and midrib beneath pubescent with short spreading hairs, leaves elliptic-lanceolate acuminate, petals hairy within.

**Western Peninsula**; Travancor, Beddome.

Leaves 6-7 by 1½-1¾ in., almost membranous, margin thickened, green below, ciliate towards the blade which is acute and not decurrent on the petiole; nerves 30-35 pairs, slightly arched; petiole ⅛ in. Flowers 2 in supra-axillary glomerules, ½ in. diam. Petals ovate-lanceolate. Filaments hairy, broad.—I have seen only imperfect specimens.

3. **N. aureo-fulva**, Beddome MSS.; branchlets petiole and midrib beneath densely rufous villous, leaves opposite narrow linear.

**Western Peninsula**; Tinnevelly, Beddome.

Leaves 7-8 by 1 in., obtuse or acute, rather membranous, shining above, much reticulated beneath; nerves about 30 pair, slender, arched; petiole ⅛ in.—I have seen only an imperfect specimen of this very curious species.


Trees. Leaves alternate, very coriaceous, simple, quite entire. Racemes axillary, simple or sparingly branched. Flowers sessile, minute, hermaphrodite. Calyx 3-5-partite; segments erect, persistent, imbricate. Petals 3-6, suborbicular, erect, imbricate. Disk urceolar. Stamens 6-10; inserted at the base of the disk. Ovary free, sessile, ovoid, 1-celled (or 2-celled with 1 cell suppressed); style very short, stigma discoid or capitate; ovule 1, pendulous from the top of the cell. Drupe ovoid, fleshy; stone hard, almost 2-celled by a vertical plate from the top of the horse-shoe shaped cell. Seed pendulous, curved round the
imperfect septum; cotyledons curved, flattish; radicle short superior.—A genus of 6 species, of which one is a native of Madagascar, and another of the Seychelles.


**Ceylon**; Saffragan and Ambamagowa districts, generally on river banks. *Thwaites.*

A ramus tree, 30–40 ft.; branchlets stout, terete, youngest parts minutely scaly. *Leaves* 3–7 by 2–2½ in., elliptic-oblanceolate or obovate or obovate, obtuse, base decurrent on the petiole, thickly coriaceous, smooth and beautifully reticulated on both surfaces, the numerous spreading nerves hardly more distinct than the reticulations, pale brown when dry, covered beneath with minute dot-like scales; midrib prominent beneath; petiole stout 4–½ in. *Raceme* usually shorter than the leaves, rachis stout. *Flowers* ½ in. diam. *Drupe* nearly globose, ⅓–⅓ in. diam., purple.


**Malacca, Griffith. Singapore; Schomburgk, &c.—Distrib. Sumatra, Borneo.**

A small tree; branchlets pubescent, as thick as the finger. *Leaves* full grown, 8–14 by 3½–6½ in., thickly coriaceous, shining above, and scarcely reticulate beneath, clothed with a very fine rusty down; nerves nearly straight, strong, transverse, venules obscure; petiole 1–3 in., very stout, winged, channelled above, pubescent all over. *Panicles* slender, very variable in length, sometimes 1 ft., lateral branches short or long. *Flowers* very minute, in clusters along the rachis and branches, globose, ⅔ in. diam., tetramerous. *Sepals* rounded, pubescent. *Petals* orbicular-ovate, obtuse, erect. *Filaments* shortly subulate. *Drupe* ⅓–⅓ in., subacute, compressed, nearly orbicular; stone crustaceous, 3–4-celled.


**Malacca, Griffith, Mainay; Penang, Porter.**

A tall shrubby tree, Wallich. Very similar in foliage to *C. macrophylla*, but the leaves are less thick, perfectly glabrous and reticulate on both surfaces, the nerves fewer and more distant, the petioles longer (2–3 in.) and winged to the base, and the panicles are more slender.—Griffith (MSS.) describes the flowers as 5-merous, but I find them to be 4-merous.

4. **C. auriculata**, *Hook. f.*; leaves obovate-spathulate auricled at the very base tip rounded quite glabrous reticulated on both surfaces, nerves 12–18 pair, panicles pubescent very slender. *Buchanania auriculata, Blume Mus. Bot. i. 185; Miq. Fl. Ind. Bat. i. pt. 2, 637.*

**Singapore, Mainay, T. Anderson.—Distrib. Sumatra, Borneo.**

*Leaves* of the same character as those of *C. Griffithii* but smaller, 6–9 by 2–3 in., coriaceous, very gradually narrowed downwards into the petiole, which is ⅓–1 in., the auricles quite small, beautifully reticulate on both surfaces, as in *C. zeylanica*, nerves arched, very slender. *Panicle* as in *P. grandifolia*, but less pubescent. *Flowers* similar, 4-merous.
20. **Spondias**, Linn.


**Spondias dulcis**, Willd.; *Roxb. Fl. Ind. ii.* 452; *Wall. Cat*. 8477 A.; with crenate longer leaflets, is a South-Sea Island plant, introduced into India, and called ‘Hog-plum’ and ‘Otaheite Apple.’— *Wall. Cat*. 8477 B. from the Calcutta gardens is in part *S. lutea*, L., the ‘Hog-plum of the West Indies.

**Spondias?**; *Wall. Cat*. 8479, from Hurdwar appears to be *Rhus succedanea*, Linn.


Throughout India from the *Indus* eastwards and southwards to *Malacca* and *Ceylon*, ascending to 5000 ft. in the *Himalaya*. Wild and cultivated.—**Distrib.** Tropical Asia.


**Western Peninsula**; *Malabar*, *Heyne*, *Roxburgh*; in the Concan hills, near *Kennedy* coves, *Graham*; *Canara*, *Ritchie*.

An elegant middling sized tree (*Roxb.*), apparently differing from *S. mangifera* chiefly in the smaller leaves with longer points, the very short panicle, and smooth stone (if I am right in referring a fruiting plant in *Wight’s Herbarium* to this species).—In *Wallich’s Herbarium*, specimens of *Odina Wodier* are mixed with this.


**Nipal**, *Roxburgh*.

A small Melia-looking tree. *Leaves* 1 ft.; petiole slender; leaflets shortly petio-
lulate, 3-4 in., pale beneath, not abruptly acuminate as in S. mangifera and acuminata; nerves free, arching. Flowers solitary or subsolitary on the branches, long pedicelled, ½ in. diam., white. Calyx lobes acute. Petals elliptic, subacute. Filaments short, subulate. Disk annular, 10-lobed. Ovary 5-celled with 5 short erect styles. Drupe 1½ in. long, rounded at the top, yellow. Stone 5-celled, quite small.—I know this plant only through Roxburgh's description and excellent drawing, which represents a true Spondias in the structure of flower, fruit and embryo; but the arched-nerved leaves which he describes as 'gash-serrate' but figures as obtusely serrate), and the subsolitary flowers on the branches with pedicules ¾ in. long, are quite unlike any Spondias I know.

4. S. macrophylla, Wall. Cat. 8480; leaflets 3-4-pair 6-9 in. elliptic acuminate.

_Burma_, at Taong-dong, Wallich.

This, of which there are only mutilated leaves and fragments of a panicle without flower or fruit, in Wallich's Herbarium, may be only _S. mangifera._


_Trees._ Leaves alternate, odd-pinnate; leaflets opposite or alternate, quite entire. Panicles axillary and subterminal. Flowers small, pale, hermaphrodite. Calyx 5-partite, segments conniving, imbricate. Petals 5, suberect, subvalvate. Disk cup-shaped, crenulate. Stamens 10, inserted at the base of the disk. Ovary sessile, 5-celled; styles 5, thick, erect (like ovaries), connate by their obtuse, stigmatic flares; ovules solitary and pendulous in the cells. Drupe globose, fleshy, tubercled above the middle by the style-bases; stone hard, depressed, 2-5-celled; cells diverging, opening by canals through the top of the stone. Seeds compressed, pendulous, testa membranous; cotyledons plano-convex, radicle short superior centrifugal.—Distr. 5 species natives of tropical Asia and the Pacific.


_Eastern Peninsula_, South Andaman Islands, Kurz.; Malacca, Griffith, Maingay; Penang, Maingay.—Distr. Eastward to the Philippines and Fiji Islands, native and cultivated.

A large tree. Leaves 1-1½ ft.; petiole cylindric, glabrous or pubescent; leaflets petiolulate, 5-7 by 1½-2½ in., usually rather falcate and oblique at the rounded or cordate base, gradually narrowed to the subacuten apex, glabrous above, beneath glabrous puberulous or with tufts of hair in the nerve axils; nerves 10-12 pair, arched, reticulations close small; petiolule ½ in. Panicle equaling or exceeding the leaves, pubescent or tomentose; pedicels slender, ebracteate. Flowers campanulate, ¼-½ in. diam., greenish white. Sepals pubescent or tomentose. Petals longer, recurved. Filaments slender. Drupe 1 in. diam., depressed.—A variable plant in pubescence, of which I think _D. sylvestre_, Blume, and _D. puberulum_, Miq. are varieties.

Var. 1. Leaflets nearly glabrous beneath with occasional tufts of hair in the nerve axils.—Andaman and Malacca.

Var. 2. Leaflets and petiole pubescent beneath.—Malacca.

Var. 3. Leaflets glabrous beneath, panicles and flowers rusty-tomentose.—Penang.
Doubtful Genus.

22. Rumphia, Linn.


Malabar; stony sandy mountain woods in Parakaroo and elsewhere, Rheede.

A very large tree; bark red within, aromatic. Leaves 4-5 by 2½-3½ in., aromatic, 5-nerved at the base; petiole 1-1½ in. Racemes axillary and terminal, shorter than the leaves, woolly. Flowers ¾ in. diam., inodorous. Drupe 1 in. long, obovoid, obliquely 3-lobed, rough and setose, flesh bitter; stone triquetrous, 3-celled.

Of this remarkable plant nothing is known except from the plate and description of Rheede. I follow the majority of authors in placing it at the end of Terebinthaceae, with which, however, I suspect it has nothing to do. Jussieu (Gen. Pl. 370) suggests that it may be more allied to Sapindaceae. To me it looks more like a Euphorbiaceous or Verbenaceous plant.

Wallich's Terebinthacea? No. 8501, ex Herb. Wight, is a mixture of Garuga pinnata fruits with the leaves and immature fruit of another plant that I do not recognise and which is in a most imperfect state.

Order XLVII.—Coriariæ. (By J. D. Hooker.)

Usually glabrous shrubs, with 4-angled sarmentose branches, the lower opposite; buds scaly. Leaves opposite, rarely 3-nately whorled, quite entire, sessile, exstipulate. Racemes axillary. Flowers small, green, hermaphrodite or polyanymous. Sepals 5, spreading, imbricate, persistent. Petals smaller than the sepals, fleshy, keeled within, thickened after flowering and embracing the fruit. Stamens 10, hypogynous, free or the alternate adnate to the petals, filaments short; anthers large, oblong, rough. Disk 0. Carpels 5-10, free, 1-celled, whorled on a fleshy receptacle; styles slender, subulate, fleshy, papilllose all over; ovules 1 in each cell, pendulous from the top. Fruit of 5 or 10 oblong compressed dry little nuts, closely embraced by the fleshy petals, 1-celled, 1-seeded. Seed compressed, testa membranous, albumen a thin layer; cotyledons plano-convex, radicle superior.—Distrib. 3-5 species natives of S. Europe, N. Africa, Japan, the Himalaya, New Zealand, and the Andes.

An order of doubtful affinity, perhaps nearest Phytolaceae, which should in this work have been placed in Thalamiflore.

Coriaria, Linn.

Character of the order.

1. C. nepalensis, Wall. Pl. As. Rar. iii. t. 289; Cat. 6817; leaves ovate or elliptic 3-7 nerved, stamens 10, carpels 5. Brandis For. Flor. 128.

Temperate and Subtropical Himalaya, from Marru alt. 3-6000 to Bhotan; ascending to 11,000 ft. in Sikkim.—Distrib. Yunan.

A shrub with arched branches, glabrous or puberulous on the leaves beneath and racemes. Leaves 1-2 by ¾-1½ in., usually broadly rounded-cordate and abruptly acu-
minute, rarely ovate-oblong or elliptic and acute or acuminate, minutely serrulate. Racemes axillary or in the forks, solitary or clustered, 2–6 in. long, rachis glabrous or pubescent; bracteoles oblong, concave, deciduous. Flowers about 1⁄2 in. diam. Fruit 1–3⁄4 in. diam., black.

**Order XLVIII. —Moringee.** (By J. D. Hooker.)

Deciduous trees with soft wood. Leaves alternate, odd-pinnate or 2–3-pinnate; leaflets opposite, quite entire, caducous as well as the pinnules, glandular at the base. Panicles axillary. Flowers irregular, bisexual. Calyx cup-shaped, 5-cleft; segments unequal, petaloid, deciduous from above the base, imbricate. Petals 5, unequal, upper smaller, lateral ascending, anterior larger. Stamens inserted on the edge of the disk, declinate, 5 perfect opposite the petals alternating with 5 (or 7) which are reduced to antherless filaments; anthers dorsifixed, 1-celled. Disk lining the calyx-tube. Ovary stipitate, 1-celled; style slender, tubular, stigma perforated; ovules numerous, in 2 series, on 3 prial placetas. Capsule elongate, beaked, 3–6-angled, 1-celled, loculicidally 3-valved, corky and pitted within. Seeds many, in pits of the valves, testa corky winged or not, albumen 0; embryo straight, cotyledons plano-convex, radicle very short superior, plumule many-leaved.—DISTRIB. 3 species, natives of Western Asia and N. Africa.

A natural order of very doubtful affinity, which has been referred to near Resedaceae, Capparideae, Mcliantheae, Violariceae, Polygalaceae, Leguminosae, Bignoniaceae, and others.

**MORINGA**, Lamk.

Character of the order.


Forests of Western Himalaya and Orndh, and cultivated elsewhere throughout India.—DISTRIB. Cultivated in various tropical countries.

A small tree, bark corky, wood soft, root pungent; young parts tomentose. Leaves 1–2 ft., usually 3-pinnate; petiole slender, sheathing at the base; pinnae 4–6 pairs; leaflets 6–9 pairs, 1⁄2 in. opposite, pale beneath; petiolules slender; glands linear, hairy. Panicles spreading, bracts linear. Flowers pedicelled, 1 in. diam., honey-scented. Sepals linear-lanceolat, reflexed. Petals narrowly spatulate. Fertile filaments villous at the base. Ovary hairy. Pod 9–18 in., pendulous, 9-ribbed. Seeds 3-gonous, winged at the angles.—The Horse-radish tree.

2. **M. concanensis**, Nimmo in Grah. Cat. Bomb. Fl. 43; leaflets 1–1 1⁄2 in. broadly elliptic or orbicular, nerves 4–6 pair distinct. Dalz. & Gibbs. Bomb. Flor. 311; Brandis For. Flor. 130.

**Rajputana**, on dry hills; Sindh and the Concan.

A tree, very similar to **M. pterygosperma**, but the leaves are much larger as are the leaflets, which are often refulate at the tip; the petals are yellowish streaked with pink. Seeds 1⁄2 in. long, very broadly trigonous with membranous wings. This may possibly be the red-flowered species alluded to by Roxburgh (Fl. Ind. ii. 368) as occurring near Maldah.
ORDER XLIX. CONNARACEÆ. (By J. D. Hooker.)

Erect or climbing shrubs or trees. Leaves alternate, exstipulate, 1–3-foliate or odd-pinnate; leaflets quite entire. Flowers racemose or panicled, regular or subregular, usually bisexual. Calyx 5-lobed or -partite, usually persistent, imbricate or valvate. Petals 5, usually narrow, free or slightly cohering, very rarely valvate. Stamens perigynous or hypogynous, sometimes declinate, 5 or 10, those opposite the petals often shorter and imperfect; filaments frequently connate at the base. Disk 0, or small annular or incomplete. Carpels 5, rarely 1–3 or 6–7, globose, hirsute, 1-celled; styles subulate or filiform, stigmas capitellate simple or 2-lobed; ovules 2, collateral, ascending, orthotropous. Fruit usually of 1 rarely 2–3 sessile or stalked 1–rarely 2-seeded follicles. Seed erect, arillate or not, testa thick sometimes arilliform below the middle, aril various; cotyledons fleshy in the exalbuminous, leafy in the albuminous seeds, radicle superior, rarely ventral.—Distrib. 12 genera, all tropical.

The following Wallachian species of this order are to be rejected.

CONNARACEÆ, Wall. Cat. 8538, B. is an undeterminable apparently Connaraceous plant.

CONNARACEÆ ? Wall. Cat. 8534, is Dialium platysiopalum, Baker.

CONNARACEÆ ? Wall. Cat. 8550, is Cupania glabrata, Kurz.

CONNARACEÆ ? Wall. Cat. 8553, consists of the foliage of a Willoughbeia and fruit of a Connarus.


Calyx accrescent, clasping the base of the sessile capsule.

Seeds arillate 2. Roureæ.

Calyx slightly accrescent, not clasping the base of the sessile capsule. Seeds exarillate 3. Rouropæis.


TRIBE II. Cnestisæ. Calyx valvate. Seeds albuminous or exalbuminous.


Calyx 5-partite, erect. Petals oblong. Stamens 5, perfect.


1. A gelæa, Soland.

Erect or scandent shrubs. Leaves 3-foliate. Panicles or racemes axillary. Calyx 5-partite, not accrescent nor embracing the fruit, imbricate or subvalvate. Petals lanceolate or ligulate, obtuse, free or connate at the middle. Stamens 5 or 10. Disk 4-annular or 0. Carpels 3–5. Capsules 1–2, sessile or shortly stalked, coriaceous, rugose or lamellate. Seed erect, exalbuminous; testa arilliform below the middle.—Distrib. 9 species, African and Asiatic.

1. A. vestita, Hook. f.; branches leaves beneath and inflorescence densely tomentose, leaflets elliptic obtusely caudate-acuminate, stamens 5, styles 5 very

EASTERN PENINSULA, Singapore, Jack; Penang, Porter; Malacca, Griffith, Maingay.—DISTR. Borneo.


2. A. Wallichii, Hook. f.; branches and leaves quite glabrous, leaflets ovate-oblong or oblong obtusely-pointed, base rounded or cordate, stamens 10, styles 5 very short. Connaracea, Wall. Cat. 8544.

EASTERN PENINSULA; Singapore, Wallich; Malacca, Griffith, Maingay.


2. ROUREA, Aubl.

Trees or shrubs. Leaves odd-pinnate; leaflets subopposite or alternate. Panicles axillary. Flowers small; pedicels usually slender. Sepals 5, orbicular, imbricate, enlarged and clasping the base of the ripe capsule. Petals 5, usually linear-oblong. Stamens 10; filaments connate at the base. Ovaries 5, usually imperfect; style slender. Capsule sessile, curved. Seed erect, arillate, exalbuminous.—DISTR. Tropics; species about 50.

* Leaflets few, 1–6-pairs, petiolulate, glabrous.


WESTERN PENINSULAS; from the Conean to Travancor. CEYLON.

Leaflets 1½–3 by 1½–3 in., coriaceous, sometimes acute at the base; nerves rarely distinct from the reticulations of the leaflet and usually spreading horizontally from the midrib, but this is a very uncertain character. Racemes terminal and axillary, 2–4 in., simple or compound, slender; pedicels slender, ¼ in.; bracts small. Flowers ¼–½ in. diam. Petals twice as long as the linear-oblong sepals. Capsule falcate, 2–3 in. long, obtuse, apiculate or pointed.

2. R. commutata, Planch. in Linnaea, xxiii. 420; quite glabrous, leaflets 2–4-pairs 3–6 in. ovate elliptic or elliptic-lanceolate caudate-acuminate shining, principal nerves usually very distinct beneath, lower pair long ascending, base usually acute, sepals orbicular not ciliate, ovaries glabrous. Cnestis monadelpha, Roxb. Fl. Ind. ii. 454. Connaracea? Wall. Cat. 8549 (no fl. or fruit.). Connaracea, Wall. Cat. 8547, 8548.

ASSAM, SELHET, CHITTAGONG, BIRMA and southwards to TENASSERIM.—DISTR. China.

So similar in most respects to R. santaloides that I scarcely doubt its being an eastern form of that plant, distinguished by the nervation of the leaflets, which are
more usually acute at the base. Some Tavoy specimens are, however, almost intermediate.

3. **R. caudata**, Planch. *in Linnaea*, xxiii. 419; quite glabrous, leaflets 3-5 pairs elliptic-ovate with long caudate-acuminate obtuse points not shining, petiole very slender, sepals ciliolate, petals oblong obtuse.

**Assam**, Jenkins; **Khasia Mts.**, alt. 1-4000 ft., **Griffith**, *H. f. & T*.

Very similar to *R. santaloides*, but much smaller in all its parts and more slender, with more membranaceous leaflets 2-2½ in., of which the points are ½-3 as long as the blade, finely reticulate, not shining. **Racemes** or panicles 1-2 in. **Flowers** ½ in. diam. **Capsule** 2-1 in., slightly curved, broader upwards. **Petals** not much exceeding the sepals. **Ovaries** glabrous, style short.


**Malacca**, Griffith, Maingay.

A smaller leaved plant than *R. caudata* with more coriaceous leaflets, which are dark chestnut-brown when dry, and have slender petiolules ¼ in. long; they are uniformly reticulated on both surfaces without obvious principal nerves. **Panicules** very slender, often exceeding the leaves; pedicels ½ in. capillary. **Flowers** ½ in. diam. **Petals** twice as long as the sepals, linear-oblong, connate, just above the base. **Ovaries** 5, pilose; styles very slender. **Capsule** ½ in., stout, curved, pointed.


**Singapore**, Wallich.

Branches slender. **Leaves** 2½-6 in.; petiole quite glabrous, petiolules very short; leaflets 1½-3 by ¾-1½ in., thinly coriaceous, brown when dry; base rounded. **Capsule** ¾ in.—The specimens are very imperfect.

**Leaflets** very numerous, small, 1½-2½ in., sessile, oblong.

† **Leaflets** very pubescent beneath.


Branches stout, velvety. **Leaves** 1 ft.; petiole stout. **Leaflets** shining above, reticulate on both surfaces. **Panicules** shorter than the leaves. **Flowers** ¾ in. diam., rosy. **Sepals** orbicular, pubescent. **Petals** twice as long, pilose on the back. **Capsules** ¾-3 in., pointed.

7. **R. villosa**, Planch. *in Linnaea*, xxiii. 422; branches petioles and inflorescence softly pubescent, leaflets 12-20 pairs ¾ in. oblong rounded at the tip pilose beneath, pedicels slender, pedicels equalling the calyx.

**Tenasserim**, at Mergui, Griffith, Hefler.—**Distrib. Sumatra**.

Branches rather stout, velvety. **Leaves** 3-8 in.; petiole slender; leaflets faintly reticulate and polished above, base oblique subcordate. **Panicules** shorter than the leaves, clothed with dense spreading soft hairs. **Flowers** ¾ in. diam. **Sepals** orbicular, scarcely pilose. **Petals** glabrous, linear-oblong, twice or thrice as long as the calyx. **Capsule** ½ in., curved.

*Singapore, Wallich, Maingay.*

Pubescence rusty when dry. *Leaves* 3–5 in., petiole rather stout; leaflets slightly dilated or contracted at the base, opaque, reticulation very obscure. *Racemes* (very contracted panicles) axillary, strict, shorter than the leaves; pedicels very short indeed. *Flowers* not seen. *Capsule* $\frac{3}{4}$ in., much curved, obtuse.—I do not see why Wallich proposed the trivial name of *fulgens* for this; in its dry state it is a remarkably lurid plant.

†† Leaflets glabrous beneath or nearly so.


*Tenasserim,* at Mergui, *Griffith.*

Branches glabrous, branchlets pubescent. *Leaves* 2–4 in.; petiole slender; leaflets contracted cordate and very oblique at the base, shining above and below, nerves and reticulations obscure. *Racemes* apparently almost reduced to fascicles; bracts ovate, ferruginous. *Sepals* lanceolate, acute, spreading, imbricate, pubescent at the tip. *Petals* linear, very narrow, $\frac{2}{3}$ times longer than the sepals. *Ovaries* pilose.—The flowers are described from *Griffiths*’ *Notulae*; the spreading calyx is anomalous in the genus.

10. *R. Wallichiana*, Planch. in Linnaea, xxiii. 421; petioles and panicles pubescent, leaflets 15–30 pairs $\frac{3}{4}$–3 in. linear-oblong rounded at the tip glabrous on both surfaces, racemes slender, pedicels equalling or exceeding the calyx, flowers $\frac{1}{2}$ in. diam. *Connaracea, Wall. Cat.* 8525. *Connarus mimosoides*, *Vahl*? *Wall. Cat.* 8526 D.

*Tenasserim* and *Martaban*; Amherst, *Wallich*; Tavoy, *Gomez*; Moulmein, *Falconer.*

*Leaves* 6–10 in.; leaflets very uniform, always obtuse, base rounded or subcordate, upper surface dark brown hardly shining, lower chocolate brown opaque; nerves faint. *Racemes* slender, much shorter than the leaves, villous, paniculate at the base, pedicels very slender, exceeding the calyx. *Sepals* orbicular, ciliate. *Petals* $\frac{1}{2}$ in. long, linear, glabrous. *Capsule* $\frac{1}{2}$–$\frac{3}{2}$ in. long, curved.—A specimen of this is mixed with Wallich’s 8526 B.

11. *R. concolor*, Blume Mus. Bot. i. 264; petioles and racemes pubescent, leaflets 15–20 pairs $\frac{1}{4}$ in. oblong rounded or retuse at the tip glabrous on both surfaces, racemes slender, pedicels about equalling the calyx, flowers $\frac{1}{4}$–$\frac{1}{2}$ in. diam. *R. parvifolia*, Planch. in Linnaea, xxiii. 420. *Connarus mimosoides*, *Vahl*? *Wall. Cat.* 8526 A.B. ? *C. mimosoides*, *Jack in Mal. Misc.* 2, viii. 44.

*Singapore, Prince; Malacca, *Griffith.*—*Dist. Borneo.*

Branchlets finely pubescent. *Leaves* 2–6 in.; petiole slender; leaflets cordate at the base, shining above, chocolate-brown and minutely reticulated beneath. *Racemes* equalling or exceeding the leaves. *Flowers* the smallest of the Indian species: *Sepals* orbicular. *Petals* twice as long, linear-oblong. *Capsules* $\frac{1}{2}$–$\frac{3}{2}$ in., pointet.—There is a Wallichian specimen in Herb. Benth. under *Wall. Cat.* 8526 B. with the leaves shining beneath.

12. *R. similis*, Blume Mus. Bot. i. 264; petioles and racemes pubescent, leaflets 8–12 pairs linear-oblong 2-lobed at the tip shining above, very sparsely

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pubescent or glabrate beneath, racemes slender, pedicels equalling the calyx. R. sororia and R. parallela, *Planch. in Linnaea*, xxiii. 421; *Connarbus mimosoides Vahl.* Wall. Cat. 8526 C.

**Eastern Peninsula, Penang, Porter; Malacca, Maingay.—Distr. Sumatra, Borneo.**


This genus, which (Gen. Pl. i. 432) when the fruit was unknown I united with *Roureopsis*, proves to be exarillate, and I therefore restore it.

1. **R. pubinervis**, *Planch. in Linnaea*, xxiii. 424; branchlets petioles and nerves beneath finely pubescent, leaflets 3-pairs ovate or elliptic with a contracted notched tip. Indeterminata, Wall. Cat. 9050.

**Eastern Peninsula, Penang, Porter; Malacca, Griffith, Maingay.**


4. **Connarus**, Linn.

Trees or shrubs. *Leaves* odd-pinnate; leaflets 5, rarely 3 or more, quite entire. *Paniciles* axillary and terminal, branched. *Flowers* small. *Sepals* 5, deciduous or persistent and clasping the pedicel of the capsule, not accrescent, imbricate. *Petals* 5, linear or ligulate and slightly dilated upwards. *Stamens* 10, 5 shorter and sometimes without anthers. *Ovaries* 5, densely pubescent, 4 usually imperfect or obsolete, the fifth with a slender style, stigma capitellate. *Capsule* oblique, stipitate, inflated, broader upwards; valves glabrous or pubescent within. *Seeds* arillate, testa shining, albumen 0; cotyledons amygdaloid.—**Distr.** Species about 55, all tropical.

The structure of the flowers is remarkably uniform in all the Indian species which are with difficulty distinguished.

* Valves of the capsule quite glabrous within. Leaves quite glabrous beneath in all. **Natives of the Western Peninsula.**


Western Peninsula, from the Concan to Travancor. Ceylon, abundant.

Leaflets 3–4 by 1 1/4 to 1 1/2 in., glossy above, reticulations faint, quite glabrous, PANICLES densely pubescent. Flowers 1/4 in. long. Sepals ovate-oblong, subacute, pubescent. Petals twice as long, slightly pubescent on the back. Longer filaments three times as long as the shorter, all antheriferous. Capsule dark-coloured, rounded at both sutures, dehiscing tardily, contracted but neither acute nor apiculate at the tip. Testa black, shining. Very near the C. oligophyllus of Penang, but the capsule is quite glabrous within.—I think there can be no doubt that this, which is clearly Lamark's C. pinnatus, is also Linnaeus's C. monocarpus, which being one of the commonest plants in Ceylon, cannot have escaped Burmann's notice. Wight & Arnott describe it as having a sessile capsule, no doubt from Rheedee's figure, which, if it belongs to this plant, is a very bad one, also as having a glabrous calyx, which is not the case.


Western Peninsula, Wight; the Concan, Stocks.

Leaflets 3–3 1/2 by 1 1/4 to 1 1/2 in. coriaceous, hardly shining, finely reticulated, quite glabrous. Capsules pale chestnut coloured, shining, rounded, strongly striate on the ventral and dorsal faces, narrowly keeled at the sutures, early dehiscing, pale and quite glabrous within.—I have described this from a fruiting specimen. The capsule resembles that of C. paniculatus, but is quite glabrous within.

3. C. Ritchiei, Hook. f.; leaflets elliptic-lanceolate obtusely acuminate, nerves 5–7 on each side faint, capsule 3/4 by 1 1/4 in. turgidly oblong rounded at the top, base cordate.

Western Peninsula, the Concan, Stocks; the Ramghat near Belgaum, Ritchie.

Leaflets 3–4 by 1 1/2 to 1 3/4 in., finely reticulated, quite glabrous. PANICLES rusty-pubescent. Flowers crowded, 3/4 in. long. Sepals ovate-oblong. Petals about twice a long. Capsule quite as broad from suture to suture as across the valves, dark-coloured, intruded at the base, which is very rounded, and suddenly contracted into the stalk.—The capsule much resembles that of C. latifolius, Wall., but is more cordate at the base and larger.

** Valves of the capsules more or less pubescent or velvety within (unknown in C. Griffithii and semidecandrus.

† Leaflets more or less pubescent beneath.

4. C. ferrugineus, Jack in Mal. Misc. 2, vii. 37; branches panicles and leaves beneath densely rusty tomentose, leaflets 7 oblong or oblanceolate acuminate rugose, capsules 2–2 1/2 by 1 1/4 in. compressed velvety narrowed into the stalk.—Connaraceae, Wall. Cat. 8530.

Eastern Peninsula, Singapore, Malacca, and Penang, Jack, &c.

Densely clothed with rusty velvety tomentum. Leaflets 3–6 by 1 1/4 to 2 1/2 in., thickly coriaceous, rugose, and pubescent above when young, glabrate above when old, base rounded or subcordate; petiolules very short and stout; nerves 6–8 pairs, arched, very much sunk above and raised beneath. PANICLES shorter than the leaves, very stout. Flowers nearly 1 1/2 in. long. Sepals oblong. Petals twice as long, narrowly linear-spathulate. Filaments glabrous, shorter, half as long as the others. Capsule almost woody, readily dehiscing, hardly pointed, densely tomentose, valves finely pubescent within.
5. **C. Griffithii**, Hook. f.; branches, petioles, and leaves beneath pubescent, leaflets ovate-elliptic-lanceolate acuminate, nerves very indistinct.

**Tenasserim,** at Mergui, Griffith.

Branches slender. **Leaflets** 3–5 by 2/3–1 1/3 in., thinly coriaceous, finely pubescent with rusty hairs beneath, midrib distinct; nerves very faint, oblique. **Panicles** rusty-pubescent. **Flowers** 3/4 in. long. **Sepals** linear-oblong. **Petals** more than twice as long, glabrous, ligulate. **Filaments** almost glabrous. Capsule unknown.


**Tenasserim** at Mergui, Griffith; Penang, Wallich, Phillips, &c.

Leaflets pale on both surfaces. **Panicle** much branched, thinly pubescent. **Flowers** 1/4 in. long, white (Wallich). **Sepals** linear-oblong. **Petals** more than twice as long, narrow, linear-spathulate, glabrous. **Filaments** nearly glabrous. Capsule not seen.

†† Leaflets perfectly glabrous beneath.


**Silhet** and the Khasia Mts., ascending to 2000 ft., Roxburgh, &c.; Chittagong, Roxburgh, H. f. & T.

A large climber; branches and leaves perfectly glabrous. **Leaflets** 3–8 by 1–2 in., coriaceous, glossy above; nerves 5–6 pairs, slender, faint, reticulations obscure; petiole stout. **Panicle** hoary, much branched and spreading. **Flowers** 1/4 in. long. **Sepals** linear-oblong, pubescent. **Petals** more than twice as long, nearly glabrous, linear. Longer filaments three times as long as the short ones. Capsule shining, pale, deeply striate, finely pubescent within.—I do not see how **C. pentandrus**, Roxburgh, differs except in being described as truly pentandrous.


**Birma,** at Rangoon, McLelland; **Tenasserim,** at Mergui, Griffith, &c.; **Penang,** Porter; **Malacca,** Griffith, Maingay; **Sincapoe,** Wallich.—Distrib. Borneo.

Leaflets 3–5 by 1½–2 ½ in., quite glabrous; transverse venules distinct beneath. **Panicles** branched, rather slender. **Flowers** ¾ in. **Sepals** oblong-oblong. Petals about twice as long. **Filaments** puberulous. Capsules compressed, broad, veined, with the beak, usually very pronounced at the outer edge of the broad top; valves finely pubescent within.—Wallich suggests that this may be Jack's **C. lucidus** or **C. grandis**.

9. **C. Championii**, Thwaites Enum. 80; leaflets 5–7 elliptic acuminate, nerves 5–6 pairs very strong beneath, capsules 1½ by ¾ in. semilunar compressed narrowed at the base but not distinctly stalked striate glabrous.

**Ceylon,** Central province, ascending to 4000 ft.

A climbing shrub; young parts clothed with rusty pubescence. **Leaflets** 3–5 by 1½–2 in., thinly coriaceous, polished on both surfaces, reticulate beneath; petiole and petiolules slender. **Panicles** axillary and terminal, 4–6 in., minutely rusty-pubescent. **Flowers** ¾ in. long. **Sepals** oblong, hairy. **Petals** twice as long, linear-obovate, white dotted with red, sparsely hairy. **Filaments** included, glabrous, the longer twice as long as the shorter. Capsule apiculate, sutures not keeled; valves thin with scattered hairs within.
10. **C. latifolius**, Wall. Cat. 8537 (by error 5837); leaflets elliptic-oblong with contracted obtuse or notched points, capsule ⅔ by ⅜ in. shortly subcylin dric very turgid abruptly contracted into the stalk, top rounded scarcely apiculate. **Connaraceae**? 8545.

**Martaban**, at Moulmein, **Wallich**. **Tenasserim**, at Tavoy, **Gomez**.

Leaflets 4–7 by 1½–3 in., coriaceous, quite glabrous; nerves 5 pairs, slender, arched, reticulations indistinct. **Panicles** widely spreading. **Flowers** ⅔ in. long. **Capsules** with very round tops, and an obscure sublateral point, finely puberulous within.


**Eastern Peninsula**, Singapore and Penang, **Wallich**; **Malacca**, **Griffith**, **Maingay**; **Tenasserim** or **Andaman Islands**, **Héfier**.

Branches and petioles very robust, quite glabrous. Leaflets 3–5, much the largest, most coriaceous and polished of the genus, transverse nerves distinct beneath; petiolules short, stout. **Panicles** spreading, clothed with hoary down. **Flowers** ⅔ in. long. **Sepals** linear-oblong, obtuse. **Petals** twice as long, almost glabrous, linear, dilated upwards. **Filaments** puberulous, longer, three times as long as the others. **Capsule** coarsely striated, glabrous, sutures rounded, not keeled or raised.

12. **C. Maingayi**, Hook. f.; leaflets ovate or ellipt-ovate obtusely acuminate very coriaceous pale, nerves very faint, capsules 1–1½ by ⅔ in. elliptic or subcylin dric, stalk obscure.

**Eastern Peninsula**; **Malacca**, **Maingay**.

Branches rather stout, glabrous. Leaflets 5, 3–5 by 1½–2½ in., closely finely reticulated, opaque and pale grey on both surfaces. **Panicles** hoary-pubescent. **Flowers** ⅔ in. long. **Sepals** small, ovate-lanceolate. **Petals** three times as long, linear, with black dots, hoary on both surfaces. **Capsules**, young, 1½ by ⅔ in., terete, grooved at both sutures, top rounded and mucronate, strie quite longitudinal; old more elliptic; valves woody, velvety within.—**Very near and perhaps identical with C. falcatus**, Blume of Borneo. I find great varieties in the capsules of Maingay’s specimens, in part I assume depending on age; the longer are almost straight and subcylin dric and ⅔ in. diam.; the shorter are ellipsoid and ⅔ in. diam.; a few are 2½ in. long, curved and more distinctly stalked, as in Blume’s falcatus.


**Penang**, **Porter**.

Branches and leaves quite glabrous. Leaflets 5, 4–7 by 1½–2½ in.; base acute, thinly coriaceous, shining on both surfaces, pale red-brown beneath, the lowest pair of nerves quite basal, the succeeding pairs distant, all very oblique; petiole and petiolules slender. **Panicle** subpyramidal, nearly black; branches slender, ascending, rufous-pubescent. **Flowers** ⅔ in. long. **Sepals** oblong, obtuse, hoary. **Capsules** nearly straight, dark brown, smooth, striated longitudinally, tip rounded, apiculate; valves coriaceous, finely pubescent within.—The sheet of 8559 D in Wall’s Herb. contains three fragments of this plant without fruit, one flowering specimen of 8539 A (C. paniculatus), and three capsules of the same (glabrous inside). The sheet of 8542 consists of flowering specimens of this; and 8542 B consists of this and C. paniculatus or **monocarpos**. The specimen given to Bentham by Wallich is in fine fruit. This seems to differ entirely from **C. Maingayi** in the foliage, large panicle, and sepals.
Doubtful Species.

C. species? leaflets 5–8 in. elliptic and stout, branches almost black and very polished, nerves 7–8 pair very strong beneath, panicles slender hoary, sepals ovate-lanceolate, petals glabrous.—Singapore or Penang, Walker.

C. species? leaflets as in C. pinnatus, but nerves beneath very strong.—Amamallay hills, alt. 3000 ft., Beddome.

Connarus velutinus, Wall. Cat. 8536, consists of foliage and diseased fruit of a Spatholobus, with one capsule of Ellipanthus tomentosus, H. f.

Connarus Jackianus, Wall. Cat. 8552, is Cupania Jackiana, Hiern.

Connarus mimosoides, Vahl Symb. iii. 87; DC. Prodr. ii. 85, from the Nicobar Islands is indeterminate from description.

5. Cnestis, Juss.

Shrubs or trees. Leaves odd-pinnate; leaflets many, quite entire. Flowers solitary, fascicled or racemoid, tomentose, rarely panicled, polygamous or dioecious, rotate. Sepals 5, valvate or imbricate at the tip, spreading in fruit. Petals 5, shorter or longer than the calyx. Stamens 10, free. Ovaries 5–7, sessile or styles short, stigmas capitate. Capsules 1–3, kidney-shaped, cylindrical, curved or waved, pubescent, often villous or clothed with rigid hairs within. Seed exarillate, albumen fleshy; cotyledons thin.—Distrib. Tropical Asia and Africa; species about 10.


A climbing shrub. Branches stout, woody. Leaves 1 ft.; petiole slender, pubescent; leaflets subsecissile, 1–3 in., sometimes contracted below the middle, glabrous and shining above; nerves 6–10 pairs, slender, arched. Panicles axillary, fascicled, slender, much shorter than the leaves, densely clothed with pale soft tomentum. Flowers ⅓ in. diam., rosy, # smaller. Sepals linear-oblong, obtuse. Petals shorter in the ⅔ longer in the %, linear-oblong, obtuse or emarginate, glabrous. Filaments slender, glabrous. Ovaries 5–7 (usually 6, Griffith), hirsute; styles short. Capsules 1–3 in. long, sessile, falcate, enlarged and tumid above the middle, obtuse, woody, rugulose; valves thickly woody, velvety within. Seed short, broad, compressed, testa thin.—I think there can be no doubt but that this answers to the three species of Cnestis described by Griffith and cited above, though his names are not attached to any of his specimens. It has been distributed as Cnestis foliolosus and C. igneus, Planch. MSS. in Herb. Hook.


A rambling shrub. Leaves odd-pinnate, glabrous; leaflets 5, quite entire. Panicles axillary, short. Flowers hermaphrodite. Calyx-tube short, hemispheric, segments 5, enlarged and revolute in fruit, valvate. Petals 5, much exceeding the calyx. Stamens 10, alternately shorter, nearly free at the base. Ovaries 5,
sessile; styles short, stigmas discoid. Capsules 1–3, ovoid, compressed, pubescent; valves glabrous within. Seed oblong, arillate; albumen 0; cotyledons plano-convex.


MALACCA, Griffith, Maingay.


7. ELLIPANTHUS, Hook. f.

Trees or shrubs. Leaves with 1 leaflet, quite entire. Racemes axillary, short. Flowers hermaphrodite or polygamous. Sepals 5, not enlarged in fruit, suberect, valvate. Petals 5, longer than the sepals, oblong-lanceolate, densely pubescent. Stamens 10, 5 shorter, without anthers, filaments short subulate connate at the base. Ovary 1, strigose; style short. Capsule stalked, oblique, velvety; valves glabrous within. Seed arillate, albumen 0; cotyledons plano-convex.—DISTRIBUT. Malayan Peninsula and Islands.

* Leaves glabrous beneath or nearly so.

1. E. Thwaitesii, Hook. f.; leaflet elliptic obtusely caudate-acuminate, capsule curved into a semicircle beaked densely closely pubescent. Connarus unifoliatus, Thwaites Enum. 80 and 410.

CEYLON, Central Province, at 3–4000 ft. Thwaites


2. E. Helferi, Hook. f.; leaflet elliptic-lanceolate or linear-lanceolate acuminate, nerves 5–7 pairs strong beneath.

TENASSERIM OR ANDAMAN ISLANDS; Helfer.—DISTRIBUT. BORNEO.

Branches slender, black. Leaves 4–7 by 1½–2½ in., very variable in length and breadth, thinly coriaceous, with slight pubescence on the petiole and midrib beneath; petiole slender, ½ in. Racemes ½–¾ in., pubescent. Flower-buds, ⅛ in. long. Fruit unknown.


ANDAMAN ISLANDS, Kurz.

A tree 20–30 ft.; shoots and buds pubescent. Leaflet 5–7 by 2–2½ in., coriaceous, finely reticulated, gradually narrowed to the obtusely acuminate tip, pale; petiole slender, ¾–1 in. Racemes ½ in., densely pubescent. Petals ⅛ in., densely pubescent, linear-oblong. Capsules ½–1 in., obovoid or ellipsoid, subacute, densely velvety; valves woody, glabrous within.—The description of the petals and inside of the capsule is taken from Kurz.
**Leaves pubescent or tomentose beneath.**

4. **E. tomentosus**, Kurz in Jour. As. Soc. Beng. 1870, pt. ii. 305; leaflet elliptic ovate or orbicular obtuse acute or obtusely acuminate densely pubescent beneath, nerves 6–8 pairs very slender. Connarus ² monophyllus, Wall. Cat. 8551 (Connnaraceae).

Peou, Martaban, and Tensasserim, Wallich, &c.—Distrib. Siam.

Branches densely tomentose with fulvous hair. Leaflets 4–5 by 2–3½ in., usually elliptic or elliptic-lanceolate, but often broader and sometimes quite orbicular, coriaceous, glabrous, shining and very finely reticulated above; petiole 1/4–1 in. Racemes 3½ in., densely tomentose. Flowers ½ in. diam. Sepals obtuse. Petals twice as long, oblong, obtuse. Filaments hairy. Ovary strigose. Capsule 1½ in. (2 in., Kurz), semicircular or obovoid, contracted into the stout stalk, obtuse, apiculate, densely velvety, sutures rounded, valves woody, glabrous within.


Malacca, Griffith.—Distrib. Borneo.

Branches slender, rusty pubescent or tomentose. Leaflet 4–5 by 1½–2 in., coriaceous, glabrous and shining above, tomentose chiefly on the nerves beneath; petiole 1/4–1 in. Racemes 3½ in., few-flowered. Capsules ½ in. long, curved, semicircular, beaked, densely clothed with rusty velvety tomentum, stalk very short, valves woody, glabrous within.

**Order L. LEGUMINOSE.**  (By J. G. Baker, F.L.S.)

Herbs, shrubs, or trees. Leaves stipulate and usually alternate, pinnate or digitate or simple, often stipellate, sometimes with the rachis ending in a tendril. Inflorescence axillary leaf-opposed or terminal, usually simply racemose or panicled; bracts and bracteoles usually both present. Flowers usually irregular, hermaphrodite, rarely regular or polygamous. Sepals 5, combined or free, often unequal, sometimes combined into two lips. Petals 5, rarely fewer by arrest, usually free and unequal. Stamens normally ten, perigynous or almost hypogynous, rarely fewer by arrest or indefinite; filaments free or variously combined. Anthers 2-celled, the dehiscence almost always longitudinal. Ovary free; style simple, cylindrical, usually declinate; stigma capitate, terminal or oblique. Ovules one or more on the ventral suture. Fruit usually dry, a pod splitting open along both sutures, sometimes continuous and indehiscent, at others separating into 1-seeded joints. Seeds usually exalbuminous; cotyledons foliaceous or amygdaloid, with a straight or inflexed accumbent radicle.—Distrib. One of the most cosmopolitan of natural orders, the second largest of flowering plants, containing between 6000 and 7000 known species. Of the three suborders it is only the first that is cosmopolitan, the two others not reaching beyond the tropical and warm temperate zones.

**Suborder I. PAPILIONACEÆ.** Corolla papilionaceous. Petals irregular, imbricated, the uppermost (standard) outermost, the four others in two opposite pairs. Stamens definite.

**Tribe I. Podalyrieæ.** Stamens free. Pod dehiscent. Leaves digitate.

- Shrub with connate stipules.
- Herbs with free stipules.

1. **Piptanthus.**

2. **Thermopsis.**

**Tribe II. Genistææ.** Stamens monadelphous. Pod dehiscent, not jointed. Leaves simple or digitately 3-foliolate.
** Anthers uniform. Keel petals scarcely cohering.

** Anthers dimorphous. Keel petals firmly cohering.

Leaflets entire, subsessile.
Keel obtuse.
Calyx 2-lipped
Calyx subequally 5-toothed
Keel beaked.
Pod flattened.
Flowers solitary in axils of leaves
Flowers in terminal racemes
Pod turgid.
Leaflets toothed, stalked

3. Rothia.

4. Argyrolobium.

5. Lotononis.

6. Heylandia.

7. Priotropis.

8. Crotalaria.


Tribe III. Trifolieae. Stamens diadelphous. Pod usually dehiscent, not jointed. Leaves digitately or pinnately 3-foliolate; leaflets usually toothed.

* Leaves digitately 3-foliolate.

Petals persistent, adnate to the staminal tube
Petals caducous, free from the staminal tube

** Leaves pinnately 3-foliolate.

Pod elongated, straight or recurved
Pod short, round, or oblong
Pod falcate or spiral

10. Trifolium.

11. Parochetus.

12. Trigonella.


Tribe IV. Loteæ. Stamens diadelphous. Pod dehiscent, not jointed. Leaves pinnately 5-foliolate; leaflets entire.

15. Lotus.

Tribe V. Galegeæ. Stamens usually diadelphous. Pod dehiscent, not jointed. Leaves imparipinnate; leaflets entire.

* Anthers apiculate. Hairs fixed by the centre.

Stamens monadelphous
Stamens diadelphous

** Anthers obtuse. Hairs basifixd.

Pod 1-seeded, indehiscent. Leaves gland-dotted
Pod few- or many-seeded, subindehiscent or late in dehiscing.
Filaments filiform.
Pod membranous, inflated
Pod woody or very firm
Filaments dilated
Pod many-seeded, soon dehiscing.
Flowers mostly in leaf-opposed racemes
Flowers mostly in axillary racemes.
Pod very long, distinctly septate
Pod linear or oblong, not septate.
Calyx very oblique
Calyx not oblique.
Keel very short, obtuse
Keel long, obtuse
Keel long, appendiculate


17. Indigofera.

18. Psoralea.


20. Millettia.


22. Trichosia.

23. Sesbania.


25. Guldenspiedia.


27. Oxytropis.
Tribe VI. **Hedysareae.** Stamens diadelphous or monadelphous. Pod jointed if more than 1-seeded. Leaves odd-pinnate.

* Leaves exstipellate.

Stamens monadelphous; anthers uniform.

Leaflets' 1–3. Flowers in a lax raceme

Leaflets 3. Flowers in a dense head

Leaflets 4

Leaflets many

Stamens diadelphous (9 and 1); anthers uniform.

Ovule solitary. Pod 1-jointed.

Ovules few.

Spiny shrub, with simple leaves

Herbs with imparipinnate leaves.

Pod distinctly jointed

Pod marked only by faint transverse lines

Stamens monadelphous; anthers dimorphous.

Joints of pod 2–6, muricated

Joints of pod 1–2, rugose

Stamens in two bundles of 5 each; anthers uniform.

Pod twisted inside the calyx

Pod straight exserted from the calyx.

Calyx 2-lipped

Calyx 5-toothed

** Leaves stipellate. ** (Stamens in all 9 and 1; anthers uniform.)

Ovary 1-ovuled.

Racemes terminal, capitate

Racemes axillary, lax

Ovules several. Pod not distinctly jointed.

Pod turgid

Pod flat

Ovules 2 or more. Pod distinctly jointed.

Pod twisted up so that the joints are brought face to face.

Calyx accrescent; teeth lanceolate

Calyx not accrescent; teeth setaceous

Pod not twisted up.

Joints turgid

Joints flattened.

Pedicel abruptly inflexed at the tip

Pedicel not inflexed.

Racemes in fascicles from the old wood

Racemes simple or panicled from the year's shoots

Tribe VII. **Vicieae.** Stamens diadelphous (the tenth abortive in Abrus). Pod dehiscent, not jointed. Leaves equally pinnate; petiole ending in a tendril or bristle.

Shrubs with the tenth stamen absent

Herbs with diadelphous stamens (9 and 1).

Leaflets toothed

Leaflets entire.

Tube of stamens oblique at mouth

Tube of stamens truncate at mouth

Tribe VIII. **Phaseoleae.** Stamens monadelphous or diadelphous. Pod dehiscent, not jointed. Climbing, rarely erect herbs or shrubs, with pinnately 3-foliolate leaves.

* Stamens diadelphous. Stipules and bracts conspicuous persistent.

Style filiform. Calyx-teeth distinct.
Standard not spurred. Flowers uniform ... 56. Shuteria.
Style flattened upwards. Calyx truncate ... 57. Dumasia.

** Stamens monadelphous. Stipules and bracts minute caducous.

Anthers uniform, all fertile ... 58. Glycine.
Alternate anthers abortive ... 59. Teramnus.


Keel exceeding the wings and standard.
Anthers dimorphous ... 60. Mucuna.
Anthers uniform ... 61. Apios.
Standard exceeding the keel and wings ... 62. Erythrina.
Standard and keel equal; wings short ... 63. Strongyloodon


* Stamens diadelphous.

Herbs.
Two upper calyx-teeth not fused ... 64. Gropa.
Two upper calyx-teeth fused into one.
Keel nearly straight ... 65. Galactia.
Keel semicircular ... 66. Cochlianthus.

Shrubs.
Pod 1-seeded, not winged.
Flowers small, panicled.
Flowers large, racemose.
Pod many-seeded, winged ... 67. Spatholobus.

** Stamens monadelphous.

Upper lip of calyx projecting.
Upper teeth of calyx not projecting.
Pod oblong, turgid, 1-2-seeded.
Pod linear, flat, many-seeded ... 68. Butea.
Pod many-seeded, winged ... 69. Mastersia.


* Stigma oblique.

Keel spiral ... 73. Phaseolus.
Keel not spiral. Style filiform ... 74. Vigna.
Keel not spiral. Style flat upwards ... 75. Pachyrhizus.

** Stigma terminal.

Petals very unequal in length ... 76. Clitoria.
Petals equal in length. Pod flattish ... 77. Dolichos.
Petals equal in length. Pod square, 4-winged ... 78. Psophocarpus.
Subtribe V. Cajaneae. Leaves gland-dotted below; stipelles often abortive. Nodes of raceme not tumid. Style not bearded.

* Ovules 3 or more.

Pod with depressed lines between each seed.
- Seeds with a large grooved aril. 79. Atylosia.
- Aril absent. 80. Cajanus.
- Pod without depressed lines between the seeds. 81. Dunbaria.

** Ovules 1-2.

Calyx-teeth accrescent. 82. Cylista.
- Calyx-teeth not accrescent.
  - Funiculus at the end of the hilum. 83. Eriosema.
  - Funiculus centric on the hilum.
  - Leaves pinnate. Pod compressed. 84. Rhynchosia.

Tribe IX. Dalbergiæ. Stamens monadelphous or diadelphous. Pod continuous, indehiscent. Leaves odd-pinnate.

* Leaflets distinctly alternate.

Flowers small, white or reddish. 86. Dalbergia.
- Flowers large, yellow. 87. Pterocarpus.

** Leaflets opposite.

Pod flat, almost woody, wingless. 88. Pongamia.
- Pod flat, thin, firm, winged down one or both sutures. 89. Derris.
- Pod round, subdrupaceous. 90. Euchresta.


Leaves simple. Bract and bracteoles large, opposite, persistent. 91. Dalhousia.
- Leaves odd-pinnate, Bracts and bracteoles small, caducous.
  - Stigma terminal.
    - Pod moniliform. 92. Sophora.
    - Pod equal, flat, membranous. 93. Calpurnia.
  - Stigma oblique.
    - Pod indehiscent, flattish, narrowly winged. 94. Pericopsis.
    - Pod turgid, dehiscent, fleshy or coriaceous. 95. Ormosia.

Suborder II. Cæsalpinieæ. Petals imbricate, slightly unequal, the upper innermost in bud. Stamens definite.

Tribe XI. Eucæsalpinieæ. Leaves ample, abruptly bipinnate.

* Calyx-disk sub-basal; sepals imbricated.

Sutures of pod not winged. 96. Cæsalpinia.
- Both sutures of pod winged. 97. Peltophorum.
- Upper suture of pod winged. 98. Mezoneuron.
- Pod samaroid. 99. Pterobium.

** Calyx-disk sub-basal; sepals valvate.

Pod thin, flat. 100. Poinciana.
- Pod turgid, moniliform. 101. Parkinsonia.
** Calyx-disk placed considerably above the base.

See also *Mezoneuron*, § *Tubicalyx*.

**Tribe XII. *Cassieae*. Leaves simply pinnate. *Calyx-tube* short; disk sub basal.

- Petals 5. Anthers mostly dehiscing by a terminal pore
- Petals 5. Anthers dehiscing longitudinally
- Petal 1. Stamens diadelphous (9 and 1)
- Petals none.
  - Stamens 2. Leaves unequally pinnate
  - Sepals usually 5
- Sepals 4


- Petals none
- Petals 3-5.
  - Stamens diadelphous (9 and 1)
  - Stamens monadelphous, only 3 developed
  - Stamens 5, free, equal
  - Stamens 3-8, free

**Tribe XIV. *Bauhiniae*. Leaves simple, mostly deeply 2-lobed.

**Suborder III. *MimoSae*. Petals regular, valvate, usually united above the base. Stamens definite or indefinite.

**Tribe XV. *Mimoseae*. Stamens definite, usually ten.

* Anthers at first gland-crested.

- Herbs with flowers in round heads
- Tree with flowers in round heads
- Shrubs or trees with flowers in spikes.
  - Climber with tendrils
  - Erect without prickles
  - Erect prickly.
    - Pod turgid with a thick mesocarp
    - Pod thin, coriaceous, finally twisted
    - Pod long, thin, flat

** Anthers not gland-crested.

- Stamens 10.
  - Calyx-teeth imbricate. Stamens monadelphous
  - Calyx-teeth valvate. Stamens free.
    - Pod ligulate, coriaceous, continuous.
      - Undershrub with clavate stigma
      - Tree with capitulate stigma
    - Pod jointed
- Stamens 5

**Tribe XVI. *Acacieae*. Stamens indefinite.

- Stamens free

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102. *Wagatea.*

103. *Cassia.*

104. *Cynometra.*

105. *Sindora.*

106. *Dialium.*

107. *Hardwickia.*

108. *Crudia.*


110. *Amherstia.*

111. *Tamarindus.*

112. *Humboldtia.*

113. *Afzelia.*

114. *Bauhinia.*

115. *Neptunia.*

116. *Xy lia.*

117. *Entada.*

118. *Adenanthera.*

119. *Prosopis.*

120. *Dichrostachys.*

121. *Piptadenia.*

122. *Parkia.*

123. *Desmanthus.*

124. *Leuclena.*

125. *Mimosa.*

126. *Acrocarpus.*

127. *Acacia.*
Stamens monadelphous.
Leaves bipinnate.
   Pod thin, ligulate, the sutures not thickened 128. ALBIZZIA.
   Pod large, turgid, oblong, indehiscent, the sutures not thickened 129. SERIANTHES.
   Pod rather falcate, the sutures much thickened 130. CALLIANDRA.
   Pod circinate 131. PITHECOLORIUM.
Leaves simply pinnate 132. INGA.

1. PIPTANTHUS, D. Don.

A shrub. Leaves digitately 3-foliolate. Flowers racemened, bracteate. Calyx-tube campanulate; teeth equal, lanceolate. Corolla three times the calyx; petals all with long claws; standard orbicular, erect, margins reflexed; wings obovate; keel-petals obovate-oblong, connate down the back, slightly incurved. Stamens free; anthers uniform. Ovary linear, stalked, downy, 6-10-ovulat; style filiform, incurved; stigma minute terminal. Pod linear, flattened, continuo within.—Distrib. A single endemic species.


Temperate Himalaya, from Simla to Bhôtan, alt. 7-9000 ft.
A shrub 6-10 feet high; habit of the laburnum; branches downy. Stipules small, connate, amplexicaul; petiole 1 in. or less; leaflets glabrescent, lanceolate, 2-4 in., narrowed to both ends. Flowers 12-20 in subdense racemes; bracts large, deciduous; bracteoles 0. Calyx downy, deciduous from the base. Corolla yellow, above 1 in. long. Pod 2-5 in., 3-10-seeded.

2. THERMOPSIS, R. Br.

Perennial herbs. Leaves stipulate, 3-foliolate; bracts large, leafy, free. Flowers showy, usually yellow, racemened. Calyx-tube turbinate; teeth lanceolate; two upper more or less connate. Petals all long-clawed; standard orbicular, sides reflexed; wings obovate; keel-petals obovate-oblong, faintly joined down the back. Stamens free; anthers uniform. Ovary linear, sessile or stalked, x-ovulat; style filiform, incurved; stigma minute terminal. Pod turgid, linear or oblong, straight or falcate, continuous within.—Distrib. Species 12, China, Japan, N. America.


Temperate and Subalpine Himalaya, from Kashmir and Kunawai to Sikkim, ascending to 11,000 ft.
Rootstock woody. Stems 1 ft. or more, copiously branched dichotomously. Leaves sessile, subglabrescent, often opposite; stipules just like the leaflets in texture and shape. Flowers 6-12, short-stalked, opposite or ternate. Calyx shaggy, like the leaves, 3 lower teeth twice the tube. Corolla 1 in. long. Pod short-stalked, 1/2-5 in. broad, 1-6-seeded.

**HIMALAYAS** of Tibet and Kunawar, alpine region, alt. 15-17,000 ft.

*General habit* of the last, but not more than half a foot high. Rootstock woody, widely creeping. Leaves sessile; leaflets fleshy, glaucous, \( \frac{1}{2} - \frac{3}{4} \) in. Stipules like the leaflets in shape and texture. Racemes close, 6-10-flowered. Flowers short-stalked, in twos or threes. Calyx finely silky, the three lower teeth as long as the tube. Pod short-stalked, 6-10-seeded, oblong, an inch or more thick, more membranous and flexible than in *T. barbata*, and dehiscing less readily.


Diffuse annuals. Leaves petioled, digitately 3-foliolate. Flowers copious, minute, in the axils of the leaves. Calyx-tube turbinate, the teeth as long as the tube, the two upper broader and arched. Corolla scarcely exserted, all the petals narrow, nearly straight, distinctly unguiculate; those of the keel scarcely cohering. Filaments united in a tube which is slit along the top; anthers uniform, minute. Ovary sessile, linear, \( \infty \)-ovulate; style short, straight, filiform, stigma capitulate minute. Pod linear, slender, nearly straight, compressed, continuous within.—Distrib. Two species, the other Trop. African.


Tropical Plains from Bundelkund to Ceylon.—Distrib. Australia.

A copiously-branched diffuse annual with slender stems a foot or more long! Stipules free, minute, \( \frac{1}{2} \)-lunate, persistent; petioles shorter than the leaflets; leaflets ob lanceolate-oblong, obtuse, minutely mucronate, rather fleshy, silky, \( \frac{1}{2} - 1 \) in. long. Flowers 1-4, on short pedicels in the axils of most of the leaves. Calyx silky, \( \frac{1}{2} - \frac{3}{4} \) in. Corolla inconspicuous, fugacious. Pod 1\( \frac{1}{2} \)-2 in., silky. Seeds 20 or more.


Herbs or shrubs. Leaves digitately 3-foliolate; stipules free. Flowers yellow, in terminal or leaf-opposed racemes or umbels. Calyx 2-lipped, slat nearly to the base, with (in Indian species) 5 distinct teeth, 2 to the upper, 3 to the lower lip. Corolla scarcely if at all exserted; standard roundish; wings oblong; keel-petals broad, joined down the back to the obtuse incurved tip. Stamens monadelphous; anthers dimorphous. Ovary linear, sessile, \( \infty \)-ovuled; style elongate, filiform, curved gradually upwards inside the keel, stigma minute oblique. Pod linear, straight, continuous within, compressed, subtorulose.—Distrib. Species 40-50, mostly South African.

Tropical and Temperate tracts of north-west India, ascending from the plains to 9000 ft.

A shrub with very slender diffuse branches reaching 12–18 in. high. *Stipules* minute, linear, persistent; petioles much shorter than the leaves; leaflets pale, silky, subequal, lanceolate, acute, $\frac{1}{2}$–$\frac{3}{4}$ in. long. *Flowers* 1–6 in leaf-opposed racemes on peduncles that exceed the leaves. *Calyx* $\frac{1}{4}$–$\frac{3}{4}$ in.; teeth shorter than the limb. *Pod* densely silky, 6–8-seeded, $\frac{1}{2}$ in. broad.—*Cytisus languinosus*, Royle MSS., is a form with more densely silky vestiture.


Tropical and Subtemperate tracts of the north-west, ascending from the plains to 7000 ft. in Kumaon.—*Distrib.* Persia.

General habit of *A. raccidum*, but nearly or quite glabrous. *Stipules* the same; petioles as long or shorter than the leaves; leaflets $\frac{1}{2}$–$\frac{3}{4}$ in. long, often nearly as broad, point truncate or emarginate. *Peduncles* 1–4-flowered, exceeding the leaves. *Calyx* $\frac{1}{4}$ in., glabrous; teeth of upper lip exceeding limb. *Corolla* yellow tinged with red; standard longer than upper lip of calyx. *Pod* glabrous, 10–15-seeded, $\frac{1}{2}$ in. broad.—*A. trigonelloides*, J. & S., with a similar habit, but a shorter flatter pod with much fewer seeds, will probably be found in Scinde.

5. **LOTONONIS**, DC.

Herbs or shrubs with digitately trifoliolate leaves, stipules connate or free, flowers in terminal or leaf-opposed racemes or umbels. *Calyx*-tube narrow-turbinate; lowest tooth deeper than the other 4. *Corolla* little exserted; standard very narrow; wings shorter and still narrower; keel longer, suddenly incurved at the tip, its petals firmly joined along the back. *Stamens* united in a tube slit along the top; anthers dimorphous. *Ovary* sessile, linear, $\infty$-ovulate; style abruptly incurved at the base, stigma minute oblique. *Pod* linear, usually compressed, but in our species turgid.—*Distrib.* Species 60, nearly all restricted to South Africa.


Scinde; between the plains and Rohill pass, *Stocks*. Punjab; Peshawur, *Stewart. Distrib.* Through the desert region to Algeria, Abyssinia and the Cape.

A much-branched finely silky diffuse annual, $\frac{1}{2}$ ft. or less high. *Stipules* minute lanceolate, deciduous; petiole as long as leaf; leaflets ob lanceolate, rather fleshy, obtuse, minutely mucronate, $\frac{1}{2}$–$\frac{3}{4}$ in. *Flowers* 1–5, subsessile in axils of most of the leaves. *Calyx* silky, $\frac{1}{4}$–$\frac{3}{4}$ in. *Corolla* pale yellow or red, scarcely exserted. *Pod* linear-oblong, turgid, 4–8-seeded, scarcely exserted.

6. **HEYLANDIA**, DC.

*Calyx*-tube turbinate; teeth lanceolate, three lowest deepest. *Corolla* much exserted; standard large, round; wings much smaller, obovate; keel-petals narrow, joined along the back, narrowed into an incurved beak. *Stamens* united in a tube slit above; anthers dimorphous. *Ovary* sessile, 2-ovulate; style
Heylandia.] L. LEGUMINOSÉ. (J. G. Baker.) 65

elongated filiform abruptly incurved at the base; stigma terminal. Pod oblong, flat, 1-2-seeded.—Distrib. A single endemic species.


Everywhere in the tropical region from the Gangetic plain and Scinde to Ceylon.

A prostrate or less silky much-branched herb. Leaves close-set, alternate, simple, subsessile, cordate-ovate, $\frac{1}{4}-\frac{3}{4}$ in. long, more produced in the lower half. Flowers in the axis of most of its leaves, sub sessile, solitary. Corolla yellow, $\frac{1}{4}-\frac{3}{4}$ in. Pod silky, $\frac{1}{4}$ in. long.

7. PRIOTROPIS, W. & A.

Calyx-tube campanulate; teeth subequal. Corolla much exserted; standard roundish; wings obovato-oblong; keel broad, with a long distinct ascending beak. Stamens monadelphous; anthers dimorphous. Ovary distinctly stalked, ovate; style long, abruptly incurved at the base, bearded on the inner side, stigma capitate. Pod distinctly-stalked, 5-6-seeded, oblong, flattened, continuous within.—Distrib. A single endemic species.


Tropical East Himalaya; Nipal to Ava, ascending to 6000 ft. in Sikkim.

Undershrub, with the habit of Crotalaria striata, with slender glabrous branches. Stipules 0; petioles as long as the leaves; leaflets 3, oblong, glabrous, membranous, 2-3 in. long, narrowed to both ends. Racemes copious, short-stalked, leaf-opposed and terminal, closely 12-20-flowered. Calyx $\frac{1}{4}$ in., finely silky; teeth lanceolate, as long as the tube. Corolla pale yellow, glabrous, 2-3 times the calyx. Pod 1 in. by $\frac{1}{4}$ in., narrowed to both ends; gynophore filiform, quite as long as the calyx.

8. CROTALARIA, L.

Herbs or shrubs of very various habit and vestiture. Leaves simple or 3-foliolate, very rarely odd-pinmate. Flowers in terminal or leaf-opposed racemes, often showy. Calyx-tube short; teeth linear or lanceolate, subequal or shortly connate in two lips. Corolla equalling or exceeding calyx; standard with a short claw, usually round; wings obovate-oblong, shorter; keel broad, equalling the wings, its petals joined down the back, much incurved, distinctly beaked. Stamens monadelphous; anthers dimorphous. Ovary sessile or stipitate, linear, usually multi-rarely 2-ovulate; style long, abruptly incurved at the base, bearded upwards, stigma minute oblique. Pod sessile or stipitate, straight, linear or oblong, turgid, continuous within, usually many-seeded.—Distrib. Species 2-300; spread everywhere in tropical and subtropical regions.

Secr. I. ARENARIA, Benth. Rigid copiously stiffly-branched undershrubs, often spiny, with scattered small rigid deciduous simple leaves.—A small group, characteristic of the desert Flora, reaching westward through Arabia and North Africa to Senegal.

Scinde and Punjab, in sandy plains, ascending to 4000 ft. Camby, in the desert region, Dalzell.—Distribs. Afghanistan and Beloochistan.

A low undershrub, with very numerous stiff erecto-patent branches, clothed with fine pale tomentum. Spines none. *Leaves* scattered, deciduous, subsessile, oblong or lanceolate, rigid, pale green, 1/2-1½ in. long; stipules 0. *Flowers* 6-12, in elongated terminal racemes; pedicels 2-bracteolate, very short. *Calyx* densely silky, 1/4 in.; teeth long, lanceolate. *Corolla* yellow, scarce exserted. *Pod* oblong, 3-4-seeded, rather longer than calyx.

Sect. II. Diffusae, Benth. Copiously-branched herbs with flexuose trailing stems. *Leaves* close, simple. *Stipules* 0 or small, not deciduous. *Racemes* all lateral, leaf-opposed, usually reduced to few flowers or one only. *Pods* glabrous or downy.


Plains of the Peninsula and Ceylon.—*Distribs.* Java.

A silky trailing annual, with stems 1-1⅓ ft. long. *Leaves* close, subsessile, densely silky, ovate or roundish, 1/2-1 in. long, obtuse, mucronate; stipules minute, usually 0. *Pedicels* 2-4 times leaves, 1 or closely 2-flowered. *Calyx* 1 in., densely silky; teeth long, upper lanceolate, lower linear. *Corolla* yellow, scarcely exserted. *Pod* compressible, 1/2-1½ in. long, short-stalked.


Habit, vestiture, leaves, inflorescence, calyx and corolla just as in *C. biflora*, but pod smaller, not compressible, glabrescent before splitting, with seeds larger and much fewer.


Plains of the west side of the Western Peninsula; Dekkan, *Edgeworth*.

Stems very slender, 1/2-1 ft., clothed with fine spreading deciduous silky hairs. *Leaves* pale, rigid, prominently veined, subsessile, obtuse, much more rounded on the lower side. *Pedicules* copious, rigid, 3-6 times the leaves, glabrous; flowers distant if more than one; bracts persistent, reflexed. *Calyx* 1/5 in. long, finely silky; teeth long, all lanceolate. *Corolla* yellow, exserted; standard erect, veined, round, 1/4 in. broad. *Pod* short-stalked, 1/4 in. long.


Ava; Mount Prone, *Wallich*.

Stems slender, copiously branched, thinly silky when young. *Leaves* short-stalked, membranous, pale, subacute, 1-2 in. long, glaucescent below; stipules small, spreading,
f oliaceous. Peduncles very slender, sometimes pseudo-terminal by the development of leaves from their nodes; flowers if two distant. Calyx \(\frac{1}{4}\) in. long; teeth deep, lanceolate. Corolla yellow, not distinctly exserted. Pod short-stalked, \(\frac{1}{4}-\frac{1}{3}\) in. long.

6. **C. trichophora**, Benth. MSS.; densely silky, stipules 0, leaves obliquely cordate-oblong, peduncles 1–2-flowered, bracts and corolla very small, pod oblong glabrous 6–8-seeded.

Concan plains, Stocks.

Stems slender, copiously branched, 1–1½ ft., clothed with long silky yellow-brown hairs. Leaves sessile, membranous, \(\frac{1}{4}-\frac{1}{2}\) in. long, obtuse or subacute, pale, membranous, more broadly rounded on the lower side. Pedicels thread-like, rigid, clothed with long hairs, rarely two-flowered, often leafy downwards, longer than the leaves. Calyx \(\frac{1}{2}\) in., densely silky; teeth long, linear. Corolla yellowish, scarcely exserted. Pod short-stalked, \(\frac{1}{4}-\frac{1}{3}\) in. long.

7. **C. Stocksii**, Benth. MSS.; subglabrous, stipules deciduous very minute, leaves linear-oblong, peduncles 1-flowered, bracts and corolla very small, pod linear-oblong glabrous 12–16-seeded.

Concan, Stocks; and contained also in Helder's Tenasserim and Andaman collection.

Stems slender, very copiously branched, 1–1½ ft. Leaves short-stalked, obtuse, \(\frac{1}{3}-\frac{1}{4}\) in. long, membranous, equally narrowed on both sides at the base. Pedicels filiform, 2–3 times the leaves; bracts subulate. Calyx \(\frac{1}{12}\) in.; teeth long, linear. Corolla yellow, slightly exserted. Ped sessile, \(\frac{1}{4}-\frac{1}{3}\) in. long, finally black.


Herb. Stocks, probably from Concan.

Stems slender, much branched, \(\frac{3}{4}-1\) ft., densely clothed with yellow-brown silky hairs. Leaves nearly sessile, moderately firm, equal-sided, \(\frac{3}{4}-\frac{1}{2}\) in. long, base rounded, point rather obtuse. Pedicels spreading, exceeding leaves; bracts acute, \(\frac{1}{2}-\frac{1}{3}\) in. long; pedicels shorter than calyx. Calyx \(\frac{1}{12}\) in., shaggy; teeth linear, long. Corolla not exserted. Pod nearly sessile, \(\frac{1}{4}-\frac{1}{3}\) in. long.

9. **C. prostrata**, Roxb. Hort. Beng. 54; Fl. Ind. iii. 270; finely silky, stipules 0, leaves obovate-oblong rather oblique, racemes 2–4-flowered, bracts subulate very minute, corolla small, pod linear-oblong glabrous 12–15-seeded. Rottl. in Willd. Enum. 747; DC. Prodr. ii. 130; Wall. Cat. 5419; W. & A. Prodr. 189 (excl. syn.). Mart. in Munch. Denk. 6, t. E.

Plains from the Upper Ganges to Ceylon, ascending to 6000 ft. in the Chenab valley.—DISTR. JAVA.

Stems slender, \(\frac{1}{4}-1\) ft., clothed with short adpressed or spreading silky yellow-brown hairs. Leaves nearly sessile, \(\frac{3}{4}-\frac{1}{2}\) in. long, obtuse, pale, glaucous below, produced (cordate) on the lower side at the base. Pedicels finely silky, usually twice the leaves. Calyx \(\frac{1}{12}\) in., densely silky; teeth linear, long. Corolla yellow, not exserted. Pod nearly sessile, \(\frac{1}{4}-\frac{1}{3}\) in. long.


KUMAON to SIKKIM and KHASIA, ascending to 5000 ft. ANAMALLAY hills, alt. 4000 ft., Beddome.
Stems under a foot long, slender, flexuose, much branched, densely clothed with short spreading yellow-brown silky hairs. Leaves nearly sessile, very obtuse, membranous, pale, glaucous below, equal at the base, ½–1 in. long. Peduncles arculate, densely silky, usually 2–3 times the leaves, sometimes leafy below; pedicels cernuous, lower as long as the calyx. Calyx ¼ in., densely silky; teeth linear, very long. Corolla yellowish, not exserted. Pod short-stalked, ¼ in. long.


**Nipal** to **Assam**, ascending to 5–6000 ft.; **Ava**, **Martaban**, **Ceylon**.—**Distrib. Java**, **Philippines**, **Formosa**.

More robust than all the preceding. Branches in the type finely silky. Leaves short-stalked, moderately thick, pale beneath, obtuse, equal-sided, 1–2 in. long; stipules persistent, foliaceous, often deflexed. Peduncles usually 2–3 times the leaves; racemes much elongated; bracts persistent, spreading or deflexed. Calyx ¾–1 in., shortly silky; teeth long, upper lanceolate, lower linear. Corolla not distinctly exserted. Pod short-stalked, 1–1¼ in. long.

**Var.** β. *pilosisima*, *Benth. MSS.*; leaves and flowers larger, calyx and branches densely clothed with longer bright yellow-brown silky hairs.—**Khasia**; 3–5000 ft., *Hook. fl.* § *Thomson*.


**Bengal** to **Ava** and **Tenasserim**.—**Distrib. Java**, **Philippines**.

Stems slender, a foot long or more, thinly clothed with spreading silky hairs. Leaves nearly sessile, obtuse, glaucous-green, membranous, thinly silky, ½–1½ in. long, rounded on the upper, coriaceous on the lower side at the base; stipules persistent, reflexed. Peduncles equalling or exceeding leaves; bracts small, persistent, reflexed, Calyx ¾–1 in., densely silky, teeth linear, very long. Corolla not exserted. Pod sessile, ⅞–¾ in. long.


Tropical region, **Nilgiris** and **Ceylon**.

Stems 1–2 feet long, copiously branched, clothed with fine short spreading hairs. Leaves short-stalked, ½–1 in. long, moderately firm in texture, always obtuse. Peduncles equalling or much exceeding the leaves; pedicels cernuous, exceeding the bracts, shorter than the calyx. Calyx ½ in., long densely pubescent; teeth long, linear. Corolla yellow, slightly exserted. Pod short-stalked ½–¾ in. long.—The plant figured under this name in Wight's *Icones* t. 81 from *Courtallium* has much larger flowers and is probably a distinct undescribed species.

Crotalaria. [L. LEGUMINOSÆ. (J. G. Baker.)


Tropical region, Central Himalaya, Royle, Edgeworth, Thomson; Bundelcund, Edgeworth; Western Peninsula, Heyne, Wight.

Very near the last. Leaves more membranous, always acute, 1-2 ft. Peduncles shorter, more slender, often leafy, densely clothed with short spreading silky hairs. Calyx 0.5 in., densely pubescent. Corolla yellow, distinctly exserted. Pod just the same in shape and size.

15. C. bifaria, Linn. Suppl. 322; inconspicuously pubescent, stipules linear minute, leaves round-oblong obtuse slightly oblique, racemes 1-2-flowered, bracts small lanceolate, corolla middle-sized, pod oblong finely downy 10-12-seeded. DC. Prodr. ii. 127; W. & A. Prodr. 188 (excl. syn.); Wt. Ic. t. 30; Wall. Cat. 5399, ex parte; Duls. & Gibbs. Bomb. Fl. 55.

Tropical regions of the Western Peninsula and Ceylon.

Habit of the two last, but pubescence short and inconspicuous. Leaves short-stalked, moderately firm, 3-1.5 in., upper casually narrow, but all obtuse. Peduncles stoutish, usually exceeding the leaves; bracts reflexed, persistent. Calyx 0.5-1 in., obliquely pubescent: teeth linear-lanceolate, long. Corolla yellow, slightly exserted. Pod short-stalked, 3/4-1 in. long, very turgid, glabrescent before it splits.


Ceylon, alt. 3-5000 ft.; Gardner, Thuwates, &c.

The most robust and showy species of the section. Leaves distinctly stalked, subcoriaceous, dark green, glandular, punctuate, usually 1-2 in., but reaching in a narrow-leaved form 4-5 in. Peduncles 1-2 foot, stout, arcuate, densely clothed like the stem with short spreading brown hairs; pedicels cernuous, 1 in.; bracts reflexed, persistent. Calyx 0.5-1 in., inconspicuously downy; teeth lanceolate, very long. Corolla yellowish, equaling the calyx; standard nearly 1 in. broad, veined with dark purple. Pod short-stalked, 1-2 in. long, densely clothed with dark brown silky hairs.

Sect. III. Alatae, Benth. Diffuse or suberect pubescent perennials. Leaves simple. Stipules decurrent as a persistent wing to the branches. Racemes all lateral, leaf-opposed 1-3-flowered. Pod stipitate-linear-oblong glabrous.

17. C. alata, Hamilt. ex Roxb. in Don. Prodr. 241; suberect, stipular wing broad, leaves thin oblong obtuse or subacute, peduncle elongated often leafy, pod long-stalked. Roxb. Hort. Beng. 98; Fl. Ind. iii. 274; DC. Prodr. ii. 124; Wall. Cat. 5356; Benth. in Hook. Lond. Journ. ii. 478. O. sagitticaulis, Wall. Cat. 5357. C. bialata, Roxb. Fl. Ind. iii. 274.

Kumaon to Assam and the Khasia Mts. ascending to 6500 ft.; Ava, Wallich; Mishmi, Griffith; Pegu, McLelland.—Distrib. Java.

A suberect under-shrub 1-2 ft. high. Stem and leaves below clothed with short silky pubescence. Leaves sub sessile, much thinner than in C. rubiginosa, varying from obovate to ovate-oblong, reaching 2-3 in.; stipule forming a wing from one node nearly to the next, its point lanceolate-deltoid. Racemes 2-3-flowered; bracts small, persistent, ovate, acuminate. Calyx 0.5 in., densely silky; tube campanulate; bracteoles inserted above the base. Corolla pale, not exserted. Pod linear-oblong, glabrous, 1-1.5 in. long, 30-40-seeded.

18. C. rubiginosa, Wild. Sp. Pl. iii. 973; diffuse, stipular wing narrow, leaves small round-ovoblate obtuse coriaceous, peduncle short not leafy, pod short-

NILGHIRS up to 4000 ft.
A spreading shrub with stems 1–1 foot long, densely short grey-downy. Leaves subsessile, rarely an inch long, dark green, always very obtuse, and densely clothed with grey or when young with yellow-brown pubescence; stipules passing suddenly into a narrow wing from the spreading deltoid points. Racemes sparse, 1–4-flowered. Bracts small, persistent, ovate; bracteoles small, lanceolate, inserted above the base. Calyx ⅔–⅓ in., densely silky. Corolla yellow, not exserted. Pod oblong, 1–1 ¼ in. long, glabrous, 20–30-seeded.

VAR. 1. scabrella; stems stronger and more ascending, flowers rather larger, pod more distinctly stalked. C. scabrella, W. & A. Prodr. 181.—NILGHIRS and CEYLON.

VAR. 2. Wightiana; stems suberect much more robust than in the type, leaves thinner more silky larger reaching 2–3 in. long 1½–2 in. broad, corolla and calyx ⅓–⅔ in. long, pod 1½–2 in. long, 30–40-seeded. C. Wightiana, Grah. in Wall. Cat. 5358, A.; W. & A. Prodr. 181.—NILGHIRS and CEYLON up to 6000 ft.

Sect. IV. Calycinae, Benth. Copiously-branched diffuse annuals or low shrubs with slender branches. Leaves simple, more or less hairy, stipules 0 or small not decurrent. Racemes all terminal or a few also lateral. Pods glabrous or pubescent, exserted or included.

* Pod decidedly exserted from the calyx.

19. C. pusilla, Heyne; DC. Prodr. ii. 128; annual, densely silky, stipules 0, leaves linear very small, racemes terminal and lateral laxly 3–6-flowered, bracts minute lanceolate, pod silky sessile twice the calyx. Wall. Cat. 5306; W. & A. Prodr. 189.

WESTERN PENINSULA; Bombay to Courtallum.

Stems under half a foot high, with copious ascending branches clothed withpressed brown silky hairs. Leaves subsessile, firm, obtuse, ⅔–⅓ in. long, densely silky. Racemes very copious, short-stalked, ⅔–1 in. long. Calyx campanulate, silky ⅔ in. deep; teeth deep, all linear. Corolla yellow, scarce exserted, Pod ½ in. long, thinly silky, 4–8-seeded. The smallest of all the species.


DEKKAN, near Hydarabad.


—Differs from chinensis by its small obtuse leaves and much shorter calyx.


TROPICAL REGION, all through India proper, ascending to 4000 ft. in KUMAON.
Copiously branched, 1-2 ft. high, the stems clothed with long dense erecto-patent brown silky hairs. Leaves membranous, short-stalked, 1-3 in. long, rounded at both ends, thinly silky. Racemes stalked, reaching 6-9 in. long. Calyx ½-⅔ in. deep, densely clothed with long silky hairs; teeth all long, acuminate, upper lanceolate, lower linear. Corolla yellow, not exserted. Pod oblong, 1-1½ in. long, 20-30-seeded.


Western Peninsula; Concan and Malwan, Dalzell, Stocks, Law; Ceylon, Thwaites.

Suffruticose, 1-2 ft. high with copious very slender ascending branches angled down to the base. Leaves membranous, pale green, glabrescent, 1-2 in. long, broadly rounded at the base. Racemes long-stalked, very lax; bracts minute, lanceolate. Calyx ¼-½ in. deep, thinly silky; teeth long all linear, acuminate. Corolla pale yellow, ⅓ in. long; standard ovate, pointed. Pod oblong-cylindrical, ⅓ in. long, thinly coated with short yellow-brown silky hairs, 15-20-seeded.


Tropical region through India proper and Ceylon, ascending to 5500 ft. in Kumaon, and to 6-7000 ft. in the West Himalayas. Birma, Wallich. Pegu, McClelland. Tenasserim, Helfer.—Distr. Malay Isles, China, and Philippines.

A shrub 1-2 ft. high, with very numerous firm slender, obscurely silky branches. Leaves short-stalked, firm, 1-2 in., thinly silky beneath, pellucid-punctate, glabrescent above. Racemes 2-4 in. long, rarely lateral. Calyx turbinate, ½ in., finally ⅔ in. long, thinly silky; teeth long, 3 lower linear acuminate, upper broader often subobtuse. Corolla pale yellow, glabrous, scarcely exserted. Pod oblong-cylindrical, ½-⅔ in. long, 6-12-seeded.

Var. 1. epunctata; leaves membranous pubescent not dotted, racemes very lax 3-6-flowered, calyx teeth all linear acuminate. C. epunctata, Dalz. in Kew Journ. iii. 210; Dalz. & Gibs. Bomb. Flora, 56.—Southern Concan, Dalzell.

** Pod included or very slightly exserted.

24. C. nana, Burm. Fl. Ind. 156, t. 48, fig. 2; leaves oblong-obtuse, racemes capitate 6-12-flowered, calyx densely silky, upper teeth connate, pod ovoid small glabrous sessile slightly exserted. DC. Prodr. ii. 127; W. & A. Prodr. 191; Dalz. & Gibs. Bomb. Fl. 56. C. umbellata, Wight in Wall. Cat. 5983; W. & A. Prodr. 191; Dalz. & Gibs. Bomb. Fl. 56. C. biflora, Herb. Mahr. in Wall. Cat. 5981, not of Linn. C. sobolifera, Grah. in Wall. Cat. 5420 B.

Western Peninsula and Ceylon, ascending to 6000 ft.

An annual 1 ft. or less high, with copious slender terete ascending or spreading branches clothed with short silky hairs. Leaves ¼-1 in., moderately firm, thinly silky above, densely so below, base subuneate, stipules 0. Bracts and bracteoles minute, subulate; upper flowers often quasi-umbellate. Calyx ⅞-⅞ in. long, densely clothed with long silky hairs; teeth of lower lip narrow, acuminate. Corolla pale, not exserted. Pod 6-8-seeded, black when mature.

Var. 1. patula; leaves narrow linear, calyx more shortly silky. C. patula, Grah. in Wall. Cat. 5571.—Birma, Wallich, Griffith.

**Tropical region:** Sikkim, alt. 1–4000 ft. Western Peninsula, Ceylon, Birma, Pegu.—Distrib. Malay Isles, China, Philippines, N. Australia.

Annual, 4–2 ft. high, with copious slender firm terete branches clothed with short adpressed silky hairs. Leaves short-stalked, moderately firm, shortly silky, base subcuneate; stipules 0. Racemes usually terminal only, reaching \(\frac{1}{2}\)–1 ft. long; bracts and bracteoles subulate, very minute. Calyx \(\frac{1}{4}\)–\(\frac{1}{2}\) in. long, deeply bilabiately, densely shortly brown-silky; teeth of upper lip very short, of lower deep linear. Corolla pale yellow, glabrous, scarcely exerted. Pod 8–10-seeded, black when mature.


**Western Peninsula, in the Concan, Nilghiries, Pulney Mts.**

A low undershrub with numerous stiff terete erecto-patent branches, clothed with short grey silky hairs. Leaves firm, \(\frac{1}{4}\)–\(\frac{1}{2}\) in., cuneate in lower half, redute or emarginated at apex, glabrescent above, thinly silky below; stipules 0. Racemes 6–12-flowered, \(\frac{1}{4}\)–\(\frac{1}{2}\) ft. long, usually distinctly stalked; bracts and bracteoles linear, very minute. Calyx \(\frac{1}{4}\)–\(\frac{1}{2}\) in. long, shortly velvety, lower teeth linear. Corolla pale yellow, glabrous, equalling the calyx. Pod sessile, glabrous, 9–12-seeded.

27. **C. occulta**, Grab. in Wall. Cat. 5300; suffruticose, shortly silky, leaves oblongate-oblong usually as acute, flowers in lax terminal racemes and often solitary from leafy nodes, calyx middle-sized shortly silky, teeth all long, upper broad rather obtuse, pod oblong included. Benth. in Hook. Lond. Journ. ii. 565. C. rhizophylla, Grab. in Wall. Cat. 5451.

**Khasia Mts. and Silhet, alt. 3–5000 ft.**

Stems 2–3 ft. high, annual?, simple or with few or many virgate ascending branches clothed with short adpressed silky hairs. Leaves firm, 2–3 in., subcuneate at base, glabrous above, glaucous and obscurely silky beneath; stipules setaceous very minute. Terminal racemes 6–20-flowered, \(\frac{1}{4}\)–\(\frac{1}{2}\) ft. long; bracts linear, minute. Calyx \(\frac{1}{4}\)–\(\frac{1}{2}\) in. deep, densely clothed with short brown silky hairs; upper teeth oblong-spathulate, \(\frac{1}{4}\)–\(\frac{1}{2}\) in. broad. Corolla glabrous, deep violet-blue, as long as the calyx. Pod glabrous, sessile, 10–15-seeded.

28. **C. calycina**, Schrank; DC. Prodr. ii. 129; annual, shortly silky, leaves linear or lanceolate acute or rather obtuse, flowers few in lax racemes and solitary from leafy nodes, calyx large densely clothed with long silky hairs, teeth all long, upper broad rather obtuse, pod linear-oblong included. C. stricta, Roxb. Fl. Ind. iii. 265 not of Roth. C. Roxburghiana, DC. Prodr. ii. 129. C. anthylloides, Don Prodr. 241; Wall. Cat. 5360 A. ex parte; W. & A. Prodr. 181; Delz. & Gibbs. Bomb. Fl. 54, not of Lam. C. linearis, Herb. Modr. in Wall. Cat. 5370. C. crinita, Grab. in Wall. Cat. 5408. C. salicifolia var.? Wall. Cat. 5359 B.

**Tropical region, from the Himalayas to Ceylon, ascending to 5,500 ft. in Kumaon.—Distrib.** Tropical Africa, Malay Isles, China, N. Australia.
Stems 1–2 ft. high, simple or with a few slender ascending branches clothed with short adpressed silky hairs. Leaves moderately firm, usually 2–4 in., but in the linear form 5–6 in., usually acute, glabrous above, obscurely silky beneath; stipules subulate, very minute, deciduous. Terminal racemes 2–12-flowered, rarely reaching ½ ft. long; bracts and bracteoles large, lanceolate. Calyx ½–1 in. long, persistently densely clothed with long brown silky hairs; lower teeth lanceolate-acuminate, upper oblanceolate, ½–½ in. broad. Corolla glabrous, pale yellow, shorter than the calyx. Pod sessile, glabrous, ½–½ in. long, 20–30-seeded.


Upper Punjab and along the base of the Himalayas to Assam, ascending to 5,500 ft. in Kumaon; Birma, Wallach; Pegu, McLelland.—Distrib. China, Philippines, Japan.

Stems 1–2 ft. high, simple or furnished with few or many ascending branches. Leaves moderately firm, narrowed to both ends, 2–6 in., glabrous above, thinly silky below; stipules setaceous, very minute. Flowers deflexed, 20–20 to a raceme, close; racemes reaching 6–9 in. long; bracts and bracteoles long, setaceous, persistent. Calyx ½–½ in. long, brown silky hairs long and dense, but not as much so as in *caryana*; teeth all acute, upper ½ in. broad. Corolla blue-white, glabrous, not exserted. Pod glabrous, sessile, 10–15-seeded.

30. **C. chinensis**, Linn.; *DC. Prodr.* ii. 130; annual, laxly silky, leaves linear or oblanceolate obtuse or subacute, flowers 3–6 densely capitulate all terminal, calyx middle-sized, teeth long upper lanceolate, pod oblong as long as calyx. *Benth. in Hook. Lond. Journ.* ii. 506 (not of Roxb.)

Upper Gangetic Plain, Concan, Malabar, Pegu, and Tenasserim.—Distrib. Sumatra, Philippines, China.

Stems 1–2 ft. high, usually with several stout ascending branches densely clothed with long brown silky hairs. Leaves moderately firm, sparsely silky, 1–2 in., pale below, base rather rounded; stipules 0. Calyx ½–½ in., densely laxly silky; lower teeth linear; bracts and bracteoles linear, persistent. Corolla glabrous, not exserted. Pod sessile, glabrous, 15–20-seeded.


Mysore, Heyne.

Stems quite woody, with rigid erecto-patent branches, densely clothed with short bright brown silky hairs. Leaves firm, 1–1½ in., densely silky on both sides, rounded at both ends; stipules subulate, very minute. Heads copious, round, terminal, usually with a leaf just beneath; bracts lanceolate, as long as calyx, persistent velvety. Calyx ½ in. long, densely persistently velvety. Corolla as long as calyx, densely silky on the outside. Pod sessile, glabrous, 10–12-seeded, much shorter than the calyx.


Stems 1-2 ft. high, simple or with many subpatent or arcuate-ascending branches. Leaves membranous, 2-3 inches, cuneate in lower third, thinly silky above, pale and densely silky beneath; stipules minute, setaceous. Heads round or oblong, mostly with a leaf just beneath; bracts and bracteoles large, persistent, ovate-acuminated. Calyx \( \frac{1}{4} \) in. deep; pubescence long, pale brown, silky, very dense; teeth linear or lanceolate. Corolla glabrous, as long as calyx. Pod sessile, glabrous, 6-8-seeded.

33. C. capitata, Benth. MSS.; shrubby, finely silky, leaves oblancoate-oblong subacute, flowers 6-20 in dense terminal heads, calyx middle-sized, teeth all long, upper broad subacute, pod oblong included.

Khasia Mts., 5-7000 ft, Hook. fil. and Thomson, Lobb, Simons.

Branches caespitose from a perennial rootstock, 1-1\( \frac{1}{2} \) ft. long, slender, suberect, mostly simple, clothed with short silky pubescence. Leaves firm, cuneate in the lower half, 1-1\( \frac{1}{2} \) in., green, glabrous above, densely shortly silky below; stipules 0. Heads round or oblong, 1-2 in long; bracts and bracteoles small, linear, persistent. Calyx \( \frac{1}{4} \) in. deep; the vestiture and shape of teeth as in C. sessiliflora. Corolla deep violet-blue, glabrous, as long as the calyx. Pod sessile, glabrous, not seen mature.

34. C. priestleyoides, Benth. MSS.; shrubby, laxly silky, leaves oblancoate-oblong subacute, flowers few in dense terminal heads, calyx middle-sized shaggy, teeth all long, upper lanceolate acute, pod oblong included.

Concan, Law, Stocks; Anamallays, Beddome.

A low undershrub with long ascending branches, densely clothed with moderately long brown silky hairs. Leaves firm, subsessile, \( \frac{1}{4}-1 \) in., glabrescent above, thinly shaggy beneath, base rather rounded; stipules 0. Heads 4-8-flowered; bracts lanceolate, acuminate, persistent as the calyx. Calyx \( \frac{1}{4}-\frac{1}{2} \) in. long, as densely shaggy as in C. calycina; upper teeth \( \frac{1}{8}-\frac{1}{4} \) in. broad, lower linear. Corolla glabrous, as long as the calyx. Pod sessile, glabrous, 10-15-seeded.

Sect. V. Glauces, Benth. Erect herbs or shrubs, glabrous throughout. Stipules 0 or very minute deciduous. Racemes terminal.


Concan, plains, Law, Dalzell.

Stems erect, slender 1-3 ft. high. Leaves membranous, pale, nearly sessile, varying from oblong obtuse to linear acute, reaching 4-6 in. Racemes laxly 6-15-flowered; pedicels cernuous finally \( \frac{1}{4}-\frac{1}{3} \) in. long. Calyx \( \frac{1}{4} \) in.; tube very short. Corolla yellow, twice the calyx; standard ovate, conspicuously veined. Pod 1-1\( \frac{1}{2} \) in. long; gynophore finally equalling calyx.


Ava; mount Taong Dong, Wallich.

A shrub with slender terete branches. Leaves membranous, pale, nearly sessile, lanceolate, rather rounded at the base, subobtuse, 3-4 in. Racemes laxly 12-20-flowered, reaching half a foot long; pedicels slender, as long as calyx. Calyx \( \frac{1}{2} \) in. long; tube campanulate. Corolla nearly twice the calyx; standard orbicular, obtuse. Ovary linear, silky. Pod unknown.

Nîlghîris, at about 4000 ft. elevation, Wight, Beddome.

General habit of C. peduncularis. Leaves narrow-linear, short-stalked, reaching 5–6 in. Raceme laxly 12–20-flowered, finally a foot long; lower pedicels \( \frac{3}{4} \)–1 in. long; bracts reflexed, shorter than the pedicels. Calyx \( \frac{3}{4} \) in.; teeth one-third the tube. Corolla smaller than in the last; standard the same shape and colour. Pod 1\( \frac{1}{2} \)–2 in. long; gynophore finally exceeding the calyx.

Sect. VI. Erectae, Benth. Erect herbs or shrubs, the foliage more or less silky or pubescent. Stipules 0, or small, not decurrent. Racemes rarely other than terminal. Pods glabrous, several times longer than the calyx.


Tropical region; Himalayas to Ceylon and Malacca, but often cultivated. Distirn. China, Malaya, N. Australia, Trop. Africa and America, in both the last doubtfully wild.

A robust undershrub 3–4 ft. high, with stout striated branches. Leaves short stalked, oblaneeolate-oblong, moderately firm, cuneate at the base, 1\( \frac{1}{4} \)–3 in. Racemes laxly 12–20-flowered; pedicels shorter than calyx. Calyx \( \frac{3}{4} \)–1 in.; teeth lanceolate, twice campanulate tube. Corolla nearly twice calyx, yellow tinged with purple. Pod linear-oblong, 1–1\( \frac{1}{2} \) in. long, distinctly stalked, 15–20-seeded.


Tropical region; through India proper, ascending to 3000 ft. in Kumaon.

Malacca, Griffith. Pegu, McClelland.

Habit and branches of C. retusa. Leaves oblaneeolate-oblong, moderately firm in texture, 3–6 in., cuneate at the base. Racemes laxer, 20–40-flowered, often a foot long; bracts persistent, reflexed; pedicels exceeding calyx. Calyx \( \frac{3}{4} \) in.; teeth lanceolate, twice campanulate tube. Corolla half as long again as calyx, generally purplish. Pod 1–2 in. long, distinctly stalked, \( \frac{3}{4} \)–\( \frac{5}{7} \) in. broad.

40. C. assamica, Benth. in Hook. Lond. Journ. ii. 481; branches and calyx silky, stipules minute subulate, leaves acute glabrous above finely silky below, bracts linear-lanceolate minute, corolla much exserted. C. Burmannii, DC. Prodr. ii. 126? C. sericea, Burm. Fl. Ind. t. 48, fig. 1?

Khasia Mts., alt. 3–4000 ft., Hook. fl. & Thomson, Lobb; Assam, Mrs. Mack.—Distrib. Philippines, Cuming, 1886.

General habit just that of the two preceding, to which it is allied closely. Leaves oblaneeolate-oblong, short-stalked, moderately firm, 2–4 in. long, cuneate at the base. Racemes laxly 20–30-flowered reaching a foot long; lower pedicels equalling calyx. Calyx \( \frac{1}{2} \)–\( \frac{3}{4} \) in.; teeth lanceolate, twice campanulate tube. Corolla \( \frac{1}{4} \) in. deep, golden-yellow. Pod 1\( \frac{1}{2} \)–2 in. long, distinctly stalked.


Pegu, Kurz, No. 1664.

Closely allied to C. assamica, from which it differs mainly in calyx and corolla, the
former being the same size, but cleft more deeply, with narrower teeth and the latter much smaller. Leaves rather more coriaceous, 3–4 in., narrowed from the middle to both ends, the adpressed brown pubescence of the underside coarser and less silky. Pod oblong, glabrous, distinctly stalked.


**Nilghiris** and highest Ghauts of Concans.

General habit of the three preceding, to which it is closely allied. Leaves oblancoelo-oblong, subcoriaceous, 3–4 in., cuneate at the base, clothed beneath with thick white silky pubescence. Racemes rather dense, 20–30-flowered, reaching ½ ft. long; bracts like those of *C. sericea* but smaller; lower pedicels as long as the calyx. Calyx ½ in.; teeth lanceolate, twice campanulate tube. Corolla yellow, ¼ in. deep. Pod distinctly stalked, linear-oblong, 1½ in. long.—A specimen from Ram Ghaut, Ritchie, perhaps distinct, has subulate bracts and leaves finely silky beneath.


**Nilghiris.**

Dwarfer and more branched than the four preceding, with woody stems densely clothed with grey or yellow-brown silky hairs. Leaves oblancoelo-oblong, 2–3 in. moderately firm, short-stalked, cuneate at the base. Racemes very dense, 1–2 in., long; pedicels ½–¾ in., densely silky. Calyx shaggy, ⅔ in.; teeth deep, lanceolate-deltoid. Pod oblong, 1½–1¾ in. long, distinctly stalked.


**Nilghiris;** Travancor, ascending to 6000 feet, Beddome.

Sparingly branched. Branches woody, clothed with ascending dark brown silky hairs. Leaves like those of *C. sericea* in shape and size, moderately firm, short-stalked, cuneate at the base. Racemes finally half a foot long; pedicels ½–¾ in., densely silky, not bracteolate at the middle. Calyx ¾ in., deeply bilabiate, densely shaggy with dark brown silky hairs; teeth of lower lip linear, equalling limb. Corolla scarce exserted. Pod 1½ in. long by half as broad, 15–20-seeded.


**Nilghiris.**

A stiff undershrub with a straight woody stem, copiously paniculately branched. Branches densely clothed with short ferruginous silky hairs. Leaves coriaceous, short-stalked, more or less rounded at base, vestiture thin and shining, lower 3–4 in. Flowers 3–4, close together near the top of numerous rigid branches; bracts copious, reflexed, foliaceous. Calyx ½ in., densely clothed with brown silky hairs, deeply bilabiate; lower teeth reaching half way down. Corolla ¾–⅞ in.; standard silky on the back. Pod linear-oblong, 1–1½ in. long, 10–12-seeded, narrowed into a long gynophore.—Except for the glabrous pod, its affinity is with *C. madurensis*. 
46. **C. penguana**, Benth. MSS.; shrubby, stipules 0, leaves oblong-lanceolate both sides obscurely silky, racemes prolonged into the axils of numerous leaves, bracts subulate very minute, pod sessile.

**Pegu**; near Rangoon, Mc Clelland.

Branches slender, terete, finely puberulent or glabrescent. **Leaves** nearly sessile, 3–4 in., narrowed to both ends, firm and thinly silky on both sides in exposure, but membranous and glabrous above in a shade form; lower pedicels as long as the calyx. **Flowers** beside the lax terminal racemes springing solitary or in pairs from many of the leaf-bearing nodes. **Calyx** 3/₈ in.; teeth long, linear-lanceolate. **Corolla** scarcely exserted. **Pod** cylindrical, 3/₄ in. long, 10–12-seeded.

47. **C. salicifolia**, Heyne in Wall. Cat. 5359 A.; herbaceous, stipules 0, leaves oblong or lanceolate acute both sides shortly silky, racemes long-stalked simple few-flowered, bracts minute lanceolate, pedicels as long as calyx, pod stalked. **W. & A. Prodr. 182; Benth. in Hook. Lond. Journ. ii. 482.**

Western Peninsula, Heyne.

**Stem** stiff, sparingly branched, densely clothed with short ascending ferruginous silky hairs. **Leaves** ceasing a space below the inflorescence, lower oblong or oblanceolate-oblong, upper linear-lanceolate reaching 3–4 in., both sides clothed with hairs like those of the stem. **Flowers** near the end of long branches. **Calyx** 3/₄ in. deep, densely coated with bright brown velvety hairs; teeth linear, all very long. **Corolla** bright yellow, not exserted. **Pod** 1 ½–2 in. long, half as broad.


Western Peninsula; Anamallay and Pulney Mts., alt. 3–4000 ft., Beddome.

A shrub 12–15 feet high, with the habit, stipules and inflorescence of *C. semperflorens*. **Branches** stout, densely clothed with short brown pubescence. **Leaves** distinctly stalked, membranous, very large, green and glabrous above, thinly matted beneath. **Calyx** 1 ½–2 in. long, densely silky; teeth linear-lanceolate, twice the tube. **Corolla** yellow, much exerted. **Pod** (Beddome) oblong, 1 ½–1 3/₄ in. long.

**Sect. VII.** Eriocarpae, Benth. Erect shrubs, the foliage more or less silky, or pubescent. **Leaves** simple, stipules not decurrent. **Racemes** terminal only or both terminal and lateral, in one group copiously panicked. **Pods** silky or velvety, many or few-seeded exerted or included.

*Flowers racemosed.*


**Tropical region; Himalayas to Ceylon** (reaching 2000 ft. in Sikkim); **Birma, Wallach; Prow, McLelland; Malacca, Griffith.**—**Distr.** China, Malaya, Trop. Africa, Mauritis, Trop. America.

Copiously branched, scarcely shrubby, 2–3 feet high. **Branches** at first puberulent, soon glabrescent. **Leaves** thin, obscurely downy beneath, reaching 4–6 in., casually acute. **Racemes** moderately close, 12–20-flowered, ½ foot or more long; bracts linear, very minute; pedicels equalling or shorter than calyx. **Calyx** 1 ½ in., obscurely
downy; teeth lanceolate, twice tube. Corolla twice calyx, yellow, white and blue. Pod finely pubescent, 1-1 1/2 in. long, 10-12-seeded.


TROPICAL REGION; Nilgiris.—DISTRIB. JAVA.

More shrubby than C. verrucosa. Branches sulcate and puberulent when young, soon glabrescent and terete. Leaves 2-4 in., moderately firm, green and glabrous above, pale and shortly downy below, distinctly petiolate. Inflorrescence like that of C. verrucosa; bracts minute, subulate; pedicels 1/4-1 in., finely downy. Calyx 3/4-1 in., more or less densely puberulent; teeth linear, twice the campylate tube. Corolla 1/4-1/2 in., bright yellow. Pod 1 1/2-2 in. long, finely downy, 10-12-seeded.


WESTERN PENINSULA; MYSORE, TRAVANCOR, AND CANARA.

General habit of C. semperflorens, of which it is most likely a mere variety. Branches woody, slender, soon glabrescent. Leaves membranous, distinctly petioled, 3-4 in., narrowed at both ends, hardly at all puberulent; stipules smaller. Inflorrescence and bracts identical; pedicels 1/4-1 in., slender, faintly puberulent. Calyx 3/4 in.; teeth lanceolate, very deep. Corolla slightly exserted. Pod 1 1/2-1 1/2 in. long, clothed with deciduous fine pubescence, 10-12-seeded.

52. C. leptostachya, Benth. in Hook. Lond. Journ. ii. 582; branches angular, stipules 0 or minute subulate, leaves lanceolate acuminate, racemes lateral and terminal not panicked, pod oblong sessile densely velvety 2-3 times the calyx.

WESTERN PENINSULA; COCHIN, JACQUEMONT, STOCKS, LAW.

A stiff erect shrub with the habit and slender sulcate thinly silky branches of C. junccea and tetragonorum. Leaves 4-6 in., membranous, green, thinly clothed on both sides with shining brown silky hairs, rather rounded at the base. Racemes laxly 12-20-flowered, reaching 1 1/2 ft. long; bracts lanceolate very minute. Calyx 1/4 in., densely silky; teeth linear, very deep. Corolla yellow, not exserted. Pod 5-6-seeded, 3/4-4 in. long.

53. C. tetragonorum, Roxb. Fl. Ind. iii. 263; branches angular, stipules 0 or minute subulate, leaves large linear or lanceolate acuminate, racemes lateral and terminal not panicked, pod linear-oblong short-stalked rarely 2-3 times the calyx. Andr. Bot. Rep. t. 595; DC. Prodr. ii. 128; Wall. Cat. 5367, A-C; W. & A. Prodr. 185. C. grandiflora, Zolling. in Miq. Flor. Ind. Bat. i. 333.

KUMAON (up to 3500 ft.), and along the Himalayas to SIKKIM AND ASSAM. PEGU, McCLELLAND.—DISTRIB. JAVA.

A stiff shrub, reaching 6 ft. high, with sulcate thinly silky slender erecto-patent branches. Leaves short-stalked, distant, membranous, both sides thinly silky or glabrescent, reaching 1 1/2 ft. Racemes laxly 6-10-flowered, half a foot or more long;
bracts minute, linear. Calyx $\frac{3}{4}$-1 in. long, densely brown-velvety; teeth very long, linear or lanceolate, acuminate. Corolla lemon-yellow, glabrous, little exserted. Pod $\frac{1}{2}$-2 in. long, densely persistently dark-brown and velvety, 12-20-seeded.


Plains from the Himalayas to Ceylon, but often planted for its fibre. Birma, Wallich; Pers, McLeod—Distr. Malay isles, Australia.

A stiff shrub several feet high, with slender virgate rigid thinly silky branches. Leaves rather distant, firm, linear or oblong, usually $\frac{3}{4}$-3 in., shining on both sides with thin short brown silky hairs. Racemes loosely 12-20-flowered, reaching a foot long; bracts minute, linear. Calyx $\frac{3}{4}$-1 in. long, densely clothed with ferruginous velvety hairs; teeth linear-lanceolate, very deep. Corolla bright yellow, glabrous, slightly exserted. Pod 1-1$\frac{1}{2}$ in. long, clothed with short-spreading persistent silky hairs, 10-15-seeded. Yields Sun fibre.

55. C. obtecta, Grab. in Wall. Cat. 5372; branches terete, stipules 0 or minute deciduous, leaves oblong obtuse, racemes terminal and lateral not panicled, pod stalked densely velvety twice the calyx. W. & A. Prodr. 185; Fl. t. 208 and 383. C. tetragona, Wall. Cat. 5367 D.

Western Peninsula; Nilghiris and Cochin.

A tall shrub, with curved woody branches densely clothed with short brown silky hairs. Leaves short-stalked, coriaceous, 2-4 in., both sides more or less silky. Racemes rather close, 12-20-flowered; bracts minute, lanceolate. Calyx $\frac{3}{4}$-1 in., densely velvety, deeply bilabiate; teeth linear. Corolla slightly exserted; standard silky on the back. Pod 1$\frac{1}{2}$-2 in. long, 10-12-seeded, densely coated with dark brown velvety pubescence.

Var. 1. glabrescens; branches and leaves glabrescent. C. glabrescens, Benth. in Hook. Lond. Journ. ii. 563.—Carnatic, near Courtallum, Wight.

**Flowers panicked.


Nilghiris and Madura hills, in the Carnatic.

A stiff erect undershrub, copiously paniculately branched. Branches clothed with short dense brown silky hairs. Leaves short-petioled, obtuse, subcoriaceous, broadly rounded at base, 2-4 in., clothed on both sides with fine very short shining silky hairs. Bracts fewer and more deciduous than in other panicled Eriocarpe. Calyx $\frac{1}{2}$ in. deep, densely silky, deeply bilabiate; teeth narrow, acuminate, two upper lanceolate. Corolla $\frac{1}{2}$ in.; standard rather pointed, densely silky on the back. Pod short-stalked, nearly glabrescent, 10-12-seeded, 1 in. long.

57. C. subperfoliata, Wight in Wall. Cat. 5377; leaves oblong acute closely silky, stipules 0, racemes panicled, bracts round spreading persistent,
calyx-teeth narrow, corolla twice calyx, pod many-seeded much exsертed. 

*C. pulcherrima*, Roxb. *Fl. Ind.* iii. 267; leaves oblongate-closely silky, stipules 0 or minute subulate, racemes panicked, bracts ovate-cuspidate, calyx-teeth broad foliaceous, corolla slightly exserted, pod oblong 2-seeded included. 


80. *C. pulchra*, Roxb. *Fl. Ind.* iii. 267; leaves oblongate-closely silky, stipules 0 or minute subulate, racemes panicked, bracts ovate-cuspidate, calyx-teeth broad foliaceous, corolla slightly exserted, pod oblong 2-seeded included. 


59. *C. pulcherrima*, Roxb. *Fl. Ind.* iii. 267; leaves oblongate-closely silky, stipules 0, racemes panicked, bracts copious ovate-acuminate reflexed, upper calyx-teeth broad foliaceous, corolla scarcely exserted, pod oblong included 5–6-seeded. 


60. *C. pulcherrima*, Roxb. *Fl. Ind.* iii. 267; leaves oblongate-closely silky, stipules 0, racemes panicked, bracts copious ovate-acuminate reflexed, upper calyx-teeth broad foliaceous, corolla scarcely exserted, pod oblong included 5–6-seeded. 


60. *C. pulchella*, Heyne in *Wall. Cat.* 5378; leaves oblongate-closely silky, stipules small obtuse, racemes panicked, bracts copious persistent like the stipules, calyx-teeth narrow, corolla twice the calyx, pod oblong 1-seeded scarcely exserted. 


Tanjore, in the Carnatic; Ceylon. 

A stiff erect shrub 3–4 ft. high, copiously paniculate-branched. Leaves nearly sessile, subcoriaceous, obtuse or subacute, cuneate at the base, 3–4 in. long, shining on both sides with dense short close brown silky hairs. Flowers few, near the top of the branches; bracts numerous, large, reflexed, persistent; pedicles short, densely silky. Calyx 2–3 in. long; upper segments oblong, lower lanceolate; standard silky on the back. Pod oblong, bright brown, sessile, as long as the calyx.

61. *C. ramosissima*, Roxb. *Fl. Ind.* iii. 268; leaves small oblongate-closely silky, stipules 0, racemes panicked, bracts lanceolate persistent, calyx-teeth narrow, corolla little exserted, pod 1-seeded scarcely exserted. 

W. & A.

**Western Peninsula, Rottler, Hayne; interior of Bengal, Roxburgh.**

Shrubby, erect, much branched. Stems a foot or less high, densely clothed, like the leaves, with thick silky brown hairs. Leaves crowded, sub sessile, sub obtuse, thick, cuneate at the base, 3–1 in. long. Branches densely pubescent, generally short. Bracts not abundant, small, falcate, silky on the back, black and viscosous on the face. Calyx 4 in. long; teeth long, linear, with reflexed edges. Corolla 3 in.; standard pointed, silky on the back. Pod sessile, as long as the calyx, oblong, densely silky.


**Carnatic, near Vellore.—Distr. Java.**

Shrubby, 2–3 feet high, with very numerous stiff ascending branches, clothed with loose brown silky hairs. Leaves 1–1 1/2 in. long, obtuse, loosely silky, cuneate at the base, nearly sessile; stipules just like the very copious bracts, conspicuous, falcate, with reflexed glandular margins. Branches short, with a few flowers near the end. Calyx 3/4 in.; teeth long, silky on the back, lanceolate or linear with recurved viscosous edges like the bracts and bracteoles. Corolla 1 1/2 in.; standard very silky on the back. Pod oblong, sessile, finely silky.


Tropical region, from the West Himalayas to Ceylon and Birma, ascending to 6000 ft. in Kashmir.—Distr. Malay isles, British India, China and Australia.

A diffuse perennial, with slender much-branched stems, 1 1/2 – 1 ft. long, thinly silky upwards. Stipules setaceous, very minute, deciduous; leaflets 1 1/4 in. long, retuse at the base, glabrous above, obscurely silky below. Racemes copious, terminal and leaf-opposed; peduncles exceeding the leaves; bracts minute, linear. Calyx thinly silky, campanulate, 1/4 in. deep; 5th linear, exceeding the tube. Corolla yellow. Pod 1/4 in. long, glabrous.

**Var. 1. herniarioides**; stems prostrate very slender, leaflets very small nearly or quite as broad as long, peduncles short 1–3 flowered. C. herniarioides, W. & A. Prodr. 192.

**Var. 2. neglecta**; branches more robust and more ascending than in the type, racemes 6–9 flowered, leaflets rather larger. C. neglecta, W. & A. Prodr. 192. C. procumbens, Roxb. & Wall. ex parte.


64. **C. Willdenoviana**, DC. Prodr. ii. 134; herbaceous or suffruticose, vol. ii.

**Western Peninsula.**

Perennial, reaching 2-3 ft. high, with very numerous ascending elongated branches. **Stipules** small, setaceous, persistent; leaflets ⅙-⅓ in. long, firm, obtuse, emarginate, silky on both sides. **Racemes** copious, terminal and lateral; bracts minute, linear-setaceous, persistent. **Calyx** ⅛ in. long, finely downy; teeth linear, extending the tube. **Corolla** yellow; keel with a narrower and longer beak than in the last. **Pod** pubescent, ⅛ in. long.


**Assam and Western Peninsula.**

An erect perennial 2-3 ft. high, with numerous erecto-patent slender branches. **Petioles** an inch or more; stipules minute, setaceous; leaflets membranous, ⅛-⅓ in. long, glabrous above, obscurely silky below, obtuse at the point, often deeply emarginate. **Racemes** copious, both terminal and lateral, short-peduncled, reaching 4-6 in. long; bracts minute, setaceous. **Calyx** ⅛ in. long, finely silky; teeth linear, twice the length of the tube. **Corolla** yellow, glabrous. **Pod** subquad rangular, sessile, thinly silky, ⅛ in. long.


**Nilgiris and Pulney Mountains.**

Branches firm, ascending, terete, clothed with minute grey silky hairs. **Stipules** setaceous, persistent, ⅛ in.; petioles shorter than the leaflets; leaflets cuneate in the lower half, reaching 1-1 ¼ in. long, green and glabrous above, thinly silky below. **Racemes** copious, short-peduncled lateral and terminal, 1-3 in. long; bracts small, setaceous. **Calyx** thinly silky, ⅛ in. long; teeth lanceolate, equalling the tube. **Corolla** yellow; keel with a very long beak. **Pod** ⅛ in. long, subquad rangular, thinly silky.

67. **C. rigida**, Heyne; DC. Prodr. ii. 133; shrubby, branchlets short stiff obscurely silky, leaflets minute obcordate, racemes 2-6-flowered, corolla 2-3 times the calyx. W. & A. Prodr. 191.

**Carnatic.** Heyne, G. Thomson.

A low shrub with very numerous woody subpatent branches, the old ones glabrescent, the copious branchlets almost spiny in old plants. **Stipules** setaceous, very minute; petiole very short; leaflets pale green, thick, obscurely silky, not more than ⅛ in. long. **Racemes** copious, close, all terminal; bracts linear, very minute. **Calyx** ⅛ in. long, thinly silky; teeth lanceolate, equalling the tube. **Corolla** yellow, glabrous; beak of keel long and narrow. **Pod** ⅛ in. long, thinly silky.

**Group 9. Trifoliatae Polyspermeae.** Leaves 3-foliate. **Pod** oblong or cylindrical, stalked or sessile, glabrous or pubescent, many-seeded. Herbs or shrubs.

Plains throughout the \textbf{Western Peninsula}.—\textit{Distrib.} Abyssiniana.

\textit{Perennnial}, with spreading slender copiously-branched stems, 1–1 ½ ft. long, clothed with short spreading brown hairs, which are bulbous at the base. \textit{Stipules} linear, persistent; petiole ½ to 1 in.; leaflets 1–1 ½ in. long, moderately firm, glabrous above, thinly clothed with long hairs below. Lateral \textit{racemes} numerous, 3–12-flowered; bracts large, ovate-acuminate, reflexed; pedicels filiform, 3–4 times the calyx. \textit{Calyx} ½ in. long; teeth linear, long. \textit{Pod} ½ to 1 in. long, 8–10-seeded, with a stalk as long as the calyx.—The only representative of the \textit{Diffuseae} in the trifoliolate series.


Plains of the \textbf{Western Peninsula}.

A small shrub, with long slender terete erecto-patent branches, finely downy or glabrescent. \textit{Stipules} minute, setaceous, deciduous; petiole as long as leaves; leaflets ½–1½ in. long, green and glabrous above, pale and obscurely silky below. \textit{Racemes} subcorbolybate at the end of copious branchlets; pedicels cermous, bracteolate, thinly silky. \textit{Calyx} ½ in. deep, thinly silky; teeth lanceolate, as long as the tube. \textit{Corolla} yellow, ½ to 3 in.; keel with a very long beak. \textit{Pod} ½ to 1 in. long, 8–10-seeded, with a stalk as long as the calyx.


An \textit{undershrub}, 2–4 ft. high, with robust terete branches, the whole plant, including calyx and pod, clothed with fine spreading brown silky hairs. \textit{Stipules} setaceous, minute; leaflets 1½–2 in. long, very obtuse, cuneate in the lower half, membranous. \textit{Racemes} closely 12–20-flowered, reaching 6–9 in. long. \textit{Calyx} ¼ in. deep; teeth long, lanceolate. \textit{Pods} deflexed, rather recurved, 1½–1 in. long, 20–30-seeded.


\textbf{Carnatic}; Dindigul hills, \textit{Wight}.

A \textit{low shrub} with arculate ascending terete glabrescent branches. \textit{Stipules} setaceous, very minute; petiole shorter than the leaflets; leaflets thick, rather fleshy, obtuse, cuneate in the lower half, pale, subglabrous. \textit{Racemes} 20–30-flowered, short-peduncled, reaching ½ ft. long. \textit{Calyx} campanulate, thinly silky, ¼ to ½ in. long; teeth lanceolate, as long as the tube. \textit{Corolla} yellow, glabrous, ½ in. long. \textit{Pod} deflexed, rather recurved, 10–12-seeded.

72. \textit{C. bracteata}, Roxb. \textit{Fl. Ind.} iii. 378: shrubby, obscurely downy, leaflets large oblong acute, racemes terminal and lateral elongated, bracts minute

A low shrub with elongated flexuoso slender finely downy or glabrescent branches. *Stipules* setaceous, very minute; petiole 2–3 in.; leaflets membranous, narrowed to both ends, 2–4 in. long, glabrous above, obscurely silky below. *Racemes* short-peduncled, closely 12–30-flowered. Calyx 1/3 in. long, finely silky; teeth lanceolate, as long as tube. *Corolla* pale yellow, 3/4–1 in. long. Pods deflexed, rather recurved, hard, 8–10-seeded, densely clothed with spreading pale brown hairs.


HIMALAYAS to CEYLON and MALACCA.—Distr. Malay isles and spread through Tropical America and Africa.
An erect low shrub 2–4 ft. high, with robust sulcate thinly silky branches. *Stipules* minute, setaceous, deciduous; petiole 2–3 in.; leaflets membranous, 3–4 in. long, usually subobtuso, green and glabrous above, pale and obscurely silky below. *Racemes* 20–50-flowered, reaching 1/2–1 ft. long. Calyx 1/4 in. long, thinly silky; teeth lanceolate, as long as the tube. *Corolla* glabrous, yellow striped with red. Pods deflexed, rather recurved, 1 1/2–2 in. long, 20–30-seeded.


WESTERN PENINSULA, CEYLON, MALACCA.—Distr. Philippines and Malay isles.
A low shrub with slender elongated terete branches. *Stipules* 0; petiole 2–3 in.; leaflets membranous, glabrous, 1–5 in. long, cuneate at the base. *Racemes* terminal and lateral, 3/4–1 ft. long; pedicels exceeding the calyx. Calyx glabrous, turbinate, 1/2–3/4 in. long; teeth lanceolate, as long as the tube. *Corolla* bright yellow, glabrous, 1 in. deep; keel very broad with a long incurved beak. *Pod* 1 1/2–2 in. long, 20–30-seeded; gynophore filiform, 3/4–1 in. long, much exceeding that of any other species.

**Group 10. Multifoliate.** Leaves usually 5–, but varying from 3– to 7-foliolate. *Pod* glabrous, oblong or linear-oblong, distinctly stalked, many-seeded. Herbs or under-shrubs.


An erect annular 2–4 ft. high, with robust straight sulcate branches. *Stipules* linear, subpersistent; petioles 1–3 in.; leaflets usually 5, rarely 3, linear, rarely narrow ob lanceolate, 2–1 in. long, obtuse, glabrous above. *Racemes* usually terminal,
laxly 10-20-flowered, reaching \(\frac{3}{4}\) ft. long; bracts persistent, as long as the pedicels. *Calyx* campanulate, subglabrous, \(\frac{3}{4}\) in. long; teeth lanceolate, as long as the tube. *Corolla* glabrous, twice the calyx. *Pod* oblong, glabrous, distinctly stalked, \(1\frac{1}{4}-2\) in. by \(\frac{3}{4}-1\) in., 30-40-seeded.—*C. heterophylla*, L. DC. Prodr. ii. 131, is a trifoliolate form.

76. **C. Grahamiana**, W. & A. Prodr. 194; shrubby, branches and leaves below densely clothed with adpressed silky hairs, leaflets oblanceolate, bracts linear thinly silvery, lower pedicels as long as the calyx. *C. digitata*, *Wight in Wall. Cat*. 5430, *non Hook*.

**Carnatic**: Pulney hills at 4000 ft.

Branches firm, elongated, angular, persistently silky. *Stipules* linear, reflexed, persistent; petiole reaching 3-4 in., silky like the branches; leaflets thicker than in *C. quinquefolia*, 2-3 in. long, often 7, glabrous above, obtuse. *Racemes* closely 12-30-flowered, \(\frac{1}{4}-\frac{1}{2}\) ft.; bracts \(\frac{1}{4}-\frac{3}{4}\) in., acuminate, reflexed, persistent. *Calyx* just like that of *C. quinquefolia*. *Corolla* yellow, glabrous, half as long again as the calyx. *Pod* linear-oblong, \(1\frac{1}{4}-2\) in. long, distinctly stalked.


**Carnatic**: Madura hills, *Wight*.

A low shrub; the whole plant, except calyx and corolla, clothed with loose soft pale brown velvety tomentum. *Stipules* \(\frac{1}{2}\) in. long, linear-spatulate, reflexed, persistent; petiole 2-3 in.; leaflets 3-5, thick and soft, cuneate in the lower half, very obtuse, the end one reaching 2\(\frac{1}{4}\)-3 in. long, \(\frac{3}{4}-1\) in. broad, the outermost sometimes unequal-sided. *Racemes* terminal and lateral, short-pediculed, closely 12-20-flowered; bracts lanceolate acuminate, densely velvety, patent, persistent. *Calyx* glabrous, \(\frac{3}{4}-\frac{3}{4}\) in. long; teeth lanceolate, as long as the tube. *Corolla* yellow, glabrous, 1 in. long. *Pod* linear-oblong, 2-2\(\frac{1}{2}\) in. long.

**C. elliptica**, Roxb. in *Wall. Cat*. 5433 (*C. Vachellii, H. & A.*), and *C. VASCULOSA*, *Grah. in Wall. Cat*. 5427, have no claim to rank as Indian species, having been introduced to the Calcutta Garden, the former from China, and the latter from Mauritius.

9. **ONONIS**, Linn.

Undershrubs or herbs, often viscid. *Leaves* with pinnately 3-foliolate toothed leaflets. *Calyx*-tube campanulate; teeth long, subequal. *Petals* clawed; standard roundish; wings obovate-oblong; keel incurved, acute. *Stamens* monadelphous, the alternate filaments dilated at the apex; anthers dimorphous. *Ovary* in our plant subsessile, few-ovuled; style filiform, abruptly incurved, stigma minute oblique. *Pod* oblong, turgid, continuous within.—Distr. Species 60, mainly Mediterranean and European.


**Temperate West Himalaya; Tibet and Kashmir**, alt. 5-7000 ft.—Distr. Orient, West Siberia, Europe. An undershrub, with ascending unarmed pubescent stems. *Stipules* large, leafy, adnate to the short petioles; leaflets oblong, obtuse. *Flowers* reddish, in pairs at the axils of the leaves, forming a close leafy raceme at the end of the branches. *Calyx* \(\frac{3}{4}\) in.; teeth linear, exceeding the tube. *Pod* oblong, downy, not exserted, 2-3-seeded.
10. **TRIFOLIUM**, Linn.

Annual or perennial herbs. **Leaves** with stipules adnate to the petiole and digitately 3-foliolate leaflets. **Flowers** small, copious, in dense axillary heads. Calyx: tube turbinate; teeth mostly 5 subequal. Corolla adnate to the staminal tube, and fading without falling; standard and wings narrow; keel straight, obtuse. Stamina diadelphous; filaments more or less dilated; anthers uniform. Ovary sessile or stalked, few-ovuled; style filiform, incurved above the base; stigma oblique. Pod minute, included, membranous, indehiscent, 1 or few-seeded.—Distrib. Species perhaps 200, mostly European and Oriental, many N. American and Trop. African.

T. *minus*, Smith, is included in Hohenacker's Neilgherry plants, no doubt from introduced specimens.

T. *resupinatum*, Linn., is largely cultivated in Afghanistan, Hazara and Khagan, in the subtropical zone.


Kashmir to Garwhal, 4–8000 ft.—Distrib. Afghanistan, Siberia, Orient, Europe. Perennial; stems a foot or more high, slightly downy. Stipules very broad; leaflets oblong; toothed obscure. Heads roundish; flowers very dense, usually red. Calyx pubescent; teeth setaceous, the lowest longer than the rest, exceeding the tube. Pod 1-seeded, opening by a lid.—One of the common forage clovers.


Temperate and Alpine Himalaya, ascending to 20,000 ft.; Nilghiris and Ceylon, perhaps introduced.—Distrib. Through Europe and Asia, also North America.

Stems slender, glabrous, wide-creeping. Stipules narrow; petioles and peduncles long, ascending; leaflets obovate emarginate, distinctly toothed. Heads globose, not dense; flowers finally deflexed. Calyx glabrous; teeth subequal, shorter than the tube. Corolla white or with a pink tinge. Pod minute, linear, 3–4-seeded.—Commonly cultivated.


Habit of *T. repens*, for which it is easily passed over in flower. Stipules lanceolate, with cuspidate points; petioles and peduncles elongated; leaflets less distinctly toothed. Corolla a deeper pink. Calyx in fruit becoming an ovoid membranous persistent bladder, enclosing the small 1–2-seeded pod.

11. **PAROCHETUS**, Hamilt.

A slender creeping herb. **Leaves** 3-foliolate. **Flowers** on axillary peduncles. Calyx: tube campanulate; two upper teeth subconnate. Corolla free from staminal tube; standard broad, obovate clawed; wings much shorter, obtuse; keel as long as the wings, incurved and subacute at the tip. Stamina diadelphous; filaments not dilated; anthers uniform. Ovary sessile, linear, ov-ovulate; style elongated, glabrous, suddenly incurved above the base, stigma terminal. Pod linear, turgid, continuous within. A single species.

Trigonella.]  
L. LEGUMINOSE.  (J. G. Baker.)

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Alpine, Temperate and Subtropical Himalaya from Simla and Garwhal to Assam, alt. 4-13,000 ft. Nilgiris, Ceylon, Burma, Wallich; Tenasserim, Parish.—Distrib. Java, Zambesi-land.

Rhizome thread-like, wide-creeping. Petiole long, filiform, bearing leaves like those of Oxalis Acetosella; leaflets subsessile, obovate, cuneate, emarginate, entire, glabrous or slightly pubescent. Peduncles overtopping the leaves, 1-2-flowered. Calyx $\frac{1}{2}$ in. deep; teeth lanceolate. Corolla $\frac{1}{4}-\frac{1}{3}$ in., purplish-white. Pod straight, glabrous, linear, $\frac{2}{3}-1$ in. long.

12. TRIGONELLA, Linn.

Annual herbs. Leaves pinnately 3-foliate, toothed. Flowers racemed, lemon-yellow. Calyx tube campanulate; teeth distinct, subequal. Petals free from the staminal tube; standard and wings narrow; keel shorter, obtuse. Stamens diadelphous; filaments not dilated; anthers uniform. Ovary sessile, many-ovuled; style glabrous; stigma terminal. Pod linear or linear-oblung, compressed or suberete, not spiral, usually exserted, many-seeded, continuous within.—Distrib. Species 50, mostly Mediterranean and Oriental. Many cultivated for forage.

* Pod short, turgid.

1. T. occulta, Delile; DC. Prodr. ii. 185; Boiss. Fl. Orient. ii. 84. T. arguta, Visiani Pl. Ægypt. 33, t. 8, fig. 1.

Plains of Scinde, Stocks; Upper Gangetic Plain, near Lucknow, Anderson.—Distrib. Egypt, Nubia.

Diffuse, densely cespitose, glabrous or subglabrous, annual, with slender stems a few in. long. Stipules deeply laciniated; petiole exceeding the sharply-toothed minute obovate cuneate leaflets. Flowers 2-4 together in copious sessile axillary clusters. Calyx $\frac{1}{3}$ in.; teeth linear-scatceous. Corolla slightly exserted. Pod elliptical, scarcely exserted, glabrous, usually 2-seeded.

** Pod long, turgid.


Kashmir, Punjab, Upper Gangetic Plain, £c.—Distrib. South Europe and Orient, widely cultivated.

Annual, robust, erect, subglabrous. Stipules not laciniated; leaflets toothed, $\frac{2}{3}-1$ in. long, obovate-oblung. Flowers 1-2, sessile in the axils of the leaves. Calyx $\frac{1}{2}-\frac{2}{3}$ in., teeth linear. Corolla much exserted. Pod 2-3 in. long, 10-20-seeded, with a long persistent beak, often falcate.


Punjab and Upper Gangetic Plain, ascending to 6000 ft.—Distrib. West Siberia, Orient, South Europe to Spain.

Annual, more slender, branched and diffuse than in the last. Stipules not laciniated; points scatceous; leaflets smaller, sharply inciso-dentate or even pinnatifid,


Included amongst Wallich's plants, with the habitat of Tikari (Hamilt.), but a doubtful native of India proper.—Distran. Afghanistan, Egypt, Nubia, Cape. Annual, glabrous. Stems cespitose, diffuse, 1 ft. or more long. Stipules broad, deeply cut; leaflets obovate-cuneate, shallowly toothed, ⅓–⅓ in. long; base deltoid, entire. Racemes close, equalling or falling short of the leaves, terminated by a spine. Calyx short-pedicelled, under ⅛ in. deep; teeth lanceolate, shorter than the tube. Corolla three times the calyx. Pod ⅓–⅓ in. long, much curved, 4–6-seeded.

*** Pod linear or linear-oblong flat.  

5. **T. gracilis**, Bentham in Royle Ill. 197; glabrous, peduncles 1–3-flowered, corolla distinctly exerted, pod linear straight 6–8-seeded.

**KASHMIR, KUMAON, GURWHAL, &c., alt. 5–7000 ft.**

Stems very slender, trailing, 1–1½ ft. long. Stipules linear, faintly toothed; petiole shorter than leaflets, often scarcely any; leaflets obovate-cuneate, ⅓–⅓ in. long, finely inciso-dentate, veins raised. Peduncles filiform, exceeding leaves, ending in a conspicuous awn. Calyx ⅛ in.; teeth setaceous, as long as the tube. Pod ⅔–⅔ in. by ⅗ in., marked with distinct rather close transverse veins.

6. **T. pubescens**, Edgew. MSS.; finely downy, peduncles 1–3-flowered, corolla slightly exerted, pod linear-oblong straight 10–12-seeded.

**HAZARA, KASHMIR, KUMAON, PITH, KUNAWAR, &c., alt. 5–10,000 ft.**

Stems more branched and stouter than in the last, reaching 1 ft. or more long. Stipules linear, faintly toothed; petiole shorter than the blade; leaflets obovate-oblong, cuneate at the base, distinctly inciso-dentate, ⅓–⅓ in. long. Peduncle as long as the leaves, not ending in an awn. Calyx ⅛ in., finely downy; teeth linear-setaceous, exceeding the tube. Pod downy at first, ⅞ in. by ⅓ in.; veins transverse, distinct, very close.


**KASHMIR to NIPAL, alt. 4–10,000 ft. — Distrib. Afghanistan, Persia, Orient.**

Habit and in florescence of *T. corniculata*, from which it mainly differs in pod. Stems glabrous, copiously branched, 1 ft. or more high. Stipules slightly inciso-dentate, points linear-setaceous; leaflets obovate, distinctly inciso-dentate in the wild form. Peduncles 1–2 in. long, terminated by a distinct point. Calyx glabrous, ⅓–⅓ in.; teeth linear, as long as the tube. Pod ⅓–⅓ in. by ⅜–⅜ in., glabrous, with close distinct raised veins.

BENGAL, KASHMIR and LADAK to KUMAOH, alt. 5-12,000 ft.—Distrib. Afghanistan, Orient, South Europe.

Diffuse, very much branched, glabrous, suberect, 1 ft. or more high. Stipules deeply or faintly toothed, points setaceous; petiole as long as or exceeding leaflets; leaflets obovate-ecuneate, faintly inciso-dentate, \( \frac{1}{3} \) in. long. Peduncles exceeding the leaves, armed at the tip. Calyx \( \frac{1}{3} \) in.; teeth shorter than the tube. Pod \( \frac{1}{2} \) in. by \( \frac{1}{4} \) in., glabrous, marked with close transverse raised veins.

13. MELILOTUS, Juss.

Annual or biennial herb. Leaves with toothed pinnately 3-foliolate leaflets. Flowers in long racemes. Calyx—tube campanulate; teeth 5, subequal, lanceolate. Corolla caducous, free from the staminal tube; standard and wings narrow; keel straight, obtuse. Stamens diadelphous, filaments not dilated; anthers uniform. Ovary sessile or stipitate, few-ovuled; style filiform, glabrous, much incurved, stigma terminal. Pod oblong, much exerted, indelhiscent.—Distrib. Species about a dozen; spread through the temperate regions of the Old World.


Western Peninsula, Bengal, North West Provinces, tropical zone.—Distrib. Orient, Europe, and introduced in many other regions.

Stems slender, 1-1½ ft. high. Stipules linear acuminate; leaflets obovate or oblanceolate, retuse or emarginate. Flowering-racemes close; fruiting-racemes 1-2 in. Calyx \( \frac{1}{3} \) in.; teeth deltoid. Corolla not more than \( \frac{1}{3} \) in. long. Pod \( \frac{1}{3} \) in., obscurely reticulato-lacunose, usually 1-seeded.—M. parviflora, Wall. 5943 D, is M. italic, Lam., only known in India in cultivation.


Northern Provinces, ascending from the plains of Bengal to 12-13,000 ft. in NUBRA, and 11,000 ft. in LADAK.—Distrib. Europe, Orient, Siberia, &c.

Much taller and more robust than the last. Stipules and leaflets similar. Racemes in flower 1½-2 in., in fruit 3-4 in. long. Calyx under \( \frac{1}{3} \) in.; teeth lanceolate, shorter than the tube. Corolla always white, inodorous, 2-3 times the length of the calyx in the temperate zone, nearly as small as in M. parviflora in the plains. Pod as in the last, but larger, often 2-seeded.


NUBRA and LADAK: 10-13,000 ft., Thomson, Stewart.—Distrib. Europe, Orient, &c.

Very like M. alba in general habit and identical in stipules and leaflets. Racemes denser, and not quite so long. Calyx \( \frac{1}{2} \) in.; teeth lanceolate, as long as the tube. Corolla linear, yellow, odorous, usually three times as long as the calyx. Pod distinctly stipitate, \( \frac{1}{2} \) in. long, 1-2-seeded, not so obtuse.

14. MEDICAGO, Linn.

Herbs, rarely shrubs. Leaves pinnately 3-foliolate; leaflets toothed. Calyx—tube campanulate; teeth 5, subequal. Corolla more or less exerted, free
from the staminal tube; standard and wings oblong; keel straight, obtuse. *Stamen* diadelphous; filaments filiform; anthers uniform. Ovary sessile, usually many-ovuled; style short, little incurved; stigma oblique. Ped usually spirally twisted, many-seeded, indehiscent, rarely sickle-shaped, in *M. lupulina* one-seeded.—Distrib. Species about 40; spread principally round the Mediterranean.

*M. sativa*, Linn.; Wall. Cat. 5945, A, B, probably a cultivated race of *M. falcata*, characterised by the pod forming a double spiral and flowers usually purple, is often grown for forage in Madras, Bengal, and the North-West Provinces.

* Suberect, perennial.


** Diffuse trailing annuals or biennials.**


Tropical and temperate tracts of the north-west, ascending from the Indus valley and Gangetic plain to 10–12,000 ft.—Distrib. Orient, Siberia, Europe, Abyssinia, often cultivated.

Stem 1 ft. or more long, finely downy. Stipules toothed; points lanceolate, acuminate; leaflets obovate, faintly inciso-crenate, base deltoid, entire. Flowers 12–20, densely capitate; peduncles exceeding the leaves. Calyx ½ in.; teeth setaceous, as long as the tube. Corolla slightly exserted. Pod ½ in. long, indehiscent, glabrous or downy, faintly veined longitudinally, finally black.


Kashmir; temperate region, Falconer.—Distrib. Orient, Mediterranean, Abyssinia.

Stems slender, subglabrous, a foot or more long. Stipules short, deeply lacinate; leaflets ½–3 in. long, obovate-cuneate, faintly inciso-dentate. Peduncles shorter than the leaves, 1–3-flowered. Calyx ½ in.; teeth linear-setaceous. Corolla yellow, much exserted. Pod ½–3 in. broad, with 4–6 flattened spirals, distantly finely transversely veined.


Punjab; tropical region, Fleming, Jacquemont, Aitchison.—Distrib. Orient, Mediterranean, Abyssinia.

Stems glabrous, very slender, reaching a foot long. Leaflets ½–3 in. long, obovate-cuneate, sharply inciso-dentate or even pinnatifid; petiole equaling or exceeding leaflets. Peduncles filiform, awned, 1–2-flowered. Calyx narrowly turbinate, ½ in.; teeth setaceous. Pod ½ in. broad with 4–5 sharply muricate spirals.

Tropical zone of the north-west: Scinde, Bengal, Oude, Punjab, Kumaon, &c.—Distr. Orient, Abyssinia, Europe, Japan, China, Siberia.

Stems subglabrous, more robust than in M. minima and laciniata. Leaflets \( \frac{1}{4} - \frac{3}{4} \) in. long, obovate-cuneate, faintly toothed. Peduncles short, closely 2-6-flowered, not awned. Calyx \( \frac{1}{2} \) in.; teeth lanceolate, as long as the tube. Pod with 2-4 spirals, the veined face \( \frac{3}{4} \) in. broad without the spines, which are \( \frac{3}{4} \) in. long in the type, but reduced down to mere tubercles in the var. M. apiculata, Willd.


Kashmir, alt. 5-6000 ft., D. Thomson.—Distr. Afghanistan, Orient, Mediterranean, Abyssinia, Europe.

Finitely downy, the stems under \( \frac{3}{4} \) ft. long. Petioles as long as the leaflets, which are obovate-cuneate, \( \frac{1}{4} \) in. long, distinctly toothed. Peduncles as long as the leaves, closely 2-5-flowered, not mucronate. Calyx \( \frac{1}{2} \) in., finely downy; teeth linear-setaceous, as long as the tube. Corolla distinctly exserted. Pod \( \frac{3}{4} \) in. broad, exclusive of the long spines, formed of 4-5 close spirals.

15. **LOTUS**, Linn.

Herbs. Leaves usually 5-foliate, the lowest pair of leaflets arising from the base of the petiole like stipules. Calyx tube campanulate, teeth subequal. Corolla caducous, free from the staminal tube; standard obovate clawed, exceeding the wings and incurred shortly beaked keel. Stamens diadelphous, filaments dilated at the apex; anthers uniform. Ovary sessile, many-ovuled; style long, abruptly inflexed, stigma terminal. Pod linear, turgid, separte between the seeds.—Distr. Species 50 or more, spread through North and South temperate regions.

L. major, Scop. is in Bellew’s Kashgar collection.


West Himalayas, as far east as Nipal, principally in the temperate zone up to 10,000 ft., but descending into the plains.—Distr. Europe, Orient, Abyssinia, Japan, Australia.

Perennial. Stems slender, glabrous or obscurely silky. Leaflets 5, the end one sessile and two lowest stipule like. Flowers 4-8 in a close umbel, subtended by a reduced trifoliate leaf, at the end of a long peduncle. Calyx \( \frac{1}{4} \) in.; teeth lanceolate-cuspidate. Corolla showy, 2-3 times as long as the calyx. Pod cylindrical, straight, \( \frac{3}{4}-1 \) in. long.

Var. minor; a dwarf form, from the plains of Scinde with solitary flowers and fleshy leaflets \( \frac{1}{2} \) in. long.


Scinde in sandy ground near the sea, Stocks.—Distr. Through Persia to Nubia.

Habit less like that of a Lotus than of an Ononis, to which genus it also approaches by its slightly dimorphous anthers. Stems \( \frac{3}{4} \) ft., copiously stiffly branched, covered like the leaves with short grey tomentum. Leaflets pale, fleshy, \( \frac{1}{4} \) in. long, obovate-cuneate. Flowers copious, inconspicuous. Calyx \( \frac{1}{4} \) in., densely downy; teeth linear, twice the tube. Corolla not exserted. Pod linear, straight, 5-6-seeded, \( \frac{3}{4}-\frac{1}{2} \) in. long.
16. **CYAMOPSIS, DC.**

Erect annuals, with 3-foliolate leaves, laterally attached hairs and small purplish flowers in axillary racemes. **Calyx**-tube oblique; teeth unequal, the lowest elongated, setaceous. **Petals** caducous: standard and wings narrow; keel obtuse, slightly incurved. **Stamens** monadelphous; anders uniform, apiculate. **Ovary** sessile, linear, 6–8-ovuled; style short, filiform, much incurved, stigma capitate. **Pod** linear, straight, subtetragonal, 2-valved, sepaite between the seeds.—**Distrib.** Species 2, the other Arabian and trop. African.


Plains from the HIMALAYA to the WESTERN PENINSULA, but often, perhaps always, cultivated.—**Distrib.** Dist. Afghanistan.

A robust, erect annual, 2–3 ft. high, clothed with adpressed grey hairs attached by the middle, as in Indigofera. **Stipules** long, linear-setaceous; leaves petioled, 3-foliolate; leaflets ovate, acute, inciso-dentate, 2–3 in. long. **Flowers** 6–30 in copious close short-peduncled axillary racemes; bracts setaceous, protruded. **Calyx** ½–1½ in. **Corolla** scarcely exserted. **Pod** thick, fleshy, straight, 1½–2 in. long.

17. **INDIGOFERA, Linn.**

Herbs or shrubs clothed more or less densely with adpressed hairs laterally attached, often silvery-canescens. **Flowers** in copious axillary racemes. **Calyx** minute, campanulate; teeth 5, subequal or the lowest longest. **Corolla** caducous; standard obovate; keel straight, not rostrate, spurred on each side near the base. **Stamens** diadelphous; anders uniform, apiculate. **Ovary** sessile, usually many-ovuled; style short incurved, stigma capitate usually penicillate. **Pod** usually linear-cylindrical, rarely oblong or globose, turgid, rarely flattish, in one section crescent-shaped, densely muriicated.—**Distrib.** Species 250–300, spread through all tropical regions and also abundant at the Cape.

**Subgen.** 1. **Acanthonotus**, Benth. **Pod** recurved, sickle-shaped, 1-seeded, muriated along the ventral suture.


Plains of Ceylon and the WESTERN PENINSULA.—**Distrib.** Guinea.

A diffuse much-branched annual with stems 1–2 ft. long. Leaves simple, narrowly sessile, broad-obovate, obtuse, mucronate, glabrescent, membranous, ½–¾ in. long; stipules linear-setaceous. **Racems** copious, short-peduncled, 6–10-flowered. **Calyx** ½ in.; teeth setaceous, very long. **Corolla** pinkish, ½ in. **Pod** under ¼ in. long, laterally flattened, beaked with the persistent style.

**Subgen.** 2. **Sphaeridiophora**, Desv. **Pod** minute, unarmed, globose, 1-seeded.

2. **I. linifolia**, Retz; DC. Prodr. ii. 222; Roxb. Fl. Ind. iii. 370; Cor. Fl. t. 196; Wall. Cat. 5489; W. & A. Prodr. 198; Wight Ic. t. 313; Dalz. & Gilbs. Bomb. Fl. 58; Boiss. Fl. Orient. ii. 188. Sphaeridiophora linifolium, Desv. Journ. Bot. iii. 126, t. 6, fig. 35. S. abyssinicum, Jaub. et Spach. Ill. t. 494.
Throughout India from the Himalayas to Ceylon, common.—Distr. Abyssinia, Afghanistan, Malay Isles, N. Australia. Annual, the whole plant persistently silvery-hoary. Stems slender, copiously branched both at the base and upwards. ½–1 ft. Leaves simple, sub sessile, ½–1 in. long, typically linear, acute, but varying (var. Campbellii, Wight) to obovate, obtuse with a mucro; stipules minute, setaceous. Flowers 6–12 in copious dense sub sessile racemes. Calyx ⅛ in., silvery; teeth long, linear-setaceous. Corolla bright red, 2–3 times the calyx. Pod hard, mucronate, silvery, under ⅛ in. thick.

Subgen. 3. Euindigofera, Benth. Ovary with at least 2 ovules, usually with many. Pod linear or oblong, unarmed, turgid.

Group 1. Simplicifoliae. Leaves simple (in Sp. 6 casually 3-foliolate.)

3. I. cordifolia, Heyne; DC. Prodr. ii. 222; herbaceous, loosely pubescent, leaves sub sessile coriaceous, flowers in dense sessile heads, pod oblong 2-seeded. W. & A. Prodr. 199; Dalz. & Gibbs. Bomb. Fl. 58. Heylandia? cor-
difolia, Gr. in Wall. Cat. 5343.
Plains throughout India proper, ascending to 4000 ft. in the Chenab valley.—Distr. Afghanistan, Beloochistan, Nubia, Malay Isles, N. Australia. A copiously branched diffuse annual with stems ½–3 ft. long. Leaves subobtuse with a mucro, flexuous, ⅞–3 in. long, obscurely downy above, densely below; stipules setaceous, minute. Heads copious, 4–8-flowered. Calyx ⅛ in. densely downy; teeth long, setaceous. Corolla bright red, not exserted. Pod under ⅛ in. long, pubescent, casually 1-seeded.

Plains of Concang, Dalzell, Stocks. Perennial, greenish in shade, obscurely silvery in exposure. Stems very flexuous, trailing, 1 ft. or less long, slender, acutely triquetrous. Leaves firm, ½–3 in. long, narrow ed or slightly rounded at both ends; stipules setaceous, persistent. Racemes short peduncled, finally an inch long. Calyx ⅛ in., cane scent; teeth long, setaceous. Corolla ⅛ in., bright red. Pod ⅛–¾ in. long, turgid, glabrous, the flattened sutures margined by acute keels.


Pedun, Kurz.
An erect branched shrub. Leaves ⅛–¾ in., rounded to both ends, mucronulate, chartaceous, glabrous above, glansaceous and softly pubescent below; petiole as long as blade; stipules minute, linear-subulate. Racemes usually shorter than leaves; pedunules ⅛ in.; bracts subulate, moderately long. Calyx broad, short. Corolla ⅛ in., probably rose. Ovary densely silky.

6. I. Brunoniana, Grah. in Wall. Cat. 5491; shrubby, argento-can-nescent, leaves large petioloed oblong, racemes close elongated, pods cylindrical many-seeded. Wall. Pl. As. Rar. t. 279.

Birma, Mount Prome, Wallich.
Branches long, virgate, terete, slender. Leaves oblong, casually 3-foliolate, firm, conspicuously veined below, 3–5 in. long, obtuse or sub acute; stipules deciduous; petioles ⅛ in. Racemes short peduncled, copious, reaching 4–6 in. long. Calyx oblique, argento-canescent, ⅛ in. long; teeth short, deltoid. Corolla ⅛ in., bright red; standard thinly canescent. Pod turgid, 2 in. long, thinly canescent, recurved at the tip.


Plains of Western Peninsula and Bundelkund.

*Annual,* with elongated slender branches clothed when young with spreading hairs. *Stipules* setaceous, minute; petiole nearly as long as the leaflets; leaflets oblanceolate, membranous, 1/4 in. long, green above, hairs adpressed obscure, pale glaucous with cypious distinct black dots below. *Heads* 1/3 in. long, sessile. *Calyx* 1/3 in., pubescent; teeth long, setaceous. *Pod* brown, finely pubescent, oblong, 1/2 in. long, the sutures often dentate, in var. *I. Sykesii,* Herb. Chiff., glosose, 1-seeded.


Plains of Scinde, Stocks.—Distrib. Afghanistan, Abyssinia.


Plains of India from the Himalayas (where it ascends to 4000 ft.) to Ceylon and Burma.—Distrib. Angola, Malay isles, North Australia.

*Annual or biennial. Stems* densely cespitose, 1-1 1/2 ft., trailing, much branched. *Leaves* 1/2-1 1/2 in. long; leaflets firm, oblanceolate, alternate; stipules minute, setaceous. *Heads* 12-20-flowered, dense, short-peduncled or sessile. *Calyx* 1/3-1/2 in., hoary; teeth long, setaceous. *Pod* 1/4-1/2 in. long, cylindrical, thinly hoary.


Plains of the Western Peninsula and Carnatic.

*Perennial.* *Stems* herbaceous, very slender, copiously branched, 1-1 1/2 ft. long. *Stipules* setaceous, very minute; leaflets 3-7, rarely 1, narrow, oblanceolate, subobtuse or subacute, 1/3-1/2 in. long, pale green, membranous, with a few obscure adpressed hairs, not always perfectly digitate. *Pedicels* filiform, 1/2-1 1/2 in. *Calyx* scarcely 1/4 in.; teeth long, linear. *Corolla* red, 1/3 in. *Pod* glabrous, straight, linear, 1/2-1 in. long, 4-7-seeded.


Plains of Carnatic and Ceylon.
Indigofera.]  

L. LEGUMINOSE. (J. G. Baker.) 95

A low undershrub, with copiously spreading rigid terete branches and argenteo-canescence branchlets. Leaflets 1–5, pale green, with a few obscure adpressed hairs, oblanceolate, 1⁄3–1 in. long, often complicate. Pedicels erecto-patent, 1⁄4–1 in. Calyx and corolla like that of I. uniflora. Pod straight, glabrous, turgid, 3–5 in. long, 6–8-seeded.


12. I. pentaphylla, Linn.; DC. Prodr. ii. 230; branches with only a few spreading deciduous glandless hairs, leaflets 5 obovate, racemes 2–4-flowered, pods glabrous. W. & A. Prodr. 200; Wight Ic. t. 385, non Burch. I. glabra, Linn.; DC. Prodr. ii. 229. I. fragrans, Retz.; DC. Prodr. loc. cit.; Roxb. Fl. Ind. iii. 375; Wall. Cat. 5452.

Plains throughout India Proper from the Himalayas to Ceylon.—Distrib. Trop. Africa.

Annual, densely cespitose; branches firm, very slender, a foot or more long. Leaves short-petioled, 3⁄4–1 in. long; leaflets opposite, membranous, pale, glaucous below, with a few adpressed bristly hairs; stipules setaceous, persistent. Calyx 1⁄4 in. long; teeth long, setaceous. Corolla 1⁄2 in., bright red. Pod turgid, straight, 2–3 in. long, 8–12-seeded, not at all torulose.


Plains of the Western Peninsula and Ceylon.

General habit of I. pentaphylla, which it approaches closely. Leaves 3⁄4–1 in. long, short-petioled; leaflets opposite, firmer than in the last and much narrower, with numerous adpressed hairs on both sides; stipules setaceous, very minute. Racemes short-peduncled, equalling or slightly exceeding the leaves. Calyx and corolla as in I. pentaphylla. Pod straight, cylindrical, 3⁄4–1 in. long, 8–10-seeded, distinctly torulose.


Plains of India from the Himalayas to Ceylon; Birma.—Distrib. Trop. Africa, Afghanistan, Malay islands, North Australia.

Branches densely cespitose, 1–3 ft. high, more robust and woody than in the last two, persistently densely viscous throughout. Leaves 3⁄4–1 1⁄4 in. long; leaflets membranous, opposite, pale green above, very glaucous below, with persistent adpressed bristly hairs; stipules setaceous, minute; petiole 1⁄4 in. long, viscous like the branches. Racemes short-peduncled, about as long as the leaves. Calyx and corolla as in the two last. Pod straight, 3⁄4–1 in. long, 10–12-seeded, faintly torulose.


Nilghiris and Pulney hills.

Perennial. Branches trailing, firm, very slender, a foot or more long, faintly pubescent when young. Stipules linear, minute; petiole shorter than the leaflets; leaflets firm, 3⁄4–1 in. long, with a few adpressed grey hairs on both sides, and black sessile glands below; the end one subsessile. Racemes 1⁄4–1 in. long, 6–12-flowered; pedicels 2–3 times the calyx, with distinct linear bracteoles. Calyx 1⁄12 in.; shortly pubescent; teeth long, setaceous. Corolla red, twice the calyx. Pod straight, 3⁄4–1 in. long, many-seeded, obscurely pubescent at first, not at all torulose.

* Leaflets 3–5.


**Himalayas** (ascending to 4000 ft. in Kumaon) to **Ceylon**, Tenasserim, Helder.—**Distrib.** Java, China, Philippines, North Australia.

Perennial. Stems copiously branched, trailing or *suberect*, 1–2 ft. long, soon glabrescent. *Stipules* minute, setaceous; petiole shorter than the leaflets, which are always 3, digitate, oblanceolate, ½–1 in. long, grey-green above, glaucous below with black dots. *Racemes* 6–12-flowered, usually shorter than the petiole. *Calyx* ⅓ in.; teeth long, setaceous. *Corolla* red, 3–4 times the calyx. *Pod* deflexed, ⅔ in. long, the sutures acutely bordered, the valves not torulose.

17. **I. vestita**, Baker; suffruticose, branches and leaves densely pubescent, leaflets 3 the end one sessile, racemes sessile congested, pod straight pubescent many-seeded.

**Western Peninsula**; Pulney hills, *Wight*.

Closely allied to the preceding, differing mainly in pubescence. Branches very slender, densely cespitose, under a foot long, ascending, clothed like the petioles, and leaves with short spreading soft brownish hairs. *Petiole* ⅓ in.; leaflets crowded, obovate, soft, thick, obtuse, ⅔ in. long. *Racemes* as in *I. trifoliata*. *Calyx* densely pubescent, teeth setaceous, plumose. *Pod* clothed with brown pubescence like that of the branches.


Plains of India from the Himalayas to Ceylon; Burma.—**Distrib.** Trop. Africa, Malay isles, North Australia.

An undershrub, 2–3 ft. high, with firm slender branches, soon glabrescent. *Stipules* minute, setaceous; petiole ⅓ in.; leaflets always 3, the end one 1–1 ⅔ in. long, the side ones opposite. *Racemes* 6–12-flowered, usually sessile, seldom over an inch long. *Calyx* ⅓ in., white-canescent; teeth long, setaceous. *Corolla* purplish-red, twice the calyx. *Pod* deflexed, ⅔ in. long, the firm glabrescent valves obtusely keeled.

19. **I. subulata**, Vahl; DC. Prodr. ii. 232; suffruticose, branches and membranous leaves thinly clothed with adpressed grey hairs, leaflets 5 obovate the side ones opposite, racemes elongated, pod long recurved 10–15-seeded not


Habit and leaflets of I. trita, from which it differs in racemes, leaves and pod. Branches woody, virgate, soon glabrescent. Leaflets thin, glabrescent above, pale below with a few adpressed grey hairs, always 5 on the leaves of the main branches, 3–1 in. long. Peduncles 1–2 in. long; racemes 20–40-flowered, reaching 4–6 in. long. Calyx 1/2 in.; teeth setaceous. Corolla lilac, 2–3 times the calyx. Pod 1–2 in. long, subetragonal from the raised keel of the valves.

20. I. marginulata, Grah. in Wall. Cat. 5467; suffruticos, branches and membranous leaves thinly clothed with adpressed grey hairs, leaflets 5 opposite obovate, racemes elongated, pod straight turgid 5–6-seeded. W. & A. Prodr. 204.

Concan, Stocks; Dindygul hills, in the Carnatic, Wight.

General habit of I. subulata, from which it scarcely differs, except in pod. Leaflets the same in shape, size, and vestiture. Racemes lax, short-peduncled, 2–3 in. long, exceeding the leaves. Pods deflexed, 1/4–1 in. long, clothed with minute adpressed decidual grey hairs, the valves broadly rounded.

21. I. angulosa, Edgew. MSS.; suffruticos, branches and membranous leaves thinly clothed with adpressed grey hairs, leaflets opposite 5 oblone, racemes elongated, pod short moniliform 1–3-seeded. I. subulata var. angulosa, Edgew. in Linn. Journ. ix. 311.

Bundekund, Edgeworth.

General habit, leaves and flowers of the two preceding. Leaflets 1–11 in. long, pale grey-green. Racemes peduncled, 30–50-flowered, reaching 4–6 in. long, much exceeding the leaves. Pod 3–4 in. long, deeply constricted between the seeds, with a beak which is gradually narrowed into the style.

22. I. paucifolia, Delile; DC. Prodr. ii. 224; shrubby, branches and subcoriaceous leaves argenteo-canescens, leaflets 3–5 alternate, pods 6–8-seeded torulose recurved. Wall. Cat. 5454; W. & A. Prodr. 201; Wight Je. t. 391; Dalz. & Gibbs. Bomb. Fl. 59; Boiss. Fl. Orient. ii. 190. I. argentea, Roxb. Fl. Ind. iii. 374; Wall. Cat. 5455; ex parte, non Linn. I. heterophylla, Roxb. MSS.

Plains from Scinde and the Upper Ganges to Ceylon.—Distrib. Java, Beluchistan, Arabia, Trop. Africa.

A shrub reaching 4–6 ft. high, with copious woody branches. Leaflets firm, ob lanceolate-oblong, 1/2–1 in. long, sometimes solitary on the branches; petiole short, but distinct. Racemes short-peduncled, 20–50-flowered, reaching 3–4 in. long. Calyx silvery, 1/3 in.; teeth lanceolate-cuspidate, as long as the tube. Corolla red, 3–4 times the calyx, thinly silvery externally. Pod 1/3–3 in. long, glaucous, distinctly torulose.

** Leaflets many, opposite (except I. endecaphylla); flowers small.


A suberect copiously-branched annual, 1-2 ft. high, with slender finely canescent stems. Leaves short-petioled, 1½-2 in. long; leaflets membranous, ¼-1 in. long, obtuse or subacute, thinly argentoo-canescence; stipules minute, setaceous. Racemes congested, sessile, ½-1 in. long, 6-12-flowered. Calyx ½ in.; teeth linear, long. Corolla lilac, 2-3 times the calyx. Pod 1-1½ in. long, finely canescent when young.


An annual or biennial, with trailing stems 1-2 ft. long. Leaves nearly sessile, 1-3 in. long; leaflets membranous, obtuse, ½-3 in. long, with a few adpressed grey hairs; stipules ½-1 in., lanceolate, acuminate. Racemes close, usually peduncled, 1-4 in. long. Calyx ½-1 in.; teeth setaceous, long. Corolla violet-purple, twice the calyx. Pods deflexed, ½-1 in. long.—If Lamarck's name belong here it has priority.


Plains from the Himalayas (ascending to 4500 ft. in Kumaon) to CEYLON, AYA, and TANESKOM.—Distrib. Trop. Africa, Trop. America, Java, Philippines, N. Austria.

Annual or biennial, suberect, reaching 2-4 ft. high, the pubescence grey or brown. Leaves short-petioled, 2-5 in. long; leaflets membranous, grey-green, glaucous below, reaching 1-2 in. long, densely coated with adpressed hairs; stipules setaceous, plumose. Racemes short-peduncled, very dense, 2-6 in. long. Calyx ½ in., densely pubescent; teeth setaceous, long, plumose. Corolla red, not much exerted. Pod ½-3 in. long, densely clothed like the branches.

26. I. semitrjuga, Forsk.; DC. Prodr. ii. 230; suffrutescent, denselyargentoo-canescence, leaflets opposite small obovate 5-9, pod linear straight 4-6-seeded not torulose.

Plains of SCINDE, Stocks.—Distrib. Arabia, Egypt, Abyssinia.

A low shrub, diffusely branched from the base. Leaves under 1 in. long; leaflets obtuse, ½ in. long, subcoriaceous, sometimes emarginate; stipules minute, setaceous. Racemes laxly 6-12-flowered, short-peduncled, usually exceeding the leaves. Calyx ½ in., canescent; teeth linear-lanceolate, as long as the tube. Corolla twice the calyx, thinly silvery externally. Pod ½ in. long, turgid, canescent.

Plains of Scinde, Stocks.—Distrib. Arabia, Egypt, Abyssinia.

A shrub several feet high, with succate woody branches. Leaves 1-2 in. long; leaflets opposite, subcoriaceous, persistently argenteous, \( \frac{1}{2} - 1 \) in. long; petiole \( \frac{1}{2} \) in.; stipules minute, setaceous. Racemes subsessile, 12-20-flowered, shorter than the leaves, \( \frac{1}{2} - 1 \) in. long while in flower. Calyx \( \frac{1}{2} \) in., campanulate, argenteous; teeth deltoid, cuspitate, as long as tube. Corolla \( \frac{1}{2} \) in., reddish-yellow, externally canescent. Pod \( \frac{3}{4} - \frac{1}{2} \) in. by \( \frac{1}{2} \) in., at first argenteous, finally glabrescent, distinctly torulose.

VAR. cerulea; leaves 2-3 in. long, leaflets 7-9 less argenteous than in the type, racemes more elongated 1-2 in. long, pod less decidedly torulose. I. cerulea, Roxb. Fl. Ind. iii. 377; W. & A. Prodr. 203; Wt. Ec. t. 366; Dalz. & Gibs. Bomb. Fl. 59. I. retusa, Grah. in Wall. Cat. 5476. I. brachycarpa, Grah. in Wall. Cat. 5470. I. tinctoria, var. brachycarpa, DC. Prodr. ii. 224. Plains of Banda and the Western Peninsula.


The universally cultivated indigo. Whether it be truly wild is doubtful.

A shrub 4-6 ft. high, with twiggy woody thinly silvery branches. Leaves 1-2 in. long; leaflets opposite, membranous, turning blackish when dried; petiole \( \frac{1}{2} - 1 \) in. Racemes lax, nearly sessile, 2-4 in. long. Calyx \( \frac{1}{2} \) in., silvery; teeth as long as the tube. Corolla \( \frac{1}{2} \) in., reddish-yellow. Pod \( \frac{1}{4} - 1 \) in. long, \( \frac{1}{4} \) in. thick, glabrescent, scarcely at all recurved.—I. Anil, Linn.; DC. Prodr. ii. 225, also commonly cultivated, a native of America, differs by its short congested racemes and pod turned back like a sickle. I. flaccida var. constricta, Thwaites Enum. 411. From Ceylon, is probably a distinct species, but the flowers are unknown. It has the habit and leaves of I. tinctoria, with a slender tetraquetrous subtorulose 4-6-seeded pod.


Plains of the Western Peninsula and Ceylon.

A low shrub, with numerous erecto-patent silvery woody branches. Leaves short-petioled, \( \frac{1}{2} - 2 \) in. long; leaflets opposite, rigidly subcoriaceous, persistently silvery, obtuse, \( \frac{3}{4} - \frac{1}{2} \) in. long. Racemes sessile, dense, 1-1\( \frac{1}{2} \) in. long. Calyx \( \frac{1}{2} \) in., silvery; teeth linear, as long as the tube. Corolla yellowish-red, \( \frac{3}{4} - \frac{1}{2} \) in. long, externally canescent. Pod turgid, straight, finely canescent, 1-1\( \frac{1}{2} \) in. long.

*** Leaflets many, opposite (except I. Dosua); flowers large for the genus.

30. **I. cylindracea**, Wall. Cat. 5482; shrubby, branches glabrous, leaflets small oblong obscurely hispid, stipella and bracts minute, pedicels elongated.

**Nipa**, Wallich.

An erect shrubby perennial, with slender woody erecto-patent branches. Leaves short-petioled, \( \frac{1}{2} - 2 \) in. long; leaflets membranous, opposite, obtuse, green above, pale below, \( \frac{3}{8} - \frac{1}{2} \) in. long, both sides with a few short adpressed hairs. Racemes very lax.
short-peduncled, finally 3–4 in. long; pedicels $\frac{1}{3}$ in. Calyx oblique, $\frac{1}{3}$ in.; teeth short. Corolla $\frac{1}{4}$ in. long, pale red. Pod straight, glabrescent, turgid, $1\frac{1}{2}$–$1\frac{3}{4}$ in. long, 8–10-seeded.


Khasia and Sikkim, temperate zone, 5–8000 ft., H. f. & T.

An erect shrub, reaching 10 ft. high, with slender twiggy branches, thinly silky only when young. *Leaves* short-petioled, 3–4 in. long; leaflets membranous, opposite, $\frac{1}{3}$–1 in. long, green above, glaucous below, nearly glabrescent. Peduncles reaching 1–2 in.; racemes lax, finally 2–3 in. long; pedicels not much longer than the calyx. Calyx $\frac{1}{2}$ in., finely brown-silky; teeth short, deltoid. Corolla $\frac{1}{2}$–$\frac{3}{4}$ in., pale red, canescent externally. Pod glabrous, straight, 1–$\frac{1}{2}$ in. long, 6–8-seeded, turgid, with narrow sutures.—The Candollean synonym may not unlikely belong to a form of *I. pulchella*.


Temperate and subtropical Western Himalaya; common, from the Saltrange to Kumaon, alt. 9–10,000 ft.—Distrib. Afghanistan.

A low copiously-branched shrub, the branchlets distinctly argenteo-canescent. *Leaves* short-petioled, 1–2 in. long; leaflets subcordiaceous, $\frac{3}{4}$–1 in. long, opposite, pale grey-green, thinly clothed with short white bristles above, glaucous and thinly argenteo-canescent below, obtuse, often emarginate. Racemes distinctly peduncled, 1–2 in. long; 12–20-flowered; pedicels very short. Calyx obliquely campanulate, argenteous, $\frac{1}{2}$ in. long; teeth deltoid-cuspidate. Corolla $\frac{1}{2}$–$\frac{3}{4}$ in., pale red, canescent externally. Pod 1–$\frac{1}{2}$ in. long, subcylindrical, glabrous, 6–10-seeded; sutures narrow.

Var. heterantha; leaflets more numerous 17–25 smaller, corolla and pod smaller, the former, $\frac{1}{4}$ in., the latter 1–$\frac{1}{4}$ in. long. I. heterantha. Wall. Cat. 5480. A.B.C. ex parte. Brand. For. Fl. 135. I. Dosua, Wall. Cat. 5481 B.; Bot. Reg. 23, t. 57, non Hamilt. I. virgata, Roxb. Fl. Ind. iii. 383? I. quadrangularis, Roth. in Wall. Cat. 5483. I. polyphylla, DC. Prodr. 227?—Temperate and subtropical Himalayas, as far east as Khasia and Bhotan, ascending to 8000 ft.—Distrib. Afghanistan.


Tropical zone; Khasia and Mergui to Ceylon, Malacca and Siam.—Distrib. Malay isles, Philippines, S. China.

A tall shrub, with twiggy woolly branches, thinly coated with adpressed hairs at first. *Leaves* distinctly petioled, $\frac{1}{2}$–1 ft. long; leaflets opposite, membranous, usually obtuse, 1–$\frac{1}{4}$ or 2 in. long, green above, glaucous below, the hairs short, adpressed, quite obscure. Racemes short-peduncled, very dense, 2–3 in. long, not lengthened in fruit. Calyx $\frac{1}{4}$ in., canescent; teeth short, deltoid. Corolla pale red, $\frac{3}{4}$–$\frac{3}{4}$ in., finely canescent externally. Pods glabrous, the longest of the genus, 2–$\frac{3}{4}$ in. long, subcylindrical, straight, 15–18-seeded, beaked.

34. *I. bracteata*, Grah. in Wall. Cat. 5477; suffruticose, branches glabrescent, leaves middle-sized oblanceolate-oblong 7–17, stipelle and bracts large.

Khasia, 5–6000 ft., Hook. fil. & Thomson; Nipal, Wallich; and an exstipellate form from Kasimbr, 5–6000 ft. Thomson.
A low shrub, with copious slender trailing branches with a few adpressed hairs at first. Leaves distinctly petioled, 3–4 in. long; leaflets opposite, membranous, $\frac{1}{2}$–1 in. long, obtuse, pale green above, glaucous beneath, nearly glabrous; stipellee setaceous, $\frac{1}{8}$ in. long. Peduncles reaching 2–3 in., bearing a close short raceme, bracts herbaceous, boat-shaped, with a cusp, enfolding the buds. Calyx $\frac{1}{2}$ in., campanulate, obscurely hairy; teeth deltoid. Corolla $\frac{3}{8}$ in. long, pale red. Pod linear, glabrous, not seen mature.


Tropical and temperate zones, through the Himalayas, from Hazara and the Punjab to Khasia, reaching 9000 ft.

A tall shrub, with twiggy woody branches, only thinly coated with adpressed hairs at first. Leaves reaching 6–9 in. long; leaflets opposite, membranous, obtuse, usually 1–1 1/2 in. long, green above, pale green below, glabrescent; petiole 1–2 in. Racemes short-peduncled, long and narrow, 4–8 in. long, dense upwards; bracts $\frac{1}{2}$ in., subpersistent, narrowed gradually into a long point; pedicels very short. Calyx $\frac{1}{10}$ in., oblquely campanulate; teeth short, deltoid. Corolla $\frac{4}{3}$ in., a much darker deeper red than in any of the others. Pod linear, turgid, 1–1 1/2 in. long, glabrous, 6–10-seeded, not at all reflexed or narrowed into a beak.

36. **I. hebepepeta**, Benth. MSS.; shrubby, branches glabrescent, leaflets large oblong 13–17 membranous, stipellee distinct, bracts boat-shaped cupulidate exceeding the buds.

Himalayas, from Kashmir to Sikkim, 6–15,000 ft.

A tall shrub, with twiggy woody branches, only thinly coated with adpressed hairs in the young state. Leaves 4–6 in. long; leaflets opposite, membranous, obtuse, usually 1–1 1/2 in. long, much smaller in a subalpine form, dull green above, pale but scarcely glaucescent, with a few short adpressed bristly hairs on both sides. Racemes peduncled, 2–4 in. long, laxly 12–20-flowered; pedicels and calyx as in the last; bracts more deciduous, enclosing the buds, with a setaceous tip protruding beyond them. Corolla $\frac{4}{3}$ in. deep, a much lighter and more crimson red than in *I. atropurpurea*, glabrous externally, the keel $\frac{1}{3}$ in. deep. Pod glabrous, turgid, straight, 1 1/2–2 in. long, 8–10-seeded.


Throughout the Himalayas and hills of India proper, ascending to 5000 ft. in Kumaon.

A shrub 4–6 feet high, the trunk reaching the thickness of a man’s leg. Branches sulcate, thinly coated with grey adpressed hairs at first, soon glabrescent. Leaves short-petioled, 3–6 in. long; leaflets opposite, firmer in texture than its allies, obtuse, often emarginate, usually $\frac{3}{2}$–1 in. long, pale green above, glaucous below, thinly
coated with short adpressed grey hairs. *Racemes* short-peduncled, moderately close, 1-3 in. long; pedicels short; bracts exceeding the buds, usually boat-shaped with a cusp. *Calyx* $\frac{1}{12}$ in. long, argenteo-canescens; teeth short deltoid. *Corolla* bright red, glabrous externally, the largest of all the species, generally $\frac{3}{8}-\frac{1}{2}$ in., reaching $\frac{3}{4}-\frac{7}{8}$ in. long, the standard $\frac{3}{8}$ in. broad, reflexed in the expanded flower. *Pod* straight, turgid, glabrous, $1\frac{1}{2}-1\frac{1}{4}$ in. long, 8-12-seeded, the sutures broader than in the preceding.


**Temperate Central and East Himalayas; Simla to Bhotan and Assam, 6-8000 ft.**

A low shrub, with woody branches, clothed with short spreading grey or brownish pubescence. *Leaves* sessile, 1-3 in. long; leaflets usually opposite, membranous, obtuse, $\frac{1}{4}-\frac{1}{2}$ in. long, dull green above, glaucous below, more or less densely pubescent. *Racemes* distinctly peduncled, moderately close, 1-3 in. long; bracts $\frac{1}{4}$ in. long, lanceolate-cuspidate, silky; pedicels very short. *Calyx* $\frac{1}{12}$ in., densely silky; teeth deltoid-cuspidate. *Corolla* bright red, glabrous, $\frac{3}{8}-\frac{1}{2}$ in. *Pod* straight, glabrescent, 1-1$\frac{1}{2}$ in. long, 8-12-seeded, with very broad sutures.


**Group 6. Paniculatae. Leaves odd-pinnate. Flowers inpanicled racemes.**


**Plains of the Carnatic, Heyne.**

A low erect copiously-branched shrub, the young stems slender, clothed with short spreading grey pubescence. *Leaves* sessile, of the main branches 1-3 in. long; leaflets 11-21, oblong, membranous, opposite, $\frac{3}{8}-\frac{1}{2}$ in. long, thinly clothed on both sides with adpressed grey hairs; stipules setaceous, $\frac{1}{2}$ in., persistent. *Racemes* lax, elongated, more or less panicked, each flower subtended by a bract just like the leaflets, and the branches furnished low down with 3-5-foliolate leaves. *Calyx* $\frac{1}{8}$ in.; teeth lanceolate, very long. *Corolla* red, glabrous, twice the calyx. *Pod* linear-cylindrical, straight, $\frac{1}{4}-\frac{3}{8}$ in. long, 4-6-seeded, finely pubescent.

**Subgen. 4. Amecarpus, Benth. Ovary with at least two ovules. Pod linear, unarmored, flattened.**


**Plains of Scinde and the Punjab.—Distrib. Afghanistan, Arabia, Nile-country.**

A diffuse annual, with stems 1 ft. or more long, thinly clothed with adpressed white hairs. *Leaves* short-petioled; leaflets 3-7, opposite, oblanceolate $\frac{3}{4}-1$ in. long. *Racemes* short-peduncled, closely 12-20-flowered, under an inch long. *Calyx* $\frac{1}{2}$ in., argenteo-canescens; teeth setaceous. *Corolla* scarcely exerted. *Pod* linear, reflexed, $\frac{4}{3}$ in. long, 6-8-seeded.
18. **PSORALEA**, Linn.

Herbs or undershrubs. Leaves simple or odd-pinnate, conspicuously gland-dotted. *Calyx*-tube campanulate; teeth 5, distinct. *Corolla* little exserted; petals all with distinct claws; keel obtuse, the tip slightly incurved. Upper *stamen* free or connate, the tube in an early stage often closed; anthers small, uniform or slightly dimorphous. *Ovary* sessile or short-stalked, ovulate; style long, filiform, incurved, stigma minute, terminal. *Pod* ovoid or oblong, 1-seeded, indehiscent, the pericarp adhering to the seed.—**Distr.** Species about 100, mainly Cape and N. American.


Plains from the Himalayas through India proper to Ceylon.


2. **P. plicata**, Delile; *DC. Prodr.* ii. 221; shrubby, leaves trifoliolate, racemes lax elongated. *Delile, Egypt,* t. 37, fig. 3.

Plains of the Punjab, Thomson, Edgeworth, Stewart.—**Distr.** Arabia, Egypt, Trop. Africa.

A low copiously-branched shrub, the stems obscurely argenteo-canescents, verrucose, the denuded branchlets subspinescent. Leaves short-petioled; leaflets subcoriaceous, dull green, oblongate, obtuse, repand, gland-dotted below only, reaching ½–1 in. long, the end one largest, the side ones oblique. Racemes short-peduncled, 2–3 in. long; lower flowers in distant fascicles; bracts ovate, very minute. *Calyx* ¼ in., clothed with adpressed white hairs, accrescent, clasping tightly the included pod; teeth short, the lowest longest. *Corolla* yellow, slightly exserted.

10. **COLUTEA**, Linn.

Shrubs with odd-pinnate leaves and showy yellow flowers in sparse copious axillary racemes. *Calyx* campanulate, with 5 short teeth. *Corolla* much exserted; standard round, fixed in its place by two basal callosities; keel broad, much incurved, not beaked. *Stamens* diadelphous; anthers uniform. *Ovary* stipitate, linear, ±-ovulate; style filiform, much incurved, bearded along the inner side, stigma large oblique. *Pod* large, membranous, inflated, continuous within, nearly or quite indehiscent.—**Distr.** Species 3 or 4, spread through South Europe and Temperate Asia.


**Temperate West Himalaya, Kunavar, Tibet, Nepal, &c., alt. 8–11,000 ft.—Distr.** Orient, S. Europe.

A subglabrous shrub, 6–10 ft. high. *Leaflets* 9–13, obovate, pale green, ¼–⅛ in. long, often emarginate, obscurely silky in the young state. Racemes as long as the leaves, laxly 3–4-flowered. *Calyx* ⅓–⅛ in. *Corolla* bright yellow, ⅜ in. long; standard furnished at the base with two nipple-shaped papillae. *Pod* ⅜–2 in. long, faintly downy when young, splitting at the tip before ripening.

Trees or large shrubs, usually climbers. *Leaves* odd-pinnate. *Flowers* showy, in axillary racemes, often fascicled, simple or paniculate and terminal. **Calyx** campanulate; teeth generally short or nearly obsolete. **Corolla** much exserted; petals with long claws; standard broad; keel not beaked. **Stamens** monadelphous or diadelphous, filaments filiform; anthers uniform. **Ovary** sessile, linear, few-ovuled; style filiform, incurved, glabrous, stigma capitate. **Pod** linear or oblong, 1- or few-seeded, flat or turged, late in dehiscing or hardly dehiscent.—**Distrib.** Species 40-50, spread through the tropics of the Old World.

**Subgen. 1. Eumilletia.** Standard not auricled at the base. **Stamens** monadelphous or diadelphous.

*Leaves lustrous beneath, with thin silky pubescence.*


**Forests of** BIRMA, MALACCA, PENANG, and SINGAPORE.—**Distrib.** Malay Islands.

A woody climber, the branchlets covered with fine short brown pubescence. **Leaves** 1 ft. or more long; leaflets 6-9 in. long, shining and glabrous above, on petiolules 4-5 in. long; pubescence beneath grey or pale brown. **Racemes** lateral, 6-9 in. long, the lower nodes with very short branches, bearing dense fascicles of pedicellate flowers. **Calyx** 4 in., silky, scarcely toothed. **Corolla** 3-4 in., reddish, very silky. **Pod** 4-5 in. long, densely coated with thick dark brown velvet.

2. **M. rubiginosa**, W. & A. Prodr. 263; leaflets 5-7 coriaceous obovate-oblong cuspidate stipellate sericeous beneath, standard densely silky on the back, stamens diadelphous, pod oblong glabrescent. **Wight** t. 207.

**Hills in the Carnatic near Courtallum, Wight.**

Habit of the preceding, the branchlets and underside of the leaves coated with persistent shining yellowish-brown silky down. **Leaflets** 4-8 in. long, not shining, when young sericeous also above; stipelle obscure; petiolules 4-5 in. long. **Racemes** nearly as long as the leaves, most of the nodes bearing short branchlets, on the tip of which the flowers are fascicled. **Calyx** campanulate, silky, 3 in., short-pedicelled. **Corolla** reddish, 4 in., densely silky. **Pod** 2-3 in. long, subligneous, 2-3-seeded, when young densely velvety.


**Tropical forests of the Nilghiris and Anamally hills.**

Habit and in florescence of the two preceding, the branchlets and leaves beneath coated persistently with white or yellowish-brown shining short silky hairs. **Leaflets** 6-9 in. long, opaque, glabrous above; stipelle sejunctive; petiolules 4-5 in. long. **Racemes** shorter than the leaves, the nearly sessile flowers densely fascicled at the end of short branchlets. **Calyx** 4-5 in., densely silky, with a pair of small ovate bracteoles. **Corolla** reddish, 4 in. long. **Ovary** linear, densely silky, 4-5 ovulate. **Pod** not seen.

**Leaves opaque, pubescent beneath.**

4. **M. pulchra**, Benth. MSS.; leaflets small 15-19 scarcely subcoria-

Forests of Khasia, Assam, Silhet, Ava, and Birma, ascending to 4000 ft.—Distrib. Philippines, Cuming, 1208?

An erect tree, with the branches and leaves below thinly clothed with opaque greyish silikshed pubescence. Leaves and leaflets the smallest of all the species, the former not more than 2-5 in. long, green and pubescent above; petiologies very short and stipellite minute. Racemes copious, shorter than the leaves, the flowers fascicled, shortly peduncled from the main rachis. Calyx ¼ in., scarcely toothed. Corolla reddish, ⅜-½ in. Pod 2-4 in long, ½ in. broad, 1-4-seeded.


Tropical forests of the Concan and Orissa.

A woody climber, with thinly silky branches. Leaves reaching 1 ft. long; leaflets 2-3 in. long, scarcely more than membranous, glabrous above, obscurely silky or glabrescent below; petiologies short, with large setaceous stipelle. Racemes copiously panicked, the flowers not fascicled on short branchlets, but close shortly pedicellate on the main rachis; bracts exceeding the buds, setaceous, deciduous. Calyx ⅝ in., densely silky. Corolla ¾-⅜ in., whitish. Pod linear, narrow, ⅛ ft. long, 4-5-seeded.

Roxburgh’s plant, which inhabits the forests of Orissa, may be distinct. As figured in his set of unpublished plates it has red flowers and much smaller bracts.


Ava, Prome hills, Wallich; Birma, forests of Pegu, McLellan, Kurz.

An erect tree, with thinly silky branchlets, and leaves ⅜ ft. long. Leaflets thin, flexible, 2-3 in. long, dull green, thinly silky above, when mature densely clothed with adpressed grey silky pubescence below, the lowest as long as broad; petiologies under ⅜ in. Flowers in short dense racemes in the axils of the leaves; pedicels densely fascicled, ⅜-½ in. Calyx ⅝-⅜ in., shortly grey-silky; teeth deltoid, shorter than the tube. Corolla shorter than the calyx. Pod oblong, 3-5 in. long, ⅛ in. broad, tubecelled, 1-3-seeded.


Ava; banks of the Irrawaddi at Yenanghuen, Wallich.

Climber, with grey pubescent branches and leaf-rachis, the latter ⅜ ft. long. Side-leaflets oblong, 2½-3 in. long, the end one obovate; upper surface glabrous, rather shining; petiologies ⅜ in. Buds densely crowded; pedicels very short; bracts lanceolate, silky, as long as the calyx. Calyx minute, densely brown-sericeous; teeth deltoid; half as long as the tube. Pod dehisce early for the genus, 2-3 by ⅜-⅞ in.

BIRMA; forests of Pegu, &c. Wallich, Griffith, Kurz.
An erect tree, with branchlets clothed with dense drab-brown short pubescence. Leaflets obtuse, 3–4 in. long, flexible and densely soft-pubescent at first, but becoming rigid and glabrescent when mature; petiolules under $\frac{1}{4}$ in. Flowers in short close nearly sessile racemes in the axils of the leaves; pedicels fascicled, $\frac{1}{3}-\frac{1}{4}$ in. Calyx $\frac{1}{4}$ in., thinly clothed with adpressed hairs; teeth deltoid. Corolla pale blue. Pod sublignous, quadrangular, straight, linear 3–4 in. long, nearly an inch thick, the wings $\frac{1}{4}$ in. broad in the middle, narrowed to each end.


MARTABAN, Kurz.
An erect tree 20–25 ft. high, the young parts puberulous. Leaf $\frac{1}{3}$ ft. with a puberulous rachis; leaflets (number not stated) 2–3 in. long, thinly chartaceous. Racemes leaf-opposed, slender, simple, 2½–3 in. long; pedicels capillary, pubescent, solitary or fascicled. Calyx reddish, broader than deep, $\frac{1}{2}-\frac{1}{3}$ in. long, slightly pubescent, obscurely toothed. Corolla yellowish-white; standard above $\frac{1}{3}$ in. long.—Kurz loc. cit.


MARTABAN, alt. 7000 ft., Kurz.
A robust climber, resembling M. pachycarpa, with verrucose branches and ferrugineo-pubescent glabrescent branchlets. Leaflets petioluled, with adpressed fulvous pubescence on the ribs. Flowers blue, in simple solitary raceme 4–7 in. long, arising above the scars of the fallen leaves. Calyx $\frac{1}{4}-\frac{1}{5}$ in., longer than broad; teeth obscure, anterior one largest. Standard $\frac{1}{4}$ in., petals much smaller than those of M. pachycarpa.—Kurz loc. cit.


Forests of Khasia, Sikkim, and Assam up to 4000 ft. MALACCA, Griffith.
A large climber, with the branches and leaves below more or less densely clothed with pale brown pubescence. Leaves 1 ft. or more long; leaflets 6–8 in. long, glabrous, opaque above, sometimes subcaudate, the pubescence below short, loose, deciduous; petiolules $\frac{1}{4}$ in. Racemes copious, 6–9 in. long, most of the nodes with short branchlets. Calyx $\frac{1}{4}$ in., distinctly pedicelled, densely downy; teeth very short. Corolla $\frac{3}{4}$–1 in. long. Pod 1–8-seeded, rugose, 1–1½ in. broad, reaching 4–5 in. long.

*** Mature leaflets glabrescent beneath.

12. **M. cinerea**, Benth. Pl. Jung. 249; leaflets 5–7 obovate-oblong cuspidate membranous stipellate soon glabrescent beneath, standard densely silky on the back, staminodes diadelphous, pod thick linear velvety torulose. Pongamia cinerea, Grah. in Wall. Cat. 5888. P. palustris, Grah. in Wall. Cat. 5889; P. paniculata, Grah. in Wall. Cat. 5804. P. heterocarpa, Wall. MSS. P. oblonga, Grah. in Wall. Cat. 5893?
Forests of Sikkim, Khasia, Silhet, Assam, Chittagong, and Birma, ascending to 4000 ft.—Distribution: China?

A woody climber, with young branchlets and leaves below with a little opaque grey deciduous pubescence. Leaflets large, reaching $\frac{1}{4}$-1 ft. long, thin and flexible; both sides green; petiolules and setaceous stipellae $\frac{1}{4}$-1 in. Racemes most or all in a panicle above the leaves; flowers distinctly pedicellate, not fascicled, subtended by a pair of setaceous bracteoles. Calyx $\frac{1}{4}$ in., densely silky, distinctly toothed. Corolla $\frac{1}{4}$-1 in., densely coate with grey silk. Pod very turgid, 4-5 in. long, 1 in. broad, 3-5-seeded, sublignose.


Birma, at Prome, Kurz.

An erect glabrous middle-sized tree. Leaves $\frac{1}{4}$-1$\frac{1}{2}$ ft.; leaflets $\frac{1}{4}$-1 in. long, glaucescent and finely reticulated beneath; petiolules slender, $\frac{1}{2}$ to $\frac{1}{2}$ in. Racemes slender, glabrous, 2-3 inches, one or several together, arising from young branchlets; pedicels capillary, solitary or fascicled. Calyx glabrous, purplish, broader than long, $\frac{1}{2}$ in., long, nearly truncate. Corolla blue; standard $\frac{1}{2}$ in. long. Pod 2-3 in. long, 2-3-seeded at middle, sublignose, pale, incurved, narrowed to base, sparsely verrucose.—Kurz loc. cit.


Ava, at Phanoe, Wallich; Malacca, Maingay.

A woody climber, with glabrous branches. Leaflets 4-6 in. long, glabrous on both sides from an early stage; petiolules $\frac{1}{2}$-1 in. Flowers in close short-peduncled racemes in the axils of the leaves; pedicels very short, densely fascicled. Calyx campanulate, $\frac{1}{2}$ long, faintly silky, nearly truncate. Corolla three times the calyx, the standard densely white-canescence on the back. Pod linear-oblong, 7-8 in. long, 1$\frac{1}{3}$-1$\frac{1}{4}$ in. broad, recurved, late in deshiscing, clothed with dense short persistent brown velvety pubescence.

15. M. glaucescens, Kurz in Journ. Asiat. Soc. Beng. xlii. 2, 67; leaflets obovate-oblong cuspidate membranous exstipellate glabrous beneath, standard glabrous on the back, stamens monadelphous, pod flat on the face woody linear-oblong glabrous not torulose with both sutures expanded into narrow wings.

Birma; forests of Pegu and Martaban, Kurz.

A woody climber, with glabrous branchlets. Leaflets thin, flexible, green above, dull below, reaching $\frac{1}{2}$ ft.; petiolules $\frac{1}{2}$ in. Racemes close, simple, $\frac{1}{2}$ ft. long, axillary on short peduncles; pedicels in pairs, exceeding the calyx. Corolla $\frac{1}{2}$ in., with a few minute hairs; teeth deltoid. Pod 3-4-seeded, tubercled, $\frac{1}{2}$ ft. by 1 in.


Forests of Sikkim, Khasia, Silhet, and Mishmi, ascending to 4000 ft.

A woody climber, with whitish branchlets, only the youngest branchlets and leaves
finely silky. Leaflets of medium size, reaching 3–4 in. long, both sides green, quite glabrous; petiolules short. Racemes copious, short, simple, laxly flowered; pedicels ½ in., often geminate, neither bracteate nor bracteolate. Calyx ½ in., thinly silky; teeth short, obsolete. Corolla snow-white, 3/8 in. Pod 3–4 in. by 1 1/4 in., narrowed to a point; valves quite smooth, dehiscing earlier than in the other species.

17. M. Brandisiana, Kurz in Journ. Asiat. Soc. Beng. xlii. 2, 60; leaflets 13 or more lanceolate glabrous subcoriaceous stipellate, standard silky on the back, stamens diadelphous, pod thin compressed ligulate-oblong glabrous.

BIRMA, near Yomah, Kurz.

An erect tree, with slender terete glabrous branches. Leaflets 1 1/4 in. long, narrowed to an obtuse tip, rather rounded at the base. Racemes very lax, panicled at the end of the branches and sending out small shoots from the lower nodes; pedicels much shorter than the calyx; bracts minute, glabrous, lanceolate. Calyx ¼ in. glabrous, broadly campanulate; teeth deltoid. Corolla lilac, ¾ in. Pod 3–4 in. long, under an inch broad, 2–4-seeded, the valves quite smooth and flat, twisting when dried.


Forests of MALACCA, Griffith, Malingay.

A woody climber, with only the youngest branches silky. Leaflets reaching 5–6 in. long, very rigid in texture, both sides green and quite glabrous; petiolules ½ in. Racemes copious, short, subsessile, dense, subspicate; bracts large, roundish, densely silky, clasping and hiding the buds. Calyx subsessile, ½ in., clothed with bright yellowish-brown silky pubescence, like the bracts and standard; teeth as long as the tube, broad, imbricated. Corolla 3/4 in., densely silky. Pod beaked, turgid, 3 in. long, 1-seeded, subindehiscent.


Forests of Martaban, Tenasserim, Malacca, and Penang.—Distrib. Sumatra.

An erect tree, with thick, glabrous branches. Leaflets 4–6 in. long, very thick and rigid, shining above, both sides quite glabrous, reticulato-venose; petiolules 1/2 in. Inflorescence a dense terminal panicle above the leaves; racemes not branched; bracts minute, ovate; pedicels 1/4 in. Calyx ½ in., thinly silky; teeth short obscure. Corolla dark purple, 1 in. long. Pod narrowed to both ends, 3 in. long, subindehiscent, 1-seeded in our specimens.

SUBGEN. 2. Otosema, Benth. Standard auricled at the base on both sides of the claw. Stamens monadelphous.


ROHILCUND and KUMAON to SIKKIM, reaching 3500 ft.; also on Parasnath in BEHAR.
Milletta.]  L. LEGUMINOSE.  (J. G. Baker.) 109

A large, robust, woody climber. Leaves reaching 1-2 ft. long; petiole 4-6 in. long; leaflets green, glabrescent above, 6-12 in. by 3-6 in., minutely stipellate, pale below, sometimes subcoriaceous. Flowers in copious close axillary racemes near the top of the branches, fascicled on a downy rachis 4-6 in. long; bracts minute, linear. Calyx $\frac{1}{3}$ in., densely silky; teeth very short. Corolla whitish, three times the calyx, densely silky. Pod straight, very hard, 5-6 in. long, 1 in. broad; sutures thickened.


Forests of Bengal, Assam and Pegu.

A woody climber. Leaves long-petioled, $\frac{1}{2}$-1 ft. long; leaflets 4-6 in. long, 1$\frac{1}{2}$-2 in. broad, obscurely stipellate, glabrous above, thinly sericeous beneath. Flowers in dense short axillary racemes and also in terminal panicles. Calyx $\frac{1}{4}$ in., densely sericeous, subtended by minute ovate bracts and bracteoles. Corolla $\frac{5}{6}$ in. red, the standard densely silky. Pod hard and woody, silky when young, 6-7 in. by 1-1$\frac{1}{4}$ in.


Martaban, Wallich.

A little-known climbing species, closely allied to the two preceding. Leaflets long-petioled, distinctly placed on an elongated nearly glabrous rachis, glabrescent above, not seen fully developed. Flowers in very copious close axillary racemes 6-8 in. long near the top of the branches. Calyx $\frac{5}{6}$ in., campanulate, scarcely toothed, with a pair of very minute bracteoles at the base. Corolla $\frac{5}{6}$ in., densely silky, reddish lilac. Pod like that of *M. auriculata* when young, but not seen mature.


Martaban, Kurz.

A woody climber with terete minutely lenticellate branches, all the young parts ferrugineo-tomentose. Adult leaves not known. Racemes 4-5 in., arising from shortened lateral branches, and forming usually ample lateral panicles; pedicels $\frac{1}{4}$-1 in., nodding, velvety. Calyx broader than deep, under $\frac{1}{4}$ in. long, fulvous-velvety, obscurely toothed, upper tooth largest. Corolla glabrous, violet; standard $\frac{1}{4}$ in. long, emarginate, yellow at the throat. Young pod smooth, linear, acuminate. Placed by Kurz next to *M. extensa*. I have seen no specimen.


Forests of Khasia and Silhet, ascending to 3000 ft.

A woody climber. Leaflets minutely stipellate, 0-9 in. long, firm, bright green above, glaucous below, narrowed out at the tip into a long distinct tail. Racemes axillary, short-peduncled, not so dense as in the others, 4-6 in. long. Calyx campanulate, $\frac{1}{4}$ in., scarcely toothed, densely silky. Bracts very minute. Corolla $\frac{8}{6}$ in., densely silky. Pod linear, straight, rigidly-coriaceous, subequally turgid, 3-4 in. long, $\frac{1}{4}$ in. broad.
Doubtful Species.

The following are probable species of *Millettia*, of which either flowers or pods are unknown.

Leaflets and pod as in *M. atropurpurea*, but the latter 6-7 in. long, 2-2½ in. broad, smooth, woody, flat, perhaps indehiscent.—MALACCA, Griffith, 1335.

Leaflets 7, subcoriaceous, obovate, very obtuse, opaque, 3-4 in. long, obscurely grey-canescent below. Pod linear, 4-5 in. long, flat, ½ in. broad, several-seeded, with similar vestiture. *Pest*, McClelland. May be *Padbergioia dasyphylla*, Miq. *Flor. Ind. Bat.* i. 150.

M. MAINGAY, Baker. Leaflets 15 or more, oblong, coriaceous, ½-2 in. long, rounded at both ends, pubescent below. Pod oblong, woody, indehiscent, rounded at both ends, 4 in. long, 2½ in. broad, an inch thick, turgid, densely clothed with short brown velvety pubescence, the surfaces traversed by deep longitudinal grooves. SINGAPORE, MAINGAY.

*Pongamia angustifolia*, Ham. in Wall. Cat. 5917. Leaflets 9, exstipellate, not coriaceous, glabrous, oblong-lanceolate-oblong, acuminate, 2-3 in. long. Inflorescence and separate flowers just as in *M. glaucescens*. *Nthal*, Hamilton.

21. MUNDULEA, DC.

Shrubs. Leaves odd-pinnate. Flowers in dense terminal racemes. Calyx campanulate; teeth short, deltoid. Corolla much exerted; standard obovate, with a long claw; wings ob lanceolate, adhering to the incurved keel, which has a short obtuse point. Stamens monadelphous; alternate filaments slightly dilated; anthers uniform. Ovary sessile, linear, many-ovuled; style filiform, glabrous, much incurved; stigma capitate. Pod large, linear, subindehiscent. DISTRIB. Species 3, the two others plants of Madagascar.


A stout erect shrub, with thick corky bark. Branches, rachises, pedicels and leaves beneath densely sericeous. Leaflets 6-10-jugate, oblong-lanceolate, coriaceous, 1½-2 in. long. Flowers in close terminal racemes. Pedicels 2-3 times the campanulate calyx. Corolla 3½-1 in. long, reddish, thinly silvery. Pod 3-4 in. long, densely sericeous, 6-8-seeded, both sutures thickened so as to form prominent borders.

22. TEPHROSIA, Pers.

Herbs or undershrubs. Leaves usually odd-pinnate; leaflets opposite, subcoriaceous. Flowers in leaf-opposed racemes or solitary or in pairs in the axils of the leaves. Calyx-tube campanulate; teeth distinct, subequal. Petals clawed; standard suborbicular; keel incurved, not beaked. Stamens diadelphous; anthers obtuse, uniform. Ovary sessile, linear, many-ovuled; style much incurved, filiform or flattened, glabrous or bearded; stigma capitate often pinnicate. Pod linear, flattened, many-seeded, 2-valved, continuous or obscurely septate between the seeds. DISTRIB. Species about 100, spread through the Tropics of both hemispheres.


Plains of SINDH, the PUNJAB and CONCAB.

Stems filiform, densely cespitose, ½-1 ft. long with a few short adpressed hairs. Leaves nearly sessile, linear, 1–2 in. long, narrowed suddenly or gradually at the point, glabrous above, obscurely silky beneath; stipules minute, setaceous, ascending. Flowers 1–2 together in the axils of the leaves. Pedicels filiform, ½–1 in. Calyx ¼ in.; teeth lanceolate, much shorter than the tube. Corolla ½ in., all the petals with very long claws. Pod linear, ½–1 in. long, 6–10-seeded, thinly clothed with adpressed hairs. Style short, glabrous, filiform.


Himalayas, tropical zone, from KUMAO eastward to KHASIA and ASSAM, ascending to 5000 ft. in SIKKIM. Silhet, Chittagong, Martaban, and Tenassesrim.—Distrib. Malay-isles.

A low shrub, with slender woody grooved branches clothed with brown or grey persistent velvety pubescence; stipules setaceous, ascending; leaves short-petioled, reaching 6–9 in. long; leaflets 19–25, ligulate, acute, 1½–2 in. long, green glabrous above, grey and thinly silky beneath. Racemes copious, terminal and lateral, elongated, 6–9 in. long; lower several to a fascicle; pedicels silky, ⅓–¼ in. Calyx ¼ in., densely silky; teeth much shorter than the tube. Corolla ¾–1 in., reddish or white; standard densely silky. Pod 3–4 in. long, 10–15-seeded, slightly recurved, clothed with adpressed brown silky hairs; style flattened, silky.

Subgen. 3. Reineria (Moench.). Perennial herbs or shrubs. Leaves odd-pinnate or simple. Calyx-teeth narrow, cuspidate, as long as the tube.

3. T. calophylla, Bedd. t. 106; herbaceous, glabrous, leaves simple, flowers in lax long terminal racemes.

East slope of the Nilgiris, alt. 3000 ft., Beddome. Branches slender, angular, tough. Leaves oblanceolate, obtuse, rigidly coriaceous, 3–4 in. long, cuneate at the base; veins below and edges distinct, brown; stipules linear, minute; petiole angular, 1–1½ in. Racemes 6–9 in. long; bracts linear, very minute; pedicels 2–3 times the calyx. Calyx ⅓ in.; teeth lanceolate, cuspidate, as long as the tube. Corolla ⅔–⅓ in.; standard downy on the back. Pod 2¼–3 in. long, recurved, glabrous, 8–10-seeded.


Western Peninsula and Ceylon, ascending to 5000 ft.

An undershrub, with flexuose woody twiggy branches, densely clothed with brown or grey velvety pubescence. Leaves subsessile, very variable; leaflets usually 3–6-
jugate (reduced to one in T. Grahame, Wall. Cat. 5652), oblong, obtuse, subcoriaceous, the end one much larger than the others, 2-3 in. long, 1-2 in. broad, green, glabrous above, clothed with persistent white silky pubescence beneath, the nerves prominent; stipules lanceolate, ascending. Peduncles often exceeding the leaves; racemes closely 3-12-flowered; flowers casually also in the axils of the leaves; pedicels very short. Calyx 1⁄₄ in., densely silky; teeth long, setaceous. Corolla 3⁄₄-1 in., pale red, silky. Pod slightly recurved, 2-2½ in. long, 10-12-seeded, glabrescent. Style flattened, bearded throughout.

Var. 1. pulcherrima; leaflets large (end one 3 in. long) coriaceous often solitary, veins below very prominent, bracts ovate-lanceolate, flowers few close, pod persistently velvety. T. pulcherrima, Wight MSS. Nilghiris and Ceylon.

Var. 2. coccinea; leaflets 1-5 3⁄₄-1 in. broad cuneately narrowed in the lower half, branches closely argenteo-canescent, bracts linear minute, racemes elongated. T. coccinea, Wall. Cat. 5633; Pl. As. Rar. t. 60. Birma, Wallich.

Var. 3. intermedia, W. & A.; branches velvety, leaflets much smaller 9-13 1-½ in. broad the end one not much larger than the others, the veins less prominent; racemes not so close as in the type. T. intermedia, Grab. in Wall. Cat. 5632. Western Peninsula and Ceylon.


Plains of the Western Peninsula and Ceylon.—Distrib. Java.

A low shrub, with very numerous terete flexuose ascending branches. Spines spreading, 1-½ in. Leaves short-petioled, ¾-1 in. long; leaflets 5-7, narrowly-oblong-lanceolate, rigidly subcoriaceous, truncate, often emarginate, glabrous above, glaucous, nearly glabrous below. Flowers all axillary; 1-2 rarely 3 from the nodes; pedicels 1-½ in. Calyx ½ in., teeth linear-acuminate, as long as the tube. Corolla red, twice the calyx. Pod 3⁄₄-1 in., nearly glabrescent, recurved, 5-6-seeded. Style much incurved, flattened, glabrous.


Plains of the Western Peninsula and Ceylon; Birma, Wallich.

A low shrub, with copious erecto-patent terete slender branches; petiole very short; stipules minute, ascending, setaceous; leaflets usually 5, rarely 3, narrowly-oblong-lanceolate, 1-1½ in. long, truncate or emarginate, green, glabrous above, thinly silky beneath, cuneately narrowed in the lower half. Flowers usually geminate; pedicels ½ in., argenteous. Calyx ½ in.; teeth linear, as long as the tube. Corolla more than twice the calyx, argenteous. Pod 1½-2 in. long, 6-8 seeded, much recurved, persistently thin caneaceous.


Tropical zone, spread universally from the Himalayas to Ceylon, Malacca and Siam, ascending to 4000 ft. in the north-west. — Distri布. Everywhere in the Tropics.

A copiously-branched suberect perennial, 1–2 ft. high, with slender firm terete stems. *Leaves* short-petioled, 3–6 in. long; stipules linear-subulate, ascending or reflexed; leaflets 13–21, narrow ob lanceolate, obtuse, green, glabrescent above, glaucous, obscurely silky below. *Racemes* copious, all leaf-opposed, 3–6 in. long, lax; lower flowers fuscicled; pedicels \(\frac{3}{4}\) in.; bracts minute. *Calyx* \(\frac{3}{4}\) in., closely silky; teeth linear-subulate, as long as the tube. *Corolla* \(\frac{3}{4}\) in., red, thinly silky. *Pod* 1\(\frac{1}{2}\)–2 in. by \(\frac{3}{4}\) in. broad; style subglabrous, penicillate at the tip.


Plains from the Himalayas to Ceylon and Malacca.

Closely allied to *T. purpurea*, from which it scarcely differs except in the vestiture of the pod. *Stipules* linear; leaflets 13–19, narrow ob lanceolate, \(\frac{3}{4}\)–1 in. long, truncate or emarginate, glabrescent above, thinly persistently silky below. *Racemes* all lateral, reaching 6–9 in. long; pedicels \(\frac{1}{12}\) in. *Calyx* densely silky, \(\frac{1}{2}\) in.; teeth setaceous, exceeding the tube. *Corolla* \(\frac{3}{4}\) in. *Pod* 1\(\frac{1}{2}\)–2 in. by \(\frac{3}{4}\) in.; style flattened, subglabrous, penicillate at the tip.


Habit of *T. purpurea*, but stems somewhat firmer and more woody, clothed with short adpressed white hairs. *Leaves* nearly sessile, 2–3 in. long; stipules linear, ascending or reflexed; leaflets 13–19, grey-green, glabrescent above, persistently silky below, narrow ob lanceolate, often emarginate. *Racemes* half a foot or more long; lower flowers in distant fascicles, lowest often in the axils of the leaves; pedicels very short; bracts setaceous, plumose. *Calyx* \(\frac{3}{4}\) in. deep, densely silky; teeth setaceous, lower exceeding the tube. *Corolla* pale red, not much exceeding the calyx. *Pod* 1–1\(\frac{1}{2}\) in. long, \(\frac{1}{2}\)–\(\frac{3}{4}\) in. broad, densely persistently velvety; style glabrous, flattened, densely penicillate at the tip.

**Var. 1. incana**; stems clothed with short spreading pubescence, leaflets rather broader, pod still more densely silky. *T. incana*, *Grah. in Wall. Cat.* 5644; *VOL. II.*
114  L. LEGUMINOSÆ. (J. G. Baker.)  [Tephrosia.


10. T. pauciflora, Grah. in Wall. Cat. 5635; herbaceous, stems finely silky, flowers usually all in the axils of the leaves, pod glabrescent or finely downy slightly recurved 6–8-seeded. T. anthylloides, Hochst.; Baker in Oliv. Flor. Trop. Africa, ii: 118?

Plains of Sind, Stocks, Dalzell; Punjab, Stewart; Burma, Wallisch.

Stems densely caespitose, under a foot high. Stipules ascending, setaceous; leaflets 5–9, narrow oblanceolate, finely silky beneath, 1–1 ½ in. long, often emarginate. Flowers usually all geminate on short pedicels in the axils of the upper leaves, casually produced into a sparse raceme. Calyx ⅛ in., finely silky. Corolla red, twice the calyx. Pod 1–2 in. by ¼ in.; style glabrous, flattened.—Probably a third variety of T. purpurea. The Indian differs from the African plant by smaller flowers and fewer seeds.

DOUBTFUL SPECIES.

T. fusca, W. & A. Prodr. 210 (T. argentea, Wight in Wall. Cat. 5648, non Pers.), is a plant gathered by Dr. Wight on the Dindigul hills, of which the flowers are not known. In general habit, leaves, inflorescence, vestiture, and the shape of the calyx and pod, it resembles closely Mundulea suberose, but the leaflets are shorter and more obtuse, and the pod dehisces readily, like that of a Tephrosia, and the sutures are not thickened so as to form a prominent border. The calyx is that of § Brissonia.

23. SESBANIA, Pers.

Soft-wooded shrubs or herbs. Leaves long, very narrow, abruptly-pinnate, with very numerous deciduous linear-oblong obtuse mucronate leaflets. Flowers in axillary racemes. Calyx campanulate, shallowly 2-lipped or 5-toothed. Corolla much exerted; petals all with long claws; standard broad; keel obtuse, straight, or in § Agati recurved and subrostrate. Stamens diadelphous; anthers uniform. Ovary linear, stipitate, many-ovuled; style filiform, incurved, glabrous, stigma capitulate. Pod very long and narrow, dehiscent, with distinct septa between the very numerous seeds.—Distrib. Species about 20, spread everywhere through the tropics.

SUBGEN. 1. Eusesbania.  Flowers small; bud straight.


Plains from the Himalayas to Ceylon and Siam, ascending to 4000 ft. in the north-west.—Distrib. Cosmopolitan in tropics of old world.


2. S. aculeata, Pers.; DC. Prodr. ii. 295; annual, muricated, pod long firm not twisted nor torulose. Wall. Cat. 5655; W. & A. Prodr. 214; Dalz. &

Plains from the West Himalayas to Ceylon and Siam.—Distr. Cosmopolitan in tropics of old world.

Suffruticose, reaching several feet high, the branches and leaf-rachises armed with small weak prickles. Leaves reaching $\frac{1}{2}$-1 ft. long; leaflets glabrous, 4–81, smaller and narrower than in S. egypatica. Racemes laxly 3–6-flowered, distinctly peduncled. Calyx $\frac{1}{2}$ in., glabrous. Corolla $\frac{3}{4}$–$\frac{3}{4}$ in., pale yellow; standard dotted with red. Pod 6–9 in. by $\frac{1}{3}$ in., straight or rather falcate, beaked with the persistent style.

VAR. 1. paludosa; more robust, unarmed, leaves glabrous. Æ. paludosa and uliginosa, Roxb. Fl. Ind. iii. 333-4.

VAR. 2. serioca; branches robust unarmed, leaflets more or less silky even when mature, racemes subsessile. S. serioca. DC. Prodr. ii. 266—Plains of Ceylon, Ferguson, CP., 3850.


Plains of the Western Peninsula.

Branches lower and more slender than in the last. Leaves 2–3 in. long; leaflets 31–41, linear-oblong, glabrous, glaucous. Flowers solitary or geminate, without a common peduncle. Calyx $\frac{1}{3}$ in. long. Corolla 3 times the calyx. Pod straight, 2–3 in. long, $\frac{1}{3}$ in. thick, 15–20-seeded, distinctly torulose.

SUB. 2. Agati, Desv. Flowers large; bud falcately recurved.


Plains of the Western Peninsula, a doubtful native.—Distr. Mauritius to N. Australia, but often cultivated.

A short-lived soft-wooded tree, 20–30 ft. high, with virgate terete branches. Leaves $\frac{1}{2}$–1 ft. long; leaflets 41–61, linear-oblong, pale green, glabrous. Flowers 2–4, in short axillary racemes. Calyx 1 in. deep, glabrous, shallowly 2-lipped. Corolla 3–4 in. deep, white or in Æ. coccinea, Desv.; DC. loc. cit. (Æschynomene coccinea, L.), more or less deeply tinged with red. Pod 1 foot or more long, falcate, firm, not torulose, the sutures much thickened.

24. CARAGANA, Lam.

Usually low shrubs, with the leaf-rachises and the stipules usually spine-tipped and hardened, persistent from year to year. Calyx campanulate, placed very obliquely on its pedicel, produced on the upper side; teeth 5, deltoid or lanceolate. Corolla much exerted; standard broad, with reflexed edges; keel not at all beaked, usually as long as the wings and standard. Stomens diadelphous; anthers uniform. Ovary linear, sessile, many-ovuled; style filiform, incurved, glabrous, stigma minute terminal. Pod linear, turgid, not at all torulose, continuous, but sometimes pubescent within.—Distr. Species about 15, spread widely through Central Asia.
Leaf-rachis suppressed.

1. *C. pygmaea, DC. Prodr. ii. 268; leaflets 4 digitate oblanceolate glabrous, flowers solitary nearly sessile. Brand. For. Flor. 134. Robinia pygmaea, Linn. Sp. Pl. 1044; Pall. Fl. Ross, i. t. 45. Genista versicolor, Wall. Cat. 5022; Royle Ill. t. 34, fig. 2. C. versicolor, Benth. in Royle Ill. 198.

West Himalayas, temperate and alpine regions; Tibet, Kunawar, &c., alt. 8-17,000 ft.—Distrib. Afghanistan, Altai to Davuria.

A low undershrub, with the habit of a prickly *Genista*, the branches armed with a pungent, ascending trifid spine under an inch long from each of the close nodes. Leaves solitary or geminate in the spine axes, with rarely a perceptible petiole; leaflets ⅓-⅓ in. long, firm, pale green. Pedicels jointed, shorter than the calyx. Calyx glabrous, ⅓ in. long; teeth short, deltoid. Corolla bright reddish-yellow, ⅓ in.; standard glabrous. Pod linear, turgid, glabrous, naked within, ⅓-1 in. long.

**Leaf-rachis produced, with a spine at the end.**

2. *C. conferta*, Benth. MSS.; leaflets 4-6 oblanceolate subglabrous, stipules spinous, flowers 1-2 subsessile.

Balti, temperate or alpine region, Winterbottom.

Nodes crowded on the castaneous downy branches. Spines woody, an inch long. Stipules broad, scariose, downy, with a spiny tip; leaflets ⅓-⅓ in. long, obtuse, with a micro, at first faintly silky beneath, subcoriaceous. Pedicels downy, shorter than the calyx. Calyx ⅓ in., finely silky; teeth deltoid, ciliated, half as long as the tube. Corolla 1 in. long, the keel incurved, with very long claws. Ovary linear, densely pubescent, 10-15-ovuled; style long, much incurved. Pod unknown.


West Himalayas, temperate and alpine region, alt. 8-13,000 ft.; Gumkhon, Kunawar, Leipaoon, Kunawar, &c.

A shrub reaching 3-4 ft. high, with very close nodes and downy young branches. Old spines erecto-patent, pungent, 1-1¼ in. long, often downy. Leaflets ⅓-⅓ in. long, obtuse, mucronate, firm, densely silky; stipules deltoid, scariose, not spine-tipped and consequently the old spines simple, not trifid. Calyx shortly pedicelled, ⅔ in. long, densely pubescent; teeth deltoid-cuspitate, half the tube. Corolla twice the calyx. Pod 2½-1 in by 1 in., woolly within and persistently clothed with grey pubescence on the outside.


Central Himalayas, alpine or temperate region; Kumaon, Brighton; Gumkhon, Strochez and Winterbottom.

A low shrub, with close nodes and densely downy young branches. Old spines 1-2 in. long, weaker and less pungent than in the last. Leaf-rachises densely matted with pale brown woolly pubescence; leaflets ⅔ in. long, pale green, rigidly coriaceous, truncate, mucronate. Common peduncle short and not always developed. Calyx ⅔ in. long, densely silky, subtended by a pair of linear bracteoles; teeth setaceous from a deltoid base, half as long as the tube. Corolla yellowish, twice the calyx. Ovary linear, densely pubescent. Pod unknown.

5. *C. brevispina*, Royle Ill. 198; leaflets 12-16 obovate-oblong glabrous or finely silky, stipules spinous, flowers 2-4 on a common peduncle. Brand. For. Flor. 133.
West Himalayas, temperate region, alt. 5-9000 ft.; Kashmire, Kunawar, Gurwhal, Simla, &c.—Distr. Chinese Tartary, Afghanistan.

A shrub several feet high, the nodes less crowded than in the preceding, the young branches finely downy. Old spine-tipped rachises 2-4 in. long, rigid or flexible. Leaflets ⅓-⅔ in. long, subcoriaceous, glabrescent on both sides or thinly pubescent below. Peduncle 1-2 in.; bracts and bracteoles linear, sericeous; pedicels downy. Calyx ⅓ in. long, subglabrous; teeth half the tube, lanceolate-cuspidate. Corolla glabrous, yellowish, twice the calyx. Pod glabrous, linear, 2 in. long, woolly within.

*** Spineless leaf-rachis produced, with a leaflet at the end (Chesneya, Lindl.).


Himalayas, alpine region, alt. 12-17,000 ft.; Gurwhal and Kumon to Sikkim.

Stems thick, tufted, woody, creeping for a few inches below the surface, clothed very densely with the long old tough but not pungent or spinous leaf-rachises. Leaves in a lax rosette at the surface, short-petioled, 1-1½ in. long; leaflets green, not coriaceous, ⅓-⅔ in. long, truncate or emarginate. Peduncle downy, as long as the calyx. Calyx ⅓ in. long, very oblique, densely pubescent; teeth ⅓-⅔ tube. Corolla reddish-yellow, twice the calyx; standard pubescent on the outside; wings and keel shorter. Pod linear-oblong, ⅓-⅔ in. long, finely pubescent, stuffed inside with cottony down.


Temperate and Alpine West Himalayas, alt. 8-13,000 ft.; Tibet and Kunawar.—Distr. Orient?; Kashgar, Bellew.

Branches 2-3 in. long, crowded from a woody rhizome. Stipules small, deltoid; leaf-rachis, including distinct petiole, 2-4 in. long; leaflets obovate, ⅓-⅔ in. long, truncate, emarginate, not coriaceous, densely pubescent. Peduncle equalling or overtopping the leaves; pedicels very short. Calyx ⅓-⅔ in. downy; teeth linear-lanceolate, half as long as the tube or more. Corolla twice the calyx; standard pubescent; wings rather shorter; keel shorter still. Pod straight, linear, glabrous, 2-2½ in. long, 10-12-seeded, slightly stuffed within. This and the last have the oblique calyx of Calophaca, but in habit artf corolla range better under Guldenstediata.—Dr. Aitchison sends from Ladak a plant with deep purple flowers, more hoary leaves and narrower pod, which may be distinct.

25. GULDENSTEIDTIA, Fisch.

Spineless perennials. Leaves odd-pinnate. Flowers solitary or umbellate on long axillary peduncles. Calyx-tube campanulate, not oblique; teeth 5, distinct, upper broader. Corolla much exserted; standard round; keel not more than half as long as the other petals, straight, obtuse. Stamens diadelphous; anthers uniform. Ovary sessile, many-ovuled; style incurved very short, stigma capitate. Pod linear, turgid, not torulose, continuous within.—Distr. Species 7-8, all Central Asian.

1. G. himalaica, Baker; shortly caesalpines, leaflets 11-13 obovate-obcordate densely silky, flowers 1-3, calyx-teeth much shorter than the tube.

Himalaya, alpine zone, alt. 11-15,000 ft.; Kumon and Gurwhal to Sikkim.

Stems 1-2 in. long, cespitose from a perennial rootstock, densely silky. Leaves ⅓-⅔ in. long, distinctly petioled, densely clothed with pale brown silky hairs; stipules
large, leafy, ovate; leaflets \( \frac{1}{2} \)-\( \frac{3}{4} \) in. long, not at all rigid. Peduncle filiform, 1-3 in. long; pedicels shorter than calyx; bracts lanceolate, very minute. Calyx \( \frac{1}{4} \) in., silky; upper teeth deltoid, lower lanceolate. Corolla 3-4 times calyx; standard round, glabrous. Pod linear, glabrous, \( \frac{1}{2} \) in. long, 6-8-seeded, with a narrow border to the upper suture.


Upper Gangetic plain at Mirpour, Jacquemont. *Hazarada, Dr. Stewart.*

Rhizomes slender, branched, with the leaves and peduncles in a rosette at the surface. Petiole \( \frac{1}{2} - 1 \) in., obscurely pubescent, like the rachis and underside of the leaves; leaflets \( \frac{1}{4} - \frac{1}{2} \) in. long, obtuse, glabrescent above, not at all rigid. Peduncle as long as the leaves; pedicels scarcely any. Calyx \( \frac{1}{4} \) in. finely silky; teeth lanceolate-acuminate. Corolla twice the calyx. Pod twice the calyx, linear, finely silky.

3. **G. multiforma**, Bunge Enum. Pl. Chin. 18; stemless, leaflets 11-13 oblong densely silky, flowers 3-6, calyx-teeth as long as the tube.

West Himalaya, Royle, the exact station not known. *Distrib. China.*

Rosettes of leaves and peduncles densely crowded at the surface on a slender woody rhizome. Leaf-rachis 2-4 in., including the distinct petiole, densely pubescent; leaflets \( \frac{1}{4} - \frac{1}{2} \) in., obtuse, soft, not rigid. Peduncle equalling or overtopping the leaves; bracts linear, exceeding the very short pedicels. Calyx \( \frac{1}{2} \) in.; teeth linear-lanceolate. Corolla violet or yellow, twice the calyx. Pod twice the calyx, linear, straight, densely pubescent.

26. **ASTRAGALUS**, Linn.

Herbs or undershrubs with pinnate leaves, the leaf-rachis terminating either in a leaflet or a spine. Calyx tubular or campanulate, equal or gibbous on the back; teeth 5, subequal. Corolla usually distinctly exserted; petals subequal or wings and keel shorter than the standard, the keel incurved, obtuse. Stamens diadelphous; anthers uniform. Ovary sessile or stalked, many-ovuled; style incurved, stigma capitate. Pod linear or oblong, usually turbid, continuous within or more or less completely longitudinally 2-celled from the introversion of the inferior suture.—Distrib. Belts the world in the north-temperate zone, the head quarters being Western and Central Asia. Monographed in the 11th volume of the 7th series of the Memoirs of the Imperial Academy of St. Petersberg, by Bunge, who estimates the number of species at 1150-1200.

*Subgen. 1. Trichostylus, Baker.* A herbaceous perennial, with basifixed hairs, the style bearded down the inner face below the stigma, as in Phaseolus.


West Tibetan Himalayas, alpine region, alt. 15-16,000 ft., Strachey. By the Tso-kar sea, between Rupshu and Korosg, Heyde.

Rhizome slender, woody, the whole plant not reaching more than an inch above the soil. Leaves \( \frac{1}{2} - \frac{3}{4} \) in. long; leaflets 17-19, oblong, crowded, complicate, persistently argenteo-canescence, fleshy; stipules small, deltoid, fleshy, spreading. Peduncles \( \frac{1}{4} - \frac{1}{2} \) in. Flowers 2-4 in a close umbellate head; bracts and pedicels minute. Calyx \( \frac{1}{2} \) in., densely argenteo-canescence; teeth lanceolate-deltoid, rather shorter than the campanulate tube. Corolla more than twice the calyx, rose-red with the tip deeper; petals subequal; limb of standard round, reflexed, deeply emarginate. Pod \( \frac{1}{2} \) in., long, oblong, membranous, much inflated, short-stalked, glabrous, 1-celled, many-seeded.

Subgen. 2. **Pogonophace, Bunge.** A group of various habit, with basifixed hairs, differing from all the rest by its penicillate stigma.
* Annuals with slender trailing stems and sessile pods (habit of Subgen. Trimeniaeus).

2. **A. amherstianus**, Benth. in Royle Ill. 199; corolla scarcely exceeding the calyx, pod 10-12-seeded with the valves but little inflexed. *Bunge Mon.* i. 5, ii. 3.

West Himalayas, temperate region, alt. 6-10,000 ft.; Kistwar, Kunawar, Chamba, Simla.—*Distrib.* Afghanistan.

Stems densely cespitose, diffuse, ½-1 ft., clothed with dense adpressed whitish hairs. Leaves short-petioled, 1-1½ in.; leaflets 13-17, narrow, oblong, obtuse, ½-2 in. long, densely clothed with thick adpressed white hairs; stipules minute, lanceolate. Flowers 4-10, in close distinctly-peduncled racemes; pedicels very short; bracts minute, setaceous. *Calyx* ⅓ in., shaggy with hairs like those of the leaves; teeth setaceous, as long as the tube. *Corolla* primrose-yellow. *Pod* linear, turgid, ⅗-⅞ in. long, much recurved, rostrate, thinly pubescent.

3. **A. subumbellatus**, Klotzsch in Reise Pr. Wald. Bot. 150, t. 3; corolla more than twice as long as the calyx, pod 20-24-seeded with the sutures much inflexed. A. hippocrepidis, Benth. MSS.; *Bunge Mon.* i. 5, ii. 3; *Bois. Fl. Orient.* ii. 231. A. Scorpiurus, *Bunge Mon.* loc. cit. A. humifusus, Jacqum. MSS.

Punjab, Hazara, Kashmir, tropical and temperate regions, ascending to 6-7000 ft.—*Distrib.* Beloochistan, Afghanistan.

Stems ½-1 ft., diffuse, branched, clothed with short deciduous ascending white hairs. Leaves 1-2 in.; leaflets 13-21, distant, oblong, glaucous, ⅝-⅞ in., thinly or densely plicate or nearly glabrescent; stipules minute, lanceolate, cuspitate. Racemes distinctly peduncled, 6-10-flowered, lax or close; pedicels very short; bracts setaceous, very minute. *Calyx* ⅓ in., thinly pubescent; teeth setaceous, as long as the tube. *Corolla* ⅓ in., yellow tinged with rose-purple; blade of wings lanceolate, shorter than the standard and keel. *Pod* ⅗-⅞ in., cylindrical, much recurved, shortly pubescent, almost completely bilocular.

**Perennials with slender cespitose trailing stems and stalked pods (habit of Subgen. Hypoglottis).**

4. **A. pycnorrhizus**, Wall. Cat. 5927; glabrous, flowers 1–2, calyx-teeth lanceolate nearly as long as the tube, wings shorter than the keel. *Benth. in Royle Ill.* 199; *Bunge Mon.* i. 4, ii. 1. Sphaerophysa pycnorrhiza, Benth. Gen. Plant. i. 504.

*Nipal, Wall.ckieh.* Sikkim, alt. 6-12,000 ft., *Hook. fil.*

Root woody, fusiform. Stems wiry, ⅓-1 ft. Leaves an inch or more long; leaflets close, 11-13, green, obovate-oblong, truncate-emarginate, ½ in. long, clothed with only a few very obscure hairs; stipules free, minute, membranous, deltoid. Peduncles equalling or exceeding the leaves, clothed with short mixed black and white hairs; pedicels very short; bracts membranous, lanceolate. *Calyx* ⅔ in., gibbous, clothed with minute pubescence like that of the peduncle. *Corolla* ⅔-⅞ in., purplish; limb of standard round, ⅓ in. broad; wings half as broad as the depth of the keel. *Pod* ⅗-⅞ in. long, glabrous, inflated, 12-16-seeded, the suture not inflexed; stalk much shorter than the calyx.

5. **A. Donianus**, DC. Prodr. ii. 283; slightly pubescent, flowers few, wings as long as the keel, calyx-teeth half as long as the tube. *Bunge Mon.* i. 4, ii. 1. A. macrorhizus, Don Prod. 245, *non* Cav.

*Nipal, Wall.ckieh.*

Plant prostrate, beset with a few scattered adpressed hairs. Leaves with 8–10-pairs of oval alternate mucronulate leaflets, which are pubescent beneath, but when
young silky; stipules connate. Peduncles twice as long as the leaves. Calyx $\frac{1}{4}$ in. long. Corolla purple; standard $\frac{3}{8}$ in. long, blade broad. Pod silky, subulate, 20-seeded. Described from DC. and Bunge loc. cit.—No specimen seen.

6. **A. kongrensis**, Benth. MSS.; green, finely silky, flowers in a dense head, wings shorter than the keel, calyx clothed with adpressed silky hairs, teeth lanceolate much shorter than the tube.

Sikkim; Kongra Lama, alt. 15,000 ft., Hook. fil.
Subcuneate, with a slender rhizome, creeping below the surface. Leaves distinctly petioled, 2-3 in. long; leaflets 15-17, roundish-oblong, obtuse, not complicate, pale green, thinly coated with short white hairs; stipules $\frac{1}{4}$-$\frac{3}{4}$ in., ovate, obtuse, persistent, slightly silky. Flowers 5-6, ascending or cernuous, in a dense head; peduncles 1$\frac{1}{2}$-2 in., erect, clothed with adpressed black hairs; pedicels very short, densely black-silky; bracts linear, not very small. Calyx $\frac{1}{4}$ in. Corolla twice the calyx, deep purple; keel as long as the standard. Ovary densely silky, multiovulate, with a stalk nearly as long as the calyx-tube.

7. **A. tribulifolius**, Benth. MSS.; glaucous, densely tomentose, leaflets crowded, flowers few in a dense head, calyx-teeth subulate as long as the tube, wings much shorter than the keel. *Bunge Mon.* i. 4, ii. 2.

Western Tibet, alpine region; valley below Hanle Rupchu, alt. 14,500 ft.; Thomson, Heyde.
Rootstock long, woody, fusiform. Stems and thick glaucous leaves densely clothed with short spreading white hairs. Leaves 1-2 in. long; leaflets crowded, 17-21, oblong, $\frac{1}{4}$-$\frac{3}{4}$ in. long; stipules minute, deltoid, leaf-like, free. Peduncles 1-2 in., the short pubescence growing black upwards; pedicels very short; bracts subulate, conspicuous, persistent. Calyx $\frac{1}{4}$ in., densely clothed with short black pubescence. Corolla purplish, half as long again as the calyx; standard $\frac{1}{4}$ in. broad. Ovary silky, distinctly stalked; ovules about 20. Pod not seen.

8. **A. Hendersoni**, Baker; glaucous, densely tomentose, leaflets crowded, flowers 1-2 together, calyx-teeth lanceolate shorter than the tube.

Tibet; upper part of the Karakash valley, Dr. Henderson.
Closely allied to the last, the thick glaucous crowded leaflets clothed with dense white hairs, the whole plant in the single specimen gathered not more than a couple of inches high. Leaves $\frac{1}{2}$-$\frac{1}{3}$ in. long; leaflets 15-17, obovate-oblong, obtuse, folded together. Peduncles short, clothed with short white pubescence. Calyx $\frac{1}{4}$ in., matted with mixed black and white hairs. Corolla seen in bud only. Pod oblong, the same size and shape, and as much inflated as in *A. pyenorhizus*, membranous, with a few short adpressed hairs and a short stalk; sutures scarcely at all intruded; seeds about 20.

** Tall perennials with almost woody stems, lax flowers, and long-stalked few-seeded pods (habit of Subgen. Phaca).**

9. **A. Falconeri**, Bunge Mon. i. 4; ii. 2; densely pubescent, stipules broad foliaceous, leaflets 13-17, pod turgid glabrescent. *A. acutiflorus*, Benth. MSS.

West Tibet, Falconer; Hazara, Winterbottom.
Stems flexuous, old glabrescent, young clothed with short spreading white pubescence. Leaves 1-1$\frac{1}{2}$ in. long; leaflets close, glaucous, obtuse, oblanceolate-oblong, $\frac{1}{4}$-$\frac{3}{4}$ in. long. Racemes few-flowered, long-peduncled; pedicels shorter than the calyx, downy. Calyx $\frac{1}{4}$ in., gibbous, nearly glabrous; teeth very short. Corolla lilac, $\frac{1}{3}$ in.; wings lanceolate, acute, as long as the keel. Pod $\frac{1}{4}$-$\frac{1}{2}$ in. long, narrowed to both ends, 4-6-seeded; stalk twice the calyx; infixed suture reaching all through in the lower part, not in the upper.

West Tibetan Himalayas, alt. 8-12,000 ft.; Dras, Zanskar, Piti, Ladak, Nubra.

Branches zigzag, glabrous, terete, woody, reaching several feet in height. Leaves 2-6 in. long; leaflets 25-41, green, obovate, emarginate, rather fleshy, lower 1/4-1/2 in. long, upper growing gradually smaller; stipules persistent, obliquely cordate-ovate. Racemes very lax, 1/2-1 ft.; pedicels very short; bracts minute, linear. Calyx 1/2 in., oblique, tubuloso-campanulate, glabrous; teeth minute, deltoid. Corolla lilac, 3/4 in., the petals subequal in length; limb of wing lanceolate, acute. Pod oblong, 3/4-1 in., narrowed to both ends, 4-8-seeded; lower suture hardly at all inflexed; stalk more than twice the calyx.

11. **A. trichocarpus**, *Grah.* in *Wall. Cat.* 5926; obscurely silky, stipules minute; leaflets very numerous, pod turbid finely downy. *Bunge Mon.* i. 4; ii. 2. A. sesbanioïdes, Benth. *in Royle Ill.* 199.; *Bunge loc. cit.*

Central Himalayas, temperate region, alt. 5-8000 ft.; Simla, Gurwhal, Kumaon.

Erect, suffruticosse, reaching several feet high, the branches straight, virgate, much furrowed. Leaves subsessile, 2-4 in.; leaflets 31-41, oblong, 1/2-1 in. long, subobtuse, pale green, clothed with minute silvery hairs. Racemes very copious, distinctly peduncled, erecto-patent, 2-4 in. long, with very numerous flowers; pedicels short, cernuous, clothed with dense short mixed black and white hairs; bracts linear, minute. Calyx glabrous, campanulate, oblique, 1/2 in.; teeth deltoid. Corolla lilac, 4-5 times the calyx; limb of standard round; wings lanceolate, shorter than the keel. Pod 3/4-1 in. long, oblong, completely 2-celled, 4-6-seeded; stalk much exceeding the calyx.

**Subgen. 3. Trimeniæus, Bunge.** Annual weeds with bisifixed hairs, small yellow flowers in usually dense heads, and glabrous stigmas.


Plains of Scinde and Punjab.—Distrib. Cape Verde islands; through Egypt to Arabia.

Stems very slender, 1/-1 ft., densely clothed upwards with adpressed white hairs. Leaves distinctly petioled, 1/2-1 1/2 in. long; leaflets distant, glaucous, 1/2-1 in., clothed with fine adpressed white hairs; stipules minute, lanceolate, free. Heads 6-12-flowered; peduncles rarely as long as the leaves. Calyx under 1/2 in., densely matted; teeth linear-setaceous, nearly as long as the tube. Corolla little exserted. Pod sessile, turbid, 1/4-3/8 in. long, densely pubescent.

13. **A. Aitchisoni**, Baker; heads very lax short-peduncled, leaflets oblong emarginate, pod very long and slender straight or slightly recurved slightly torulose unilocular 15-20-seeded.

**Punjab,** Salt range, Aitchison.

Stem suberect, 1/2 ft., slender, thinly white-canescent. Leaves distinctly petioled, 1 1/2-2 1/2 in. long; leaflets distant, 17-25, alternate, 1/4 in. long, grey-green, thinly coated with adpressed short white hairs; stipules minute, deltoid. Racemes 4-6-flowered; pedicels very short; bracts minute. Calyx 1/4 in. campanulate, thinly white-silky; teeth linear or lanceolate, nearly as long as the tube. Corolla twice the calyx, white with a purple tip; standard longer than the wings and keel. Pod 1 1/2 in. long, under 1/2 in. thick, thinly white-canescent at first; disseminet not at all incurved; seeds distant, very small.
14. **A. ophiocarpus**, Benth. MSS.; heads lax nearly sessile, leaflets oblong emarginate, pod very long and slender sickle-shaped slightly torulose unilocular 10–12-seeded. *Bunge Mon.* i. 10; ii. 6; *Boiss. Fl. Orient.* ii. 224.

**Ladak,** alt. 11,000 ft., Thomson.—**Distrib.** Persia.

*Stems* slender, diffuse, \( \frac{1}{5} \)–\( \frac{1}{2} \) ft., densely finely white-downy. *Leaves* distinctly petioled, \( \frac{1}{2} \)–1 in. long; leaflets moderately close and thick, distinctly notched at the apex, matted on both sides with short white hairs; stipules lanceolate, very minute. *Racemes* 3–6-flowered; pedicels and bracts minute. *Calyx* under \( \frac{1}{10} \) in., densely matted; teeth lanceolate, shorter than the tube. *Corolla* nearly twice the calyx, its petals subequal in length. *Pod* 1–1\( \frac{1}{2} \) in. long, thick, finely downy, the dissempet not at all incurved, the oblong seeds with a space corresponding to the slight constrictions of the pod between them.


**Plains of Punjab.—** **Distrib.** Canaries, through Egypt to Afghanistan.

*Stems* slender, densely cespitose, trailing, \( \frac{1}{4} \)–1 ft., densely clothed upwards with ascending white hairs. *Leaves* distinctly petioled, 1–2\( \frac{1}{2} \) in. long; leaflets mostly close, densely clothed with long white hairs on both sides; stipules minute. *Heads* 6–10-flowered. *Calyx* tubular, \( \frac{1}{8} \)–\( \frac{1}{4} \) in., densely matted; teeth setaceous, shorter than the tube. *Corolla* pale yellow, little exserted. *Pods* \( \frac{3}{4} \) in. long, turgid, densely pubescent, the cluster often spreading from the stem like the spokes of a wheel from the axis.


**Plains of Punjab at Lahore, Peshawur, &c.—** **Distrib.** Canaries, Mediterranean region, Orient.

More robust and less hairy than the other species, the stems 1–2 ft. long. *Leaves* distinctly petioled, \( \frac{1}{4} \)–\( \frac{1}{2} \) ft. long; leaflets distinctly stalked, pale green, \( \frac{1}{4} \)–\( \frac{1}{3} \) in. long, glabrescent above, or thinly matted with silvery hairs on both sides. *Heads* 6–20-flowered; peduncles much shorter than the leaves. *Calyx* \( \frac{1}{4} \) in., matted with mixed black and white hairs; teeth subulate, as long as the tube. *Corolla* pale yellow, half as long again as the calyx. *Pod* \( \frac{1}{3} \)–1 in. long, cylindrical, firmer than in its neighbours, quite glabrous.

17. **A. gracilipes**, Benth. MSS.; heads dense peduncled few-flowered, leaflets 0–13 oblong obtuse, pod cylindrical pubescent little recurved 10–12-seeded half-bilocular. *Bunge Mon.* i. 15; ii. 17.

**West Tibet**; Zanskar and Indus valley, alt. 11–14,000 feet, Thomson.

Acacaleanous, or stems short, suberect, densely clothed with ascending strong white hairs. *Leaves* long-petioled, 1–3 inches long; leaflets distant, greenish, \( \frac{1}{4} \)–\( \frac{1}{3} \) in. long, densely clothed with hairs like those of the stem; stipules minute. *Heads* 3–6-flowered; peduncles pilose, 2–4 in. *Calyx* \( \frac{1}{4} \) in., tubular; teeth short, setaceous. *Corolla* pale yellow, twice the calyx; standard narrowed suddenly into a deltoid tip, the wings shorter and keel shorter still. *Pod* \( \frac{1}{3} \)–\( \frac{2}{3} \) in. long by \( \frac{1}{3} \) in., sessile, clothed with short dense white bristly hairs.

Plains of Punjab and Scinde.—Distrib. East Europe, Orient, West Siberia.

Stems suberect, $\frac{3}{4}-1\frac{1}{4}$ ft., densely clothed with short soft spreading white hairs. Leaves distinctly peltioted, 3-4 inches long; leaflets $\frac{3}{4}-\frac{1}{4}$ in., distant, greenish, thin at first, densely pilose on both sides; stipules lanceolate, free, larger than in all the preceding. Heads very dense, many-flowered, on pilose peduncles much shorter than the leaves. Calyx $\frac{1}{8}$ in., densely pilose; teeth setaceous, plumose, exceeding the tube. Corolla little exerted, the lanceolate acute wings shorter than the standard and keel. Pod $\frac{1}{2}$ in. long, sausage-shaped, membranous, rugose, completely conduplicate.

Subgen. 4. Podolotus, Royle. A caulacens perennial, with a few obscure basifixed hairs and naked stigma, differing from all the other groups by the endocarp of the unilocular pod separating as a thin membrane and produced into septa between the seeds.


Kumaon and Gurwhal, temperate region.

Stems slender, glabrous, zigzag, densely cespitose, $1\frac{1}{4}-1\frac{1}{4}$ ft. Leaves short-peltioted, 1-1$\frac{1}{2}$ in.; leaflets 13-15, green, glabrous, oblong, obtuse, $\frac{1}{4}-\frac{1}{2}$ in.; stipules minute, deltoid. Peduncles equalling or exceeding the leaves, 1-2-flowered. Calyx $\frac{1}{8}$ in., glabrous; teeth short, deltoid. Corolla yellow, twice the calyx; petals equal in length, wings and keel abruptly incurved. Pod linear, turgid, straight, $\frac{3}{4}-\frac{3}{4}$ in. long, 5-6-seeded, with a stalk as long as the calyx.

Subgen. 5. Hypoglottis. Herbaceous perennials, with basifixed hairs, flowers in dense mostly peduncled capitate heads, and naked stigmas.

* Heads sessile or peduncled. Flowers lilac or purple.

20. A. confertus, Benth. MSS.; stems very dwarf densely cespitose thinly clothed with adpressed white hairs, leaflets 11-13, calyx clothed with adpressed black hairs, teeth linear shorter than the tube, pod stalked unilocular few-seeded. Bunge Mon. i. 23; ii. 27.

West Tibet, alpine region; Pangong and Parang valley, alt. 15-17,500 ft., Thomson, Henderson.

Rhizome woody, fusiform, the whole plant not more than 1-3 inches high above the soil. Leaves $\frac{1}{4}-\frac{1}{2}$ in. long; leaflets silvery, thick, close, complicate, oblong, densely canescent, $\frac{3}{4}$ in. or less long; stipules small, lanceolate. Heads 6-8-flowered; peduncle 1-1$\frac{1}{2}$ in., mostly subradical, clothed with adpressed black and white silky hairs; pedicels and bracts very small. Calyx $\frac{1}{2}$ in., the tube campanulate. Corolla twice the calyx; keel and wings subequal, rather shorter than the standard. Ovary silky, not seen fully developed.

21. A. rigidulus, Benth. MSS.; stems very short glabrous, leaflets 17-21, calyx clothed with adpressed black silky hairs, teeth lanceolate as long as the tube, pod oblong turgid sessile unilocular 6-8-seeded. Bunge Mon. i. 23; ii. 25.

Sikkim, alpine region; Tungu, alt. 13,000 ft., Hook. fil.

Rhizome slender, much branched below the surface, the whole plant closely resembling A. alpinus in habit, not more than 3-4 inches high above the soil. Leaves distinctly peltioted, 1-1$\frac{1}{2}$ in.; leaflets green, linear-oblong, obtuse, $\frac{1}{4}-\frac{1}{2}$ in. long, thinly coated with adpressed white hairs; stipules $\frac{1}{4}$ in. deltoid, membranous. Heads 6-10-flowered; peduncles and pedicels both very short. Calyx under $\frac{1}{4}$ in. Corolla twice the calyx; limb of standard oblong, exceeding the wings and keel. Pod glabrous, oblong, membranous, $\frac{1}{2}$ in. long.

22. A. alpinus, Linn. Sp. 1070?; stems short slender clothed with adpressed white silky hairs, leaflets 11-13, calyx clothed with adpressed mixed
black and white silky hairs, teeth setaceous as long as the tube, ovary stalked glabrous few-ovuled. Phaea astragalina, DC. Prodr. ii. 274?

West Tibet; Burgil pass, Winterbottom.—Distrib. Alpine region through north temperate zone.

Stems 3-4 in. high, simple, ascending. Leaves about an inch long; leaflets oblong, acute, pale green, thinly coated with close silvery hairs on both sides; stipules deltoid, foliaceous, rather large. Peduncles 1-1 1/2 in., thinly silky. Heads 3-6-flowered; bracts linear, exceeding the short pedicels. Calyx 1/4 in. Corolla twice the calyx; wings shorter than the standard and keel. Pod not seen.—The Sikkim plant referred here by Bunge is our A. kongreensis.

23. **A. tibetanus**, Benth. MSS.; stems slender short ascending thinly clothed with adpressed mixed black and white hairs, leaflets 21-25, calyx-teeth densely black-silky setaceous a third as long as the tube, pod linear stalked bilocular 6-10-seeded. Bunge Mon. i. 52; ii. 85; Boiss. Fl. Orient. ii. 250. A. Maxwellii, Royle Ill. 108?

West Tibet, temperate and alpine region, alt. 9-14,000 ft.; Dras, Zanskar, Nubra, Ladak, Thomson, Henderson.—Distrib. Afghanistan.

General habit of A. Hypoglottis, to which it is closely allied. Stems zigzag, firm, slender, branched, 3-4 ft. Leaves 2-4 in. long, distinctly petioled; leaflets oblong, obtuse, moderately close, pale green, thinly canescent at first, glabrescent above when mature; stipules small, lanceolate or deltoid, free. Heads subglobose, 10-20-flowered; peduncles 1-4 in., the black hairs predominantly upwards; bracts lanceolate, much exceeding the short black pedicels. Calyx 3/4 in., the teeth densely, the tube thinly black-silky. Corolla twice the calyx; wings shorter than the standard; keel still shorter. Pod 1/4-3/4 in., rather recurved, finely black-silky; stalk shorter than the calyx-tube.

24. **A. hypoglottoides**, Baker; stems slender short ascending thinly clothed with adpressed white hairs, leaflets 17-19, calyx densely coated with mixed black and white silky hairs, teeth linear a third as long as the tube, ovary stalked 8-10-ovulate.

Tibetan Himalayas, the exact station not known, Dr. Henderson.

Closely allied to the last, with which it agrees in general habit. Leaves 1-1 1/2 in. long; leaflets oblong, obtuse, pale grey green, persistently coated on both sides with adpressed silvery hairs; stipules foliaceous, connate in lower half. Flowers 12-20, in a dense head, not more than half the size of those of A. Hypoglottis and tibetanus; peduncles 1-2 in. long, with a few black hairs mixed with the white ones upwards. Calyx 3/4-1 1/2 in. Corolla deep purple, 3/4 in., the proportion of the petals as in the last. Developed pod unknown.

25. **A. lessertioides**, Benth. MSS.; stems short firm erect glabrous, leaflets 9-11, calyx-teeth linear densely black-silky half as long as the nearly naked tube, pod stalked silky unilocular 3-4-seeded. Bunge Mon. i. 24; ii. 28.

Sikkim, alpine region; Tungu, alt. 13,000 ft., Hook. fil.

Whole plant under a foot high. Leaves 1-2 in. long; leaflets green, oblong, obtuse, 1-1 1/2 in. long, with a few black hairs; stipules foliaceous, lanceolate, 1-1 1/2 in. long, ciliated at first with black hairs; petiole twice as long as the stipules. Heads 12-20-flowered. Pedicels very short; peduncles erect 1-1 1/2 ft., with a few adpressed black hairs in the upper half; bracts minute, shaggy with black hairs. Calyx 1/4-1 1/2 in., tube campanulate, nearly naked; teeth black-plumose. Corolla 1/4 in., petals sub-equal. Pod 1 1/2 in. densely silky, narrowed from the middle to both ends; stalk as long as the calyx-tube.

26. **A. strictus**, Grah. in Wall. Cat. 5924; stems short slender ascending
clad with adpressed white silky hairs, leaflets 19–25, calyx clad with adpressed mixed black and white hairs, teeth linear shorter than the tube, pod stalked linear-oblong unilocular 6–8-seeded. *Benth.* in *Royle Ill.* 198; *Bunge Mon.* i. 23; ii. 27. A. mutabilis, *Jacquem.* MSS.

Through the Himalayas in the alpine region, alt. 11–16,000 ft., from *Nubra* and *Ladak* to *Sikkim* and *Silhet*.

*Stems* densely caespitose, firm but slender, branched, 1–1 ft. long. *Leaves* short-petioled, 1–1½ in. long; leaflets close, oblong, obtuse, ½–⅔ in. long, pale green, persistently coated with adpressed white hairs; stipules small, deltoid, free, foliaceous. *Heads* very dense, 20–40-flowered; peduncles 2–4 in., with a few black hairs mixed with the silvery ones near the top; pedicels black, shorter than the minute bracts. *Calyx* ⅓ in. *Corolla* twice the calyx; wings and keel shorter than the standard. *Pod* ⅓ in. long, short-stalked, rather recurved, clothed like the calyx.

27. *A. oxyodon*, *Baker*; stems short slender ascending clad with adpressed white silky hairs, leaflets 15–17, calyx clad with adpressed mixed black and white hairs, teeth setaceous twice as long as the tube, ovary stalked 5–6-ovulate.

*West Tibet*, Falconer.

General habit of *A. strictus*. *Stems* densely caespitose, ¼–1 foot high. *Leaves* 1–1½ in. long; leaflets oblong, obtuse or subacute, densely white-strigillose on the back, thinly on the face, alternate, the lower distant; stipules moderately large, con- nate, silky on the back. *Peduncles* 2–3 in., very slender, densely clothed with adpressed mixed black and white hairs; pedicels black, very short; bracts ½–⅔ in., lanceolate, membranous. *Calyx* ⅓ in.; *tube* caespitose; teeth much longer in proportion than in any of its allies. *Corolla* ⅔ in.; keel and standard equal; wings much shorter. *Mature pod* not seen; ovary thinly silky.


*West Himalayas*, alpine region, alt. 12–17,000 ft.; *Lahul*, *Sassar*, *Zanskar*, *Ladak*, *Kunawa*.—*Distr.* Afghanistan, Central Siberia.

*Stems* densely caespitose, rigid, erect, 1–1 ft. long. *Leaves* 1–2 in. long; leaflets thick, oblong, glaucous, obtuse, ⅔ in. long, obscurely white-strigillose on both sides; stipules small, deltoid, foliaceous, free. *Peduncles* 1–4 in., with a few black and white hairs in the upper half; bracts minute, linear, black, ciliated, exceeding the very short black pedicels. *Corolla* ⅓–⅔ in., campanulate; teeth shorter than the tube. *Corolla* lilac, three times as long as the calyx; keel and wings much shorter than the standard. *Pod* rugose, silky, ⅜ in. long, turgid, membranous.


*West Himalayas*, alpine region, alt. 10–15,000 ft.; *Kashmir*, *Lahul*, *Tibet*.

*Stems* 1¼–2 ft. high, moderately stout. *Leaves* distinctly petioled, 1–3 in. long; leaflets oblong, glaucous-green, obtuse or emarginate, ⅔ in. long, nearly naked; stipules ⅔–⅜ in., free, foliaceous, deltoid-cuspidate. *Heads* dense, 1–3 in. long; peduncles 2–6 in. long, clothed with short spreading mixed black and white hairs, dense at the base of the head; bracts ⅔–⅞ in., lanceolate, foliaceous, persistent. *Calyx* ⅜–⅓ in. nearly sessile. *Corolla* narrow, half as long again as the calyx; keel and wings shorter than the standard. *Pod* included in the calyx, ⅝ in. long, clothed with fine black silky hairs.
30. **A. bhotanensis**, *Baker*; stems firm elongated glabrous, leaflets 21-25, calyx glabrous, teeth short linear, pod cylindrical sessile many-seeded half-bilobular.

*Bhotan*, temperate region; grassy banks at Panga, 7000 ft., *Griffith*.

*Stems* 1-2 feet high, slender glabrous, terete, with distant nodes and ascending branches. *Leaves* 2-4 in. long; leaflets oblanceolate-oblong, obtuse, 1/4-3/4 in. long, green and glabrescent above, clothed with a few obscure adpressed hairs below; stipules free, lanceolate, 1/3-1 in. *Flowers* 12-20, in very dense heads; peduncles 2-5 in. long, with only a few obscure adpressed white hairs at the top; bracts lanceolate, glabrous, 1/3-1 in. *Calyx* nearly sessile, 1/2 in. long, tubular; teeth a third as long as the tube. *Corolla* twice the calyx, colour uncertain; wings rather shorter than the keel and the latter than the standard. *Pod* firm, turgid, straight, 1/3-3 in. long; seeds about 20.

31. **A. inconspicuus**, *Baker*; stems short filiform trailing subglabrous, leaflets 15-17, calyx-tube with a few adpressed black hairs, teeth minute lanceolate or setaceous, pod stalked unilocular 10-12-seeded.

*Kumaoon*; banks of the Ralam river, alt. 9000 ft., *Strachey and Winterbottom*.

Habit of a small *Vicia*. *Leaves* 1-1 1/2 in. long; leaflets opposite, oblong, obtuse, 1/3 in. long, green, glabrescent when mature, thinly silky at first; stipules minute, lanceolate. *Flowers* 2-4 together, on a short peduncle clothed with ascending grey silky hairs; pedicels distinct, but shorter than the minute deltoid bracts. *Calyx* 1/3 in., tubuloso-campanulate, nearly naked. *Corolla* scarcely twice the calyx, the petals equal in length. *Pod* not seen mature.

32. **A. tenuicaulis**, *Benth. MSS.*; stems elongated subglabrous very weak and slender, leaflets 13-15, calyx thinly clothed with short black hairs, teeth not more than 1/4-1/3 as long as the tube, pod oblong sessile unilocular 4-6-seeded. *Bunge Mon.* i. 23; ii. 28.

**Sikkim** and **East Nipal**, temperate region, alt. 7-9000 ft., *Hook. fil.*

*Stems* straggling, branched, a foot or more long. *Leaves* 1-1 1/2 in.; leaflets oblong, obtuse, opposite, thin, glaucous green, finely downy; stipules free, minute. *Heads* 4-8-flowered, not very dense; peduncles an inch or less long, finely downy; bracts lanceolate or deltoid, minute. *Calyx* 1/3 in., tubuloso-campanulate. *Corolla* 1/3 in.; standard slightly exceeding the keel and wings. *Pod* 1/4 in. turgid, membranous, obscurely downy.—General habit of an *Ervum*.

33. **A. sikkimensis**, *Benth. MSS.*; stems elongated slender weak nearly glabrous, leaflets 19-21, calyx clothed with adpressed black hairs, teeth half as long as the tube, pod small oblong stalked unilocular 2-3-seeded. *Bunge Mon.* i. 23; ii. 28.

**Sikkim** and **East Nipal**, alt. 8-12,000 ft., *Hook. fil.*

*Stems* 1-2 feet, erect, very slender, with distant nodes clothed only with a little minute adpressed white pubescence. *Leaves* 13-2 in. long; leaflets oblong, obtuse or emarginate, clothed when young with adpressed white silky hairs, green and glabrescent above when mature; stipules minute, lanceolate, falcate. *Peduncles* short, clothed with copious adpressed black hairs; flowers 20-30 in an oblong head; pedicels black, very short; bracts deltoid, minute. *Calyx* 1/3 in. tubuloso-campanulate. *Corolla* twice the calyx; standard slightly exceeding the keel and wings. *Pod* 1/4 in. long, membranous, turgid, densely black-silky; stalk as long as the calyx-tube.

34. **A. himalay anus**, *Klotzsch Reise Pr. Wald. Bot.* 160, t. 4; stems elongated slender weak nearly glabrous, leaflets 21-25, calyx clothed with minute adpressed black and white hairs, teeth half as long as the tube, pod linear-oblong stalked subunilocular 5-6-seeded. **A. carinalis**, *Benth. MSS.*; *Bunge Mon.* i. 23; ii. 28. *Phaca longicaulis* and *cachemirica*, *Benth. MSS.*
West Himalayas, temperate and alpine region, alt. 5-13,000 ft. ; Lahul, Kulu, Kunwar, Kashmir, Garwhal.

Stems very slender, 1-2 feet long, with distant internodes, clothed when young with a few minute adpressed white hairs. Leaves 1 1/2-2 in. long; leaflets thin, oblong, obtuse or acuminate, 1/3-1/2 in. long, pale green, with a few short adpressed white hairs; stipules minute, lanceolate, spreading. Peduncles shorter than the leaves, clothed with mixed black and white hairs; pedicels 1/4 in.; bracts very minute. Calyx 3/4-1 in., campanulate. Corolla 3/4 in., keel slightly exceeding the wings, falling short of the standard. Pod 3/2 in. long, membranous, finely black-silky; stalk exceeding the calyx.—A specimen gathered by Strachey and Winterbottom at the Melam glacier in Kumaon has setaceous calyx-teeth, twice as long as the campanulate tube, and will probably prove a new species between A. himalayanus and Maddenianus.

35. A. Maddenianus, Benth. MSS.; stems elongated slender weak clothed at first with short spreading black and white hairs, leaflets 19-21, calyx clothed with minute adpressed black and white hairs, teeth setaceous as long as the tube, pod stalked unilocular 3-4-seeded.

Kumaon; temperate region, alt. 10-11,000 ft., Madden, Edgeworth.

General habit exactly as in A. himalayanus, but the young branches densely beset with short spreading black and white bristly hairs. Leaves 1 1/2 in. long; leaflets oblanceolate-oblong, obtuse, densely clothed at first on both sides with adpressed silky hairs; stipules minute, spreading. Heads few-flowered; peduncle 1/2-1 in., clothed like the branches; bracts linear, exceeding the short black pedicels. Calyx 1 1/2 in. Corolla 1 3/4 in.; wings much shorter than standard and keel. Pod 3/2 in. long, membranous, densely white-silky, narrowed to both ends; stalk exceeding the calyx.

** Heads peduncled. Flowers yellow.**

36. A. cashmirensis, Bunge Mon. i. 30; ii. 34; stems elongated shaggy with long hairs, leaflets 29-33, calyx thinly clothed with long hairs, corolla much exserted, pod sessile finely pubescent bilocular 0-8-seeded.

Kashmir, temperate region, alt. 9-10,000 ft., Jacquemont, Falconer.

Stems stout, erect or ascending, under a foot high. Leaves distinctly pectiolo, 3-4 inches long; leaflets close, oblong, obtuse or acute, 3-1/2 in. long, dull green, clothed densely at first with long fine hairs; stipules 1/2 in. long, free, lanceolate, membranous, striated. Heads dense, round; peduncle 1 3/2 in.; pedicel 1 4/4 in., shaggy; bracts linear, plumose, persistent, 1-3/4 in. long. Calyx 3/4-1 in.; teeth linear, shorter than the tube. Corolla 3/4 in.; standard exceeding the wings and keel. Pod 3/2 in. long, firm in texture, linear-oblong, straight, hollowed down the keel, narrowed into a long beak.

Var. i. Falconeri, Baker; taller, much less shaggy, stipules narrower 3/4 inch long, leaflets 31-34 broad-oblong obtuse.—Kashmir, Falconer.

37. A. floridus, Benth. MSS.; stems elongated clothed with minute rather spreading black hairs, leaflets 25-31, calyx densely clothed with adpressed black hairs, pod long-stalked unilocular 4-5-seeded. Bunge Mon. i. 24; ii. 28.

Sikkim, alpine region; Tugu, alt. 13,000 ft., Hook. fil.

Stems moderately stout, erect, 3-4 ft. Leaves 1 1/2-3 in.; leaflets linear-oblong, glaucous, subacute, 3-1/2 in., thinly clothed with adpressed silky bristles; stipules lanceolate or deltoid, free, 1 3/4 in. Heads round or oblong, 12-30-flowered, the lower flowers cernuous; peduncle 1-2 in., densely black-silky; pedicels black, 1 1/2 in.; bracts linear, minute. Calyx under 1 1/2 in.; teeth short, linear. Corolla bright yellow, twice the calyx; petals nearly equal. Pod linear-oblong, 1/2 in. long, narrowed to both ends, densely black-silky; stalk as long as the calyx-tube.
38. **A. leucocephalus**, *Grah. in Wall. Cat. 5923*; stems short slender densely clothed with loose white hairs, leaflets 21-31, calyx shaggy with white hairs, corolla little exserted, pod minute oblong sessile unilocular 3-4-seeded. *Benth. in Royle Ill. 198, t. 32; Bunge Mon. i. 48; ii. 70; Boiss. Fl. Orient. ii. 241.*

West Himalayas, temperate and tropical zone, alt. 1-7,000 ft.; **Punjab, Kashmir, Simla, Gurwhal, Kumaon.**—**Distr.** Afghanistan.

Stems densely cespitose, ascending, \( \frac{1}{4} \) ft., densely persistently tomentose. *Leaves* 1-3 in. long; leaflets close, oblong, glaucous, densely argenteo-canescent, thick, obtuse or subacute. \( \frac{1}{4} \) in. long; stipules small, foliacaceous, connate below the middle. *Heads* small, very dense, oblong; peduncles 2-6 in., densely white-tomentose; bracts lanceolate, exceeding the buds. *Calyx* \( \frac{4}{6} \) in. long, subossise, very shaggy; teeth setaceous, as long as the tube. *Corolla* pale yellow, \( \frac{1}{2} \) in.; keel rather shorter than the standard and wings. *Pod* \( \frac{3}{2} \) in. long, included in the calyx, finely downy.

*** Heads few-flowered, sessile or nearly so, in the axils of the leaves of an elongated stem; flowers yellow.

39. **A. Munroii**, *Benth. MSS.; Bunge Mon. i. 30; ii. 35.*

Tibet Himalayas, alpine region; Piti, **Lahul, Ladak.**—**Distr.** Kashgar, Bellew.

Rhizome stout, long, woody, fusiform. *Stems* cespitose, stout, erect, \( \frac{1}{4} \) ft., shaggy throughout with dense spreading white hairs. *Leaves* 1-2 in. long; leaflets 19-21-oblong, obtuse, \( \frac{3}{4} \) in. long, thinly clothed with loose white hairs; stipules \( \frac{3}{4} \) in., free, linear, or lanceolate. *Calyx* short-pedicelled, \( \frac{3}{4} \) in., thinly pubescent; teeth linear-setaceous, nearly as long as the tube. *Corolla* \( \frac{2}{3} \) in., pale yellow; petals subequal. *Pod* oblong, sessile, membranous, much inflated, an inch long, nearly bilocular, 10-12-seeded.

**Subgen. 6. Phaca.*** Herbaceous perennials or undershrubs with flowers in elongated racemes, basi-fixed hairs and naked stigmas.

* Stipules small.


Tibetan Himalayas, alpine region, alt. 9-12,000 ft.; **Ladak, Zanskar, &c., Thomson.**—**Distr.** Western and Central Siberia.

An erect undershrub, 2-3 ft. high, with numerous erecto-patent stiff virgate glabrous branches. *Leaves* 2-3 in. long; leaflets distant, thick, pale green, glabrescent, \( \frac{3}{4} \) in. long; stipules minute, lanceolate, free, spreading, caducous. *Racemes* very lax, \( \frac{3}{4} \) ft. long; peduncles stiff, ascending, \( \frac{3}{4} \) ft.; pedicels \( \frac{3}{4} \) in.; bracts very minute. *Calyx* campanulate, \( \frac{3}{4} \) in. long, with a few minute adpressed black hairs; teeth deltoid-cuspidate. *Corolla* \( \frac{3}{4} \) in.; keel much shorter than the wings and standard. *Pod* \( \frac{4}{5} \) in. long, glabrous, turbid, narrowed to a beak, nearly straight.

41. **A. chlorostachys**, *Lindl. in Trans. Hort. Soc. viii. 249; shrubby, leaflets 13-17 oblong, calyx-teeth very short, bracts lanceolate, corolla pale green tinged with lilac, pod oblong turbid stalked bilocular 6-10-seeded. *Bunge Mon. i. 27; ii. 32. A. Govanianus, Grah. in Wall. Cat. 5925. A. himalensis, *Jacquem. MSS.*

West Himalayas, alpine and temperate region, alt. 5-14,000 ft.; **Pangi, Lahul, Kashmir, Simla, Kumaon, Gurwhal.**

* Name used here in a much more restricted sense than in Bunge's Monograph.
An undershrub, several feet high, with abundant slender branches, pubescent when mature, clothed with short spreading hairs above. *Leaves* $\frac{1}{2}$-$1$ ft. long; leaflets thin, oblong, obtuse, $\frac{1}{2}-\frac{3}{4}$ in. long, green, glabrescent above, glaucous, finely white-silky beneath; stipules lanceolate, free, small, spreading. *Racemes* close, copious, long-peduncled, 2-4 in. long; pedicels $\frac{1}{4}$ in. long; bracts lanceolate, scarcely exceeding the buds. *Calyx* tubular, under $\frac{1}{4}$ in. long, finely downy, oblique at the mouth, the teeth deltoid. *Corolla* twice the calyx; petals subequal. *Pod* turgid, membranous, glabrous, $\frac{1}{3}$ in. long, narrowed to both ends; its stalk twice the calyx.

42. **A. Stewartii**, Baker; shrubby, leaflets 13-15 oblong, calyx-teeth half as long as the tube, bracts long setaceous plumose, corolla pale yellow tinged with lilac, pod oblong turgid stalked bilocular 6-8-seeded.

HAZARA, temperate region, alt. 5-9000 ft., Dr. J. L. Stewart.

Habit of the last, from which it differs by its leaves persistently and densely white-silky, and long setaceous plumose calyx-teeth and bracts, the latter conspicuously protruded beyond the buds. *Stipules* $\frac{1}{3}$ in., linear-setaceous, spreading, caducous. *Branches* firm, many-ribbed, clothed with copious adpressed short white hairs. *Racemes* $\frac{1}{2}$-$\frac{3}{4}$ ft., in the single specimen panicked near the base. *Calyx* $\frac{1}{4}$ in. long, including the teeth, densely silky. *Pod* $\frac{1}{3}$-$\frac{1}{2}$ in. long, oblong, glabrous, very turgid, fully bilocular.

43. **A. longicaulis**, Baker; shrubby, leaflets 21-25, narrow-oblong, calyx-teeth half as long as the tube, bracts long setaceous plumose, corolla pale yellow-lilac, pod oblong turgid stalked bilocular 10-12-seeded.

KASHMIR, temperate region, Falconer.

General habit of the two preceding, to which it is closely allied. *Branches* with only a few adpressed short silky hairs. *Leaves* 4-6 in. long; leaflets $\frac{1}{2}-\frac{3}{4}$ in. long, finely white-silky, greenish above, glaucous beneath; stipules minute, free, lanceolate. *Bracts* as in the last. *Calyx* $\frac{1}{4}$ in., with copious minute adpressed black hairs and deciduous longer white ones. *Pod* $\frac{1}{2}$-$\frac{3}{4}$ in. long, glabrous, narrowed to both ends; its stalk $\frac{1}{2}$-$\frac{3}{4}$ in. long.

44. **A. ciliolatus**, Benth. MSS.; stems herbaceous, leaflets oblong 17-19, calyx-teeth elongated setaceous, corolla yellow tinged with lilac, pod oblong turgid stalked bilocular 8-10-seeded. *Bunge Mon.* i. 27; ii. 33.

West Himalayas, temperate region; LADAK, KASHMIR, KISTWAR, alt. 6-9000 ft.; Thomson, Falconer.

*Stems* 1-2 ft. or more high, firm, hollow, erect, glabrous. *Leaves* reaching $\frac{1}{2}$-$\frac{3}{4}$ ft. long; leaflets thin, obtuse, green and glabrescent, $\frac{1}{3}$-$\frac{1}{4}$ in. long, glaucous, thinly white-silky at first below; stipules $\frac{1}{4}$-$\frac{1}{2}$ in., free, persistent, lanceolate or deltoid. *Racemes* long-peduncled close, subsecund; bracts linear, not exceeding the buds. *Calyx* $\frac{3}{4}$ in., oblique, tubular; teeth setaceous, plumose, half as long as the tube. *Corolla* nearly twice the calyx; keel shorter than the other petals, broad, abruptly upcurved. *Pod* 1 in. long, oblong, turgid, membranous narrowed into a beak, clothed with fine short spreading black hairs; stalk as long as the calyx.

45. **A. xiphocarpus**, Benth. MSS.; herbaceous, leaflets 21-25 oblong, corolla yellow, calyx-teeth short linear, pod ensiform subcompressed stalked bilocular 8-12-seeded. *Bunge Mon.* i. 27; ii. 32.

East Himalayas, alpine region, alt. 10-11,000 ft.; SIKKIM and East NIPAL, Hook. fil.

*Stems* 2-3 ft. high, erect, hollow, obscurely pubescent upwards, glabrous below. *Leaves* $\frac{1}{4}$-$\frac{1}{2}$ ft. long; leaflets thin, narrow, oblong, obtuse, 1-1$\frac{1}{4}$ in. long, green, glabrescent above, glaucous, thinly silvery below; stipules lanceolate, spreading, free, $\frac{3}{4}$-$1$ in.
Racemes long-peduncled, at first close, finally 2–3 in. long; pedicels 1 1/2 in., black; bracts lanceolate, not protruded. Calyx 3/4 in., tubular, with a few black hairs; teeth more densely black-silky, less than half as long as the tube. Corolla bright yellow, 1/4–5 in.; petals subequal. Pod 1–1 1/2 in. by 1/2–5 in., glabrous, membranous, narrowed gradually to both ends, rather recurved; stalk as long as the calyx.

46. A. emodi, Steud. Nomen. edit. 2, p. 161; herbaceous, leaflets oblong 21–25, calyx-teeth half as long as the tube, corolla yellow, pod long-stalked oblong turdug subbilocular 12–16-seeded. Bunge Mon. i. 28; ii. 33. A. podocarpus, Grah. in Wall. Cat. 5930, non C. A. Meyer.

Kumaon, alt. 10–11,000 ft., Blinkworth, Strachey and Winterbottom. Stems tall, fistular, stout, erect, glabrous. Leaves 6–9 in. long; leaflets thin, obtuse, 3/4–5 in. long, glabrescent on both sides, green above, glaucous beneath; stipules lanceolate, acute, free, reflexed. Racemes long-peduncled, 2–3 in. long; pedicels ascending, 1/4 in. long, finely downy; bracts lanceolate, 1/4–3 in. Calyx 1/4 in., long, subglabrous, tubular. Corolla twice the calyx; petals equal. Pod oblong, turdug, membranous, glabrous, 1 1/4–1 1/2 in. long, narrowed gradually into a beak; stalk 1 3/4–4 in. long.

47. A. khasianus, Benth. MSS.; shrubby, leaflets oblong 21–25, calyx-teeth minute, corolla yellow, pod oblong turdug stalked bilocular 12–16-seeded. Bunge Mon. i. 27; ii. 32.

Khasia, temperate region, alt. 6–7000 ft., Hook. fl. and Thomson, Griffith. Stems tall, erect, shrubby, much branched, subglabrous. Leaves 4 in. long; leaflets thin, narrow oblong, obtuse, 1/4–3 in. long, green and glabrescent above, glaucous with a few adpressed white hairs below; stipules lanceolate, free, 1/4 in. long. Racemes long-peduncled, moderately close, subseund, finally 3–4 in. long; pedicels 1/2 in., finely downy; bracts lanceolate, caduceous, 1/2 in. Calyx 1/4 in., tubular, scarcely at all pilose. Corolla twice the calyx; petals subequal. Pod oblique oblong, very turdug, membranous, glabrous; stalk exceeding the calyx.


West Tibetan Himalayas and Kunawar, alt. 6–10,000 ft., Thomson, Munro.—Distrib. Afghanistan. A tall undershrub, with copious erecto-patent terete virgate glabrous branches. Leaves 4–5 in. long; leaflets opposite, firm, glabrous, obtuse, glaucous, 1/4–3 in. long; stipules free, minute, deltoid. Racemes long-peduncled, at first close; finally 1/4–5 ft. long; pedicels short, pilose; bracts linear, not protruded. Calyx 3/4 in., tubular, thinly pilose; teeth setaceous, half as long as the tube. Corolla 3/4 in.; keel abruptly incurved, much shorter than the wings and standard. Pod glabrous, very turdug, 1–1 1/2 in. long, narrowed to both ends; stalk finally longer than the calyx.

** Stipules large.

49. A. frigidus, Bunge Mon. i. 25; ii. 28; herbaceous, leaflets 9–15 oblong, calyx-teeth minute, pod oblong stalked unilocular 6–8-seeded. Phaca frigida, Linn.; DC. Prodr. ii. 273.

Western Himalayas, temperate region; Gurwhal, Kistwar, Lahul.—Distrib. Mountains through the north temperate zone. Stems 1–2 ft. high, erect, stout, glabrous. Leaves 4–6 in. long; leaflets opposite, thin, an inch or more long, green, glabrescent above, glaucous with a few obscure hairs below; stipules ovate or lanceolate, acute or obtuse, free, persistent, 1/4–3 in. long. Racemes long-peduncled, moderately close, subseund, finally 2–3 in. long; pedicels black-
silky, \( \frac{1}{12} \) in. Calyx \( \frac{3}{6} \) in., tubular, with a few obscure adpressed black hairs. Corolla twice the calyx, bright yellow; standard exceeding the wings and keel. Pod an inch long, glabrous, turgid, membranous, narrowed to both ends.


Central Himalayas, temperate region; NIPAL, KISTVAR and KUNAWAR.

Stems 1–2 ft. high, erect, moderately stout, hollow, glabrous. Leaves \( \frac{1}{12} \)–\( \frac{1}{4} \) ft.; leaflets 1–1\( \frac{1}{4} \) in. long, thin, oblong, obtuse, green and glabrescent above, glaucous, with a few adpressed hairs below; stipules broad, membranous, connate, \( \frac{1}{12} \)–\( \frac{1}{4} \) in. long. Racemes long-peduncled, close, 2–3 in. long; pedicels \( \frac{1}{12} \)–\( \frac{1}{4} \) in., subglabrous; bracts lanceolate, \( \frac{1}{12} \) in. Calyx \( \frac{1}{4} \) in., tubular, glabrous except the teeth, the mouth oblique. Corolla bright yellow, twice the calyx; petals equal. Pod glabrous, oblong, membranous, turgid, \( \frac{1}{2} \) in. long, narrowed to both ends.

51. **A. graveolens**, *Ham. in Wall. Cat.* 5929; shrubby, leaflets 17–19 round-oblong, calyx-teeth half as long as the tube, pod ensiform subcompressed stalked bilocular 12–18-seeded. *Bunge Mon. i. 26; ii. 31; Benth. in Royle Ill. 199.*


West Himalayas, temperate region, alt. 4–12,500 ft.; KASHMIR, KISTVAR, PITH, GURWAL, KUNAWAR, KUMAON.—DISTRIK: Afghanistan, Belochistan.

A tall undershrub, with copious virgate terete glaucous branches. Leaves 4–6 in. long; leaflets opposite, firm, obtuse, glaucous, glabrous on both sides, subdistant, \( \frac{1}{12} \)–\( \frac{1}{4} \) in. long; stipules free, foliaceous, cordate, ovate or lanceolate, 1–1\( \frac{1}{4} \) in. long. Racemes long-peduncled, \( \frac{1}{12} \)–1 ft. long; pedicels \( \frac{1}{12} \)–\( \frac{1}{4} \) in.; bracts linear, glabrous. Calyx tubular, glabrous, \( \frac{1}{12} \) in. long; mouth very oblique. Corolla yellow, twice the calyx; standard slightly exceeding the wings and keel. Pod 1–1\( \frac{1}{2} \) in. long, \( \frac{1}{4} \) in. broad, glabrous, membranous, nearly straight; stalk as long as the calyx.

52. **A. stipulatus**, *D. Don in Bot. Mag. t. 2380; Prod. Nep. 246; herbaceous, leaflets 31–41 oblong, calyx-teeth as long as the tube, pod oblong subsessile bilocular 15–20-seeded. *Wall. Cat.* 5928; *Benth. in Royle Ill. 199; Bunge Mon. i. 28; ii. 33.*

East Himalayas, temperate region, alt. 6–8000 ft.; NIPAL and SIKKIM.

Stems stout, erect, hollow, glabrous, 3–6 ft. high. Leaves \( \frac{1}{12} \)–1 ft. long; leaflets thin, obtuse, 1–2 in. long, green, glabrescent above, glaucous with a few adpressed hairs below; stipules membranous, concretes, leaf-opposed, amplexicul, 1–3 in. long. Racemes long-peduncled, \( \frac{1}{12} \)–1 ft. long, at first dense; pedicels \( \frac{1}{12} \) in.; bracts \( \frac{1}{4} \) in., lanceolate, membranous. Calyx tubular, \( \frac{1}{12} \)–\( \frac{1}{4} \) in., finely grey-downy. Corolla yellow, \( \frac{1}{12} \) in.; petals equal. Pod glabrous, turgid, rather recurved, narrowed into a long beak.

SUBGEN. 7. **Myobroma**, *Bunge.* Stemless or short-stemmed perennial or low shrubs, with stipules adnate in the lower part to the petiole, leaf-rachis ending in a leaflet, large yellow flowers in close heads, gibbous calyces and naked stigmas.

* Stemless.

53. **A. rhizanthus**, *Royle Ill. 200; heads subsessile, leaflets oblong obtuse densely silky, leaf-rachis not indurated, calyx-teeth linear, pod subsessile. Bunge Mon. i. 35; ii. 60.*
West Himalayas, temperate and alpine regions, alt. 9-16,000 ft.; Zanskar, Lahul, Kashmir, Kunawar.

Tufts one or several together at the crown of a woody rootstock. Stipules 3/4 in., lanceolate; petiole and leaf-rachis densely silky, the latter 2-4 in. long, not persisting after the leaflets fall; leaflets 31-41, 1/4 in. long, glaucous, persistently silky on both sides, the upper close, the lower distant. Heads dense, many-flowered, usually quite sessile at the crown of the rootstock; bracts linear, 1/4 in. long, densely silky. Calyx tubular, silky, 1/4 in. long; teeth half as long as the tube. Corolla half as long again as the calyx; wings shorter than the standard, and keel than the wings. Pod densely silky, 1/2 in. long, oblong, turgid, bilocular, splitting open the calyx, 15-20-seeded, narrowed suddenly into the beak.

54. **A. acaulis**, Baker MSS.; heads sessile, leaflets lanceolate acute glabrous, leaf-rachis not indurated, calyx-teeth lanceolate, ovary stipitate.

Sikkim, alpine region, alt. 16-17,000 ft., Hook. fil.

Tufts several from the crown of the woody rootstock, the glabrous stems at most an inch long. Leaves 2-3 in. long, distinctly petioled; leaflets 25-31, green, narrowed gradually to a point, 1/4 in. long; stipules 1/2 in., membranous, lanceolate. Heads 2-3-flowered, sessile. Calyx under 1/2 in. long, clothed with a few adpressed hairs; teeth a third as long as the tube. Corolla bright yellow, twice the calyx; petals subequal; standard 1/3 in. broad, Ovary glabrous, distinctly stalked; ovules 12-16. Pod not seen.

55. **A. Webbianus**, Grah. in Wall. Cat. 5936; heads subsessile, leaflets oblong obtuse glabrous, leaf-rachis indurated, calyx-teeth linear-sesquio, pod subsessile. Benth. in Royo Ill. 199; Bunge Mon. i. 39; ii. 51.

Kunawar and West Tibet, alt. 12-16,000 ft., alpine region.

Tufts densely caespitose at the crown of a thick woody rootstock. Stipules linear or lanceolate, 3/4 in.; petiole 1-4 in. long, stramineous, glabrous, like the leaf-rachis, which is 3-6 in. long and becomes wiry in texture; leaflets 31-51, scattered, distant, rather caducous, 3/4 in. long, glaucous with a few fine spreading hairs in the early stage. Heads many-flowered, sessile or short-peduncled; pedicels 1/4 in.; bracts linear, exceeding the pedicels. Calyx tubular, 1/2 in. long; teeth a third as long as the tube. Corolla under an inch long; wings distinctly shorter than the standard, and keel than the wings. Pod oblong, turgid, glabrous, 3/4 in. long, bilocular, 15-20-seeded, narrowed suddenly at both ends.


Punjab, subtropical zone; Salt range, Fleming, Stewart.—Distrib. Orient.

Leaves 1-1/2 ft. long; petioles 2-6 in. long, densely clothed with short spreading hairs; leaflets 31-41, distant, opposite or alternate, glaucous, distinctly stalked, 3/4 in. long; stipules lanceolate, 3/4 in. Racemes many-flowered, laxer than in the other species; peduncle 2-12 in. long, finely downy; bracts linear-sesquio, 1/2 in. long. Calyx tubular, downy, 1/2 in. long; teeth a third as long as the tube. Corolla half as long again as the calyx, considerably tinged with purple; petals subequal. Pod oblong, densely silky, bilocular, 15-20-seeded, not seen mature.—Connects *Myobroma* with *Phaca*.

** Stems distinct.

57. **A. Candelleanus**, Royle Ill. 199, non Boiss; heads subsessile, leaflets 17-25, leaf-rachises indurated persisting long after the leaflets fall, pod linear-oblong narrowed from the middle to both ends. A. Royleanus, Bunge Mon. i. 30; ii. 34.
West Himalayas, temperate and alpine region, alt. 8-13,000 ft.; West Tibet, Kunawar, Kashmir, Gurwhal, Kumaon.

Stems woody, not more than a few inches long, beset below the tufts of leaves with the copious ascending woody rachises of the old leaves with the lanceolate membranous stipules still persisting. Leaves 3-4 in. long; leaflets oblong, obtuse, glaucous, \( \frac{1}{4} \) in. long, more or less silky; petioles 1-2 in., finely downy. Heads dense, many-flowered; pedicels \( \frac{1}{2} \)-in., densely silky; bracts linear. Calyx \( \frac{1}{2} \) in., densely silky; teeth linear, a third as long as the tube. Corolla an inch long; wings shorter than the standard, keel than the wings. Pod \( \frac{3}{4} \)-1 in. long, curved, short-stalked, firm, turgid, bilocular, 12-16-seeded.

A plant from Kumaon and Gurwhal, of which we have incomplete examples gathered by Falconer and Madden (var. pindreensis, Benth.) with the general habit and copious persistent indurated petioles of this species, but with a shorter ped round at both ends like the next, will probably prove distinct from both when fully known.

Bunge cites from 'Royle Ill. p. 199,' A. subcaulescens, which he keeps up as a species, but says he has not seen. Royle has no such plant.

58. A. pyrrhotrichus, Boiss. Diag. ix. 73; Fl. Orient. ii. 290; heads distinctly peduncled, leaflets 41-51 clothed with long silky hairs, leaf-rachis not indurated nor persistent. Bunge Mon. i. 30; ii. 64.


Stems short, woody, densely clothed with long soft spreading fine pale brown hairs. Stipules \( \frac{1}{2} \) \(-\frac{1}{3} \) in. long, lanceolate, silky; leaf-rachis including petiole \( \frac{1}{2} \) -1 ft. long, densely clothed with spreading hairs, much overtopping the heads; leaflets green, roundish or obovate-oblong, \( \frac{1}{2} \) \(-\frac{1}{3} \) in. long, obtuse, with a minute mucro. Heads close, 6-12-flowered; peduncle 1-4 in.; pedicels short; bracts linear-setaceous, plumose. Calyx densely silky, \( \frac{1}{2} \) \(-\frac{1}{4} \) in. long; teeth setaceous, nearly as long as the tube. Corolla half as long again as the calyx. Pod subsessile, dimidiate-oblong, densely silky, bilocular, 10-12-seeded.

59. A. malacophyllus, Benth. MSS.; heads shortly peduncled, leaflets 31-41 densely silky, leaf-rachises not indurated nor persistent, pod oblong narrowed suddenly at both ends. Bunge Mon. i. 30; ii. 61.

West Himalayas, temperate region, alt. 8-11,000 ft.; Kashmir and Kistwar.

Stems densely pubescent, usually short, but reaching a foot long. Leaves 2-4 in. long; leaflets close, oblong, obtuse, densely silky, \( \frac{1}{2} \) \(-\frac{1}{4} \) in. long; stipules lanceolate, \( \frac{1}{2} \) \(-\frac{1}{4} \) in. Heads close or rarely sub lax; peduncles an inch or less; bracts linear-setaceous, exceeding the distinct pedicels. Calyx \( \frac{1}{2} \) in., densely silky; teeth linear, a third the length of the tube. Corolla half as long again as the calyx; wings rather shorter than the standard; keel shorter still. Pod \( \frac{1}{2} \) in. long, sessile, very turgid, firm, bilocular, silky, 8-10-seeded.

60. A. anomalous, Bunge Mon. i. 35; ii. 62; heads distinctly peduncled, leaflets 25-31 nearly glabrescent, leaf-rachises not indurated nor persistent.

West Tibet, Falconer.

Closely allied to the last, from which it mainly differs by its longer peduncles and fewer leaflets. Leaves 3-4 in. long; leaflets oblong, obtuse, \( \frac{3}{8} \) \(-\frac{1}{3} \) in. long, the upper close, the lower distant, green, with a few short silky hairs; stipules lanceolate, \( \frac{1}{2} \) \(-\frac{1}{3} \) in. long. Calyx \( \frac{1}{2} \) in.; teeth setaceous, plumose, half as long as the tube. Corolla \( \frac{3}{4} \) \(-\frac{1}{2} \) in.; proportion of the petals as in A. malacophyllus. Ovary linear, silky, nearly sessile; ovules about 20. Pod not seen.

Subgen. 8. Beagacantha, Bunge. Low shrubs, with basifixed hairs, stipules adnate at the base to the petiole, persistent rigid leaf-rachises without
any leaflet at the end, large yellow flowers in the axils of the leaves without any peduncles, gibbous calyces and naked stigmas. Included in Fischer's monograph in *Tragacantha*, from which they are separated by their pedicelled gibbous calyx.

* Leaflets glabrescent or obscurely silky.

61. **A. polyacanthus**, Royle Ill. 199, *non* Wall. *Cat.* 5934; spines short, stigmates deltoid or lanceolate-deltoid, leaflets 9–13, flowers sessile in the axils of the leaves usually gaminate, corolla twice as long as the calyx. A. Daltonianus, *Bunge Mon.* i. 44; ii. 69. A. psilocentrus, *Fisch.*; *Bunge Mon.* i. 44; ii. 70. A. scariosus, *Benth. MSS.*; *Bunge Mon.* i. 44; ii. 71. A. Grahamianus, *Royle Ill.* 199, i. 36, fig. 2; *Bunge Mon.* i. 44; ii. 68. A. Jacque-montii, *Bunge Mon.* i. 44; ii. 66.

Common in the north-west, ascending from the plains of the *Punjab* to 12,000 ft., reaching east to *Kumaon* and *Garwal*.—Distri. Afghanistan.

A copiously-branched undershrub, with short branchlets armed with the crowded ascending old leaf-rachises, which are not more than 1½–2 in. long. Leaflets oblong, glabrescent or persistently slightly silky, pale glaucous green, rather thick in texture, often complicate, 4½–6 in. long. Pedicels silky, 4½–6 in. long, glabrescent or thinly silky; mouth oblique; teeth short, linear. Corolla 1½–2½ in. long; wings shorter than the standard, and keel than the wings. *Pod* ½ in. long, dimidiate-oblong, turgid, sessile, bilocular, 15–20-seeded.

62. **A. cicerifolius**, Royle; *Bunge Mon.* i. 44; ii. 70; spines elongated, leaflets 31–41, stipules lanceolate or linear-lanceolate, flowers in peduncled heads, corolla not twice as long as the calyx. A. opilites, *Benth. MSS.*. A. tenuispinus, *Bunge Mon.* i. 44; ii. 70. A. microphyllus, *Jacquem. MSS.*

West Himalayas, temperate and alpine region, alt. 10–17,000 ft.; *Nubra*, *Ladak*, *Kashmir*, *Garwal*, *Kumaon*, &c.

An undershrub, densely armed with the erecto-patent rigid stramineous leaf-rachises, which are 4½–6 ft. long. Leaflets finely silky at first, mostly glabrescent when mature, pale green, thick in texture, obtuse, sometimes emarginate, ascending, caducous, 4½–6 in. long, ob lanceolate or obovate-oblong. Flowers usually 3–4 together on short peduncles from the axils of the leaves; pedicels 4½–6 in.; bracts linear or setaceous, exceeding the pedicels. *Calyx* ½–2 in., with a few adpressed black or brownish silky hairs; teeth setaceous, a third as long as the tube. Proportion of the petals as in the last. *Pod* ½–2 in. long, oblong, turgid, bilocular, densely silky, narrowed to the point, 15–20-seeded.

** Leaflets persistently densely silky.

63. **A. multiceps**, Wall. *Cat.* 5937; main stems not produced, branchlets with densely crowded nodes, flowers 1–2 together in leaf-axils usually not peduncled, corolla twice as long as the calyx. *Bunge Mon.* i. 44, ii. 69.

West Himalayas, temperate zone, alt. 10–12,000 ft.; *SIMLA*, *Kumaon*, *Garwal*. Tufts densely congested, armed with the very crowded ascending old leaf-rachises, which are 1½–3 in. long. Stigmates ½ in., lanceolate, adnate only at the very base; leaflets 21–31, mostly crowded, obovate-oblong ½–1 in. long, thick in texture, dull green, clothed with grey silky hairs. Pedicels ½–1 in.; bracts linear, exceeding the pedicels. *Calyx* ½–2 in., thinly silky; teeth linear-setaceous, half as long as the tube. *Corolla* 2 in.; standard exceeding wings and keel. *Pod* sessile, oblong, turgid, bilocular, 12–14-seeded, clothed with fine grey silky hairs.

64. **A. zanskarensis**, *Benth. MSS.*; main stems short, branchlets
with densely crowded nodes, flowers in short-peduncled heads, corolla half as long again as the calyx. *Bunge Mon.* i. 43, ii. 67.

West Himalayas, temperate and alpine region, alt. 10-14,000 ft.; ZANSKAR, Thomson.

A dichotomously-branched undershrub, with the old part of the stems densely beset with stiff persistent ascending leaf-rachises 3-4 in. long. *Stipules* lanceolate, ¼ in. long; leaflets 21-25, close, oblong, obtuse, caducous, ½-3/5 in. long, densely clothed on both sides with rather spreading short pale brown silky pubescence. *Flowers* up to a half-a-dozen in heads much overtopped by the leaves; *pedicels* ½ in., densely pubescent; bracts linear-setaceous, plumose. *Calyx* ½-3/5 in., tubular, densely silky; teeth setaceous, ½ as long as the tube. *Corolla* ⅞ in.; wings shorter than standard and keel than wings. *Ovary* oblong, silky, short-stalked; ovules about 20. *Pod* not seen.

65. **A. leptocentrus**, *Bunge Mon.* i. 44; ii. 69; main stems elongated, branchlets with densely crowded nodes, flowers 1-2 together in leaf-axes not peduncled, corolla twice as long as the calyx. *A. leptocanthus*, *Benth. MSS.* non Boiss. & Buhse.

West Himalayas, alpine region. *Piti*, alt. 14,000 ft., Thomson; *Hazara*, Winterbottom.

A low undershrub, with branches clothed with very dense short pale brown spreading pubescence. *Leaf-rachises* erecto-patent, 2-3 in. long, persistently pubescent; leaflets 21-31, oblong, obtuse, ½-3/5 in. long, persistently matted on both sides with thick grey-brown silky pubescence. *Pedicels* ½ in., densely silky; bracts plumose, linear-setaceous. *Calyx* ⅞ in., densely silky; teeth linear-setaceous, a third as long as the tube. *Corolla* an inch long; keel much shorter than standard and wings. *Pod* oblong, ½-3/5 in., sessile, silky, turgid, bilocular, 12-14-seeded.

66. **A. bicuspis**, *Fisch. Mon.* Trag. No. 94; main stems elongated, nodes not crowded, flowers 1-3 together in the axils of the leaves not peduncled, corolla half as long again as the calyx. *Bunge Mon.* i. 43, ii. 69. *A. lasiocladius*, *Benth. MSS.*

*Hazara and West Tibet*, temperate zone, Winterbottom, Jacquemont, Falconer.


*Subgen. 9. Tragacantha*, *Bunge*. A low shrub with basifixed hairs, indurated spiny leaf-rachis, caducous leaflets and sessile calyx narrowed equally to the base.


West Himalayas, temperate and alpine region, alt. 8-13,000 ft.; Piti, Kashmir, Kunawar.—Distr. Afghanistan.

A copiously-branched undershrub, not more than a few inches high, densely armed with the ascending spine-tipped stramineous petioles, which are 1-2 inches long. *Stipules* membranous, deltoid, adnate to the petiole, like those of a rose, except at the tip; leaflets 11-13, ob lanceolate, glaucous, rigid, acute, ½-3/5 in. long, strigillose. *Flowers* a few sessile in the axil of each petiole, scarcely protruding
beyond the stipules. Calyx ¼ in. long, cleft down to the base, each lobe like a dense tuft of thick white pubescence. Corolla yellow, little exserted; petals equal, marcescent; standard panduriform. Pod sessile, silky, 3-4-seeded.

Bunge gives his A. glabrisolius, Mon. i. 93, ii. 167, gathered also by Griffith in Afghanistan, from the West Himalayas, on Falconer’s authority. It has much longer petals, longer flat glabrous leaflets, flowers of many nodes at the top of a short stem aggregated into a thick very dense oblong head.

Subgen. 10. Cercidothrix, Bunge (including Calyccocystis). Herbaceous perennials, densely canescent with adpressed white bristly hairs fixed by the centre like those of Indigofera, moderately large yellow flowers and glabrous stigmas. Outlying representatives of a group of above 300 species, mostly Central Asian.

68. A. peduncularis, Royle Ill. 199; leaflets 21-25 distant narrow-obleng, racemes many-flowered lax in the lower part, calyx permanently tubular, pod linear very turgid unilocular many-seeded. Bunge Mon. i. 96, ii. 168.

West Tibet; Dras and Zanskar, alt. 9-12,000 ft., Thomson, Henderson; Kunawar, Royle.

Stems tall, erect, glabrous, firm, little branched, 1-2 ft. high, with only a few obscure adpressed bristles. Leaves 3-4 in. long; rachis channelled down the face; leaflets obtuse or subacute, 3-3½ in. long, pale green, glabrescent above, persistently strigillose below; stipules deltoid, free, membranous. Racemes 2-4 in. long, dense upwards, Phaca-like; peduncles finally ½ ft. or more; pedicels very short, cernuous; bracts lanceolate, ½ in., subpersistent. Calyx ¼ in., finely downy; teeth very short, upper deltoid, lower lanceolate. Corolla twice the calyx; keel and wings nearly equal, rather shorter than the standard. Pod sessile, firm, glabrous, very turgid, ½-2½ in. long, depressed down the keel, but the suture not intruded; seeds 15-20.


West Tibet, alpine region, alt. 12,000 ft., Thomson, Henderson.—Distrib. Afghanistan, Baluchistan, Crimea, West Siberia, Chinese Tartary.

Stems under a foot high, 2-3 times dichotomously forked, the branches divaricated, thinly clothed with minute white bristles. Leaves ½-1 in. long; leaflets ½-3 in. acute, firm, pale green, persistently strigillose on both sides; stipules linear, very minute. Racemes 3-12-flowered, 1-2 in. long; pedicules rigid, exceeding the leaves, clothed with mixed black and white adpressed hairs; pedicels very short; bracts minute, lanceolate, persistent. Calyx cylindrical, ½-3 in. long, densely clothed with adpressed mixed black and white bristles; teeth minute, lanceolate. Corolla nearly twice the calyx; wings shorter than the standard; keel much shorter, the lamina not more than half as long as the claw. Pod cylindrical, 1-1½ in. long, canescent with similar bristles to those of the calyx and peduncle, firm, rostrate, 20-30-seeded, straight or slightly recurved, narrowed to a short stalk.

70. A. nivalis, Kar. & Kir. Enum. Fl. Song. No. 272; leaflets 13-17 close oblong, racemes many-flowered capitate, calyx becoming inflated, pod very small half-bilocular few-seeded. Bunge Mon. i. 137, ii. 294. A. Thomsomianus, Benth. MSS.

West Tibet, alpine region, alt. 11-16,000 ft.; Zanskar, Ladak, and Sassar, Thomson, Stewart.—Distrib. Central Siberia.

Root thick, woody. Stems 1-½ ft., densely cespitose, slender, finely canescent. Leaf
1-1½ in.; leaflets ¼-⅜ in., obtuse, densely white-canescent on both sides; stipules small, lanceolate, cuspidate, free. Flowers 6-20, in a dense head, all ascending; peduncles 1-2 in., finely canescent; bracts lanceolate, shaggy, exceeding the very short pedicels. Calyx ½ in. membranous, tubular at first, densely silky, becoming much inflated after the petals fall; teeth short, lanceolate. Corolla nearly twice the calyx; wings shorter than the standard; keel shorter still. Pod ¾-⅞ in., oblique oblong, silky, distinctly stalked, 2-4-seeded, with the introverted suture reaching half through.

UNKNOWN SPECIES.

Of A. caruleus, Hort. Paris; Bunge Mon. i. 103, ii. 184, a species near A. Onobrychis, supposed to have been raised in the Paris garden from Ceylon seeds, we know nothing. No doubt the locality is a mistake.

27. OXYTROPIS, DC.

Herbaceous perennials with odd-pinnate leaves, the flowers usually in dense heads. Calyx tubular or campanulate, with 5 subequal teeth. Corolla more or less exserted; standard longest; keel shortest, pointed with a distinct cusp. Stamens diadelphous; anthers uniform. Ovary sessile or stalked, many-ovuled; style abruptly incurved bearded, stigma capitate. Pod oblong or roundish, turgid, continuous longitudinally within, unilocular or rarely bilocular.—Distrib. Species about 100, spread through the North temperate zone.

SECT. I. Hypoglottidei. Flowers in dense peduncled heads. Leaflets not more than one from the same point.—Habit of Astragalus, section Hypoglottis.

* Flowers purple, rarely yellow.

1. O. lapponica, Gaud. Fl. Helv. iv. 545; stemless or short-stemmed, leaflets lanceolate 13-25, flowers in permanently dense heads, calyx nearly sessile, pod of the lower flowers or all the flowers deflexed. O. microrhyncha, Benth. MSS. Phaca lapponica, DC. Prodr. ii. 274.

WESTERN HIMALAYAS, frequent in the alpine and temperate regions, alt. 9-17,000 ft. SIKKIM, Hook. fl.—Distrib. Mts. of Europe and Siberia. Stems often not developed, sometimes ¼-½ ft. long. Leaves 1-3 in. long; leaflets ½-¾ in., green in the type, with a few adpressed white silky hairs or sometimes nearly glabrescent; stipules ½-⅛ in., leaf-opposed, connate towards the base. Peduncles ½-¾ ft., with only a few adpressed hairs; flowers 6-20 in a dense rounded head; bracts minute, linear. Calyx ⅓-¼ in., coated with adpressed nearly black silky hairs; teeth linear, shorter than the tube. Corolla bright purple, ⅜-½ in. long; keel much shorter than the wings. Pod linear-oblong, ⅜-⅜ in. long, unilocular, keeled down the back, 5-6-seeded, clothed with a few obscure black or white hairs; stalk as long as the calyx-tube.

Var. 1. Jacquemontiana, Benth.; stemless, very dwarf, the whole plant not more than 1-3 in. high, leaflets few small thick greenish, heads 1-3-flowered, corolla rather larger than in the type. A high alpine form.

Var. 2. humifusa, Kar. & Kir., sp.; stemless, leaflets densely and persistently white-silky on both sides, calyx more densely silky, the black hairs mixed with copious white ones. O. glacialis, Benth. MSS.—Alpine zone of Kashmir and Western Tibet.

Var. 3. xanthantha, Baker; general habit and leaves of the type, but calyx longer, with teeth quite as long as the tube and corolla yellow.—East Tibet; Lama Kongra, alt. 15,000 ft., Hook. fl.

2. O. mollis, Royle Ill. 198; stemless, tall, leaflets densely white-
silky 13–25 oblong or lanceolate-oblong, heads finally subtusx, corolla half as long again as the calyx, pods ascending. O. floribunda, Benth. in Royce Ill. 198. 

Astragalus vesicularus, Jacqtem. MSS.

West Himalayas, alpine region, alt. 10–12,000 ft.; Lahul, Zanskar, Kunavat, &c. 

Tufts ½–1 ft. high, crowded at the top of a woody rootstock. Leaves long-petioled, 2–3 in. long; leaflets ½–⅓ in. long, moderately thick, pale green, densely clothed on both sides with persistent adpressed white silky hairs; stipules lanceolate or deltoid-cuspidate, densely silky. Peduncles usually much overtopping the leaves; heads finally 2–3 in. long; pedicels very short; bracts minute, linear. Calyx ½–⅓ in long, densely clothed with mixed black and white silky hairs. Pod ½–⅔ in. long, oblong-cylindrical, unilocular, distinctly stalked, 6–8-seeded.

3. O. Thomssoni, Benth. MSS.; stemless, tall, leaflets lanceolate densely white-silkv 13–51, heads finally sublax, corolla twice as long as the calyx, pods ascending.

West Himalayas, temperate and alpine region, alt. 7–15,000 ft.; Lahul, Ladak, Kashmir.

General habit of O. mollis. Leaves long-petioled, 4–6 in. long; leaflets grey-green, narrower in proportion, ½–1 in long, not so thick nor densely silky as in the last; stipules lanceolate, ½ in. long. Racemes finally 3–4 in. long; peduncles equaling or overtopping the leaves; pedicels ¼–⅔ in.; bracts linear, small. Calyx ¼–⅔ in., densely clothed with mixed black and white silky hairs; teeth plumose, the lower nearly as long as the tube. Pod oblong-cylindrical, unilocular, 4–6-seeded, with a few minute adpressed white hairs; stalk as long as the calyx-tube.

** Flowers mostly yellow, rarely varying to purple.

4. O. densa, Benth. MSS.; acaulescent, very dwarf, leaflets 15–17 minute densely-silkv, heads few-flowered short-peduncled, pod ovate-cylindrical bilocular.

West Tibet, alpine region, alt. 16–17,000 ft., Thomson, Strachey. 

Tufts densely cespitose from a woody root, the whole plant not more than 1–1½ in. above the surface. Leaves under ½ in. long; leaflets ½–⅓ in. long, close, oblong, thickly matted with persistent grey-silkv hairs; stipules deltoid, membranous, ½–2 in. conuate downwards. Heads 3–6-flowered; peduncles densely silky, ½–⅔ in.; pedicels very short. Bracts small, linear. Calyx ⅓ in., densely silky; tube campanulate; teeth linear, shorter than the tube. Corolla half as long again as the calyx. Pod sessile, finely silky, narrowed gradually from the middle to the point, turgid, 5–6-seeded.

5. O. Stracheyana, Benth. MSS.; stemless, very dwarf, leaflets 5–7 densely silky, heads few-flowered short-peduncled, pod round-oblong turgid unilocular.

West Tibet, alpine region; Darma Yankti, alt. 15,500 ft., Strachey & Winter-bottom.

Whole plant not above a couple of inches above the surface. Stipules deltoid, membranous, minute; leaflets thick, complicate, oblong, ½–⅔ in. long, densely matted with grey-brown silky hairs. Heads short-peduncled, 2–3-flowered; bracts minute; pedicels very short. Calyx ⅔ in. long, tubular, densely clothed with ascending grey silky hairs; teeth linear, ⅔–1 tube. Corolla half as long again as the calyx. Pod ⅔ in. long, sessile, 3–4-seeded, densely clothed with long persistent pale brown silky hairs.

6. O. tatarica, Jacquem. MSS.; stemless, leaflets small 13–21 densely matted with white silky hairs, heads dense long-peduncled, bracts minute, pod sessile inflated unilocular round-oblong.
West Tibet, alpine region, frequent, alt. 13-17,000 ft.; NUBRA, ZANSKAR, PITH, PARANG, LADAK, &c.

Densely tufted, the whole plant 3-4 in. high. Leaves ⅓-1 in. long; leaflets close, except the lowest, oblong or oblanceolate-oblong, ⅔-⅔ long, thick, densely persistently matted with white silky hairs on both sides; stipules minute, deltoid, silky. Flowers 20-40, in very dense heads; pedicels scarcely any; bracts minute, linear, white-plumose. Calyx ⅓-⅓ in., densely white-silky; teeth nearly or quite as long as the tube. Corolla not more than half as long again as the calyx, usually all yellow, rarely purple or the keel tipped with purple; standard oblong-spathulate, exceeding the wings and keel. Pod much inflated, membranous, sessile, ⅔-⅔ in. long, 5-6-seeded, shaggy with loose dense white silky hairs.


WEST TIBET and KASHMIR, temperate zone, alt. 8-10,000 ft.—Distrib. Central SIBERIA.

Whole plant ⅓-⅔ ft. high. Stems ascending from a woody rootstock, finely pubescent. Leaves 1-2 in. long; leaflets ⅔-⅔ in. long, clothed on both sides with loose white silky hairs; stipules lanceolate or deltoid, connate downwards. Flowers 12-30 in a dense head; pedicels very short. Calyx ⅔ in. long; densely white-silky; teeth linear, nearly or quite as long as the tube. Corolla half as long again as the calyx. Pod just like that of the last but rather larger.

8. **O. Meinshausenii**, Schrenk; Led. Fl. Ross. i. 786; stem distinct, leaflets 17-31 thin large oblong green pubescent, heads dense long-peduncled, bracts conspicuous, pod short-stalked oblong unilocular. **Bunge Rel. Lehman.** 76.

WEST HIMALAYAS, temperate region; valley of Kishengunga, alt. 9-11,000 ft., STEWART.—Distrib. SIBERIA.

Stems a foot or more high, at first thinly pilose. Leaves 3-4 in. long; leaflets ⅔-⅔ in. long, obtuse, thinly clothed with rather long whitish hairs on both sides; stipules ⅔-⅔ free, lanceolate or oblong. Flowers 12-20 in a dense head; peduncles erect, 4-6 in. long; pedicels ⅔-⅔ in.; bracts linear, ⅔-⅔ in. long, ciliate with black hairs. Calyx ⅔ in., tubular, thinly clothed with adpressed black hairs; teeth linear, half as long as the tube, black-plumose. Corolla twice as long as the calyx. Pod oblong, turgid, ⅔-⅔ in. long, straight, 6-8-seeded, with a few dark silky hairs.

Dr. Hooker procured from Nipalese Tibet flower-heads of a fifth yellow-flowered species which, as far as the material goes, matches the Tibetan **O. argentina**, Led. It differs from **O. Meinshausenii** by larger bracts, longer calyx with linear teeth as long as the tube, corolla shorter in proportion, not more than half as long again as the calyx. These two represent in the Himalayas the group of **O. campestris**.

**Sect. 2. Verticillares, DC.** Herbaceous perennials with flowers in dense heads, with leaflets often in pairs from the same point, so that they are whorled when the nodes are opposite on the two sides of the leaf-rachis.


WEST HIMALAYAS, alpine region, alt. 11-16,000 ft.; ZANSKAR, PITH, SASSAR, NUBRA, KUNAWAR, &c.; SIKKIM, Hook. fl.

Stemless, erect, ⅔-⅔ ft. high, the tufts densely cespitose at the top of a woody rootstock, the deltoid imbricated stipules clothed with dense tufts of long white silky hairs. Leaf short-petioled, 1½-3 in. long; leaflets crowded, linear-oblong, ⅔-⅔ in. long, subcoriaceous, grey-green, gland-dotted, with fine deciduous pubescence, the edges much reflexed. Peduncles equalling or overtopping the leaves; flowers 4-15, the heads
at first close, becoming 2-3 in. long when they expand. Calyx \( \frac{3}{4} \) in. long, tubular, clothed with large sessile glands, nearly glabrous; teeth short, linear, pubescent. Corolla bright purple, twice the calyx. Pod half-bilocular, sessile, linear, turgid, recurved, densely gland-dotted, glabrous, bilocular; seeds 20-30.

**Sect. 3. Phacoidei.** Herbaceous caulescent perennials, with flowers in elongated racemes.—Habit of Astragalus, section Phaea.


West Tibet, temperate region, alt. 7-8000 feet.—Distrib. West Siberia.

Caulescent, 1-2 ft. high. Stems copiously branched, firm, slender, zigzag, terete, glabrous. Leaves 2-3 in. long; leaflets 9-13, lanceolate, \( \frac{3}{4} \) in. long, green, rather thick, acute, glabrous or with only a few minute obscure hairs; stipules minute, free, deltoid, foliaceous. Racemes 2-4 in. long; pedicels very short; bracts minute, lanceolate. Calyx \( \frac{3}{4} \) in., campanulate, with a few adpressed black and white hairs. Corolla yellow, twice the calyx. Pod \( \frac{3}{4}-\frac{3}{2} \) in. long, oblong, sessile, turgid, unilocular, straight, glabrous, 6-10-seeded.

28. **TAVERNIERA**, DC.

Much-branched undershrubs. Leaves simple or 3-foliolate. Flowers in lax racemes. Calyx-tube turbinate; teeth 5, distinct, setaceous from a deltoid base. Corolla marcescent, much exserted; standard obovate; wings small, much shorter; keel obtuse, as long as the standard. Stamens monadelphous; anthers uniform. Ovary stalked, 2-4-ovulate; style long, filiform, inflexed, stigma minute, capitate. Pod of 1-4 flattened indehiscent densely muricated joints.—Distrib. Species 3-4, reaching Egypt and Abyssinia.


Plains of Scinde and the Punjab.—Distrib. Afghanistan, Orient.

A copiously-branched undershrub, 1-2 ft. high, with slender finely caulescent terete branches. Leaves shortly petioled, usually 3-foliolate; leaflets very variable in size, \( \frac{3}{4}-1 \) in. long, obovate-oblong or nearly round, thick, pale green, thinly caulescent beneath, the side ones not opposite; stipules free, minute, lanceolate, scarioso. Racemes few- or many-flowered, usually exceeding the leaves. Calyx \( \frac{3}{4}-\frac{3}{2} \) in., thinly silky. Corolla red, glabrous, \( \frac{3}{8}-\frac{3}{2} \) in. Joints of pod 1-4, roundish.

29. **EBENUS**, Linn.

Villous herbs or undershrubs. Leaves odd-pinnate; leaflets entire, exstipellate; petiole often spinose. Flowers red, in dense peduncled axillary spikes. Calyx-teeth 5, subequal, setaceous, plumose, exceeding the tube. Corolla much shorter than the calyx; standard broad; keel obtuse, as long as standard; wings short. Stamens monadelphous, the upper free at the base; anthers uniform. Ovary sessile, 1-ovulate; style filiform, incurved, stigma capitate. Pod flat, oblong, included in the calyx-tube, membranous, indehiscent.—Distrib. Species 8, Oriental and Mediterranean.

1. **E. stellata**, Boiss. Diag. ii. 100; Fl. Orient. ii. 557. E. tragacan-

**PUNJAB-HIMALAYA**, alt. 4-8000 ft., *Stewart.*—**Distrib.** Persia, Afghanistan, Beloochistan.

A low undershrub, densely armed with woody erecto-patent spines 1-1½ in. long. *Leaves* shorter than the spines, digitately trifoliolate; leaflets lanceolate, subcoriaceous, sericeous, ½-2 in. long. *Flowers* sessile in dense stalked heads, on peduncles at most as long as the spines, each head surrounded by a whorl of large lanceolate bracts. *Calyx* ⅓ in., densely clothed with long brown silky hairs.

### 30. **GEISSAPSIS**, W. & A.


**Plains of Western Peninsula, Ceylon, Ava, Martaban, Tenasserim, and Pegu.**

A densely cespitose trailing annual, with slender naked branches ½-2 ft. long. *Leaves* petioled, with a very short rachis; leaflets obovate, oblique, glabrous, truncate, ⅓ in. long; stipules lanceolate, membranous, distinctly spurred. *Heads* dense, terminal, ½-2 in. long; bracts much imbricated, ½ in. broad, reniform, ciliated with firm yellow bristles ⅓ in. long. *Calyx* ⅓ in. long *Corolla* twice the calyx. *Joints* 1-2, ⅓ in. long.

2. **G. tenella**, *Benth. in Hochen. Pl. Ind. Or.* No. 659; flowers nearly or quite as long as the short-bristled bracts.

**Western Peninsula.**

Habit of the last, but much smaller. *Leaflets* all four nearly from the same point, ⅔ in. long, obliquely obvate, truncate, glabrous. *Racemes* copious, terminal, peduncled, 4-12-flowered; bracts obliquely oblong, less imbricated, ⅔-1 in. broad, strongly veined, ciliato-denticulate. *Calyx* ⅔ in., deeply cleft. *Corolla* yellow, ⅓ in., *Joints* 1-2, with a flat edge, round, with a turgid centre.

### 31. **ONOBRYCHIS**, Gaertn.


1. **O. Stewartii**, *Baker.*

**Punjab; Hazara, Dr. Stewart. Rawul Pindee, Dr. Aitchison.*

*Stems* slender, 1½-2 ft., glabrescent. *Leaf-rachis* 3-4 in. long, including distinct
petiole; leaflets 9-11, ob lanceolate, subacute, distant, \( \frac{1}{2} - \frac{3}{4} \) in. long, obscurly canescent; stipules linear, minute. Racemes long-peduncled, 6-9 in. long, lax; buds crowded; pedicels very short; bracts linear, minute. Calyx canenanulate; \( \frac{1}{12} \) in., silky; teeth lanceolate. Corolla 3-4 times calyx; standard glabrous, veined. Pod reniform, turgid, \( \frac{1}{2} - \frac{3}{4} \) in., 1-seeded; faces woody, deeply alveolate; edge muricated with close minute spines. A second species, of which we have a scrap from Hazara, gathered by Winterbottom, with oblong obtuse leaflets and a much larger calyx and corolla agrees, as far as the material goes, with O. heterophylla, C. A. Meyer; Led. Fl. Ross, i. 711, from Persia and the Caucasus.


Herbs or undershrubs. Leaves extipellate, trifoliolate. Flowers copious, in racemes, or crowded in the leaf-axils. Calyx-tube canenanulate; teeth lanceolate or linear. Corolla exerted; standard broad; keel obtuse or acute. Staments diadelphous; anthers uniform. Ovary sessile or stipitate, 1-ovulate; style long, filiform, incurved; stigma minute, terminal. Pod small, oblong, compressed, 1-seeded, reticulato-venose, indehiscent.—**Distrib.** Species 20-25, the others Siberian, Chinese, Japanese, and N. American, one Javan. Monographed lately by Maximowicz.

**Subgen. Eulespedeza.** Keel obtuse, not much incurved.


Along the Himalayas from Hazara and Kashmir to Assam, alt. 3-8000 ft.—**Distrib.** China, Japan, N. Australia.

An erect undershrub, 2-3 ft. high, with tough long slender branches. Leaves ascending, crowded; leaflets \( \frac{1}{2} \) in. long, rigidly coriaceous, truncate or emarginate, narrowed gradually in the lower half, very variable in vestiture, usually glabrous above, clothed with adpressed grey or white silky hairs below, rarely both sides clothed with loose white pubescence; petiole \( \frac{1}{4} \) in. Flowers 2-4, on short pedicels in the axils all down the branch; bracteoles linear, minute. Calyx \( \frac{1}{12} - \frac{1}{4} \) in., canescent; teeth linear-subulate, very long. Corolla twice the calyx, white, tinged with purple. Pod \( \frac{1}{2} \) in., thinly silky; style twice its length.


Kashmir and Kunawar, temperate region, alt. 4-8000 ft.—**Distrib.** Siberia, North China.

Stems slender, 1-2 ft. high, finely downy, erect or decumbent. Leaves not nearly so crowded as in the last; leaflets \( \frac{1}{2} - \frac{3}{4} \) in. long, rigidly subcoriaceous, obtuse, narrowed gradually in the lower half; petioles \( \frac{1}{4} - \frac{1}{2} \) in. Umbels usually sessile, produced far down the branches. Calyx \( \frac{1}{2} - \frac{1}{4} \) in., canescent; teeth linear-scatteous, 3-4 times the tube. Corolla twice the calyx. Pod and style as in L. sericea.

3. **L. Gerardiana**, Grah. in Wall. Cat. 5744; petiole short, leaflets ob-
lanceolate grey-silky below, umbels sessile or short-peduncled in the axils of the leaves, corolla large, pod small sessile.

Along the Himalayas, temperate region, alt. 5-10,000 ft.; Simla and Kumaon to Sikkim.

*Stems* 1-3 ft., densely pubescent. *Leaves* moderately close, ascending; leaflets 1-2 in. long, rigidly coriaceous, glabrescent on the upper side, densely grey-silky below; petioles 1-1½ in. *Umbels* 4-8-flowered, usually sessile; bracteoles linear, half as long as the calyx. *Calyx* ½ in., densely pubescent; teeth linear-subulate, 2-3 times the tube. *Corolla* ⅜ in.; keel tipped with purple. *Pod* considerably shorter than the calyx.


*Kashmir*, temperate region, alt. 5-6000 ft.; *Jacquemont, Thomson.*

*Stems* 2-3 ft., finely downy. *Petiole* ½ in.; leaflets 1½ in. long, obtuse, glabrescent above, densely grey-silky beneath. *Flowers* 6-8, in sessile umbels, rarely in short racemes, reaching low down the branches and forming at the top a close leafless panicle. *Calyx* ⅜ in., densely pubescent; teeth linear-subulate, very long. *Corolla* half as long again as the calyx. *Pod* ⅜ in. long, oblong, downy.


*Khasia*, temperate region, alt. 5-6000 ft.; *Griffith, Hook. fil. and Thomson.*

*Stems* woody, reaching several feet high, finely pubescent. *Leaves* not crowded; leaflets subcoriaceous, 1-1¼ in. long, obtuse, green, glabrous above, grey, finely downy below; petiole 1-1½ in. *Racemes* many-flowered, close or lax, the peduncles sometimes as long as the leaves; pedicels shorter than the calyx; bracteoles linear, as long as the tube. *Calyx* ⅜ in., densely canescent; teeth lanceolate, acute, twice as long as the tube. *Corolla* deep red, twice as long as the calyx. *Pod* oblong, ⅜ in. long, finely downy, distinctly stalked.—Very near the common *East Asian L. bicolor, Turcz. Led. Pl. Ross.* i. 715 (*L. viatorum*, Champion), from which it differs mainly by its long acute calyx-teeth.


**Western Himalaya**, temperate region, alt. 6-7000 ft.; *Edgeworth.—Distrib. China, Japan, Korea.*

*Stems* 2-3 ft., erect, densely pubescent. *Leaves* distant; leaflets 1-2 in. long, obtuse, thick, subcoriaceous, at first thinly silky above, densely silky, and the veins raised beneath; petioles 1½ in.; stipules subulate, persistent. *Racemes* distinctly peduncled, 2-4 in. long, moderately close, rarely congested; sessile (*L. glomerata*, Horn.); pedicels very short. *Calyx* ⅛ in., densely pubescent; teeth linear-subulate, 3-4 times the tube. *Corolla* whitish, half as long again as the calyx; standard not longer than the wings and keel. *Pod* shorter than the calyx, oblong, pubescent.—Very near *L. hirta*, Elliott, of North America.

**Surgen. Oxymamphis, Wall.** *Keel* acute and much incurved, like that of a Crotalaria.

HIMALAYS, tropical and temperate zones, alt. 2–7000 ft.; SIMLA and GURWAL to KHASIA.

An undershrub, 3–4 ft. high, with woody densely pubescent branches. *Petiole* ½–1¾ in.; leaflets obovate-cuneate, rigidly subcoriaceous, ½–¾ in. long, grey, glabrescent, venose above, usually persistently silky, rarely (*O. macrostyla*, Wall.) subglabrescent below, broadly rounded, sometimes deeply emarginate at the point, the petiolar of the end one not more than ½ in. *Racemes* short, dense, many-flowered, catkin like when unexpanded, the silky ovate bracts hiding the buds; pedicels ½–¾ in., densely silky. *Calyx* ⅓ in.; teeth lanceolate, twice the tube. *Corolla* deep red, three times the calyx. *Pod* short-stalked, ⅔–¾ in. long, narrowed to both ends; style persistent, ⅓ in. long, densely plumose in the lower half.


HIMALAYS, temperate and tropical zones, alt. 3–9000 ft.; HAZARA and KASHMIR to KHASIA and SIKKIM.

A copiously-branched erect shrub, 3–4 ft. high, with slender silky angular furrowed branchlets. *Petioles* ⅓–1½ in.; leaflets obovate-cuneate, ⅓–1 in. long, rigidly subcoriaceous, green, glabrous, reticulato-venose above, broadly rounded at the apex, the end one on a petiolule ½–1¾ in. long; uppermost leaves reduced or suppressed. *Racemes* copious, peduncled, not dense, many-flowered, 2–4 in. long; bracts not exceeding buds; pedicels ⅓–1 in. *Calyx* ⅓ in.; teeth linear-subulate, twice the tube. *Corolla* deep purple-red, ⅔–¾ in. *Pod* ⅔ in.; long, minutely stalked, more coriaceous than in the last; style as long as the pod, slightly pubescent near the base.—*L. paniculata*, *Royle*, is a mere form, with lax racemes and longer pedicels.


KHASIA, temperate region, alt. 5000 ft., Hk. *fil. & Thomson*, *Lobb*.

Habit of the last, to which it is closely allied. *Petiole* 1–2 in.; leaflets oblong, 1–2 in. long, subcoriaceous, obtuse, green, glabrescent, less venose above. Upper *leaves* suppressed or much reduced, so that the racemes form a terminal panicle. *Bracts* ⅓ in., linear, subpersistent, canescent on the back; pedicels ⅔–¾ in. *Calyx* ⅓ in.; teeth lanceolate, as long as the tube. *Corolla* ⅔ in., deep red. *Pod* ⅔–¾ in. long, shortly stipitate, finally glabrescent, subcoriaceous; style ⅓ in., not at all plumose.

**SPECIES UNKNOWN TO MR.**


leaflets ovate-elliptic, $\frac{1}{2}$-1 in. long, chartaceous, dark green and glabrous above, glaucous and pilose below. Racemes axillary, stiff, fulvo-pubescent, twice as long as the leaves; bracts caducous; pedicels very short. Calyx densely fulvo-pubescent, $\frac{1}{2}$ in.; teeth subulate. Corolla scarcely twice as long as the calyx, probably immature. Immature pod oblique ovoid acuminate, silky. Martaban, Rev. F. Mason, ex Kurz loc. cit.


33. **ALHAGI**, Desv.

Low shrub. Leaves simple. Flowers axillary. Calyx campanulate; teeth 5, distinct, minute. Corolla exserted; standard broad; keel obtuse. Stamens diadelphous; anthers uniform. Ovary linear, sessile, 6-8-ovulate; style filiform, incurved; stigma minute, capitulate. Pod linear, subcontinuous or moniliform; joints oblong, small, turgid, smooth.—Distrib. Species 1, spread from Songaria to Greece and Nubia.


Plains of the North West Provinces, Upper Ganges and Concan, ascending to 3000 ft. on the Kishengunga.

A low shrub, armed with copious subpatent hard pungent spines $\frac{1}{2}$-1 in. long. Leaves simple, drooping from the base of the spines or branches, oblong, obtuse, rigidly coriaceous, glabrous. Flowers 1-6 from a spine, on short pedicels. Calyx glabrous, $\frac{1}{10}$-in. Corolla reddish, 3 times the calyx. Pod 1 in. long or less, falcate or straight.

34. **HEDYSARUM**, Linn.

Herbs. Leaves numerous, odd-pinnate, exstipellate. Flowers usually red, in copious long-peduncled axillary racemes. Calyx-tube campanulate or tubular; teeth 5, distinct, long or short. Corolla much exserted; petals unequal in relative proportion in the different species; keel obtuse. Stamens diadelphous; anthers uniform. Ovary linear, stalked, few-ovuled; style very long, filiform, abruptly inflexed, stigma minute terminal. Pod of 1-3 flattened indehiscent joints, in our species not muricatated, but reticulately veined on the faces, the sutures usually furnished with acute entire or toothed borders.—Distrib. Species about 50, spread through the North Temperate zone.

* Calyx-teeth equalling or exceeding the tube.


Kumaon, temperate region, alt. 9000 ft., Strachey and Winterbottom.

Leaves and peduncles in a dense rosette from a thick woody rhizome. Leaf-rachises 4-6 in. long, including distinct petiole; leaflets 17-25, $\frac{1}{2}$-in. long, obtuse, with a mucro, dark green, glabrous above, pale grey with adpressed silky hairs below; veins distinct. Inflorescence seen only in a late stage; pedicels very short. Calyx 1-2 in.; teeth setaceous, from a lanceolate base, exceeding tube. Corolla $\frac{1}{2}$-in. Joints of pod solitary in the specimens seen, rather downy, oblong, under $\frac{1}{2}$ in. long.

2. **H. sikkimense**, Benth. M.S.S.; stem dwarf, leaflets small linear-oblong subcoriaceous, standard and wings shorter than the keel, joints large membranous with toothed borders.
Sikkim, alpine region, alt. 12-16,000 ft., Hook. fil.
Stems slender, at first slightly downy, ½ ft. or less high. Leaf-rachis 2-3 in. long; leaflets 21-27, ½ in. long, obtuse, glabrous above, obscurely pubescent with raised veins below. Heads dense, 1-2 in. long in flower; bracts linear, minute. Calyx pubescent, ⅛ in.; teeth lanceolate, as long as the tube. Corolla bright red, ⅛ in. Joints of pod 1-3, roundish or oblong, ½ in. long; sutures irregularly faintly erose-dentate.

3. **H. Falconeri**, Baker; caulescent, robust, leaflets large subcoriaceous ovate-oblong, keel and standard equal, joints large membranous with toothed borders.

West Tibet, temperate region, Dr. Falconer.
Stems 1½-2 ft. high, slender, firm, sulcate, glabrous. Leaf-rachises 6-9 in. long; leaflets 13-19, distant, ⅜-⅝ in. long, obtuse, glabrous, full green above, grey-green, obscurely canescent with prominent veins below. Flower-racemes 3-4 in. long, moderately close; bracts setaceous, very small; pedicel as long as the calyx. Calyx ⅛ in. long; teeth setaceous, as long as the tube. Corolla ½-⅞ in. Joints oblong, glabrous, ⅜ in. long, thin, with broad irregularly erose-dentate borders.

4. **H. astragaloides**, Benth. MSS.; caulescent, robust, leaflets large membranous linear-oblong, corolla yellowish, keel exceeding the standard, joints large membranous with crisped borders.

Kishtwar, alpine zone, alt. 11-12,000 ft., Thomson. Lahul, Jaeschke.
Stems robust, erect, 2 ft. high, densely canescent at first. Leaf-rachises 4-8 in. long; leaflets 21-29, not at all coriaceous, obtuse, with a minute micro, ⅜-1 in. long, glabrous above, persistently grey-canescent below. Flower-racemes very dense, 2-3 in. long, the linear scarisose bracts protruding beyond the buds; pedicels shorter than calyx. Calyx ⅛ in., finely silky; teeth exceeding the tube. Pod distinctly stalked; joints 1-2, oblong, with a distinct rather crisped wing on the lower side and an obscure one on the upper.

5. **H. cachemirianum**, Benth. MSS.; caulescent, robust, leaflets large membranous linear-oblong, corolla red, standard exceeding wings and keel, joints large membranous with entire borders.

Kashmir, temperate region, alt. 9-10,000 ft., Thomson, Falconer, Winterbottom.
Stems 1½-2 ft. high, erect, glabrous, many-grooved. Leaf-rachises ½-1 ft. long; leaflets 21-27, thin, obtuse, ⅜-⅝ in. long; both sides green, glabrescent, concolorous. Racemes very dense, 2-3 in. long in flower, the linear setaceous bracts protruding beyond the buds; pedicels very short. Calyx downy, ⅜ in.; teeth as long as the tube. Corolla ⅜-1 in. long. Joints 1-3, glabrous, oblong, ⅜-⅞ in. long; both sutures with a distinct entire wing.

**Calyx-teeth shorter than the tube.**

6. **H. laxiflorum**, Benth. MSS.; stems slender, leaflets subcoriaceous, bracts minute setaceous, keel exceeding wings and standard, joints small entire not bordered.

West Himalaya, temperate or alpine region. West Tibet, Falconer. Valley of Kishengunga, Winterbottom.
Stems 1½-2 ft. high, firm, slender, glabrous. Leaf-rachis 3-5 in. long; leaflets 21-31, close, firm, linear-oblong, ½-⅝ in. long; green, glabrous above, grey, obscurely canescent with raised veins below. Racemes lax, 2-3 in. long in flower; pedicels as long as the calyx; finely downy. Calyx ½ in.; upper teeth deltoid, lower lanceolate. Corolla ⅝-¾ in. Joints 3-4, oblong, firm, glabrous, rather turgid, not more than ⅛ in. long.

7. **H. strobiliferum**, Baker; stems robust, leaflets membranous, bracts large ovate-acuminate, corolla under twice the calyx, its petals equal.
Kashmir, temperate region, Falconer.

Stems above a foot high, densely clothed with short adpressed whitish hairs. Leaf-rachises 6–8 in. long; leaflets 19–25, oblong-lanceolate, obtuse, 1–1 1/2 in. long, flexible, glabrescent above, thinly white-silky beneath. Racemes dense, 2–3 in. long; the buds quite hidden by the imbricated scarious eiliated bracts; pedicels very short. Calyx tubular, 1 1/2 in. long; teeth deltoid-cuspidate, not more than 1 1/6 tube. Corolla yellowish, under 1 1/2 in. long. Pod unknown.

8. H. microcalyx, Baker; stems robust, leaflets large membranous, bracts linear minute, corolla several times calyx, keel exceeding standard, joints large membranous entire.

West Himalayas, temperate region; Gurewah, Falconer; Kashmir, Lance; Lahul, Jaeschke.

Stems 1½-2 ft. high, stout, sulcate, glabrous. Leaf-rachises 6–9 in. long; leaflets 11–13, distant, oblong-lanceolate, obtuse or subacute, 1–1 1/2 in. long; both sides green, glabrous. Flower-racemes 2–4 in. long, lax; pedicels 1/1–1/4 in. long, grey-pubescent. Calyx 1/4 in., campanulate, membranous, glabrous; teeth minute, deltoid-cuspidate. Corolla bright red, 2 3/4 in. Joints 2–3, oblong, 1/5 in. long, thin, glabrous, the sutures both distinctly marginated.

35. STRACHEYA, Benth.

A tufted low shrub. Leaves odd-pinnate. Flowers axillary. Calyx-tube turbinate; teeth 5, lanceolate, as long as the tube. Corolla much exserted; standard broad; keel as long as the other petals, incurved and obtuse at the tip. Stamens diadephous; anthers uniform. Ovary linear, sessile, few-ovuled; style long, filiform, abruptly incurved, stigma minute capitate. Pod flat, not visibly jointed, muricated along the edge and face and marked with conspicuous transverse veins.—Distrib. A single endemic species.


Tibetan Himalayas, alpine region, from Pangong eastward to East Nepal, alt. 14–17,000 ft., Thomson, Strachey & Winterbottom, &c.

Stems densely tufted, from a slender woody rootstock, the leaves and peduncles in a rosette at the surface. Leaves odd-pinnate; leaflets 11–13, oblong, obtuse, faintly hairy; leaf-rachis 2–4 in. long, including a distinct petiole, articulated at the nodes. Flowers 1–5, shortly pedicellate, on very short peduncles; bracts lanceolate, silky. Calyx 1 1/2 in., densely pubescent. Corolla 2 3/4 in., reddish, glabrous. Pod glabrous, membranous. 1 in. long.

36. ZORNIA, Gmel.

Annuals, with large gerninate coriaceous bracts and dotted leaflets in 1–2 opposite pairs. Flowers in lax racemes. Calyx minute; upper teeth short, connate; lowest shorter than the two middle ones. Corolla much exserted; standard broad; keel incurved, acute. Stamens monadelphous; anthers dimorphic. Ovary sessile, many-ovuled; style filiform, incurved, stigma minute capitate. Pod of several small round flattened finely muricated 1-seeded indehiscent joints.—Distrib. Species 10, all but two American.

Plains from the Himalayas to Ceylon and Burma, ascending to 4000 ft. in Kumaon.—Distrib. Everywhere in the Tropics.

Stems wiry, densely cespitose. Leaves petioled; leaflets lanceolate, acute, glabrous, rigidly coriaceous, ½-1 in. long, dotted with black glands; stipules lanceolate, with a long spur. Racemes 1-3 in. long, 3-12-flowered; bracts ovate, acute, nearly or quite hiding the flower and pod. Joints 2-6, under ½ in., densely prickly.


Var. 2. Walkerii (Arn. Pugill. 12, sp.); leaflets oblong ½-1 in. long, bracts downy at the edge, pod scarcely exserted from the bracts, joints small reticulato-venose with only a few small bristles near the edge. Walp. Rep. i. 726; Thwaites Enum. 85.—Ceylon, Walker, Thwaites.

37. STYLOSANTHES, Sw.

Undershrubs. Leaves rigid, pinnately 3-foliolate. Flowers inconspicuous, in small dense heads. Calyx with an elongated filiform tube, and 5 teeth, of which the upper 4 are subconnate. Flowers polygamous, the fertile ones often apetalous. Petals inserted at the throat of the calyx-tube; standard orbicular; keel subrostrate. Stamens monadelphous; anthers dimorphous. Ovary subsessile at the base of the calyx-tube; style long, filiform, the lower part persistent, stigma minute capitate. Pod with 1-2 flattened rugose joints.—Distrib. Species about 15. Cosmopolitan, tropical.


Shores of Western Peninsula and Ceylon.—Distrib. Cape, Trop. Africa, Malay isles.

A low diffuse undershrub, with terete pubescent branches. Stipules scariose, adnate downwards to the petiole; leaflets ½-1 in. long, pale green, rigidly coriaceous, oblong or lanceolate; under-side a little pubescent at first. Flowers 1 or few, in sessile terminal heads; bracts persistent, striated, pubescent. Corolla ½ in., exserted. Pod 1-2-jointed, tipped with the falcate indurated lower part of the style.

38. SMITHIA, Ait.

Herbs or undershrubs. Leaflets many, small, sensitive, leaf-rachis ending in a bristle; stipules scariose, with large auricles. Flowers racemose or axillary. Calyx deeply 2-lipped, the lips usually entire. Corolla exserted; standard orbicular; keel incurved, obtuse. Stamens in two bundles of 5 each; anthers uniform. Ovary linear, many-ovuled; style incurved, filiform, stigma minute capitate. Pod of few or many minute flattened or turgid joints, folded together inside the calyx.—Distrib. Species 20-30, spread through the tropics of the old world.

* Calyx rigid, its veins close, parallel, simple.

1. S. sensitiva, Ait.; DC. Prodr. ii. 323; stems not bristly, leaflets small 4-20, flowers in short simple racemes, calyx-lips equal, corolla yellow. Roxb. Hort. Beng. 56; Fl. Ind. iii. 342; Salisb. Par. t. 92; Wall. Cat. 5668, ex
Himalayas to Travancore and Rangoon, ascending to 3000 ft. in Khasia.—
Distr. Madagascar, Abyssinia, Java, China.

Annual, ½-3 ft. high. Stems very slender, much branched. Leaf-rachis bristly, 
½-1 in. long; leaflets ½-1 in. long, with subparallel edges, bristly mainly on the mid-
drib below. Flowers 1-6, in close short-peduncled racemes from the axils of the upper 
leaves; pedicels short, ascending. Calyx ½-1 in. long; lips acute, entire, with a few 
short deciduous scattered bristles. Joints 4-6, densely papillose on the faces.

2. S. geminiflora, Roth; DC. Prodr. ii. 323; stems not bristly, leaflets small 4-12, flowers in pairs in the axils of the leaves, calyx-lips equal, corolla yellow. S. sensitiva, Wall. et W. & A. loc. cit. ex parte.

Himalayas (ascending to 1-3000 ft.) to Ceylon and Tavoy.—Distr. Java, N. 
Australia.

General habit of the last. Leaflets obtuse, with parallel sides, ½-3 in. long, the 
bristles of the edge and midrib more copious and longer. Calyx ½ in., with a few 
deciduous bristles; both lips entire, acute. Corolla about twice the calyx. Joints 
4-6, very turgid and papillose.

Var. 1. conferta; upper nodes congested into dense heads, leaves and calyx more 
bristly. S. conferta, Sm.; DC. loc. cit. S. capitata, Desv. Journ. Bot. i. 121, non 

small 12-24, flowers in sublax peduncled axillary racemes, lower calyx-lip 
shorter, corolla purple. S. laxiflora, Benth. Pl. Jungh. 211.

Plains of Concan.

Annual. Stems very slender, ½-2 ft. high. Leaf-rachis 1-2 in. long; leaflets 
linear, ½-2 in. long, tipped with a long awn and furnished with a few bristles on the 
rachis and oblique midrib. Flowers 6-12, in copious short-peduncled second racemes 
from the axils of the upper leaves; pedicels cernous; bracteoles acute or obtuse, 
½-3 calyx. Calyx ½-2 in. long; upper lip obtuse, recurved, lower subacute, both with-
out bristles. Corolla little exserted. Joints of pod 10-12, reticulato-venose, not 
papillose.

4. S. setulosa, Dalz. in Kew Journ. iii. 208; stems densely bristly, leaflets 
large 10-12, flowers in copiously paniced second racemes, lower calyx-lip shorter, 

Plains of Concan, Stocks, Dalzell.

A robust annual, 2-4 ft. high, the stems densely clothed throughout with deflexed 
bristles. Leaflets linear, ½-1½ in. long, with a few bristles in the edge and subcentric 
midrib. Racemes 1-2 in. long, dichotomously forked, forming a long thyrsoid panicle, 
only the lowest subtended by a leaf; pedicels ascending. Calyx ½ in. long, densely 
clothed with minute bristles; upper lip broad, obtuse, recurved; lower much smaller, 
lanceolate, acute. Corolla twice the calyx. Joints 10-12, reticulato-venose, not pa-
pillose.

** Calyx membranous, its veins not so close and distinctly anastomosing.

5. S. bigemina, Dalz. in Kew Journ. iii. 208; stems minutely bristly, 
leaflets 4, flowers in short axillary racemes, bracteoles minute, joints 6-8 

Plains of Concan, Stocks, Dalzell; Dekkan, near Poonah, Jacquemont.

Annual, very diffuse, with very slender stems, 1 ft. or less high. Leaf-rachis ½ in. 
long; leaflets membranous, oblanceolate-oblong, obtuse, ½-2 in. long, minutely bristly
on the back and edge. **Flowers** 4–6, in copious short-peduncled racemes; bracteoles linear, ¼ the calyx. **Calyx** ¼ in., turbinate, densely bristle-ciliated; lips equal, upper truncate. **Corolla** yellow, twice the calyx.


**Nigghirs, Schmidt, Wight.**

A diffuse, very slender, perennial, with the general habit and inflorescence of **S. bigeminna**. **Leaflets** obovate-oblong, ¾–2 in., minutely bristly. **Calyx** ¼ in., densely ciliated with minute bristles; lips equal, narrower than in the last, the lower acute; bracteoles linear. **Corolla** bright yellow, twice the calyx. **Joints** distinctly veined, not at all echninate as in **S. bigeminna**.

7. **S. ciliata**, Royle **Ill.** 201 t. 35, fig. 2; stems not bristly, leaflets 6–16, flowers in dense axillary racemes, bracteoles large, joints 6–8 obscurely papillose. **S. punila**, Royle **MSS.**; **W. & A. Prodr.** 220.

**Simla and Kumaon to Khasia and Sikkim**, alt. 3–6000 ft. Parasath in Behar. Annual. **Stems** slender, ¾–2 ft. high. **Leaf-rachis** ¾–1 in.; leaflets linear, ¾–2 in. long, obtuse, distinctly bristly on the edge and midrib below. **Flowers** up to a dozen in dense copious short-peduncled secund racemes; bracteoles leafy, oblong, ciliated, nearly as long as the calyx. **Calyx** ¼ in., densely bristle-ciliated; upper lip truncate, finally ¼ in. broad; lower lanceolate. **Corolla** yellow, little exserted.


**Western Peninsula.**

An annual, 1–2 ft. high, with firm shrubby terete branches. **Leaf-rachis** densely bristly, 1½–2 in. long; leaflets linear, ¾–2 in. long, bristly on the back and edge. **Flowers** in a dense globose head 1 in. thick, at the end of each branch; pedicels very short; bracteoles oblong, membranous, bristle-tipped, nearly as long as the calyx. **Calyx** ¾ in. long; both lips broad, truncate, ciliated with long bristles. **Corolla** purplish, much exserted. **Joints** neither venose, nor papillose.

9. **S. pycnantha**, Benth. **MSS.**; stems minutely bristly, leaflets 6–8, flowers in globose terminal heads, bracteoles minute, joints 5–6 venose.

**Concan, Stocks, Law.**

An erect annual, ¾–2 ft. high, the stem clothed densely with small bristles dilated at the base. **Leaves** distinctly petioled; leaf-rachis ½ in. or less long, densely bristly; leaflets linear, ¾–2 in. long, with a few minute yellow bristles in the back and edge. **Heads** 1 in. or more broad, formed of densely congested racemes; pedicels shorter than the calyx; bracteoles half the calyx, obtuse. **Calyx** ½ in., with copious sessile black glands and small yellow bristles on back and edge; lips equal, truncate. **Corolla** yellow, half as long again as calyx.

10. **S. dichotoma**, Dalzell **MSS.**; stems not bristly, leaflets 4–6, racemes forming a lax corymbose panicle, bracteoles minute, joints 10–12 papillose. **S. blanda**, Hohen. **Plant. Ind. Or. Exsic.** No. 146, non **Wall.**

**Western Peninsula.**

**Stems** annual, very slender, little branched, 1–1½ ft. high. **Leaf-rachis** ½ in. or less long; leaflets membranous, oblanceolate-oblong, obtuse, ¾–2 in. long, not aristate, both sides without bristles. **Lower racemes** of the panicles 5–6-flowered, second; pedicels ascending, ½–1 in.; bracteoles linear, ¾–1 calyx. **Calyx** membranous, ½ in.; lower acute lip slightly longer than the broad truncate upper one. **Corolla** yellow, half as long again as the calyx.
11. **S. grandis**, Benth. MSS.; stems robust not bristly, leaflets 20–24, racemes forming a lax corymbose panicle, bracteoles ¼ calyx, joints 20–25 venose.


Stems stout, erect, 3–4 ft. high. Leaf-rachis 2½–3 in. long; leaflets linear, obtuse, without bristles, ½–3½ in. long; lower stipules 1 in. long. Racemes subsecund, 6–12-flowered, forming a corymbose panicle ½ ft. broad; pedicels erect, ½–1½ in. long, with a few deciduous bristles; bracteoles ¼ in., obtuse. **Calyx** ⅔ in. long; lips equal, truncate, obtuse, with only a few small bristles at first. **Joints** largest of all, ⅓ in. broad.

12. **S. blandia**, Wall. Cat. 5660; stems densely bristly, leaflets 6–10, racemes copiously panicled, bracteoles half as long as the calyx, joints 5–6 reticulated.

**East Himalayas**, tropical zone up to 4000 feet, **East Bengal**, Nilgiris.

Perennial, suffruticose. Stems 1½–2 ft. high, the bristles very dense, spreading, fine, fragile. Leaf-rachis under 1 in. long; leaflets firm, obtuse, bristle-tipped, ⅔–1½ in. long, with copious fine deciduous bristles on the rachis, edge and midrib. Racemes forming a dense terminal panicle, with corymbose branches; pedicels 1½–6 in., densely bristly. **Calyx** ⅔–1½ in., denselyclothed with fine bristles on back and edge; lips equal; upper broad, truncate. **Corolla** bright yellow, twice the calyx. **Joints** ⅓ in. broad.

**Var. 1.** *paniculata*; stems more slender, flowers fewer smaller crowded at the end of the peduncles. **S. paniculata**, Arn. Pug. 12.—Hilly tracts of Ceylon, alt. 2–7000 ft.

**Var. 2.** *racemosa*; annual, more slender and fugacious, leaflets more membranous, calyx ⅓–⅘ in. long, corymbs formed of a few close subsecund racemes 1–1½ in. long. **S. racemosa**, Heyne in Wall. Cat. 5670; W. & A. Prodr. 221; Dalz. & Gibbs. Bomb. Fl. 63. S. hirsuta, Dalz. in Kew Journ. iii. 135; Dalz. & Gibbs. Bomb. Fl. 63.—Plains of Western Peninsula and Ceylon.

30. **ESCHYNOMENE**, Linn.

Erect herbs or undershrubs. Leaves with very numerous close sensitive odd-pinnate small linear leaflets. Flowers in sparse racemes. **Calyx** deeply 2-lipped, the lips faintly toothed. **Corolla** fugacious; standard orbicular; keel not beaked. **Stamens** in two bundles of 5 each; anthers uniform. **Ovary** stalked, linear, many-ovuled; style filiform, incurved, stigma terminal. **Pod** linear, with a stalk longer than the calyx and 4–8 flattened 1-seeded separating joints.—**Distrib.** Species about 30, spread everywhere in the tropics.


**HIMALAYAS** to Ceylon and **SIAM**, ascending to 5000 ft. in KASHMIR and 4000 ft. in KUMAON.—**Distrib.** Japan and everywhere in tropics of old world.

A suffrutiaceous annual, 1–3 ft. high, glabrous, pale green, with slender terete branches. Leaf-rachis 2–3 in. long; leaflets close, 41–61, linear, obtuse, 1-nerved; stipules lanceolate, membranous, deciduous, with a large auricle. Flowers 1–4, in copious axillary racemes; peduncle and pedicels usually viscid; bracts small, lanceolate,
rigid, gland-ciliiated. Calyx under $\frac{1}{2}$ in. long. Corolla fugacious, twice the calyx. Pod 1-1$\frac{1}{2}$ in. long, straight or rather curved; upper suture straight, lower more or less distinctly indented; joints 6-10, $\frac{3}{4}$-$\frac{3}{4}$ in. broad, smooth or finally papillose on the face.


Tropical Zone; Bengal and Sikkim to Malacca and Ceylon.—Distr. Malay isles, Tropical Africa.

A tall erect swamp species, with stout glabrous main stems, full of white pith. Stipules linear or lanceolate, auricled, deciduous; leaf-rachis 3-6 in. long; leaflets 61-101, linear, obtuse, 1-nerved. Racemes corymbose, 2-4-flowered; pedicels and peduncles clothed with spreading bristles. Calyx $\frac{1}{2}$ in., with a pair of round bracteoles. Corolla twice the calyx. Pod 2-2$\frac{1}{4}$ in. by $\frac{1}{2}$ in.; joints 3-6, smooth or echinate on the faces over the seeds.

*E. surattensis*, W. & A. Prodr. 219, is altogether doubtful, the description being probably taken in part from *Sesbania aculeata*.

40. **ORMOCARPUM**, Beauv.

Shrubs. Leaves with odd-pinnate exstipellate leaflets and persistent striated stipules and bracts. Flowers in lax racemes. Calyx-tube campanulate; 2 upper teeth deltoid; 3 lower lanceolate. Standard broad; keel much incurved, not at all beaked. Staminos in two bundles of 5 each; anthers uniform. Ovary linear, few-ovuled; style filiform, inflexed, stigma minute terminal. Pod of a few indehiscent turgid linear or oblong joints, the lower seedless, the faces rugose, naked or muriculated with weak gland-tipped prickles.—Distr. Species 6, spread all round the world in the tropics.


Plains of the Western Peninsula and Ceylon.—Distr. Siam, Philippines, Polynesia, Trop. Africa.

A low shrub, with terete slender branches, the branchlets and leaf-rachis viscid. Leaflets 9-17, alternate, oblong, obtuse, membranous, deciduous. Flowers 2-6, in copious short-peduncled axillary corymbose racemes; bracts spreading, minute, deltoid; pedicels viscid, as long as calyx. Calyx $\frac{1}{2}$ in. Corolla yellow, much exserted. Pod with 2-4 joints, linear or oblong, 1-1 in. long, horizontally plicate, smooth or muriculated.

41. **LEPTODESMA**, Benth.

Diffuse perennial herbs. Leaves simple or pinnately 3-foliolate, stipellate. Bracts large, imbricated. Flowers small, crowded in dense terminal racemose heads. Calyx with a very short tube, and 5 subequal setaceous teeth. Corolla minute, included; standard broad; keel obtuse. Staminos diadphalous; anthers uniform. Ovary sessile, 1-ovuled; style long, filiform, incurved, stigma capitate. Pod small, oblong, membranous, flattened, 1-seeded, opening widely along the ventral suture.—Distr. Two species, the other a plant of Madagascar.

Tropical Zone; Nilghiriis. Gardner, Schmidt, Wight.
A perennial, with slender firm trailing cespitose stems 1–2 ft. long. Leaves short-petioled, membranous, 1 or 3-foliolate, the end leaflet the largest, orbicular or oblong, obtuse, 4–5 in. long, a little hairy below. Flowers in copious oblong terminal capitate racemes under 1 in. long; bracts ovate, scariose, finely pubescent; pedicels short. Calyx 1⁄4 in.; teeth densely plumose. Pod as long as calyx.

42. ELEIOTIS, DC.

An annual herb. Leaves usually 1-foliolate. Flowers in axillary racemes. Calyx with a very short tube and 5 subequal setaceous teeth. Corolla minute; standard broad; keel obtuse, adhering to the wings. Stamens diadelphous; anthers uniform. Ovary subessicile, 1-ovuled; style short, unicinate or nearly straight, thickened at the base, stigma capitate. Pod of a single dimidiate membranous veined joint, with a flattened "traight" dorsal and rounded ventral suture.—A single endemic species.


Plains of Bundelkund, Western Peninsula and Ceylon.

An annual, with slender trailing densely cespitose glabrous stems, 1–2 ft. long. Leaves subglabrous, membranous, consisting usually of a single short stalked stipellate terminal leaflet, rounded or broader than long, emarginate, 4–1 in. long, but occasionally with a pair of minute lateral leaflets. Flowers in copious simple lax axillary racemes; pedicels spreading, downy, exceeding the calyx; bracts minute, ovate, scariose, deciduous. Pod 1⁄4 in. long.

43. PYCNOSPORA, R. Br.

A low shrub. Leaves pinnately 3-foliolate. Flowers minute, racemose, Calyx deeply cleft, the upper teeth subcomate. Corolla much exerted; standard roundish; keel obtuse, cohering to the wings. Stamens diadelphous; anthers uniform. Ovary sessile, many-ovuled; style reflexed, filiform; stigma minute capitate. Pod oblong, turgid, 2-valved, 8–10-seeded, continuous within, not jointed, but marked with transverse veins.—A single species, combining the habit of Desmodium, with a pod like Crotalaria.


Tropical zone; Khasia (3–5000 ft.), Silhet, Tenasserim, Western Peninsula, Ceylon.—Distrib. China, Philippines, N. Australia.

A perennial herb, with slender densely cespitose trailing stems 1–2 ft. long. Leaves pinnately 3-foliolate; leaflets obovate, obtuse, 1–1 1⁄2 in. long, stipellate, subcoriaceous, glabrous above, finely downy and reticulato-venose below. Flowers in lax terminal racemes; bracts deciduous, scariose, ovate-cuspidate; pedicels downy, 2–3 times the calyx. Calyx 1⁄12 in. long or less. Pod 3⁄8–1⁄2 in. long, finally black.

44. PSEUDARTHRIA, W. & A.

Habit of Desmodium, from which it only differs in pod. Calyx-teeth as long as the tube, 2 upper subcomate. Corolla 2–3 times the calyx; standard broad; keel obtuse. Stamens diadelphous; anthers uniform. Ovary subessicile, many-ovuled; style filiform, stigma capitate. Pod linear-oblong, compressed, mem-
branous, indescent, continuous without, the sutures not at all indented.—DistriB. Species 5, the others African.

1. **P. viscida**, W. & A. Prodr. 200; Wight Ic. t. 286. Hedysarum viscidi-
dum, Linn.; Roxb. Hort. Beng. 57; Fl. Ind. iii. 356. Desmodium viscidi-

Tropical zone, Western Peninsula and Ceylon, up to 3000 ft.—DistriB. Timor.

Perennial, 2–3 ft. high, with slender stems, clothed with fine grey pubescence. Leaves peltiolar, pinnately 3-foliolate; leaflets stipellate, membranous or subcoriaceous, green, obscurely bristle-tipped, grey, densely pubescent, rarely subglabrescent below; end leaflet round-rhomboidal, obtuse or acute, 2–4 in. long. Racemes axillary and terminal, sometimes branched, flowers distant, fascicled; pedicels spreading, 3–4 times the minute calyx. Pod 5–7 in. long, 4–6-seeded, finely downy.

**D. LOURSA, Neck.**

Herbs. Leaves membranous, stipellate; 1–3-foliolate. Flowers in terminal simple or panicked racemes. Calyx membranous, accrescent, the lanceolate teeth as long as the cymules. Corolla equalling or exceeding the calyx; standard broad; keel obtuse. Stamens diadelphous; anthers uniform. Ovary few-ovuled; style filiform, inflexed, stigma capitate. Pod of about 4 small distinct 1-seeded smooth veined joints, included in the calyx.—All the species are East Indian.


Ava; Taong-dong mountains, Wallich.

Stems erect, slender, finely downy. Leaves 2½–3 in. broad, rigidly coriaceous, gla-

brous; lobes spreading, rounded at the point, 4–5-nerved, base subcordate, apex rounded or slightly emarginate; petiole nearly as long as the blade. Racemes 1–3, forming copious terminal and lateral panicles; pedicels pubescent, cernuous, sometimes gametive, shorter than the calyx. Calyx slightly downy, finally 1/6–1/3 in. Joints downy.


Common in waste places throughout India.—DistriB. Tropics of both hemi-
spheres, often planted.

Stems erect, slender, finely downy upwards. Petiole 3/4–3 in.; leaflets rigidly subcoriaceous, green, clouded usually with white, the end one 2–3 in. broad, 3/4–3 in. long, with two linear or lanceolate spreading or slightly ascending 2–3-nerved halves; apex bristle-tipped, broadly emarginate; side leaflets, if present, much smaller, obliquely obversely deltoid. Racemes 3–6 in. long; pedicels pubescent, shorter than the calyx; lower gametive. Calyx finally 3/8–3/4 in. long. Corolla not exerted. Joints 4–5.

Birma, Wallich.—Distrib. Malay isles, China, Philippines, N. Australia.

Stems cespitose, very slender, wide-trailing, pubescent. Petiole \( \frac{1}{4}-\frac{3}{4} \) in.; leaflets membranous, pale green, as broad as long, truncate or rounded at the apex, pale green, not clouded, glabrous above, \( \frac{1}{4}-\frac{3}{4} \) in. long. Racemes very lax, reaching 6-9 in. long; pedicels as long as the calyx, pubescent, cernuous, rarely geminate. Calyx downy, finally \( \frac{1}{4}-\frac{3}{4} \) in. long. Corolla twice the flowering-calyx. Joints 4-5, glabrous.


Aya; Taong-dong mountains, Wallich.
Erect, with the habit of a Desmodium. Stems firm, slender, finely downy. Petioles \( \frac{1}{2}-\frac{3}{4} \) in.; leaflets subcoriaceous, green, glabrous above, pale green, reticulato-venose below; end one 2-3 in. long, obtuse, with a cuneate base; side ones much smaller. Racemes 4-6 in. long, forming copious terminal panicles, with densely pubescent rachises; pedicels \( \frac{1}{4} \) in. curved. Calyx \( \frac{1}{2}-\frac{3}{4} \) in., densely pubescent. Corolla twice flower-calyx. Joints 2-3, pubescent.

40. Doodia, Desv.

Suffruticosperennials. Leaves stipulate, with 1 to 9 leaflets. Flowers very numerous, minute, racemose. Calyx-tube very short; two upper teeth short; three lower usually elongated, setaceous. Standard broad; wings adh-erling to the obtuse keel. Stems diadelphous; anthers uniform. Ovary sessile or short-stalked, few-ovuled; style inflexed filiform, stigma terminal. Pod of 2-6 small turgid 1-seeded indehiscent joints, often placed face to face.—Distrib. Species all here included.

* Upper leaves 5-9-foliolate.


Himalayas to Ceylon, ascending to 6000 ft. in the north-west.—Distrib. Tropical Africa, Malay isles, Philippines.

An erect little-branched suffruticosperennial, 3-6 ft. high. Stems robust, finely downy. Petioles 1-2 in.; leaflets 4-6, rarely 9, rigidly subcoriaceous, glabrous above, reticulato-venose, minutely pubescent below, 4-8 in. long, \( \frac{1}{4}-\frac{3}{4} \) in. broad; lowest simple, round or oblong. Flowers in dense cylindrical racemes, \( \frac{1}{4}-\frac{3}{4} \) ft. long, \( \frac{3}{4}-\frac{1}{4} \) in. broad; bracts brown, scarious, deciduous, not distinctly ciliated; upper lanceolate, lower ovate acuminate; pedicels \( \frac{2}{4}-\frac{3}{4} \) in., abruptly recurved at the tip after flowering. Corolla purple, slightly exerted. Joints 3-6, glabrescent, polished, often whitish.


Himalayas to Ceylon and Siam, ascending to 9000 ft. in the north-west.—Distrib. China, Malay isles.

General habit of the last. Upper leaves 3-7-foliolate; leaflets subcoriaceous, green, smooth above, paler, reticulato-venose beneath, 4-6 in. long, \( 1\frac{1}{2}-2 \) in. broad, much rounded at the base. Racemes dense, reaching above a foot long, \( 1\frac{1}{2} \) in. thick;
lower pedicels 1/2 in. long with spreading bristles 3–4 times their thickness; bracts distinctly ciliated. Calyx-segments densely plumose. Corolla purplish, 1/2 in. long. Joints 4–6, opaque.

** Leaves 1- and 3-foliolate intermixed.


Tropical zone. **Nipa** and **Bengal** to **Ava.**—**Distrib.** Malay isles, China, Polynesia, N. Australia.

Stems densely cespitose, woody, slender, pubescent. Petiole 1/2 in.; leaflets many, of both kinds, obtuse, broadly rounded at the base, 1–2 in. long, glabrous above, finely downy below. Heads always simple, very dense, 1–2, rarely 3 in. long, under 1 in. thick; bracts subpersistent, distinctly ciliated; pedicels densely crinite, not longer than calyx. Calyx 1/2 in.; lower teeth setaceous, densely plumose. Corolla scarcely exserted. Joints 1–2, brown, polished, finely pubescent. U. cercifolia, Desv.; DC. Prodr. ii. 325, is probably a form of this with a single leaflet.


Punjab, along the Himalayas to Assam and Ava, ascending to 6000 ft. in Simla.

An erect undershrub, reaching 10–12 ft., with slender woody densely pubescent branches. Leaves usually all 3-foliolate, subcoriaceous, glabrescent above, reticulatovenose, finely downy below; end leaflet 2–4 in. long, 1 1/2–2 in. broad. Racemes copious, both terminal and axillary, resembling those of U. crinita, reaching 6–9 in. by 1–1 1/4 in.; bracts deciduous; pedicels 2–3 times the calyx, densely crinite. Calyx 1/2 in. Corolla purple, little exserted. Joints 2–6, dark or pale, dull or polished.


**Birma,** Wallich.

General habit of the last, to which it is closely allied. Pubescence of branches shorter. Leaves simple and trifoliolate intermixed, the side leaflets of the latter much smaller than the end one, which is subobtuse or subacute, deeply produced at the base. Racemes 2–4 in. by 3–6 in.; bracts ovate, acuminate, distinctly ciliated, not deciduous; pedicels densely crinite, shorter than the calyx. Calyx 1/2 in.; lower teeth long, setaceous, plumose. Joints 2, polished, glabrous, brownish-drab.


**Himalayas** to **Ceylon,** **Birma** and ** Pegu,** ascending in Sikkim to 4000 ft.—**Distrib.** Malay isles.

Branches woody, slender, shortly pubescent. Leaves similar in texture to those of all the preceding, sometimes all simple, the end one obtuse, broadly rounded at the
base, 3–5 in. by 2–3 in. Racemes much laxer than in the other species, resembling those of a Desmodium, copiously panicked, reaching 3–1 ft. long; bracts ovate, cuspidate, pubescent, deciduous; pedicels ½–³ in., often fascicled. Calyx ⅛ in., all the teeth deltoid-cuspidate. Corolla 2–3 times the calyx. Joints 4–6, opaque, drab or brown.

*** Leaves usually all 1-foliolate.

7. U. prunellafolia, Grub. in Wall. Cat. 5636; stems erect, leaflets oblong-lanceolate, racemes short close oblong. Hedysarum hamatum, Heyne MSS.

Kumaon, alt. 3000 ft., Thomson. East Himalayas, Griffith.

Branches slender, shortly pubescent. Leaves oblong or lanceolate, obtuse or acute, rounded at the base, 3–4 in. by 1–1⅓ in.; petiole ⅓–⅔ in. Racemes terminal, simple, 1–2 in. by ⅓–⅔ in.; bracts small, lanceolate, deciduous; pedicels 2–3 times the calyx, shortly bristly. Calyx ⅛–⅓ in., lower teeth twice as long as the upper. Corolla under twice the calyx. Joints 3–4, placed end to end, opaque or polished.


Promes and banks of the Irrawaddi, Wallach.


47. ALYSICARPUS, Neck.

Diffuse annuals or biennials. Leaves simple, rarely 3-foliolate, stipellate, subcoriaceous. Flowers in copious, axillary racemes. Calyx glumaceous; teeth deep, often imbricated, the two upper often connate. Corolla not exserted; standard broad; keel obtuse, adhering to the wings. Stamens diadelphous; anthers uniform. Ovary nearly or quite sessile, many-ovuled; style incurved, stigma capitate. Pod terete or turbid, composed of several indehiscent 1-seeded joints. —Distrib. Species about 15; weeds everywhere in the tropics of the old world.

* Microcalycineae. Calyx not longer than the first joint of the pod.

1. A. monilifer, DC. Prodr. ii. 353; stems clothed with fine spreading hairs, pod distinctly moniliform turbid veinless. Wall. Cat. 5769; W. & A. Prodr. 232. Hedysarum moniliferum, Linn.; Durn. Fl. Ind. t. 52, fig. 3; Roxb. Hort. Beng. 56; Fl. Ind. iii. 345. A. Rubibarna, Wall. Cat. 5771, ex parte.

Tropical zone; Himalayas through India proper. Birma and Tenasserim, Wallach.—Distrib. Nubia, Abyssinia.

Stems densely tufted, 3–1 ft. long. Leaves all simple, oblong, obtuse, glabrous, ⅔–⅔ in. long, often cordate; petiole ⅔–⅔ in. long, finely downy. Racemes close, 4–8-flowered; pedicels very short. Calyx ⅛–⅓ in., obscurely hairy; teeth linear, erecto-patent. Pod ⅓ in. thick, 4–8-jointed, ⅔–⅔ in. long, densely clothed with minute hooked pubescence, not at all reticulato-venose.

2. A. hamosus, Edgew. Cat. Banda. Pl. 47; stems densely clothed with short spreading hairs, calyx much shorter than the first joint, pod compressed reticulato-venose not moniliform. A. rotundifolius, Wight MSS.
Plain of BUNDALKUND and WESTERN PENINSULA.

*Stems* 1 ft. or less long, with many erecto-patent hairy branches. *Leaves* all simple; leaflet orbicular, obtuse, cordate, hairy on the veins below, 3-12 in. long and broad; petiole ¼–3 in., hairy like the branches. *Racemes* short-peduncled, moderately close, 4-6-flowered; pedicels as long as the calyx. *Calyx* ¼ in. long, the linear teeth erecto-patent. *Pod* 3–5 in. long, by ½ in., distinctly pubescent, 3–5-jointed.


HIMALAYS to MALACCA and CEYLON, ascending to 4000 feet in the North-west provinces.—Distrib. Through tropics of old world, Afghanistan, introduced in America.

*Stems* robust, ascending, 1–3 ft. long in the type. *Leaflets* glabrous, ¼–2 in. long, coriaceous at the base, usually oblong, obtuse, about twice as long as broad, rarely lanceolate, 3–6 times as long as broad; petiole ¼–1 in. *Racemes* elongated, 6–12-flowered, 2–3 in. long; pedicels shorter than the calyx. *Calyx* ¼ in., usually glabrous; teeth linear-setaceous, exceeding the tube. *Pod* ½–3 in. by ½ in., the joints half as long again as broad, faintly pubescent, rugose, usually a little thickened at the end, sometimes indistinctly moniliform.


Var. 3. **Stocksii**; stems clothed with fine spreading hairs, leaflets thinner than in the type obovate oblong hairy beneath, racemes elongated.—Plains of Conean, *Stocks & Law*. Intermediate between the type and A. *rotundifolius*.

**Macrocalycinae.** *Calyx* much longer than the first joint of the pod, its teeth imbricated in the fruiting stage.


HIMALAYS to CEYLON and BIRMA, ascending to 4000 ft. in KUMAO.—Distrib. Malay isles, China, Philippines, Mauritius, Polynesia.

*Stems* 1–2 ft., slender, ascending, glabrous. *Leaflets* glabrous, linear or lanceolate, 1–3 in. long, acute, rather rounded at the base, rarely oblong, subobtuse. *Racemes* 3–6 in. long, the flowers in 10–20 distant pairs; pedicels very short. *Calyx* ¼ in. adpressed to the pod, hairy at the edge only; teeth twice as long as the funnelformed tube. *Pod* stalked, ½–3 in. long, ½ in. thick; joints 4–6, glabrous, as long as smooth, slightly moniliform.


Plains, scattered throughout India proper.

Stems stout, ascending, subglabrous, reaching 4–5 ft. Leaflets oblong or lanceolate, 3–6 in. long, subcordate, ciliated on the veins below. Racemes moderately close, 1–1 ft. long, the flowers adpressed to the finely hairy rachis; pedicels ¼ in. *Calyx* ¼–¾ in.; teeth lanceolate, 4–5 times the length of the funnel-shaped plicate tube. Pod 4–6-jointed, usually exserted, ½ in. broad, turgid, moniliform, marked only with a few faint raised veins.


**Himalayas** (up to 4–5000 ft.) to Ceylon and Burma.—Distrib. Tropics of the old world. Cape, W. Indies.

Stems 1–2 ft., ascending, subglabrous. Leaflets 1–3 in. long, subglabrous below, usually oblong, obtuse, 2–3 times as long as broad, rarely orbicular or linear-lanceolate. Racemes dense, 1–4 in. long; pedicels ¼–½ in.; flowers adpressed to subglabrous rachis. *Calyx* ¼–¾ in., glabrous on the back; teeth lanceolate, much imbricated, reaching down nearly to the base, minutely ciliated. Pod 3–5-jointed, included, glabrous, ½ in. broad; joints rather broader than long, marked with close prominent transverse ribs.


Var. 3. **indicus**; leaves linear distant 2–3 in. long, racemes reaching ½ ft. long the lower flowers lax, calyx ¼ in. long hairy not much ciliated. Habit of *A. bupleurifolius*. *A. indicus, Wall. Cat.* 5762 B & F. *A. bupleurifolius, Roxb. Herb. non Cor.*—Plains of Bengal, &c.


Plains of Bundelcund, Deccan and Concan.

Racemes closely the small forms of *A. rugosus*. Stems slender, ½–1 ft. finely hairy. Leaves simple, oblong or lanceolate, 1–1½ in., ciliated on the nerves beneath. Racemes lax, 2–3 in. long, the lower flowers in distant pairs; pedicels ½ in. *Calyx* ½–¾ in.; teeth lanceolate, acuminate, reaching down nearly to the base. Pod ½–¾ in. by

Plains of Concan and Deccan.

**Stems** ascending, 1–1 1/2 ft., clothed with short adpressed hairs. **Leaves** distant, linear or lanceolate, 1–2 in. long, hairy on the nerves below, strongly triplinerved. **Spikes** close, 2–6 in. long, with a plumose rachis. *Calyx* 2 in. long; teeth lanceolate-setaceous, densely plumose, reaching down to the base. *Pod* 3–4-jointed, included in the calyx, moniliform, glabrous; joints globose, under 1/16 in. thick, the veins honeycombed.


Plains of Concan, Dalzell, Ritchie.

**Stems** 1–2 ft., clothed with dense short pubescence. **Leaves** casually 3-foliolate, usually simple; leaflets oblong or lanceolate, 2–3 in. long, subcordate, clothed with adpressed short hairs beneath. **Racemes** moderately close, reaching 6–9 in. long, 1 1/2–4 1/2 in. broad; pedicels curved, ascending, downy 1/4–3/4 in. *Calyx* 8 in.; teeth 5, lanceolate, reaching down to the base. *Pod* 3–4-jointed, subcompressed, scarcely moniliform, 8 in. broad, marked on the face with fine raised honeycomb veins.


48. **MECOPUS**, Bennett.

An annual herb. **Leaves** 1-foliolate. **Flowers** in dense racemes. *Calyx-tube* campanulate; teeth lanceolate, the two upper connate. **Standard** broad; keel incurved, obtuse. **Stamens** diadelphous; anthers uniform. **Ovary** stipitate, 2-ovuled; style flexined, stigma minute capitulate. *Pod* of one small oblong reticulato-venose joint on a long stalk thrust down by the twisting of the top of the pedicel so as to approach the rachis.—A single species.


Hilly woods of Birma, Martaban and Tenasserim.—**Distr.** Malay isles.

An erect annual, 1 ft. or more high, with numerous slender spreading naked branches. **Leaves** simple; leaflet broader than long, membranous, glabrous, pale green, venose, truncate or faintly emarginate; base subcordate; petiole filiform, articulated and minutely stipellate at the tip. **Flowers** in dense oblong peduncled terminal heads 1 in. or less long; pedicels fascicled, 1/4–3/8 in. long, finely downy, exceeding the setaceous bracts. *Calyx* and corolla very small. *Pod* with a stalk 3–4 times as long as itself.

49. **OUGEINIA**, Benth.

Tree. **Leaves** pinnately 3-foliolate. **Flowers** in fascicled axillary racemes. *Calyx-tube* campanulate; teeth small, upper 2 subconnate. **Corolla** much exserted; standard broad; keel obtuse. **Stamens** diadelphous; anthers uniform. **Ovary** sessile, linear, many-ovuled; style filiform, incurved, stigma minute capitulate. *Pod* linear, flat, smooth, formed of 2–5 large more or less distinct joints.—**Distr.** A single endemic species.

Hilly tracts of Northern India and Concan, ascending to 4000 ft. in Kumaon.

An erect tree, 20-40 ft. high, with slender terete grey branches. Leaves distinctly petioled, pinnately 3-foliolate, stipellate; leaflets rigidly coriaceous, glabrous or downy below; end leaflet roundish or obovate, 3-6 in. long, obtuse, entire or obscurely crenate; side ones smaller, opposite, oblique. Flowers very copious, in short fascicled racemes, from the nodes of old branches; pedicels 1/2-3 in., filiform, downy or glabrous. Corolla 1/2-3 in.; teeth obtuse. Corolla whitish or pale rose. Pod 2-3 in. long; joints 2-3 times as long as broad.

50. DESMODIUM, Desv.

Shrubs or herbs. Leaves 3-foliolate or simple, stipellate. Flowers small, red, in copious usually dense racemes. Calyx campanulate or turbinate; teeth longer or shorter than the tube, the two upper often subconnate. Corolla exserted; standard broad; wings more or less adhering to the usually obtuse keel. Upper stamen entirely or partially free, the other 9 united. Ovary sessile or stipitate, few- or many-ovuled; style incurved, stigma minute capitate. Pod usually composed of several one-seeded indehiscent joints, the faces compressed, never mucricated, the upper suture rarely finally splitting open.—Distrib. Species about 120; cosmopolitan in the tropics and several in the Cape and North America.

D. Cajanifolium, DC Prodr. ii. 331 (Hedysarum cajanifolium, H. B. K. Nov. Gen. t. 528. H. mucronatum, Blume; Walp. Rep. i. 746) a species widely spread in tropical America, has been introduced in Ceylon, and is included in Wallich's distribution from the Calcutta Garden as D. leptostachyum, Wall. Cat. 5697 A.

Ornithopus Perpusillus is in Schmidt's Nilghiry collection, no doubt accidentally introduced.

Arachis hypogea is frequently cultivated, but has no claim to be regarded as a native.

Subgen. 1. Dendrolabium, W. & A. Shrubs with woody branches, 3-foliolate leaves; flowers in dense short-peduncled or sessile axillary umbels, minute deciduous bracts.


Tropical zone: Ayah, Tenasserim, Penang, Malacca, Ceylon.—Distrib. Mascaren isles, Malaya, Philippines, Polynesia.

A shrub, 5-6 ft. high, with densely downy young branches. Petioles 1 in. or less, slightly furrowed; leaflets subcoriaceous, green and glabrous above, thinly grey-canescent or nearly glabrescent beneath, the veins not much raised; end one larger than side ones, roundish or broad-oblanceolate, 2-3 in. long. Umbels 6-12-flowered; pedicels short, unequal. Calyx 1 1/2 in. densely silky; teeth shorter than or as long as the tube. Corolla 1 1/2-2 in. Pod 1 1/2-2 in. long; joints 4-5, thick, glabrescent or silky, 1-3 in. long, indented at both sutures.

2. D. Cephalotes, Wall. Cat. 5721; branches triquetrous, leaflets acute 2-3 times as long as broad, joints of pod small as long as broad. W. & A.
East Himalayas, tropical zone. NIPAL to CHITTAGONG, ascending to 4000 ft.; through India proper to Ceylon and Siam.—Distr. China, Malay isles.

A shrub, several ft. high, with densely grey-silky acutely-angled zigzag branches. Petiole 1-2 in., thickened, deeply furrowed down the face; leaflets oblong or obovate-oblong, subcoriaceous, green and glabrous above, grey-silky with conspicuous parallel raised main veins below, the end one 3-6 in. long. Flowers 20 or more, in dense umbels; pedicels unequal, silvery, jointed at the apex. Calyx 3/4-1 in.; teeth lanceolate, as long as the tube. Corolla deep red, twice the calyx. Pod under an inch long, glabrescent or silky; joints 4-5, square, slightly indented, mainly at the lower suture.

**Phyllodium, Desv.** Shrubs with woody branches, 3-foliulate leaves, flowers umbellate, the umbels in long continuous rows and each hidden by a pair of persistent bracts.


East Himalayas and through India proper to Ceylon, BIRMA, and Pegu.—Distr. China, Philippines, Malay isles.

A shrub, 3-6 ft. high, with slender terete finely grey-downy branches. Petiole 1-11/2 in.; leaflets rigidly coriaceous, green, glabrous above; end one much the largest, oblong, 3-6 in. long, obtuse or subacute, rounded at the base, sometimes slightly repand. Racemes 1-2 ft. long, composed of 12-50 umbels; bracts the same texture as the leaves, orbicular, rather oblique, 3/4-1 in., long, with a short petiole ending in a long bristle; umbels 2-6-flowered; pedicels 1/4-1 in., downy. Calyx 1/4 in.; teeth lanceolate, shorter than the tube. Corolla 3 times the calyx. Joints of pod rarely 1 or 3, glabrous or downy, 1/4 in. long, constricted at both sutures.


Ava, Kurz. Griffith No. 1690, the exact station not known, probably TENASSERIM. Closely allied to the preceding, but considerably larger in most of its parts. Branches slender, terete, finely grey-downy. Petiole 1-11/2 in.; leaflets ovate, narrowed gradually to an acute point, the end one 4-5 in. long. Racemes reaching a foot long, with a downy zigzag rachis; bracts like those of the last in texture, 2-1 in. long, more cordate at the base; pedicels 1/4-1 in. long. Calyx 1/4 in., finely downy; upper teeth deltoid; lowest lanceolate. Joints of pod 1/4 in. long and broad, finely downy.


Martaban, Wallich. TENASSERIM, near Mergui, Griffith. Branches slender, clothed with dense short pubescence. Leaflets oblong, 3-4 in. long, at first densely pubescent on both sides, glabrescent above, obtuse or subacute,
rounded at the base. *Racemes* 4-6 in. long in the specimens seen; bracts 1-1 1/2 in. long, orbicular, not oblique, obtuse, emarginate, thinner in texture than in the other two and dissimilar to the leaves; umbels 2-3-flowered; pedicels as long as the calyx. Calyx 1/4 in.; teeth deltoid, two upper connate, lowest lanceolate. *Corolla* 1/4-1/2 in. Joints of pod 2-3, downy, 1/4 in. long.

**Subgen. 3. Dicerma, DC.** A trailing undershrub with small 3-foliolate exstipulate leaves, minute bracts and flowers in long racemes.


Plains of Western Peninsula, Ceylon and Bhima.—Distrib. Malay isles, N. Australia.

Stems slender, densely cespitose, 1/2-2 ft., glabrous or downy. *Stipules* scarioso, connate, 2-3 cleft; petiole 1-1/2 in.; leaflets rigidly coriaceous, pale green, subequal, oblanceolate-oblong, obtuse, subglabrous, 3/4-1 in. long, nearly digitate. *Racemes* peduncled, subaxil, 1/4-1/2 ft., the lower flowers 2-4 together. Calyx scarioso, subglabrous, under 3/16 in.; teeth exceeding the tube, the two upper connate. *Corolla* 2-3 times the calyx. Joints usually 2, rarely 1, round-oblong, pubescent, 1/4 in. long, both sutures deeply indented.

**Subgen. 4. Catenaria, Benth.** Shrubs with woody branches, 3-foliolate leaves, long racemes, small bracts and long pendulous many-jointed pods.


Central and East Himalayas, tropical zone; Kumaon to Assam and Mishmi, ascending to 4000 ft. in Sikkim; Ceylon.—Distrib. Malay isles, China, Japan.

A shrub, with slender terete branches, soon glabrescent. *Stipules* free, minute, serraticeous; petiole 1-1 1/2 in., thickened, grooved down the face; leaflets oblong-lanceolate, acute, 2-4 in. long, rigidly subcoriaceous, shining above, hairy on ribs below. *Racemes* 1/2-1 1/2 ft.; pedicels 1/4 in., finally spreading. Calyx 1/4 in.; hairs adpressed; teeth lanceolate, as long as the tube, lowest linear. *Corolla* whitish, 1/2-1 in.; *Pod* 2-3 in. long; joints 6-8, twice as long as broad, hairy with minute hooked spreading hairs.

**Subgen. 5. Pteroloma, Desv.** Shrub with 1-foliolate leaves, winged petioles, racemose flowers, minute bracts and acute keel.


Central and East Himalayas, through India proper to Ceylon, ascending to 4000 ft. in Kumaon, Sikkim and Khasia. Chittagong, Tavoy, Pegu.—Distrib. Seychelles, China, Philippines.

Branches triquetroso, soon glabrescent. *Leaflet* ovate or lanceolate, reaching 6-5 in. long, acute, rigidly subcoriaceous, glabrous above, hairy on the ribs below; petiole 1-1 1/2 in., with a wing on each side, like the leaflet in texture, 1/4-1 in. broad. *Racemes* 2-1 1/2 ft. long, axillary and terminal; pedicels ascending, 1/4-1 in. *Calyx* 1/4 in., campulinate; upper teeth deltoid, lowest linear. *Pod* 1-2 in. long, 6-8-jointed, glabrous or pubescent; joints nearly square, lower square doubly incised.

**Subgen. 6. Desmodium proper.** Erect herbs or undershrubs with
large 1–3-foliolate leaves, flowers often 2 or several from a node in long racemes simple or panicked, deciduous bracts and distinctly jointed pods.

* Joints of pod indehiscent, 3–5 times as long as broad (Scorpiurus, Benth.)


Hills of West Peninsula; Wight, Beddome; and Ceylon, Gardner, Thwaites.

Stems woody, slender, obtusely angular, finely downy when young. Leaflet ovate, acute, rigidly subcoriaceous, 4–6 in. long, inconspicuously downy below; petiole ½–1 in. Racemes terminal only, 6–9 in. long; fascicles of flower few and distant; bracts minute, setaceous; pedicels ½–1 in., finally subpatent. Calyx ½ in., pubescent; teeth short, deltoid. Pod pendulous, 3–4 in. long, under ¼ in. broad; joints ribbed horizontally, clothed with minute hooked hairs, distinctly constricted at both sutures.


Ava; Taung-dong mountains, Wallich.

Branches woody, terete, very slender, finely downy. Leaves oblong-lanceolate, acute, 4–6 in. long, rounded at the base, subcoriaceous, glabrous above, reticulatovenose, minutely hairy on the ribs below; petiole ½–1 in. Racemes terminal and axillary, lax, 6–9 in. long, sparsely panicked; bracts minute, subulate; pedicels downy, ½–1½ in., finally spreading. Calyx ½ in., densely hairy; teeth as long as the tube. Pod 1½–2 in. by ½ in. br., clothed with minute hooked hairs, sub sessile, scarcely constricted between the joints.


Himalayas, temperate and tropical regions from Ghurwhal and Kumaon to Assam, ascending to 6000 ft. in Sikkim and Kumaon. Western Peninsula, Ava, Pegu, Tenasserim.—Distr. Java, Borneo, Philippines.

An erect undershrub, 3–5 ft. high, with obtusely angled branches, clothed with dense short hairs. Petiole 1–2 in.; leaflets membranous or subcoriaceous, glabrous above, clothed with adpressed minute hairs beneath; end one usually ovate or broad oblong, acute, sometimes obovate, subobovate, 4–6 in. long. Racemes copious, axillary and terminal, the latter often compound, often a foot long; flowers several to a node and the nodes close; pedicels ½–1½ in., finally spreading; bracts minute, linear-subulate. Calyx under ½ in., densely hairy; teeth lanceolate, longer than the tube. Pod 1½–2 in., rarely 2½ in., by ½ in., clothed with minute hooked hairs, not at all or slightly constricted at the joints.

** Joints of pod indehiscent, as broad as long, spirally twisted; both sutures deeply indented (Challariun, DC.)

12. **Desmodium** spirale, DC. Prodr. ii. 332; Benth. in Mart. Fl. Bras. xv. 105, with many synonyms. **Hedysarum** spirale, Swartz Fl. Ind. Oct. 1275. **Desmodium**.


Temperate and tropical Himalayas, alt. 2-7000 ft.; from Simla and Gurweal to Khasia and Sikkim,—Distrib. China, Japan.

**Stems** 2-3 ft., herbage, angular, erect, finely pubescent. **Stipules** small, setaceous; petiole 1-3 in.; leaflets 3, membranous, both surfaces subglabrescent, the lower one pale; end one rounded, subacute, 2-3 in. long, with a deltoid base. **Racemes** few, very lax, axillary and terminal, the latter reaching a foot long, copiously panicked; bracts minute, linear; pedicles under 1/4 in. **Calyx** truncate, 1/4 in., slightly bristly; teeth deltoid, very short. **Corolla** 5 in. **Joints** 1-2, 1/4 in. long by half as broad, half-rhomboidal, pubescent, the upper suture flattened.

Var. laxum; leaflets larger, the end one 2-3 times as long as broad, narrowly gradually to a point. D. laxum, DC. loc. cit. Hedysarum laxum, Spreng. Syst. App. 292. D. trinervis, Grah. in Wall. Cat. 5720.—Kumaon, Nipal and Sikkim.


West Peninsular, Shevagerry hills, Dr. Wight. Ceylon, Gardner.—Distrib. Japan.

General habit of the last, of which it is perhaps a mere southern variety. **Stipules** linear, 1/2 in.; petiole 2-3 in.; leaflets 3, membranous, subglabrescent, the end one narrow-ovate, 4-6 in. long, narrowed gradually to a point. **Pedicels** 1/4 in.; bracts, calyx and corolla of **D. podocarpum**. **Joints** 2-3, 1/2 in. long, 1/4 in. broad, cut away in an oblique line from opposite the point to the base; stalk of pod 1/2 in. long.

15. **D. dolabriforme**, Benth. Pl. Jungh. 226; corolla small, bracts minute, setaceous, stalk of pod 2-3 times as long as the calyx, pedicels short, joints oblique at the apex.

Western Peninsular, Carnatic, near Courtallum, Wight; Tinnevelley, Boidone. **Leaves** crowded on an erect stem a few inches high. **Stipules** small, lanceolate, persistent; petiole 1-1 1/2 in.; leaflets 3, membranous, both surfaces green, lower obscurely pilose, end one ovate, narrowed gradually to an obtuse point, twice as long as broad, 1 1/2 in. long, base deltoid. **Racemes** simple, lax, long-peduncled, terminal, 2-3 in. long; pedicels 1/8 in., finally patent. **Calyx** 1/4 in., turbinate; lower tooth lanceolate, as long as the tube, upper deltoid. **Joint** solitary, half-rhomboidal, 1/2 in. long, three times as long as broad, narrowed gradually from above the middle to the tip and stalk.


Stems 3–4 feet high, crect, woody in the lower part, densely downy. Stipules ½ in., lanceolate, persistent; petiole 2–3 in.; leaflets 3, membranous, finely downy on both surfaces, often slightly repand; end one 2–4 in. long, roundish-ovate-rhombooidal, base and apex subdeltoid. Racemes very lax, mostly terminal, often a foot long, simple or forked at the base; bracts boat-shaped, enclosing the buds, soon falling; pedicels capillary, permanently ascending, lower 1–½ in. long. Calyx ½ in., downy; lower tooth lanceolate, as long as the tube; upper deltoid. Corolla ½–1 in., bright red. Joints 1–3, half-rhombooidal, ½–1 in. long by half as broad; apex oblique; upper suture rather recurved.


Ava; Taong-dong mountains, Wallich.

Stems slender, woody, finely downy. Leaflet oblong, 3–5 in. long, obtuse, rounded at the base, subcoriaceous, green, glabrous above; petiole ½–2 in. Racemes very lax, axillary and terminal, copiously panicked, 4–6 in. long, most of the flowers in distant pairs; pedicels ½–1 in.; bracts ½ in., ovate-cuspidate. Calyx ½ in., lowest tooth lanceolate, as long as the tube. Corolla ½ in. Pod 3–5 in. long, ½ in. broad, 6–7-jointed, thinly closely silky, the upper suture slightly indented.


Birma; forests of Pegu, Ava and Martaban, Kurz.

Stems slender, grey, glabrous. Leaflet membranous, ½–1 in. long, ½ in. broad, green above, grey-green beneath; petiole ½–1 in. Racemes very lax, axillary and terminal, the end one panicked; pedicels erecto-patent, ½–1 in. Calyx ½ in., thinly silky; teeth as long as the tube, lowest lanceolate, the others deltoid. Corolla 3–4 times the calyx. Pod ½–1 in. long, ½ in. broad, 4–8-jointed, subglabrous, distinctly stalked; upper suture slightly indented.—Very near D. reniforme, DC., from which it differs by its longer pedicels and more deeply indented pod.

†† Leaves 3-foliate.

20. D. sinuatum, Blume MSS.; leaflets repand, pedicels short, corolla small, bracts setaceous, joints many small clothed with minute hooked hairs. D. strangulatum var. sinuatum, Miq. Flor. Ind. Bat. i. 255.
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Branches terete, woody, minutely downy. Petiole 1–1½ in.; leaflets subcoriaceous, pale, minutely downy or nearly glabrescent beneath; end one roundish-rhomboideal, obtuse, 2–3 in. long, conspicuously repand in the upper half. Racemes copious, terminal and axillary, moderately close, not more than 3–4 in. long; pedicels ⅓–⅔ in., finely downy. Calyx ⅓ in.; teeth as long as the tube. Corolla ⅔ in. Pod ⅓–⅔ in. long, under ⅜ in. broad; joints 8–12, as broad as long.


Himalayas, tropical and temperate zones, from the Upper Punjab to Khasia, ascending to 7000 ft.

Branches woody, angular, densely pubescent. Stipules lanceolate, ½ in.; leaflets subcoriaceous, green, with a few adpressed hairs above, densely clothed with adpressed grey silky hairs and finely reticulato-venose beneath; end one obovate-oblong, 3–4 in. long, obtuse or subacute. Racemes very copious, axillary and terminal, moderately close, 3–6 in. long, often second; bracts acuminate, ciliolate, ½ in. long; pedicels ⅓ in., erecto-patent, finely hairy. Calyx ⅔ in.; teeth as long as the tube. Corolla ⅔ in. Pod ⅔–⅔ in. long, under ⅜ in. br.; joints 6–8, rather longer than broad.

22. D. confertum, DC. Prodr. ii: 335; leaflets entire, pedicels short, bracts and corolla large, joints few large densely clothed with spreading silky hairs. D. barbatum, Wall. Cat., 5724, non Benth. (Hedysarum, Linn.)

Central and East Himalayas, alt. 2–4000 ft.; Nipal, Sikkim and Khasia.

Branches terete, finely downy when young. Petiole 1–1½ in.; leaflets subcoriaceous, glabrous above, distinctly reticulato-venose, pale, minutely hairy below; end one obovate or oblong, obtuse or acute, 3–6 in. long. Racemes copious, short, dense, axillary and terminal, the latter panicked, often subsecund; bracts ½ in. long, lanceolate, scarious; pedicels ⅔ in., ascending. Calyx ⅔ in., turbinate, subglabrous; lower teeth lanceolate, as long as the tube; upper deltoid. Corolla 3–4 times the calyx. Pod 1–1½ in. long, under ¼ in. broad; joints 3–4, twice as long as broad, the constriction from below reaching more than half way through.

23. D. oxyphylum, DC. Prodr. ii. 336; leaflets acute thinly silky beneath, pedicels long, bracts lanceolate acuminated, corolla large, joints many large glabrescent. D. serriferum, Wall. Cat. 5705 B.

Central and East Himalayas, tropical and temperate zones. Kumaon and Simla to Assam and Khasia, ascending to 7000 ft.

Branches slender, terete, soon glabrescent. Petiole 1–1½ in.; leaflets membranous or subcoriaceous, green, glabrous above, pale, thinly grey-silky beneath; end one obovate-oblong, usually twice as long as broad, narrowed gradually to a point, entire or obscurely repand, 2–4 in. long. Racemes copious, short, moderately close, axillary and terminal, the latter much panicked; bracts lanceolate, acuminated, ciliolate, ⅓ in. long; pedicels ascending, subglabrous ⅔–⅔ in. Calyx ⅔ in., subglabrous; teeth very short. Corolla ⅔–⅔ in. Pod 2–3 in. long, ¼ in. broad, shortly stalked; joints 6–10, rather longer than broad.

Var. serriferum; leaflets obtuse repand densely silky beneath, pedicels spreading or deflexed ⅔–⅔ in. long clothed with spreading silky hairs like the calyx. D serriferum, Wall. Cat. 5708 A. D. polycarpum, Wall. Cat. 5710, non DC.—Nipal, Wallich.

All along the Himalayas from the Upper Punjab to Tavoy, temperate and tropical zones, ascending to 9000 ft.

**Branches** slender, terete, finely downy. *Pedicel* 2-3 in; leaflets thick, flexible, subcoriaceous, green, glabrescent above, more or less densely persistently matted with whitish silky hairs beneath; end one broad obovate, 2-4 in. long, entire or obscurely repand, base deltoid or rather rounded. *Racemes* copious, lax, often a foot long, axillary and terminal, the latter often copiously panicled, with lower branches again compound; pedicels $\frac{1}{3}$ in., ascending, finely downy. *Calyx* $\frac{1}{4}$ in., downy; teeth deltoid, shorter than the tube. *Corolla* $\frac{3}{4}$ in. *Pod* 2-3 in. long, $\frac{1}{4}$ in. broad; joints 6-9, longer than broad.

**** Joints of pod as in the last group, but the calyx-teeth narrower and longer. (HETEROLOMA, Benth.)

† Leaves 1-foliolate.


**Birma**; Prome hills, Wallisch.

**Stems** slender, woody, flexuose, trailing, clothed throughout with spreading or deflexed bristly hairs. *Leaflet* 2-3 in. long and broad, obtuse, or obscurely cuspidate, rounded or slightly cordate at the base, thinly coated with adpressed grey hairs below; pediole 1-1$\frac{1}{2}$ in. *Racemes* terminal and lateral, distinctly peduncled, 2-3 in. long, moderately close; pedicels $\frac{1}{4}$ in., slender, ascending; bracts setaceous, minute. *Calyx* $\frac{1}{2}$ in., bristly, teeth lancelate. *Corolla* $\frac{1}{4}$ in. *Pod* glabrescent, 5-6-jointed, only seen immature.


**Himalayas** (ascending to 5000 ft. on the Chenab) to Proot and Ceylon.—**Distrib.** Trop. Africa, Malay isles, Philippines, China; introduced in West Indies.

**Stems** suberect, reaching 3-4 ft. high, woody, slightly angular, clothed with short grey down upwards. *Leaflet* oblong, usually 3-6 in. long, not more than $\frac{1}{3}$ as broad, rounded at the base, narrowed gradually to an acute point, thinly clothed beneath with adpressed grey hairs, not reticulato-venose; petiole 3-4 in. *Racemes* copious, ascending, lateral and terminal, the latter subaxil, 6-12 in. long, simple or with a few short ascending branches in the lower part; pedicels $\frac{1}{3}$ in., ascending; bracts minute, setaceous. *Calyx* under $\frac{1}{4}$ in., finely downy; teeth lancelate. *Corolla* $\frac{3}{4}$ in. *Pod* rather, $\frac{1}{2}$ in. long, $\frac{1}{2}$ in. broad, 6-8-jointed, glabrescent or clothed with minute hooked hairs.


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HIMALAYAS (ascending to 4000 ft. in Sikkim) to BURMA, SIAM and CEDYLON.—DISTRICT Trop. Africa, Madagascar, Malay isles, Philippines; introduced in W. Indies. An erect undershrub, 3-6 ft. high, with terete branches densely clothed with short brown pubescence. Leaflets 3-6 in. long, 1½-2 as long, as broad, usually cordate or truncate, rarely deltoid at the base, reticulato-venose, densely clothed with short soft brown hairs beneath; pediole ¼-½ in. Racemes copious, ascending, 2-6 in. long, sessile or short-peduncled, spike-like, usually dense, axillary and terminal, the latter compound; pedicels ¼-½ in. or less, densely downy; bracts minute, setaceous. Calyx ¼ in.; teeth linear-lanceolate, as long as the tube. Corolla 3-4 times calyx. Pod ¼-½ in. long, ½ in. broad, 4-6-jointed, densely clothed with minute hooked hairs, the upper suture slightly indented.

†† Leaves 3-foliate.


CEDYLON, Thwaites C.P. 3237.

Stems a foot or more long, clothed upwards with dense spreading grey hairs. Pediole ¼-½ in.; leaflets membranous, green, glabrous above, clothed below with short adpressed grey hairs; end one 1½-3 in. long. Racemes few, long-peduncled, lateral and terminal, lax, few-flowered; pedicels ¼-½ in., spreading or ascending. Calyx under ½ in.; teeth lanceolate. Corolla 1½ in. Pod 1¼ in. by ½ in.; joints about 4, minutely pubescent, scarcely constricted at the upper suture.—Habit of D. polycarpum var. trichoacaulon, from which it differs by its pod, long pedicels, and lax racemes.


NILGIRI Hills and CEDYLON.

Stems erect, clothed when young with fine short spreading grey hairs. Stipules large, lanceolate, acuminate, not amplexicual; pediole 1½ in.; leaflets membranous or subcoriaceous, green and smooth above, grey clothed with short adpressed hairs beneath; end one 2-4 in. long, narrowed gradually to a point. Racemes copious, lax, lateral and terminal, the latter reaching a foot long, usually simple; pedicels ¼-½ in., ascending or spreading. Calyx ½ in.; teeth lanceolate, longer than the tube. Corolla 3 times calyx. Pod ¼-⅔ in. long, under ½ in. broad, glabrescent, 4-6-jointed; upper suture distinctly indented.


Plains of the WESTERN PENINSULA, BUNDUKUND, BENGAL and PROME, ascending to 4000 ft. in the Vindhia chain (Edgeworth).

Stems 1-2 ft. long, diffuse, cespitose, prominently angled, clothed with spreading grey hairs. Stipules large, leafy, amplexicual, auricled; pediole 1-½ in.; leaflets
subcoriaceous, rather sebaceous above, with obscure adpressed hairs, reticulato-venose, finely grey-downy below; end one obtuse, obovate, rarely roundish or oblong, 2-3 in. long. \textit{Racemes} copious, lateral and terminal, lax or moderately close, reaching a foot long, the end one panicked; pedicels \(\frac{3}{4}-\frac{1}{2}\) in., pubescent, erecto-patent. \textit{Calyx} \(\frac{3}{4}\) in.; teeth deep, setaceous. \textit{Corolla} twice the calyx, the smallest of all the species. \textit{Pod} \(\frac{1}{4}-\frac{3}{4}\) in. long, \(\frac{1}{5}-\frac{8}{15}\) in. broad; joints 4-6, densely clothed with minute spreading hooked grey hairs; upper suture distinctly indented.


Along the Himalayas from Simla and Kumaon to Sikkim, alt. 4-7000 ft.

A shrub, reaching 2-30 ft. high, the branches clothed with dense short grey or brown pubescence. \textit{Petiotes} 1-2 in.; leaflets subcoriaceous, subsebaceous, with short obscure adpressed hairs above, grey and more densely hairy beneath; end one 3-5 in. long, narrowed gradually to a point. \textit{Racemes} copious, moderately lax, lateral and terminal, 2-4 in. long, the end one panicked; pedicels \(\frac{3}{4}-\frac{1}{2}\) in., downy, spreading or ascending. \textit{Calyx} \(\frac{3}{4}\) in.; teeth lancelolate. \textit{Corolla} 3 times calyx. \textit{Pod} \(\frac{1}{4}-\frac{3}{4}\) in. long, \(\frac{1}{5}\) in. broad, 6-8-jointed, short-stalked, densely clothed with minute spreading hooked hairs.


All along the Himalayas from the Upper Punjab to Silhet and Khasia, ascending to 7000 ft. in Simla. \textit{Pegu, McClelland.}

A tall shrub, with slender drooping branches, densely clothed at first with short grey pubescence. \textit{Petiotes} \(\frac{1}{4}-\frac{1}{2}\) in.; leaflets subcoriaceous, green, smooth above, with raised parallel main veins and clothed with adpressed grey or brownish silky hairs beneath; end one 2-3 in. long; side ones smaller. \textit{Racemes} copious, lax, lateral and terminal, the latter often \(\frac{1}{2}-\frac{1}{2}\) ft. long, usually simple; pedicels \(\frac{1}{4}-\frac{1}{2}\) in., ascending; bracts \(\frac{3}{4}-\frac{5}{8}\) in., closely imbricated, densely silky. \textit{Calyx} \(\frac{3}{4}\) in.; teeth lancelolate-deltoid. \textit{Corolla} \(\frac{1}{4}\) in. \textit{Pod} \(\frac{3}{4}-\frac{1}{2}\) in. long, \(\frac{1}{5}\) in. broad, short-stalked, 4-6-jointed, minutely downy.

\textit{Var. amatum}; leaflets narrowed to an acute point, racemes most or all terminal.

\textit{D. amatum}, \textit{Wall. Cat.} 5726.—Khasia and Silhet.

\textit{********} Joints of pod small, as long as broad, sometimes splitting along the lower suture; upper suture straight, lower slightly constricted. \textit{Calyx}-teeth long. (\textit{Nicolosia} \textit{(DC.))}


Assam, Silhet and Tenasserim, tropical zone.—\textit{Distrib. China}.

\textit{Branches} terete, woody, clothed with short spreading hairs at first. \textit{Leaves} subcoriaceous, thick, green, glabrous above, densely coated with adpressed white silky hairs beneath, 1-2 in. long and broad; side leaflets when present much smaller than the end one; petiole \(\frac{1}{2}-\frac{1}{2}\) in., deflexed at tip. \textit{Racemes} copious, simple, axillary and terminal, very dense, subsessile, an inch or less long; bracts ovate, ciliolate; pedicels \(\frac{1}{4}-\frac{1}{2}\) in. \textit{Calyx} \(\frac{3}{4}\) in., densely bristly. \textit{Corolla} twice the calyx. \textit{Pod} \(\frac{3}{4}-\frac{1}{2}\) in. long, obscurely hairy, under \(\frac{1}{4}\) in. broad; joints 3-5.


Branches woody, terete, argenteo-canescens when young. Petiole ½-1 in.; leaflets subcoriaceous, green, glabrescent above, densely persistently coated with adpressed white silky hairs below; end one 1-½ in. long, retuse. Racemes copious, axillary and terminal, simple, dense, nearly sessile, 1-2 in. long; pedicels ½-1 in.; bracts small, ovate-cuspidate, ciliolate. Calyx ½ in. glabrescent; teeth deep, setaceous. Corolla twice the calyx. Pod ½-3 in. long, glabrescent, 4-6-jointed, ½ in. broad.


Khasia, alt. 4-6000 ft., Griffith, Hook. fl. & Thomson.

Stems 1-2 ft. long, moderately robust, densely clothed upwards with fine spreading hairs. Petiole ½-1 in.; leaflets always 3, subcoriaceous, green, glabrous above, clothed with short inconspicuous adpressed hairs beneath; end one obovate-oblong, obtuse, 3-1 in. long. Racemes terminal, peduncled, 2-6 in. long, dense in the upper part; bracts ¼-½ in. ovate-cuspidate, densely silky; pedicels ½-½ in., silky, erecto-patent. Calyx ¾ in., densely silky; teeth deep, setaceous. Corolla twice the calyx. Pod ½-3 in. by ⅛ in., 4-5-jointed, obscurely downy.


Upper Gangetic Plain, Hamilton, Edgeworth, &c.

Stems cespitose, slender, a foot long, glabrous except at the top. Leaflets rounded or broad-oblong, cordate, ⅔-⅓ in. long, obtuse or emarginate, subcoriaceous, glabrous above, recuticulato-venose and inconspicuous hairy below; petiole ½ in. Racemes copious, close, under 1 in. long, axillary and terminal, nearly sessile; bracts lanceolate, under ½ in.; pedicel ½-½ in., abruptly cernuous at the tip, as in Uvaria. Calyx ¾ in., all clothed over with dense white hairs; teeth long, lanceolate-cuspidate. Corolla twice the calyx. Pod sessile, 2-jointed, glabrous, not longer than the calyx.


Nilghiris and Ceylon, up to 4000 ft.

An erect undershrub, with young branches densely clothed with short ferruginous silky hairs. Petiole 1-⅓ in.; leaflets subcoriaceous, glabrous above, more or less densely argento-canescens beneath; end one obovate-oblong, 1-2 in. long, obtuse, with a mucro. Racemes usually terminal, 3-6 in. long, dense in the upper part; bracts ovate-acuminate, ⅔-⅓ in., densely silky; pedicels ⅔-⅔ in., densely silky. Calyx ¾ in.; teeth lanceolate, exceeding the tube; lowest linear. Corolla ⅞-½ in. Pod short-stalked, 1-½ in. by ⅛ in., 6-8-jointed, minutely downy.

HIMALAYAS, (ascending to 5000 ft.) and everywhere in the plain to BIRMA, MALACCA and Ceylon.—DISTRIB. Zanzibar, Malay isles, Philippines, China, Japan, Polynesia.

An erect or suberect undershrub, with woody slightly angular slender branches, clothed upwards with short adpressed grey hairs. Petiole 1/4–1 in.; leaflets subcoriaceous, green, glabrous above, thinly clothed with adpressed grey hairs beneath; end one obovate-oblong, obtuse, 1–3 in. long; side ones smaller. Racemes terminal and lateral, close, short-peduncled, 1–3 in. long, the end one sometimes branched; bracts 3/4–1 in.; pedicels 1/8 in., glabrous. Calyx 1/3 in.; teeth acuminate, exceeding tube. Corolla under 1/4 in. Pod 3/4–1 in. long, 3 in. br., glabrescent or minutely downy, 5–8-jointed.


39. D. jucundum, Thwaites Enum. 411; shrubby, erect, leaflets 3, pedicels ascending, corolla bracts and joints of pod large.

Ceylon; Matelle district, Thwaites.

An erect much-branched undershrub, the young stems densely clothed with short ferruginous silky hairs. Leaves coriaceous, the under side densely coated with adpressed grey or pale brown silky hairs, the main veins much raised; end one obovate-oblong, obtuse, 1–3 in. long; base subcuneate; petiole 1/4 in. Racemes terminal, peduncled, 4–6 in. long, close upwards; bracts 3/4 in., ovate, silky; pedicels 1/16 in. Calyx 1/16 in.; teeth lanceolate, acuminate, exceeding tube. Corolla 3/16 in. Pod 1–1 1/16 in. by 1/16 in.; joints 4–6, rather longer than broad, minutely downy.

40. D. rotundifolium, Baker, non Wall.; annual, stems very slender, leaves 1-foliolate, leaflet orbicular, racemes very lax few-flowered, pedicels ascending, corolla exerted. Alysicarpus rotundifolius, Dalzell MSS.

Plains of Concan, Dr. Ritchie.

Stems erect, under a foot high, with many ascending branches, thinly clothed with fine short spreading hairs. Leaflet round, 1/2–3/4 in. long, obtuse or obscurely cuspidate, slightly cordate, membranous, grey-green below with only a few obscure adpressed hairs; petiole 1/4–1 1/2 in. Racemes corymbous, terminal and lateral, the former forked, 3–4 in. long, the lower flowers in distant pairs, upper solitary; pedicels 1/8–1/2 in. long, arcuate, finely pubescent. Calyx 1/3 in., thinly hairy; teeth linear-setaceous, very deep. Pod 1/2–1 in. long, under 1/16 in. broad, falcate; joints 3–5, glabrescent, reticulate-venose.


Plains of Concan, Dalzell; Ritchie. Anamallay forest, Wight.

Stems diffuse, 1–2 ft. long, much branched, clothed with short spreading grey hairs. Leaflets membranous, mostly simple, oblong, 1–1 1/2 in. long, obtuse or subacute, subcordate, with only a few adpressed grey hairs beneath; side ones, if present, much smaller; petiole 1/8–1/3 in. Racemes usually terminal, simple, 4–8 in. long, the lower flowers in distant pairs; pedicels capillary, 1/2–2 in., finely downy; bracts 1/8 in., lanceolate-cuspidate. Calyx 1/2 in., clothed with short bristly hairs; teeth setaceous, very long. Pod sessile, falcate, 3/16 in. by 1/16 in., 4–6-jointed, glabrescent.


Plains of Martaban and Tenasserim, Wallach, Helder, Parish, Kurz.
Stems cespitose, diffuse, 1-1½ ft., densely clothed throughout with spreading brown silky hairs. Leaves subcoriaceous, pale green, nearly glabrous beneath; end leaflet obovate-oblong, obtuse, 3-½ in. long; side ones smaller; petiole ¼ in. Racemes terminal, 2-3 in. long, the lower flowers in distant pairs, upper solitary; pedicels ¼-½ in.; bracts lanceolate, ¾ in. Calyx ⅛ in., shaggy with silky hairs, like those of the stem; teeth linear-setaceous, very long. Pod sessile, silky, under ½ by ⅜ in., 4-5-jointed.

** Flowers all 1-3 together without a common peduncle in the axils of the leaves.


Everywhere in the plains throughout India, ascending to 4000 ft. in Kumaon and 6-7600 ft. in Kashmir and on the Chenaip—Distrib Cosmopolitan in tropics.

Stems cespitose, very slender, trailing ½-1½ ft., copiously branched, clothed with fine spreading hairs. Stipules lanceolate, persistent; petiole ¾-½ in.; leaflets obovate, ¼-½ in., truncate or emarginate, with a few adpressed hairs below. Pedicels ¼-⅜ in. Calyx pubescent, ¼-½ in.; teeth very long, setaceous. Pod ⅛-½ in. long, ⅛ in. br., 3-5-jointed, pubescent; upper suture straight, lower slightly indented.

** Flowers some racemose, the others pedicelled in the axils of the leaves.

44. D. reniforme, DC. Prodr. ii. 327; leaves 1-foliolate, leaflet broader than long, calyx-teeth and pedicels short. Wall. Cat. 5702; W. & A. Prodr. 230; Dalz. & Gibbs. Bomb. Fl. 67. Hedysarum reniforme, Linn. Sp. 1051; Burm. Fl. Ind. t. 52, fig. 1.

East Himalayas, Loba; Prom, Ava on the Banks of the Irrawaddi, Wallich; Western Peninsula, Wight.—Distrib. Java.

Stems 1 ft. or more long, very slender, glabrous. Leaflet rigidly subcoriaceous, half as broad again as long, ½-⅜ in. long, truncate or emarginate, glabrous; stipules linear, minute, deciduous; petiole ½ in., jointed at the apex. Racemes mostly terminal, laxly 10-20-flowered and a few flowers, solitary in the axils of the leaves; bracts linear, minute; pedicels ¼-⅜ in., finally cernuous. Calyx under ¼ in., turbinate, glabrous. Pod glabrous, ⅛-⅜ in. by ⅛ in.; joints 3-5, longer than broad; upper suture straight, lower little indented.


East Himalayas, tropical zone; Khasia and Assam and along the gulf to Penang and Malacca. Plains of Peninsula and Ceylon.—Distrib. Malay isles, China, Philippines, Mascarene isles.

Stems 1-2 ft. long, copiously branched, clothed with dense spreading hairs. Stipules ⅛ in., lanceolate-acuminate, persistent; petiole ⅜-½ in., pubescent; leaflets
oblong or obovate-oblong, 3/4-1 in. long, hairy beneath. Flowers solitary or geminate in leaf-axils and up to 6 in copious lax racemes; bracts rather large, lanceolate, deciduous; pedicels 1/2-3 in. Calyx 1/4 in., densely hairy; teeth very long, setaceous. Pod 1/4-3 in., long, 3/4 in. broad, glabrescent; joints 4-5, as broad as long; upper suture straight, lower considerably indented.

*** Flowers all in lax racemes.


Plains of Mysore, Rottler; Prome, Wallich.

Stems 1 ft. or more long, copiously branched, finely downy at first. Stipules linear-setaceous, minute; petiole 1/2-3 in.; leaflets 3, obovate, 3/4-3 in. long and broad, truncate or emarginate, with a few adpressed hairs beneath. Racemes copious, axillary and terminal, long-peduncled, laxly 6-8-flowered; bracts boat-shaped, hiding the buds; pedicels 1/2-3 in. Calyx 1/4 in., campanulate; teeth subdeltoid. Joints 1/2 in. long, twice as long as broad, the constriction from below reaching nearly to the straight upper suture.


Everywhere in the plains, from the Himalayas to Ceylon and Ava, ascending to the temperate region, reaching 7000 ft. in Kumaon.—Distrib. Malay isles, China, Japan.

Stems densely cespitose and branched, wide-trailing, at first pubescent. Stipules 1/4 in., linear-setaceous, persistent; leaflets oblong or obovate, pubescent below, often not more than 1/4-1 in. long, sometimes 3/4-1 in. Racemes copious, but usually terminal on the short branches, laxly 6-10-flowered; bracts boat-shaped, deciduous; pedicels 1/4-1 in., permanently ascending. Calyx 1/4-1 in., densely pubescent. Pod 3/4-1 in. by 1/2 in., finely downy; joints as broad as long; both sutures distinctly indented.

Var. macrocarpum; pod larger, quite 1/2 in. broad, the sutures-less indented, the upper one nearly or quite straight.—Assam and Khasia, Griffith, Hook. fl. & Thomson.

SUBGEN. 8. Pleurolobium, DC. Erect undershrubs, with large leaves, racemose flowers and indistinctly jointed pods desiccating in a continuous line along the ventral suture.—An aberrant group, which perhaps should be considered a distinct genus.


All along the Himalayas from Hazara to Assam, ascending to 7000 ft.; Western Peninsulas, Ceylon, Ava, Pegu, Tenasserim.—Distrib. Malay isles, Philippines.

An undershrub, 3-4 ft. high, with subteteo-glabrous branches. Petiole 3/4-1 in.; leaflets 1-3, subcoriaceous, oblong-lanceolate, 3-4 in. long, obtuse, with a little inconspicuous pubescence beneath; side ones, if present, very small, moving by jerks. Racemes axillary and terminal, the latter copiously panicked, at first short, the flowers
hidden by the large ovate deciduous bracts, finally 3-6 in. long; pedicels ¼ in., patent, finely downy. Calyx ¼ in., campanulate; teeth deltoid, shorter than the tube. Corolla ¼ in. Pod 1¼ in. long, ¼ in. broad, falcate, 6-10-jointed, straight along the upper, slightly indented along the lower suture.


Central and East Himalayas, tropical region; Guerwhal to Khasia and Cachar; Upper Bengal, Pegu, Ceylon.—Distr. Malay isles.

Closely allied to the last, but decidedly shrubby, reaching 8-10 ft. in height. Leaves obtuse, oblong or obovate-oblong, thinly or densely pubescent beneath; side ones often suppressed. Racemes shorter and the terminal ones not so copiously panicled; bracts under ¼ in. long, narrowed suddenly at the point. Corolla 8 in., both standard and keel broader. Pod similar, except in vestiture.

51. ABRUS, Linn.

Climbing shrubs. Leaves with numerous deciduous leaflets. Flowers small, in dense racemes on axillary peduncles or short branches. Calyx campanulate, equal; teeth very short. Corolla much exserted; standard ovate, acute, adhering below to the staminal tube; wings narrow; keel arcuate. Stamens 9, united in a tube slit above, the tenth absent; anthers uniform. Ovary subsessile, ovule; style short, incurved, beardless, stigma capitulate. Pod oblong or linear-oblong, flat or turgid, moderately firm, thinly serate.—Distr. Species 5; cosmopolitan in the tropics.


Himalayas to Ceylon and Siam, ascending to 3500 ft.—Distr. Cosmopolitan in the tropics, often planted. A copiously-branched climber, with slender branches. Leaves 2-3 in. long; leaflets 20-40, membranous, deciduous, ⅓-½ in. by ⅓-½ in. Racemes many-flowered, crowded, usually shorter than the leaves. Calyx ½ in., thinly silky. Corolla reddish or white, 3-4 times the calyx. Pod 1¼ in. by ⅜-⅞ in. Seeds bright scarlet and black, black, or whitish, or mixed black and white, as large as a pea.


Kumaon to Chittagong, Tenasserim and Birma, ascending to 3000 ft. in Sikkim; Ceylon.—Distr. Malay isles, Guinea, Natal, Kaffraria.

General habit exactly of A. precatorius. Leaves 3-4 in. long; leaflets 24-30, similar in texture, ⅓-1¼ in. by ⅓-⅞ in. Racemes more numerous flowered, on longer peduncles. Calyx and corolla similar. Pod incurved, 2-2½ in. by ⅛ in., with thinner smooth valves.
3. **A. fruticulosus**, Wall. Cat. 5820; branchlets and leaves densely silky, leaflets minute ligate-linear, pod linear-oblong flat-topped 4-6-seeded. *W. & A. Prodr. 236; Wight Ic. t. 33.*

Forests of Mysore and the Carnatic, tropical region. Branches more slender than in the two others. Leaves and leaflets much smaller, the latter 20-50, 1/8-1/2 in. by 1/4-1/2, densely silky on both sides, or glabrescent above. Racemes few-flowered, exceeding the leaves. Calyx 1/3 in. thinly silky; teeth distinct. Pod 1-1 1/2 in. by 3/8 in.; valves thin, at first densely silky.

52. **CICER**, Linn.

Annual herbs. Leaves pinnate, rigid; leaflets and stipules strongly veined, deeply toothed. Flowers solitary in the axils of the leaves. Calyx-tube oblique; teeth lanceolate, subequal. Corolla exerted; standard broad, exceeding the wings and keel. Stamens diadelphous; anthers uniform. Ovary sessile, 2 or many-ovuled; style incurved beardless, stigma capitate. Pod sessile, oblong, turgid, narrowed into the persistent style.—Distr. Species 7, Mediterranean and West and Central Asian, one widely cultivated.

1. **C. arietinum**, Linn.; *DC. Prodr. ii. 354*; leaflets close oblanceolate or oblong, corolla scarcely half as long again as the calyx, pubescence of pod short and fine. Roxb. Fl. Ind. iii. 324; Wall. Cat. 5949; *W. & A. Prodr. 235; Wight Ic. t. 20; Bot. Mag. t. 2274; Boiss. Fl. Orient. ii. 500.

Commonly cultivated in the northern provinces and Nilghiris.—Distr. Cultivated in various temperate and tropical countries. Aris. viscose much-branched annual. Leaves 1-2 in., with usually a terminal leaflet; stipules small, with a few long teeth. Peduncle 1/2-1 1/2 in. Calyx 1/3-1 in.; teeth linear, 2-3 times the tube. Pod oblong, 3/4-1 in.


Western Himalayas, temperate and alpine region, alt. 9-15,000 ft.; Piti, Lahul, Kumaon, Tibet, &c.—Distr. Orient, Afghanistan, Songaria.

A very diffuse annual, with wavy finely pubescent or subglabrous stems. Leaves 3-4 in. long, ending in a spiral tendril; leaflets in 10-12 pairs, growing gradually smaller upwards, subcoriaceous, strongly veined; stipules 3/8-1 1/2 in., deeply sharply palmatifid. Pedicels 1 1/2 in., with a large bract at the curve. Calyx very gibbous, 3/4 in.; teeth lanceolate, 2-3 times the tube. Pod linear-oblong, 1 in. long.

53. **VICIA**, Linn.

Annual or perennial herbs. Leaves equally pinnate, ending in twisted tendrils. Flowers sub sessile, or in peduncled racemes in the axils of the leaves. Calyx-tube campanulate, often oblique; teeth long, often unequal. Corolla more or less exerted; standard broad; keel shorter than the wings. Stamens diadelphous, the mouth of the sheath very oblique; anthers uniform. Ovary nearly sessile, 2- or many-ovuled; style short, filiform or slightly flattened, stigma capitate. Pod flat-topped, continuous within.—Distr. Species 180, spread principally through the north temperate zone.

Subgen. 1. **ERVUM**, Linn. ex parte. Annuals, with flowers in sparse peduncled racemes, rarely solitary. Style finely downy all round near the tip.

**North-west Himalayas**, temperate region, rare; Kumaon, &c.—Thomson, Edgeworth, &c.—Distrib. Europe, Orient, &c.

Stems very slender, copiously branched. Leaves about 1 in. long; leaflets 3-4 pairs, obtuse or acute, $\frac{1}{2} - \frac{3}{4}$ in. long. Flowers on copious axillary peduncles about as long as the leaves. **Calyx** $\frac{1}{12}$ in. **Corolla** lilac, distinctly exserted. **Pod** linear-oblong, $\frac{1}{2}$ in.


**North-west Provinces**, from the Punjab to Nipal, in the tropical and temperate region, frequent in cultivated grounds, ascending to 6000 ft.; Nilghiris.—Distrib. Europe, Orient, &c.

Stems rather stronger than in the last. Leaves longer, ending in an intricate tendril; leaflets 5-8 pairs, $\frac{3}{8}-1$ in., truncate. Peduncles shorter than the leaves. **Corolla** smaller, scarcely exserted from the calyx. **Pod** $\frac{4}{12}$ in. long, oblique, more turgid, finally black.

Subgen. 2. **Cracca**. Perennials with numerous flowers in peduncled racemes. **Style** finely downy all round near the tip.

3. **V. tenera**, Grah. in Wall. Cat. 5028; leaflets 12-16 distant narrow ligulate, racemes laxly many-flowered as long as their peduncles, lower calyx-teeth linear-subulate, corolla small pale. **Benth. in Royle Ill. 200.**

**Western Himalayas**; Simla, Gurwhal, Kumaon, alt. 3-8000 ft.; Silhet, Wallich.

A slender straggling subglabrous climber. Leaves 2-3 in. long; leaflets membranous, $\frac{3}{4}-1$ in. by $\frac{13}{12} - \frac{7}{8}$ in. broad, acute, finely silky beneath; stipules small, deeply toothed. Racemes 6-20-flowered, 1-2 in. long. **Calyx** $\frac{1}{12}$ in., subglabrous; teeth very unequal, upper deltoid. **Corolla** $\frac{3}{8}$ in. **Pod** oblique, linear, glabrous, rostrate, $\frac{1}{4}$ in. long, 6-8-seeded.


**North-west Himalayas**, temperate region; Chenab valley, 6-8000 ft., Thomson. West Tibet, Falcower.—Distrib. Europe.

A subglabrous climber, a yard or more high. Leaves 4-6 in. long; leaflets acute, membranous, silky beneath, $1\frac{1}{2}-1\frac{3}{4}$ in. long; stipules linear, with a single tooth. Racemes copious, reaching, as do the peduncles, $\frac{1}{2}$ ft. long. **Calyx** subglabrous, $\frac{1}{12}$ in.; teeth very unequal, all shorter than the tube, upper deltoid. **Corolla** $\frac{3}{4}-\frac{3}{8}$ in. **Pod** 1 in. long, with a stalk as long as the calyx-tube.

5. **V. mollis**, Benth. MSS.; leaflets 16-20 close narrow ligulate, racemes few-flowered close short-peduncled, lower calyx-teeth linear, corolla large yellowish.

Valley of the Kishengunga, Winterbottom.

A suberect perennial, with the habit of **V. septum**, with stems clothed with fine spreading hairs. Leaves 1$\frac{1}{2}-2$ in. long; leaflets $\frac{2}{3}-\frac{3}{4}$ in. long, obtuse, clothed on both surface with adpressed, silky hairs; stipules broad, subentire. Racemes from the upper axils only, secund, an inch long. **Calyx** $\frac{1}{4}$ in., densely silky; teeth all linear, lower as long as the tube, upper shorter. **Corolla** nearly 1 in. long.

**WEST HIMALAYAS**, temperate region; KASHMIR to KUMAON, 4-9000 ft.—Distrib. Siberia.

A tall straggling glabrous climber, with the habit of *V. sylvatica*. *Leaves* 2-4 in. long, ending in tendrils; leaflets obtuse, 1/3-3/4 in., the upper growing gradually shorter; stipules small, narrow, deeply toothed. *Racemes* 12-20-flowered, on peduncles 1-4 in. long. *Calyx* 1/3 in., glabrous, membranous; all the teeth much shorter than the tube. *Corolla* 1/3 in. *Pod* 1-1 1/2 in. long, flat, glabrous, oblique, distinctly-stalked, 5-6-seeded.

7. **V. Griffithii**, Baker; leaflets 12-16 distant linear-oblong membranous, racemes peduncled laxly 2-4-flowered, lower calyx-teeth lanceolate, corolla lilac middle-sized.


A straggling annual, 1-2 ft. high, with slender stems, finely silky at first, soon glabrescent. *Leaves* about 2 inches long; leaflets obtuse, scattered, 1/8-1/4 in. broad, obscurely silky; stipules deltoid, deeply palmately laciniated. *Racemes* about as long as the leaves. *Calyx* 1/4 in. long, rather silky, the lower teeth half as long as the tube, the upper deltoid. *Corolla* more than 1/3 in. *Pod* above 1 in. long, oblong, flat, glabrous, veined, 5-6-seeded.


**WEST HIMALAYAS**, temperate region; KASHMIR to KUMAON, 7-9000 ft.

A subglabrous or finely downy climber, 2-3 ft. high. *Leaves* 2-3 in. long, ending in intricate tendrils; leaflets obtuse, 3/4-1 in. long, firmer in texture than in the others, finely silky beneath, with veins raised like those of a *Trifolium*; stipules small, half-hastate, deeply-toothed. *Peduncles* 2-3 in. long. *Calyx* 1 1/3 in., glabrous; pedicels longer than in the others, fully 1 in. *Corolla* 3-4 times the length of the calyx. *Pod* linear, glabrous, on a stalk nearly as long as the calyx, 5-6-seeded.

**SUBGEN. 3. Euvicia.** Annuals or perennials, with the style conspicuously bearded on the lower side at the tip.


**NORTH-WEST PROVINCES**, ascending from the plains of BENGAL to 7500 ft. in KUMAON, probably always cultivated.

*Stems* slender, suberect, glabrous or obscurely downy. *Leaflets* 8-12, of upper leaves 2-1 in. long, of lower shorter, broader; stipules small, obliquely lanceolate, deeply toothed. *Calyx* 3/4 in.; teeth lanceolate-subulate. *Corolla* red-blue, twice the calyx. *Pod* glabrescent, 1 1/2 in. long, 8-10-seeded.


Plains of Punjab, Aitchison.—Distrib. Europe, Orient.
Stems slender, glabrous, diffuse. Leaflets 10-12, alternate or opposite, 1/2-1 in. long; stipules minute, bifid, with linear divisions. Flowers solitary, on short pedicels in the axils of the leaves. Calyx 1/2 in.; teeth lanceolate, the upper shorter, curved upwards. Corolla purplish-red, twice the calyx. Pod linear-oblong, deflexed, glabrescent, rather recurved, 1-1 1/2 in. long, 5-6-seeded.


Kashmir, temperate region.—Distrib. Europe, Orient, Siberia.
Stems finely downy, suberect, 1-2 ft. Stipules small, deeply toothed; leaflets 10-12, membranous, truncate, 1/4-1 in. long. Racemes very close, second, confined to the axils of the upper leaves. Calyx 1/2 in., glabrous or downy; teeth deltoid-cuspidate, much shorter than the tube. Corolla reddish, twice the calyx. Pod linear-oblong, oblique, rostrate, glabrous, 1 in. long, 6-10-seeded.


Punjab, near Peshawar, Vicary, perhaps introduced.—Distrib. S. Europe, Orient, probably the original of the cultivated Bean.
A stout suberect annual, 1-1 1/2 foot high, glabrous or finely downy. Stipules large, deeply toothed; leaflets 1-2 in. long, entire in our plant. Calyx 3/4 in.; lower teeth lanceolate, as long as tube; upper deltoid. Corolla purple, more than twice the calyx. Pod 1 1/2-2 in. long, downy. 6-7-seeded.

**Eryum Lens**, Linn.; Wall. Cat. 5954 (Cicer Lens, Willd.; Roxb. Fl. Ind. iii. 324) the common Lentil, and Vicia Faba, Linn.; Roxb. Fl. Ind. iii. 323; Wall. Cat. 5951, the Bean, are commonly cultivated, especially in the North-West Provinces.

**Vicia Bengalensis**, Linn. seems to be the Mediterranean *V. atropurpurea*, Desf., and to have no claim to be regarded as an Indian plant.

54. **Lathyrus**, Linn.

Annual or perennial herbs, with equally pinnate leaves, ending in a tendril or bristle. Flowers racemous or solitary. Calyx-tube campanulate, oblique; teeth long or upper short. Corolla more or less exerted; standard broad; keel shorter than the wings. Stamens diadelphous, the mouth of the tube not oblique; anthers uniform. Ovary subsessile or stalked, many-ovuled; style flattened, bearded on the inner side, stigma capitate. Pod terete or flattish, continuous within.—Distrib. Species described 170, spread principally through all the north temperate zone.

**Subgen. 1. Eulathyrus.** Petiole terminated by a long tendril.

1. **L. Aphaca**, Linn.; DC. Prodr. ii. 372; annual, leaflets abortive, flowers 1-2 on a long peduncle. Roxb. Fl. Ind. iii. 322; Wall. Cat. 5952; Benth. in Roye Ill. 200; Boiss. Fl. Orient. ii. 602.

Spread through the northern provinces, ascending from the plains of Bengal to the temperate zone in Hazara, Kashmir and Kumaon.—Distrib. Europe, Orient, Abyssinia.
Stems slender, wingless, much branched. Stipules in pairs pressed to the stem, leaf-like, entire, truncate, hastate. Peduncle 2-3 times the stipule. Calyx 1/4 in.; teeth equal, lanceolate, exceeding the tube. Corolla yellow, twice the calyx. Pod linear-oblong, wingless, 4-6-seeded.

2. **L. sativus**, Linn.; DC. Prodr. ii. 373; annual, stems winged, leaflets

Spread through the northern provinces, ascending from the plains of Bengal to 4000 ft. in *Kumaon*. Often cultivated.—*Distrib.* Europe, Orient, Trop. Africa.

Glabrous, much branched. *Stipules* broad, entire; petiole winged; leaflets \(\frac{3}{4}-\frac{3}{4}\) in. broad. *Peduncle* rather longer than the petiole. *Calyx* \(\frac{3}{4}-\frac{3}{4}\) in.; teeth lanceolate, subequal, twice the tube. *Corolla* \(\frac{3}{4}\) in., red, bluish or white. *Pod* \(\frac{3}{4}\) in., long, glabrous, 4-5-seeded, the dorsal suture with a narrow spreading wing on each side.

The allied *L. tingitanus*, Linn., also much cultivated, with oblong leaflets and a linear many-seeded pod, is included in the set of Nilghiri plants distributed by Hohenacker, but has no claim to be considered a native.


North-West Provinces, ascending from *Bundelkund* and the *Punjab* to 5500 ft. in *Kumaon*.—*Distrib.* Europe, Orient, Abyssinia.

*Stems* glabrous, very slender, very copiously branched. *Stipules* linear, caduate; petiole \(\frac{3}{4}-\frac{3}{4}\) in., winged; leaflets very narrow, reaching 3 in. long. *Peduncle* shorter than or a little exceeding the petiole, with a conspicuous linear bracteole. *Calyx* under \(\frac{3}{4}\) in.; teeth equal, as long as the tube. *Corolla* reddish, twice the calyx. *Pod* 2 in. long, 10-12-seeded.


*Stems* slender, wingless, very diffuse. *Stipules* large, lanceolate-caduate; petiole distinct, angular. *Peduncles* often much exceeding the leaves. *Calyx* \(\frac{3}{4}\) in.; teeth all linear, as long as the calyx. *Corolla* yellow, 3 times the calyx. *Pod* linear. *L. cashmericus*, Royle MSS., is a form with pubescent stems and calyx.


West *Himalayas*, temperate region; Baltal and Chenab valley, 6-8000 ft., *Royle, Thomson, Jacquemont*.—*Distrib.* Siberia.

A suberect glabrous perennial, \(\frac{3}{4}-1\) ft. high. *Leaves* 2-3 in. long; leaflets glaucous, membranous, venose, \(\frac{3}{4}-\frac{3}{4}\) in. broad; stipules lanceolate-caduate slightly toothed. *Racemes* second, laxly 3-6-flowered; peduncles 2-4 in. long. *Calyx* \(\frac{3}{4}\) in.; lower teeth linear, nearly as long as the tube; upper deltoid. *Corolla* reddish, twice the calyx.

**Subgen. 2. Orobus, Linn.** Petiole terminated by a mere bristle.


*Kashmir*, 4-5000 ft., *Thomson, Falconer, Scinde, Stocks*. Habit of *L. sphaericus*, with which it coincides in stem, leaflets, pod and stipules. *Petiole* very short, not winged; leaflets 1-1\(\frac{1}{4}\) in. long. *Calyx* \(\frac{3}{4}\) in.; teeth subequal, lanceolate-subulate, as long as the tube. *Corolla* lilac, twice the calyx.

Lathyrus.]  L. Leguminose.  (J. G. Baker.)  181


West Himalayas, tropical and temperate zone, ascending from the salt range in the Punjab to 8500 ft. in Kumaon and 10,000 ft. in Khasia.—Distr. Europe, Orient, Altai, Songaria.

Stems suberect, glabrous, 2–3 ft. high.  Stipules large, leafy; leaflets membranous, acute, 2–4 in. long.  Racemes 6–12-flowered, equalling or exceeding the leaves.  Calyx 3–4 in.; lower teeth lanceolate, upper deltoid.  Corolla bright yellow, twice the calyx.  Pod linear, beaked, 2–3 in. long.

The genus Pisum is principally distinguished from Lathyrus by its thick laterally compressed style.  The two subspecies of the common cultivated Pea are both often cultivated in the northern provinces;  P. sativum, Linn.;  Roxb.  Fl.  Ind.  iii. 321;  Wall.  Cat. 5550, with round seeds of uniform colour and 4–6 leaflets; and P. arvense, Linn., with compressed marbled seeds and 2–4 leaflets.  Royle considers the latter a true native.

55. Amphicarpæa, Elliott.

Wide-twinning herbs, with 3-foliolate stipulate leaves and persistent striated stipules and bracts.  Flowers with a strong tendency to dimorphism, those that bear the fully developed pods being, as in Viola, without petals.  Calyx-tube long, equal, teeth distinct, unequal.  Corolla much exserted; petals equal in length; standard and wings with a distinct spur on each side of the claw.  Stamens diadelphous; anthers uniform.  Ovary obscurely stalked, many-ovuled; style filiform, inflexed, beardless, stigma capitate.  Pod flat, linear-oblong.—Distr. Species 3, or 3 varieties of one, from the United States, Japan, and Himalayas, one in each country.


West Himalayas, temperate zone; Simla, 5–6000 ft., Edgeworth, Thomson.

Stems very slender, thinly shortly pubescent.  Stipules and bracts oblong or lanceolate, subobtuse or subacute, ½ in. long; leaflets membranous, obscurely hairy; and one broad ovate acute, side ones oblique.  Flowers usually solitary or in pairs, but casually racemose; pedicels very short.  Calyx ½ in.; teeth lanceolate-subulate, much shorter than the tube.  Corolla ½ in., reddish.  Perfect pod 1 in. long, linear, recurved, 2–3-seeded.  Very near the Japanese species (Shuteria trisperma, Miq.  Ann.  Mus.  Lag.  Bat.  iii. 51) and the well-known American  A.  monoica, both of which have obovate bracts and copiously racemose flowers.

56. Shuteria, W. & A.

Climbers, with 3-foliolate stipellate leaves, persistent bracts and bracteoles, and middle-sized racemose uniform flowers.  Calyx-tube gibbous; teeth distinct, shorter than the tube.  Corolla exserted; exauriculate standard rather exceeding the keel and distinctly spurred wings.  Stamens diadelphous; anthers uniform.  Ovary subsessile, many-ovuled; style incurved, filiform, beardless, stigma capitate.  Pod flat, linear, recurved.—Distr. One additional species, Trop.  African.


East Himalayas;  Khasia, Sikkim, Bhutan and Mishmi, ascending to 5000 ft.  Hills of Western Peninsula and Ceylon, ascending to 7000 ft.
Stems slender, woody, glabrescent. *Stipules* lanceolate, rigid, under $\frac{1}{2}$ in.; petals 1-3 in., hairy or glabrous; leaflets membranous or subcoriaceous, obscurely hairy on both sides or glabrescent, the end one 1-2 in. long. *Racemes* copious, close, 1-4 in. long, sometimes 2-3 from same node; lower flowers often geminate; bracts rigid, about as long as the densely hairy pedicels. *Calyx* $\frac{1}{2}$ in., densely hairy; teeth shorter than tube, upper lanceolate-cuspidate. *Corolla* reddish, twice the calyx. *Pod* 1-1$\frac{1}{4}$ in. long, linear, hairy, recurved, 5-6-seeded.


Var. 2. *involutata*; racemes laxer, their lower nodes bracteated by 2-3 reduced roundish leaflets $\frac{1}{2}$-1 in. long, leaflets ovoborate-oblong, calyx silky. *S. involutata*, W. & A. Prodr. 207; Benth. Pl. Jungh. 252. Glycine involutata, Wall. Pl. As. Rar. iii. 22, t. 241; Wall. Cat. 5506, ex parte.—Kumaon, Gurwhal, Nipal.

Var. 3. *densiflora*; racemes very dense, the flowers often several from the same node, bracts and bracteoles rather larger, calyx pod and oblong subcoriaceous leaflets glabrous. *S. densiflora*, Benth. Pl. Jungh. 252. Glycine involutata, Wall. Cat., 5506, ex parte.—Gurwhal, Kumaon and Nipal, ascending to 7000 ft.

2. *S. hirsuta*, Baker; stems densely hairy, racemes peduncled many-flowered, bracts and bracteoles long linear-setaceous, leaflets ovate cuspidate.

**Khasia** and **Sikkim**, 3-5000 ft., *Hook. fl. & Thomson.*

*Stems* firm, slender, densely clothed with conspicuous deflexed hairs. *Stipules* $\frac{1}{2}$-1 $\frac{1}{2}$ in.; leaflets membranous, with a thin coating of adpressed hairs on both sides, subconcolorous; end one 2-4 in. long. *Flowers* in lax racemes, 2-3 in. long, on densely hairy peduncles as long as themselves, geminate at the nodes; bracts $\frac{1}{2}$-1 in. *Calyx* $\frac{1}{2}$ in., thinly hairy; teeth shorter than tube, upper deltoid, lower linear. *Corolla* purple, twice the calyx. *Pod* recurved, densely hairy, many-seeded.


**Nipal**, Wallich.

*Stems* slender, woody. *Stipules* and bracts less persistent than in the other species; petiole 2-3 in.; leaflets membranous, green, with inconspicuous adpressed hairs above, glaucous-grey with dense hairs below, ferruginous on the nerves; end one 2-3 in. long. *Flowers* 6-12 together, in short-peduncled racemes. *Calyx* under $\frac{1}{2}$ in., subglabrous; upper teeth deltoid, lower lanceolate. *Corolla* $\frac{1}{2}$-$\frac{1}{2}$ in., reddish.—Recedes to Glycine by its subadaxial bracts and bracteoles.


**Birma**; Prom hills and Taong Dong, Wallich. *Tenasserim*, Heuffer.

*Stems* firm, very slender. *Stipules* linear, $\frac{1}{2}$ in.; leaflets membranous, subglabrous, glaucous-grey beneath, the end one $\frac{3}{4}$-1 in. long. *Racemes* nearly sessile, 1-2 in. long, 6-10-flowered, the lower nodes bracteated by reduced leaves as in *S. vestita*, var *involucrata*; bracts rigid, not more than $\frac{1}{2}$ in. long; pedicels distant, solitary, very short. *Calyx* $\frac{1}{2}$ in., with a few adpressed hairs; teeth all short, lowest lanceolate. *Corolla* $\frac{3}{8}$ in., reddish. *Pod* 1$\frac{1}{2}$ in. long, glabrous, recurved; 6-8-seeded.

57. **DUMASIA**, DC.

Climbing herbs. *Leaves* 3-foliolate, with stipellate leaflets. *Flowers* middlesized, racemose. *Calyx-tube* cylindrical, very gibbos, with a very oblique sub-truncate mouth. *Corolla* exerted; petals equal in length; standard spurred on.
both sides of the base of the limb; wings and keel adherent, with small blades and very long claws. *Stamens* diadelphous; anthers uniform. *Ovary* linear, sub-stipitate, few-ovuled; style long, flattened above its curve, stigma capitate. *Pod* linear, falcate, torulose.—DISTRIB. One other species, in Japan.


*Stems* slender, densely clothed with grey or ferruginous hairs. *Petiole* 1–2 in.; stipules minute, setaceous; leaflets membranous, obtuse, green, with a few obscure hairs above, grey, densely pubescent beneath; end one 2–3 in. long. *Racemes* 2–6 in. long, lax or close, 12–40-flowered, rarely (*D. congesta*, Grah.) close, sub sessile; bracts and bracteoles minute, setaceous. *Calyx* 1–2 in., with a few adpressed hairs. *Corolla* 1–2 in., yellow or purplish. *Pod* 1½ in. long, velvety, 3–4-seeded.


2. **D. cordifolia**, Benth. MSS.; leaves and leaflets sub sessile, the latter rotundato-cardate, corolla half as long again as the calyx.

Khasia, 5000 ft., Hook. fl. & Thomson.

*Stems* very slender, at first finely downy. *Stipules* linear, very minute; leaflets membranous, glabrous, ½–1 in. long, firm, pale green. *Flowers* 6–10, in a close raceme, on a glabrous peduncle 1–2 in. long; bracts and bracteoles linear, very minute. *Calyx* glabrous, membranous, ½–¾ in. long. *Corolla* pale yellow.

58. **GLYCINE**, Linn.

Twining or suberect herbs. *Leaves* with 3–7 stipellate leaflets. *Flowers* in axillary racemes, with minute narrow bracts. *Calyx-tube* campanulate; teeth distinct, long or short. *Corolla* mostly little exserted; petals about equal in length; standard not distinctly spurred. *Stamens* more or less completely monadelphous; anthers uniform. *Ovary* sub sessile, many-ovuled; style short, incurved, beardless, stigma capitate. *Pod* linear or linear-oblong, straight or recurved, flat or rather turgid, few-seeded.—DISTRIB. Species about 12, spread through tropics of old world, and especially Australia.


Plains of the Western Peninsula and Ceylon.—DISTRIB. Trop. Africa, Natal, Java.

*Stems* wide-climbing, more or less clothed with grey or ferruginous silky hairs. *Petioles* 1–3 in.; leaflets membranous, green, with a few adpressed hairs above, grey and pubescent below; end one ovate, acute, 2–4 in. long. *Racemes* short-peduncled, dense or lax, 1–6 in. long; pedicels very short; bracteoles long, setaceous. *Calyx* 1½ in., densely silky; teeth setaceous, plumose. *Corolla* reddish, little exserted. *Pod* linear, straight, 1 in. by ½ in., 4–5-seeded, clothed with adpressed hairs.


*Stems* wide-climbing, with a few adpressed hairs. *Pétiole* 1–2 in.; leaflets subcoriaceous, with a few adpressed hairs on both sides, green above, grey below, distant; end one oblong-lanceolate, acute, 3–4 in. long. *Racemes* lax, usually short-peduncled, reaching 6–8 in. long; pedicels very short, fascicled. *Calyx* ⅓ in.; teeth deltoid, shorter than the tube. *Corolla* reddish, twice the calyx. *Pod* glabrous, flat, rather recurved, 1⅓ in. by ⅓ in., 4–5-seeded.


**Himalayas**, tropical region; **Kumaon** to **Sikkim**, **Khasia** and **Ava**, often cultivated.—**Distrib.** East Asia.

*Stems* suberect or climbing upwards, annual, densely clothed with fine ferruginous hairs. *Leaves* long-petioled; leaflets membranous, ovate, acute, rarely obtuse, 2–4 in. long. *Calyx* ⅓ in., densely hairy. *Corolla* reddish, little exserted. *Pods* usually only 2–3 developed in the axil of each leaf, linear-oblong, recurved, densely pubescent, 1⅓–2 in. by ⅓–⅔ in., 3–4-seeded, subtorulose.

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50. **TERAMNUS**, Sw.

Twining herbs, with exactly the habit of *Glycine*. *Calyx-tube* campanulate; teeth distinct, subequal or two upper not so long. *Corolla* little exserted; petals about equal in length; standard not spurred. *Stamens* monadelphous; alternate anthers small, abortive. *Ovary* sessile, many-ovuled; style short, curved, bearded, stigma capitulate. *Pod* linear, hooked with the persistent style at the tip, flatish, septate between the seeds.—**Distrib.** Species 4, belting the world in the tropics.


Plains from the foot of the **West Himalayas** to **Ceylon**, **Birma** and **Penang**.—**Distrib.** Cosmopolitan in the tropics, Natal.

*Stems* wide-climbing, slender, with a few fine adpressed hairs. *Stipules* minute, lanceolate, deciduous; petiole ½–1½ in.; leaflets 3, membranous or subcoriaceous, green, with a few adpressed hairs above, grey and more hairy below, the end one ovate or oblong, 1–2 in. long. *Racemes* 1–4 in. long, usually lax, the pedicels fascicled. *Calyx* ⅔–⅗ in.; teeth lanceolate. *Corolla* reddish. *Pod* linear, glabrous, recurved, 1½–2 in. long, 8–12-seeded.


**East Himalayas**; forests of Assam, Sillet and Chittagong.

More robust than the last, of which it may be a mere variety. *Stems*, petioles and leaves nearly glabrous. *Leaflets* subcoriaceous, the end one 3–5 in. long. **Racemes** 1 in. or less long. Calyx-teeth lanceolate-deltoid. **Pods** glabrous, 2½–3 in. long.

60. **Mucuna**, Adams.

Perennials and annuals of wide-twinning habit. *Leaves* ample, stipellate, always 3-foliolate. *Flowers* large, showy, usually dark purple, turning quite black when dried. *Calyx-tube* campanulate; two upper teeth quite conuate; lowest longer than the middle ones. *Corolla* much exserted; standard not more than half as long as the rostrate keel, which usually a little exceeds the wings. *Stamens* diadephous; anthers dimorphous, like those of the **Genistae**. **Ovary** sessile, many-ovuled; style incurved, beardless, stigma capitate. *Pod* very variable in shape and sculpture, usually covered with brittle needle-like irritating bristles.—**Disturb**. Species above 20, spread everywhere in the tropics.

**Subgen. 1. Amphiptera.** Pod broadly winged down both sutures and the faces covered also by close oblique plaits.


**East Himalayas, Silhet, Sikkim, Assam, tropical region, 1–4000 ft., Wallich Griffith, Hook. fil.**

A woody climber, with slender glabrescent branchés. *Leaflets* membranous, with a few minute adpressed grey hairs below, glabrous above; the end one oblong-cuspidate, 5–6 in. long. **Racemes** few-flowered, lax, on drooping peduncles 2–12 in. long; pedicels ½–1 in. long; bracts large, roundish, soon deciduous. *Calyx* ⅜ in. long, with a few irritating bristles; teeth all nearly as long as the tube. *Corolla* dull purple, 2–2½ in. long; keel abruptly inflexed at the tip; wings ½ in. broad; standard half as long as the keel, 1 in. broad. **Pod** oblong, 4–6 in. by 2 in., 2–4-seeded, clothed with abundant deciduous, irritating bristles; wings of sutures finally ⅜ in. broad.

**M. acuminata**, *Grah. in Wall. Cat. 5621 from Penang, may perhaps belong to this group, but the fruit is unknown. The calyx is like that of *M. imbricata*, but the corolla is smaller and the racemes are short-peduncled and corymbose like those of *M. monosperma*.

**Subgen. 2. Citta**, Lour. Pod with the faces covered by close oblique plaits, but not winged down the sutures.


**East Himalayas**, tropical zone; **Khasia**, Assam, Chittagong, Pegu; **Tavoy**, **Gomez**. Hills of West Peninsula and Ceylon, up to 3000 ft.

A woody climber, with slender glabrescent branches. *Leaflets* membranous or subcoriaceous, thinly clothed with ferruginous pubescence beneath; the end one oblong-cuspidate, 4–6 in. long. **Racemes** 6–12-flowered, corymbose, short-peduncled, or
subsessile; bracts none seen; pedicels ½-3 in.; bracteoles linear, exceeding the bud. Calyx ⅓ in., with copious irritant bristles; lower tooth linear; side ones deltoid. Corolla 1½ in. long; keel abruptly inflexed at the tip; wings ½ in., standard ½ in. broad. Pod 3 in. long, obscurely stipitate, clothed with copious ferruginous or dull brown irritant bristles; wings ⅓ in. deep.


Plains of Western Peninsula and Ceylon. Malacca, Maingay.
A woody climber, with very slender glabrous branches. Leaflets membranous, subconcolorous, shining on the upper surface, the end one oblong-cuspidate, 4–6 in. long. Racemes pendent, not corymbose; bracts small, ovate, soon deciduous; bracteoles oblong-spathulate, obtuse, ⅓–⅔ in. Calyx ⅓–⅔ in. long, deeply bilabiate, with a few ferruginous irritant bristles. Corolla dark purple, 2–2½ in. long; keel abruptly turned up at the end; wings ⅓–⅔ in., standard 1 in. broad. Pod sessile, 3 in. long, the faces traversed with close oblique plaits, and furnished with abundant yellow-brown irritant bristles.

**Subgen. 3. Carpopogon**, Roxb. Pod broadly winged down both sutures, but not plaited on the faces.


Plains of the Western Peninsula; Andamans, Kurz.—*Distrib.* Malaya, Philippines, Polynesia.
A woody climber, with slender glabrous branches. Leaflets subcoriaceous, subconcolorous, glabrous; end one oblong-cuspidate, 6–6 in. long. Flowers 12–30 in long-peduncled drooping close racemes; pedicels 1 in. long. Calyx ½–⅔ in., with a few irritant bristles; upper lip subtruncate. Corolla yellow, 1–1½ in. long; keel not abruptly inflexed at the end. Pod 3–6 in. by 2 in., flat on the faces, copiously clothed with abundant deciduous yellow-brown irritant bristles, 2–6-seeded.

**Subgen. 4. Stizolobium**, Pers. Pod without either distinct plaits on the faces or wings down the sutures.

5. **M. macrocarpa**, *Wall. Cat.* 5618; woody, branches and leaves glabrous, upper lip of calyx subtruncate, pod very large sublignose glabrescent.

Branchlets slender, terete. Leaflets subcoriaceous, the undersurface with a few adpressed deciduous hairs; end one ovate-cuspidate, 6–8 in. long. Racemes fascicled from the old wood, short-peduncled, with a densely brown-velvety rachis, the lower nodes sending out short branches; pedicels ⅓–⅔ in., velvety, decurved; bracteoles ⅓–⅔ in. obtuse, oblong. Calyx nearly 1 in. long, with a few irritant bristles; lower teeth as long as the tube. Corolla 2½–3 in. long; keel abruptly turned up at the tip; wings ⅓ in.; standard ½ in. broad. Pod 1–1½ ft. by 1½–2½ in., 8–12-seeded, distinctly torulose, finely velvety at first, slightly channelled down both sides of both sutures.

6. **M. bracteata**, DC. Prodr. ii. 406; annual or perennial, branches and leaves below with a few adpressed hairs, flowers purple in short-peduncled


Closely allied to *M. pruriens*, with which it quite agrees in calyx, corolla and shape and texture of leaflets. Leaves grey, with only a few obscure adpressed hairs below. Rachis of the racemes densely grey-pubescent; bracts broader and more persistent than in the rest of the group, those of the peduncle acuminate, $\frac{1}{2}-\frac{3}{4}$ in. long. *Pod* 3–4 in. long, similar in texture to that of *M. pruriens* and similarly abruptly recurved at the end.

7. **M. hirsuta**, W. & A. Prodr. 254; annual, branches and leaves below densely silky, flowers purple in long racemes, bracts small ovate or lanceolate, pod ribbed longitudinally clothed with yellow-brown irritating bristles.

**Plains of Western Peninsula**.

Branches slender, densely clothed with short fine deflexed ferrugineous or grey hairs. Leaflets ovate-rhomboid, obtuse, with a cusp, membranous, thinly silky above, densely grey-silky beneath, ferrugineous on the veins, 4–6 in. long. *Racemes* short-peduncled, $\frac{3}{4}-\frac{5}{4}$ ft. long, with a densely silky rachis. Calyx and corolla as in *M. pruriens*. *Pod* 3–4 in. long, reflexed at the end, 5–6-seeded.


From the Himalayas, in the plains, to Ceylon and Birma.—Distrib. Cosmopolitan in the tropics. Often cultivated, as are the two following.

An annual, with slender terete branches, glabrescent when mature. Leaflets membranous, ovate-rhomboid, green, glabrescent above, lustrous with fine grey silky pubescence beneath, $\frac{1}{2}-\frac{3}{4}$ ft. long. *Racemes* short-peduncled, drooping, $\frac{3}{4}$–1 ft. long, the axis finely grey-silky; pedicels $\frac{3}{4}$–1 in. Calyx $\frac{3}{4}$ in. long, with a few irritating bristles; upper lip and lanceolate teeth as long as the tube. Corolla purplish, 1$\frac{1}{4}$–1$\frac{3}{4}$ in. long; wings $\frac{1}{4}$ in. broad, rather shorter than the slightly incurved keel. *Pod* 2–3 in. long, 5–6-seeded, turgid, clothed with dense persistent bristles which are usually pale brown or steel-grey.—*M. utilis*, Wall. is a cultivated variety with a velvety pod. A variety occurs in Ceylon with short usually two-flowered peduncles. An allied plant from Assam, Masters, known in bud only, has closer laxer pubescence and large linear-setaceous bracts.


Foot of the Western and Eastern Himalayas.—Distrib. Java.

Closely allied to *M. pruriens*, of which it may be a cultivated race. Leaflets the same texture and shape, but with only a few adpressed hairs, not silky below. Corymbbs with 5–6 flowers, on short ascending peduncles. Calyx and corolla the same. *Pod* larger, 5–6 in. long, similarly turned up at the end, but the bristles much shorter and deciduous.

**Aya** and **Bengal**, perhaps cultivated only.

Like the preceding, perhaps only a cultivated race of *M. pruriens*. Leaflets 1-3 ft. long, distinctly rhomboidal at the base, both sides at first with a few adpressed hairs. Racemes pendulous, often exceeding the leaves. Pedicels, calyx and corolla of *M. pruriens*, but the latter white. Pod half a foot long, black and destitute of bristles when mature, 6-8-seeded.

### 61. APIOS, Moench.

Twining herbs. Leaves pinnately 3-7-foliate, stipellate. Flowers middle-sized, in lax racemes, with tumid nodes; bracts and bracteoles minute, deciduous. Calyx teeth shorter than the tube, two upper connate, lowest linear, the two others short, deltoid. Corolla much exserted, the much incurved narrow keel exceeding the spoon-shaped standard, the wings still shorter. Stamens diadelphous; anthers uniform. Ovary subsessile, many-ovuled; style very long, filiform, beardless, much incurved, stigma capitate. Pod linear, compressed.—**Distrib.** Species 3, the two others Chinese and N. American.

1. **A. carnea**, Benth. MSS. Cyrtotropis carnea, Wall. Cat. 5527; Pl. As. Rar. 49, t. 62.

**Nipal**, Wall. *Khasia*, 4-6000 ft., Hook. fil. & Thomson, Lobb.

Stems slender, soon glabrescent. Pedicels 2-3 in.; leaflets usually 5, rarely 3, glabrous, green above, pale beneath, membranous, opposite, oblong, acute, 3-4 in. long. Flowers in long-pediculed flexuose secund racemes 6-9 in. long; lower pedicels fascicled, upper solitary; bracts and bracteoles minute, linear, caducous. Calyx green, glabrous, 1-3 in. Corolla reddish, quite twice the calyx. Pod 4-5 in. long, glabrous, straight, 12-16-seeded.

### 62. ERYTHRINA, Linn.

Trees with prickly branches. Flowers large, coral-red, in dense racemes, produced usually before the development of the large constantly 3-foliate leaves. Calyx oblique, spathaceous, finally slitting down to the base or campanulate-bilabiate. Petals very unequal; standard always much exserted and considerably exceeding the keel and wings. Upper stamen free down nearly to the base or connate with the others half way up the filaments; anthers uniform. Ovary stalked, many-ovuled; style incurved, beardless, stigma capitate. Pod linear, turbid, turmose.—**Distrib.** Species 25-30, principally tropical, in both the new world and the old, and at the Cape.

**Sturgen.** 1. **Stenotropis**, Hassk. Calyx spathaceous, oblique, not at all 2-lipped, finally split to the base down the back.


Foot of the **Himalayas** to **Ceylon**, **Birma** and **Malacca**, often planted.—**Distrib.** **Java**, Polynesia.
A tall tree, with thin grey bark, the prickles minute, conical, usually black. Petioles 4-6 in., mostly unarmed; leaflets membranous, subcoloraceous, glabrous, the end one round-cuspidate, 4-6 in. long and broad, truncate or broad-rhomboidal at the base. Racemes dense, ½ ft. long, on spreading woody peduncles; pedicels ¼-½ in., downy. Calyx 1-1½ in. long, with a very oblique mouth from the first, subglabrous, minutely 5-toothed at the very tip. Standard 2-2½ in. long, the blade 1 in. broad; wings and keel subequal, not more than half as long as the calyx. Pod ¾-1 ft. long, distinctly torulose.—E. picta, Linn. (Rumph, Ambobin. t. 77) appears to be a mere form of this, with variegated leaves.


Western Peninsula, common.

A large tree. Prickles whitish, rarely extending to the petioles. Leaflets same shape as in E. indica, glabrescent on both surfaces. Calyx subglabrous, ½ in. long. Standard oblong-lanceolate, 1½ in. long; keel half as long as the standard, much exceeding the truncate wing. Stamens as in the last. Pod 4-5 in. long, less torulose than in the last, narrowed to both ends, glabrous, its stalk longer than the calyx.

Subgen. 2. Micropteryx, Wulp. Calyx campanulate, more or less distinctly 2-lipped, but not splitting down to the base. Pod turgid and seed-bearing through its whole length.

3. E. resupinata, Roxb. Cor. Pl. t. 220; Hort. Beng. 53; Fl. Ind. iii. 257; herbaceous, leaflets as broad as long, limb of standard oblong. DC. Prodr. ii. 410; Brand. For. Fl. 141.

Upper Gangetic plain; Nawal Khar, Dr. Brandis. Oudh, Dr. Stewart.

Racemes direct from the rootstock, under a foot high, dense, appearing before the leaves. Petioles and peduncles prickly. Leaflets round-cordate, 2-3 in. long and broad. Calyx ¼-½ in. long, campanulato-bilobate. Standard 3-4 times the calyx; keel half as long as the standard tinged with red, its petals united; wings much shorter, greenish. Upper stamen free from low down.

4. E. ovalifolia, Roxb. Hort. Beng. 53; Fl. Ind. iii. 254; arboreal, leaflets twice as long as broad, glabrous, limb of the standard as broad as long. Wall. Cat. 5901; Wright Ir. t. 247; Bedd. Fl. Sylv. 88; Benth. Pl. Jungh. 237. E. picta, Wall. Cat. 5900, non Linn. Duchassaingia ovalifolia, Wulp. in Linnaea, xxiii. 742.

Forests of Sillet, Assam, Bengal, Ceylon, Burma and Malacca.—Distrib. Java, Polynesia, and perhaps not distinct from American E. glauca, Willd.

Branches pale grey. Prickles usually black, not extending to the petiole. Leaflets subcoriaceous, glaucescent, the end one ovate or obovate-oblong, very different in shape from that of any other species, often ½ ft. long, obtuse or subacute. Calyx ¾-1 in., brown-velvety, splitting nearly down to the base in two halves. Standard deep scarlet, 1½-2 in. by 1½ in., emarginate; keel petals adherent, half as long as standard; wing rather shorter. Pod 6-8-seeded, ½ ft. long, distinctly torulose, narrowed into a short stalk.

5. E. suberosa, Roxb. Hort. Beng. 53; Fl. Ind. iii. 253; arboreal, leaflets as long as broad matted with pubescence beneath, limb of the standard 3-4 times as long as broad, pod turgid. Wall. Cat. 5950; W. & A. Prodr. 260; Bedd. Fl. Sylv. 87; Dalz. & Gibs. Bomb. Fl. 70. Micropteryx suberosa,
**Himalayas to Ceylon**, ascending to 3-4000 in the north-west.

A tree, reaching 40-50 feet high, with corky deeply cracked bark. **Prickles** yellowish, longer than in the others. **Leaflets** green and glabrous above, 3-6 in. broad, often broader than deep, usually pointed, with a broad deltoid base, thickly matted with grey cottony down beneath. **Racemes** densely capitate. **Calyx** 3/4 in. long, faintly downy, soon deeply bilabiate. **Standard** 1 1/2-2 in. long, its blade 1/3 in. broad; keel-petals connate, less than half as long as the standard. **Upper stamen** free from low down. **Pod** 3/4 ft. long, subterete, distinctly torulose, 4-6-seeded.


6. **E. arborescens**, **Roxb. Hort. Beng.** 53; **Fl. Ind. iii. 256**; arborescent, leaflets as broad as long glabrous beneath, limb of the standard 2-3 times as long as broad, pod firm flattish. **Roxb. Cor. Fl. t. 219; Wall. Cat. 5962; Brand. For. Fl. 140.**

**Central and East Himalayas; Kumaon to Sikkim and Khasia**, ascending to 7,000 ft.

A low tree, with few prickles on the branches. **Leaflets** membranous, greenish on both sides, the end one pointed, truncate or rather cordate at the base, often 3/4-1 ft. broad. **Flower** very like that of **E. suberose**, but the calyx larger and the limb of the standard broader. **Pod** much curved, 1 1/3 ft. long, 1 in. or more broad, 4-6-seeded, narrowed gradually to a distinct beak and stalk.

**Subgen. 3. Hypaphorus, Hassk. Calyx** as in the last. **Pod** flat, seedless and indehiscent in the lower half, bearing 1-3 seeds towards the tip.—**Connects Erythrina with Butea and Spatholobus.**


**Rangoon, McClelland.—Distrib. Java; Philippines, Cuming, 1161.**

A tall tree, with branchlets often unarmed. **Leaflets** membranous, glabrous, greenish, the end one roundish, acute, 4-6 in. long. **Racemes** pilose, cotemporaneous with the leaves. **Calyx** velvety, 1/3-3 in. long, finally splitting down nearly to the base in two lips. **Standard** 1 1/2-1 1/3 in. long, the limb oblong, obtuse; keel and wings subequal, 1/3 in. long. **Pod** much recurved, 4-5 in. long, broader in lower half, with a stalk reaching 1 1/3 in. long.—**Kurz (Journ. Asiat. Soc. Beng. xlii. 2, 69) says Miquel's plant is not Blume's, and that it is E. sumatrana, Miq. Fl. Ind. Bat. Suppl. 304. I cannot, without specimens, clearly distinguish E. holosericea, Kurz loc. cit. from this; its pod is unknown.

63. **STRONGYLODON**, Vogel.

Twining herbs, with the habit of *Phaseolus*, with stipellate 3-foliolate leaves. **Flowers** in long lax racemes. **Calyx** campanulate, gibbous; teeth short, obtuse, imbricated. **Corolla** much exserted; standard lanceolate, recurved; wings obtuse, more than a third as long; keel curved, as long as the standard, narrowed into a long beak. **Stamens** diadelphous, anthers uniform. **Ovary** stalked,
few-ovuled, style filiform, beardless, stigma capitate. Pod oblong, turgid. 

Seeds as large as a bean, with a hilum running more than half round.—DISTRIB. Species 3, Polynesian.


Ceylon, near Kornegalle, Thwaites.—DISTRIB. Polynesia.

Stems firm, wide-twinning, glabrous. Leaflets green, subconcolorous, glabrous, membranous, the end one roundish with a point, 4-6 in. long. Racemes copious, axillar, distinctly-peduncled, 3-1 ft. long; pedicels geminate from the tumid nodes, filiform, drooping, ½-1 in. Calyx glabrous, 4/3 in., clasped at the base by a pair of short round deciduous bracteoles. Corolla bright red, 3-4 times the calyx. Pod oblong, 3 in. long, distinctly stalked, 2-seeded.

64. GRONA, Lour.

Twining herbs, with stipulate 1-foliolate leaves, deciduous stipules and bracts. Racemes with obscurely-swollen nodes. Calyx-tube campanulate; teeth elongated, upper 2 shorter. Corolla distinctly exserted, its petals nearly equal in length, both standard and wings spurred; keel obtuse, nearly straight. Stamens diadelphous; anthers uniform. Ovary subsessile, many-ovuled; style long, filiform, beardless, stigma capitate. Pod linear, turgid, septate between the seeds.—DISTRIB. Another species reported from Cochín China.


PROPE, Wallich.

A lax climber or trailer, the slender stems with a few adpressed hairs. Leaflet subcoriaceous, glabrous, subconcolorous, reticulato-renose, 3-6 in. long, acute, lower cordate-ovate, upper oblong-lanceolate; petiole ⅓-1½ in. Racemes 2-3 from each node, 1-3 in. long, the flowers in pairs from the distant nodes. Calyx glabrescent, ⅓ in; teeth all exceeding tube, lower linear, upper lanceolate. Corolla ⅓ in. reddish.

2. G. Dalzellii, Baker; flowers in dense usually sessile heads, bracteoles as long as the calyx. Galactia simplicifolia, Dalz. in Kew Journ. iii. 209; Dalz. & Gibbs. Bomb. Fl. 69.

Plains of CONCAN, Dalzell, Stocks.

A herbaceous twiner, the slender stems with a few adpressed hairs. Leaflet membranous, with a few adpressed hairs on both sides, green above, glaucous below, ovate, acute, 2-4 in. long, lower cordate, upper rounded at the base; petiole ⅔-1½ in. Flowers 6-12, in copious dense cymes. Calyx ⅔ in., clothed with dense ferruginous silky hairs; lower teeth lanceolate, upper deltoid. Corolla twice the calyx. Pod linear, straight, hairy, 2-2½ in. long, 8-10-seeded.


Proo, Kurz.

Voluble, slender. Leaves broad cordate-ovate, obtuse, mucronate, 1-1½ in. broad, palmately nervured, thinly hirsute on both sides; petiole ⅓-⅔ in. Flowers small, yellow, pedicellate, cirrhuso-pedunculate. Pod slender, linear, glabrous, 1 in. long, 5-6-seeded; seeds shining, olive-green, mottled with black.—Kurz, loc. cit.
65. **Galactia**, P. Br.

Twining herbs, with 3-foliolate stipellate leaves, like *Glycine* in habit, but with the nodes of the raceme slightly tumid. *Calyx*-tube short; teeth linear or lanceolate, the two uppermost entirely fused in one. *Corolla* little exserted; its petals nearly equal in length; keel obtuse, nearly straight. *Stamens* diadelphous; anthers uniform. *Ovary* sub sessile, many-ovuled; style long, filiform, beardless, stigma capitulate. *Pod* linear, flattened, recurved.—**Distr.** Species 45, mostly Tropical American.

1. **G. tenuiflora**, W. & A. Prodr. 206; leaflets small obtuse, flowers in pairs from the distant nodes of elongated racemes, hairs of calyx very short ad pressed. *Glycine* tenuiflora, Willd.; DC. Prodr. ii. 241; Roxb. **Fl. Ind.** iii. 319.’

Plains from the foot of the Himalayas to Ceylon and Siam.—**Distr.** Natal, Zambesi-land, Australia, Malay isles.

**Stems** very slender, obscurely grey-downy. **Stipules** deciduous, minute; petiole 1–1½ in.; leaflets obovate or oblong, 1½–2 in. long, membranous, green, glabrescent above, grey, obscurely silky below. **Racemes** copious, peduncled, ¼–½ ft. long. *Calyx* ⅘–¾ in. long, finely grey silky; teeth lanceolate acuminate, exceeding the tube. *Corolla* reddish, ½ in. long. *Pod* 1½–2 in. by ⅜ in., glabrescent, 6–8-seeded.

**Var. 1. lucida;** leaflets linear-oblong sub coriaceous glabrous on both surfaces sublucent above, flowers smaller. *Glycine lucida*, Graih. in **Wall. Cat.** 5511. G. graminea, *Heyne MSS.*—**Western Peninsula.**

**Var. 2. minor;** stems very slender, leaflets and flowers smaller, the former oblong ½–1 in. long thinly grey silky below, corolla ⅘–¾ in. long, pod 1 in. long glabrous 4–5-seeded. Leucodictyon malvensis, Dalz. & Gibbs. **Bomb. Flora**, 73. G. tenuiflora, **Wall. Cat.** 5509 A.—**Western Peninsula.**

**Var. 3. villosa;** stems leaves below and pods densely grey-downy, leaflets oblong 1–1½ in. long, flowers fewer and smaller than in the type. G. villosa, W. & A. Prodr. 207. *Glycine tenuiflora*, **Wall. Cat.** 5509, B, C. G. filiformis, **Wall. Cat.** 5510 and 5519.—**Western Peninsula.**

**Var. 4. latifolia;** stems and leaves below densely pubescent, leaflets sub coriaceous roundish 1½–2 in. long, racemes elongated, calyx hoary more deeply cleft.—Concan, Stocks.


**Tennasserim;** Tavoy, Gomez. Amherst, Parish.

**Stems** slender, clothed with conspicuous spreading deciduous ferruginous hairs. *Petioles* 2–3 in.; leaflets membranous, green, subconcolorous, with a few adpressed hairs on both surfaces, oblong, 3–4 in. long. *Bracts* lanceolate, nervose, subpersistent; bracteoles linear, as long as the tube. *Calyx* ⅞ in. long; teeth linear-setaceous, 2–3 times as long as the tube, plumose. *Corolla* reddish, ⅜ in. long. *Pod* unknown.—Re cedes from *Galactia* by its cymose inflorescence and persistent nerveous bracts.

66. **Cochlianthus**, Benth.

A climbing herb. **Leaves** pinnately 3-foliolate, stipellate. **Flowers** racemose. *Calyx*-tube campanulate; teeth short, the lowest longest, lanceolate, the two upper fused into one. *Corolla* much exserted, the petals nearly equal in length; standard broad; keel narrow, curved, rounded at the end in a semicircle. *Stamens* diadelphous; anthers uniform. *Ovary* short-stipitate, many-ovuled; style
filiform incurved; stigma large, terminal. Pod linear, incurved, flattish.—Distrib. A single endemic species with the habit of a slender Mucuna.


NIPAL, Wallich.

A slender twining subglabrous herb, with both leaves and flower turning black when dried. Leaves distinctly petioled, 3-foliolate, stipellate, membranous, with a few adpressed hairs on both surfaces, grey beneath; end one ovate-rhomboidal, acuminate, 2-3 in. long. Flowers 6-20 in close racemes on drooping slender peduncles; bracteoles setaceous, very minute, deciduous. Corolla ⅜ in., densely clothed with adpressed silky hairs. Corolla 3 times as long as the calyx.

67. SPATHOLOBUS, Hassk.

Woody climbers, with 3-foliolate stipellate leaves. Flowers small or middle-sized, in ample terminal panicles, extending into the axils of the upper leaves, the pedicels densely fascicled at the tumid nodes. Calyx campanulate; teeth lanceolate or oblong-deltoid, the upper two connate. Corolla distinctly exserted, its petals subequal, the keel obtuse, nearly straight. Stamens diadelphous; anthers uniform. Ovary sessile or stalked, 2-ovuled; style incurved, beardless, stigma capitate. Pod exactly like that of Butea.—Distrib. Species 10, the others Malayan and one Trop. African. By the pod dehiscing only at the seed-bearing apex this and Butea approach Dalbergieae.


Plains from the foot of the West Himalayas to Ceylon, Martaban and Tenasserim.

A robust climber, with densely grey-downy branches. Petiole ⅓-½ ft.; leaflets subcoriaceous, dull green, glabrescent above, obtuse or shortly cuspidate, deltoid at the base, 6-9 in. long. Panicle reaching 1-1½ ft. long; branches very downy; pedicels ⅓ in. or less long. Calyx ⅓-⅔ in., densely grey-velvety; lower teeth lanceolate, nearly as long as the tube. Corolla bright red, half as long again as the calyx. Pod 3-4 in. long, usually 1 in. broad, clothed with ferruginous tomentum, which is thickest and darkest towards the tip, narrowed suddenly into a stalk ⅛ in. long.

Var. 1. denudatus; leaves nearly concolorous, calvate beneath. Butea gyrocarpa, Wall. Cat. 5442, in part.—Penang.

Var. 2. platycarpus; pod nearly 2 in. broad conspicuously narrowed to the seed-bearing tip.—Concan, Stocks.

2. S. gyrocarpus, Benth. Pl. Jungh. 238; leaflets subcoriaceous ferrugineo-pubescent beneath, end one obovate-rhomboidal, flowers small, calyx densely grey-downy, teeth very short, pod sessile narrowed to the tip. Butea gyrocarpa, Wall. Cat. 5442, ex parte.

Forests of Penang and Malacca, Wallich, &c.—Distrib. Philippines, Cuming, 945. A robust woody climber, with densely ferrugineo-pubescent branches. Petiole 4-6 in.; leaflets dull green, pubescent on the ribs above, not at all canescence, but beset with short spreading hairs and reticulato-venose beneath, the base rather rounded, the end one 6-9 in. long. Panicle 1 ft. long; branches very downy; pedicels very short.
Calyx ¼ in.; teeth deltoid. Corolla reddish, ½ in. long; limb and standard broader than deep, emarginate. Pod like the samara of a sycamore reversed, finely downy, 8–5 in. long, more membranous than in the last.


Forests of Tenasserim and Penang, Wallich, &c.

A robust climber, with branches minutely downy at first, soon glabrescent. *Petiole* 2–4 in. long; leaflets subconcolorous, pale grey-green on both sides, much thinner than in *S. crassifolius*, the end one 4–8 in. long. *Panicle* more than a foot long; pedicels much shorter than the calyx. Calyx ½ in. *Corolla* bright red, three times the calyx; limb of the standard as long as broad. Pod just like that of *S. gyrocarpus*.—Here most likely belongs *Pongamia*? *Wall. Cat.* 9054, from Penang. We have a closely allied plant from Mishmi, *Griffith*, 1678, with a more rigid much recurved larger pod half a foot long; and another from Concan, *Stocks* (S. purpureus, *Benth. MSS*.) with very dense panicles, dark purple corolla, and longer pedicels, which no doubt is distinct, but of which the pod is unknown.


Forests of Silhet and Penang, Wallich. *Khasia, Griffith*.

Branches at first clothed with ferruginous pubescence. Leaflets like those of *S. acuminatus*, 6–9 in. long, thicker in texture, very shining on the upper surface, quite glabrous beneath from the beginning. Pedicels very short, the flowers densely clustered towards the end of the branchlets. Calyx ½ in. long. *Corolla* dark purple, scarcely twice as long as the calyx; limb of the standard broader than deep, emarginate. Pod only seen very immature.

68. **BUTEA**, Roxb.

Erect trees or climbing shrubs, with 3-foliate large stipellate leaves. Flowers densely fascicled, large, showy, in axillary racemes or terminal racemes or panicles. Calyx broadly campanulate; teeth short, deltoid. Corolla much exserted; petals nearly equal in length, the keel much curved, subobtuse or acute. Stamina diadelphous; anthers uniform. Ovary sessile or stalked, 2-ovulate; style filiform, curved, beardless, stigma capitulate. Pod firm, ligate, splitting round the single apical seed, the lowest part indehiscent.—DISTR. No other species.


Plains from the Himalayas to Ceylon and Burma, ascending to 4000 ft. in the north-west.

An erect tree, reaching a height of 40–50 ft. Shoots clothed with grey or brown silky pubescence. *Petiole* ¾–1 ft.; leaflets 4–8 in. long, coriaceous, glabrescent above, densely finely silky and strongly veined below; end one roundish, with a rhomboid base, obtuse, often emarginate. *Racemes* ¾ ft. long; pedicels ¼–1 in., densely brown-velvety. Calyx ¼ in. long, velvety. *Petals* bright orange-red, equal, thickly clothed on the outside with silvery tomentum, the standard 1 in. broad, the keel semicircular, beaked. *Pod* 6–8 in. by 1½–2 in., argenteo-canescens, narrowed suddenly into a stalk longer than the calyx.

Forests of **Conca**, **Bengal**, **Orissa** and **Birma**.

Very near the last, from which it differs mainly by its scandent habit, not by any botanical characters. **Leaflets** and flowers larger, the former reaching 20 in. long. **Racemes** 1 ft. long; pedicels sometimes 3 times as long as the calyx.

3. **B. minor**, Ham. in Wall. Cat. 5439; a climber, corolla three times the calyx, keel little curved subobtuse, pod subsessile.

East Himalayas; N**Pa**, **Wallich**; **Silhet**, **Da Silva**; **Khasia**, 1-4000 ft., Hook. fl. & **Thomson**, **Lobb.**; **Mishmi**, **Griffith**.

**Branches** robust, clothed at first with grey or brown silky hairs. **Petiole** ½–1 ft.; **leaflets** obtuse or cuspidate, 6–15 in. long, coriaceous, scabrous above, finely silky beneath, the end one orbicular, with a rhomboidal base. **Racemes** ½–1 ft. long. **Calyx** ¹⁄₄–¹⁄₂ in., brown-velvety, as are the pedicels; teeth very short. **Corolla** dull red, 1 in. long, densely velvety on the outside; keel rather exceeding the wings and standard, which is ½ in. broad. **Pod** 3–3½ in. long by 1–1½ in., cuneate at the base.

69. **Mastersia**, Benth.

**Calyx-tube** turbinate; teeth long, lower lanceolate, two upper connate. **Corolla** scarcely exerted; petals nearly equal in length; standard roundish; keel obtuse, little curved. **Stamens** diadelphous; anthers uniform? **Ovary** sessile, many-ovuled; style short, filiform, incurved, stigma capitiate. **Pod** linear-oblong, flat, indehiscent, the dorsal suture bordered by a narrow erect wing.—**Distrib**. A single endemic species, combining the habit of **Phaseolus** with the pod of **Dalbergia**.


East Himalayas, Assam and **Mishmi**, **Wallich**, **Griffith**.

A woody climber, with firm terete glabrous branches. **Leaves** 3-foliolate, distinctly petioled; **leaflets** subcoriaceous, stipellate, glabrous above, inconspicuously downy beneath; end one obovate-cuspidate, 5–6 in. long, rounded at the base. **Racemes** reaching a foot long; pedicels ½–½ in., geminate, from very timid nodes. **Calyx** ½ in. long, the tube hidden by a pair of large round striated bracteoles. **Pod** shining, very flat, 3–5 in. by ³⁄₄–1 in.

70. **Canavalia**, DC.

Large twining perennials or biennials, with stipellate 3-foliolate leaves and showy flowers. **Calyx** deep, the limb 2-lipped, the upper lip projecting, entire or emarginate, the lower shortly 3-toothed. **Corolla** much exerted; standard large, roundish; wings shorter, equalling the incurred obtuse keel. **Stamens** monadelphous; anthers uniform. **Ovary** obscurely stalked, many-ovuled; style incurved, beardless, stigma terminal. **Pod** large, linear or oblong, flattish, with a distinct rib on each valve near the upper suture.—**Distrib**. Species about a dozen, two widely-spread in the tropics, the others mostly American.

Dolichos gladiatus, Jacq. Lc. t. 560; Roxb. Fl. Ind. iii. 300. C. Loureiri, G. Don Gen. Syst. ii. 303. C. incurva, DC. loc. cit.—Rheed Hort. Mal. viii. t. 44.

_East Himalayas to Ceylon and Siam, wild and commonly cultivated.—Distrib. Everywhere in the Tropics._

_Stems_ wide-twinning, perennial or biennial, glabrous. _Stipules_ minute, deciduous; leaflets entire, ovate, membranous, glabrous, 4-6 in. long. _Peduncles_ and racemes each 1/2 ft. long; pedicles very short, geminate from the very tumid nodes; _bracteoles_ minute, ovate, caducous. _Calyx_ 3-4 in., glabrous, the upper lip a third of the length of the tube. _Corolla_ more than twice as long as the calyx, red or white. _Pod_ 6-9 in. by 1-1 1/2 in., glabrescent, rather recurved, 8-12-seeded.

_Vari. 1. virosa; leaflets obovate or obovate-oblong smaller more obtuse glabrous, axis of raceme more densely pubescent, pod 2-4 in. long 4-6-seeded, flowers smaller. Dolichos virosus, Roxb. Hort. Beng. 55; Fl. Ind. iii. 301. C. virosa, W. & A. Prodr. 253; Dalz. & Gibbs. Bomb. Fl. 69.—Perhaps rather the wild form of the plant than a proper variety. Seeds said to be bitter in the variety, eatable in the type._

_Vari. 2. turgida, Grah. in Wall. Cat. 5534 (sp.); leaves like the last, but the pod larger and more turgid, 3-5 in. by 1 1/2-2 in. broad. Miq. Fl. Ind. Bat. i. 218. C. Stocksii, Dalz. & Gibbs. Bomb. Fl. 69?_ 

_Vari. 3. mollis, Wall. Cat. 5533 (sp.); branches leaves and calyx densely clothed with short grey pubescence, pod small oblong slightly downy till mature. W. & A. Prodr. 253.—Nilghiris and Dindigul hills, in the Carnatic._


_Coasts of Western Peninsula, Ceylon and Malay Peninsula.—Distrib. Cosmopolitan in the tropics._

A glabrous perennial. _Leaflets_ thicker than in the last, 2-4 in. long, more conspicuously veined, often as broad as long. _Racemes_ usually overtopping the leaves. _Flower_ like that of the last, but the upper lip of the calyx rather shorter. _Pod_ 4-5 in. by 1 in., glabrous, 4-6-seeded.

71. _Dioclea_, H.B.K.

_Climbing shrubs. Leaflets pinnately 3-foliate, stipellate. Flowers_ blue or white, in elongated racemes with thickened nodes; bracts and bracteoles caducous. _Calyx-tube_ campanulate; teeth as long as the tube, two upper quite connate. _Corolla_ little exserted; petals about equal in length; keel incurved, but not beaked. _Stamens_ monadelphous, but the uppermost free at the base; anthers uniform. _Ovary_ subsessile, few-ovuled; _style_ incurved, beardless, stigma capitate. _Pod_ oblong, turgid, 1-2-seeded, flattened along the upper suture.—_Distrib. Species 10, all the others Tropical American._

_D. lasiocarpa, Mart.,_ a common Tropical American species with lax racemes, small bracts, densely fascicled pedicels as long as the glabrous calyx and 6-8-seeded strap-shaped pods 4-6 in. long, is contained in the CONCANC collection of Dr. Stocks, probably introduced.


A woody climber, with terete branches, at first pubescent. *Leaflets* subcoriaceous, obtuse or acute, pubescent beneath, 4-6 in. long. *Flowers* in peduncled dense subspicate racemes ½-1 ft. long; bracts linear, reflexed, silky, ¼ in. long. *Calyx* 3-½ in., silky, with a pair of small obtuse bracteoles. *Corolla* reddish, half as long again as the calyx. *Pod* 3-4 in. long, glabrous, but clothed at first with adpressed silky hairs.

72. **PUERARIA**, DC.

Twining shrubs or herbs, with stipulate 3-foliolate leaves; leaflets sometimes palmatifid. *Flowers* large or small, densely fascicled, in long often compound racemes. *Calyx-teeth* long or short, the two upper connate. *Corolla* distinctly exerted; standard usually spurred at the base, equalling in length the obtuse wings and keel. *Stamens* more or less thoroughly monadelphous; anthers uniform. *Ovary* sessile or nearly so, many-ovuled; style filiform, much incurved beardless, stigma capitate. *Pod* linear, flattish.—*Distrib.* Only one East Asian species not here represented.

**Subgen. 1. Pueraria** proper. *Flowers* produced after the leaves fall. *Pod* ½-1 in. broad, with constricitions between the seeds that recall the articulations of *Hedysarum*.


**West Himalayas**, tropical zone, ascending to 4000 ft. in *Kumaon*. Hills of *Western Peninsula* and *Orissa*.

*Root* very large, tuberous. *Stems* shrubby, the branches finely grey-downy. *Stipules* minute, deciduous, cordate-ovate; leaflets membranous, roundish, ½-1 ft. long, green, glabrescent above, densely clothed with whitish adpressed hairs beneath. *Flowers* in dense virgate leafless often panicled racemes, reaching 6-9 in. long; pedicels very short, densely fascicled. *Calyx* ½-1 in. long, densely silky. *Corolla* bluish, not quite twice the calyx; limb of standard orbicular, distinctly spurred. *Pod* 2-3 in. long, membranous, flat, 3-6-seeded, clothed with long grey silky bristly hairs.

2. **P. Candollei**, *Grah.* *in* *Wall.* *Cat.* 5355; calyx subglabrous, teeth acute as long as the tube, bracts exceeding the buds, lamina of wings semi-circular, pod subglabrous. *Benth.* *in* *Journ.* *Linn.* *Soc.* *ix.* 123.

**Pegu, Wallich, McClelland. Mouleman, Lobb.**

Shrubby, with slender terete glabrous branches. *Stipules* in the last; leaflets subcoriaceous, roundish, with an acute point, ½-3 ft. long, both surfaces greenish, glabrescent. *Racemes* lax, virgate, panicled, reaching a foot or more long, the sulcate rachises subglabrous; pedicels ½-1 in.; bracts linear, ¾-1 in. long. *Calyx* ½-1 in., clasped by a pair of minute persistent ovate bracteoles. *Corolla* twice the calyx; limb of standard roundish, spurred. *Pod* 3 in. long, few-seeded.

**Subgen. 2. Neustanthus**, *Benth.* *Leaflets* entire, rarely faintly lobed, contemporaneous with the flowers. *Pod* ½-1 in. broad, not constricted, 4-12-seeded.

4. **P. Wallichii**, DC. Prodr. ii. 240; shrubby, stipules basifixated, flower-pedicels at most equaling the calyx, calyx-teeth deltoid, corolla middle-sized, pod glabrous rigid-coriaceous. **DC. Mem. Leg. t. 43**; **Wall. Cat. 5553**; **Benth. in Journ. Linn. Soc. ix. 124.**  

**P. composita**, Grah. in Wall. Cat. 5570.

5. **P. Stracheyi**, Baker; herbaceous, stipules deciduous, flower-pedicels nearly or quite as long as the calyx, calyx-teeth large nearly as long as the tube, corolla large.

**Kumaon**, Kalimundi, alt. 7300 ft., **Strachey and Winterbottom.**  
**Branches slender, with a few short deciduous hairs. Leaflets membranous, very thin, with a few obscure adpressed hairs on both surfaces, greyish green, paler below; end one obovate-oblong, cuspidate, rather rounded at the base, 3-4 in. long. Flowers in a long lax simple subsecund raceme, with a subglabrous rachis; pedicels 1/4-3/4 in. **Calyx** subglabrous, 3/4 in. long; lower tooth lanceolate, 1/4 in. long, the others much shorter. **Corolla** reddish, 3-5/8 in. long; standard 1/4 in. broad, distinctly spurred. Pod unknown.


**A climber, with slender branches, clothed with deciduous deflexed fine brownish hairs. Stipules persistent, 1/3-1/2 in. long; leaflets membranous, green, with a few obscure adpressed hairs above, grey with dense thin hairs beneath; end one roundish, obtuse or cuspidate, 6-9 in. long, rarely faintly lobed. Racemes close, simple, 6-9 in. long. Calyx 1/4 in. long, densely silky; teeth lanceolate. Corolla reddish, half as long again as the calyx; standard 1/3 in. broad, distinctly spurred. Pod 4-5 in. by 1/4-1/2 in., flat, straight, membranous, 8-12-seeded.


**Purn and Martaban, Kurz.**  
A perennial, 2-4 ft. high, with subterete branches, tomentose when young. **Leaflets**
chartaceous, thinly clothed with adpressed hairs on both sides; end one ovate acute; 2–3 in. long. **Racemes** canescent, axillary and forming a terminal panicle; fruit-pedicels \( \frac{1}{4} \) in.; bracts small, subulate, persistent. **Calyx** 1 in., puberulous. **Corolla** unknown. **Pod** linear, 1–1\( \frac{1}{2} \) in. by \( \frac{1}{4} \) in., flat, pale.—I have seen no specimens.


**PEGU, Kurz.**

Perennial, the obtuse angles of the branches beset with retrorse adpressed hairs. **Leaflets** chartaceous, furnished, especially below, with sparse adpressed hairs; end one ovate or ovate-lanceolate, 2\( \frac{1}{2} \)-3\( \frac{1}{2} \) in. long. **Racemes** axillary, densely pilose, usually 2–3-nate; bracts caducous; fruit-pedicels \( \frac{1}{12} \) in. **Corolla** unknown. **Pod** linear-oblong, \( \frac{2}{4} \)–1 in. by \( \frac{1}{2} \) in., flat, slightly torulose.—I have seen no specimens.

9. **P. brachycarpa**, **Kurz** in Journ. Asiat. Soc. Beng. xlii. 2, 243; xliii. 2, 185; herbaceous, twining or diffuse, pedicels as long as the calyx, calyx very small, pod with a few adpressed hairs 5–6-seeded.

**PEGU, Kurz.**

A perennial, with long branches, clothed on the acute angles with retrorse hairs. **Stipules** small, lanceolate acuminate; leaflets chartaceous, with scattered adpressed hairs on both surfaces; end one ovate or ovate-lanceolate, 1\( \frac{1}{2} \)-2 in. long. **Racemes** 1–2, stiff, axillary, pilose; bracts minute, subulate, persistent. **Calyx** \( \frac{1}{12} \) in., pubescent. **Corolla** unknown. **Pod** linear-oblong, 1 in. by \( \frac{1}{2} \) in., pale, compressed, torulose.—I have seen no specimens.

**SUBGEN. 3. Schizophyllon.** **Leaflets** usually deeply lobed, contemparaneous with the flowers. **Pod** \( \frac{2}{4} \) in. broad, rather turgid, recurved at the tip, 10–15-seeded.


**EAST HIMALAYAS,** tropical region; **ASSAM,** Sikkim, Khasia, Sylhet, Chittagong, Birma, Pegu, Tenasserim, Penang and Malacca.—**Distrib.** China, Malay isles.

**Stems** wide-twinning, often scarcely woody, clothed with dense spreading brown hairs. **Stipules** small, lanceolate, besifixed; leaflets membranous, green above, thinly clothed with adpressed bristly hairs, grey and densely matted beneath; end one very variable in size and shape, roundish, broad ovate or rhomboidal, entire or shallowly or deeply 3-lobed, 3–6 in. long. **Flowers** fascicled in copious long-peduncled racemes; pedicels very short; bracts and bracteoles lanceolate, strongly nerves, like those of *Shuteria*, the latter subsinist. **Calyx** \( \frac{1}{4} \)-\( \frac{3}{8} \) in. long, densely clothed with adpressed bristly hairs; lowest tooth lanceolate, as long as tube, others shorter, all sinistre at the tip. **Corolla** reddish, twice the calyx; blade of standard roundish, distinctly spurred. **Pod** glabrescent, 3–4 in. long.—**N. SERICANS,** **Miq. Flor. Ind.** Bat. i. 218, is a form with thin adpressed pubescence and large entire leaflets.

**VAR. javanicus**, **Benth. (sp.);** leaflets small thick entire obtuse densely pubescent, end one nearly as broad as long with a deltoid base. Pueraria javanica, **Benth. in Journ. Linn. Soc.** ix. 125. Neustanthus javanicus, **Benth. Pl. Jungh.** 235; **Miq. Pl. Ind.** Bat. i. 218, t. 4 B. Pachyrhizus mollis, **Hassk. Cat. Bogor.** 280.—Khasia and Malacca.
73. PHASEOLUS, Linn.

Twiners, usually herbaceous, with 3-foliolate stipulate leaves. Flowers in copious axillary racemes; bracteoles usually conspicuous and persistent. Calyx campanulate, the lowest tooth usually longer than the rest and the two uppermost subconnate. Corolla much exerted, the keel prolonged into a very long beak which forms a complete, or in § Dysolobium, nearly complete, spiral. Stamens diadelphous; anthers uniform. Ovary sessile, many-ovuled; style filiform, twisted round with the keel, conspicuously bearded down the side below the very oblique stigma. Pod linear, rarely oblong, suberect or subcompressed, more or less distinctly septate between the seeds.—Distrib. Species about 60, mostly tropical, many widely cultivated, especially in America.

Subgen. 1. Phaseolus proper. Stipules small, basifixed. Pods \( \frac{1}{2}-\frac{3}{2} \) in. broad, subcompressed. Keel prolonged into a complete spiral.

1. P. lunatus, Linn.; DC. Prodr. ii. 393; twining, racemes lax short-peduncled many-flowered, pedicels longer than the calyx, corolla small greenish-yellow, bracteoles minute, pod recurved oblong 2-4-seeded. Roxb. Fl. Ind. iii. 287; W. & A. Prodr. 244. P. vulgaris, Wall. Cat. 5595, non Linn.

Everywhere cultivated, probably a native of America.—Distrib. Everywhere in the tropics. A tall biennial, with stems at first minutely downy, soon glabrescent, easily distinguished from all the other species by the shape of the pod, which is 2-3 in. by \( \frac{1}{2}-\frac{3}{2} \) in., less turgid than in any of the others, with the upper suture recurved and the lower broadly rounded. Racemes reach \( \frac{1}{4} \) ft. long, the lower fascicles distant, with 2-4-flowers to a node; pedicels finally \( \frac{1}{4}-\frac{1}{4} \) in. long. Calyx \( \frac{1}{2} \) in.; teeth all very short. Corolla 3-4 times the calyx. Seeds large, very variable in colour.—P. inamoenus, Linn., Xzaresii, Zucc., PUBERULUS, H.B.K., and TUNKINENSIS, Lour., are cultivated varieties.

2. P. vulgaris, Linn.; DC. Prodr. ii. 392; suberect or twining, racemes lax subsessile few-flowered, pedicels longer than the calyx, corolla middle-sized white or lilac-purple, bracteoles often exceeding the calyx, pods linear recurved 4-6-seeded. Roxb. Fl. Ind. iii. 287; W. & A. Prodr. 243, non Wall. P. nanus, Linn.; DC.; Roxb.; W. & A. loc. cit. P. compressus, oblongus, saponaceus, tumidus, hematocarpus, sphaericus and gonospermus, DC. loc. cit.

Universally cultivated, but not anywhere clearly known as a wild plant.—Distrib. Spread everywhere, both in tropical and temperate regions. A subglabrous annual. Stems low and suberect (P. nanus, Linn.) or twining to a height of 6-10 ft. (P. vulgaris, Linn.). Racemes much shorter than the leaves; pedicels finally \( \frac{1}{2}-\frac{3}{2} \) in. long; bracteoles ovate or roundish, persistent. Pod 4-6 in. by \( \frac{1}{2} \) in., glabrous, rostrate, turgid.—The Scarlet Runner, P. MULTIFLORUS, Willd.; DC. Prodr. ii. 392; W. & A. Prodr. 244; P. cocineus, Lam., differs by its bright scarlet casually white flowers, arranged in long racemes which often overtop the leaves.

Spread in the plains from the Himalayas to Ceylon, not cultivated.—Distrib. Cosmopolitan in the Tropics.


**Subgen. 2. Macroptilium.** Connects § 1 and 3, agreeing with the former in its basifixed stipules and with the latter in its narrow turgid pods.


**Birma;** Promile hills, Wallich.

*Stems* very slender, annual? at first minutely puberulent. *Stipules* not more than 1/16 in.; leaflets membranous, glabrous, the end one ovate, acute, entire, 2-3 in. long. *Racemes* 5-6-flowered; lower pedicels shorter than the calyx. *Calyx* glabrous, 1/2 in. *Corolla* 3 times the calyx, reddish. *Pod* unknown, so that its position is doubtful.


Copiously twining, with slender woody branches. *Stipules* as in the last; leaflets quite glabrous on both sides, the end one ovate acute, 2-3 in. long, rather deltoid at the base. *Racemes* 2-4 in. long; peduncles about as long as the leaves; pedicels gminate; the lower finally as long as the calyx. *Calyx* glabrous, 1/8 in. *Corolla* reddish, 3-4 times the calyx. *Pod* linear, glabrous, rather recurved, many-seeded, 2 1/2-3 in. by 1/8 in.


Spread through the **Western Peninsula and Ceylon**, but probably not wild.—Distrib. Trop. America, Malay.

*Stems* tall, suberect and shrubby in the lower part, quite terete. *Stipules* 1/4-3/8 in. long; leaflets entire, membranous, soon glabrescent, thicker than in most of the species, the end one ovate, entire, acute or subobtuse, 2-3 in. long, usually deltoid at the base. *Peduncles* reaching a foot and racemes half a foot long; pedicels very short, gminate. *Calyx* under 1/4 in. long, split open by the pod. *Corolla* deep purple and white, 3-4 times the calyx. *Pod* 3-4 in. by 1/8 in., glabrous, rather recurved, many-seeded.


7. **P. trilobus**, *Ait. Hort. Kew*, iii. 30; stems slender diffuse glabrous or slightly hairy, stipules oblong, leaflets more or less deeply 3-lobed with the central division spathulate, racemes capitate, bracteoles ovate, flowers minute. *Roxb. Fl. Ind.* iii. 298; *Wall. Cat.* 5588 A-K.; W. & A. *Prodr.* 246; *Wight*
Himalayas to Ceylon and Birma, wild and commonly cultivated, ascending to 7000 ft. in the north-west.—Distrib. Afghanistan, Malay isles, Nubia, Abyssinia.

Perennial or annual. Stems trailing to a length of 1–2 feet, glabrous or furnished with a few deciduous spreading hairs. Stipules ½–2 in., attached near the base; leaflets membranous, glabrous, or with only a few obscure loose or short hairs, rhomboid or ovate, 1–2 in. long, very rarely entire (var. oxalideus, Grah., P. cornutus, Blume), usually shallowly lobed in the annual cultivated, deeply lobed in the perennial wild form, the central divisions broad, spoon-shaped, obtuse. Flowers in a close, deltoid head, on a peduncle that usually overlots the leaves; pedicels very short. Calyx campanulate, ½–1 ½ in., pale yellow; teeth deltoid. Corolla under ¾ in. long. Pod 1–2 in. by ½ in., subcylindrical, glabrous, recurved, 6–12 seeded.


Himalayas to Ceylon, tropical region, up to 4000 ft. in the north-west.

Closely allied to the last, with which it agrees in flowers and general habit. Stems more copiously clothed with loose deflexed fine brownish hairs. Stipules much smaller and narrower. Peduncles hairy, like the stems; bracteoles twice as long as the calyx, their setaceous ciliated tips protruding beyond the buds. Pods rather stouter than in P. trilobus and seeds larger.

9. P. grandis, Dalz. & Gibbs. Bomb. Fl. 72, non Wall. Cat. 5602; stems stout suberect, stipules very large obovate, leaflets obovate entire or distinctly lobed, racemes close, bracteoles enclosing the calyx and corolla, corolla middle-sized.

Concan, on the highest ghatsof Bombay, Stocks, Dalzell.

Stems as robust as in the Common Bean, 2–4 ft. high, clothed with adpressed deciduous blackish bristles. Stipules persistent, ciliated, obovate-spathulate, 1–2 in. long, attached a little above the corolate base; leaflets rather fleshy, 3–4 in. long, clothed with short deciduous firm grey bristles, deltoid or rather rounded at the base, lobed only in the upper half. Racemes copious, on short or long suberect densely bristly peduncles; bracteoles nerved, obovate-oblong, ¾–1 ¾ in. long. Calyx ½ in.; teeth lanceolate. Pod 2–3 in. long, at first densely bristly.

10. P. pauciflorus, Dalz. in Kew Journ. iii. 209; stems very slender twining subglabrous, stipules minute lanceolate, leaflets membranous entire or faintly lobed, racemes capitate, bracteoles linear, flowers minute, pod glabrous, Dalz. & Gibbs. Bomb. Fl. 72.

Southern Concan, common, Dalzell, Stocks.

Stems very slender, climbing, quite glabrous when mature. Stipules ¼ in.; leaflets ovate, acute, 1¾–2 in. long, green above, paler beneath. Flowers 2–4, at the end of a slender peduncle about as long as the leaves; bracteoles twice as long as the calyx; pedicels shorter than the calyx. Calyx not more than ⅓ in.; teeth shorter than the lowest lanceolate. Corolla ¼ in., pale yellow. Pod 1½–2 in. by ⅛ in., subcylindrical, slightly recurved, 6–10 seeded.

P. trilobatus, Wall. Cat. 5598 C, from the estuary of the Irrawaddi, is closely allied to this, but at present is known only in the flowering state. It has firmer leaves, thinly clothed with adpressed grey bristles, 6–12-flowered short-peduncled racemes not closely capitate, and lanceolate bracteoles not longer than the calyx.
11. **P. Mungo**, Linn.; DC. Prodr. ii. 395; stems suberect or flexuose more or less densely clothed with loose deflexed hairs, stipules ovate, leaflets membranous entire, rarely faintly lobed, racemes capitate, bracteoles ovate or lanceolate, flowers middle-sized, pod clothed with long spreading deciduous silky hairs. Roxb. Fl. Ind. iii. 292 (seeds green); Wall. Cat. 5589 (in greater part); W. & A. Prodr. 245. P. Max, Roxb. Hort. Beng. 55; Fl. Ind. iii. 295 (seeds black); Wall. Cat. 5606. P. aureus, Ham. in Wall. Cat. 5500 (seeds yellow). P. hirtus, Retz. Obs. iii. 63, non Wall.

Wild and universally cultivated in the plains throughout our limits in a large number of forms, ascending to 6000 ft. in the N.W. Himalayas.—Distr. Spread through tropics of Old World.

Stems annual, suberect in the typical form, 1-2 ft. high, copiously branched from the base, clothed with fine long deciduous brownish silky hairs. Stipules \(\frac{1}{4}-\frac{1}{2}\) in. long, attached near the base; leaflets membranous, with scattered adpressed hairs on both sides, 2-4 in. long, roundish, acute or subobtuse, deltoid or rather rounded at the base. Flowers about half a dozen at the very end of short peduncles, clothed like the stems; pedicles very short. Calyx \(\frac{1}{4}-\frac{1}{3}\) in.; lower tooth deltoid or lanceolate. Corolla \(\frac{3}{4}-\frac{1}{2}\) in., yellow. Pod \(\frac{1}{2}-\frac{1}{2}\) in. long by \(\frac{1}{4}\) to \(\frac{1}{2}\) in., subcylindrical, slightly recurved, 10-16-seeded.


**Var. 2. Wightianus**, Grah. in Wall. Cat. 5591 (sp.); stems elongated slender flexuose finely hairy, the hairs short and grey, leaflets thinner. P. Wightii, W. & A. Prodr. 245. P. subvolubilis, Ham. in Wall. Cat. 5605.

**Var. 3. radiatus**, Linn. (sp.); stems elongated twining densely clothed, as are the peduncles and pod with long ferruginous deflexed silky hairs, leaflets firmer than in the last, similar to those of the type. Roxb. Fl. Ind. iii. 296; Wall. Cat. 5592; DC. Prodr., ii. 395. P. Roxburghii, W. & A. Prodr. 246. P. Mungo, Wall. Cat. 5589, *ex parte*. P. setulosus, Dalz. in Kew Journ. ii. 33; Dalz. & Gibbs. Bomb. Fl. 72. Vigna opisotricha, A. Rich. Fl. Abyss. i. 220.

12. **P. trinervius**, Heyne in Wall. Cat. 5603; stems twining densely clothed with deflexed ferruginous hairs, stipules middle-sized oblong, leaflets entire or faintly lobed persistently pilose on both surfaces, racemes close, bracteoles oblong-lanceolate, pod at first densely silky. W. & A. Prodr. 245; Dalz. & Gibbs. Bomb. Fl. 71. P. farinosus, Linn.; DC. Prodr. ii. 395?

Plains of **Western Peninsular** and **Ceylon**, ascending to 4000 ft.—**Distr. Malaya.**

Perennial. Stems copiously twining, never suberect. Stipules like those of *P. Mungo*, but apparently attached higher up. Leaflets thicker in texture, often distinctly lobed, ovate, acute, 2-4 in. long, dark green, sooty, with adpressed grey bristly hairs above, still more hairy beneath. Flowers 6-12, on long downy peduncles, the raceme finally 1-2 in. long; pedicles very short. Calyx \(\frac{1}{4}\) in.; teeth deltoid. Corolla 3-4 times the calyx, yellow or reddish. Pod 2-2\(\frac{1}{2}\) in. long, 10-12-seeded, slightly recurved.—Closely allied to *P. Mungo*, var. radiatus, and probably a fourth variety of that species.


**Himalayas to Ceylon**, in the tropical zone, both wild and commonly cultivated, ascending to 5000 ft. in **Khasia.**—**Distr. Malaya.**
Closely allied to *P. Mungo*, and equally variable in general habit. Hairs of the stems short, but spreading, not ferruginous. *Stipules* much smaller and narrower; leaflets membranous, subglabrous, 2–4 in. long, the end one broad-ovate, acute. *Flowers* 10–20, the lower pedicels as long as the calyx, and the raceme finally 2–3 in. long. Calyx ½ in.; teeth short, deltoid. Corolla ½ in., yellow. Pod 2½–3 in. by ¾–½ in., not so cylindrical as in *P. Mungo*, 8–12-seeded, *glabrous* from the beginning, considerably recurved.—*P. torosus*, Roxb. *Pl. Ind*. iii. 298, is probably a cultivated form, with short sub erect stems and sub sessile congested racemes.

**Subgen. 4. Dysolobium.** Stipules small, basifixed, caducous. Pod linear, sub terete, densely velvety or bristly. *Wings* distinctly shorter than the other petals. Keel prolonged into a long incurved beak but not forming a complete spiral.—Connects *Phaseolus* and *Vigna*.


BIRMA; Prome hills, Wallach.

Stems firm, wide-twining, with many grooves. Leaflets membranous, dull green, thinly pubescent above, grey-green, more densely downy beneath, always entire, rounded at the base, narrowed gradually to a point, the end one 3–4 in. long. Peduncles 1–1½ in. long. Racemes 2–3 in. long, copious, much shorter than the leaves; pedicels geminate, spreading, ½–¾ in. Calyx under ¼ in., sub glabrous, very gibbous, with a few long deciduous bristles; teeth ciliated, the lowest lanceolate, shorter than the tube. Corolla ½ in.; standard ½ in. broad, yellowish with red-brown lines externally; keel and wings yellow. Pod linear, 2–3 in. by ½–¾ in., brown, clothed with spreading brownish hairs, many-seeded.


EAST HIMALAYAS, tropical zone; NIPAL, ASSAM, CHITTAGONG. Ava, Moulmein, Pegu.

A woody climber, with very large leaves and flowers, by far the most showy of all the species. Stems terete, minutely pubescent. Leaflets thin, but flexible, full green, sub scabrous at first above, paler green beneath, with copious obscure bristly hairs, broadly rounded at the base, 6–9 in. long. Racemes and woody terete peduncles reaching each 6–9 in. long; pedicels ¼–½ in.; bracteoles roundish, minute, adpressed to the calyx. Calyx ½ in., finely silky; lowest tooth lanceolate, shorter than of the tube, the others much shorter still. Corolla reddish, more than twice as long as the calyx; standard 1 in. broad. Pod almost woody, sub cylindrical, straight, ½–3 ft. by 2½ in., deeply channelled both sutures, densely brown velvety.

74. **VIGNA**, Savi.

Twining herbs or shrubs, with exactly the habit of *Phaseolus*, from which they differ by having the style and keel much less curved and lengthened out. Calyx campanulate; teeth long or short, the upper often connate. Corolla much exserted; keel truncate or in § *Plectrotropis* prolonged into an ascending or slightly recurved beak. Stamens diadelphous; anthers uniform. Ovary sessile, many-ovuled; style long, filiform, bearded along the inner face below the oblique stigma. Pod linear, subterete, subseptate.—DISTR. Species 40–50, mostly tropical, one widely cultivated.
VOANDEZIA SUBTERRANE,A. Thouars; DC. Prodr. ii. 474, which is allied to *Vigna*, but may be easily known by its 1-2 ovulate ovary, which, by the torsion of the peduncle is thrust below the soil to ripen, and becomes a tuber-like pod, is occasionally cultivated, but less frequently than in Tropical Africa. Its native country is not clearly known.

**Subgen. 1. Vigna proper.** Keel not prolonged into a beak.

1. *V. repens*, Baker; stems trailing very slender, stipules minute lanceolate basifixed, leaflets membranous entire acute, flowers 1-2 together on very short geminate peduncles. Phaseolus repens, Grah. in Wall. Cat. 5608.

**Birma.** near Prome, Wallich.

*Stems* herbaceous, wide-creeping, glabrous. *Leaflets* firm, glabrous; the end one ovate, acute, 2-3 in. long. *Pedicels* very short, pubescent. *Calyx* ½ in., slightly downy; teeth lancetolate-deltoid, shorter than the tube. *Corolla* reddish, 3 times the length of the calyx. *Pod* unknown.


*Stems* wide-trailing, perennial, much stouter than in the last. *Leaflets* glabrous, with a subdeltoid base, the end one 2-3 in. long. *Pedicels* equaling or exceeding the leaves. *Flowers* 6-20, in a close raceme. *Calyx* campanulate, subglabrous, ½ in.; teeth deltoid. *Corolla* yellow, 3-4 times the calyx. *Pod* 2-3 in. by ⅔ in., quite glabrous from an early stage, subtorulose, 4-6-seeded.


**Bengal;** Sunderbunds, Roxburgh, G. Thomson. **Ceylon, Thwaites.** Pegu, Kurz.—Distr. Cosmopolitan in tropics, Cape.

A trailing or twining perennial. *Leaflets* glabrous, or with a few spreading grey silky hairs, narrowed gradually to a point, always entire, the end one 2-3 in. long. *Flowers* 12-20, on peduncles equaling or exceeding the leaves; pedicels slightly downy, finally as long as the calyx; bracts and bracteoles very minute. *Calyx* ½ in., subglabrous; lower tooth lancetolate, as long as the tube, the others deltoid. *Corolla* 3-4 times the calyx. *Pod* glabrescent, recurved, 2-4 in. by ½ in., 6-12-seeded.


Native and universally cultivated in the tropical zone.—Distr. Tropics of old world.
Low and suberect (*V. Catianang*) or tall and voluble (*V. sinensis*), always glabrous or nearly so. *Stipules* $\frac{1}{2}-\frac{3}{4}$ in. long, attached and persistent as in *Phaseolus* $\frac{1}{2}$ *Strophostyles*; leaflets membranous, 3–6 in. long, acute, very variable in shape, broad or narrow ovate, or ovate-ribbonoidal, with the two sides below the middle prolonged into obtuse lobes. *Peduncules* often exceeding the leaves, 3–6-flowered; pedicels very short. *Calyx* glabrous, under $\frac{1}{2}$ in.; teeth lanceolate or deltoid-cuspidate. *Corolla* yellow or reddish, twice the calyx. Pod in some of the cultivated forms 1 or even 2 feet long; under $\frac{1}{2}$ in. broad, edible; seeds 10 to 20.

**Subgen. 2. Plectrotropis.** Keel prolonged into a distinct beak, so that this group connects *Vigna* proper with *Phaseolus*.


Himalayas, from Simla to Kumaon and Kasia, ascending to 8000 ft.; Hills of **West Peninsula and Ceylon.—Distribution.** Cosmopolitan in tropics. Cape, Australia.

*Bodt* fusiform, perennial. Stems wide-twinning, glabrescent when mature. *Stipules* $\frac{1}{2}-\frac{3}{4}$ in., lanceolate, basifixed; leaflets with few or copious adpressed, brownish or grey hairs, varying in shape from broad ovate to lanceolate, 2–6 in. long, always acute, the base rounded. *Peduncules* $\frac{1}{2}$–1 ft.; bracteoles setaceous. *Calyx* $\frac{1}{2}–\frac{3}{4}$ in., silky; teeth linear-lanceolate, as long as the tube. *Corolla* reddish-purple. 1 in. or more long; standard 1–1½ in. broad. Pod 3–4 in. by $\frac{1}{2}$ in., thinly silky at first, 10–15-seeded.


6. **V. brachycarpa**, Kurz in Journ. Asiat. Soc. Beng. xliii. 2, 185; stems herbaceous slightly hairy, leaflets chartaceous linear or lanceolate-deltoid acuminate, flowers few crowded at the end of long peduncles, corolla small, pod linear-oblong with a few long hairs.

**Arracan, Kurz.**

A perennical climber, with filiform stems. *Stipules* $\frac{1}{2}$–$\frac{3}{4}$ in., linear-oblong, peltate; petiole 1–1½ in., pilose; leaflets 1–2 in., thinly hairy on both sides. *Peduncules* equaling or exceeding petioles; pedicels very short. *Calyx* glabrous, $\frac{1}{2}$ in.; teeth broad, short, acute. *Corolla* yellow, $\frac{1}{2}$ in. Pod 1 in. by $\frac{1}{2}$ in., stiff, compressed, black, many-seeded. I have seen no specimens.


**Carnatic; Courtallum, Wight, Thomson.**

A slender twiner, with slender sulcate glabrescent stems. *Stipules* minute, lanceolate, basifixed, caducous; leaflets glabrescent above, thinly silky below, 2–3 in. long. *Peduncules* reach 6–9 in.; pedicels very short; bracteoles minute, setaceous. *Calyx* $\frac{3}{4}$ in., finely downy; lower teeth linear, nearly as long as the tube. *Corolla* reddish, $\frac{1}{2}$ in. long; standard roundish, emarginate, $\frac{1}{2}$ in. broad. *Pod* not known.

8. **V. dolichooides**, Baker; stems woody with short adpressed grey hairs, leaflets subcoriaceous roundish cupulate with copious adpressed bristly hairs, racemes many-flowered short-peduncled, corolla middle-sized, pod stout clothed with dense firm spreading grey silky hairs. *Phaseolus* dolicho-

**East Himalayas, tropical zone; Silhet, Khasia and Assam.**—**Distrib. Java.**

*Stems* wide-twining, clothed densely with persistent rather bristly pale brown hairs. *Stipules* lanceolate, minute; leaflets always entire, as broad as long, flexible, 4-6 in. long, densely clothed, especially below, with short bristly hairs. *Racemes* 2-3 in., conical in bud, sometimes nearly sessile; pedicels shorter than the calyx; bracteoles minute, lanceolate. *Corolla* reddish, 3-4 times the calyx. *Pod* 2-3 in. by ½ in., firm, cylindrical, 5-6-seeded, the very dense spreading velvety hairs persistent.


**East Himalayas, tropical zone; Assam, Nipal, Sikkim, Prome, Western Peninsula and Orissa.**

*Branches* very slender, but firm, glabrescent. *Stipules* minute, lanceolate, caducous; leaflets usually twice as long as broad, narrowed gradually to a point, 4-6 in. long, thin, but firm, both sides subscabrous. *Racemes* 2-3 in. long, much shorter than the leaves; pedicels finally ½ in.; bracts and bracteoles minute. *Corolla* ⅔ in., thinly silky, oblique; lower tooth lanceolate, as long as the tube. *Corolla* reddish, twice the calyx. *Pod* 4-5 in. by under ⅓ in., beaked, rather recurved, 8-12-seeded, the short fine brown hairs spreading and persistent.


**Tavoy, Gomez.**

A wide-climbing perennial, with only the youngest branches clothed with a few adpressed grey hairs. *Leaflets* green on both sides, rounded at the base, narrowed gradually to a point, 4-6 in. long; stipules minute, lanceolate, caducous. *Racemes* and peduncles each 2-3 in. long; pedicels very short; bracteoles minute, ovate, *Corolla* ⅔ in. long, nearly glabrous; lower tooth lanceolate, shorter than the tube. *Corolla* reddish, 3 times the calyx. *Pod* beaked, many-seeded.

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### 75. **PACHYRHIZUS**, Rich.

Wide-climbing herbs. *Leaves* pinnately 3-foliolate with stipellate lobed leaflets. *Racemes* long, with tumid nodes and fascicled pedicels; bracts and bracteoles seaceous, caducous. *Corolla* 2-lipped, the limb as long as the tube, the upper lip emarginate, the lower deeply 3-toothed. *Corolla* much exerted, the petals subequal; keel obtuse. *Stamens* diadelphous; anthers uniform. *Ovary* subsessile, many-ovuled; style long, circinate at the apex, bearded down the inner side below the very oblique stigma. *Pod* large, linear; turgid, deeply depressed between the seeds.—**Distrib.** Species 2 or 3, the others Mexican and Angolan.

Cultivated throughout our limits, but not known in a wild state.—Distrib. everywhere in the tropics.

Root a large tuber, like a turnip, which is eaten both raw and boiled. Stems wide-twining, suffruticose, clothed with short deciduous pubescence. Leaflets large, membranous, glabrous, as broad as long, deeply or shallowly lobed in the upper half, the base deltoid. Racemes lax, \( \frac{1}{4} - 1 \) ft., the lower nodes often prolonged into short branches; bracteoles setaceous. Calyx \( \frac{1}{4} \) in., as long as the pedicel. Corolla reddish, 1 in. or more long. Pod 6-9 in. long, 8-12-seeded, straight, glabrous.

76. CLITORIA, Linn.

Scandent or suberect undershrubs, with the most showy flowers of all the Phaseoleae, 3-7-foliolate leaves, stipellate leaflets and persistent membranous small stipules and bracts and large bracteoles. Calyx membranous, tubular; teeth deltoid or lanceolate. Corolla much exerted; standard spoon-shaped, very large; wings and incurved keel much shorter. Stamens monadelphous or diadelphous; anthers uniform. Ovary stalked, many-ovuled; style incurved, flattened, bearded along the inner side. Pod linear, flattish or turgid.—Distrib. Species 27, in tropics of old and new world, mostly the latter.

Subgen. 1. Ternatea. Pod flattish, the valves not keeled on the face.


Tropical zone from the Himalayas to Ceylon, Burma, and Malacca.—Distrib. Cosmopolitan in the tropics, common in cultivation.

A climber, with slender downy stems. Stipules minute, linear; petiole \( \frac{1}{4} - 1 \) in.; leaflets ovate or oblong, obtuse, subcoriaceous, 1-2 in. long. Bracteoles roundish, obtuse, \( \frac{1}{4} - \frac{3}{4} \) in. long. Calyx \( \frac{1}{4} - \frac{3}{4} \) in.; teeth lanceolate, half as long as the tube. Corolla \( \frac{3}{4} - 2 \) in.; standard 1 in. broad, bright blue, with an orange centre. Pod 2-4 in. long, 6-10-seeded.

Var. 1. pilosula, Wall. Cat. 5347 (sp.); leaflets and flowers much smaller, the former \( \frac{1}{4} - \frac{2}{3} \) in. long, standard white an inch long.—Guzerat, Stocks.

2. C. biflora, Dalz. in Kew Journ. ii. 35; stems suberect angular, petioles very short, leaflets 5, flowers geminate, bracteoles large. Dalz. & Gibbs. Bomb. Pl. 68.

In the Concan, common; Dalzell, Stocks, Law.

Scarcely shrubby, the young branches densely pubescent. Stipules minute, lanceolate; petiole \( \frac{1}{4} - \frac{3}{4} \) in.; leaflets membranous, 2-3 in. long, ovate or oblong, usually acute. Flowers copious, scarcely peduncled; bracteoles \( \frac{1}{4} - \frac{3}{4} \) in., ovate or lanceolate aristate. Calyx \( \frac{1}{4} - \frac{3}{4} \) in.; teeth shorter than the tube, lanceolate, aristate. Corolla like that of the last, but much smaller. Pod 1-2 in. long, firm, 5-6-seeded.


Khasia, temperate region, alt. 5-6000 ft., Hook. fil. & Thomson, Lobb. Tavoy, Wallisich. Distrib. Mexico, United States.

Stems slender, terete, glabrous. Stipules lanceolate, \( \frac{1}{4} - \frac{3}{4} \) in.; petiole \( \frac{1}{4} - 2 \) in.; leaflets membranous, glabrous, ovate, pale beneath, 2-4 in. long, acute or subobtuse. Peduncles \( \frac{1}{4} - 2 \) in., with a pair of minute lanceolate bracts at the apex; bracteoles lan-
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Clitoria.] L. LEGUMINOSE. (J. G. Baker.)

colate, $\frac{1}{4}-\frac{1}{2}$ in. Calyx $\frac{3}{4}$-$\frac{1}{2}$ in. Standard pale blue, 2 in. by $\frac{1}{4}$ in. Pod more turgid than in the two preceding.


**Martaban, Parish. Tenasserim, Helfer. Burma, Wallach.**

Similar to the last in general habit, bracteoles and corolla. Petiole 2–3 in.; leaflets subcoriaceous, glabrous, oblong or obovate-oblong, 3–5 in. long, grey beneath. Calyx $\frac{3}{4}$ in. long, veined like the stipules bracts and bracteoles; teeth lanceolate, acuminate. Pod 2 in. long, flattish, 6–8-seeded.

**SUBGEN. 2. Neurocarpum.** Pod turgid, with a rip along the face of the valves.


**Malacca and Singapore, G. Thomson, Griffith, &c.—Distrib. Java, Trop. America.**

A suberect undershrub, with terete pilose branches. Leaflets 3, obovate or oblanceolate, subcoriaceous, 2–5 in. long, obtuse, grey-canescence beneath; petiole scarcely any. Flowers usually 2, distinctly peduncled; bracteoles small, ovate or lanceolate. Calyx $\frac{3}{4}$ in.; teeth much shorter than the tube. Corolla pale violet, twice the calyx or more; standard $\frac{1}{4}$ in. broad.

77. **DOLICHOS, Linn.**

Twining herbs, with stipellate 3-foliolate leaves and minute subpersistent bracts bracteoles and stipules. Flowers racemose or axillary. Calyx-tube campanulate; teeth long or short. Corolla much exserted; its petals usually equal in length; keel obtuse or rostrate, not spiral. Stamens diadelphous; anthers uniform. Ovary nearly sessile, many-ovuled; style filiform or thickened upwards, bearded down the inner face or round the terminal stigma. Pod flat, linear or oblong, recurved.—Distrib. Species about 20, wide-spread in tropics of both hemispheres.

**SUBGEN. 1. Lablab, Savi.** Style thickened upwards, narrowed to the base, bearded down the inner edge.


Wild and universally cultivated throughout India, ascending in the Himalayas to 6–7000 ft.—Distr. Tropics of the Old World.

Subglabrous, wide-twinning, perennial, or under cultivation annual. Stipules lanceolate, basifixied; leaflets as broad as long, always entire, acute, 2–6 in. long, broad ovate, membranous, rarely downy beneath. Racemes and pedicules each reaching $\frac{3}{4}$ ft. long; pedicels densely fascicled, $\frac{1}{4}$ or finally $\frac{1}{2}$ in.; bracteoles oblong, sometimes as long as the calyx. Calyx $\frac{1}{4}$–$\frac{1}{4}$ in.; teeth short, deltoid. Corolla red.
dish or white, $\frac{1}{2}$–$\frac{3}{4}$ in. Pod 1½–2 in. by $\frac{1}{2}$–$\frac{3}{4}$ in., tipped with the hooked persistent base of the style.—Roxburgh describes fully 13 cultivated varieties.

2. **D. bracteatus**, Baker; flowers large, pedicels exceeding the calyx, keel broad subobtuse, pod linear many-seeded.

Plains of CONCANC, Stocks.
A robust glabrous perennial twiner. **Stipules** $\frac{1}{2}$ in., lanceolate, basifixed; leaflets entire, membranous, glabrous, acute or obtuse, $\frac{1}{2}$–$\frac{3}{4}$ ft. long, and broad, the base deltoid. **Racemes** long-peduncled, reaching a foot or more long; bracts minute, linear-lanceolate, deciduous; pedicels $\frac{1}{4}$–$\frac{3}{4}$ in.; bracteoles firm, oblong or roundish, as long as the calyx. **Calyx** $\frac{1}{4}$ in., glabrous; teeth deltoid, short. **Corolla** reddish, 1 in. long. Pod much recurved, 5–6 in. by $\frac{3}{5}$ in., 10–12-seeded.

**Subgen. 2. Macrotyloma**, W. & A. Style filiform, minutely penicillate round the stigma, not bearded down the edge.—Connects Phaseoleae and Galacieae.


**Himalayas to Ceylon and Birma**, ascending to 3000 ft. in SIKKIM, sometimes cultivated.—**DISTRIBUTION.** Every where in tropics of Old World.

Annual, suberect (D. uniflorus) or lengthened out and twining (D. biflorus), downy, rarely glabrescent. **Stipules** basifixed, $\frac{1}{2}$ in., lanceolate, scarios; leaflets membranous, ovate, acute, 1–2 in. long, at first finely pilose on the faces. **Flowers** 1–3 together, in the axils of the leaves, without a common peduncle. **Calyx** $\frac{1}{4}$ in., downy; teeth lanceolate-setaceous, much exceeding the tube. **Corolla** $\frac{1}{3}$–$\frac{1}{2}$ in. long; keel narrow, obtuse, rather shorter than the standard. Pod 1½–2 in. by $\frac{3}{4}$–$\frac{1}{2}$ in., much recurved, tipped with the persistent style.

4. **D. lanceolatus**, Grah. in Wall. Cat. 5547; leaflets entire, flowers 1–2 on a short common peduncle in the axils of the leaves, calyx-teeth shorter than the tube, corolla reddish.

**Birma;** Prome hills, Wallich.
**Stems** very slender, wide-twinning, with only a few short adpressed hairs. **Stipules** minute, lanceolate; leaflets 1–1½ in. long, moderately firm, oblong, acute, with a few adpressed hairs on both sides, narrowed to a rounded base. **Pedicels** shorter than the calyx; bracteoles ovate, persistent, rather shorter than the calyx. **Calyx** under $\frac{1}{2}$ in., silky. **Corolla** 3 times the calyx; petals subequal; keel distinctly incurved at the tip, subobtuse. **Style** rather thickened upwards, so that it connects the two sections. Pod unknown.


Plains of the **Western Peninsula and Ceylon.**
**Root** tuberous, perennial. **Stems** slender, firm, clothed with short spreading deciduous grey hairs. **Stipules** small, nervose, lanceolate, basifixed; leaflets oblong, rounded at the base, 1–3 in. long, with only a few adpressed hairs at first on the faces. **Pedicels** shorter than the calyx; bracteoles minute, ovate, nervous, persistent. **Calyx** under $\frac{1}{4}$ in.; lower teeth lanceolate-setaceous. **Corolla** $\frac{1}{2}$ in.; standard as in Clitoria, much
exceeding the wings and keel. *Pod* 1–1½ in. by ½ in., tipped with the hooked base of the style.


Himalayas, from Kumaoon to Khasia, ascending to 7500 ft. Plains of Western Peninsula and Ceylon.

Root tuberous, perennial. Stems wide-twining, very slender, pilose or glabrescent. *Stipules* small, lanceolate, reflexed, persistent; leaflets membranous, 1–3 in. long, ovate, acute, entire or obtuse, 3-lobed, finely pilose on the faces, ornavbar glabrescent. *Peduncles* 1–2 in. long, sometimes scarcely any; pedicels ½–1 in. Calyx glabrous, under ¾ in.; teeth very short. *Corolla* twice the calyx, its petals nearly equal in length; keel broad, obtuse. *Pod* subuplicate, 2–3 in. by ½ in., slightly recurved.

**DOUBTFUL SPECIES.**

*D. subcarnosus*, *W. & A. Prodr.* 249, is a plant from the Western Peninsula, of which the flower is unknown and of which the place is therefore doubtful. It has small ovate acute entire leaflets, many-flowered distinctly-peduncled racemes, and a narrow linear nearly straight glabrous many-seeded pod 3–4 in. long.

*D. subequalis*, *Grah. in Wall. Cat.* 5539, is another doubtful plant, of which the flower is unknown, gathered by Wallich in Ava, which has been referred through some confusion to *Psophocarpus palustris*, from which it totally differs. It has slender terete woody suberect stems, with short deflexed deciduous grey pubescence, caducous stipules, membranous stipellate leaflets with a few adpressed bristly hairs on both sides, the end one oblong subobtuse or cuspidate 4–5 in. long, many-flowered short-peduncled racemes and a 2–3-seeded ligulate flatish pod ¾–1 in. by ¼ in., thinly clothed with long adpressed grey hairs, faintly depressed between the seeds.

**78. PSOPHOCARPUS, Neck.**

Twining herbs, with large tuberous roots. *Leaves* 3-foliolate, stipellate; stipules fastened above the base. *Flowers* rather large, lilac. Calyx teeth shorter than the tube, the two upper connate. *Corolla* much exserted, the petals equal in length; keel much incurved, but not beaked. *Stamens* monadelphous, the upper free downwards; *Ovary* subuplicate, many-ovuled; style long, much recurved, flattened laterally, densely bearded round the terminal stigmatic. *Pod* square, with a distinct wing to each angle, distinctly separte between the seeds.—Distrib. Species 3–4, all tropical in the Old World.


*Prome* and *Martaban*, Wallich, perhaps only introduced. Cultivated elsewhere.

Root large, annual. Stems weak, wide-twining, glabrous. *Stipules* lanceolate each way from the attachment; leaflets broad, ovate, acute, 3–6 in. long, 2–6 in. broad, glabrous, base subdeltoid. Racemes lax; pedicels ½–1½ ft.; pedicels geminate, as long as the calyx; bracteoles ovate, ½ in. Calyx ¼ in., glabrous; side-teeth oblong; lowest shorter, deltoid. *Pod* ½–1 ft. by 1 in., the wings ¾–¼ in. broad, usually much crisped and toothed.

Cultivated in the tropics of both hemispheres; a native of Africa. 

*Stems* slender, glabrous, firmer than in the last. *Stipules* similar; leaflets broad ovate or roundish, 2-4 in. long, acute, sometimes with two distinct obtuse lobes in the lower half. *Racemes* long-peduncled, 1-3 ft. long, dense upwards; bracteoles oblong, glabrous, quite enveloping the young calyx. *Pod* 2-4 in. long, ½-3 in. broad, including the wings, 4-8-seeded.

We have what may prove a third species from Assam, Masters, with pubescent stems and leaves, entire lanceolate subcoriaceous prominently-veined leaflets 4-5 in. long, short sessile racemes, a straight square 6-8-seeded pod 2-2½ in. long, with much less prominent wings than in the preceding, the faces densely clothed, with persistent firm short spreading grey hairs. Flowers, stipules, and bracteoles unknown.

**79. Atylosia, W. & A.**

Herbs or shrubs, erect or twining. *Leaves* 3-foliolate, sometimes subdigitate, often exstipellate, gland-dotted beneath. *Flowers* axillary or racemose. *Calyx* teeth distinct, longer or shorter than the tube, the lowest the longest. *Corolla* more or less exserted, marcescent or caducous; keel not beaked. *Stamens* dia-delphous; *anthers* uniform. *Ovary* sessile; *ovules* 3 or more; style filiform, incurved, glabrous, stigma capitate. *Pod* linear or oblong, turgid, marked with transverse lines between the seeds, which have a conspicuous divided strophiole.—

**Distrib.** Species about 20, spread from India to Australia and Mauritius. Differs from *Cajan* mainly by its arillate seeds.

**Subgen. 1. Atyla, Bentham.** Petals marcescent, remaining till the pod is developed.

* Erect. *Flowers* in sessile or stalked pairs. *Pod* not distinctly linearate between the seeds.


**Nilghiris** and **Ceylon**, up to 4000 ft.

An erect shrub, with rigid sulcate branches, densely clothed with grey or brownish subpatent hairs. *Stipules* lanceolate, minute, silky, caducous; petioles ½-1 in.; leaflets very thick and coriaceous, almost digitate, 2-3 times as long as broad, shortly pubescent above, the underside with the veins and veinlets in relief, densely clothed with thick grey or brownish silky pubescence, usually obtuse, the end one 1-3 in. long. *Pedicules* rigid, erecto-patent, of the lower pairs of flowers 1-2 in. long, of the upper often suppressed; bracteoles oblong, caducous; pedicels ½-1 in. *Calyx* ½-3 in., densely silky; lowest tooth linear, twice the tube, the others lanceolate. *Corolla* reddish, 1 in. long; limb of standard oblong; keel with a short obtuse beak. *Pod* straight, oblong, 1-1½ in. by ½ in., densely clothed with soft short spreading grey or pale brown silky pubescence.

leaflets orbicular thinly hispid on both surfaces, flowers in stalked pairs, corolla small, pod hispid 5-7-seeded.

**Western India, Dalzell.**

*Branches suberect, flexuose, clothed with spreading fulvous hairs. Petiole 3 in.; leaflets membranous, 3-nerved, pellucido-punctate, with scattered golden glands, 1½-2½ in; stipules acuminate from a broad auricled base. Calyx tomentose; teeth acuminate, twice as long as the tube. Corolla ½ in. long. Pod almost membranous, rounded at both ends, 1-1½ in. by ½ in., its hairs bulbous at the base. Ex Dalz. loc. cit.*


**Hills of the Western Peninsula.**

An erect shrub, with long straight sulcate branchlets, densely clothed with short grey pubescence. *Stipules* minute, setaceous; petiole ½-3 in.; leaflets subcoriaceous, greenish and thinly pilose above, densely shortly grey-downy below, triplinerved, nearly digitate, obtuse, the end one 3½-1½ in. long. *Pedicels* as long as the calyx. *Calyx* ¼-½ in., densely downy; teeth deltoid-cuspidate, the lowest as long as the tube. *Corolla* twice the calyx; keel obtuse. *Pod* oblong, straight, ½-3 in. by ½ in., thinly clothed with fine spreading grey hairs.

4. **A. sericea**, Benth. MSS.; petiole short, leaflets oblanceolate silky on both surfaces especially beneath, pairs of flowers not peduncled, corolla small 3 times the calyx, pod small densely pilose 2-seeded.

**Concan, Stocks, Law, Ritchie.**

An erect shrub, with long straight toretate branches, with many grooves, densely clothed with fine short whitish subpatent silky hairs. *Stipules* setaceous, subpersistent, ¼-½ in.; petiole ½-1 in.; leaflets flexible, moderately thick, subdigitate, 6-8 times as long as broad, subacute, triplinerved, persistently grey-silky, 1-2 in. long. *Pedicels* very short. *Calyx* ½ in., silky; teeth lanceolate, as long as the tube. *Corolla* ⅓ in., red; keel with a short obtuse beak. *Pod* oblong, ⅔ in. long, densely softly persistently grey-downy.

**Twining with flowers in lax peduncled racemes and distinctly lineate pod.**


*Branches* firm, slender, terete, glabrescent. *Petioles* 1-2 in.; leaflets coriaceous, shortly pilose, greenish above, densely persistently grey-downy beneath, finally reticulato-venose, distinctly stipellate, the end one 2-4 in. long, roundish-obovate, euspidate, spathulately narrowed to a rounded base. *Racemes* 2-3 in. long, lax, short-peduncled; pedicels geminate, ¼-³ in.; bracteoles large, roundish, reddish, forming a conspicuous tuft before the racemes expand. *Calyx* ⅔ in., finely grey-downy; lowest tooth lanceolate, as long as the tube. *Corolla* yellow, twice the calyx. *Pod* straight, 1-2 in.
by 3/8 in., 4-9-seeded, rounded at both ends.—Dolichos blandus is an imperfect flowering specimen, without locality, which resembles this closely as far as it goes, but has a much smaller corolla and shorter calyx-teeth.

6. **A. villosa**, Benth. MSS.; branches and leaves below thinly grey-dowry, stipules minute caducous, end-leaflet short-stalked, pod densely clothed with long spreading hairs.

Lower hills of Sikkim, alt. 4000 ft., Hook. fil.

Known only from two flowerless examples, which as far as they go differ from the last principally in the vestiture of the pod. **Leaflets** subcoriaceous, obovate-cuspidate; petiole 3/8 in. **Pedicels** decurved, finally 1/4 in. long. **Pod** 1-1 1/8 in. long, 3/8 in. broad, 5-6-seeded, densely clothed with persistent fine spreading pale brown silky hairs, rounded at both ends, tipped with the persistent pilose base of the style.


**Concan**, near Kulna, in the Warree Country, Stocks, Law, Dalzell.

**Branches** firm, slender, terete, glabrescent. **Stipules** ovate-lanceolate, 3/8-1 3/8 in.; petiole 1-2 in.; leaflets thin, but firm, green on both sides, with a few obscure hairs on the ribs below, scabrous with glands above, the end one obovate-rhomboid cuspidate, 1 1/3-3 in. long; stipelle subulate, persistent. **Racemes** lax, short-peduncled, few-flowered; pedicels 3/8-1 3/8 in.; bracteoles round, enclosing the buds. **Corolla** 1/3 in., finely downy, lowest tooth linear-acuminate, exceeding the tube. **Corolla** half as long again as the calyx. **Pod** 1 1/2 in. by 3/8-1 3/8 in., 5-6-seeded, marked with distinct oblique depressed lines.

8. **A. grandiflora**, Benth. MSS.; branches minutely downy, stipules minute caducous, leaflets membranous glabrous the end one long-stalked, pod clothed with fine spreading silky hairs.


**Branches** terete, firm, slender, glabrescent. **Petioles** 2-3 in.; leaflets thin, green on both sides, minutely hairy on the ribs beneath, the end one obovate-cuspidate, rounded at the base, 3-4 in. long; petiolule 3/8 in. long; stipelle distinct, setaceous. **Racemes** lax, few-flowered; pedicels finally 1 3/8 in., recurved. **Calyx** 3/8-1 3/8 in., finely downy; lowest tooth linear-setaceous, 3-4 times the tube; the others lanceolate. **Corolla** slightly exceeding the calyx. **Pod** 1 1/2-2 in. by 3/8 in., 5-6-seeded.

**Subgen. 2. Cantharospermum**, W. & A. Petals falling before the pod develops.

* Leaflets subdigitate.


**Birma**; Prome and near Zeranghuen, Wallech.

Very like *A. albicans*, with which Wight and Arnott join it, but suberect, not twining. **Branches** slender, woody, terete, grey-canescence. **Petiole** 1 in.; leaflets exstipulate, rigidly coriaceous, 1 in. long, rounded at both ends, thinly grey-canescence above, densely beneath. **Racemes** falling short of the leaves, subcorymbose; pedicels cernuous, 3/8-1 3/8 in. **Calyx** 3/8-1 3/8 in., finely downy; all the teeth deltoid. **Corolla** 4 times as long as the calyx; keel obtuse. **Pod** 1-1 1/2 in. by 3/8 in., distinctly lineate, firm, rounded at both ends.

* Hills of the *Western Peninsula* and *Ceylon*.

*Branchlets* slender, thinly canescent, with many grooves. *Stipules* minute, caducous; petiole 1–2 in.; leaflets 1–2 in. long, densely finely persistently white-canescence beneath, not reticulato-venose, greenish and obscurely canescent above, much narrowed in the lower half, the base subdeltoid, or a little rounded. *Racemes* 4–12-flowered, often corymbose, usually shorter than the leaves; bracts small, round, silvery on the back, caducous; pedicels ¼–½ in. *Calyx* ½–¾ in., thinly canescent; lowest tooth lanceolate, upper oblong or deltoid. *Corolla* 3 times as long as the calyx. *Pod* 1–1½ in. by ¾–½ in., straight, distinctly lineate, narrowed to the base, beaked with the base of the style.


*Nipal*, *Khasia* and *Assam*, ascending to 6000 ft.

*Stems* very slender, wide-twining, clothed with fine spreading grey hairs. *Stipules* minute, caducous; petiole 1–4 in.; leaflets greenish on both sides, paler and inconspicuously pilose on the ribs below, always pointed, 1–1½ in. long, narrowed from the middle to a rather rounded base, exstipellate. *Pedicules* 1–2 in.; pedicels as long as the calyx. *Calyx* ¾–1 in., densely pubescent; lower tooth setaceous, twice the tube, the others similar but shorter. *Corolla* scarcely exceeding the calyx. *Pod* oblong, ¾ in. long by half as broad, narrowed to the base, distinctly lineate, beaked, clothed at first with short spreading hairs.


*Nigiriris* and *Ceylon*, ascending to 6000 ft.

*Branches* slender, sulcate, densely shortly grey-downy. *Stipules* minute, ovate, caducous; petiole ½–1½ in.; leaflets coriaceous, flexible, rugose on both sides, rounded at the base, 1–2 in. long, grey, thinly canescent above, densely persistently grey-canescence below, with the veinlets in relief, exstipellate. *Pedicules* ½–1½ in., the flowers rarely 4 to each; pedicels as long as the calyx; bracts small, round, thick, caducous. *Calyx* ½–¾ in., densely canescent; lower tooth linear, exceeding the tube, the others lanceolate. *Corolla* half as long again as the calyx. *Pod* ¼–1 in. by ½ in., densely grey-canescence, rounded at both ends.


Universally spread in the plains throughout India, reaching 5–6000 ft. in the *West Himalayas*.—Distinguishes China, *Malaya*, Mauritius, Madagascar.

A biennial, with slender trailing or twining densely grey-downy stems. *Stipules* minute, caducous; petiole ¼–1 in.; leaflets 1½ in. long, flexible, twice as long as broad,
Exstipellate, obtuse or subacute, triplinerved in the lower half, thinly grey-canescent above, densely beneath, with usually only the main nerves raised. Peduncles short, densely pubescent, 2–6-flowered; pedicels as long as the calyx. Calyx ½–1 in., densely grey-silky; teeth linear, the lowest twice as long as the tube. Corolla yellow, ¼–½ in.; keel abruptly incurved at the tip. Pod straight, distinctly lineate, ¼–1 in. by ½ in., clothed with fine spreading grey or pale brown silky hairs.—C. nervosum, Royle MSS., is a form with thick leaves, with the veinlets raised on the under side. The descriptions of Dolichos scabroaoides and medicagineus in Roxburgh, Flora Indica, iv. 315, have been accidentally transposed.

** Petiolule of the end leaflet elongated.  


Central Himalayas, Garwhal, &c., alt. 1–8000 ft.

Branches very slender, climbing or trailing, densely clothed with short spreading grey hairs. Petioles 1–4 in.; stipules minute, linear, caducous; leaflets round-cuspidate, 1–3 in., long and broad, greenish on both surfaces, paler beneath; petiolule ¼–¾ in. Peduncles shorter than the petioles, suppressed at the end of the shoots, where the leaves also are much reduced; pedicels as long as the calyx. Calyx ⅝–⅞ in., densely pilose; teeth linear-setaceous. Pod flat, 1–1½ in. by ½ in., distinctly lineate, clothed with fine short deciduous spreading hairs.

15. A. rostrata, Baker; a woody climber, branches glabrescent, leaflets exstipellate roundish subcoriaceous obscurely canescent below, flowers in long-peduncled lax racemes, calyx-teeth short, corolla much exserted, pod briskly recurved 8–10-seeded.

Concan, Stocks.

Branches firm, terete, at first minutely downy. Stipules minute, caducous; petiole 1–3 in.; leaflets as broad as long, 3–4 in. each way, green and glabrous above, narrowed to a deltoid point, suddenly narrowed in the lower third or quarter; petiolule 1 in. Racemes overtopping the leaves, the flowers much the most showy in the genus; pedicels ¼–½ in. Calyx ⅞ in., broadly campanulate, with only a few deciduous bristles, all the teeth shorter than the tube. Corolla 1 in. long; keel broad, beaked; limb of standard 1½ in. broad. Pod linear, distinctly lineate, 2½–3 in. long, ½ in. broad, narrowed at the tip, thinly clothed with stiff grey bristles with bulbous bases.


Assam, Martaban, Tenasserim, Concan.—Distrib. Java.

Branches firm, densely clothed at first with short spreading grey pubescence. Stipules ¼ in., lanceolate, caducous; petiole 1–4 in.; leaflets 3–4 in. broad and long, cuspidate, broadly rounded at the base, green above, paler and greyer beneath, both surfaces minutely permanently pubescent; petiolule ¼–1 in.; stipelle minute, setaceous. Peduncles often overtopping the leaves; racemes at first close, finally 4–6 in. long, the rachis densely pilose; bracts roundish or ovate, with a cusp, shaggy, exceeding the buds; pedicels ¼–⅝ in. Calyx ¼ in., shaggy; teeth lanceolate, exceeding the tube. Standard half as long again as the calyx; keel equalling the calyx ¼ in. broad. Pod 1¼–2 in. by ¾ in., straight, densely clothed with long grey spreading hairs, narrowed to both ends.
80. **CAJANUS, DC.**

An erect shrub. *Leaves 3-foliolate. Flowers racemed. Calyx-tube campanulate; teeth short. Corolla much exserted, its petals equal in length; keel truncate. Stamens diadelphous; anthers uniform. Ovary sessile, few-ovuled; style long, filiform, much upcurved, stigma capitate. Pod linear, straight, narrowed at both ends, 3-5-seeded, torulose with oblique linear depressions between the non-strophiolate seeds.—Distrib. The only species.*


Wild? and cultivated throughout our limits, ascending to 6000 ft. in the Himalayas.—Distrib. Everywhere in the tropics, probably native of the Old World.

An erect shrub, with slender sulcate grey-silky branchlets. Stipules minute, lanceolate; leaflets 3, minutely stipellate, oblong-lanceolate, entire, subcoriaceous, thinly silky above, densely beneath, indistinctly gland-dotted. Flowers in sparse distinctly-peduncled corymbose racemes, often forming a terminal panicle; pedicels downy, 2-3 times the calyx. *Calyx* ⅓ in. *Corolla* 3 times the calyx: standard yellow, *C. flavus*) or beautifully veined with red (*C. bicolor*). Pod 2-3 in. by ⅓-⅓ in., finely downy, tipped with the lower half of the style.

81. **DUNBARIA, W. & A.**

Woody or herbaceous climbers. *Leaves 3-foliolate, distinctly gland-dotted beneath; stipelles rarely present. Flowers racemose or axillary. Calyx-teeth long and narrow, the lowest distinctly exceeding the others. Corolla more or less exserted, marcescent or caducous; keel usually not beaked. Stamens diadelphous, anthers uniform. Ovary sessile or stalked, many-ovuled; style inflexed, filiform beardless, stigma capitate. Pod linear, flat, not marked with depressed lines between the substrophiolate seeds.—Distrib. Three more species, reaching North Australia and Japan.*

Subgen. 1. **Eudunbaria, Benth.** Corolla large, marcescent, lasting till the pod reaches full size.

1. **D. ferruginea**, W. & A. Prodr. 258; stems closely pubescent, stipules minute caducous, leaflets thick as broad as long densely pubescent beneath, standard exceeding the wings and keel, pod puberulent. Collaea venosa, Grah. in Wall. Cat. 5573. C. gibba, Grah. in Wall. Cat. 5572, B.C. Dunbaria latifolia, W. & A. Prodr. 258.

Hills of Western Peninsula and Ceylon.

A woody twiner, with slender stems and densely downy branchlets and petioles. Leaflets roundish-deltoid, entire, coriaceous, 2-3 in. long, glabrescent or thinly downy above, clothed with soft grey or ferruginous pubescence beneath; stipelle sometimes present. Racemes lax, many-flowered, distinctly peduncled; pedicels downy, geminate, ⅔-⅔ in.; bracts large, boat-shaped, soon falling. *Calyx* ⅔-⅔ in., densely downy; lower tooth linear, as long as the tube, the others lanceolate. *Corolla* 1-1 in. long, the standard 1 in. broad, exceeding the wings and keel. ⅔-⅔ in. *Pod* sessile, straight, 1⅔-2 in. by ⅔ in., 4-5-seeded, tipped with the hooked base of the style.

2. **D. Heynei, W. & A. Prodr.** 258; stems thinly clothed with fine spreading hairs, stipules membranous persistent, leaflets thin twice as long as

Hills of Mysore and Ceylon, up to 3000 ft.

A wooly climber, with slender terete glabrescent stems and petioles. *Stipules* lanceolate, $\frac{1}{4}$ in.; leaflets green on both surfaces, with a few minute deciduous hairs, membranous, the end one nearly sessile, obovate-oblong, cuspitate, 3–6 in. long; stipellae minute, caducous. *Racemes* few-flowered, lax, distinctly peduncled; pedicels $\frac{1}{4}$ in.; bracteoles large, oblong, caducous. *Calyx* $\frac{1}{4}$–$\frac{1}{2}$ in. finely downy; lowest tooth acuminate, exceeding the tube. *Corolla* twice the calyx; standard $\frac{3}{4}$ in. broad; keel subtruncate. *Pod* 1$\frac{1}{2}$–2 in. by $\frac{1}{2}$ in., straight, densely pilose at first, 4–5-seeded.

3. **D. pulchra**, Benth. MSS.; stems finely downy, stipules caducous, leaflets thin twice as long as broad, obscurely downy, standard exceeding the wings and keel, pod clothed with fine spreading hairs.


A wooly climber, with slender terete glabrescent branches. *Leaflets* membranous, green, glabrescent above, greenish-puberulent beneath, the end one oblong, narrowed to a rounded base, and a long point, distinctly petioled, 3–4 in. long, stipellate. *Racemes* few-flowered, lax, distinctly peduncled; pedicels $\frac{1}{3}$ in.; bracteoles large, navicular, caducous. *Calyx* finely downy, $\frac{3}{4}$ in. long; lowest tooth subacute, 2–3 times the tube, the others much shorter, lanceolate. *Corolla* 1$\frac{1}{2}$ in. long; limb of standard round. *Pod* as in the last.

**Subgen. 2. Rhyncolobium, Benth.** *Corolla* small, caducous, little exserted.

4. **D. debilis**, Baker; stems filiform, leaflets subcoriaceus ligulate-oblong obtuse 3–4 times as long as broad, flowers solitary in the axils of the leaves, pod sessile glabrous.


A twining herb, with very slender finely downy stems and distant nodes. *Stipules* minute, setaceous, persistent; petiole $\frac{1}{4}$ in.; leaflets grey-green, thinly canescent above, densely so beneath, prominently nerved, the end one short-petioled, rounded at both ends, 1–1½ in. long. *Pedicels* as long as the calyx. *Calyx* $\frac{1}{3}$ in., grey-downy; teeth linear, the lowest as long as the tube. *Corolla* yellowish, half as long again as the calyx. *Pod* recurved, glabrescent, 1$\frac{1}{2}$–2 in. by $\frac{1}{2}$ in., 8–10-seeded.


**Eastern Himalayas, tropical region; Silhet and Assam. Western Peninsula, Wight.** *Prom. Wallich.*—**Distrih. Malayia, China, N. Australia.**

A twining herb, with very slender finely-downy stems. *Stipules* minute, linear; petiole 1 in.; leaflets thin, flexible, green, glabrescent above, pale green, obscurely downy, distinctly gland-dotted beneath, not stipellate; end one distinctly petioled, 1–1½ in. long and broad, subacute. *Pedicels* very short; flowers rarely 3–4 on a short peduncle. *Calyx* $\frac{1}{4}$ in., grey-downy; lowest tooth as long as the tube. *Corolla* reddish, $\frac{3}{2}$–$\frac{3}{4}$ in.; keel distinctly beaked. *Pod* linear, 1½–2 in. by $\frac{1}{2}$ in., recurved, 6–8-seeded.—The Japanese *Atylosia subhombea* and Javan *Dolichos truncatus* of Miquel both belong to this section of *Dunbaria*, and are near this species.

Tenasserim, Kurz.


A slender woody climber, with terete glabrescent branches, finely grey-downy at first. Stipules minute, caducous; leaflets flexible, green, glabrescent above, finely grey-downy beneath, obscurely stipellate; the end one acuminate, distinctly stalked, 1–1 1/4 in. long and broad, broadly rounded at the base. Racemes 6–10-flowered, shorter than the leaves; pedicels short, densely grey-downy. Calyx 1/4 in.; lowest tooth lanceolate, as long as the tube. Corolla little exserted; keel with a recurved beak. Pod incurved, 2–3 in. by 3/8 in., 8–10-seeded, with a stalk 1 1/4 in. long.—The Wallachian specimen includes the pod of a true Phaseolus.

82. CYLISTA, Ait.

A climbing shrub. Leaves 3-foliate. Flowers racemose. Calyx-tube campanulate; teeth scariose and persistent, the lowest much the largest boat-shaped, the two side ones smaller than the two upper. Corolla enclosed in the calyx, the petals equal in length; keel much incurved, truncate. Stamens diadelphous; anthers uniform. Ovary subsessile, 1-ovuled; style long, filiform, stigma capitate. Pod small, oblique, oblong, enclosed in the calyx.—Distrib.: The only species. Differs from Rhynchosia only by its peculiar calyx.

1. C. scariosa, Ait.; DC. Prodr. ii. 410; Roxb. Cor. Pl. i. t. 92; Fl. Ind. iii. 320; Wall. Cat. 5586; W. & A. Prodr. 259; Wight Ic. t. 1597; Dalz. & Gibbs. Bomb. Fl. 74.

Woods of Concan, Deccan, Canara, and Orissa.

A woody twiner, with slender finely downy branches. Leaflets minutely stipellate, subcoriaceous, ovate or subrhomboidal, acute, 2–4 in. long, thinly grey-downy above, densely downy below. Flowers in copious distinctly-peduncled lax or dense racemes; bracts large, membranous, ovate, caducous; pedicels short, densely pubescent. Corolla yellowish-red, 1/4 in. long. Calyx finally 1–1 1/4 in. long, the scariose conspicuously veined lower lip 1 in. broad.

83. ERIOSEMA, DC.

Shrubs or herbs, mostly suberect, with 1–3-foliate leaves. Flowers racemose or axillary. Calyx campanulate; teeth 5, as long as the tube. Corolla distinctly exserted; limb of standard roundish, auricled at the base; wings and slightly beaked keel shorter. Stamens diadelphous; anthers uniform. Ovary sessile, 2-ovuled; style filiform, glabrous, stigma capitate. Pod oblong, turgid, 1–2-seeded; seeds oblique, the funiculus attached to the extremity of a linear hilum.—Distrib.: Species about 50, mostly Trop. African and American.


Himalayas from Kumaon and Gurwhal to Khasia and Assam, ascending to


84. RHYNCHOSIA, Lour.

Twining or erect herbs or shrubs. Leaves pinnately 3-foliolate, gland-dotted beneath; stipellae present or absent; stipules and bracts caducous. Flowers axillary or racemose. Calyx-tube short; teeth equalling or often much exceeding it, usually not accrescent, slightly so in $Phyllomatia$, the upper often more or less connate. Corolla included or exserted; keel incurved, not distinctly beaked. Stamens diadelphous; anthers uniform. Ovary subsessile, usually 2-ovuled; style long, filiform, much incurred, stigma capitate. Pod round or oblong, flattish or turgid, usually continuous between the seeds, the hilum parallel with the sutures and funiculus centrical upon it.—Distr. Species about 80, spread everywhere in the tropics and reaching the Cape and United States.

Subgen. 1. Phyllomatia, W. & A. Calyx-teeth broad and marcescent, but not so excessively enlarged as in Cylista, in which Graham placed the species. Seeds with a large grooved white waxy arillus, as in Atylosia.


Suberect, shrubby, with long trailing shoots, clothed with fine short grey pubescent. Petioles erecto-patent, 1–2 in.; stipules minute, caducous; leaflets subcoriaceous, minutely stipellate, ovate or oblong, 1–3 in. long, acute, rounded at the base, minutely pubescent, the end one distinctly stalked. Racemes nearly sessile, laxly 2–6-flowered; pedicels 1/4–1 in., cernuous. Calyx downy, 3/8 in. deep, cut down nearly to the base into 5 subequal scarious lobes 1/4–1 in. broad. Corolla not exserted. Pod 1/4–3/8 in. long, roundish, turgid, finely downy.


Plains of Mysore, Heyne. Nilghiris, Beddome. Shrubby, with densely short grey-downy elongated slender branches. Stipules minute, caducous; petiole 1–1 1/2 in.; leaflets oblong, acute, rounded at the base, subcoriaceous, minutely pubescent, the end one 2–3 in. long, distinctly stalked. Flowers in short-peduncled 2–4-nate racemes of 1–2 distant clusters. Calyx 1/2–5/8 in., downy;
lobes subacute, rounded at the base, \( \frac{1}{4} - \frac{1}{2} \) in. broad. Corolla included. Pod oblong, \( \frac{1}{4} \) in. long, obliquely lineate, minutely pubescent.

Subgen. 2. **Nomismia**, *W. & A.* Trailing herbs with narrow setaceous or acuminate calyx-teeth. Seeds with a waxy arillus.


Plains of the Western Peninsula and Ceylon.

Stems trailing to a length of 2–3 ft., clothed with fine grey spreading hairs. Stipules minute, ovate; petiole 1–6 in.; leaflets subcoriaceous, 1–2 in. broad, truncate or emarginate, finely pubescent on the edge and lower surface, the end one distinctly-stalked, broadly deltoid at the base. Racemes 2–6-flowered, distinctly peduncled, equalling or exceeding the leaves; pedicels gminate, very short, cernuous. Calyx \( \frac{1}{4} \) in. long, densely pubescent; teeth lanceolate. Corolla \( \frac{1}{4} \) in. Pod \( \frac{1}{4} \) in. each way, plicate, lenticular, clothed with fine deciduous hairs.


Plains from the foot of the Himalayas to Ceylon.

Stems wide-trailing, very slender, clothed with fine spreading hairs. Stipules minute, lanceolate, caduceus; petiole 1–3 in.; leaflets subcoriaceous, as long as broad, \( \frac{1}{4} \)–2 in. each way, glabrescent above, obscurely pilose below, broadly deltoid at both ends, extipellate, the end one distinctly stalked. Racemes short-peduncled, 6–30-flowered, about on a level with the leaves; pedicels \( \frac{1}{4} - \frac{1}{2} \) in., densely pubescent. Calyx \( \frac{3}{4} - \frac{1}{2} \) in., densely pubescent; teeth setaceous, the lowest the longest. Corolla bright yellow, scarcely exserted. Pod membranous, subcompressed, \( \frac{3}{4} - \frac{1}{2} \) in. each way, with a faint line between the seeds, thinly clothed with fine spreading hairs.

5. **R. filipes**, *Benth. in Hohen. Pl. Ind. Or. Exot.* No. 1184; perennial, leaflets thick obovate white-canescent reticulato-venose beneath, flowers peduncled solitary, calyx-teeth as long as the tube, pod oblong two-seeded.

Nilghiris.

Stems woody in the lower part, wide-trailing, slender, densely tomentose. Stipules minute, lanceolate; petiole under 1 in.; leaflets coriaceous, very thick, \( \frac{1}{4} - \frac{1}{2} \) in. long, greenish, obscurely canescent above, covered with persistent thick white tomentum below, the end one short-stalked, obtuse, with a minute mucro, rounded at the base. Flowers on thread-like pedicels \( \frac{1}{2} - 1 \) in. long, with a persistent silky lanceolate bract a short distance below the calyx. Calyx \( \frac{1}{4} - \frac{3}{4} \) in., densely silky; teeth lanceolate. Corolla little exserted. Pod \( \frac{1}{4} \) in. long by half as broad, finely downy, reticulato-venose, not lineate between the seeds.


6. **R. suoaveolens**, *DC. Prodr.* ii. 387; leaves minutely downy, flowers in peduncled pairs casually solitary, calyx-teeth twice the tube, corolla half as long again as the calyx, pod minutely downy lineate externally septic late in-

Plains of Ceylon and both sides of the Western Peninsula.

An undershrub, 1-3 ft. high, with many stiff erecto-patent branches, clothed with fine short grey pubescence, sometimes lengthened out and half twining at the ends. *Stipules* minute, lanceolate; petiole 1-2 in., stiffly erecto-patent; leaflets almost membranous, pale green, minutely downy, especially beneath, sometimes stipellate, the end one roundish, with a long cusp, distinctly stalked, 1-3 in. long. *Peduncles* slender, erecto-patent, downy, seldom above 1 in.; pedicels shorter than the calyx. *Calyx* ½ in., downy; teeth linear-setaceous. *Pod* oblong, ½-3 in. long, turgid, 2-seeded.


Plains of Ceylon, and both sides of the Western Peninsula.

A dwarf undershrub, with very numerous erecto-patent slender shortly downy branchlets. *Petioles* 1-2 in. long, erecto-patent; leaflets ovate or oblong, obtuse or subacute, thicker in texture and deeper in colour than in the last, thinly pilose above, densely or thinly grey downy beneath, 1-2 in. long, exstipellate, the end one distinctly stalked. *Peduncles* slender, ½-1 in.; pedicels shorter than the calyx, with a small persistent lanceolate bract at the base. *Calyx* ½ in., densely silky. *Pod* oblong, ½-3 in. long, turgid, glabrescent, 2-seeded.


Ava; Taungdong, Wallich. Pegu, near Rangoon, McClelland.

Branches slender, woody, virgate, densely clothed with grey tomentum. *Stipules* caducous; petiole 1-2 in., stiffly erecto-patent; leaflets thick, coriaceous, greenish, thinly canescent above, densely persistently thickly grey-canescence beneath, the end one ovate-acuminate, 3-4 in. long. *Peduncles* equalling or exceeding the petioles; pedicels ½-1 in.; bracts lanceolate, caducous. *Calyx* ½-3 in., densely silky; all the teeth linear-setaceous, the lowest the longest. *Corolla* not exserted. *Pod* oblique, oblong, firm, ½-3 in. long, 2-seeded.

9. **R. Beddomei**, Baker; leaflets argenteo-canescence on both sides, flowers in subcylindric congested racemes, calyx-teeth much exceeding the tube, corolla not exserted.

Western Peninsula; Cudrapipe hills, Beddome.

An erect shrub, with terete white-canescence branches. *Petioles* erecto-patent, ½-3 in.; leaflets oblong or oblong-lanceolate, acute, subcoriaceous, thinly persistently argenteo-canescence above, densely so beneath, the veins conspicuously raised, the end one short-stalked. *Flowers* in copious cymes from the axils of reduced leaves; pedicels much shorter than calyx. *Calyx* ½ in., thinly silky. *Corolla* bright yellow. *Pod* 1-seeded, not seen fully mature, oblong, thinly canescent.

Subgen. 4. **Cyanospermum**, *W. & A.* A woody twiner with broad foliaceous calyx-teeth. Seeds without an arillus.

Jungles of the Western Peninsula and Ceylon.—Distrib. Mascaren isles, Zambesi-land.

A robust woody climber, with stems clothed with short grey or brown pubescence. Leaves subcoriaceous, flexible, softly pilose on both sides, 4–6 in. long, the end one ovate-cuspidate, distinctly stalked; stipelles large, setaceous, persistent. Racemes close, distinctly peduncled, \( \frac{3}{4} \) ft. long; bracts large, round-cuspidate, caducous. Calyx membranous, \( \frac{3}{4} \) in. long, densely clothed with grey hairs; tube short, teeth \( \frac{1}{4} \) in. broad. Corolla included, marcescent, bright red or white. Pod as long as the calyx, deeply torulose, persistently grey-canescent; seeds large, globose, shining, violet-black.


Western Himalayas; Hakara to Gurwhal and Kumao, ascending to 5000 ft.

An erect shrub, 4–6 ft. high, with virgate slender branches, clothed with persistent fine grey tomentum. Petiole \( \frac{1}{4} \) in.; stipules minute, caducous; leaflets subcoriaceous, 1–2 in. long, extipellate, grey-green, thinly canescent above, densely persistently grey-canescent beneath, with raised veinlets; the end one oblong-rhomboideal, distinctly stalked, apex deltoid, subacute. Flowers in short-peduncled close corymbs; pedicels shorter than the calyx. Calyx \( \frac{3}{4} \) in., densely grey-canescent; lowest tooth linear-setaceous, exceeding the tube; the others shorter, lanceolate. Corolla \( \frac{3}{4} \) in.; standard thinly silky. Pod oblong, an inch long, \( \frac{3}{4} \) in. broad, straight, hard, persistently grey-canescent, subcompressed, bearing 1–2 seeds in the upper half.


Everywhere in the plains, from the Himalayas, where it ascends to 4000 ft., to Ceylon and BirmA.—Distrib. Cosmopolitan in the Tropics, Cape, United States.

A twining or wide-trailing annual, with very slender stems, with only a little short pubescence at the beginning. Stipules minute, lanceolate, caducous; leaflets subcoriaceous or membranous, \( \frac{1}{4} \)–1 in. broad and deep, obtuse, usually extipellate, the end one distinctly stalked, mostly conspicuously gland-dotted beneath. Racemes 6–12-flowered, short-peduncled, usually exceeding the leaves; bracts minute, linear; pedicels short. Calyx \( \frac{3}{4} \) in., pubescent; lowest tooth setaceous, twice the tube. Corolla yellow, twice the calyx. Pod \( \frac{3}{4} \)–\( \frac{5}{6} \) in. long, under \( \frac{1}{4} \) in. broad, glabrescent, turgid, slightly recurved, mostly 2-seeded.

Var. laxiflora; glabrous, leaflets larger \( \frac{1}{2} \)–2 in. long acute both the upper and


Scinde, near Kurrachee, Stocks.—Distrib. Arabia, Trop. Africa.

Scarcely more than a variety of the preceding, from which it only differs in vestiture.

14. R. velutina, W. & A. Prodr. 233; young branches minutely downy, leaflets thinly grey-canescent beneath as broad as long obtuse deltoid in the lower half, racemes 2-4-flowered cymose, calyx-teeth equalling or exceeding the tube, pod middle-sized 4-6 times the calyx.

Nilghiris.

Stems wide-trailing, rather stouter than in R. minima, glabrescent when mature. Stipules minute, linear, caducous; leaflets subcoriaceous, \( \frac{1}{3} \)–\( \frac{1}{2} \) in. long and broad, green, glabrous above, persistently thinly grey-canescent beneath, extispellate, the end one distinctly stalked. Cymes 2-4-flowered, shorter than the leaves; pedicels of \( \frac{1}{3} \) in. Calyx of \( \frac{1}{2} \) in., finely silky; lowest tooth linear-setaceous, twice the tube, the others much shorter, lanceolate. Corolla \( \frac{1}{2} \) in. Pod much recurved, 1\( \frac{1}{2} \) in. by \( \frac{3}{4} \) in., glabrescent, 2-seeded, narrowed very gradually to the base.

15. R. pilosa, Wall. Cat. 5499; branches and leaves clothed with long fine spreading grey hairs, leaflets oblong rounded at the base, racemes short few-flowered, calyx-teeth with long setaceous points exceeding the tube.

Birma; banks of the Irrawaddy at Segaen, Wallach.

Stems very slender, twining. Stipules linear, of \( \frac{1}{2} \) in., subpersistent; leaflets subcoriaceous, grey-green above, grey beneath, clothed on the edge and below with conspicuous long fine hairs, extispellate, the end one oblong or ovate-oblong, rounded at both ends, \( \frac{1}{2} \)–2 in. long. Racemes like those of R. minima, the buds like dense tufts of silky hairs; pedicels shorter than the calyx; bracts minute, lanceolate. Calyx of \( \frac{1}{2} \) in., all the teeth with long setaceous points. Corolla half as long again as the calyx. Pod unknown.

16. R. Falconeri, Baker; branches and leaves clothed with short spreading grey hairs, leaflets ovate-oblong rounded at both ends, racemes long-peduncled lax few-flowered, lowest calyx-tooth linear exceeding the tube, pod middle-sized 4-5 times the length of the calyx.

Gurwhal, Falconeri.

Stems wide-trailing, slender, densely clothed with short firm deflexed grey hairs. Stipules of \( \frac{1}{2} \) in., subpersistent, linear or lanceolate; petiole 1-2 in.; leaflets subcoriaceous, 1\( \frac{1}{2} \) in. long, rounded to both ends, greyish beneath, thinly clothed on both sides with persistent moderately firm grey hairs, extispellate, the end one distinctly stalked. Racemes 4-6-flowered; peduncles much exceeding the leaves; pedicels shorter than the calyx. Calyx pilose, \( \frac{1}{2} \) in.; teeth linear. Corolla half as long again as the calyx; standard slightly pilose. Pod 1 in. by \( \frac{3}{4} \) in., finely pubescent, 2-seeded.

** Leaflets larger, flexible, not coriaceous, mostly acute. Pod much exceeding the calyx.**


*Stems* rather woody, wide-twining, clothed with deciduous fine short grey viscos pubescence. *Stipules* small, deltoid, subpersistent; leaflets green on both surfaces, finely gland-dotted, often glabrescent, 14–3 in. long, the apex deltoid, the base broadly rounded, sometimes faintly 3-lobed, rarely stipellate, the end one on a petiole ½–3 in. long. *Racemes* long-peduncled, lax, 2–4 in. long; pedicels ¼–½ in.; bracts minute, ovate-cuspidate, deciduous. *Calyx* ¼ in., finely gland-downy; upper teeth deltoid. *Corolla* twice the calyx. *Pod* 1½ in. by ½ in., 2-seeded, turgid, finely pubescent, straight, tipped with the base of the style, narrowed to both ends.

18. *R. himalensis*, Benth. MSS.; pubescence fine glandular, end leaflets acute longer than broad, pedicels elongated, lower calyx-tooth as long as the corolla 3–4 times as long as the tube.

Western and Central Himalayas, alt. 3–7000 ft. *Hazara, Simla, Garwhal*, Kumaon, &c.

*Stems* wide-trailing, slender, terete, clothed with fine short grey viscos pubescence. *Stipules* lanceolate, ¼ in., subpersistent, reflexed; leaflets thin, finely pubescent on both surfaces, not at all coriaceous, a much paler green beneath than above, csx stipellate, 2–3 in. long; the end one ovate-acuminate, distinctly stalked. *Racemes* ½–1 ft. long, lax, distinctly peduncled; pedicels ¼ in.; bracts ¼–½ in., oblong-lanceolate. *Calyx* ½ in., densely downy; lowest tooth linear-setaceous; the others lanceolate-setaceous, twice the tube. *Standard* glabrous, yellow, very conspicuously veined with purple. *Pod* 1–1½ in. by ½ in., finely downy, 2-seeded, rather recurved, narrowed to both ends.


Central and Western Himalayas, ascending to 5–6000 ft., and hills of West Peninsula.—Distr. Malaya.

*Stems* woody, slender, wide-climbing, densely clothed with soft short spreading grey glandular hairs. *Stipules* lanceolate, ¼–½ in., subpersistent; leaflets not at all coriaceous, soft with dense short pubescence on both surfaces, sometimes stipellate, pale green both above and beneath, the end one distinctly stalked, deltoid at the tip, the lower half narrowed suddenly to a rather rounded base. *Racemes* many-flowered, moderately close, including the long peduncle reaching a foot in length; pedicels much shorter than the calyx; bracts lanceolate, silky, exceeding the buds. *Calyx* ¼–½ in., densely grey-silky; upper teeth deltoid-cuspidate, shorter than the tube. *Corolla* ¼–½ in.; standard dark purple inside, callose, distinctly auricled, silky on the back. *Pod* 1–1½ in. by ½ in., finely-pubescent, turgid, 2-seeded, rather recurved, tipped with the long persistent base of the style.


Upper Gangetic Plain, near Benares, Madden. Birmâ; Prome, Jenanghaen and Taong-dong, Wallich.
Branches twining or straight, woody, many-grooved, persistently pilose. Stipules minute, caducous; leaflets 2–4 in. long and broad, thick, subcoriaceous, green, thinly downy above, densely softly grey-downy beneath, exstipellate. Racemes moderately close, distinctly peduncled, much exceeding the leaves; pedicels shorter than the calyx. Calyx ¼ in., densely downy; upper teeth deltoid or lanceolate, shorter than the tube. Corolla ½ in.; standard cuneate externally. Pod 1–1¼ in. by ½ in., turgid, 2-seeded, narrowed in the lower half, minutely downy.

21. R. acutissima, Thouites, Enum. 413; pubescence short not glandular, leaflets oblong-rhomboidal, pedicels exceeding the calyx, lowest calyx-tooth lanceolate much shorter than the corolla.

Travancor, Beddom. Ceylon, near Hantani, alt. 3000 ft., Thouites.

A twiner, with stems clothed with short pale brown tomentum. Stipules lanceolate, caducous; leaflets 2–5 in. long, very acuminate. Racemes equalizing or shorter than the leaves; pedicels geminate, ¼–½ in. long; bracts lanceolate-acuminate, deciduous. Calyx ¼ in.; teeth lanceolate, the upper pair subconnate. Corolla ½ in., yellow veined with red. Ovary 2-ovuled. Pod not seen.

*** Leaflets not at all coriaceous. Calyx as long as the corolla, nearly as long as the pod. (Acrephyllum, Elliott).


Plains of both sides of the Western Peninsula.—Distrib. Zambesi land.

Stems very slender, woody, wide-twining, finely grey-downy. Stipules minute, caducous; leaflets ovate-rhomboidal, obtuse or acute, 1–2 in. long, flexible, minutely grey-downy, especially below, sometimes stipellate, the end one short-stalked. Flowers 20–40 or more in dense nearly sessile heads usually shorter than the leaves; pedicels much shorter than the calyx; bracts linear, ½–¾ in., persistent. Calyx ⅓–⅔ in.; teeth all lanceolate acuminate; tube very short. Corolla glabrous. Pod oblong, ½–2 in. by ½ in., 2-seeded, pubescent, oblique, narrowed suddenly at the tip.

DOUBTFUL SPECIES.

Dolichos candicans, Wall. Cat. 5567, from Ava, belongs either to § 3 or 5, but the seed is not known. It has densely tomentose virgate branches, thick coriaceous obtuse leaflets rather broader than long densely persistently grey-tomentose on the lower side with the veins raised, the end one distinctly stalked 1–2 in. long, racemes short-peduncled closely few-flowered. small lanceolate bracts, pedicels shorter than the calyx, calyx densely grey-pubescent ⅔ in. long, lowest tooth linear exceeding the tube, the others shorter, lanceolate, corolla scarcely exerted.

R. mollissima, Dalz. in Journ. Linn. Soc. xiii. 186, from Kandesh, which I have not seen, is said to differ from R. sericea principally by the want of callosities and auricles to the standard.

85. FLEMINGIA, Roxb.

Shrubs, rarely herbs, with leaves digitately 3-foliolate or simple, gland-dotted below. Inflorescence various; pedicels very short, not bracteolate. Calyx-tube short; teeth narrow, acuminate, the lowest often the longest. Corolla little or not at all exserted; petals equal in length; keel obtuse or slightly rostrate. Stamens diadelphous; anthers uniform. Ovary subsessile, 2-ovuled; style filiform, beardless, stigma capitate. Pod oblong, turgid, small, usually two-seeded; seeds not strophiolate, the funicle centrical.—Distrib. Only 3 Trop. African species not here represented.

Subgen. 1. Ostryodium, Desv. Shrubs. Leaves simple. Flowers in
small cymes, each hidden by a large folded persistent bract, closely distichisely arranged in simple or slightly bracted racemes, both in the axils of the leaves and above them.


Himalayas from Simla and Kumaun, ascending to 8000 ft. to Assam, Khasia, Chittagong, Siam, Malacca, and Ceylon.—Distrib. Malayan Islands, Philippines, Timor. Introduced in Mauritius and West Indies.

An erect shrub, 5–10 ft. high. Branches slender, terete, velvety. Leaves subcoriaceous, 3–8 in. long, green, glabrescent above, thinly silky, especially on the raised parallel erecto-patent ribs below; stipules scariose, linear, $\frac{1}{2}$–$\frac{1}{2}$ in.; petiole stiffly erecto-patent, $\frac{1}{2}$–1 in. Racemes 3–6 in. long, usually simple, the slender zigzag rachis densely grey-downy; bracts erecto-patent, short-petioled, deeply cordate, $\frac{1}{2}$–1 in. long, membraneous, finely downy, rather broader than long, obscurely cuspitate in the typical form. Calyx $\frac{1}{4}$ in., finely pilose; teeth lanceolate, exceeding the tube. Corolla purple, little exserted. Pod oblong, turged, $\frac{1}{2}$–$\frac{1}{2}$ in. long, finely downy, 2-seeded.


Var. 2. *fruticulosa*; habit low and branches trailing, leaves smaller plicate, racemes fewer-flowered, bracts $\frac{1}{2}$–$\frac{1}{2}$ in. slightly emarginate. F. fruticulosa, *Wall. Cat.* 5754; *Benth. Pl. Jungh.* 245.—Temperate region of Central Himalayas.


**Eastern Himalayas, Hamilton. Behar, Dr. Hooker. Ava, Wallisch.**

General habit and inflorescence just that of the last. Branches terete, with a thin coating of adpressed hairs. Leaves nearly as broad as long, subcoriaceous, 2–4 in. each way, green, glabrous above, minutely grey-downy below; petiole longer than in *F. strobilifera*. Racemes often panicked; rachis more woody than in the last, and the pubescence shorter; bracts firmer, less distinctly veined, much broader than long. Calyx $\frac{1}{2}$–$\frac{1}{2}$ in.; teeth lanceolate, as long as the tube. Corolla twice the calyx. Pod as in the last.

Subgen. 2. **Chalaria, W. & A.** Erect shrubs. Leaves simple or 3-foliolate. Bracts minute, caducous. Flowers in lax panicked racemes.


Central and Eastern Himalayas, tropical zone; from Kumaon to Sikkim. Moullaein, Holfer.

An erect shrub, 4 to 6 ft. high, with finely downy slender terete branches. Leaves subcoriaceous, thin, full green above, paler beneath, glabrous except on the ribs of the undersurface, 3–6 in. long; petiole 1 in. or less long; stipules minute, lanceolate, caducous. Axillary racemes sometimes simple, sometimes fascicled, the end ones forming a thyrsoid panicle $\frac{1}{2}$ ft. long, with densely grey downy branches, rather laxly flowered nearly down to the base; bracts ovate, pilose, scariose; pedicels shorter than the calyx. Calyx $\frac{1}{2}$–$\frac{1}{2}$ in., densely grey-downy; teeth lanceolate, acuminate; tube very short. Corolla reddish, little exserted; keel rostrate. Pod $\frac{1}{2}$ in., oblong, finely downy, 2-seeded.

Plains from the Himalayas to Ceylon, Birma and Siam.—Distrib. Malayan Islands, N. Australia.

An erect shrub, with the ultimate branchlets angular and grey-canescence. Stipules lanceolate, scariose, subpersistent, 1/8-3 in.; petiole 1/2-2 in., erecto-patent, deeply sulcate; leaflets rigidly subcoriaceous, 1-3 in. long, obtuse, or with a slight cusp, deltoid at the base, exstipellate, both surfaces especially the lower finely grey-canescence, sublucent. Panicles from the axils of most of the leaves, erecto-patent, 2-4 in. long, the flowers crowded towards the end of the branches and absent from the lower part; pedicels very short. Calyx 1/8-1 in., densely grey-downy; teeth lanceolate. Corolla little exerted; keel beaked. Pod 3/8-1 in., finely downy, rounded at both ends, 2-seeded.

Subgen. 3. Flemingiastrum, DC. Erect shrubs. Leaves digitately 3-foliolate. Flowers in dense subsperate axillary racemes; bracts linear or lanceolate, caducous.

5. F. stricta, Roxb. Cor. Pl. iii. t. 248; Hort. Beng. 56; Fl. Ind. iii. 342; branches triquetrous, leaflets thin large acuminate obscurely silky on the ribs below, bracts linear firm much exceeding the buds, calyx silky. DC. Prodr. ii. 351; Wall. Cat. 5745, excl. E; W. & A. Prodr. 241; Wight Ic. t. 329.

Tropical regions of Sikkim, Silhet, Assam; Birma, Tenasserim, and the Western Peninsula.—Distrib. China.

A tall shrub, with woody triquetrous branches, clothed with only a few short adpressed hairs. Stipules large, lanceolate, rigidly scariose, soon falling; petiole 3-6 in., triquetrous, deeply sulcate, not winged; leaflets subcoriaceous, 1/3-1 ft. long, oblong, narrowed to both ends, smooth and glabrous above, with only a few short obscure hairs on the ribs below. Racemes dense, oblong-cylindrical, often fascicled, 2-3 in. long, the lower bracts larger than the others and subpersistent, the upper ones rigidly scariose, linear, 1/4-3 in. long, shortly silky, densely imbricated before the flowers expand; pedicels very short. Calyx 1/8-1 in.; teeth linear, the lowest twice as long as the others. Corolla as long as the lower tooth, much exceeding the others; keel obtuse. Pod 1/8-3 in. long, glabrescent.

Var. pteropus, Baker; petiole distinctly winged, leaflets lanceolate acuminate plicate, spikes more slender densely fascicled, bracts and flowers smaller.—Pegu, McClelland.


Nilghiris, Wight, Gardner, &c.

A low erect shrub, with tormentose young shoots. Stipules lanceolate, 1/4-1 in., caducous; petiole 1/4-1 in., erecto-patent, not winged; leaflets subcoriaceous, 2-3 in. long, plicate, glabrous above, grey-silky especially on the ribs beneath many of the veinlets raised. Spikes dense, oblong, 1-2 in. long, often fascicled; bracts under 1/3 in. long, erecto-patent, subrigid, subpersistent. Calyx 5/8 in.; teeth plumose, linear-acuminate, subequal. Corolla not exerted. Pod oblong, 3/8 in. long, finely pubescent, and often covered with red viscous glands.

7. F. congesta, Roxb. Hort. Beng. 56; Fl. Ind. iii. 340; branches subterete, leaflets oblong acuminate silky on the ribs below, bracts neither rigid nor protruded, calyx silky. DC. Prodr. ii. 351; Wall. Cat. 5747, in greater part; W. & A. Prodr. 241; Wight Ic. t. 390; Dalz. & Gibbs. Bomb. Fl. 75.

Central Himalayas to Ceylon and Malacca, in the tropical region.—Distrib. Malay isles, China, Philippines.

An erect woody shrub, 4–6 ft. high, with terete glabrescent old and rather angular succulate silky young branches. Stipules linear, ¼ in., caducous; petiole 1–4 in., succulate down the face, not winged; leaflets subcoriaceous, thin not plicate, 4–6 in. long, narrowed to a long point, and downwards to a rather rounded base, green and glabrous above, thinly grey-silky beneath. Racemes oblong, dense, 1–2 in. long, sessile, often fascicled; bracts lanceolate, ¼–½ in. long, silky on the back, like the calyx, deciduous, not at all rigid; pedicels very short. Calyx ½–⅓ in., densely clothed with adpressed shining pale brown silky hairs; teeth linear-lanceolate, the lowest exceeding the others. Corolla scarcely exerted; keel obtuse. Pod oblong, ⅘ in. long, obscurely downy, 2-seeded.

Var. 1. semilata; general habit and leaflets of the type, but the petiole narrowly winged, the racemes often rather laxer and calyx-teeth narrower. F. semilata, Roxb. Fl. Ind. iii. 340; Don Prodr. 242; W. & A. Prodr. 241; Wight in. t. 326; Wall. Cat. 5746, in greater part. F. stricta, Wall. Cat. 5745 E. F. prostrata, Roxb. Fl. Ind. iii. 338 (a low trailing form).—Range of the type, ascending to 5000 ft. in the Central Himalayas.

Var. 2. latifolia; tall, very robust, leaflets larger acute 6–9 in. long, bracts ⅘–⅙ in. long like the calyx densely clothed with shining adpressed brown silky hairs. F. latifolia, Benth. Pl. Jungh. 246; Miquel Fl. Ind. Bat. i. 163.—Khasia, 2–3000 ft. Hook. fil. and Thomson, Griffith.—Distrib. Java.


Branches slender, erect, densely clothed with short spreading hairs. Stipules small, caducous; petiole 1–2 in. faintly winged; leaflets obvate-oblong, 2–4 in. long, glabrous on the upper surface, nearly flat. Heads dense, oblong, sessile, 1–2 in. long, solitary or fascicled. Calyx ⅘–⅗ in., shaggy, with dense persistent firm spreading grey hairs, slit down nearly to the base into subequall linear plumose teeth. Corolla included. Pod oblong, as long as the calyx, finely downy. Not clearly distinct from the last, from which it mainly differs in vestiture.

Subgen. 4. Lepidocoma, Jungh. An erect shrub. Leaves digitately 3-foliate. Flowers in dense globose heads surrounded by large bracts (like the capitula of Composite).


An erect shrub, 2-4 ft. high, with slender terete zigzag woody finely downy branches. Stipules large, scariose, caducous; petiole ¾-1 in.; leaflets oblong or lanceolate, narrowed to both ends, 2-3 in. long, subcoriaceous, glabrous above, grey and finely downy below. Heads copious, both terminal on the branches and axillary on short peduncles. An inch broad, encircled by about a dozen lanceolate acuminate scariose persistent bracts ¾ in. long. Calyx ⅔ in. long, shaggy with long dense grey hairs; teeth very long, the two upper subconnate. Corolla included; keel obtuse. Pod small, oblong, included, firm, downy, 1-seeded.

Subgen. 5. Rhynchosioides. Trailing herbs with herbaceous roots. Leaves digitately 3-foliolate; bracts minute, caducous.

10. F. vestita, Bentth. MSS.; leaflets obovate-cuneate minutely pilose, stipules large persistent, flowers 4-10 in dense long-peduncled heads, corolla much exerted. Dolichos vestitus, Grah. in Wall. Cat. 5545.

Himalayas; from Simla, Garwhal and Kumaon to Khasia, ascending to 7000 ft. Sometimes cultivated for the sake of its tuberous esculent root.

Stems trailing to a length of 1-2 ft., branched, densely clothed with short grey hairs. Stipules ¾-⅔ in., lanceolate, scariose; petiole ⅔-1 in.; leaflets brought close to one another by their edges, not at all coriaceous, full green above, pale green beneath, minutely hairy on both sides, exstipellate, obtuse or shortly cuspidate, ⅔-1 in. each way. Flowers 3-6 together, in dense heads like Lotus, on pilose peduncles overtopping the leaves; pedicels very short; bracts ⅔ in., silky, oblong or roundish, cuspidate. Calyx ⅔-⅔ in., densely brown-velvety; teeth subequal, exceeding the tube. Corolla bright red, half as long again as the calyx; keel much incurved, distinctly rostrate. Pod oblong, included, subcylindrical, 1-seeded, finely hairy.

Var. nilgheriensis; leaflets smaller firmer more acute, hairs of stem and petioles longer and denser, flowers a dozen or more in a head, calyx-teeth linear, corolla scarcely exerted. F. procumbens, Wight in. t. 987; Dalz. & Gibbs. Bomb. Fl. 75, nom Roxb.—Hills of Western Peninsula.


Concan, Dalzell, Stocks.

Stems 2-3 ft. long, copiously branched, thinly clothed with fine spreading hairs. Leaflets rigidly subcoriaceous, acute, 1-2 in. long, those of the lowest leaves shorter, oblong. Corymbos copious, terminal and axillary, distinctly peduncled, exceeding the leaves, the last branches erecto-patent, 1-2 in. long, the flowers usually solitary, rarely geminate at their tips; bracts and bracteoles minute, rigid, ovate, like those of Shittoria. Calyx ⅔ in., strongly ribbed, densely pilose; teeth lanceolate, exceeding the tube. Blade of standard round; keel very narrow, abruptly incurved at the tip. Pod oblong, 1-2-seeded, if the latter slightly exceeding the calyx.

86. DALBERGIA, Linn. fil.

Trees or climbing shrubs. Leaves with alternate subcoriaceous leaflets. Flowers copious, small, in terminal or lateral panicles. Calyx campanulate; teeth 5, distinct, usually short. Corolla exerted; standard broad; keel obtuse, with its petals only joined at the tip. Stamens 9-10, monadelphous or the sheath slit down the keel; anthers minute, basifixied, with the cells back to back, and the slit mostly short and apical. Ovary stalked, few-ovuled; style short, incurved, glabrous, stigma capitate. Pod oblong or strap-shaped, usually thin and flat, 1-4-seeded, indehiscent, not thickened or winged at the sutures.—Distrib. Species 60-70, cosmopolitan in the tropics.
SUBGEN. 1. **Sissoa**, Benth. Stamens usually nine in one bundle, the sheath of filaments being slit only along the top. *Pod* straight, thin, 1–4-seeded.

* Leaflets large.


Plains through **India Proper**, ascending to 5000 ft. in the Central Himalayas.—Distr. Afghanistan, Beloochistan.

An erect tree, with finely grey-downy branches. Leaf-rachis zigzag; leaflets firm, soon glabrescent, 1–3 in. long. Panicles much shorter than the leaves, the erecto-patent branches densely pubescent. Calyx ⅓ in. deep, downy; teeth very short, the lowest rather the longest, lanceolate. *Corolla* yellowish, twice the length of the calyx; standard with a long claw and round limb. Stamens 9. Pod thin, strap-shaped, pale brown, glabrous, 1⅓–4 in. by ⅓–⅔ in., obtuse with a stalk twice as long as the calyx.


An erect tree, glabrous in all its parts. Leaves 4–6 in. long; rachis straight; leaflets 1½–2½ in. long, firm, greenish or glaucous below, often emarginate at the point, cuneate at the base, the petiolules unusually long. Flowers in lax broad panicles, shorter than the leaves; pedicels as long as the calyx. Calyx ⅓–⅔ in.; teeth obtuse, rather shorter than the tube. Stamens 9. *Corolla* white, twice the length of the calyx. Pod firm, brown, strap-shaped, rather shining, 1½–3 in. by ⅓–⅔ in., in the place of the seeds distinctly marked but not wrinkled.


**Martaban**, Wallich. *Peou, Kurz*.

Whole plant glabrous, except the branchlets of the panicle. Leaf-rachis 2–3 in. long; leaflets firm, greenish or slightly glaucous below, the upper oblong, 3–4 in. long, narrowed gradually to a point, the lower shorter round-ovate. Panicles broad, about as long as the leaves, made up of distant congested clusters, the main branches spreading or even deflexed. *Flower* and *pod* just like those of *D. latifolia*.

Var. **obtusifolia**; leaflets oblong or obovate-oblong obtuse emarginate 3–5 in. long.—Birma, *Griffith, Kurz*.

oblong acute, flowers in lax axillary panicles with subcorymbose branches, pedicels as long as the calyx, pod not veined opposite the solitary seed. Benth. in Journ. Linn. Soc. iv., Suppl. 39. D. pseudo-sissoo, Miq. Fl. Ind. Bat. i. 128?

CEYLON, Gardener, Walker, &c.—Distr. Malay isles.

Branches glabrous, twining. Leaflets firm, glabrous, green on both surfaces, oblong, 2–4 in. long, rounded at the base, narrowed suddenly to a point. Panicles as long as or shorter than the leaves, the branches finely grey-downy. Calyx ½ in., sub-glabrous; teeth short, obtuse. Corolla twice the length of the calyx; claws of the petals as long as the calyx. Stamens 9. Pod strap-shaped, obtuse, 3–4 in. by ½–¾ in., always 1-seeded.

5. D. rimos, Roxb. Hort. Beng. 53; Fl. Ind. iii. 233; erect, leaflets 5–9 oblong obtuse or acute, flowers very small in axillary and terminal panicles with corymbose branches, pedicels very short, pod thickened and veined opposite the solitary seed. Wall. Cat. 5853; Wight Ic. t. 262; Benth. in Journ. Linn. Soc. iv., Suppl. 32.

Eastern Himalayas, tropical zone, ascending to 4000 ft.; Khasia, Silhet, Assam.

Leaf-rachis straight, 3–4 in. long; leaflets moderately firm, oblong or ovate-oblong, 2–4 in. long, bright green above, grey with a thin coating of grey short adpressed hairs beneath. Panicles broad and corymbose, with finely grey-downy branches, the very numerous small flowers in crowded corymbs. Calyx ¼ in., finely downy; teeth obtuse, subequal, about as long as the tube. Corolla white, twice as long as the calyx; claws of the petals very short. Pod oblong, glabrous, 2–3 in. by 1–1½ in., much thickened opposite the large seed. Seeds very rarely 2.


Forests of Ava, Pegu, and Martaban.

Leaf-rachis straight, 3–4 in. long; leaflets rigidly subcoriaceous, glabrous, not glaucous beneath. Panicle ¼–¾ ft., the main branches wide-spreading, rather decurved, the branchlets clothed with thin grey-brown pubescence. Calyx ¼ in., finely downy, the lowest tooth about as long as the tube. Corolla twice the length of the calyx, the claws of the petals short. Pod just like that of D. rimos.

** Leaflets few, small.

7. D. rubiginosa, Roxb. Cor. Pl. i. 9, t. 115; Fl. Ind. iii. 231; scandent, leaflets 5–7 oblong obtuse glabrous beneath, flowers in short crowded axillary panicles, pedicels very short, petal-claws as long as the calyx, ovaries 3–4-ovuled. DC. Prodr. ii. 416; W. & A. Prodr. 265; Benth. in Journ. Linn. Soc. iv., Suppl. 43.

WESTERN PENINSULA.—Distr. South China.

Habit of D. monosperma, from which it may be readily known by the stamens and ovary. Branches glabrous, twining. Leaflets firm, not conspicuously veined, 1–2 in. long, rather glaucous beneath. Panicles 1–2 in. long, sessile, the branchlets finely pubescent. Calyx scarcely ½ in. long, finely brown-silky, with a pair of small obtuse persistent bracteoles; teeth short, obtuse. Corolla twice the length of the calyx. Pod unknown.

8. D. congesta, Grah. in Wall. Cat. 5872; scandent, leaflets 7–11 oblong obtuse more or less clothed with brown pubescence beneath, flowers in short crowded axillary panicles, pedicels very short, petal-claws as long as the calyx, pod 1–2-seeded not veined opposite the seeds. W. & A. Prodr. 265; Benth. in Journ. Linn. Soc. iv., Suppl. 43. D. Gardneriana, Benth. loc. cit.
Nilghiris, Noton, Gardner, &c.

Closely allied to *D. rubiginosa*, of which it is perhaps a variety. Branchlets and leaves below at first densely clothed with brown pubescence. **Leaflets** very thick, 1-1½ in. long, emarginate. **Panicles** 1-2 in. long, dense, the branches densely brown-velluto. *Pedicels* ¼-½ in., with a pair of conspicuous adpressed bracteoles; teeth short. **Corolla** twice the length of the calyx. **Pod** thin, brown, glabrous, distinctly stalked, strap-shaped, 1½-2½ in. by ½ in.

9. **D. cultrata**, Grah. in Wall. Cat. 5861; erect, leaflets 7-11 obovate-oblong obtuse emarginate glabrous, flowers in short axillary fascicled panicles with racemose branches, pedicels as long as the calyx, petal-claws short, pod 1-3-seeded not veined opposite the seeds. *Benth. in Journ. Linn. Soc. iv.*, **Suppl.** 39.

**Prome Hills, Wallich. Pegu, McClelland.**

General habit like that of *D. lanceolaria*. Branches and leaves below glabrous. **Leaflets** 1½-2 in. long, moderately firm, green on both sides. Flowers in copious rather lax panicles, with slender ascending subglabrous branches. **Calyx** ½ in., subglabrous; teeth short. **Corolla** twice the calyx. **Pod** just like that of *D. lanceolaria*, from which it can only be distinguished by the flowers.

***Leaflets many, small.***


**Malacca, Griffith, Maingay.**—**Distrib.** Malay isles.

**Branches** slender, glabrous, often twisted. **Leaves** 2-3 in. long; leaflets thick, rigid, ½-1½ in. long, truncate or emarginate, glabrous, slightly glaucous below. **Branches** of the panicle downy, the ultimate branchlets forming distinct scorpioid cymes. **Calyx** glabrous, under ½ in.; teeth short, obtuse, the lowest. **Corolla** ⅛ in. **Pod** thin, membranous, greenish, glabrous, distinctly stalked, 2½-3 in. by 1-1½ in.


**Oudh and Silhet, Wallich. Concan, Stocks.**

Habit of *D. volubilis*, from which it can only be safely distinguished by the stamens. **Leaves** 4-6 in. long; leaflets moderately firm, 1-2 in. long, obtuse or emarginate, much paler below than above, but scarcely glaucous. **Branches** of the panicle densely pubescent. **Calyx** ⅛ in.; upper teeth short, obtuse, lowest lanceolate. **Corolla** not more than half as long again as the calyx. **Pod** thin, glabrous, brownish, 2-3 in. by ⅛-⅜ in., narrowed to the point and to a stalk nearly half an inch long.


**Khasia, Silhet, and Eastern Peninsula.**

**Branches**, pedicels, and leaves, especially on the underside, at first densely clothed with dark brown tomentum. **Leaves** 6-9 in. long; leaflets moderately firm, not
veined, rather glaucous beneath, 1½ to 2 in. long; stipules large, lanceolate, velvety, more persistent than in the other species. **Panicules** distinctly peduncled, ¼ to ¾ in. long as the leaves, the branches densely brown-pubescent, spreading or ascending; pedicels shorter than the calyx, furnished with small persistent bracts and bracteoles. **Calyx** ¾ in.; upper teeth very short; lowest lanceolate, rather longer. **Corolla** twice the calyx. Pod thin, obtuse, brownish, short-stalked, 2–3½ in. by ½–¾ in.

13. **D. Stocksii**, Benth. in Journ. Linn. Soc. iv., Suppl. 42; scendent, leaflets 11–15 oblong obtuse with a few obscure adpressed hairs, flowers in copious axillary panicles with corymbose branches, pedicels and petal-claws short, pod thin oblong veined opposite the large usually solitary seed.

**Concan, Stocks.**

Branches finely grey-downy. **Leaves** 4–5 in. long; leaflets thin for the genus, ¾ to 1 in. long, emarginate, with only a few obscure short adpressed hairs below when mature. **Panicules** copious, distinctly peduncled, nearly or quite as long as the leaves; branches slender, densely finely grey-downy, densely corymbose at the tip, the lowest ones distant. **Calyx** oblique, ½ in., densely grey-downy; teeth half as long as the tube. **Corolla** twice the length of the calyx. **Pod** quite characteristic, thin, glabrous, 2–1½ in. by ¼ in., the usually solitary seed filling up the greater part, subacute, cuneate at the base with a very long stalk.


Hills of the Western Peninsula.

**Trunk** armed with strong large curved thorns, the branches often twisted, the young ones finely grey-downy. **Leaves** 4–6 in. long; leaflets moderately firm, obtuse or emarginate, ¾ to 1 in. long, thinly silky at first, especially beneath. **Panicules** distinctly peduncled, with finely downy ascending curved branches, the ultimate branchlets second. **Calyx** ¾ in., silky, with a pair of small obtuse adpressed bracteoles; teeth short, obtuse. **Corolla** twice the length of the calyx. **Pod** membranous, obtuse, 2–3 in. by ¾–1 in., with an unusually short stalk.—Closely resembles **D. volubilis** in leaves and general habit.


Eastern Himalayas; **Nipal, Sikkim, Silhet, Khasia.** ascending to 4000 ft., and frequent down the gulf to Malacca. Hills of Western Peninsula.—**Distrib.** Malay isles.

**Branches** densely clothed with fine brown pubescence. **Leaves** ½–1 foot; leaflets quite different in shape to that of all the other species, nearly sessile, caducous, moderately firm, ½ to 1 in. long, glaucous, thin clothed with brown pubescence beneath, especially on the midrib. **Panicules** sessile, 1–2 in. long, the branches densely brown-pubescent; pedicels shorter than the calyx; bracts and bracteoles minute, downy, persistent. **Calyx** ¾ in., downy; teeth short, obtuse. **Corolla** white, 2–3 times the length of the calyx; blade of the standard orbicular. **Stamens** 10. **Pod** thin, bright brown, glabrous, long-stalked, 1½–3 in. by ½–¾ in.
VAR. 1. pubescens; branches and leaves below clothed with persistent dense thick pubescence.—Concan, Stocks.

VAR. 2. acaciefolia; leaflets thicker very oblique rigidly coriaceous glabrous bright green above glaucescent beneath. D. acaciefolia, Dalz. in Kew Journ. ii. 37.—Concan.

Sturgen. 2. Dalbergaria, Benth. Sheath of filaments slit both along the top and bottom, so that the stamens are in two bundles containing five each. Pod straight, thin, 1-3-seeded.


Plains from the Western Himalayas to Ceylon.
An erect tree, reaching 60–80 feet in height, with glabrous branches. Leaves 3–6 in. long; leaflets rigidly subcoriaceous, with slightly raised veins, green above, paler and rather glaucous below, 1–2 in. long, rounded at both ends, emarginate at the apex. Branches of the panicle wide-spreading, silky or subglabrous. Calyx ½ in., more or less silky; teeth obtuse, the lowest rather longer. Corolla 2–3 times as long as the calyx, the standard ¼ in. broad, with a large callosity at the base of the limb, the keel much shorter than the wings. Pod 1½–4 in. by ½–⅗ in., bright brown, flexible, pointed to the point and gradually at the base into a long stalk.

17. D. purpurea, Wall. Cat. 5869; scendent, leaflets 11–13 glabrous obtuse, flowers in copious ample terminal and axillary panicles with corymbose branches, pedicels ebracteate as long as the calyx, calyx-teeth much shorter than the tube, pod glabrous 1-seeded rather thickened and veined opposite the seed. Benth. in Journ. Linn. Soc. iv., Suppl. 46.

Martaban, Wallich, Griffith. Pegu, Kurz.
Closely allied to D. lanceolaria, from which it differs by its scendent habit, smaller flowers (under ¼ in. long), and shorter calyx-teeth.

18. D. volubilis, Roxb. Cor. Pl. ii. 48, t. 191; Fl. Ind. iii. 231; scendent, leaflets 11–13 glabrous obtuse, flowers in copious ample terminal and axillary panicles with corymbose branches, pedicels very short ebracteate, calyx-teeth minute, pod glabrous 1–2-seeded rather thickened and veined opposite the seed. DC. Prodr. ii. 417; Wall. Cat. 5874; W. & A. Prodr. 265; Benth. in Journ. Linn. Soc. iv., Suppl. 46; Dalz. & Gins. Bomb. Fl. 78.

Central and Eastern Himalayas, to Pegu and Ceylon.
Closely allied to the two preceding. Branches of the panicle densely clothed with brown velvety pubescence, the main ones horizontal or even decurved, the ultimate corymb densely congested. Calyx ½ in. long, densely velvety. Corolla 2–3 times the length of the calyx. Pod just like that of D. lanceolaria.

19. D. assamica, Benth. Pl. Jungh. 255; scendent, leaflets 15–21 obtuse glabrous or nearly so, flowers in axillary panicles much shorter than the leaves with corymbose branches, pedicels as long as the calyx, calyx-teeth nearly as long as the tube, pod glabrous flexible 1–2-seeded. Benth. in Journ. Linn. Soc. iv., Suppl. 45.
Tropical Himalayas, from Kumaon eastwards; Assam, Griffith, Jenkins.

A twiner, with glabrous branchlets. Leaves 6-10 in. long; leaflets the same shape and size as in *D. lanceolaria*, but rather thinner, with a few hairs at the beginning on the under surface. Panicles deltoid, moderately close, 3-4 in. long, with slender fine silky branches. Calyx \( \frac{1}{15} \) in., finely silky, the lowest tooth lanceolate, as long as the tube, the others obtuse, rather shorter. Corolla under \( \frac{1}{4} \) in. Pod just like that of *D. lanceolaria*.

20. **D. paniculata**, Roxb. Cor. Pl. ii. 8, t. 114; Fl. Ind. iii. 227; erect, leaflets 9-15 obtuse glabrous or nearly so, flowers in copious axillary and terminal panicles with racemoso-corymbose branchlets, pedicels very short, calyx-teeth as long as the tube, pod glabrous 1-3-seeded rather thickened and veined opposite the seeds. DC. Prodr. ii. 417; W. & A. Prodr. 265; Wall. Cat. 5848, A to D; Dalz. & Gibbs. Bomb. Fl. 78; Benth. in Journ. Linn. Soc. iv., Suppl. 45; Bedd. Fl. Sylv. 88.

Plains of the Western Peninsula.

A tall erect tree, the ultimate branches clothed with short erect grey-brown silky pubescence. Leaflets like those of *D. lanceolaria* in shape, size and texture. Panicle very different, mainly terminal, but much less ample, the branches always densely dotted with brown silky pubescence, the main ones erecto-patent. Calyx \( \frac{1}{8} \) in., subsessile, densely silky. Corolla twice the length of the calyx, the limb of the standard not more than \( \frac{1}{8} \) in. broad, without any callosity at the base, the keel much shorter than the other petals. Pod just like that of *D. lanceolaria*.


Birma, at Prome, Kurz.

A middle-sized erect tree, with fulvo-tomentose branchlets. Leaflets ovate-oblong or obovate, 2-2½ in. long, thinly coriaceous, glabrous above. Panicle subcapitate, with villose branches. Calyx glabrous, \( \frac{1}{4} \) in. Corolla white, a little longer than the calyx.—Ex Kurz loc. cit.

22. **D. hircina**, Benth. in Journ. Linn. Soc. iv., Suppl. 46; erect, leaflets 17-25 obtuse both surfaces clothed with short persistent grey hairs, flowers in short congested axillary corymbose panicles, pedicels ebracteate as long as the calyx, calyx-teeth nearly as long as the tube, pod small glabrous 1-3-seeded slightly thickened but not veined opposite the seeds. Wall. Cat. 5871 B, not A.

Central and Eastern Himalayas, tropical zone; from Garwhal and Kumaon to Bhotan, ascending to 4000 ft.

Leaf-rachis 6-10 in. long, finely grey-downy; leaflets obtuse at both ends, firm, with veins rather raised, emarginate at the apex, 1-1½ in. long. Panicles short-peduncled, 1-2 in. long, with densely pubescent ascending branchlets. Calyx \( \frac{1}{8} \) in. long, densely pubescent. Corolla scarcely more than twice the length of the calyx; standard obvate, \( \frac{1}{4} \) in. broad; keel distinctly shorter than the wings. Pod much smaller than that of its allies, often 3-4-seeded, 1-1½ in. by \( \frac{1}{4} \) in., obtuse or subacute, narrowed gradually into a stalk twice as long as the calyx.

23. **D. Thomsoni**, Benth. in Journ. Linn. Soc. iv., Suppl. 33; scandent, leaflets 9-11 glabrous obtuse, flowers in copious ample terminal and axillary panicles, ultimate branches secund cymose, pedicels very short minutely bracteate, calyx-teeth minute, pod thin greenish rather oblique slightly thickened and veined opposite the solitary seed.

A climber, with even the branches of inflorescence nearly glabrous. **Leaflets** very firm in texture, greenish on both surfaces, 3/4-1 in. long, obtuse, slightly emarginate. **Inflorescence** mainly terminal, the principal branches erecto-patent, the ultimate ones forming distinct elongated scorpion cymes. **Flowers** much smaller than in any of its neighbours and very deciduous, the minute pedicels subtended by lanceolate bracts as long as themselves. **Calyx** 1/4 in., subglabrous. **Corolla** under 1/4 in. long. **Pod** 2-2 1/2 in. by 3/4 in., thin and not turning brown, narrowed from the middle to a very short stalk, the lower suture much more rounded than the upper one.

**24. D. cana**, *Grah. in Wall. Cat.* 5859; scandent, leaflets 15-19 acute glabrescent, flowers in short axillary panicles with corymbose branchlets, pedicels ebracteate as long as the calyx, calyx-teeth shorter than the tube, pod thin flat one-seeded softly pubescent not at all thickened or veined opposite the seed. **Kurz in Journ. Asiat. Soc. Beng. xlii. 2, 70.**

**Moulmein, Wallich. Pegu and Martaban. Kurz.**

**Branches**, leaf-racemes and leaves below thinly clothed with deciduous brown silky hairs. **Leaves** 1-1/2 ft. long; leaflets rigidly subcoriaceous, 1 1/2-2 1/2 in. long, rounded at the base, narrowed to a point, the veinlets rather raised on the undersurface. **Pedicels** sparse, much shorter than the leaves, the erecto-patent branches finely brown-silky. **Calyx** subglabrous, 1 1/4 in.; teeth lanceolate-deltoid. **Corolla** twice the length of the calyx. **Pod** strap-shaped, straight, 2-2 1/2 in. by 1 1/2 in., pale dull brown, narrowed suddenly at the base to a stalk twice as long as the calyx.


Eastern Himalayas, tropical zone, ascending to 4000 ft. in Sikkim; Assam, Khasia, Silhet, Chittagong, Pegu, Martaban, Tenasserim.—Distr. Malay isles.

**Branches** glabrous, or at first finely grey-downy. **Leaf-rachis** 4-6 in. long; leaflets moderately firm, obtuse, 1-1 1/2 in. long, glabrous, or at first minutely hairy beneath, green above, subglabrous beneath. **Pedicels** much shorter than the leaves, with only a few lax ascending branches, the inflorescence readily distinguishable from that of all the others by the conspicuous persistent ob lanceolate glabrous bracts and bracteoles. **Calyx** subglabrous, 1 1/4 in. long; lowest tooth linear, exceeding the others. **Corolla** purplish, twice the length of the calyx; blade of the standard, roundish. **Pod** the largest and thickest of the group, 2-4 in. by 1 in., strap-shaped, obtuse, narrowed suddenly into a stalk twice as long as the calyx.

**Surgen. 3. Selenolobium, Benth. Stamen**s in two bundles of 5 each. **Pod** obliquely orbicular-oblong, rather recurved, usually 1-seeded.


Shores of the Western Peninsula, Ceylon and Malayan Peninsula.—Distr. Malay isles, China, Philippines, N. Australia.

A wide-twinning shrub, with lithe much-twisted black glabrous branches. **Leaflets** usually 5, obovate-oblong, glabrous, obtuse, often emarginate, 1-1 1/4 in. long. **Flowers** in sessile congested axillary panicles, 1-2 in. long, the branches only inconspicuously downy; pedicels shorter than the calyx. **Calyx** 1/3 in., subglabrous, with a pair of
minute obtuse bracteoles; teeth short, obtuse. *Corolla* $\frac{1}{4}$ in.; claws as long as the calyx; standard narrow. *Pod* brown, flat, glabrous, under 1 in. long, the upper suture recurved; stalk as long as the calyx.


Shores of the Eastern and Western Peninsulas. *Chittagong*, *Roxburgh*.

A stiff erect shrub, with numerous short round horizontal branchlets, ending in pungent spines. *Leaves* crowded, from the nodes of the branchlets, 1-1$\frac{1}{4}$ in. long; leaflets firm, obovate-oblong, $\frac{3}{4}$-$\frac{1}{2}$ in. long. *Flowers* in congested sessile corymbose panicles, with minutely downy branches; pedicels shorter than the calyx. *Calyx* $\frac{1}{3}$ in., minutely downy; teeth short, obtuse. *Corolla* whitish, twice the length of the calyx. *Pod* 1 in. long, brown, glabrous, reniform.


A large crooked bushy tree, with fine brown-silky branchlets. *Leaves* 4-8 in. long; leaflets rigidly coriaceous, glabrescent, 1$\frac{1}{2}$-2 in. long, broadly rounded at the base. *Flowers* in deltoid close axillary panicles, shorter than the leaves, the branchlets racemose, densely brown-velvety. *Calyx* $\frac{1}{3}$ in., campanulate, densely silky; teeth deltoid, shorter than the tube. *Corolla* twice the length of the calyx, white; standard obovate-epinimate. *Pod* glabrous, rigid, usually one-seeded, an inch broad by $\frac{1}{3}$-$\frac{1}{4}$ in., narrowed suddenly into a stalk $\frac{1}{4}$-$\frac{3}{4}$ in. long.

**Imperfectly Known Species.**


Shrub, with the young parts clothed with golden or fulvous silky pubescence. *Leaves* 5-8 in. long; leaflets 9-13, oblong, 1-1$\frac{3}{4}$ in. long, retuse, with a minute mucro, chartaceous, glaucous and thinly pilose beneath. *Panicles* axillary, much shorter than the leaves; Rachises pilose; pedicels $\frac{1}{3}$ in. *Calyx* $\frac{1}{12}$ in., pilose; upper tooth very short, obtuse; lower very long, subulate. *Corolla* and stamens unknown. *Pod* linear, 1-2 in. by $\frac{1}{4}$ in., flat, brown, thin, narrowed gradually to a long stalk, indistinctly veined, 1-5 seeded. *Pod* of *D. Sissoo* and habit of *D. lanceolaria*. *Sikkim* at *Pankabari*, *Gamble.—Ex Kurz loc. cit.*

87. **PTEROCARPUS**, Linn.

Erect trees. *Leaves* with alternate coriaceous exstipellate leaflets. *Flowers* yellowish, in copious panicked racemes; bracts and bracteoles minute, caducous; pedicels distinctly articulated at the apex. *Calyx* turbinated, curved before expansion, the teeth short. *Petals* exserted, with long claws; standard and wings crisped; keel obtuse, the petals scarcely or not at all coherent. *Staminal* sheath slit both above and below, or above only; the upper stamen often nearly or quite free; anthers versatile. *Ovary* stalked, 2-ovuled; style incurved, stigma terminal. *Pod* orbicular, rarely other than 1-seeded, with a broad rigid wing, the point turned down to oppose the base or near it.—Distr. Species about 15; cosmopolitan in the Tropics.

Pterocarpus.]

L. LEGUMINOSE. (J. G. Baker.) 239

EASTERN and WESTERN PENINSULAS.—DISTR. Malay isles, Philippines, China.

A tall tree, with ascending glabrous branches. *Leaves ¾-1½ ft. long; leaflets moderately firm, 2-4 in. long, glabrous, rounded or deltoid at the base, always narrowed to a point; petiolules ¼-½ in.; main veins fine, distant. Flowers in copious terminal and axillary panicles, with subsecond racemose branches, clothed with fine pubescence; pedicels ¼-½ in., furnished with a pair of linear spreading caducous bracteoles at the apex. Calyx ½-1 in., finely brown-silky; teeth rounded, the two upper much the largest. Corolla exceeding the calyx; standard ¾-1 in. broad. Pod orbicular, 2 in. broad, silky and veined against the seed, the wing ½-1 in. broad; the style a considerable distance above the base, pointing outwards, at a right angle with the stalk.


MARTABAN and TENASSERIM, Kurz.


WESTERN PENINSULA.

Branches obscurely grey-downy. Leaflets 3 in all our specimens, but said to be sometimes 5, 2-4 in. long, rounded at both ends, slightly emarginate, clothed with obscure adpressed grey hairs below. *Racemes shorter and less copious than in P. indica, the pedicels shorter. Calyx ½-1 in.; teeth deltoid, minute. Limb of standard not longer than the calyx. Pod silky at first, the same size as in P. indica, but the centre more turgid, wing narrower and style brought down to the basal corner.


Plains of the WESTERN PENINSULA and CEYLON.

Leaflets thicker than in the others, green and glabrous on both surfaces, 3-5 in. long, obtuse or subacute, sometimes slightly or deeply emarginate, often twice as long as broad, the main veins much closer, more numerous, and more prominent than in the others. *Racemes ample, copious, lateral and terminal, the branches thinly clothed with brown pubescence; pedicels ³⁄₄-1½ in. Calyx ¾-1 in., finely brown-downy; teeth deltoid, the two upper ones the largest. Corolla twice the length of the calyx; sheath of stamens sometimes finally split down the keel as well as the top. Pod 1-2 in. broad, the same shape as in the last, but the seed smaller and wing broader.

88. PONGAMIA, Vent.

Arborescent or fruticose. *Leaves* odd-pinnate. *Flowers* racemed. Calyx campanulate, nearly truncate. Corolla much exerted; standard broad; keel obtuse, the petals cohering at the tip. *Stamens* monadelphous, the upper filament free low down; anthers oblong, versatile. *Ovary* subsessile, 2-ovuled;
style incurved, glabrous, stigma capitate. *Pod* woody, flattened, oblong, indehiscent, not at all winged or thickened at the sutures.—**Distrib.** A single species, with the habit of *Derris* from which it differs only in the pod.


Central and East Himalayas, to Ceylon and Malacca, especially near the coast.—**Distrib.** Malay isles, N. Australia, Polynesia, Seychelles.

A tall erect tree or climber, with glabrous branches and leaves. *Leaflets* 5–7, opposite, subcoriaceous, oblong or ovate, pointed, stalked, 2–4 in. long. *Flowers* in simple peduncled axillary racemes, nearly as long as the leaves; pedicels 2–4-nate, ½–¾ in., with a pair of minute bracteoles in the middle. *Corolla* ¾ in.; standard silky on the back. *Pod* woody, glabrous, ½–¾ in. thick, 1½–2 in. long, with a short decurved point.

**89. DERRIS**, Lour.

Climbers, rarely erect trees. *Leaves* odd-pinnate, with exstipellate leaflets. *Flowers* copious, usually fascicled, showy, in axillary or terminal racemes or panicles. *Calyx* campanulate, nearly truncate. *Corolla* much exerted; standard broad; keel obtuse, the petals cohering slightly. *Stamens* usually monadelphous, the upper one free in *Aganope*; anthers versatile. *Ovary* sessile, few-ovuled; style incurved, filiform, stigma capitate. *Pod* rigid, thin, flat, indehiscent, oblong if one-seeded, strap-shaped if few-seeded, with a distinct wing down the upper or both sutures.—**Distrib.** Species about 40, belting the world in the tropics, but most abundant in our area.

**Sect. 1. Brachypterum, W. & A.** *Pod* thin, strap-shaped, narrow (⅓ in. or less broad), winged along the upper suture. *Stamens* monadelphous. *Leaflets* comparatively small. Climbers or erect trees.


Eastern Himalayas, Bengal, Western Peninsula, Chittagong, Siam, Ceylon.—**Distrib.** Malay isles, China, N. Australia.

A wide-climbing shrub, with branchlets and leaves below at first obscurely gray-dow. *Leaves* ½–1 ft. long; leaflets rigidly subcoriaceous, oblong or obovate-oblong, short-stalked, bright green, 1–2 in. long. *Flowers* in very copious short-peduncled simple axillary racemes, often twice as long as the leaves, with raised nodes, produced sometimes into short branches, bearing each a cluster of pedicels ½–¾ in. long, the different flowers from the same node expanding at different times. *Calyx* ½ in., thinly grey-silky; teeth obscure. *Corolla* pale rose, 3 times the length of the calyx. *Ovules* 6–8. *Pod* 1–3 in. by ½–¾ in., narrowed to both ends, 1–4-seeded, glabrous, turgid, and smooth against the seeds, the wing not more than ⅔ in. broad.

Ceylon, Thwaites.

A climber, quite glabrous in all its parts, even the pedicels and calyx. Leaflets rigidly subcoriaceous, oblong or obovate-oblong, 1½-2 in. long, green above, rather glaucous beneath. Racemes axillary, short-pediculed, 2-4 in. long; pedicels twice the length of the calyx. Calyx campanulate, ⅛ in.; teeth deltoid, minute. Corolla ⅜ in., the claws of the petals as long as the calyx. Ovules 2. Pod ligulate, glabrous, 1⅓-2⅔ in. by ½ in.


Eastern Himalayas, Western Peninsula and Ceylon.

An erect tree, 30-40 ft. high, with branchlets and leaves below obscurely grey-silky. Leaves ½-⅔ ft. long; leaflets 1-2 in. long, not so coriaceous as in D. scandens, green and glabrous above, grey and obscurely grey-silky beneath. Racemes like those of D. scandens, but seldom exceeding the leaves, the flowers densely fascicled and nodes liable to be produced in the same way; pedicels 1-2 in., finely grey-downy. Calyx ⅜ in. long; teeth minute, deltoid. Corolla whitish, 3-4 times the calyx; standard erect, with a round blade. Pod 1-5-seeded, narrowed to both ends, glabrous, 1-2½ in. long, ⅜ in. broad, the wing more distinct than in D. scandens, sometimes ⅛ in. broad.

4. D. dalbergioides, Baker; erect, leaflets 25-33 obtuse rather oblique at the base, racemes close shorter than the leaves, pedicels unequal densely fascicled.


A small spreading tree, 15-20 ft. high, with branchlets, pedicels and calyx brown-silky. Leaves 6-8 in. long; leaflets close, short-stalked, not more than an inch long, rounded at both ends, emarginate, rigidly subcoriaceous, glabrous, dark green above, pale green beneath, the veins immersed. Flowers in copious short-pediculed racemes, like those of D. scandens and robusta, but the nodes more crowded; pedicels and calyx each about ½ in. long; teeth minute, deltoid. Corolla rose-coloured, 4 times the length of the calyx; blade of the standard oblong. Pod just like that of D. robusta.

Sect. II. Euderris. Robust climbers, with the habit of Millettia and Lonchocarpus. Leaflets large. Flowers showy, in copious axillary racemes or panicles, with the nodes often produced into short branchlets. Stamens monadelphous. Pods flattened, broader than in the last group and distinctly winged down one or both sutures.

* Pod distinctly winged down the upper suture only.

† Leaflets few; standard not callose at the base. (Euderris, Benth.)


A wide-climbing shrub, with branchlets and leaves quite glabrous from an early stage. Leaves distinctly petioloed, ¼-½ ft. long; leaflets usually 5, distinctly stalked, narrowed to a point, 2-4 in. long, the lowest pair shorter, ovate, the veins not prominent on either surface. Racemes short-peduncled, 2-4 in. long, the lower nodes often produced into short branches; pedicels fasciède, as long as the calyx. Calyx campanulate, ⅛ in., subglabrous; teeth obscure. Corolla rose-red, ⅜ in. long; blade of standard round, not calllose. Pod sessile, glabrous, 1-2-seeded, obliquely roundish or oblong, 1-1¼ in. by 1 in., thin, flat, prominently veined, with a distinct narrow wing to the upper suture.—A plant gathered at Malacca by Griffith differs by its thicker and more rigid leaves and longer pedicels. It is referred by Bentham to D. trifoliata, Lour. Fl. Cochín. 433 (D. affinis, Benth. Pl. Jungh. i. 252), but the pod is unknown.


Malacca, Malingay.

A climber, with the branches and under surface of the leaves densely covered with soft short brown pubescence. Leaflets 3-6 in. long, glabrous and rather glossy above, rather rounded at the base, pointed, with conspicuous main veins raised on the under-surface. Panicles 1-2 in. long, sometimes fasciède; pedicels equalling or rather exceeding the calyx. Calyx ¼ in., finely pubescent; teeth obscure. Corolla red, ⅜ in. long; standard with a round not callose blade. Pod just like that of D. uliginosa in texture, veining and shape, but thinly clothed with fine brown pubescence.


Birma; Phanoe and Trogla hills, Wallich. Tenasserim, Griffith.

Leaves, including the petiole, a foot long, thin but subcoriaceous, thinly clothed beneath with evanescent fine brown pubescence; leaflets narrowed to a subobtuse point, rounded at the base, the end one 6-8 in. long. Racemes dense or sublax, 2-4 in. long, clothed with fine brown pubescence on the rachis and pedicels; pedicels ⅓-½ in., the lower nodes sometimes produced. Calyx under ⅛ in., broadly campanulate; teeth obscure. Corolla bright red, ⅜ in. long; blade of standard round, not callose. Pod just like that of D. vestita.


Ceylon, Walker, Thwaites.

Branches slender, terete, soon glabresscent. Leaflets subacute, rounded at the base, thick and rigid in texture, 2-4 in. long, not prominently veined, glabrescent from an early stage. Panicles copious, reaching a foot long, with numerous slender curved branches, clothed with finely silky brown pubescence; pedicels ⅓-⅔ in. Calyx ⅛ in., between tubular and campanulate, brown-silky, with short obscure teeth. Corolla red, scarcely ⅓ in. long. Pod 1-2-seeded, 1-2 in. by ⅜ in., rigid in texture, turgid against the seeds, persistently brown-silky, not veined, with a wing under ⅜ in. broad down the upper suture.

† Leaflets many. Standard with two callosities at the base of the limb. (Paraderris, Bentham.)

subglabrous, leaflets 9-15 small oblong or ob lanceolate-oblong, racemes much shorter than the leaves, standard glabrous, pod broad. D. ovalifolia, Benth. Pl. Jungh. i. 252, in part; Thwaites Enum. 92. Pongamia elongata, Grah. in Wall. Cat. 5016, not 5886.

Concan, Stocks. Ceylon, Gardner, &c.
The most like a Dalbergia in foliage of the species of this section, but very different in the flowers. Leaves distinctly petioled, not more than half a foot long; leaflets the smallest of the group, 1 1/2-2 in. long by 1/2-3/4 in., obtuse or subacute, quite glabrous, rigidly subcoriaceous when mature, rather glaucous beneath, the veins immersed. Racemes copious, moderately close, sub sessile, many of the nodes produced into short spreading branchlets; pedicels rather exceeding the calyx, finely grey-silky. Calyx 1/2 in. long. Corolla 1/2 in. long; standard reflexed, nearly 1/2 in. broad. Pod one-seeded in all our specimens, oblong, 1 1/2 in. by 1/4-1/6 in., thin but firm, glabrous, with a distinct wing down the upper suture.


Eastern Himalayas, Nipal, and Sikkim; ascending to 5000 ft. in Sylhet and Eastern Peninsula.

Leaves distinctly-petioled, 1/4-3/4 ft. long; leaflets usually 5-7, moderately firm, slightly silky at first beneath, 3-5 in. long, subobtuse or acute, the veins immersed. Flowers very copious, the nodes of the racemes usually produced into branchlets; racemes sometimes fasci cled; pedicels finely grey-downy, 1/8-1/6 in. Calyx 1/8 in., sub glabrous, broadly campanulate. Corolla 3/8-1/3 in., bright red; blade of the standard round. Pod 1-3-seeded, 2-3 in. by 1/3-1/2 in., thin, flat, glabrous, with a narrow distinct wing down the upper suture and sometimes a trace of one on the lower.

11. D. microptera, Benth. in Journ. Linn. Soc. iv. Suppl. 113; branches subglabrous, leaflets 5-9 large membranous obovate-oblong cuspidate, racemes long and lax, standard glabrous, pod broad.

Sikkim, alt. 2-5000 ft., Hook. fl.
Closely allied to D. cuneifolia, and even more showy. Leaves a foot or more long, distinctly petioled; leaflets 3-6 in. long, twice as long as broad, membranous, green, glabrous on both surfaces from an early stage, with a very distinct cusp. Racemes peduncled, flexuose, 1/2-1 ft. long, with distant nodes, the axis and pedicels nearly glabrous, the nodes not produced into branchlets; pedicels 1/4-1 in. Calyx 1/4 in., broadly campanulate. Corolla 3/8-1/2 in., bright red; standard erect, 3/8-1/4 in. broad. Pod 1-2-seeded, 1 1/2-3 in. by 1 in., glabrous, thin, firm; wing very narrow.


Martaban, Birma, Penang, Malacca.—Distrib. Siam, Malay isles.
A large handsome climber, easily distinguished from all the other species by its petals silky on the outside. Leaves long-petioled, a foot or more long; leaflets thin, but firm when mature green and glabrous above, glaucous and thinly brown-silky beneath,
4-6 in. long, usually twice as long as broad, obtuse or pointed. **Race**mes \( \frac{1}{2} \)–1 ft. long, obtuse, very lax, with nodes copiously produced into branchlets, the axis and pedicels densely clothed with brown pubescence; pedicels \( \frac{1}{4} \)–\( \frac{1}{2} \) in. **Corolla** bright red, \( \frac{3}{4} \) in. long; blade of standard round, \( \frac{1}{2} \)–\( \frac{3}{4} \) in. broad. **Pod** 2–3 in. by \( \frac{3}{4} \) in., 1–3-seeded, thin, flat, with raised sutures, the upper one with a narrow distinct wing.

**Pod more or less distinctly winged down both sutures** (Dipteroderris, **Benth.**)

13. **D. brevipes**, **Baker**; leaflets 5–7 glabrous obovate-oblong middle-sized acute or subobtuse, racemes copiously paniced with densely pubescent branches, pedicels shorter than the calyx, corolla middle-sized, pod persistently silky the lower wing obscure. **Derris Heyneana**, var. brevipes, **Benth in Journ. Linn. Soc. iv. Suppl. 110**.

**Concan, Stocks. Nilghiris, Hohenacker. Mysore, Cleghorn.**

**Branches and leaves on both surfaces glabrous. Leaflets** moderately firm, 2–3 in. long, rounded at the base, obtuse or acute, the upper surface rather glossy, the veins below little raised, the colour grey-green. **Flowers** crowded on the short branchlets of copious ample axillary racemes, which are as long as the leaves, with ascending branches, densely clothed with short brown pubescence. **Calyx** under \( \frac{1}{4} \) in., densely silky. **Corolla** red, 3 times the length of the calyx; standard obovate, not callose. **Pod** broad, oblong, 1-seeded. 1\( \frac{1}{4} \)–1\( \frac{1}{2} \) in. by 1 in., persistently brown-silky, with a narrow wing down the upper and a very obscure one down the lower suture.

**Var. coriacea**, **Benth.**; leaflets much thicker and very rigid glossy above, flowers nearly sessile.—**Nilghiris, Hohenacker, 1598.**

14. **D. eualata**, **Bedd. Ic. Pl. Ind. Or. 42, t. 186**; leaflets 7–9 oblong middle-sized obtusely pointed, racemes copiously paniced with densely pubescent branches, pedicels as long as the calyx, corolla middle-sized, pod glabrous, lower wing as broad as upper.

**Western Peninsula; common in plains of South Canara and Malabar, and at the foot of the Coorg ghauts, Beddome.**

A gigantic creeper, with brown silky branchlets. **Leaflets** subcoriaceous, glabrous, 2–3 in. long, the veins little raised. **Flowers** in axillary racemes and an ample panicle often 1 ft. long at the end of the branches; pedicels fasciuled, \( \frac{3}{4} \)–\( \frac{1}{2} \) in. **Calyx** \( \frac{2}{3} \)–\( \frac{1}{2} \) in., densely brown-silky. **Corolla** reddish, scarce \( \frac{1}{4} \) in.; standard not callose. **Pod** ligulate, thin, 4–5 in. by 1–1\( \frac{1}{2} \) in., 1–3-seeded, each wing \( \frac{3}{4} \) in. broad.

15. **D. Heyneana**, **Benth. Pl. Jungh. i. 252**; leaflets 5 glabrous obovate-oblong middle-sized subobtuse, racemes copiously paniced with obscurely grey-downy branches, pedicels as long or longer than the calyx, corolla small, pod glabrous with a distinct wing down the lower suture. **Benth. in Journ. Linn. Soc. iv. Suppl. 110; Dalz. & Gibbs. Bomb. Pl. 77. Понгамия Heyneana, **Grah. in Wall. Cat. 5016.**

**Mysore, Heyne. Concan, Stocks, Law.**

A slender climber, glabrous in all its parts, except the branches of the panicle. **Leaflets** moderately firm, grey-green, obtusely pointed, broadly rounded at the base, 2–4 in. long, the veins immersed. **Panicules** copious, axillary, as long as the leaves, with numerous very slender ascending branches, with the subdistant nodes produced into short branchlets; pedicels \( \frac{3}{4} \)–\( \frac{1}{2} \) in. **Calyx** \( \frac{1}{2} \) in., subglabrous. **Corolla** rose-red, \( \frac{1}{4} \)–\( \frac{1}{2} \) in.; blade of standard roundish. **Pod** oblong or ligulate, 1–3-seeded, \( \frac{3}{4} \)–\( \frac{1}{2} \) in. by \( \frac{3}{4} \)–1 in., thin, firm, rather glossy and veined, the wing of the upper suture \( \frac{3}{4} \)–\( \frac{1}{4} \) in. broad, of the lower much narrower.

**Var. paniculata**; leaflets 5–7 considerably smaller and especially narrower, panicles a foot long very lax with branches clothed with fine silky pubescence, pedicels
3 times as long as the calyx.  P. paniculata, Wight, Herb. 920.  P. Heyneana, W. & A. Prodr. 263.—Western Peninsula, Wight.


**Eastern Himalayas**, tropical zone, *Khasia* and *Silhet*, ascending to 3000 ft.

A showy climber, glabrous in all its parts.  *Leaves* 3-4 in. long; leaflets moderately firm, rather glossy above, ¼–½ ft. long, narrowed into a distinct cusp, the veins little raised.  *Panicles* as long as the leaves, with several spreading slender lax-flowered branches; pedicels usually solitary, ½ in. long.  *Calyx* ½ in., broader than deep when expanded.  *Corolla* pale red, ¼–½ in. long; standard ½ in. broad, not callose.  *Pod* thin, flat, ligulate-oblong, glabrous, flexible, finely veined, 3–4 in. by 1½–1¾ in., the upper wing ½ in. broad, the lower narrower.

17. **D. platyptera**, Baker; leaflets 5–7 large subcoriaceous oblong subacute glabrous, racemes copiously panicked with silky branches, pedicels as long as the calyx, corolla middle-sized, pod glabrous very distinctly winged down the lower suture.

**Malabar**; near Calicut, Wight.

**Branches** glabrous.  *Leaves* 2½ in. long; leaflets obtusely pointed, 3–6 in. long, broadly rounded at the base, thin, flexible, finely reticulate-venulose; petiolules ⅓ in. *Panicles* as long as the leaves, with numerous short ascending fine silky branches; pedicels close, but not fascicled.  *Calyx* ⅓ in., subtruncate, finely silky.  *Corolla* under ⅓ in.  *Pod* 3–4 in. by 1 in., including the wings, thin, flat, glossy, glabrous, reticulato-venulose, one-seeded, narrowed to both ends, the upper wing ⅛ in. broad.


**Martaban, Wallishe. Tenasserim, Griffith. Malacca, Maingay.**

A climber, glabrous in all its parts.  *Leaves* about ½ ft. long: leaflets moderately firm, glossy above, 3–4 in. long, oblong-cuspidate, the veins not prominent.  *Panicles* equalling or exceeding the leaves, the nodes often produced into branchlets, the flowers close and pedicels densely fascicled; pedicels ¼–½ in. *Calyx* ⅐ in.  *Corolla* under ⅔ in., bright red.  *Pod* thin, glabrous, ligulate-oblong, flexible, finely veined, 3–4 in. by 1½–1¾ in., the upper wing ⅛ in. broad, the lower distinct, but much narrower.

19. **D. Maingayana**, Baker; leaflets 5–7 oblong rigidly coriaceous middle-sized glabrous glaucous beneath, flowers in panicked racemes with glabrous branches, corolla middle-sized, pedicels equalling or rather exceeding the calyx, pod glabrous narrowly winged down the lower suture.

**Singapore, Maingay.**

Closely allied to *D. amœna*, with which it agrees in general habit, pod and inflorescence, differing in its rather larger more rigidly coriaceous leaves glaucous beneath, and larger flowers, which are ¾ in. long with a standard with a round ecallose wing, rounded suddenly to a long claw.

20. **D. ferruginea**, Benth. *Pl. Jungh. i. 252; leaflets 5–9 large obovate-oblong finely ferrugineo-pubescent beneath, racemes copiously panicked with


Branchlets clothed with dense ferruginous pubescence. *Leaves* 4–6 in. long, cuspidate or subtuse, rounded at the base, subcoriaceous, green and glabrous above, finely pubescent, especially on the main raised veins beneath. *Panicles* axillary, peduncled, ½–1 ft. long, with slender ascending branches, clothed with dense ferruginous pubescence; pedicels ¼ in., fascicled and nodes often produced into branchlets. *Calyx* ½ in.; teeth deltoid, minute. *Corolla* rose-red, three times the length of the calyx; standard emarginate, ¼ in. broad. Young pod densely brown-silky; old nearly glabrescent, 2–3 in. by 1 in., oblong or ligulate-oblong, rigid in texture, obscurely veined on the faces, the sutures much raised, the wing of the upper ½–1 in. broad, the wing of the lower one sometimes not perceptible.


**Concan**, near Garsuppa, Dalzell.

*Leaves* 9 ft. long; *leaves* 2–2½ in. by ½ in., glabrous above. *Panicles* terminal, shorter than the leaves; racemes simple, the branches ferrugineo-pubescent; pedicels fascicled in threes. *Corolla* reddish. *Ovary* hirsute, 2–3 ovuled. *Pod* flat, oval or elliptic, pointed at both ends winged on both sides, 1¼ in. long. *Dalzell*, loc. cit.—Appears to connect *Paraderris* and *Dipteroderris*.

**Sect. III. Aganope, Miquel.** Habit of *Euderris*, but the racemes in ample thyrsoid panicles, with the nodes not produced into branchlets, and the upper stamer distinctly free from the rest down to the base.


** Pegu, Martaban, Tenasserim, Malacca, Ceylon,—Distr. Malay isles.**

A robust climber, with glabrous branches and leaves. *Leaves* 5–7, ovate- or obovate-oblong, 4–6 in. long, rigidly coriaceous, all but the main veins immersed. *Panicles* ¼–1 ft. long, with numerous ascending thinly brown-silky branches; pedicels ¼–½ in. *Calyx* ¼ in., thinly silky, broadly campanulate, circumscissile above the base. *Corolla* ¼ in., turning dark purple when dried; standard erect, with a round ecallose blade. *Pod* very different from that of any of the other species, 1–4-seeded, 2–8 in. by 1–1¼ in., smooth, firm, finely veined, the wing usually not more than ¼ in. broad, and sometimes not perceptible.


**Eastern Himalayas** and the *Khasia Mts.*, ascending to 4000 ft.; **Eastern Peninsula.—Distr. Malay isles.**

A robust climber, with glabrous branches and leaves. *Leaves* 5–9, oblong or
obovate-oblong, rigidly subcoriaceous, 4-6 in. long, the veinlets distinct in the dried specimens. **Panicels** ½-1 ft. long, with very numerous ascending or spreading branches, clothed with dense brown-silky pubescence, the upper ones growing gradually shorter; pedicels crowded, but not fascicled, much shorter than the calyx. **Calyx** ¼ in., thinly silky. **Corolla** whitish, 3-4 times the calyx. **Pod** 1-3-seeded, 1½-3½ in. by 1-1½ in., thin, flat, glabrous, finely-veined, each wing ½-⅔ in. broad.

**Doubtful species.**

Of the following species of **Euderris** the fruit is unknown.

**D. Acuminata**, **Benth. Pl. Jung.** i. 252. (Pongamia elongata, **Grah. in Wall. Cat.** 5886, **non** 5915. P. acuminata, **Grah. in Wall. Cat.** 5901.) A large climber, with glabrous branches and leaves. **Leaflets** 5-7, elongate-oblong, 4-6 in. long, with a long very distinct cusp, green on both surfaces, with the main veins raised below. **Racemes** 6-9 in. long, the flowers fascicled at the distant nodes, the rachis, pedicels and calyx with a little brown pubescence; pedicels ½-⅓ in., equalling or exceeding the calyx. **Corolla** rose-red, ⅓ in. long. **Ovary** silky, 5-6-ovuled.—**NIPAL, Wallich**; and a plant with 9-11 leaflets of similar shape, and shorter closer racemes of considerably larger (½ in. long) bright purple flowers in **Sikkim**, **Hook. fil.** This last closely resembles **D. microptera**, but the standard is not callose.

**D. Secundia**, **Baker.** (Pongamia secundum, **Grah. in Wall. Cat.** 5890. Amerinimum secundum, **Hamill. MSS.**) **Leaflets** 7, oblong with a long cusp, 2-3 in. long, rigidly coriaceous, glabrous rather shining above, the veins immersed. **Racemes** like those of **D. scandens**, but in a terminal panicle and in the axils of upper leaves; rachis and pedicels finely brown-silky, the latter densely fascicled, exceeding the calyx. **Calyx** ¼ in. **Corolla** reddish, ⅔ in., the blade of the standard oblong, not callose. **Ovary** silky.—**Assam, Hamilton.**

**D. Polystachya**, **Benth. in Journ. Linn. Soc.** iv. Suppl. 114. **Branches** and leaves below glabrous. **Leaflets** 5-7, subcoriaceous, acuminate, pale green on both surfaces, twice as long as broad, 3-4 in. long, with a distinct point. **Racemes** long and narrow, ½-1 ft. long, from the upper leaves and forming an end panicle, the nodes copiously produced into branchlets, the rachises finely obscurely pubescent; pedicels exceeding the calyx, crowded on the branchlets. **Calyx** ¼ in., slightly pubescent. **Corolla** ⅔-⅔ in., rose-red. **Ovary** silky, with about 4 ovules.—**Khasia, 2-4000 ft., Hook. fil. & Thomson.**

**D. Ovalifolia**, **Benth. Pl. Jungh.** i. 252, *ex parte*. (Pongamia ovalifolia, **W. & A. Prodr.** 262; **Wight** Jc. t. 328.) A climber, glabrous in all its parts, with general habit and leaves very like **Dalbergia volubilis**. **Leaflets** 9, long-stalked, oblong, obtuse, emarginate, 1½-2 in. long, membranous, with raised veinlets. **Racemes** copious, auxillary, ⅔ ft. long, sometimes geminate, with nodes produced and very abundant small bright red flowers; pedicels twice the calyx. **Calyx** ⅓ in., broadly campanulate. **Corolla** ¼ in.; standard with a long claw and a broad blade, not callose. **Ovary** slightly hairy, 2-ovuled.—**Western Peninsula, Wight.**

The following are probable species of **Dipteroderris**, of which the flowers are unknown.

**D. Discolor**, **Benth. in Journ. Linn. Soc.** Suppl. 111. A robust climber, glabrous throughout. **Leaves** long-petioled; leaflets 5-9 cbovate-oblong, 3-5 in. long, obtusely pointed, bright green above, very glaucous below, rigidly coriaceous, with immersed veins. **Pod** oblong, 1 seeded, thicker than in the other species, 1¼-1½ in. by ⅔-⅔ in., both sutures raised and furnished with a narrow distinct wing.—**Sikkim** and **Silhur, Hook. fil. & Thomson.** A different type of the pod to the admitted species, like that of **Pongamia glabra** in shape and texture, but with a double wing.

**D. Wightii**, **Baker.** A slender glabrous climber. **Leaflets** 5-7, oblong, obtusely pointed, broadly rounded at the base, 1-1½ in. long, rigidly subcoriaceous, with immersed veins, pale grey-green on both surfaces. **Racemes** much exceeding the leaves.
with produced nodes. *Pod* 1-2-seeded, 1-2 in. by $\frac{1}{2}$--$\frac{5}{8}$ in., thin, but firm, rather veinied, persistently brown-silky, with a narrow wing down the upper and a very obscure one down the lower suture.—**Western Peninsula**; Shevagerry hills, *Wight*. Pod clothed like that of *D. brevipes*, but narrower and leaves much smaller.

90. **EUCHRESTA**, Bennett.

Shrubs. *Leaves* odd-pinnate. *Flowers* racemcd. *Calyx* deeply campanulate, very oblique; teeth 5, deltoid, very short. *Corolla* much exserted; standard narrow; keel obtuse, its petals scarcely cohering. *Stamens* diadelphous (0, 1), but the filaments fastened very slightly; anthers versatile. *Ovary* long-stalked, 1-2-ovuled; style filiform, stigma capitate. *Pod* the size of an olive, turgid, rather fleshy, filled up with the solitary seed.—**Distrib.** Species 2, the other Japanese.


An erect shrub, with glabrous leaves and branches. *Leaves* long-petioled; leaflets 3-5, oblong, acute, $\frac{1}{2}$ ft. long, subcoriaceous, opposite, sub sessile, pale green, the veins immersed. *Flowers* (not seen in Indian specimens) in simple penduncled racemes; pedicels gernimate, minutely bracteate, shorter than the calyx. *Corolla* pure white, $\frac{1}{2}$ in. long, twice the length of the calyx. *Pod* oblong, purplish-black, $\frac{3}{4}$--$\frac{5}{8}$ in. long.

91. **DALHOUSSIEA**, Grach.

A climbing shrub. *Leaves* 1-foliolate. *Flowers* in axillary corymbs. *Calyx* campanulate; teeth short, deltoid. *Corolla* exserted; petals equal in length; standard broad; keel obtuse. *Stamens* free; anthers uniform, oblong, versatile. *Ovary* sub sessile, few-ovuled; style filiform, stigma capitate. *Pod* oblong, subcompressed, dehiscent, rigidly coriaceous, continuous within, 1-3-seeded.—A single species, with a peculiar distribution, as it is known only in the East Himalayas and Angola.


**Eastern Himalayas**, tropical region, **Assam**, **Silhet**, and **Chittagong**.

A subscandent shrub, with slender finely grey-downy branches. *Leaves* simple, distinctly petioled, oblong, acute or obtuse, rigidly subcoriaceous, glabrous, 4-12 in. long; stipules small, lanceolate, subpersistent. *Flowers* in sparse lax sub sessile axillary corymbs about as long as the petioles, terminal on the branchlets, which have several pairs of round membranous large persistent striated bracts; bracteoles like the bracts, but larger, completely hiding the flowers. *Calyx* $\frac{1}{2}$ in. silky. *Corolla* whitish, twice the length of the calyx. *Pod* 2-4 in. long, the thick discoid seeds an inch broad.

92. **SOPHORA**, Linn.

Trees or shrubs. *Leaves* odd-pinnate. *Flowers* showy, yellow or violet purple, racemed or panicked. *Calyx* oblique, broadly campanulate; teeth deltoid, very short. *Corolla* much exserted; standard broad; petals equal in length, all with long claws; keel obtuse, or appendiculate in § *Goebelia*, with a small hooked mucro. *Stamens* free, or obscurely connate at the very base; anthers uniform, versatile. *Ovary* stalked, many-ovuled; style incurved, stigma
capitate. Pod moniliform, subignose or membranous in our species, usually indehiscent, the joints turgid, terete or in § Edwardsia furnished with four wings.—Distrib. Species above 20, widely spread in warm countries.

§ Eusophora. Pod wingless. Keel obtuse, without a mucro.

* Stipules persistent, spiny. Pod finally dehiscing.


Western Tibet. Ladak, Moorcroft. Nubra valley, alt. 10–12,000 ft., Thomson. Kashmir, Bellow.—Distrib. Kashgar, Bellow. A low copiously-branched shrub, with densely grey-downy branches, armed with fine pungent spines, which are the stipules that persist, as in Caragana, long after the leaves fall. Leaves 1½–2 in. long; leaflets 11–17, caducous, obovate, obtuse, with a long awn, 1½–3 in. long, subcoriaceous, pale green, finely grey-silky on both surfaces, finally nearly glabrescent. Flowers in copious sparse axillary racemes; pedicels shorter than the calyx. Calyx ½ in., densely grey-silky; teeth short. Corolla yellow, more than twice the length of the calyx; blade of standard oblong. Pod thinner than in the other species, 3–4 in. long, 5–6-seeded, densely pubescent.

** Small spineless trees with usually indehiscent pods.

2. S. tomentosa, Linn.; DC. Prodr. ii. 95; leaflets 15–19 obovate obtuse densely grey-downy beneath, pedicels as long as the densely grey-downy calyx, flowers yellow, pod finely grey-downy. Wall. Cat. 6333; Royb. Fl. Ind. ii. 316; W. & A. Prodr. 179; Bedd. Fl. Sylv. 89. S. glabra, Hassk.; Mig. Flor. Ind. Bat. i. 125.

Shores of the Eastern and Western Peninsulas, and Ceylon.—Distrib. Cosmopolitan in the Tropics.

Branchlets virgate, thinly persistently grey-downy. Leaves ½ ft. long; leaflets flexible, subcoriaceous, 1–2 in. long, dull grey-green, thinly downy above, the veins immersed on both surfaces. Racemes terminal, ½ ft. long; pedicels densely grey-silky, articulated a little below the calyx. Calyx ½–3 in., nearly truncate, very oblique. Corolla ¾–3 in.; blade of standard round, veined. Pod ½–1 ft. long, 6–8-seeded, the oblong hoary joints separated by a narrow neck as long as themselves.


Ceylon; Galle district, Thwaites.

A middle-sized shrub. Branches slender, virgate, obscurely silky at first. Leaves 1¾–3 ft. long; leaflets subdistant, membranous, glabrous, 3–1 in. long, bright green above, glaucous beneath. Racemes axillary, close, short-peduncled, 3–4 in. long; pedicels very slender, articulated below the apex. Calyx very oblique, both at the base and throat; teeth obscure. Corolla twice the length of the calyx; blade of standard oblongate-spathulate, ¾ in. broad, with a very long claw. Pod 3–4 in. long, 4–6-seeded; joints oblong, veined, hard, with a narrow neck between them.


Hills of the Western Peninsula.

Branches clothed with dense persistent grey or brown velvety pubescence. Leaves ½ ft.; leaflets oblong, not acuminate, rarely subobtuse, ¾–1 in. long, subcoriaceous,
green, glabrescent above, densely grey-silky beneath, finally nearly glabrescent, the hairs on the midrib brown, the veinlets immersed. *Racemes* dense, terminal, short-peduncled, $\frac{1}{4}$-1 ft. long; pedicels densely silky. *Calyx* $\frac{1}{4}$ in.; teeth distinct. *Corolla* twice as long as the calyx; blade of standard obovate, $\frac{1}{4}$ in. broad. Pod 3-4 in. long, moderately firm, 5-6-seeded, finally dehiscing, but little moniliform when all the seeds are matured.


Ceylon, alt. 4-7000 ft.—Distrib. China.

Branchlets at first brown-silky. *Leaves* $\frac{1}{4}$-1 ft.; leaflets conspicuously alternate, subcoriaceous, bright green above, 2-3 in. long, the veins rather raised on both surfaces, glaucous beneath, rounded at the base. *Racemes* short-peduncled, moderately close, 1-3 ft long; pedicels $\frac{1}{4}$-1 in., articulated at the middle, thinly silky, the lower in pairs. *Calyx* $\frac{1}{4}$ in., thinly silky at first. *Corolla* twice the length of the calyx. *Pod* 2-3 in. long, rigidly coriaceous, 2-4-seeded, the joints oblong, $\frac{1}{3}$-3 in. broad, with a broad neck between them when the seeds all mature, the faces distinctly veined.


Hills of the Western Peninsula, Mysore, Cleghorn.

Branchlets persistently brown-velvety. *Leaves* $\frac{1}{4}$ ft. long; leaflets subcoriaceous, 2-3 in. long, bright green above, very glaucous with a thin coating of bright brown pubescence, especially on the midrib beneath, the veinlets on both sides rather raised. *Racemes* lax, axillary, short-peduncled, as long as the leaves; pedicels twice the calyx. *Calyx* $\frac{1}{4}$ in., oblique at the mouth, persistently brown-silky; teeth obscure. *Corolla* more than twice the length of the calyx. *Pod* 3-4 in. long, firm, indehiscent; joints oblong, distinctly veined on the faces with a deep constriction between them.


Eastern Bengal and the Eastern Himalayas, tropical zone, ascending to 4000 ft.; Khasia, Assam, Bhutan, Mishmi.

Branchlets thinly grey-silky at first, soon glabrescent. *Leaves* $\frac{2}{3}$-1 ft.; leaflets subcoriaceous, 3-4 in. long, narrowed to a very long point, the upper cuneate, the lower rounded at the base, bright green above, glaucous beneath, with a few obscure adpressed hairs. *Racemes* peduncled, moderately close, axillary much shorter than the leaves. *Calyx* $\frac{1}{4}$-1 in., very oblique, membranous, thinly grey-silky; teeth obscure. *Corolla* bright yellow, more than twice the length of the calyx. *Pod* 3-5 in. long, 3-4-seeded, moderately firm, indehiscent, with deep constrictions between the oblong strongly-veined joints.


Western Tibet, temperate region, alt. 10-12,000 ft., Thomson, Falconer.—Distrib. Afghanistan, Orient.

An undershrub, with virgate branches, clothed with short adpressed grey pubescence. *Leaves* $\frac{1}{4}$ ft. long; leaflets 15-25, pale green, oblong, subcoriaceous, obtuse, $\frac{3}{4}$-1 in. long, thinly grey-downy above, densely beneath. *Flowers* in dense terminal racemes $\frac{1}{4}$ ft. long; pedicels shorter than the calyx. *Calyx* $\frac{1}{4}$-1 in., very oblique,
densely pubescent; teeth distinct, deltoid. **Corolla** bright yellow, 3 times the length of the calyx. Pod ½ in. broad, subglignose, finely downy, 6–12-seeded, the seeds close and constrictions slight except where the ovules do not develop.


9. **S. mollis**, **Grah. in Wall. Cat. 5335**: flowers smaller developed before the leaves in short crowded racemes. Edwardsia mollis, **Royle Ill.** t. 32, fig. 2. Sophora Houghiana, **Wall. Cat.** 5336 B.

Plains and low hills of the north-west; **Hazara** and the **Salt range to Kumaon** and **Natal**, ascending to 4000 ft.

A low spineless shrub, with finely grey-downy branches, the flowers developed first in copious short simple ascending racemes, the leaves appearing with the fruit. Leaves ½ ft. long; leaflets 21–25, rigidly coriaceous, pale, grey green, ½–3 in. long, obtuse, emarginate, prominently veined, finely grey-downy. **Racemes** 2–5 in. long; pedicels equaling or exceeding the calyx. **Calyx** ½–1 in., very oblique, finely grey-downy. **Corolla** yellow, ½–½ in. **Pod** glabrous, 3–4 in. long, 5–6-seeded, the joints with four distinct crustaceous wings and separated by distinct constrictions.

**Var. hydaspidis**: leaves and calyx more densely and persistently silky, flowers larger.—Salt Range, Punjab.

10. **S. interrupta**, **Bedd. Ic. Pl. Ind. Or.** t. 165; **Fl. Sylv.** 90; **Anat. Gen.** t. 12, fig. 6; flowers larger developed at the same times as the leaves in their axils. Edwardsia maderaspatana, **Wight Ic.** t. 1054, as regards the fruit.

Hills of **Mysore**, alt. 2500–3000 ft., **Wight, Beddome**.

A tall erect shrub. Leaves ½–2 ft. long; leaflets 19–29, obtuse, emarginate, ½–1½ in. long, thinner than in the last, with a few obscure hairs beneath. **Racemes** distinctly peduncled, shorter than the leaves; pedicels twice the length of the calyx. **Calyx** ½ in., very oblique, obscurely silky. **Corolla** bright yellow, ½–½ in. long; blade of standard round. Pod just like that of **S. mollis**.—This is doubtless the plant intended by Wight, but all except the fruit in the plate appears to be drawn from **S. glauca**.

** Imperfectly known species.**

A plant from the top of Parasmat, in Behar, seen in pod only, doubtless a new species, comes nearest to **S. Wightii**, but the 13–15 leaflets are obtuse, with thinner texture and finer veining, and the joints of the fruit smaller, with a tendency to dehisce down the sutures.

93. **CALPURNIA**, E. Meyer.

Shrubs or trees. Leaves odd-pinnate, with numerous leaflets. Flowers yellow, racemed or panicked. **Calyx** broadly campanulate; teeth deltoid. **Corolla** much exserted; petals equal in length; keel obtuse, rather incurved, its petals cohering. **Stamens** free; anthers small, oblong, versatile. **Ovary** linear stalked, many-ovuled; style filiform, stigma capitate. Pod strap-shaped, flat, membraneous, many-seeded, indehiscent, with a narrow wing down the dorsal suture.—**Distrib.** Species 6, the others Cape and Abyssinian.

**Virgilia capensis**, Lam., a well-known Cape plant, allied to **Calpurnia**, is included in Hohenacker’s Nilghiry plants, but is only cultivated in India.


**Western Peninsula**, near Courtallum, and on the Denkinacottah hills in mountain jungles.—**Distrib.** Abyssinia.
Branches slender, finely grey-silky. Leaves 13-21, membranous, oblong, obtuse, glabrous, 1-1/4 in. long. Racemes copious, short-peduncled, as long as the leaves; pedicels finely silky, much exceeding the calyx. Calyx 1/4-1 in. Pod pliable, 3-4 in. long, 5-6-seeded, glabrous.

94. PERICOPSIS, Thwaites.

A tree. Leaves odd-pinnate, with large coriaceous leaflets. Flowers racemose or panicled. Calyx large, cleft to below the middle, the upper teeth shortest, subconnate. Corolla little exerted; standard round, reflexed, rather shorter than the obtuse wings and keel. Stamens free, as long as the corolla, recurved at the end; anthers uniform, versatile. Ovary stalked, few-ovuled; style long, filiform, recurved at the end, stigma oblique. Pod like that of a Derris, rigid, indehiscent, flattish, strap-shaped, with a narrow wing down each suture.—Distrib. A single species, endemic in Ceylon.


Ceylon, southern and central districts, Thwaites, Ferguson.

A large tree, with slender subglabrous branches. Stipules, bracts and bracteoles minute, caducous; leaflets 5-7, glabrous, subcoriaceous, conspicuously alternate, broad oblong, subacute, 2-3 in. long. Flowers in sparse axillary racemes and terminal corymbose panicles. Calyx pedicellate, glabrous, 1/4 in., leathery; teeth lanceolate. Corolla dark purple, yellowish at the base; keel-petals slightly cohering. Pod 3-5 in. by 1 in., 4-5 seeded, glabrous, polished.

95. ORMOSIA, Jacks.

Erect trees. Leaves odd-pinnate. Flowers usually in dense terminal racemes. Calyx campanulate, deeply 5-cleft, the upper teeth the shortest. Corolla not much exerted; petals all with short claws, about equal in length; standard round; keel-petals and wings oblong, obtuse, the former not connate. Stamens free, much incurved, often exerted when the flower expands; anthers oblong, versatile. Ovary subsessile; style long, filiform, circinate at the end, stigma oblique. Pod thick, rigid or rather fleshy, turgid, 2-valved, continuous within, the sutures not winged. Seeds with a bright scarlet aril or testa.—Distrib. Species above 20, cosmopolitan in the tropics.

* Leaflets glabrous beneath. Seeds (where known) large.


Silhet, Roxburgh, Wallich. Pegu and Tenasserim, Kurz.

A large tree, with thick subate thinly grey-dowyny branches. Leaflets opposite, 3-5 in. long, acute, rounded at the base, rigidly subcoriaceous, dull green beneath, the veins fine, rather raised. Racemes in a large end panicle and also from the axils of the upper leaves, the branches finely grey-downy; bracts lanceolate, minute, subpersistent; bracteoles 0. Calyx under 1/4 in., brown-silky, the teeth as long as the tube. Corolla twice the length of the calyx. Ovary densely silky. Pod oblong, glabrous, bright yellow, rather fleshy, but two-valved, usually 1-seeded, 2-2 1/2 in. long, sometimes 2-seeded. Seeds oblong, 1 1/2 in. long, ‘enveloped in a complete thick fleshy scarlet aril.’—Kurz.
2. **O. travancorica**, Bedd. *Fl. Sylv.* t. 45; leaflets 7–9 oblong dull green long-stalked, racemes crowded in terminal panicles, pedicels very short, pod oblong with the valves rounded on the back.

**Travancore** hills, Beddome.

A tall tree, with finely grey-downy branchlets. *Leaflets* opposite, oblong, cuspidate, rigidly coriaceous, 2–3 in. long, dull grey-green beneath, rounded at the base, slightly downy on the midrib, the veinlets immersed; petiolules 1/2–3/4 in. long. *Flowers* crowded on the finely grey-downy branches; bracts very minute. *Calyx* brown-silky, 1/2–1 in., deeply 5-cleft. *Corolla* whitish, under twice the length of the calyx. *Pod* glabrous, hard, oblique oblong, subacute, 3 in. long, 1-seeded. *Seed* oblong, 1 in. long, with a bright scarlet testa.

3. **O. macrodisca**, Baker; leaflets 7–9 rigidly coriaceous pale green oblong, short-stalked, racemes crowded in terminal panicles, pedicels shorter than the calyx, pod large orbicular with subcompressed thick valves.

**Malacca,** Maingay.

A large tree, with very thick grey glabrous branchlets. *Leaflets* very thick and rigid in texture, pale grey-green on both surfaces, acute, broadly rounded at the base, 3–5 in. long, quite glabrous, the veins immersed. Branches of the *panicle* stout, sulcate, glabrous; bracts and bracteoles minute, subpersistent; pedicels brown-silky 1/2–3/4 in. *Calyx* 1/4–1 in., densely brown-silky, cleft considerably below the middle. *Corolla* half as long again as the calyx; standard 3/8 in. broad. *Stamens* considerably exserted. *Pod* hard, thick, 3 in. broad, flat at first, turgid when the usually solitary seed swells. *Seed* oblong, 1 in. long, with a large black adnate pitted aril.


**Nipal,** Wallich.

A tall tree, with thinly brown-velvety stout sulcate branchlets. *Leaflets* rigidly subcoriaceous, obtusely cuspidate, 3–4 in. long, dull pale green on both surfaces, the veins immersed; petiolules 1/5–1 in. *Flowers* in peduncled racemes, shorter than the leaves; bracts and bracteoles minute, caducous. *Calyx* 1/4 in., obscurely silky; teeth as long as the tube. *Corolla* white, twice, the length of the calyx. *Ovary* linear, brown-silky, 3–4-ovuled.

**Leaflets beneath and branchlets velvety. Seeds small.**

5. **O. microsperma**, Baker; leaflets 11–13 acute short-stalked, veinlets beneath slender raised anastomosing, pedicels shorter than the calyx, pod subcompressed with thin valves, seed oblong turgid.

**Malacca,** Griffith, Maingay.


6. **O. parvifolia**, Baker; leaflets 9–13 small acute, long-stalked, veins
beneath inconspicuous, pedicels very short, pod subcompressed with thin valves, seeds oblong turgid. Macroptropis bancana, Miq. Fl. Ind. Bat. Suppl. 295?

MALACCA, Griffith, Maingay.
Branches slender, persistently brown-velvety. Leaflets rigidly coriaceous, grey-green, oblong, distinctly cuspidate, the end one 2–2½ in. long, rather glossy above, thinly hairy beneath, the veins fine and scarcely at all raised; petiolules 1/6 in. Racemes short; flowers crowded; bracts and bracteoles distinct, ovate-lanceolate, subpersistent. Calyx ⅓ in., brown-silky, cleft half way down. Corolla twice the length of the calyx. Ovary silky. Pod and seeds just like those of O. microsperma.

7. O. venosa, Baker; leaflets 7 obtuse or subobtuse nearly sessile on the rachis with thick much-raised parallel main veins beneath, pedicels long, pod-valves thick turgid, seeds orbicular subdiscoid.

MALACCA, Maingay.
A tall tree, with branches clothed with persistent dense velvety pubescence. Leaflets ovate-oblong, rigidly coriaceous, 3–4 in. long, grey-green and glabrous above, densely persistently tomentose beneath. Flowers crowded in terminal racemes, the branches densely velvety, not rigid as in the two preceding; bracts and bracteoles minute, but distinct and subpersistent; pedicels as long as the calyx. Calyx ⅓ in., densely velvety, cleft down to the middle. Corolla half as long again as the calyx. Stamens distinctly exserted. Pod oblate or subacute, oblong or obvoid-oblong, glabrous, 1½–1⅓ in. long, 1 in. thick. Seeds bright scarlet, exarillate, ⅖ in. broad.

96. CAESALPINIA, Linn.

Robust erect trees, shrubs or woody prickly climbers. Leaves large, abruptly bipinnate. Flowers showy, yellow, in copious axillary racemes. Calyx deeply-cleft, with the disk confined to its base, the lobes imbricated, the lowest the largest, cucullate. Petals spreading, usually orbicular with a distinct claw, the uppermost smaller than the others. Stamens 10, free, declinate; anthers oblong, uniform, versatile. Ovary sessile or subsessile, few-ovuled; style filiform, sometimes clubbed at the tip, stigma terminal. Pod oblong or lignulate, thin and flat, or thicker and subturgid, indehiscent or dehiscent, smooth or in subgen. Guilandina armed all over with wiry spines.—Distrib. Species about 40, widely spread in the tropics of both hemispheres.

Subgen. 1. Guilandina (Linn.) Pod dry, armed on the faces with abundant wiry prickles. Petals narrow.


From the Himalayas, throughout India, ascending to 2500 ft. in Kumaon. Distrib. Cosmopolitan in the tropics.

Branches finely grey-downy, with abundant small hard falcate yellow prickles. Leaves a foot or more long, with a pair of reduced pinnae persistent at the base; pinnae mostly 12–16; leaflets oblong, obtuse, mucronate, membranous, usually ⅓–1 in. long, rather downy beneath. Racemes long-peduncled, simple or panicked, dense at the top, lax downwards; pedicels as long as the calyx, finely brown-downy. Calyx 4–⅗ in. Petals oblong-oblanceolate, yellow, little exserted. Pod short-stalked, oblong, 2–3 in. long. Seeds 1–2, large, oblong, lead-coloured.

Eastern and Western Peninsulas. Ceylon.—Distrib. Malay isles, Polynesia, West Indies.

Very near C. Bondweuella, from which it differs by its more robust habit, less downy branches, larger leaflets (often 2-3 in. long), the absence of the reduced sti- pular pinnae, by its smaller not squarrose bracts, and more tropical dispersion.

Subgen. 2. Eucæsalpinia. Pod dry, naked on the valves, indehiscent or finally dehiscing, the sutures thin except in C. sepiaria. Petals broad.


Chittagong, Silhet, Eastern and Western Peninsulas, and Ceylon.—Distrib. Malay isles, Philippines, China, N. Australia, Polynesia.

Branches slender, very flexuose. Prickles copious, dark-coloured, hooked. Leaflets distinctly petiolules, 1½-2 in. long, obtuse, glossy. Racemes axillary and terminal, copiously panicled, with spreading branches; pedicels as long as the calyx. Calyx glabrous, 1½ in. Petals scarcely exserted. Filaments densely woolly in the lower half. Pod 2 in. long, broad, oblong, beaked, hard, glabrous, indehiscent, rather turgid.


Eastern and Western Peninsulas and Pegu.—Distrib. Malay isles.

A small tree. Prickles small and few. Leaf-rachis ½–1 ft. long; leaflets close, sessile, subcoriaceous, ½–3 in. long, attached at the lowest corner. Panicles often as long as the leaves, the young branches slightly ferrugineo-pubescent; bracts large, lanceolate, caducous; pedicels ½–3 in. Calyx ¼ in., glabrous. Filaments densely woolly in the lower half. Ovary grey-velvety. Pod 3–4 in. by 1½ in., subcompressed, polished, indehiscent, with a hard recurved beak at the upper angle.


Universally cultivated through India and elsewhere in the tropics; the native country not clearly known.

A shrub or small tree. Prickles few and scattered on the branches. Leaflets sessile, close, membranous, ½–2 in. long, not so oblique as in the last, very obtuse. Racemes very broad, the lower pedicels 3–4 in. long. Calyx ½–1 in., glabrous. Petals round, crisped, reddish-yellow, with a very distinct claw, the largest and most showy of all the species. Filaments bright red, 3–4 times the length of the corolla. Pod nearly straight, 2–3 in. long, the narrowest and thinnest of that of any of the species.

Himalayas to Ceylon and Ava, ascending to 4000 ft. in the North-West.—Distrib. Malay isles, China and Japan, and introduced in Tropical America.

Branches more or less densely coated with grey or brown pubescence. Prickles small, copious, hooked, pale brown. Leaves 4—1 ft. long; pinnæ distinctly stalked; leaflets membranous, very obtuse, ½—1 in. long, green and glabrous above, glaucous and slightly pubescent beneath. **Racemes** simple, distinctly-peduncled, ½—1 ft. long; pedicels rigidly erecto-patent, twice the length of the calyx. **Calyx** ⅓—½ in., more or less pubescent. **Corolla** ½ in., bright yellow. Filaments densely woolly in the lower half. **Pod** 3—5 in. by above 1 in., subglobose, glabrous, rather recurved, with the upper suture dilated into a narrow Derris-like wing, subindehiscent.


Birma at Chappedong, Wallich. Western Peninsula. Ceylon.

Branches armed with copious irregular small prickles, passing down gradually into aciculi, bristles and hairs. Leaves 1—1½ ft. long, much narrower than in the other species; leaflets sessile, membranous, sensitive, glabrous, ½—5/8 in. long. **Racemes** lax, simple, 1—2 ft. long, the rachis densely prickly and like the rigidly erecto-patent prickles very rough with hard raised points; pedicels 2—3 times the length of the calyx. **Calyx** ½—5/8 in., more or less downy. **Petals** broad, bright yellow, scarcely exserted. Filaments densely woolly in the lower half. **Pod** under 2 in. long, more turgid than in the other species, half an inch thick, narrowed to the base, hard, subindehiscent, clothed with minute deciduous bristles, truncate at the end with a short recurved beak, the sutures not at all thickened.

Subgen. 3. **Cinclidocarpus** (Z. & M.). Pod rather fleshy, indehiscent, naked on the faces, the sutures much thickened. Petals broad.


Eastern Himalayas, Eastern and Western Peninsulas, and Ceylon.—Distrib. Malay isles.

Branches glabrous or slightly downy; prickles scattered, uniform. Leaves ½—5/8 ft. long; leaflets close, oblong, obtuse, sessile, ½—1 in. long, dark green and glabrous above, grey and glabrescent or obscurely downy beneath. **Racemes** peduncled, simple, equaling or exceeding the leaves; pedicels ½—1 in., slender, glabrous, spreading horizontally or rather deflexed. **Calyx** glabrous, ½—3 in. **Stamens** little exserted, woolly. **Pod** oblong, glabrous, 1½—2 in. long, 2—4-seeded, turgid, torulose.

9. **C. cinclidocarpa**, Miq. Flor. Ind. Bat. i. 110; leaflets 28—36 rigidly subcoriaceous, racemes copiously panicked, pedicels erecto-patent as long as the
Cassipinia.]

Cinclidocarpus nitidus, Zoll. & Moritz. Nat. Genesek. iii. 74. C. microphylia, Hamilt. in Wall. Cat. 5826. C. tortuosa, Wall. Cat. 5827 D.

Assam and Sylhet.—Distrib. Java.

Obscurely downy. Prickles scattered, uniform. Leaves a foot or more long; pinnae 20-24; leaflets close, sessile, obtuse, ligulate, caducous, \(\frac{1}{3}-\frac{3}{4}\) in. by \(\frac{1}{4}-\frac{1}{3}\) in., glossy above. Panicles often as long as the leaves, with finely downy rachises and pedicels. Calyx \(\frac{1}{3}-\frac{1}{2}\) in. Petals round with a claw, bright yellow. Stamens little exserted. Pod oblong, indehiscent, 2-3 in. by 1 in., glabrous, 3-4-seeded.

10. C. tortuosa, Roxb. Hort. Beng. 32; Fl. Ind. ii. 365; leaflets 40-60 rigidly subcoriaceous, racemes simple, pedicels erecto-patent as long as the calyx. Wall. Cat. 5827 A, B, C.

Tenasserim, Wallich.—Distrib. Malay isles.

Branches slightly downy. Prickles small, scattered, uniform. Leaves 1-1\(\frac{1}{2}\) ft. long; pinnae 30-40; leaflets close, glossy, sessile, narrow ligulate, obtuse, \(\frac{1}{4}-\frac{3}{4}\) in. by \(\frac{1}{4}\) in., just like those of the last in shape and texture. Racemes as long as the leaves. Calyx \(\frac{1}{2}\) in., glabrous. Pod just like those of the two preceding.

97. PELTOPHORUM, Vogel.

Tall unarmed trees. Leaves abruptly bipinnate. Flowers showy, yellow, in axillary and panicked terminal racemes. Calyx with the disk confined to the base; teeth subequal, very deep, imbricated, spreading. Petals oblong or roundish, imbricated, spreading. Stamens 10, free, declinate; filaments with a dense tuft of hairs at the base; anthers uniform, linear-oblong. Ovary sessile, free, few-ovuled; style long, filiform, incurved, stigma large peltate. Pod oblong, flat, thin, hard, indehiscent, with a firm broad wing on each suture.—Distrib. Species 6, cosmopolitan in the Tropics.


Sincapore, Malacca, Andamans, and Ceylon.—Distrib. Malay isles, N. Australia.

Young branches clothed with thin bright reddish-brown tomentum. Leaves distinctly peltioid, \(\frac{1}{4}-1\) ft. long; pinne opposite, 16-20, \(\frac{1}{4}-\frac{1}{2}\) ft. long; leaflets 20-30, close, ligulate-oblong, sessile, obtuse, unequal-sided, \(\frac{1}{4}-\frac{3}{4}\) in. long, rigidly subcoriaceous, slightly tomentose below. Branches of the panicle numerous, stiffly erecto-patent, conspicuously ferrugineo-tomentose, as is also the calyx; bracts minute, lanceolate, caducous. Calyx \(\frac{1}{4}\) in. deep. Pod 1-4-seeded, rigid, glabrous, 2-4 in. by 1 in., narrowed to both ends, closely longitudinally veined.

2. P. dasyrachis, Kurz MSS.; flowering pedicels 3-4 times as long as the calyx. Cassipinia dasyrachis, Miq. Flor. Ind. Bat. Suppl. 292. C. Finlaysoniana, Grah. in Wall. Cat. 5971.

Malacca, Griffith, Maingay.—Distrib. Java, Sumatra.

Very near P. ferrugineum, with which it agrees in vestiture and leaves. Flower-panicles 6-9 in. by 3 in.; lower pedicels patent or rather reflexed, 1-1\(\frac{1}{4}\) in. long; bracts linear, subpersistent, \(\frac{1}{2}\) in. long. Flowers rather larger. Pod the same shape but rather larger, thinner and not reticulately veined.

98. MEZONEURUM, Desf.

Robust woody prickly climbers. Leaves abruptly bipinnate. Flowers in ample panicked racemes. Calyx very oblique, usually deeply cleft, with the disk vol. ii.
confined to the base or extending upwards, the lobes imbricated, the lowest the longest, remarkably hood-like. Petals spreading, obovate-spathulate, subequal. Stamens free, decline, usually exerted; anthers oblong, uniform. Ovary sessile, many-ovuled; style filiform, incurved with the stamens, stigma small capitulate. Pod large, oblong, flat, thin, indehiscent, with a broad wing down the upper suture.—Distrib. Species 10, mostly Trop. Asiatic, confined to the old world.

* Eumezoneuron. Calyx deeply cleft; disk basal.


Eastern Himalayas from Nipal, ascending to 4,000 ft. to the Khasia hills, Behar and the Western Peninsula.—Distrib. Malay isles.

Branches glabrous, with small dark hooked scattered prickles. Leaf-rachis 1/4–1 ft. long; pinnae 4–10 long-stalked; leaflets rigidly subcoriaceous, 1–2 in. long, glabrous, dark-green above, subdistant, rather glaucous below. Racemes simple or forked, sometimes as long as the leaves, the rachis virgate, tinged with yellow; pedicels as long as the calyx, which is the most oblique of all the species, with the posterior sepal and petal very curly. *Calyx* 2/3 in., glabrous, tinged with yellow. Petals bright yellow, streaked with red. Filaments faintly ciliated near the base. Pod like that of a Dalbergia, with a single large seed in the middle, 3–4 in. long, with a wing like the valves in texture 1/2–3/4 in. broad.

Var. grandis, Heyne in Wall. Cat. 5830, under Cæsalpinia, sp.; larger in all its parts, the leaflets 3–4 in. long, and wing of the pod 1/4 in. broad. Guilandina macrocarpa, Grah. in Wall. Cat. 5804.—Distribution of the type.

Rheede Hort. Mal. vol. vi. t. 20, on which is founded Guilandina axillaris, Lam. (Cæsalpinia? axillaris, DC. Prodr. ii. 481) is probably made up of the leaf of this and pod of Cæsalpinia Sappan.


Tenasserim, Wallich.—Distrib. Philippines, Timor.

Branches glabrous, the falcate prickles almost restricted to the base of the pinnae. Leaves 1 ft. long; pinnae 12–14, distinctly stalked; leaflets membranous, caduceous, close, dark green, alternate, 1/2–3 in. long. Racemes simple or forked, as long as the leaves; pedicels exceeding the calyx. Calyx glabrous, 3/4 in. long, less oblique than in the last, the upper teeth reaching half down, the lowest twice as long. Filaments densely ciliated near the base. Pod 5–6 in. by 1 1/4 in., 2–4-seeded, with a wing 1/2–3/8 in. broad.

3. **M. enneaphyllum**, W. & A. Prodr. 283; leaflets 18–22 small glabrous oblong obtuse sessile, stamens slightly exceeding the calyx. Cæsalpinia enneaphylla, Roxb. Hort. Beng. 32; Fl. Ind. ii. 363; Mig. Flor. Ind. Bat. i. 104, tab. 2 B. C. sepiaria, Wall. Cat. 5834 H.


Branches slender, glabrous; prickles cipious, minute, falcate. Leaves 3/4–1 ft. long; pinnae 16–20, distinctly stalked, 2–3 in. long; leaflets sensitive, glabrous, membranous, 3/4–1 in. long. Racemes copiously panicked, sometimes a foot long; pedicels slender, glabrous or pubescent, twice as long as the calyx. Flower smaller than in the last. Calyx 1/4–3/4 in., glabrous. Corolla bright yellow. Filaments densely woolly at the base. Pod 3–4 in. long by less than 1 in., thin and glossy, 4–6-seeded; wing 1/2–3/8 in. broad.—Very like Cæsalpinia sepiaria in habit and inflorescence.

**AVA; Taong-dong, Wallich. Ceylon, Thwaites.—**Distrib. Malay isles.

General habit and inflorescence of the last. *Branches*, leaves below and calyx densely finely grey-downy. *Pinnae* 12-24, distinctly stalked; leaflets sensitive, \( \frac{3}{4} \) in. long. *Racemes* close, copiously panicked; pedicels erecto-patent, twice the calyx. *Flowers* larger than in the last, bright yellow. *Filaments* densely woolly near the base. *Pod* 3-4-seeded, 3-4 in. by 1 in. broad, without the wing.

**Tubicalyx, Miq. Flor. Ind. Bat. i. 1081.** *Calyx* shallowly cleft with the disk extending above the base.


**Malacca, Griffith, Maingay.—**Distrib. Malay isles.

**Branches** thick, rather downy, armed with copious small falcate prickles. *Leaves* a foot or more long; *pinnae* and leaflets both 8-10, the latter obovate-oblong, rigidly coriaceous, glabrous, obtuse, 2-3 in. long. *Racemes* as long as the leaves, forked; rachis virgate, woody; pedicels very short. *Calyx* glabrous, \( \frac{3}{4} \) in. long, the upper teeth not more than \( \frac{1}{3} \) in. deep, the lowest rather longer, the tube splitting off at the insertion of the glabrous filaments. *Petals* little exserted, reddish-yellow, much narrower than in the other species, permanently imbricated, oblongate-spathulate. *Pod* thin, 3-4 in. by 1 in., 3-4-seeded, with a moderately broad wing.—The structure of the flower is so different from that of the other species that it would probably be better to separate it generically, and place it next to *Wagatea*.


Woody climbers, with the habit of *Cæsalpinia*, from which they differ only in pod. *Calyx* deeply cleft, with the disk near the base, the lobes imbricated, the lowest longer and more hooded than the others. *Petals* spreading, oblong and clawed, equaling the calyx. *Stamens* 10, free, declinate, little exserted; anthers oblong, versatile. *Ovary* sessile, 1-ovuled; style filiform, stigma small terminal. *Pod* indehiscent, samaroid, with a large horny oblique terminal wing.—Distrib. Species 4, spread through the Tropics of the old world.


**Western Peninsula.**

*Branches* slender, finely downy; prickles minute, hooked, uniform. *Pinnae* 8-16; leaflets 12-16, close, sessile, oblong, obtuse, membranous, sensitive, \( \frac{1}{4} \) in. long, glabrous, pale green. *Racemes* 2-3 in. long, copiously panicked at the end of the branches; pedicels finely downy, spreading, \( \frac{3}{4} \) in. *Calyx* glabrous, \( \frac{3}{4} \) in.; *sepal* lowest longest. *Corolla* yellow, not showy, as long as the lowest sepal. *Pod* \( \frac{1}{4} \) \- \( \frac{3}{4} \) in.; wing \( \frac{3}{4} \) \- \( \frac{1}{4} \) in.

**Var. 1. microphyllum**, Miq.; Kurz, loc. cit. sp.; racemes copiously panicked, leaflets \( \frac{3}{4} \) in. long, pod \( \frac{1}{4} \) in. long with an obtuse or obliquely acute wing \( \frac{3}{4} \) \- \( \frac{1}{4} \) in. by \( \frac{1}{4} \) in.—**Tенассерим, Helpfr. Malacca, Maingay.—**Distrib. Malay isles.

**Var. 2. macropterum**, Kurz, loc. cit. sp.; branches stouter, leaflets much larger, pod \( \frac{3}{4} \) \- \( \frac{1}{2} \) in. long with an obtuse wing \( \frac{3}{4} \) \- \( \frac{1}{2} \) in.—**Pegu, Martaban, Tenasserim.**
100. **POINCIANA**, Linn.

Erect unarmed trees. *Leaves* just those of *Cesalpinia*. *Flowers* in corymbose racemes. *Calyx* deeply cleft, with the disk a little above the base, the segments valvate, oblong, subequal. *Petals* spreading, subequal, orbicular, with a claw, the blade crispate-fimbriate. *Stamens* 10, free, declinate, much exserted; anthers oblong, versatile. *Ovary* subsessile, many-ovuled; style very long, filiform, stigma minute capitulate. *Pod* flat, thin, dehiscent, ligulate, continuous within, the sutures neither thickened nor winged.—**Distrib.** Species 2–3, Trop. African and Asiatic.

1. *P. elata*, Linn.; DC. Prodr. ii. 484; Roxb. Fl. Ind. ii. 355; Wall. Cat. 5812; W. & A. Prodr. 282; Bedd. Fl. Sylv. t. 178; *Cesalpinia elata*, Swartz Obs. 106.

Truly wild, in the Western Peninsula, planted elsewhere.—**Distrib.** Arabia, W. Trop. Africa.

An erect tree, 20–30 ft. high. *Leaves* 1/4–3 ft. long; pinnae 10–16; leaflets 30–40, membranous, caducous, close, sessile, obtuse, ligulate. *Flowers* in corymbose racemes; pedicels and obovoid buds finely grey-downy. *Calyx* very coriaceous, 3–1 in. long. *Petals* scarcely exserted, an inch broad, shortly clawed. *Filaments* bright red, 3–4 times the length of the calyx, downy near the base. *Pod* 6–8 in. long by above an inch, 4–8-seeded.—The Mascarene *P. regia*, Bojer, with petals much exceeding the calyx, is frequently planted in India.

101. **PARKINSONIA**, Linn.

Trees. *Leaves* with 2–6 pinnae from a very short racis. *Flowers* yellow, in short racemes. *Calyx* deeply cleft, with a subbasal disk, the divisions subvalvate, lanceolate, subequal. *Petals* exserted, broad, the upper with a long claw. *Stamens* 10, included, villose; anthers versatile. *Ovary* short-stalked, many-ovuled; style filiform, stigma terminal. *Pod* turgid, dry, moniliform, finally dehiscent.—**Distrib.** Species 3, of which 2 are American, the other Cape.


Universally cultivated and often naturalised. A native of Tropical America.

A glabrous bush or low tree, armed with sharp woody spines, which represent the primary racis of a bipinnate leaf and have 2–6 pinnae congested in their axils. *Pinnae* 3/8–1 ft. long, the racis much flattened, so that when the very minute obtuse ob lanceolate leaflets have fallen or are not developed they resemble the phyllodes of an acacia. *Racemes* lax, shorter than the leaves; pedicels long, slender, erecto-patent. *Corolla* tender, yellow, 3/8–1 in. *Pod* 3–4 in. long.

102. **WAGATEA**, Dalz.

A climbing shrub. *Leaves* abruptly bipinnate. *Flowers* in long simple or panicled spikes. *Calyx* cleft about half way down into 5 obtuse teeth, the lowest the longest and wrap over the others, the disk high up in the tube. *Petals* ob lanceolate, obtuse, subequal, little exserted. *Stamens* 10, included, nearly straight, filaments naked; anthers oblong. *Ovary* sessile, many-ovuled; style slightly clubbed at the tip, stigma oblique. *Pod* ligulate-oblong, indehiscent, few-seeded, subtorulose, with thickened sutures, not winged.—**Distrib.** Endemic.

Hills of Western Peninsula.

A robust woody prickly climber. Leaves 4'1 ft. long and broad; pinnae 8-12; leaflets 12-14, nearly sessile, oblong, obtuse, or subacute, 1-2 in. long, rigidly subcoriaceous, glabrous, venulose. Flowers in long simple or panicled dense subspicate racemes with a thick furrowed woody finely brown-downy axis; bracts minute, lanceolate-cuspidate. Calyx 3/4 in., scarlet. Petals orange. Pod like that of *Cassalpinia digyna*.

**Gleitschis sinensis**, Linn.; Wall. Cat. 5811, is known in India in cultivation only.

103. **Cassia**, Linn.

Erect shrubs or trees, rarely herbs. Leaves simple, abruptly pinnate. Flowers usually large and showy, in axillary racemes and terminal panicles. Calyx-tube very short; sepals broad or narrow, imbricated. Petals 5, imbricated, sub-equal, usually broad. Stamens normally 10, but rarely all perfect, 3-5 being often reduced to staminodia or altogether absent; anthers mostly but not invariably basifixged, dehiscing by terminal pores or with the slit more or less continued longitudinally. Ovary sessile or stalked, many-ovuled; style incurved, stigma terminal. Pod very variable, terete or flat, usually septate, the albuminous seeds flattened, sometimes parallel with the valves, sometimes with the sepalis, dry, dehiscent or indehiscent.—Distrib. Species 340, spread everywhere in the tropics, a few extra-tropical. Monographed by Mr. Bentham in Trans. Linn. Soc. xxvii. p. 503, t. 60-3.

**Subgen. I. Fistula, DC. (Cassia, Roxb.) Sepals obtuse. Stamens all bearing anthers, of which those of the 2-3 lowest are larger than the others and the filaments longer. Pods very large, terete. Seeds compressed parallel with the dissepiments.—Trees.**


Central and Eastern Himalayas to Ceylon and Malacca, ascending to 3000 ft. in Kumaon, wild and often planted.—Distrib. China, Malay isles.

A middle-sized erect tree, glabrous in all its parts. Leaves a foot or more long; leaflets 2-6 in. long, ovate, distinctly stalked, usually acute, rigidly subcoriaceous, pale green, strongly veined. Racemes as long as the leaves; pedicels spreading, 1½-2 in. long. Calyx 3/4 in., glabrous, caducous. Petals ovate, shortly clawed, 1½ in. deep. Pod 1-2 ft. long, above an inch thick.


**Eastern Himalayas and to Malacca.—Distrib. Malay isles, Philippines.**

A tree, reaching a height of 50 feet. Leaves a foot or more long; leaflets oblong, acute, distinctly stalked, 2-4 in. long, rather oblique at the base, glossy, subcoriaceous, strongly veined, with a few obscure short hairs below. Racemes from the old
branches, dense, under half a foot long; bracts silky, lanceolate, persistent; pedicels twice the length of the flower, lower deflexed. Sepals downy, \( \frac{1}{4} \) in. Petals oblong, acute, \( \frac{3}{4} \) in. deep. Pod a ft. long, \( \frac{1}{4} \) in. thick.


**CEYLON AND WESTERN PENINSULA.**

Branches slender, sulcate. Leaves 4-1 ft. long; leaflets oblong, deeply emarginate, with a distinct mucro, 1-1\( \frac{1}{2} \) in. long, rigidly subcoriaceous, very oblique, strongly veined, persistently grey-downy beneath. Flowers in copious short axillary racemes and terminal panicles; bracts ovate-cuspidate; pedicels under 1 in. long.—Flowers and pod like that of *C. nodosa*, but much smaller.


**BURMA**; Taong-dong mountains and banks of the Irrawaddi, Wallich.

Closely allied to *C. marginata*. Leaves 1 ft. long; leaflets close, nearly sessile, ligulate-oblong, \( \frac{1}{2} \) to 2 in. long, broadly rounded at both ends, slightly oblique, rigidly coriaceous, finely grey-downy below; stipules oblong, cuspidate, large, membranous, persistent, fastened above the base. Pod 1 foot long, cylindrical, indehiscent, glabrous.

**SECTION 2. Senna** (Roxb. *ex parte*, as a genus). Sepals obtuse. Perfect *stamens* 7, the anthers subequal or those of the 2-3 lowest larger than the others; three posterior filaments without anthers. Pods compressed, rarely terete, the seeds usually flattened parallel with the valves.—Some trees, some shrubby herbs.

* Leaf with a single large gland placed just above the base of the common pediole.


Scattered from the Himalayas, to Ceylon, probably introduced.—Distrib. Cosmopolitan in the tropics.

A diffuse subglabrous undershrub, a few feet high, usually only of annual duration. Leaves \( \frac{1}{2} \) ft. long; leaflets glaucescent, fuscous, acuminate, 1-3 in. long, glabrous or finely pubescent. Racemes short-pedicelled, few-flowered, corymbose, axillary and forming a terminal panicle; bracts thin, ovate-acuminate, caducous; pedicels spreading, \( \frac{3}{4} \) in. Sepals obtuse, glabrous, \( \frac{3}{4} \) in. Petals \( \frac{1}{3} \) in. pale lilac, conspicuously veined. Pod 4-5 in. by \( \frac{3}{4} \) in., rather recurved, glabrous, subcompressed, distinctly torulose. Seeds 15-30.

Himalayas to Ceylon and Penang.—Distrib. Cosmopolitan in the tropics, probably native in Asia only.

Closely allied to C. occidentalis, from which it differs by its more shrubby habit, more numerous smaller narrower leaflets and shorter broader more turgid pods, which are not usually terolose when mature.

Var. purpurea; Roxb. Hort. Beng. 31, sp.; leaflets smaller more obtuse not more than 1 in. long, branches slender purple. C. purpurea, Bot. Reg. t. 856. Senna purpurea, Roxb. Fl. Ind. ii. 342.

** Leaf furnished with glands on the main rachis between the leaflets.


Universally spread through our limits in a truly wild state, ascending to 5000 ft. in the Central Himalayas.—Distrib. Cosmopolitan in the tropics.

An annual weed, growing up into an undershrub. Leaves distinctly petioled; leaflets 1-1½ in., glaucous, membranous, glabrous; stipules large, linear-subulate, caducous. Flowers usually in nearly sessile pairs in the axils of the leaves, the upper crowded. Corolla small, bright yellow. Pods ½-3 ft. by ½ in., membranous, the sutures very broad, the seeds flattened in the same direction as the pod.


A native of Tropical America, not unfrequently introduced.

A shrub, with virgate woody branches. Leaves distinctly petioled; leaflets green, membranous, obtuse, ¾-1½ in.; stipules small, subulate, caducous. Racemes copious, corymbose, as long as the leaves. Flowers middle-sized, bright yellow. Pods membranous, curved, sausage-shaped, ¼ ft. long, ½ in. thick, the sutures very narrow.


A native of Trop. America, introduced in the Nilghiris and Ceylon.

A tall shrub, with the branches and leaves beneath densely matted with greyomentum. Leaves short-petioled, 3-4 in. long; leaflets oblong, obtuse, oblique at the base. Flowers bright-yellow, middle-sized, in copious distinctly peduncled corymbose racemes. Lower anthers much larger than the others. Pod linear, membranous, 4-5 in. long, finely downy.—C. tomentosa, Wall. Cat. 5304 is C. hirsuta, Linn., a totally different species, also a native of Tropical America.


Wild in the Central provinces, the Western Peninsula and Ceylon; often planted elsewhere.

A tall shrub, with the virgate branches and underside of the leaves finely grey-dowmy. Leaves nearly sessile, 2-4 in. long; leaflets obovate-oblong, rigidly subcoriaceous, ¾-1 in., obtuse or emarginate, with a mucro; stipules large and foliaceous.
Flowers very large and showy, an inch deep, bright yellow, in copious corymbose racemes. **Pod** 4–5 in. long by \( \frac{3}{4} \)-\( \frac{5}{4} \) in., straight, ligulate, glabrous, flexible, dark brown, with a distinct space between the uniseriate seeds.

*** Leaf-rachis without glands.***


PUNJAB, SCINDE, WESTERN PENINSULA.—DISTRIB. Arabia, Egypt, Abyssinia.

Subglabrous, scarcely shrubby, 1–4 ft. high. **Leaves** distinctly petioled, 2–3 in. long; leaflets obvate-oblong, membranous, very glaucous, obtuse, with a minute mucro, \( \frac{3}{4} \)-\( \frac{5}{4} \) in. **Racemes** distinctly peduncled, equalling or exceeding the leaves; pedicels very short. **Sepals** glabrous, very obtuse. **Corolla** middle-sized, pale yellow. **Stamens** very unequal. **Pod** thin, glabrous, flexible, 1–1\( \frac{1}{2} \) in. by \( \frac{3}{4} \)-\( \frac{5}{4} \) in, short-stalked, narrowed suddenly at both ends, 6–12-seeded; sutures very thin.—**C. angustifolia**, Vahl. (C. lanceolata, *Wall. Cat.* 5318, *Royle. Ill.* t. 37, W. & A. *Prodr.* 288; Senna *officinalis*, *Roxb. Fl. Ind.* ii. 346), with 10–16 oblong-lanceolate acute leaflets and nearly straight oblong pods without crests, is a native of Tropical Africa and has no claim to be considered indigenous in India.


LOWER BENGAL, WESTERN PENINSULA, BIRMA and MALACCA.—DISTRIB. Cosmopolitan in the tropics.

A shrub, with very thick finely downy branches. **Leaves** subsessile, 1–2 ft. long; leaflets oblong, obtuse, 2–6 in. long, minutely mucronate, rigidly subcoriaceous, glabrous or obscurely downy beneath, broadly rounded, oblique at the base; rachis narrowly winged on each side of the face. **Racemes** peduncled, \( \frac{3}{4} \)-1 ft.; bracts large, membranous, caducous. **Corolla** yellow, very distinctly veined. **Stamens** very unequal. **Pod** membranous, dehiscing, straight, glabrous, 4–8 in. by \( \frac{3}{4} \)-\( \frac{5}{4} \) in. **Seeds** 50 or more.


WESTERN PENINSULA, CEYLON, MALAYAN PENINSULA and SIAM.—DISTRIB. Malay isles.

A low tree, with virgate finely grey-downy terete branchlets. **Leaves** \( \frac{3}{4} \)-1 ft.; leaflets oblong, glaucous, subcoriaceous, epomarginate, strongly veined, subglabrous, distinctly stalked, 2–3 in. long. **Corynbs** crowded, both axillary and in a terminal panicle \( \frac{3}{4} \)-1 ft. long, with grey-pubescent branches. **Sepals** downy, very obtuse. **Petals** middle-sized, bright yellow, not veined. **Stamens** subequal. **Pod** nearly straight, flat, distinctly stalked, 6–9 in. by \( \frac{3}{4} \) in., firmer in texture and with thicker sutures than in the next two.

12. **C. montana**, Heyne; *DC. Prodr.* ii. 499; stipules minute caducous, leaflets 20–30 with a large mucro, racemes corymbose forming a long end pa-

Hills of the Western Peninsula.


13. **C. timoriensis**, DC. Prodr. ii. 499; stipules persistent foliaceous, leaflets 20–24 with a minute mucro, racemes corymbose forming a long end panicle, pod ligulate thin flat not winged, the sutures thin.  C. palmata, Wall. Cat. 5306.

BIRMA, MARTABAN, TENASSERIM, CEYLON.—DISTRIB. Malay isles, Philippines, N. Australia.


**Subgen. 3. Psilorhegma, Vogel.** Like the last, but all the ten stamens perfect, with subequal anthers.


HIMALAYAS to CEYLON and MALACCA.—DISTRIB. Malay isles, Trop. Australia, Polynesia.

A tall tree, with glabrous terete branchlets.  Leaves distinctly petiolar, 1/8–1/4 ft.; leaflets ovate, acute or subobtuse, 2–4 in. long, subcoriaceous, very glaucous; rachis with conspicuous glands between the lower, rarely (C. fastigiata, Vahl), between all the leaves; stipules narrow, caducous.  Racemes corymbose, not panicled.  Sepals large, obtuse.  Flowers large, bright yellow.  Pod flat, thin, strap-shaped, glabrous, 6–8 in. long, 1/4–1/3 ft. broad, distinctly stalked.  20–30-seeded.


**Subgen. 4. Lasiorhegma, Benth.** Sepals narrow.  Stamens 5–10, all perfect.  Pod small, strap-shaped, flat, dehiscent, the seeds compressed parallel with the valves.—Diffuse low slender annual or perennial herbs.

* Leaflets 4, large, membranous.


Foot of the Western Himalayas to CEYLON.—DISTRIB. Everywhere in the tropics of old world.
An erect annual, 1-2 ft. high, with stem and leaves clothed with grey bristly viscose hairs. Leaves long-petioled; leaflets oblong, very oblique, 1-2 in. long, obtuse or subacute; stipules small, linear, persistent. Racemes narrow, equalizing or exceeding the leaves. Sepals lanceolate, bristly, $\frac{1}{6}$ in. Corolla reddish-yellow, very small. Pod oblique, ligulate, 1-1½ in. long, 5-6-seeded, the thin valves beset with grey bristly hairs.

** Leaflets very numerous, close, small, narrow, rigidly subcoriaceous (Mimosoideae).


From the Himalayas (ascending to 6-7000 ft.) to Ceylon.—Distrib. Malay isles, Trop. Australia.

A low very diffuse shrub, with slender finely downy branches. Leaf 1-2 in. long; leaflets 20-40, $\frac{1}{4}$-½ in. long, distinctly mucronate, the midrib close to the upper border; stipules linear, rigid, persistent. Flowers usually solitary in the axils of the leaves, on very short pedicels. Sepals $\frac{1}{2}$ in. Corolla little exserted. Anthers 5 equal. Pod 3½-1½ in. by $\frac{1}{4}$-½ in. — Probably this and the next are mere varieties of *C. mimosoideae*.


Western Peninsula and Ceylon.—Distrib. Java.

Very like *C. pumila*, but more robust, the branches thinly or densely pilose. Leaflets 20-40, reduced to 8-12 on the lowest leaves, $\frac{1}{4}$-½ in. long, rigidly coriaceous, strongly veined, with a distinct oblique mucro, the midrib close to the upper border. Flowers 1-3 together in the axils of the leaves, on downy bracteate pedicels. Calyx $\frac{1}{4}$-½ in. Petals obvate, little exserted. Pod 1½-2 in. long, rather recurved, blackish, glabrescent.


Himalayas, ascending to 5-6000 ft. in Kumaon and Khasia, to Ceylon and Malacca.—Distrib. Cosmopolitan in Tropics.

A low diffuse perennial, with slender shrubby finely downy branches. Leaves 1-3 in. long, with a solitary sessile gland on the rachis below the leaflets; leaflets 60-100, linear, rigidly coriaceous, $\frac{1}{8}$-½ in. long, obliquely mucronate, with the midrib close to the upper border; stipules large, linear-subsulate, persistent. Flowers 1-2 together in the axils of the leaves on short pedicels. Sepals $\frac{1}{4}$-½ in., lanceolate-acuminate, bristly. Corolla little exserted. Stamens 10, alternately longer and shorter, Pod strap-shaped, flat, dehiscent, 1½-2 in. by $\frac{1}{4}$ in, nearly straight, glabrescent or finely downy; septa more or less oblique.

Var. 1. dimidiata; Roxb. Hort. Beng. 32, sp.; leaves and flowers of the type but the stamens 5 only. Senna dimidiata, Buch. in Roxb. Fl. Ind. ii. 352.—Himalayas.

Var. 2. Wallithioida; DC. Prodr. ii. 505, sp.; finely downy, leaflets larger 1½-3 in. long and less rigid, flowers larger $\frac{4}{4}$-½ in. long. Wall. Cat. 5320; W. & A. Prodr. 292. C. Leschenaultii, Wall. Cat. 5325. C. myriophylla, Wall. Cat. 5326. C. Telfairiana, Wall. Cat. 5324; Bot. Mag. t. 5874.—Distribution of the type.

Var. 3. auricoma; Grah. in Wall. Cat. 5322, sp.; flowers and leaves of the last, but the branches densely clothed with fine spreading hairs.
DOUBTFUL SPECIES.

C. JAVANICA, Linn.; DC. Prodr. ii. 490, Wall. Cat. 5309 (C. Bacillus, Gaertn.; Rob. Fl. Ind. ii. 337, Wt. Icones, t. 252) differs from C. nodosa by its smaller and more obtuse leaflets. It is sometimes cultivated within our limits and is wild in the Malay isles. A plant gathered by Griffith near Prome is either a variety with leaflets densely pubescent beneath or a new species. The inflorescence of both this and the Malay plant corresponds with that of C. nodosa.

104. CYNOMETRA, Linn.

Erect unarmed trees. Leaves with few coriaceous odd-pinnate leaflets. Flowers copious, minute, in axillary corymbs or racemes. Cal., with a very short tube and subbasal disk; divisions 4–5, oblunge, imbricated. Petals 5, oblongate, equal, not exserted. Stamens 10, or in C. polyandra indefinite, filaments erect, free, filiform, exserted; anthers small, oblong, versatile, dehiscing longitudinally. Ovary sessile or short-stalked, 2-ovuled; style filiform, stigma capitate. Pod turgid, oblique-oblong, with very thick indeliscent usually rugous tough somewhat fleshy valves. Seed exalbuminous, central, filling up the cavity.—Distrib. Species 20, spread everywhere in the tropics.


Western Peninsula and Ceylon.—Distrib. Malay isles, Philippines, N. Australia.

Leaflets 1-jugate and 2-jugate mixed or often all 1-jugate, sub sessile, if 2-jugate (var. heterophylla, Thwaites) the upper much the largest, oblong, subacute, or glabrous, 3–6 in. long; petiole 1/4–1 1/2 in. Racemes few-flowered, corimbse, sessile from the axis of the leaves of the branchlets, with the primary axis not produced, rarely geminate; outer scales ovate, 1/4–1/2 in.; pedicels 1/4–1 in. Sepals 1/4 in. Pods turgid, very rugose, 1/4–1 in. long, sub sessile.

Var. mimosaides, Wall. Cat. 5817, sp.; leaflets all bi jugate not so unequal as in the bijugate form of the type much smaller 1–3 in. long more obtuse and thicker, flowers and pod smaller, the latter pointed and very deeply wrinkled. C. bijuga, Spanog.; Miq. Flor. Ind. Bat. i. 78.—Western Peninsula, Pegu, Tenasserim.

2. C. travancorica, Bedd. Fl. Sylva. t. 316; leaflets 2, flowers in sessile corymbs from the branchlets, pod flat smooth.

South Travancore and in the Carnatic near Tinnevelly, alt. 2–4000 ft., Beddome. Petioles 1/4–1 in.; leaflets always unijugate, oblique oblong-lanceolate, subacute, glabrous, 2–3 in. long. Racemes solitary, copious, rounded, few-flowered, with the central axis not at all produced; bracts 1/2 in., deltoid; pedicels erecto-patent, 1/4–1 in. Sepals 1/4 in., finally reflexed. Filaments twice the length of the sepals. Pod flat, smooth, firm, semicircular, sessile, 1–1 1/4 in. long.


Malacca, Moingay.—Distrib. Philippines, Cuming, 1297.

Leaflets subcoriaceous, rigid, glabrous, oblique, obovate-oblong, subequal, in our specimens 2–3 in. long. Flowers in very dense oblong sessile cone-like racemes, 1 1/2–2 in. long, the central axis produced; outer bracts round-cordate, obtuse, 1/2 in.; pedicels
erecto-patent, \( \frac{1}{4} - \frac{1}{2} \) in. Sepals \( \frac{1}{4} \) in., permanently ascending. Filaments twice the calyx. Pod \( \frac{1}{4} \) in. thick, woody, oblique obovate, 2-2\( \frac{1}{2} \) in. long, not at all wrinkled.—Col. Beddome has found a plant in South Canara with 3 pairs of leaflets and similar bracts, of which the flowers are not yet known.

4. **C. cauliflora**, Linn.; DC. Prodr. ii. 509; leaflets usually 2, flowers in dense sessile congested racemes from thick branches with the axis produced, pod turgid wrinkled. Roxb. Hort. Beng. 32; Wall. Cat. 5816, ex parte; W. & A. Prodr. 293; Bedd. Fl. Sylv. t. 315 (*analysis*).

**Western Peninsula, Ceylon, Malacca.**—Distrib. Malayan isles.

Branchlets slender, glabrous. Petioles very short; leaflets very rarely bijugate, and if so very unequal, rigidly coriaceous, sessile, glossy, obovate, very oblique obtuse or subacute, 3-6 in. long. Racemes congested in dense rounded masses, not more than an inch long, the central axis of each produced, the short erecto-patent pedicels subtended by small roundish spreading persistent bracts. Calyx \( \frac{1}{8} \) in. Pod like that of *C. ramiflora*, oblique oblong, very turgid, 1-1\( \frac{1}{4} \) in. long.

**Subgen. 2. Pseudocynometra, W. & A.** Stamens indefinite.


**Khasia, Silhet, Penang, Malacca.**

Branchlets slender, glabrous. Leaves nearly sessile, \( \frac{1}{2} - \frac{3}{4} \) ft.; leaflets 4-6, usually the latter, sessile, oblique-oblong or obovate, 2-4 in. long, rigidly subcoriaceous, acute or subobtuse, glossy. Flowers in dense corymb, sessile in the axils of the leaves of the branchlets; pedicels downy, \( \frac{1}{4}-\frac{3}{4} \) in. Sepals \( \frac{3}{4} \) in., reflexed. Stamens 40-60, much exerted. Pod oblique oblong, smooth, woody, 2 in. long.


Unarmed trees. Leaves abruptly pinnate; leaflets few. Flowers small, panicked. Calyx with a very short tube and basal disk; segments 4, valvate, the two upper being connate. Petal one, the same size and shape as the upper lip of the calyx. Stamens 10, the upper one free from the others, shorter and anantherous, the rest declinate, shortly monadelphous, unequal, the upper longest, exserted; anthers oblong, versatile, dehiscing longitudinally. Ovary 2-ovuled, short-stalked; stigma long, filiform, circinate, stigma minute terminal. Pod like that of *Guianlandina*, oblique, round-oblong, dehiscent, the flat, hard valves armed all over the face with straight large firm prickles.—Distrib. Another species or variety in Sumatra.


**Singapore, Wallich; Malacca, Griffith, Maingay.**

A small erect unarmed tree, with branches clothed with short brown pubescence. Leaflets rigidly coriaceous, 2-3 in. long, subobtuse, oblong, glossy above, closely pubescent beneath. Panicles dense, axillary and terminal; bracts cordate, roundish spreading or reflexed; pedicels nearly as long as the calyx. Calyx \( \frac{1}{4} \) in., brown-downy, the sepals armed towards the tip with large firm prickles. Pod glabrous, sublignose, 2-3 in. long.

Var. 1. *siamensis*, Teysm., sp.; leaflets 6 obovate distinctly emarginate larger thinner strongly veined the end one 3-4 in. long.—Siam, Teysmann.

Var. 2. *intermedia*, Baker; leaflets 6-8 smaller more acute, flowers smaller, and receding towards the next by its shorter pedicels, caducent bracts, calyx without prickles and more densely velvety sepals and branches.—Malacca, Maingay.
2. **S. velutina**, Baker; branchlets and leaves below densely tomentose, leaflets 10-12, bracts caducous, calyx not prickly.

**Malacca, Dr. Maingay.**

Leaves $\frac{1}{2}-\frac{3}{4}$ ft. Pubescence of branchlets calyx and underside of leaves much longer and more dense than in the last, bright brown. **Leaflets** 3-3$\frac{1}{2}$ in. long, oblong, subacute, very thick and rigid. **Pedicels** very short. **Buds** $\frac{3}{4}$ in. long. **Ovary** and lower part of filaments more densely pubescent than in the last. **Pod** not seen.

106. **Dialium**, Linn.

Erect unarmed trees. **Leaves** odd-pinnate, with alternate leaflets. **Flowers** copious, small, obscure, in ample terminal panicles. **Calyx-tube** very short; sepals lanceolate or ovate-lanceolate, subequal, much imbricated. **Petals** 0. **Stamens** 2, erect, included; **anthers** dehiscing longitudinally, attached near the base. **Ovary** sessile, 2-ovuled; style filiform, stigma terminal. **Pod** firm, dry, indehiscent, oblong, 1-seeded; endocarp pulpy. **Seed** albuminous.—**Distrib.** Species about 10, cosmopolitan in the tropics.

* **Sepals** oblong-lanceolate, not more than $\frac{1}{2}$ in. broad.

1. **D. ovoides**, Thw. Enum. 97; leaflets 3-5 the end one cuneate at the base, branches of the panicle ascending, pedicels nearly as long as the calyx, pod brown-velvety. **Bedd. Fl. Sylv.** t. 181.

**Ceylon,** districts north of Kandy, Thwates.

A tall tree. **Leaflets** conspicuously alternate, rigidly subcoriaceous, thinner than in the following, glabrous on both sides, strongly veined, not glossy above, 2-4 in. long, subobtuse, narrowed gradually from the middle to both ends; petiolules $\frac{3}{4}$ in. **Panicle** ample, with slender finely grey-downy branches. **Bud** lanceolate, $\frac{3}{4}$ in. long. **Sepals** subpetaloid, lanceolate, under $\frac{1}{2}$ in. broad, thinly grey-downy. **Filament** nearly as long as the anther in the developed flower. **Pod** ovoid, slightly compressed, $\frac{1}{4}$-in. long, ciliate, with an agreeable acid flavour; seeds round, compressed, shining, yellow or reddish-brown.—Closely allied to the Javan D. inuun, Linn. (Bennett Pl. Jav. Rar. t. 30), which is not known within our limits, and differs by its oblong buds and shorter filaments and petiolules.


**Singapore, Dr. Maingay.**

Leaflets more crowded on the rachis than in the last, distinctly alternate, oblong-cuspidate, glabrous, 3-4 in. long, rigidly coriaceous, glossy above, dull and paler below; petiolules $\frac{3}{4}$ in. **Panicle** ample, close, with rigidly erecto-patent main branches, the lowest springing from the axils of the upper leaf; pedicels ascending, not more than half as long as the calyx. **Sepals** $\frac{1}{4}$ in., oblong-lanceolate, thinly coated on the back with grey-brown pubescence. **Filaments** much shorter than the anthers. **Pod** obovoid, 1 in. long, firm, persistently brown-velvety.

3. **D. laurinum**, Baker; leaflets 7 rounded at the base, branches of the panicle ascending, pedicels short, pod not velvety.

**Malacca, Dr. Maingay.**

Leaflets oblong, broadly rounded at the base, narrowed suddenly to a subobtuse point, 4-5 in. long, rigidly coriaceous, glossy above, glabrous, opaque, strongly veined beneath; petiolules $\frac{3}{4}$ in. **Panicles** axillary and terminal; pedicels very short, ascending. **Bud** ovoid-oblong, $\frac{1}{4}$ in. long. **Sepals** oblong-lanceolate, densely grey-downy on the back. **Filaments** very short. **Pod** roundish, 1 in. deep, fragile, black, thinly coated with greyish-brown down. **Seed** as large as a bean.
4. **D. patens**, Baker; leaflets 3–5 rounded at the base, branches of the panicle spreading, pedicels as long as the calyx, pod not velvety.

**Malacca, Griffith, Maingay.**

Leaflets opposite or subopposite, oblong, rigidly coriaceous or subcoriaceous, glabrous, 3–5 in. long, obtusely pointed, finely veined, rather glossy; pedicules ⅔–1 in. **Panicles** both axillary and terminal, ample, flexuose with the distant main branches spreading or even sometimes decurved; pedicels ascending, spreading or cernuous. **Bud** ⅓ in., ovoid-oblong. **Sepals** oblong-lanceolate, subpetaloid, thinly grey-downy. **Filaments** very short. **Pod** 1 in. long, round-oblong, firm, black, thinly coated with grey-brown down; **seed** oblong, ⅔–⅓ in. long.

**Sepals ovate-lanceolate ⅓–⅔ in. broad.**


**Malacca, Griffith, Maingay.**

Leaflets 5–7, distant, conspicuously alternate, oblong, pointed, 4–6 in. long, rounded or the end one subcuneate at the base, rigidly coriaceous, rather glossy above, finely veined beneath, with a persistent coating of bright yellowish-brown silky pubescence; pedicules ⅔ in. **Panicles** ample, deltoid, moderately close, terminal and axillary, the branches clothed with fine brown silky pubescence, the main ones erecto-patent; pedicels ascending or cernuous, much shorter than the calyx. **Bud** ovoid, under ⅔ in. long. **Sepals** leathery, densely brown-velvety on the back, reflexed when the flower is fully expanded. **Filaments** thick and fleshy, nearly as long as the anthers. **Pod** round-oblong, ⅔–⅓ in. long, hard, persistently brown-velvety. **Seeds** oblong, compressed, glossy, chestnut-brown.


Unarmed trees. **Leaves** abruptly pinnate, with few leaflets. **Flowers** very abundant, minute, punicled. **Calyx** with scarcely any tube and a subbasal disk; **sepalas** usually 5, rarely 4, oblong, imbricated, subpetaloid, persistent. **Corolla** 0. **Stamens** twice the sepals in number, included or exserted; **filaments** filiform; **anthers** versatile, dehiscing longitudinally. **Ovary** sessile, 2-ovuled; **style** filiform, stigma capitate. **Pod** subindehiscent, dry, with only the upper ovule perfected; **seeds** exalbuminous.—**Distrib.** One other species, Trop. African.


**Behar and Western Peninsula,** ascending to 3500 ft.

A tree 100 feet high, with slender glabrous branches. **Leaflets** like those of a Bauhinia, oblique, ovate-trapezoid, 1–3 in. long, obtuse or subacute, with 4–5 ribs radiating from the base. **Panicles** axillary and terminal; pedicels as long as the calyx, not bracteolate. **Sepals** oblong, obtuse, under ⅔ in. long. **Pod** like that of Spaltholobus, thin, flexible, 2–3 in. long.

2. **H. pinnata**, Roxb. Fl. Ind. ii. 425; leaflets 4–6 alternate peltiolute not oblique, stamens exserted, stigma minute, racemes dense narrow, pod obovoid or oblong nearly or quite filled up by the seed. Wall. Cat. 5807; DC. Prodr. ii. 487; W. & A. Prodr. 284; Bedd. Fl. Sylv. t. 255.
Ghauts of Canara, Travancore and the Carnatic.

Leaflets oblong, rigidly coriaceous, acute, 2–4 in. long, venulose, the upper of the uppermost pair sometimes apparently terminal; midrib central, veining pinnate; petiolules 3–4 in. Panicles copious, axillary and terminal, formed of dense slender cylindrical racemes; pedicels spreading, 1/2 in. Calyx broadly campanulate, under 1 in. long, with a pair of adpressed bracteoles. Filaments twice as long as the sepals. Pod turgid, 1 1/2–2 in. long, rigid, subligneous, not at all oblique.

108. CRUDIA, Schreb.

Glabrous shrubs or trees. Leaves odd-pinnate,* with conspicuously alternate leaflets. Flowers in terminal or lateral racemes. Calyx-tube very short, with the disk nearly basal; segments 4, oblong, imbricated, persistent, reflexed. Petals 0. Stamens 10, exserted, filaments free, filiform; anthers oblong, versatile, dehiscing longitudinally. Ovary stalked, few-ovuled; style filiform, stigma terminal capitate. Pod flat, rigidly coriaceous, 2-valved. Seeds exalbuminous.—DISTR. Species 10, one African, the rest Trop. American.


Ceylon, near Caltura, Thwaites.

A tall tree, with slender glabrous branchlets. Leaflets 3–5, oblong, short-stalked, rigidly subcoriaceous, rather oblique, obtusely pointed, bright green above, paler beneath, strongly veined. Racemes dense, terminal, on short branches, as long as or shorter than the leaves; pedicels reflexed, finally 1/2 in., equaling the reflexed coriaceous sepals. Ovary distinctly stalked, oblique-oblong, densely clothed with pale brown tomentum. Ovules 3–4. Pod not seen.

109. SARACA, Linn.

Erect trees. Leaves abruptly pinnate, glabrous, rigidly coriaceous. Flowers in dense sessile corymbose axillary panicles, with subpetaloid reddish bracteoles. Calyx with the disk at the summit of a cylindrical tube; divisions 4, oblong, unequal, subpetaloid. Corolla 0. Stamens 3–8, exserted with long filiform filaments, and oblong versatile anthers opening longitudinally. Ovary many-ovuled with a stalk produced beyond the disk; style long, filiform, stigma minute capitate. Pod flat, dehiscing, rigidly coriaceous. Seeds exalbuminous.—DISTR. Species 6, restricted to India and Malaya.


From the Central and Eastern Himalayas, ascending to 2000 feet in Kumaon, Ceylon and Malacca.—DISTR. Malay isles.

A low erect tree. Leaves sessile or subsessile; leaflets oblong or oblong-lanceolate, acute or obtuse, 3–9 in. long rigidly subcoriaceous. Corymba dense, 3–4 in. broad; pedicels stout, 1/2 in. long, below the oblong-spathulate ascending amplexicaul bracteoles. Sepals 1 1/2 in., obovate-oblong. Filaments three times as long as

* Wrongly given as equally pinnate in the Key.

2. **S. cauliflora**, *Baker*; leaflets 10–12, petiolules long, bracteoles 0, corymbs dense from thick old branches, sepals half as long as the calyx-tube, stamens about 7.

**Malacca**, *Griffith, Maingay*.

P **Etiolules** ½ in. long; leaflets rigidly subcoriaceous, strongly veined; upper ob lanceolate-oblong, acute, a foot or more long; lower shorter, more oblong. *Cor ymb* solitary or geminate, nearly sessile, ample, dense, 4–6 in. broad; main branches stout, woody; pedicels of lower flowers disarticulated at the base before the upper expand; bracteoles none to be seen in the specimens. *Flowers* the same size as in the last, but the tube and pedicels more slender.—Closely approaches the Malayan *S. declinata*, Miquel, in habit, foliage and inflorescence, but that has only 4 stamens.

3. **S. Lobbiana**, *Baker*; leaflets 10–12, petiolules short, bracteoles large caducous, cor ymbs sparse from young slender branches, sepals half as long as the calyx-tube, stamens 7–8.

**Martaban**; foot of Mount Kola, Moulmein, *Lobb*.

A tree 40 feet high. *P etiolules* ½ in.; leaflets thinner than in the last two, ob lanceolate-oblong, subacute, ½–1 ft. long. *Cor ymb* solitary from leafless slender branches, with only a few erecto-patent branches; bracteoles 2–½ in., oblong-spathulate, navicular, amplexicaul, falling before the flowers expand. *Sepals* oblong, ½ in. deep. *Stamens* twice as long as the sepals. *Flowers* yellow, turning to reddish.


**Tenasserim**, *Malacca*—**Distr ib. Siam, Sumatra**.

P **Etiolules** ½ in.; leaflets ob lanceolate-oblong, subcoriaceous, subobtuse or sub-acute; upper 4–1 ft. long. *Cor ymb* sessile from the side of slender branches, round, very dense, sometimes 6–8 in. broad; bracts persistent, spreading or reflexed; bracteoles ovobate, under ½ in. long, not boat-shaped or amplexicaul, bright-coloured. *Sepals* under ½ in. long. *Filaments* 3–4 times as long as the sepals. *Pod* oblong, 5–6 in. by 1½–2 in.—Very near the Malay *S. macroptera* and *palembanica*, Miquel.

110. **Amherstia**, *Wall*.

An erect tree. *Leaves* abruptly pinnate. *Flowers* racemed. *Calyx* with a long cylindrical disciferous tube; sepals 4, oblong, the two lowest connate. P **Etals** only 3 developed, the upper very broad, with a long claw, the two lateral as long, but narrower, oblong-spathulate, the two lowest rudimentary. *Stamens* diadelphous, 9 lower having the filaments connate in a long tube, alternately larger and smaller, the upper free from the base; anthers versatile, dehiscing longitudinally. *Ovary* stalked beyond the disk, many-ovuled; style long, filiform, stigma capitate. *Pod* large, flat, almost woody, dehiscing. *Seeds* large, round-oblong, compressed, exalbuminous.—**Distrib.** A single endemic species.


**Martaban**, **Tenasserim** and **Malacca**, often planted. An erect unarmed tree. *Leaves* very large, abruptly pinnate; leaflets oblong, acuminate, ½–1 ft., opposite, glabrous, subcoriaceous. *Flowers* in ample pendulous
racemes, the most showy of those of the Indian Leguminose; pedicels 2–4 in., with a pair of large lanceolate persistent coloured bracteoles at the apex enclosing the buds. Sepals membranous, coloured, 1 in. long. Petals mixed brilliant red and yellow, the upper one 2 in. long and broad; tube as long as the sepals, cylindrical. Pod like that of a Milletia, ½ ft. long, 1½ in. broad, glabrous, truncate, 4–6-seeded.

111. TAMARINDUS, Linn.

A spineless tree. Leaves abruptly pinnate. Flowers racemed. Calyx-tube turbinate; disk produced some distance above its base; teeth lanceolate, much imbricated, the two lowest connate. Petals only the three upper developed, the two lateral ovate, the upper hooded, the two lower reduced to scales. Stamens monadelphous, only 3 developed, the others reduced to mere bristles at the top of the sheath; anthers oblong, versatile, dehiscing longitudinally. Ovary many-ovuled, with a stalk adnate to the calyx-tube; style filiform, stigma capitate. Pod ligulate, many-seeded, with a thin crustaceous epicarp and thick pulp mesocarp. Seeds exalbuminous.—A single species.


Diffused throughout India and the Tropics generally, probably indigenous in Africa.

A large unarmed tree. Leaves abruptly pinnate, with 20–40, glabrescent, close obtuse opposite oblong leaflets. Flowers few together, in copious lax racemes at the end of the branchlets; pedicels articulated at the base of the calyx; bracts boat-shaped, enclosing the buds, caducous. Petals under ½ in. long, yellow, striped with red. Pod 3–6 in. by 1 in. or more, 3–10-seeded.

112. HUMBOLDTIA, Vahl.

Unarmed erect small trees. Leaves abruptly pinnate, with persistent usually peltate stipules. Flowers small, in copious racemes, each furnished with a pair of persistent coloured bracteoles at the base. Calyx-tube turbinate, with the disk produced some distance above its base; sepals 4, oblong, subequal, imbricated. Petals 5 or 3, oblong-spathulate, clawed, subequal, exceeding the calyx. Stamens 5, equal, exerted, alternating with 5 minute staminodes, filaments filiform; anthers oblong, versatile, dehiscing longitudinally. Ovary with a stalk immersed in the disk, linear, few-ovuled; style very long, filiform, stigma terminal. Pod flat, dehiscent, rigidly coriaceous. Seeds exalbuminous.—Distrib. Species 5, the other Tropical African.


MALABAR and CEYLON.

A low tree, with the internodes of the branchlets conspicuously swollen. Leaves ½–1 ft. long; leaflets oblong, cuspidate, rigidly subcoriaceous, glabrous, 3–4 in. long; stipules coriaceous, very large, oblong-lanceolate, 1 in. or more long above the attachment. Racemes dense, axillary, drooping, nearly sessile, 3–6 in. long; pedicels ½–1 in. Flower ½ in. long, exclusive of the exerted stamens; bracteoles oblong-spathulate, half as long as the calyx. Pod rigid, ligulate-oblong, 3–4 in. long. Seeds 3–4.

**Trayancore mountains**, alt. 3—4500 ft., Beddome.

A large tree, glabrous in all its parts, with terete slender branchlets. **Stipules** lanceolate, \( \frac{1}{4} \) in., rigidly coriaceous; petiole very short, broadly flattened and hallowed out on the face; leaflets oblong-lanceolate, rather oblique, 5—6 in. long, obtusely acuminate, glossy on the upper surface. **Pedicels** \( \frac{1}{2}—\frac{1}{3} \) in., spreading, finely silky; bracteoles obtuse, half as long as the calyx. **Flower** \( \frac{1}{2} \) in. long, exclusive of the exserted stamens. Petals bright red.


Ghauts of **Nilghiris** and **Coorg**. Branchlets slender, terete. **Petiole** not flattened; stipules small, lanceolate above the attachment, with a transverse oblong spur; leaflets oblong, rigidly subcoriaceous, glabrous, obtusely cuspidate, 4—6 in. long. **Racemes** axillary, distinctly peduncled, equaling or exceeding the leaves; pedicels \( \frac{1}{2}—\frac{1}{3} \) in., spreading or ascending; bracteoles and calyx grey-downy. **Flower** \( \frac{1}{3}—\frac{1}{2} \) in. long, exclusive of the exserted stamens.


**Nilghiris**; juncles about Conoor, Dr. Wight.

Branchlets slender, terete. **Stipules** 1 in. or more long, lanceolate above, transversely oblong below the point of attachment; leaf-rachis 5—7 in. long, including the 1 in. petiole; leaflets oblong-lanceolate, acuminate, glabrous, rigidly coriaceous, 5—6 in. long, both sides finely venulose. **Racemes** peduncled, subspicate, 1—3-nate; bracteoles and sepals very downy on the back, the latter \( \frac{3}{4} \) in. long. Petals very caduceous, not exceeding the sepals. **Pod** almost woody, \( \frac{3}{4} \) ft. by 1\( \frac{1}{2} \) in., narrowed to the point.

113. **Afzeilia**, Smith.

Erect unarmed trees. **Leaves** abruptly pinnate, with few pairs of opposite leaflets. **Flowers** in copious terminal panicles. **Calyx** with the disk produced to the top of its elongated tube; sepals 4, much imbricated, slightly unequal. Developed **petal** one, orbicular with a distinct claw, the others absent or rudimentary. **Stamens** 3—5, declinate, filaments long, pilose; anthers minute, oblong, opening longitudinally. **Pod** large, oblong, flattish, subgloseous, subindehiscent.—**Distrib.** Tropics of the Old World; species 10.


**Malacca**, Griffith. **Andamans**, Kurz.

A shrub, glabrous in all its parts. **Leaflets** stalked, oblong, subcoriaceous, 2—3 in. long, obtuse, conspicuously emarginate. **Flowers** in simple corymbose terminal racemes; pedicels \( \frac{1}{2} \) in. **Calyx-tube** \( \frac{1}{2}—\frac{1}{3} \) in., cylindrical; sepals \( \frac{1}{4} \) in. broad. **Petal** twice as long as the sepals; blade round, \( \frac{1}{2} \) in. broad. **Pod** oblong, subcoriaceous, 3—4 in. by 1—1\( \frac{1}{2} \) in.


MALAY peninsula, Wallich, Griffith.—Distr. Seychelles and Malay isles and Polynesia.

An erect tree, 50 feet high. Leaves stalked, obliquely oblong, subcoriaceous, glabrous, 2-5 in. long, subacute or obtuse. Flowers in a dense terminal corymbose panicle; pedicels $\frac{1}{2}$-$\frac{3}{4}$ in., grey-downy. Calyx-tube cylindrical, $\frac{3}{4}$-$\frac{3}{2}$ in. Petal exerted, round, with a long claw. Filaments above 1 in. Pod rigid, flat, oblong, 6-8 in. long; seeds 4-5.


A tall unarmed erect tree. Leaves stalked, oblong, subcoriaceous, obtuse, emarginate, 2-4 in. long; lowest pair distinctly smallest. Flowers in a dense terminal corymbose panicle; pedicels $\frac{1}{2}$-$\frac{3}{4}$ in., grey-downy. Calyx-tube cylindrical, $\frac{3}{4}$-$\frac{3}{2}$ in. Petal not exerted. Filaments $\frac{3}{4}$-1 in. Pod oblong, almost woody, glossy, 6-10 in. by 3 in., straight or rather curved.

4. A. coriacea, Baker; leaves 4-6, panicle thyrsoid with racemose branches, calyx-tube much shorter than the limb, fertile stamens 9. Intsia coriacea, Maingay MSS.

MALACCA, Maingay.

Leaves stalked, oblong, glabrous, very rigid and coriaceous, 3-4 in. long, obtuse, emarginate. Flowers in copious elongated terminal panicles, with distant racemose branches, clothed like the pedicels and calyx with thin rusty tomentum. Calyx-tube very short; sepals $\frac{3}{4}$ in., much narrower and less imbricated than in the two other species. “Filaments alternately longer and shorter (6 long, 4 short), in bud, connate into a partial tube at the base,” Maingay. Pod not seen.—May prove a Puhudia, but we have young buds only.

114. BAUHINIA, Linn.

Unarmed erect trees or climbers with circinate tendrils. Leaves simple, usually deeply cleft from the tip, rarely entire or fully divided into 2 leaves. Flowers showy, in copious simple or panicked often corymbose racemes. Calyx-tube with the disk produced to the top, sometimes long and cylindrical, sometimes short and tubinate; limb entire and spathaceous, or cleft into 2 or 5 teeth. Petals 5, subequal, usually with a distinct claw. Stamens 10, or reduced to 5 or 3, if fewer than 10 with sterile filaments absent or present, filaments free, filiform; anthers versatile, dehiscing longitudinally. Ovary stalked, many-ovuled; style long or short, stigma small or large and peltate, subterminal or oblique. Pod linear or rarely oblong, flat, continuous within, dehiscent or indehiscent. Seeds albuminous.—Distr. Species 130, spread everywhere in the Tropics.

Sec. 1. PAULETIA, Cav. Fertile stamens 10. Calyx with a very short tube and spathaceous limb. Pod narrow, dehiscent.—Erect shrubs with large showy flowers and connate leaves.

L. LEGUMINOSE. (J. G. Baker.) [Bauhinia.]

NORTH WEST Provinces to CEYLON and PENANG.—Distrib. Malay isles, China, Trop. Africa.

An erect shrub, with downy branches. Leaf broader than long, not cordate, coriaceous, 1-2 in. deep, cleft less than half way down into two obtuse lobes, pubescent below, 7-nerved. Flowers usually in short-peduncled pairs from the axils of the leaves, rarely 1 or 3; pedicels with a pair of large persistent linear bracteoles. Calyx-limb broad-ovate, finely downy, 1 in. Petals 1½-2 in. long, obovate-spathulate, yellow, the upper with a red blotch on the face. Style 1–2 in. Pod distinctly stalked, 4–5 in. by ½-3 in., 6–10-seeded, glabrous.


AVA; Taong-dong mountains, Wallich.

A doubtful plant, known only in fruit. Branches slender, glabrous. Leaf cordate, roundish, thin, glabrous, 9-ribbed, cleft a third down into two obtuse lobes. Racemes short-peduncled, many-flowered, about as long as the leaves; pedicels ascending, ½ in. Pod 1¾–1½ in. by ½ in., narrowed to both ends, 2–3-seeded, dehiscent.


MARTAN; banks of the Attrum river, Wallich.

Another doubtful species, known only in bud and pod. Leaves suborbicular, slightly cordate, 3–4 in. long, glabrous, flexible, obtusely lobed 3/4 down. Flowers in narrow close short-peduncled axillary regular racemes 3–5 in. long. Pedicels shorter than the bud, which is glabrous, ovoid-lanceolate, ¾ in. long. Pod 3–4 in. long, ¾ in. broad, glabrous, dehiscent, nearly straight, 6–10-seeded.

4. B. acuminata, Linn.; DC. Prodr. ii. 513; flowers in close axillary racemes, petals as long as the calyx-limb which is cleft into 5 subulate teeth at the tip, pod with a rib on each side of the upper suture; Roxb. Hort. Beng. 31; FL Ind. ii. 324; Wall. Cat. 5794; W. & A. Prodr. 205. B. purpurea, Wall. Cat. 5797, D. B. candida, Ait.; DC. Prodr. loc. cit., non Roxb.

NORTH WEST Provinces to CEYLON and MALACCA.—Distrib. China, Malay isles.

An erect shrub, with obscurely downy angular branches. Leaves slightly cordate, flexible, 3–6 in. long, 9–11-nerved, the lobes acute or subobtuse, not reaching half way down, at first finely pubescent beneath. Racemes axillary, short-peduncled, coriaceous; pedicels erecto-patent, ½–3 in. long, with linear-subulate bracts and bracteoles. Calyx 1–1½ in., narrowed into a long point, cleft at the tip. Petals oblong, whitish. Style ½ in. Pod 4–5 in. long, ½–3 in. broad, firm, glabrous, 8–12-seeded; stalk ½ in. long.

SECT. 2. FIELOSTIGMA, Hochst. Fertile stamens 10. Calyx with a short tube and spatheaceous or 5-cleft limb. Pod narrow, indehiscent.—Erect shrubs, or climbers with small flowers and connate leaflets.


PUNJAB and GARWHAL to CEYLON and Pegu.—Distrib. China, Malay isles, Timor.
A small crooked bushy tree with drooping branches. **Leaves** broader than long, rigidly coriaceous, 1½–2 in. long, slightly cordate, clothed more or less densely beneath with grey pubescence. **Racemes** short-peduncled, lax, terminal and leaf-opposed, ¾–1 ft. long, with densely grey-downy racissae; pedicels ½–1 in., erecto-patent. **Calyx**-tube turbinate, not more than ⅛ in. long; limb ⅛–¾ in., not splitting up. **Petals** ob lanceolate, yellow, as long as the limb. **Pod** ¾–1 ft. by ¼–1 in., not venulose, falcate, firm, glabrous, turgid; stalk above an inch long. **Seeds** 12–20.

B. **aurvescens**, Lam.; DC. Prodr. ii. 514, which is sometimes cultivated, differs from this by its very small leaves, seldom over half an inch deep, short style, and much smaller pod. It is a native of Tropical Africa.


Western and Central Himalayas (ascending to 1000 ft. in Kumaon and 4000 feet in Behar) through India proper and to Burma.—Distrib. B. acida, Reinw. (B. purpurea DC. of Malay isles and Timor scarcely more than a variety.)

An erect low bushy tree. **Leaves** broader than long, rigidly coriaceous, the same shape as in the last, but longer, with two obtuse lobes reaching about a quarter down, glancous, subglabrous or finely grey-downy beneath. **Racemes** sessile, dense, axillary, as broad as long; pedicels ascending, very slender, ¼–1 in. long. **Calyx** clothed with pale brown down; tube cylindrical, turbinate, ⅝–1 in.; limb ⅛ in. **Petals** oblong-spathulate, little exerted. **Pod** 1 ft. by ¼–1 in., nearly straight, firm, glabrous, rather turgid, reticulato-venulose, rostrate with the style, 20–30-seeded; stalk 1 in. long.

Var. **reniformis**, Royle MSS., sp.; leaves as small as those of B. racemosa, densely pubescent beneath.—North-west provinces.

7. **B. unguiculata**, Baker; erect, leaves 7-nerved cordate deeply bifid, flowers in short simple corymbs, bracts large, pedicels 3–4 times the calyx, calyx-limb 5-cleft, style produced.

**Siam**, Sir R. Schomburgk.

Closely allied to the last. **Leaves** broader than long, rigidly subcoriaceous, 2–3 in. long, glabrous beneath, with two obtuse lobes reaching ½–¾ down. **Racemes** short-peduncled, as long as the leaves; bracts under ¼ in., ob lanceolate, reflexed; pedicels slender, lower ⅛–2 in. **Calyx** thinly grey-downy externally; tube cylindrical, turbinate, ⅝–¾ in.; limb ⅛–¾ in. **Petals** ⅛ in., pilose, with a round limb equalling a distinct claw. **Ovary** downy, with a distinct stalk and style. **Pod** unknown.

8. **B. Lawii**, Benth. MSS.; scandent, leaves deeply cordate shortly bifid 15–17-nerved, racemes dense forming ample terminal panicles with reflexed branches, calyx-limb shortly 5-cleft, stigma sessile. ? B. fooveolata, Dalz. in Journ. Linn. Soc. 13, p. 188.

**Concan**, Law.

Branchlets slender, terete, eci rri llo s, thinly grey-downy. **Leaves** orbicular, rigidly coriaceous, 4–9 in. long and broad, finely downy, the numerous ribs thick and much raised on the under surface. **Racemes** forming an ample deltoid panicle ½ ft. long and broad, with numerous deflexed densely pale-brown downy branches, the lower compound; bracts deltoid, minute; pedicels erecto-patent, very short. **Calyx**-tube ⅝–¾ in., narrow, turbinate; limb ⅛–⅜ in., shortly 5-cleft. **Petals** twice the calyx. **Stigma** large, peltate, ⅛ in. broad. **Pod** unknown.—Agrees with the description of Dalzell's plant except that it is not dicoceous.

**Sect. 3. Lysiphyllum**, Benth. Fertile **stamens** 10. **Calyx** with a long tube and 5-cleft limb. **Pod** broad, indehiscent.—Leaflets distinct.


A glabrous twiner, with cincinate tendrils. Leaflets rigidly coriaceous, 2–3 in. long, rounded at both ends. Flowers in lax axillary racemes, with rusty-downy branches; pedicels ascending, 1½ in. Calyx-tube 1 in. long, narrow turbinate; sepals lanceolate, coriaceous, 1–1½ in. Petals rather exserted, oblong, with a long claw. Pod 3–1 ft. by 1½–2 in., thin, glabrous, indehiscent, many-seeded down the centre; stalk finally 1½–2 in. long.

**Sect. 4. Phanera,** Lour. Fertile stamens usually 3, sometimes 4–5. Calyx-tube mostly produced; limb usually 5-cleft, sometimes spathaceous.— Erect or scandent; flowers large or small.

* Leaves narrowed gradually or suddenly to an entire point.

11. **B. cornifolia**, Baker; leaf half as long again as broad gradually pointed, calyx-tube 3–4 times as long as the limb, petals ob lanceolate-oblong not clawed.

* Penang, Griffith.

Branches slender, glabrous, without tendrils, thinly rusty-downy. Leaves 2–3 in., rigidly subcoriaceous, slightly cordate, 5-nerved, thinly brown-silky beneath; petiole 1 in. Flowers in dense terminal coriobose racemes, 3 in. long and broad; pedicels ereto-patent, lower above 1 in. long. Calyx thinly rusty-downy externally; tube cylindrical, ½–2 in. long; bud ovoid, under ¼ in. Petals more than twice the length of the calyx-limb. Ovary downy, with a short distinct style and stalk; stigma large, peltate.

12. **B. Finlaysoniana**, Grah. in Wall. Cat. 5801; leaf once and a half to twice as long as broad gradually pointed, calyx-limb as long as the tube, petals orbicular with a distinct claw. Phanera Finlaysoniana, Benth. Pl. Jungh. 262.

* Malay Peninsula, Finlayson.

Branchlets slender, glabrescent, without tendrils. Leaves 3–4 in. long; rigidly coriaceous, glabrous, shortly cordate, 3–5-nerved, narrowed gradually from the middle to a point; petiole very short. Racemes terminal and axillary, close, 3–4 in. long, the rachis thinly rusty-downy; pedicels ½ in. Calyx-tube ½ in., cylindrical. Bud ovoid. Petals ½–2 in. long, glabrous. Ovary rusty; style and stalk both very short.


* Penang, Porter.—Distr. Sumatra.

A cirrhose twiner, with glabrescent branches. Leaves rigidly coriaceous, glabrous.
3–5 in. long, 5-7-nerved, distinctly cordate. **Flowers** in copious peduncled terminal racemes 3–4 in. long; pedicels erecto-patent, lower 1 in. or more long, like the calyx densely brown-downy. **Calyx-tube** between cylindrical and turbinate, \( \frac{3}{4} \) in.; bud obovoid. **Petals** twice the length of the calyx, densely silky on the outside. **Ovary** downy, with a short distinct style.

**Leaves round-cordate, cleft only at the very tip.**


Western Himalayas; Simla, Gurwhal, Kumaon, ascending to 4000 ft.

**Leaves** rigidly coriaceous, rather broader than long, 4–6 in. long, 9-nerved, glabrous beneath, usually deeply cordate. **Flowers** in ample terminal panicles, sometimes a foot long and broad, with corymbose branches clothed with fine grey silky pubescence, the lower springing from the axils of reduced leaves; lower pedicels ascending, \( \frac{1}{2} \) in. long; bracts and bracteoles minute, caducous. **Calyx-tube** scarcely any; limb \( \frac{1}{2} \) in. long, irregularly cleft; bud ovoid. **Petals** oblong, clawed, twice the sepals, yellow. **Style** produced, stigma large. **Pod** hard, flat, 5–6 in. by \( 1\frac{1}{4} \) in., glabrous, late in dehiscing, short-stalked, 6–8-seeded.


**Penang and Malacca.**

**Leaves** rigidly subcoriaceous, glabrous, 9-nerved, deeply cordate, 3–6 in. long, with a deltoid apical sinus. **Inflorescence** as in the last, a long panicle with very dense many-flowered ascending racemose branches, clothed like the calyx with bright rusty silky pubescence; bracts small, lanceolate, subpersistent; pedicels ascending, lower \( \frac{1}{2} \) in. **Calyx-tube** \( \frac{1}{4} \) in.; sepals deltoid; bud globose. **Petals** obovate, clawed, twice the sepals, densely rusty-silky. **Style** long; stigma small. **Pod** oblong, hard, flat, short-stalked, 5–6 in. by 2 in., late in dehiscing.


**Penang and Malacca.—Distrib. Philippines.**

Very near **B. integrifolia**, with which it agrees in leaf, vestiture and inflorescence. **Lower pedicels** 1–2 in. long; bracts caducous. **Calyx-tube** cylindrical, \( \frac{2}{3} \) in. **Bud** broad-ovoid or subglobose. **Calyx-limb** under \( \frac{1}{2} \) in., slit down to the base. **Petals** 2–3 times the length of the sepals, obovate, clawed, more or less silky. **Style** long; stigma large, peltate. **Pod** unknown.

**Leaves** deeply cleft, persistently pubescent beneath.


Foot of the Central and East Himalayas, ascending to 2500 feet in Kumaon. Behar, Dr. Hooker. Concan, Stocks. Circars, Roxburgh.

An enormous climber, with densely pubescent branchlets and abundant circinate tendrils. **Leaves** rigidly subcoriaceous, rather broader than long (\( 1\frac{1}{2} \) ft.), deeply


**Martaban, Brandis.**


**Silhet, Wallich.**
Branches, petioles, leaf-ribs beneath, pedicels and calyx densely ferrugineo-tomentose. *Leaves* rigidly subcoriaceous, 4-6 in. long, deeply cordate, 11-13-nerved, with a deltoid sinus reaching ¼ down and deltoid lobes. *Corymb* dense, terminal, subaceous; pedicels 1½-2 in., more slender than in *B. Vahl.* *Calyx*-tube ½-¾ in.; limb equaling the tube, membranous, irregularly slit. *Petals* oblong-spathulate, twice the length of the calyx-limb, densely silky on the back. *Ovary* densely silky, with a short stalk and long style, stigma small. *Pod* unknown.


**Tenasserim, Wallich, Griffith, Helfer.**
Habit and inflorescence of *B. purpurea* and *variegata*. *Leaves* broader than long, rigidly coriaceous, pale green, deeply cordate, 9-11-nerved, with an open sinus reaching ¼ down. *Racemes* few-flowered, short-peduncled, axillary, coriaceous; pedicels ¾ in.; bracts deltoid, very minute. *Calyx* thinly grey-pubescent; tube ¾-1 in.; sepals distinct, lancedolate, as long as the tube. Claw of the *petals* three times as long as the limb. *Ovary* grey-tomentose, narrowed gradually into a long stalk and style, stigma small. *Pod* unknown.


**Malacca, Griffith. Tenasserim, Helfer.**
Branchlets, leaf-ribs beneath, pedicels and calyx clothed with bright ferruginous silky pubescence. *Leaves* rigidly subcoriaceous, 2-3 in. long, deeply cordate, 11-nerved. *Racemes* terminal, subaceous, 3-4 in. long; pedicels 1-1½ in. *Calyx*-tube ½ in., narrowed from the base towards the neck; sepals lanceolate, distinct, coriaceous, reflexed, as long as the tube. *Ovary* densely silky, distinctly stalked, with a short thick style and large peltate stigma.—Closely allied to *B. ferruginea.*

**Penang, Wallich.** BIRMA, MAINGAY.—DISTRIB. Malay isles.

*Branchlets*, pedicels and calyx clothed persistently with fine ferruginous tomentum. *Leaves* rigidly subcoriaceous, deeply cordate, 11-13-nerved, 4-6 in. long, with an open sinus reaching about ¼ down. *Corymbs* sessile, few-flowered, axillary; bracts small, lacerolate, subpersistent; pedicels erecto-patent, lower 1-1½ in. *Calyx*-tube slender, ½-1 in.; sepals as long as the tube, distinct, lanceolate. *Petals* ob lanceolate, clawed. *Ovary* tomentose, narrowed into a very long stalk and style, stigma small.

**Leaves deeply cleft, with acute or subacute lobes, nearly or quite glabrous beneath when mature.**


**Pegu, Kurz.**

*Branchlets* clothed with deciduous bright ferruginous silky pubescence. *Leaves* deeply cordate, firm, membranous, reaching nearly a foot long, the acute contiguous lobes reaching half way down or more, the slender veins clothed at first with ferruginous hairs. *Flowers* in dense rounded peduncled simple terminal corymbs; bracts small, lacerolate, tomentose, persistent; pedicels slender, an inch long, clothed with short spreading hairs; lower deflexed. *Calyx* thinly silky; tube ½ in.; limb reflexed, membranous, irregularly cleft. *Petals* ½ in., oblong, clawed, silky on the back. *Stamens* 3. *Ovary* sub sessile, densely rusty-silky; style ½-1 in., stigma small pilose.


**Khasia** hills, alt. 1-3000 ft., Hook. fil. & Thomson.

A climber, with branchlets clothed with bright rusty silky pubescence. *Leaves* cordate, large, thin, glabrous, the divergent subacute lobes reaching about a third down. *Flowers* in numerous contiguous short-peduncled corymbs, forming a broad terminal corymbose panicle, the lower branches subtended by large leaves; pedicels ascending, 1-1½ in. long, like the calyx densely clothed with very bright rusty silky pubescence; bracts caducous. *Calyx*-tube 1-1½ in.; bud subglobose; limb irregularly cleft. *Petals* obovate, clawed, densely silky on the back. *Stamens* 3. *Ovary* short-stalked, densely rusty-silky; style short, stigma small.


**Tenasserim, Hefler,** and sent from the Calcutta gardens as *B. piperifolia*.

*Branchlets* slender, at first finely grey-silky. *Leaves* shallowly cordate, rigidly subcoriaceous, glabrous, shining above, moderately large, the acute lobes reaching ¼ down. *Flowers* in dense many-flowered, short-peduncled corymbs, forming a broad terminal corymbose panicle; bracts minute, lanceolate; pedicels slender, ascending; lower ½-1 in., clothed like the calyx with adpressed grey silky pubescence. *Calyx*-tube ½ in.; bud globose; limb not usually fully 5-cleft. *Petals* obovate, clawed, densely silky on the back. *Ovary* glabrous, short-stalked; style produced, stigma small.

26. **B. macrostachya**, Wall. Cat. 5774; cirrhose, leaves 9-nerved, pubescence thin grey, pedicels moderately long, calyx-tube turbinate very oblique,

Silhet, Roxburgh, Wallich. Assam, Hamilton.

Branches glabrous, with copious stalked geminate tendrils. Leaves round-cordate, rigidly subcoriaceous, subglabrous, 3-4 in. long, with an open deltoid sinus reaching \( \frac{1}{3} \) \( \frac{1}{2} \) down and deltoid subacutate lobes. Flowers in forked or simple peduncled narrow subaxial racemes \( \frac{1}{2} \) \( \frac{1}{2} \) ft. long; bracts minute, deltoid; pedicels \( \frac{1}{2} \) \( \frac{1}{2} \) in., clothed like the calyx with fine grey silky pubescence. Calyx-tube \( \frac{1}{2} \) in.; limb campanulate, \( \frac{1}{2} \) in., regularly 5-leafed half-way down. Petals \( \frac{1}{2} \) in., obovate, clawed, densely silky. Ovary densely ferrugineo-tomentose; stalk and style short. Pod ligulate, 4-6 in. by 2 in., flat, indehiscent, persistently tomentose, 2-4-seeded.

27. B. divergens, Baker; cirrhose, leaves 7-nerved, pubescence thin grey, pedicels very short, calyx-tube cylindrical, limb spathaceous entire as long as the tube, petals much exerted.

Birma, Griffith.

Stems slender, scandent, glabrescent. Leaves rigidly subcoriaceous, slightly cordate, glabrous, broader than long, 3-4 in. long, with a broadly rounded sinus reaching half way down and divergent deltoid acuminate lobes. Racemes copious, few-flowered, congested, sessile, axillary; pedicels scarcely any; bracts minute, deltoid. Calyx-tube \( \frac{1}{2} \) \( \frac{1}{2} \) in. long; limb tough, entire, \( \frac{1}{2} \) in. broad. Stamens 5. Petals ob lanceolate, three times as long as the limb, glabrous, not clawed. Immature pod narrow, \( \frac{1}{2} \) ft. long, glabrous, with a long stalk.


Tenasserim, Griffith, Halper. Siamese gulf, Finlayson.

Branchlets finely grey-downy, with copious stout circinate tendrils. Leaves rigidly coriaceous, slightly cordate, rather longer than broad, 4-6 in. long, glabrous, with a sinus reaching half way down, so narrow that the dimidiate deltoid subacute lobes touch each other. Corymb many-flowered, short-peduncled, axillary, \( \frac{1}{2} \) \( \frac{1}{2} \) ft long; bracts large, lanceolate; persistent; pedicels ascending, slender, clothed like the calyx with fine grey pubescence, furnished with a pair of opposite linear bracteoles above the middle, the lower ones 2-3 in. long. Calyx-tube \( \frac{1}{2} \) \( \frac{1}{2} \) in.; sepals \( \frac{3}{2} \) \( \frac{3}{2} \) in., lanceolate, subacute. Petals above 1 in. long, with a tomentose claw, exceeding the cor date crisped limb. Ovary grey-downy, with a long style and stalk, stigma small.

29. B. involucellata, Kurz in Journ. Asiat. Soc. Beng. xlii. 2, 72; leaves 9-11-nerved, pubescence thin, pedicels very long, bracteoles large oblong, flowers large, calyx-limb as long as the tube, petals much exerted.

Martaban, Dr. Brandis.

A climbing shrub, with thinly puberulous young branches. Leaves thinly char taceous, cordate-ovate, 3-4 in. long, glabrous, with a sinus reaching half-way down or more, the lobes narrowed to a sub obtuse point. Racemes lax, terminal, glabrescent; pedicels 2-2\( \frac{1}{2} \) in.; bracteoles oblong, subobtuse, \( \frac{1}{2} \) in. long, velvety within. Calyx velvety; tube \( \frac{1}{2} \) in. or more long; teeth lanceolate acuminate, finally free and reflexed. Petals pale rose, 1\( \frac{1}{2} \) in. long, with an ovate-oblong obtuse blade as long as the claw. Ovary glabrous; style thick, moderately long. Pod unknown. Ex Kurz loc. cit.

***** Leaves deeply cleft, with obtuse or rarely subacute lobes, nearly or quite glabrous beneath when mature.

30. B. glauca, Wall. Cat. 5785; cirrhose, pubescence thin ferruginous, leaves 7-9-nerved cleft below the middle, pedicels moderately long, calyx-limb.
2-valved much shorter than the cylindrical tube, petals glabrous exserted. Phanera glauca, Benth. Pl. Jungh. 265; Miq. Fl. Ind. Bat. i. 68, t. 2, A.

_Tenaesserim, Martaban, Penang._—Distrib. Malay isles, China.

Branchlets slender, soon glabrescent, with copious tendrils. Leaves the smallest and deepest cleft of the section, cordate, firm, 1–3 in. long, the ribs at first pilose, the apical lobes always obtuse. Flowers in copious dense short-peduncled or sessile terminal corymb; pedicels slender, erecto-patent, 1–1 in., with several setaceous persistent bracteoles. Calyx-tube 1/2–1 in.; limb 1/4 in., reflexed, thinly silky. Fertile stamens 3. Ovary glabrous, with a short stalk, moderately long style and small stigma. Pod thin, firm, indehiscent, glossy, 6–8 in. by 13–2 in., with 10–12 small seeds down the middle, like _B. diphylla_.—Only distinguishable from the Chinese _B. corymbosa_, Roxb.; Wall. Cat. 5388, by its broad indehiscent pod. A plant gathered by Hooker and Thomson in Khasia, without flower, has a pod like _B. glauca_, but the leaves are larger, thinner, and much less deeply cleft.

Var. _parvifolia_, Teysm. & Binend. sp.; leaves very small 1/4–1 in. long clef nearly to base clothed beneath with fine ferruginous silky pubescence, corymb few-flowered. _Sincapobe_, Dr. _Uxley._


_Penang, Malacca, Singapore._—Distrib. Malay isles.

Branchlets soon glabrescent, with a few stout woody tendrils. Leaves rigidly subcoriaceous, deeply cordate at both ends, 2–4 in. long, with the ribs at first rusty-pubescent. Flowers in ample terminal racemes, 1/2 ft. long; pedicels erecto-patent, clothed like the calyx with bright rusty silky pubescence, 1/2–2 in. long; bracts minute, lanceolate, caducous. Calyx-tube 1/4 in. long; sepals lanceolate, coriaceous, distinct. Pedals oblanceolate, clawed. Staminodes 3. Ovary densely rusty-silky, with a long stalk and style and very large oblique stigma. Pod smooth, thin, 1/4 ft. long, 1/4 in. broad.

Var. 1. _Griffithiana_, (Phanera Griffithiana, Benth. _Pl. Jungh._ 263), a form with large round persistent stipules.—Malacca, _Griffith, Maingay._

Var. 2. _excelsa_, (Phanera excelsa, Blume; _Miq. Fl. Ind._ Bat. i. 62); calyx-tube oblong 1/3 in. long much stouter than in the type (1/2–2 in.), sepals above an inch long.—Malacca, _Griffith._ Distrib. Malay isles.


_Silhet, Wallich. Assam, Griffith._ _Khasia Mts._, 1–3000 ft., _Hook. fil. & Thomson._ A robust climber, with thinly silky branchlets. Leaves rigidly subcoriaceous, deeply cordate, middle-sized, rather longer than broad, at first thinly silky on the ribs, the contiguous lobes sometimes subacute. Flowers in copious elongated terminal racemes, with branches clothed with bright rusty-silky pubescence; bracts lanceolate, silky, caducous; pedicels erecto-patent, lower 1/2–2 in. long. Calyx-tube 1/3–2 in., not narrowed upwards; sepals coriaceous, finally distinct. Pedals, stamens and ovary as in the last. Pod 1/2 ft. long, 2 in. broad, thin, firm, strongly veined.

Ghauts of Travancore and Canara.

An extensive climber, with slender branches, clothed at first with fine ferruginous pubescence. Leaves rigidly subcoriaceous, slightly cordate, thinly silky on the ribs when young, the obtuse lobes reaching $\frac{3}{4}$-1 down. Racemes few-flowered, short-peduncled, axillary and terminal. Calyx-tube $\frac{1}{3}$-3 in. Fertile stamens 5. Petals ob lanceolate, with a distinct claw as long as the limb. Ovary densely rusty-downy, with a long style and stalk and small stigma. Pod flat, finely rusty-downy, $\frac{1}{2}$ ft. long, an inch broad, with a raised rib on either side of the upper suture.


From the foot of the West Himalayas and Khasia Mts. (alt. 4000 ft.), to Ceylon and Penang.—Distr. China.

A middle-sized erect tree, with moderately stout glabrescent branchlets. Leaves rigidly subcoriaceous, glabrous, shallowly cordate, the lobes obtuse or subacute, reaching $\frac{1}{4}$-1 way down. Flowers in terminal and axillary short-peduncled few-flowered corymb; bracts minute, deltoid; lower pedicels $\frac{1}{4}$-1 in. Calyx-tube $\frac{1}{4}$-1 in.; limb $\frac{1}{4}$-1 in., coriaceous, slim into two valves, which show a division into 5 teeth. Petals ob lanceolate, with a long claw, reddish, twice the calyx. Fertile stamens 3-4. Ovary grey downy, with a long stalk and style and moderately large oblique stigma. Pod $\frac{3}{4}$-1 ft, by $\frac{3}{4}$-1 in., firm, flat, glabrous, late in dehiscing, rather recurved, 12-15-seeded.


From the foot of the Western Himalayas, and Sikkim, alt. 4000 ft., and through India proper, to Birma.—Distr. China.

General habit of the last, to which it is closely allied. Leaves rather broader than deep, middle-sized, rigidly subcoriaceous, deeply cordate, the obtuse lobes reaching $\frac{1}{4}$-1 down. Corymb few-flowered, lateral, sessile or short-peduncled; bracts minute, deltoid; pedicels erecto-patent, $\frac{1}{4}$-1 in. Calyx-tube $\frac{3}{4}$-1 in.; limb cordate-ovate, remaining to the end spathaceous and entire. Petals 1$\frac{1}{2}$-2 in. long, an inch or more broad, white, beautifully variegated with red and yellow, sometimes pure white (B. candida, Roxb.) Stamens 3-5. Ovary with a long stalk and style and a minute stigma. Pod $\frac{1}{4}$-1 ft. long, $\frac{3}{4}$-1 in. broad, hard, flat, glabrous, rather recurved, dehiscent, 10-15-seeded.


From Eastern Bengal and Sikkim to Birma and Eastern and Western Peninsula.—Distr. Malay isles.
A climbing glabrous shrub, with copious circinate tendrils. *Leaves* thin, deeply cordate, 5-7-nerved, the cleft very variable, sometimes scarcely perceptible, sometimes a deep deltoid sinus and the points acuminate. *Racemes* cylindrical, 2-6 in. long, arranged in ample axillary and terminal panicles; bracts minute, linear; pedicels 1½ in., erecto-patent, finely downy. *Calyx* 6/5 in. long, broadly campanulate, with 5 deltoid teeth. *Petals* white, oblanceolate, twice the length of the calyx. *Pod* thin, flat, oblone, glabrous, indehiscent, stalked, 1½-2 in. long, 1-2-seeded.


**BIRMA**, Dr. Brandis.

Young branches puberulous, *Leaves* round-ovate, truncate at the base, palmately 11-nerved, chartaceous, 1-1½ in. long, glabrous above, downy on the ribs below; cut one-third down into two rounded lobes. *Racemes* short, terminal, pubescent; pedicels 1-1½ in., densely puberulous; bracts minute, subulate. *Calyx* downy externally. *Petals* 1½ in., ovate-cuneate, glabrous, undulated, probably whitish. *Ovary* stalked, fulvo-villosa; style slender, twice as long as the ovary. *Pod* unknown.—*Ex Kurz loc. cit.*

**DOUBTFUL SPECIES.**

B. *LUCIDA*, Wall. Cat. 5779 B (totally different from 5779 A), grown in the Calcutta garden from Penang, has the fully divided leaves of section *Lyssiphylum*, but the flower is unknown. The half-leaves are dimidiate cordate-ovate, twice as long as broad, narrowed gradually to a point, rigidly subcoriaceous, 3-4-nerved, with the ribs beneath clothed with adpressed ferruginous tomentum. It may be the Malayan Phanera diptera, *Miq. Flor. Ind. Bat.* i. 70.

B. *Piperifolia*, Roxb. *Fl. Ind.* ii. 327 (Phanera, Benth. Pl. Jungh. 262), from the mountain forests of Silhet, is said to be a climber with entire cordate 5-7-nerved smooth lucid leaves, terminal panicles and 1-2-seeded round-oval pods.

115. **NEPTUNIA**, Lour.

Herbs without prickles. *Leaves* bipinnate, with persistent stipules and numerous small strap-shaped sensitive membranous leaflets. *Flowers* minute, dimorphous, in dense heads on axillary peduncles, polygamous, those of the lower part of the head bearing only protruded flattened staminodia. *Calyx* minute, campanulate, 5-toothed. *Petals* 5, strap-shaped, connate near the base. *Stamens* of the perfect flowers exserted; anthers gland-crested. *Ovary* stalked, many-ovuled; style filiform, stigma club-shaped. *Pod* coriaceous, flattened, ligulate or oblong, 2-valved.—DISTRIB. Species 8; cosmopolitan in the tropics.


**NORTH WEST** provinces, to **CEYLON** and **MALACCA**.—DISTRIB. Cosmopolitan in the tropics.

*Shtems* stout, annual, wide-creeping, rarely throwing out suberect branches, producing cipious fibrous rootlets from the same nodes that bear the leaves and peduncles. *Pinne* 4-6, 2-3 in. long; rachis glandless; leaflets glabrous, obtuse, ¾-½ in. long. *Pedicules* ascending, ½-1 ft.; bracts small, ovate, subobtuse. *Staminodes* ¾ in., strap-shaped, yellow. *Corolla* ¾ in. *Pod* ½-1 in. long, rostrate, dry, soon dehiscing by the upper suture.

**Western Peninsula and Burundi.**—**Distrib.** Brazil?

A low diffuse perennial, with slender stems, angular upwards. *Stipules* small, acute; *pinnae* 2–6, an inch or less long, with a gland on the rachis between the lowest pair; leaflets ½–1 in. *Heads* small, globose, long or short-peduncled. *Corolla* yellow, ½ in. long. Sterile *flowers* sometimes quite absent from the heads. *Pod* ½–1 in. long, with more membranous valves than in the two others, and a very minute beak.


**North West provinces and Ceylon.** introduced. A native of Tropical America. Glabrous throughout. *Stems* comparatively stout, suffrutose, several feet high. *Pinnae* 6–10, with a gland between the lowest pair; leaflets like those of the last. *Stipules* and bracts copious, cordate-ovate, acuminate. *Heads* copious, oblong. *Flowers* and heads just like those of *N. oleracea*, but the pod twice as long.


Tall unarmed tree. *Leaves* bipinnate. *Flowers* in round heads, mostly perfect. *Calyx* tubular, 5-toothed at the tip. *Petals* 5, valvate, slightly united at the base, little longer than the calyx. *Stamens* 10, free, exserted; *anthers* gland-crested in an early stage. *Ovary* sessile, many-ovuled; *style* filiform, stigma minute terminal. *Pod* large, woody, oblong-falcate, finally dehiscing, flat, septate between the oblong compressed seeds.—A single species.


**Western Peninsula, Birma, Singapore.**—**Distrib.** Philippines.

A tall tree, without prickles. *Pinnae* 2; leaflets 4–10, opposite, with an odd one on the outside and with a gland on the rachis between each, oblong, acute, subcoriaceous, glabrous, 3–6 in. long, the lowest much shorter. *Flowers* sessile, in dense globose peduncled heads, crowded on short branchlets developed with the young leaves. *Corolla* ½ in. *Pod* 4–6 in. by 1–2½ in., 6–10-seeded.

117. **ENTADA**, Adans.

Woody unarmed climbers with tendrils. *Leaves* bipinnate. *Flowers* in long narrow spikes, minute, yellowish, polygamous. *Calyx* minute, campanulate, equally 5-toothed. *Corolla* oblong in bud, the 5 long equal narrow lobes falcate in expansion. *Stamens* 10, free, shortly exserted, filaments filiform; *anthers* crowned with a gland. *Ovary* subsessile, many-ovuled; *style* filiform, stigma concave terminal. *Pod* flat, woody, very large, composed of many discoid one-seeded joints, the endocarp persisting round the large compressed orbicular seeds.—**Distrib.** Species 10, the others Trop. African and American.
118. **ADENANTHERA**, Linn.

Erect trees without spines or tendrils. **Leaves** ample, bipinnate. **Flowers** minute, in narrow spike-like racemes, hermaphrodite, usually pentameros. **Calyx** campanulate, equally toothed. **Petals** valvate, equal, lanceolate, cohering only at the very base. **Stamens** 10, free, equaling the corolla; anthers tipped with a gland. **Ovary** sessile, many-ovuled; style filiform, stigma minute capitate. **Pod** strap-shaped, torulose, falcate, the coriaceous valves much twisted after they separate. **Seeds** small, bright-coloured.—**Distrib.** Species 4, spread through tropics of Old World.

1. **A. pavonina**, Linn.; DC. Prodr. ii. 446; pinnae 8–12, leaflets 12–18 obtuse, seeds concolorous usually bright scarlet. Roxb. Fl. Ind. ii. 370; Wall. Cat. 5300; W. & A. Prodr. 271; Wight II. t. 84 (80); Bedd. Fl. Sylv. t. 46; Brand. For. Fl. 168.

**East Himalayas** (ascending to 4000 ft. in Sikkim), **Western Peninsula** and **Ceylon**, shore of Malay gulf.—**Distrib.** Malay isles, Timor, China, Philippines.

**Pinnae** short-stalked, 4–8 in. long; leaflets oblong, alternate, short-stalked, not coriaceous, \( \frac{3}{4} – 1 \frac{1}{2} \) in. long. **Racemes** short-peduncled, 2–6 in. long, \( \frac{1}{4} \) in. broad, simple from the axils of the leaves and panicked at the end of the branches; pedicels as long as the flower, \( \frac{1}{2} – \frac{3}{4} \) in. **Pod** 6–9 in. by \( \frac{1}{2} \) in., falcate, 10–12-seeded. **Seeds** rarely yellow-brown.

2. **A. bicolor**, Moon; Thwaites Enum. 98; pinnae and leaflets 6–8, the latter acute, seeds half black half bright red. Bedd. Fl. Sylv. 94.

**Ceylon**, Walker, &c. **Malacca**, Griffith, Maingay.

**Pinnae** short-stalked, 2–3 in. long. **Leaflets** ovate, rigidly subcoriaceous, \( \frac{3}{4} – 1 \frac{1}{2} \) in. long. **Raceme** and pod just like those of **A. pavonina**, the flower perhaps rather smaller.

119. **PROSOPIS**, Linn.

Erect trees or shrubs with scattered prickles. **Leaves** bipinnate, with small narrow leaflets. **Flowers** minute, in narrow spikes or subsessile racemes, polygamous. **Calyx** minute, campanulate, subentire or faintly 5-toothed. **Petals** 5, ligulate, subcoherent at the base. **Stamens** 10, free, slightly exserted, filaments filiform; anthers crowned with a gland. **Ovary** stalked, many-ovuled; style
filiform, stigma minute terminal. Pod turgid, cylindrical or oblong, with a thick spongy mesocarp, separte between the seeds.—**Distrib.** Species 18, cosmopolitan in the tropics.

1. **P. spicigera**, Linn.; DC. Prodr. ii. 446; pinnae mostly 4, rachis glabrous, flowers sessile, calyx truncate not ciliated, pod slender cylindrical torulose. Roxb. Cor. Fl. i. t. 63; Wall. Cat. 5299; W. & A. Prodr. 271; Dalz. & Gibs. Bomb. Fl. 84; Bedd. Fl. Sylv. t. 56; Brand. For. Flor. 169, t. 25; Boiss. Fl. Orient. ii. 634. P. spicata, Burm. Ind. 102, t. 25, fig. 3. Adenanthera aculeata, Roxb. Fl. Ind. iii. 371.

**Punjab, Sind, Western Peninsula.—Distrib.** Afghanistan, Persia.

A low tree, with slender grey branches. Prickles copious few or none, \( \frac{1}{2} \) in., nearly straight, at first straw-coloured. **Pinna** 1-2 in. long; leaflets 16-24, sessile, \( \frac{3}{4} \) in., ligulate, with an ascending cusp, grey, glabrous, rigidly coriaceous, caducous. Flowers in short-peduncled axillary spikes, 2-3 in. long, and terminal panicles. **Corolla** \( \frac{1}{2} \) in. long. Pod straight, edible, glabrous, 4-6 in. long, \( \frac{1}{2} \) in. thick, narrowly gradually into a short stalk, the mesocarp pinnaceous. **Seeds** 10-15, dull brown, oblong.


**Punjab**, near Peshawur, &c., Falconer, Stewart.—**Distrib.** Caucasus, Orient, Afghanistan.

A low bushy tree, with downy slender whitish branchlets, armed with copious slender stramineous prickles. Leaflets like those of *P. spicigera*, but smaller and downy. Flowers rather larger. Pod oblique oblong, \( \frac{1}{2} \) in. long, \( \frac{3}{4} \) in. thick, black, rugose, obtuse, contracted abruptly into the stalk; mesocarp pulpy. **Seeds** subbiseriate.

120. **Dichrostachys**, DC.

Shrubs. Leaves bipinnate, with minute coriaceous leaflets. Flowers minute, spicate, dimorphous, polygamous, only perfect in the upper half of the spike, those of the lower half bearing long filiform staminodia. Calyx minute, campanulate, 5-toothed. Corolla oblong, the 5 strap-shaped petals subcommate towards the base. Stamens of the perfect flowers slightly exerted, filaments filiform free; anthers gland-crested. Ovary sessile, many-ovuled; style filiform, stigma capitulate. Pod small, strap-shaped, coriaceous, indehiscent, subarticulated, continuous within, twisted up when mature.—**Distrib.** Species 4-5, confined to the tropics of the Old World.


**North West Provinces, Western Peninsula, Ceylon.—Distrib.** Malay isles, N. Australia, and doubtfully distinct from *D. unians*, of Tropical Africa.

A much-branched shrub, with copious spreading branchlets, ending in spines. Leaves 1-1\( \frac{1}{4} \) in. long and broad; rachises often downy; pinnae 16-20; leaflets 24-40, strap-shaped, sessile, rigidly coriaceous, \( \frac{1}{2} \) in. long. Spikes axillary, short-peduncled, 1-2 in. long. Corolla \( \frac{1}{3} \) in. Staminodes red-purple, \( \frac{1}{2} \) in. long. Pod 2-3 in. by \( \frac{1}{4} \) in., 6-10-seeded, dry, glabrous.
121. **PIPTADENIA**, Benth.


122. **PARKIA**, R. Br.

Tall, unarmed trees. *Leaves* bipinnate with very numerous leaflets. *Flowers* in dense long-peduncled heads, each subtended by a coriaceous persistent ligulate bract with a spoon-shaped tip. *Calyx* tubular, shortly 5-cleft. *Corolla* tubular, cleft half-way down, the segments subvalvate. *Stamens* 10, exserted, the filiform filaments united in the lower part with each other and the corollatube; anthers narrow, glandless, the pollen cohering in irregular masses. *Ovary* stalked, many-ovuled; style filiform, stigma minute capitate. *Pod* large, flat, strap-shaped, coriaceous, finally dehiscing.—**Distrib.** Species 8, cosmopolitan in the tropics, mostly American.


Rachis of leaf downy, 1 ft. or more long; pinnae 40–60, 3–4 in. long; leaflets 1-nerved, rigid, ½ in. by ¼ in. *Peduncle* under a foot long in the specimens seen. *Calyx* ⅛ in.; tube glabrous; teeth pilose. Immature *pod* downy, narrowed gradually into a long stalk.


Assam, Silhet, Birma, Malay Peninsula.—**Distrib.** Malay isles.

An erect tree, 40–60 feet high. *Leaf-rachis* a foot or more long, glabrous or pubescent; pinnae 20 or more, 3–4 in. long; leaflets 100–120, ½ in. by ¼ in., with rarely any other veins than the costa perceptible. *Peduncle* 1–1½ ft.; flowers in turbinate heads 2–3 in. long. *Calyx* ⅛ in.; tube cylindrical, glabrous; lobes pilose. *Pod* 1 ft. by 1–1½ in., narrowed into a 3–4 in. stalk.

PEGU, Kurz.
An erect tree 80-120 feet high. Leaf 1-2 feet long; rachis fulvo-pubescent, pinna 4 in. long; leaflets rigidly coriaceous, shining, glabrous, ½ in. by ¼ in., with a distinct fork from the base of the costa and penninerved veinlets. Peduncle 1-1½ ft. Calyx ½ in.; tube glabrous; lobes round, densely fulvo-tomentose. Pod 1-1½ ft. by 1½ in., glabrous, slightly torulose, narrowed into a 6-9 in. stalk.


MARTABAN, Kurz.
An erect tree, 80-100 ft. high. Leaf 1-2 ft. long; rachis fulvo- or ferrugineo-tomentose; leaflets 1 in. by ¾ in., coriaceous, penninerved, glabrous above except on the ribs, pubescent beneath. Peduncles a foot long, many arising from the apex of the branches. Calyx ½ in.; tube glabrous; lobes obovate-cuneate, with adpressed fulvous pubescence. Pod unknown.—Ex Kurz loc. cit.

123. DESMANTHUS, Wild.
Suffruticose perennials with the habit and leaves of Neptunia. Flowers polygamous. Calyx minute, campanulate, 5-toothed. Petals 5, valvate, finally nearly free. Stamens 10; filaments free, filiform; anthers not gland-crested. Ovary sessile, linear, many-ovuled; style filiform, stigma clavate. Pod linear, straight, coriaceous, dehiscent.—DISTRIB. Species 8, indigenous in America only.


Scattered through India proper and Ceylon, but only introduced.—DISTRIB. Wild through Trop. America and introduced in Africa.
A glabrous shrubby perennial, 3-4 ft. high, with virgate branches; stipules subulate. Flowers in solitary globose peduncled axillary heads. Leaves with 6-8 pinnae, with a gland on the rachis between the lowest; leaflets 30-40. Pod 2-3 in. long, 20-30-seeded.

124. LEUCÆNA, Benth.


Spread throughout India, as it is through Trop. Asia and Africa, but probably indigenous only in Tropical America. A low erect tree, without spines. Pinna 8-16; leaflets 20-30, linear, acute, glaucous, membranous, caducous, ⅛-⅜ in., finely downy. Heads short-peduncled, very dense, often in pairs, ¾-⅜ in. broad. Corolla whitish, ⅛ in. Stamens twice the length of the corolla. Pod straight, 5-6 in. by ⅜-⅜ in., 15-20-seeded, soon dehiscing.
125. **MIMOSA**, Linn.

Shrubs or herbs, with or without prickles. Leaves in the indigenous species bipinnate; leaflets small, sensitive, ligulate, caducous. Flowers minute, in dense globose heads, polygamous, in the Indian species mostly tetramerous. Calyx campanulate, shortly toothed. Petals connate towards the base. Stamens twice the number of the petals, much exserted, filaments filiform, free; anthers not gland-crested. Ovary stalked, many-ovuled; style filiform, stigma minute terminal. Pod flat, membranous, made up of 1-seeded joints that separate when mature from the sutures.—**Distrib.** Species 230, mostly confined to Trop. America.

1. **M. pudica**, Linn.; DC. Prodr. ii. 426; stem and rachises copiously bristly and prickly, leaves digitate; pod small with densely prickly sutures. Roxb. Hort. Beng. 41; Fl. Ind. ii. 564; Wall. Cat. 5292.

Spread through the hotter parts of India, possibly introduced from Trop. America.

Shrubby, the copious bristly hairs of the branchlets and petioles deflexed, those of the leaf-rachis ascending. Pinnae of the leaves 3–4, nearly sessile, 2–3 in. long; leaflets 24–40, glabrous, subcoriaceous. Flowers in small peduncled heads, all down the branches, 1–2 from each axil. Pod ½ in. long, 3–4-seeded, with very abundant straw-coloured weak prickles from both sutures, as long as the breadth of the pod.


**Western Himalayas**, ascending to 5000 ft. in Kumaon, westward to Mishmi and Biotan, and through India proper.—**Distrib.** Afghanistan.

A low tree, with slender grooved finely grey-downy branches, armed with copious small scattered hooked spines. Leaflets 12–24, membranous, ¾–⅞ in. long, rather downy below, with an obscure recurved cusp. Heads ¾–⅞ in. broad, on short simple erecto-patent peduncles, from the leaf axils and crowded at the top of the branchlets, at first reddish, afterwards bleached. Corolla ⅛ in. Pod rather falcate, 3–4 in. by ¾–⅞ in., 6–10-seeded, the sutures rarely furnished (M. spinosi-ligia, Rottler) with a few distant prickles.


**Western Peninsula**.

Closely allied to M. rubicaulis, with which it agrees in prickles, general habit and inflorescence. Leaflets 12–20, oblique, ligulate-oblong, ⅜–¾ in. long, downy or glabrous. Pod rather shorter and broader, downy or glabrous, 4–6-seeded.


**Singapore, Schomburgk, Mainay.**—**Distrib.** China. Doubtless introduced into Asia from Trop. America, where it is common.

A woody shrub, glabrous except the leaf-rachises, which are slightly downy. Leaflets 12–20, rigidly coriaceous, narrow ligulate, caducous, ⅔ in. long, with a
distinct midrib nearer the upper side and conspicuous veinlets. Heads globose, forming an ample patent panicle, with compound spreading lower branches. Flowers sometimes pentamersous. Corolla $\frac{1}{4}$ in. Pod distinctly stalked, nearly straight, 1$\frac{1}{4}$-2 in. by 4-6 in., glossy, finely reticulato-venulose, 6-8-seeded.

126. ACROCARPUS, W. & A.

An erect unarmed tree. Leaves bipinnate. Flowers racemized. Calyx campanulate, cleft about half-way down into 5 equal lanceolate teeth, the disk completely investing the tube. Petals oblanceolate, equal, half as long again as the calyx. Stamens 5, exserted, straight, equal; anthers uniform. Ovary stalked, linear, many-ovuled; style incurved, very short, stigma small terminal. Pod long-stalked, flat, ligulate, many-seeded, with a wing down the upper suture.—Distrib. A single species.


A large unarmed erect tree, 50 feet high before it forks. Pinnae 8, a foot or more long; leaflets 10-12, nearly sessile, oblong, rather oblique, glabrous, subcoriaceous, 3-4 in long. Flowers in dense simple racemes produced in February, when the leaves are fallen; pedicels short, drooping. Calyx $\frac{1}{4}$ in. Petals scarlet; slightly imbricated in bud. Filaments twice the length of the corolla. Ovules about 15. Pod long-stalked, thin, flat, with a wing down the upper suture.

127. ACACIA, Willd.

Spinose or prickly shrubs or trees, erect or climbing. Leaves bipinnate, with minute leaflets. Flowers in globoseheads or cylindrical spikes, hermaphrodite or polygamous, usually pentamersous. Calyx campanulate or funnel-shaped, shortly toothed. Petals exserted, united in the lower half. Stamens free, indefinite, much exserted; anthers minute, not gland-crested. Ovary stalked or sessile, many-ovuled; style filiform, stigma minute capitule. Pod glabrous or oblong, not jointed, usually compressed and dry, dehiscent or indehiscent, rarely turgid or subcylindrical, sutures straight or wavy, not thickened.—Distrib. Species 430, the foliiforous groups cosmopolitan in the tropics, the great phylodineous series, which comprises two-thirds of the genus, almost restricted to Australia.

A. melanoxylon, R. Br., and A. dealbata, Link, both Australian species, have been extensively planted in the Nilghiris.


Himalayas to Ceylon and Penang.—Distrib. Cosmopolitan in the Tropics, but often planted.

A shrub or low tree, with slender zigzag branches, marked with grey dots. Spines stipular only, seldom over 1$\frac{1}{4}$ in. long on the branches. Leaf-merises downy, with a minute petiolar gland; pinna 1-1$\frac{1}{4}$ in. long; leaflets green, subglabrous, rigidly
coriaceous. Peduncles crowded in the nodes of full-grown leaves, shorter than the leaves, with the ring of bracts at or near the apex. Heads fragrant, bright yellow, under $\frac{1}{2}$ in. diam. Calyx campanulate, very minute. Corolla $\frac{1}{4}$ in.; teeth short, obtuse. Pod 2–3 in. long, $\frac{1}{2}$ in. thick, dull brown, marked with fine close horizontal strie.


Western Peninsula.

A tree, with a flat umbrella-like top, and glabrous branches with grey lenticular dots. Spines $\frac{1}{2}$–2 in. long, the old ones spreading, $\frac{1}{4}$ in. thick, very pungent. Leaves glabrous, very small; glands of the rachis 0 or minute; pinnae $\frac{1}{2}$–$\frac{3}{4}$ in. long; leaflets $\frac{1}{2}$–$\frac{1}{4}$ in., rigidly coriaceous, glaucous-green, glabrous. Heads in clusters from the axils of mature branchlets, $\frac{1}{4}$–$\frac{1}{2}$ in. diam.; peduncles very slender, with the involucre below the middle. Corolla $\frac{1}{2}$ in., yellow, twice the calyx. Pod subglandular, glabrous, 2–3 in. long, $\frac{1}{2}$–$\frac{1}{3}$ in. thick, circinate, rigidly subcoriaceous, indehiscent.


A shrub or tree, with straight finely grey-downy branchlets. Spines $\frac{1}{2}$–2 in. long, large, white, ascending and pungent on the older branchlets. Leaf-rachises downy, with several glands; pinnae $\frac{1}{2}$–$\frac{3}{4}$ in. long; leaflets membranous, green, $\frac{1}{2}$–$\frac{1}{4}$ in., glabrous or rather downy. Peduncles short, densely grey-downy, with the bracts above the middle, 4–6-nate, the subtending leaves of the upper nodes reduced or suppressed; heads yellow, $\frac{1}{2}$ in. diam. Calyx $\frac{1}{4}$ in., campanulate. Corolla twice the length of the calyx. Pod rigidly coriaceous, subindehiscent, densely persistently grey-downy, 8–12-seeded, $\frac{1}{2}$–$\frac{1}{4}$ ft. by $\frac{1}{3}$–$\frac{1}{4}$ in., distinctly stalked.


East Himalayas and Punjab to the Western Peninsula and Ceylon.—Distrib. Afghanistan, Arabia.

General habit of A. arabica, with fewer leaflets and a different pod. Branchlets slender, downy or glabrous. Spines $\frac{1}{2}$–2 in., the large ones white, $\frac{1}{4}$–$\frac{1}{2}$ in. Pinnae $\frac{1}{2}$–$\frac{1}{4}$ in. long, with a gland between the lowest pair; leaflets $\frac{1}{2}$–$\frac{1}{4}$ in., rigidly coriaceous, grey-green. Heads yellow, under $\frac{1}{2}$ in. diam. from the axils of developed leaves; peduncles densely grey-downy, with the involucre about the middle. Calyx $\frac{1}{4}$ in., funnel-shaped, shortly toothed. Corolla scarcely twice the length of the calyx. Pod distinctly stalked, 3–6 in. by $\frac{1}{4}$ in., thin, flat, straight, drab, glossy, rather venulose, 6–10-seeded.

5. A. Jacquemontii, Benth. in Hook. Journ. Bot. i. 499; pinnae 6–8, leaflets 12–16, heads axillary, pod thin flat broad-ligulate dehiscence glabrous with straight sutures.
Plains of the North West provinces.

General habit of A. eburnea, from which it mainly differs in the pod. Spines slender, reaching 1\(\frac{1}{2}\)–2 in. long. Pinnae 1\(\frac{1}{2}\)–1 in. long; leaflets grey-green, sub-glabrous, rigidly coriaceous. Heads yellow, \(\frac{3}{4}\) in. diam. Corolla \(\frac{3}{4}\) in., twice the length of the calyx. Pod straight, flexible, grey, 2–3 in. by \(\frac{1}{2}\)–\(\frac{3}{4}\) in., 5–6-seeded, with a stalk \(\frac{1}{4}\)–\(\frac{1}{2}\) in. long.


Western Peninsula and Ceylon.

A small tree, with the branchlets and leaf-rachises densely clothed with fine grey pubescence, the latter with several glands. Pinnae 1–2 in. long; leaflets \(\frac{1}{2}\)–\(\frac{3}{4}\) in., grey-green, more or less downy, membranous or subcoriaceous. Developed spines 1–2 in. long, spreading, brown, not white. Heads purple, \(\frac{1}{4}\) in. diam.; peduncles stout, densely downy, with a medial involucre. Calyx \(\frac{3}{4}\) in., funnel-shaped, grey-downy. Corolla subcampanulate, twice the length of the calyx. Pod 4–6 in. by \(\frac{1}{4}\) in., short-stalked, 6–10-seeded.


North West provinces to Ceylon and Burma.—Distribution. Malay isles, Timor.

Easily recognizable from all the foregoing by its pineded inflorescence. Spines \(\frac{1}{4}\)–1 in., white. Leaf-rachises downy, with several glands; pinnae 1\(\frac{1}{2}\)–2 in. long; leaflets crowded, rigidly coriaceous, \(\frac{1}{4}\)–\(\frac{1}{2}\) in. Panicle reaching a foot long and broad, with long compound densely tomentose ascending branches, the lower only from leafy nodes; heads yellow, not more than \(\frac{1}{4}\) in. diam.; peduncles with the bract medial, the upper very short. Corolla under \(\frac{1}{4}\) in. Pod 4–8 in. by \(\frac{1}{4}\)–\(\frac{1}{2}\) in., sessile, subindescent, clothed with pale brown or grey persistent tomentum.

Var. microcephala, Grah. in Wall. Cat. 5263, sp.; leaf-rachis glabrous, leaflets much larger \(\frac{1}{4}\)–\(\frac{3}{8}\) in. long. A. densa, Wall. Cat. 5262.—Birma, Wallisch.


Bengal, Behar, Western Peninsula, Ceylon.

A middle-sized tree, with white bark and downy branchlets. Leaf-rachis \(\frac{1}{2}\) ft. long, with a large basal gland and smaller ones between several of the upper pinnae; pinnae 1\(\frac{1}{2}\)–2 in. long; leaflets very close, rigidly subcoriaceous, pale green, under \(\frac{1}{4}\) in. long. Spikes 1–4-nate, 3–4 in. long. Calyx \(\frac{1}{2}\)–\(\frac{3}{4}\) in., densely grey-downy;
teeth deltoid. Corolla nearly white. Pod 3-4 in. by $\frac{1}{2}$ in., rather thicker than in the two following, veined, 6-8-seeded, distinctly beaked, subindehiscent, narrowed suddenly into a stalk $\frac{1}{2}$ in. long.


Through the Himalayas from the **PUNJAB** to Sikkim, ascending to 4–5000 ft.

**BIRMA.**

Very near *A. Suma*, from which it differs by its brown bark, darker yellow flowers, calyx not more than half as long, both absolutely and in proportion to the corolla, and not merely downy, but clothed with distinct spreading grey hairs, and by its narrower thinner darker brown pod.


**WESTERN PENINSULA, CEYLON, BIRMA.**

Scarcely more than a variety of *A. Catechu*, from which it differs by its fewer leaflets and pinnae, and by the total absence of pubescence from the leaflets leaf-rachises and calyx, by the latter being rather shorter, and by the very dark brown colour of its branchlets.


**WESTERN PENINSULA.**

A middle-sized tree, with brown bark and glabrous or slightly downy branchlets. Prickles sometimes suppressed. Leaf-rachis with a gland on the petiole and one between the uppermost pinnae; pinna 2–3 in. long; leaflets $\frac{1}{2}$ in. long, pale glaucous-green, rigidly subcoriaceous. Spikes dense, 3–4 in. long. Corolla yellowish, $\frac{1}{2}$ in. Pod 3–4 in. long. $\frac{1}{2}$ in. broad, brown, glabrous, veined, distinctly stalked, 4–6-seeded, the upper suture narrowly winged.


**SCINDE, Stocks.**—**DISTRIB.** Arabia, tropical Africa.

A low tree, with flexuose glaucous grey branches. Leaf-rachises not above an inch long, with a gland at the base and one between the upper pair of pinnae; leaflets rigidly subcoriaceous, $\frac{1}{2}$ in. long, glabrous, pale, glaucous-green. Spikes 2–3 in. long,
not very dense. *Calyx* \( \frac{1}{2} \) in., campanulate, glabrous, deeply toothed. *Corolla* yellowish. *Pod* 3 in. by \( \frac{3}{4} \) in., thin, grey, firm, indehiscent, 5-6-seeded, narrowed suddenly into a short stalk.


Foot of the **Western and Central Himalayas.**—**Distr.* Afghanistan.
A middle-sized tree, with grey glabrous branches. *Prickles* dark-brown, polished. *Leaf-rachises* very slender, finely downy, with a small gland at the base and one between the uppermost pinna; leaflets thin, rigidly subcoriaceous, \( \frac{1}{2} \) in. long, shortly stalked, glabrous, oblique at the base, pale green, obtuse or minutely cuspidate. *Spikes* 2-3 in. long, not very dense. *Corolla* \( \frac{1}{2} \) in., greenish. *Pod* 2-3 in. by \( \frac{3}{4} \) in., 6-8-seeded, glossy, drab, glabrous, venulose, narrowed gradually into a short stalk.

14. **A. lenticularis**, Ham. in *Wall. Cat.* 5244; spines in pairs short hooked, pinnae 4-8, leaflets 12-16 large obovate-oblong, corolla twice the campanulate calyx, pod strap-shaped straight or subfalcate. *Benth. in Hook. Lond. Journ.* i. 508.

Foot of **Central and Eastern and Western Himalayas.**—**Rare, Hamilton, Royle.**
*Branches* grey, glabrous. *Leaves* long-petioled, without any gland on the rachis; pinnae 3-4 in. long; leaflets much larger than in any other species, 1-1\( \frac{1}{2} \) in. long, obtuse, pale glaucous-green, glabrous, rigidly subcoriaceous, sessile, reduced on the upper side towards the base. *Spikes* very dense, short-peduncled, 3-4 in. long. *Corolla* \( \frac{1}{2} \) in., grey, campanulate, deeply toothed. *Pod* 6-8 in. by \( \frac{3}{4} \) in., 6-8-seeded, thin, flat, opaque, brown, venulose, with both sutures slightly thickened and furnished with a narrow wing.


**Western Peninsula.**
A low tree, forming an umbrella-like top when old, with brown glabrous branches. Full-sized prickles 2-2\( \frac{1}{2} \) in. long, \( \frac{1}{4} \) in. thick, connate at the base. *Leaves* shorter than the prickles; rachises very slender, glabrous or downy, with a small petiolar gland; leaflets \( \frac{1}{2} \) in., glabrous, rigidly subcoriaceous. *Spikes* abundantly produced from the close nodes of leafless branches. *Corolla* \( \frac{1}{2} \) in., 3-4 times the minute glabrous campanulate calyx. *Pod* 1\( \frac{1}{2} \)-2 in. by \( \frac{3}{4} \) in., opaque, dark brown, 2-4-seeded, veined, finally dehiscing.

**Series III. Vulgares.** Climbers with copious scattered prickles. *Flowers* in copiously panicked globose heads.

Acacia.] L. Leguminose. (J. G. Baker.) 297

Eastern Himalayas, Western and Eastern Peninsulas, and Ceylon.—Distrib. Malay isles, China.

Prickles abundant, minute, hooked. Branchlets and leaf-rachises finely grey-downy. Petiolar with a large gland near the base and one between the uppermost pinnae; pinnae 2–3 in. long; leaflets ¼–½ in. long, pale green above, glaucous beneath, subglabrous, ½–1 in. broad, with a very oblique midrib, sensitive, often not crowded. Pinnales with densely downy branches, the lower springing from the axils of the leaves, the upper subtended by conspicuous oblique membranaceous subpersistent bracts; heads yellow, ½–1 in. broad. Calyx funnel-shaped, ½ in. long. Corolla little exerted. Pod strap-shaped, straight, 3–4 in. by ½ in., 4–10-seeded, with broad sutures, narrowed to a short stalk, depressed between the seeds.

**Var. rugata**, Ham. in Wall. Cat. 3251, sp.: leaflets and pod larger, the pinnae ½ in. and the latter 1–1½ in. broad, ovary villose.—Eastern Himalayas.


Tropical Himalayas, Western Peninsula, Eastern Peninsula, and Ceylon.

Prickles minute, hooked. Branchlets and leaf-rachises finely downy or glabrous, the latter with a gland at the base and between the 2–3 upper pinnae. Pinnae 2–3 in. long; leaflets ¼–½ in., broad, minutely cuspidate, with the midrib nearer the upper margin, both surfaces glabrous or nearly so, the lower grey-green. *Poduncles* finely downy, 1–4-nate; heads yellow, under ½ in. broad. Calyx shorter, and more broadly funnel-shaped than in the last. Pod straight, strap-shaped, glabrous, dehiscent, smooth, 4–6 in. by 2–3 in., 8–12-seeded, the sutures straight or slightly repand, cuneately narrowed at the base to a short stalk.


**Var. oxyphylla**, Grah. in Wall. Cat. 5252, sp.; leaflets 40–50 more membranous than in the last and more acutely pointed.—Eastern Himalayas.


Prickles generally fewer and less hooked than in A. *Intsia* and *concinna*. Branchlets and leaf-rachises finely downy, the latter with a large plate-shaped gland at the base of the petiole and several between the upper pinnae. Pinnae 2–3 in. long; leaflets firm in texture, not more than ½–1 in. broad, dark green above, grey-green below, both sides glabrous. *Poduncles* 1–4-nate, finely downy; heads ½ in. thick. *Corolla* ¼ in., slightly exceeding the glabrous subcampanulate calyx. *Pod* straight, strap-shaped, thin glabrous, dehiscent, 6–8 in. by ½–1 in., distinctly stalked, 8–12-seeded, the sutures rather raised, slightly repand.
L. LEGUMINOSÆ. (J. G. Baker.)


VAR. 2. arrophula, Don; Wall. Cat. 5257, sp.; pinnae more numerous, leaflets duller in colour and not so firm in texture, panicle more elongated and compound, peduncles often 4-6-nate.—Eastern Himalayas.

VAR. 3. pluricapitata, Steud.; Benth. in Hook. Lond. Journ. Bot. 1842, 516, sp.; pinnae 40-80 not more than 1½-1½ in. long, leaflets very narrow and crowded, petiolar glands much smaller, panicle elongated sometimes a foot long above the leaves, peduncle often 6-8-nate, heads smaller, A. polypephala, Grah. in Wall. Cat. 5255, non DC.—Martaban, Penang, and Malacca.—Distrb. Malay isles.

IMPERFECTLY KNOWN SPECIES.

A. WIGHTI, Baker. In Dr. Wight’s collection are specimens without fruit of a well-marked species near A. arabica, from Travancore and Tinnevelly, with glabrous branchlets and leaf-rachises, large straight dark-brown spines, 2-3 pinnae, 12-32 oblique oblong glabrous subcoiraceous leaflets ½-¾ in. long, short glabrous 2-4-nate peduncles with the involucre below the middle, funnel-shaped shortly-toothed calyx ½ in. long, and a minute campanulate glabrous calyx.

128. ALBIZZIA, Durazz.

Large trees. Leaves bipinnate. Flowers in the Indian species in globose heads, sessile or pedicellate, usually pentamerous and all hermaphroditic. Calyx campanulate or funnel-shaped, distinctly toothed. Corolla funnel-shaped, petals firmly united below the middle. Stamens indefinite, monadelphous at the base, filaments several times the length of the corolla; anthers minute, not gland-crested. Ovary sessile or shortly-stalked; style filiform, stigma capitulate minute. Pod large, thin, flat, strap-shaped, straight, indehiscent or subindehiscent, continuous within, the sutures not thickened.—Distrb. Species 25-30, spread through the Tropics of the Old World.

The Australian A. lophantha, which resembles A. amara in the leaves but has the flowers in spikes, is naturalised on the Nilghiris.

* Leaflets oblong, at least ½ in. broad.


Tropical Himalayas, ascending to 5000 ft. in the Central Provinces and 4000 ft. in Khasia; through India proper and Ceylon to Birma and Tanzania.—Distrb. Malay isles, China, N. Australia, Trop. Africa.

A tall tree, without prickles. Leaves with glabrous or downy rachises, and a large gland near the base of the main petiole; pinnae 4-8, with or without a gland between the lowest; leaflets short-stalked, rigidly subcoiraceous, oblique, 1-1½ in. long, glabrous or finely grey-downy. Heads many-flowered, short-peduncled, 3-4 together from the crowded upper nodes on downy erecto-patent peduncles. Calyx ½ in., downy. Corolla greenish-yellow, twice the calyx, the teeth short, lanceolate. Pod strap-shaped, firm, yellow-brown, ½-1 ft. by ½-1½ in., 6-10-seeded.

MALACCA, Maingay.
Combines the leaves of *A. odoratissima* with inflorescence of *A. Lebbeck*. Leaves with a gland near the base of the main petiole; rachises and leaflets finely downy; pinnae 12–18; leaflets oblong, obtuse, sessile, rigidly subcoriaceous, little oblique, \( \frac{1}{4} \) in. long. Heads many-flowered, on crowded downy peduncles from the upper nodes. Pedicels and calyx each \( \frac{3}{4} \) in., densely pubescent. Corolla half as long again as the calyx. Pod a foot or more by 2 in., very thin and brittle, pale yellowish-brown, with repand sutures and very small seeds.


Foot of the Central Himalayas to Ceylon and Malacca.

A tall erect tree, without prickles. Leaf-rachises finely downy, with a gland at the base of the petiole and of the 1–2 upper pinnae; pinnae 6–8; leaflets obliquely oblong, articulated on the rachis, \( \frac{1}{2} \) in. long, rigidly subcoriaceous, glaucous beneath, strongly veined, with the midrib parallel with the upper edge at a short distance from it. Heads small, few-flowered, very numerous, forming ample deltoid terminal panicles crowded in peduncled corymbs at the end of the branches and smaller ones from the upper leaf-axils. Calyx under \( \frac{3}{4} \) in. Corolla grey-silky \( \frac{1}{2} \) in., with lanceolate teeth. Pod firm, flexible, 6–8 in. by 1–1\( \frac{1}{2} \) in., opaque or glossy, 8–12-seeded. We have not material for separating from this *A. lebbeckoides*, Benth., reported by Kurz from Birma.

Var. *mollis*, Benth.; leaflets and leaf-rachises densely grey-downy, the former less rigid than in the type.—Rohilcund, Thomson. Siwaliks, Edgeworth.


Central and Eastern Himalayas, Behar, Western Peninsula, Birma.—Distri. Malay isles, Philippines.

Leaf-rachises glabrescent, with a large gland near the base of the petiole; pinnae 4–12; leaflets rigidly subcoriaceous, grey beneath, glabrous, 1–1\( \frac{1}{2} \) in. long, obliquely truncate on the lower side at the base. Inflorescence like that of *A. odoratissima*. Calyx \( \frac{3}{8} \) in., shortly toothed. Corolla twice the length of the calyx, deeply cleft. Pod 4–8 in. by \( \frac{3}{4} \) in., thin, brown, glabrous, finally dehiscing, 8–12-seeded.


NIPAL, Khasia, Assam, Silhet, Ava, and Singapore.

Differs widely from all the other species except the next, by its large acute leaflets and unijugate pinnae. Main and partial petiole each with usually a large gland. Leaflets oblong, 2–4 in. long, glabrous, membranous, firm, bright green. Ultimate-
branches of the **p**anicle **umbellate** or **cori**mbose. **Calyx** $\frac{1}{2}$ in., faintly-toothed. **Corolla** 3–4 times the length of the calyx; teeth lanceolate. **Pod** 6–8 in. by 1–1\(\frac{1}{2}\) in., thin, flexible, pale brown, 6–8-seeded.


**MARTABAN, Kurz.**
A shrub, 2–5 ft. high, with puberulous branchlets. **Pinnae** unijugate; leaflets oblong- or subrhomboidal-lanceolate, 1–2 in. long, chartaceous, nearly glabrous above when mature, glanscecent and downy beneath. **Heads** the size of a pea, in axillary racemes and terminal panicles. **Calyx** under $\frac{1}{2}$ in., pubescent. **Corolla** thrice as long as the calyx, deeply lobed, pubescent, greenish-white. **Pod** unknown. *Ex Kurz loc. cit.***

**Leaflets narrow, dimidiate-lanceolate, with the midrib close to the upper edge.**


Throughout the Himalayas from Hazara to Sikkim, ascending to 6–7000 ft.—Distribr. Abyssinia, Eastern and Central Asia, China, Japan.

A middle-sized unarmed tree. **Leaf-rachises** finely downy, with a small gland at the base of the petiole, and between the upper pinnae; pinnae 8–24; leaflets membranous, sessile, sensitive, $\frac{1}{4}$ in. long, cuspidate, straight on the upper side, rounded on the lower, $\frac{3}{4}$ in. broad. **Heads** globose, on clustered erecto-patent peduncles from the crowded leafless upper nodes. **Calyx** $\frac{1}{2}$–$\frac{3}{4}$ in., funnel-shaped, shortly toothed. **Filaments** rose-red, 1 in. **Pod** glabrous, membranous, grey or pale brown, 5–6 in. by $\frac{3}{4}$–1 in., 8–12-seeded, narrowed to a beak and short stalk, indehiscent.

**Var. mollis**, Benth.; leaflets broader ($\frac{1}{2}$–$\frac{3}{4}$ in.) more coriaceous, like the peduncles and calyx densely pubescent. *Acacia mollis, Wall. Pl. As. Rar.* ii. 76, t. 177; *Cat.* 5235.—Simla to Nipal.


**Tropical Himalayas,** ascending to 4000 ft. in Kumaon and Sikkim, to Ceylon and Burma.—Distribr. Malay isles.

A tall unarmed tree, with finely grey downy branchlets. **Leaves** with many glands on the rachis; pinnae 12–40; leaflets $\frac{1}{4}$ in. or less broad, membranous, sensitive, $\frac{1}{2}$–$\frac{3}{4}$ in., sessile, glaucous beneath, finely downy, with a slightly recurved acute point. **Stipules** and bracts large, membranous, downy, cordate, acute. **Heads** in copious axillary simple and compound terminal racemes with densely pubescent erecto-patent branches. **Calyx** like that of *A. Julibrissin*, but smaller. **Pod** 5–6 in. by $\frac{3}{4}$–1 in., pale brown, thin, indehiscent, subsessile, 8–10-seeded.

***Leaflets very narrowly strap-shaped with a central midrib.***

9. **A. myriophylla**, Benth. in *Hook. Journ.* 1844, 90; leaflets 80–100
rigidly subcoriaceous, heads paniced stipules persistent subspinescent, pod sessilis. Mimosa microphylla, Roxb. Fl. Ind. ii. 549. Acacia myriophylla, 


A low tree, with dark brown shoots, *Leaf-rachises* finely downy, with a large gland on the petiole, and several between the upper pinnae; pinnae 30–40, not more than 2–3 in. long; leaflets green, closely crowded, caducous, $\frac{1}{2}$–$\frac{3}{4}$ in. by $\frac{1}{5}$ in. Heads small, corymbose, forming an ample terminal panicle, with brown-tomentose branches. Calyx sessile, campanulate, under $\frac{1}{4}$ in. long. Corolla funnel-shaped, $\frac{1}{4}$–$\frac{1}{2}$ in. Pod 4–5 in. by $\frac{3}{4}$ in., glossy, brown, thin, flexible, 6–8-seeded, narrowed to both ends.

**Var. foliolosa**; leaflets large $\frac{1}{4}$–$\frac{3}{4}$ in. long nearly $\frac{1}{5}$ in. broad, rachises less pubescent. Acacia foliolosa, Gr. In. Wall. Cat. 5241.—Martaban, Wallich.


**Western Peninsula and Ceylon.—Distr. Abyssinia (A. sericeocephala, Benth.) and Kordofan.**

A middle-sized unarmed tree, with densely pubescent branchlets and leaf-rachis, the latter with a small gland on the petiole, and between the lowest pair of pinnae. Pinnae 8–20, 1–3 in. long; leaflets $\frac{1}{2}$–$\frac{3}{4}$ in. long, sessile, caducous, finely pubescent, grey or glaucous beneath. Peduncles copious, axillary, densely tomentose, crowded at the upper nodes in the axils of much-reduced leaves. Calyx $\frac{1}{4}$ in., funnel-shaped, shortly stalked. Corolla 3 times as long as the calyx; teeth lanceolate. Pod 6–9 in. by $\frac{3}{4}$–1 in., 6–10-seeded, opaque, grey-brown.

129. **SERIANTHES**, Benth.

Unarmed trees. Leaves bipinnate. Flowers racemosed, much larger than in the other Mimosa, 5-merous, mostly hermaphrodite. Calyx deeply campanulate, deeply toothed. Petals adnate at the base to the staminal tube, free above this. Stamens monadelphons, very numerous; anthers minute. Ovary sessile, many-ovuled; style filiform, stigma minute capitulate. Pod large, oblong, sub-lignose, indehiscent, rather turgid.—Distr. Another species in Polynesia.


Malacca, Griffith, Maingay.—Distr. Malay isles, Philippines.

Leaf-rachis with a gland on the common petiole and at the base of each pinna; pinnae 6–16; leaflets 12–24, glossy green, glabrous, rigidly coriaceous, $\frac{1}{2}$–1 in. long, oblique, rather falcate, obtuse, with the upper and lower edge subparallel. Flowers shortly pedicellate, in few-flowered axillary corymbose panicles, which are shorter than the leaves. Calyx and yellowish corolla densely felted on the outside, the former $\frac{1}{4}$ in., the latter $\frac{1}{4}$ in. long. Stamens many hundreds, much exerted.
Pod ½ ft. by 2 in., glabrous, 6–8-seeded, rather turgid, the sutures neither lobed nor thickened.

130. **CALLIANDRA**, Benth.

Shrubs or trees. *Leaves* bipinnate, with small or large leaflets. *Flowers* in globose heads, polygamous, 6-merous. *Calyx* campanulate, toothed. *Corolla* funnel-shaped, deeply 5-cleft. *Stamens* indefinite, monadelphous at the base, filaments filiform much exserted; anthers minute, not gland-crested. *Ovary* stalked, many-ovuled; *style* filiform, stigma minute capitulate. *Pod* strap-shaped, slightly falcate, flat, rigidly coriaceous, the valves dehiscing with elasticity, bordered by much-thickened sutures, continuous within, narrowed gradually to a short stalk.—**Distrib.** Species 80, all the rest Tropical American.

1. **C. Griffithii**, Benth. in *Trans. Linn. Soc.*** xxx. 537; *spines* minute, bracts linear-lanceolate.

**Khasia Mtts., Griffith.**

Branches slender, terete, glabrous. General and partial *petioles* very short, glandless. *Leaves* as in *C. umbrosa*; upper pair of leaflets connivent, oblong-lanceolate, oblique, acuminate, 2–3 in. long, rigidly subcoriaceous, glabrous, strongly veined, lower nearly sessile, ½–3 in. *Heads* dense, on slender glabrous ascending peduncles 1–2 in. long, from the axils of developed leaves. *Calyx* ½ in., funnel-shaped; *teeth* deltoid. *Corolla* funnel-shaped, glabrous, ⅗ in.; *teeth* lanceolate. *Pod* unknown.


**Silhet, Khasia Mtts., Chittagong, and Penang.**

A tree, with slender glabrous branchlets, sometimes furnished with small erecto-patent stipular spines. *Leaves* short; *pinnae* 2, with a pair of large sessile oblique oblong acute rigidly subcoriaceous leaflets at the apex, and an odd much smaller one below on the outer side, all with a gland on the rachis at the base. *Flowers* sessile, in small dense globose heads on short ascending peduncles. *Corolla* ¼ in., yellow, inodorous. *Pod* 6–9 in. by ¾–1 in. broad, smooth, finely veined, the valves with elevated rounded thick raised edges.

131. **PITHECOLOBIUM**, Mart.

Erect trees. *Leaves* bipinnate. *Flowers* in globose heads, usually hermaphrodite and pentameres. *Calyx* campanulate or funnel-shaped, shortly toothed. *Corolla* funnel-shaped, the petals united below the middle. *Stamens* monadelphous, much exserted; anthers not gland-crested. *Ovary* sessile or stalked, many-ovuled; *style* filiform, stigma minute capitulate. *Pod* strap-shaped, falcate or circinate, usually dehiscent and much twisted in a late stage, the sutures not thickened.—**Distrib.** Species about 100, cosmopolitan in the Tropics, mostly American, only one African.

**Series I. Unguiscati.** Stipules spinose.

Cultivated throughout India, but not indigenous. A native of Trop. America.

A middle-sized tree, with glabrous leaves and branches. Spines minute, pointing upwards. Leaflets approximated, oblique, obovate-oblong, rigidly subcoriaceous, obtuse, 1-2 in. long. Heads dense, 3/4 in. broad, shortly peduncled, on elongated branches. Calyx 1/2 in., funnel-shaped, grey-downy. Corolla 4 in. Ped 4-5 in. by 1/2 in., 6-8-seeded, both sutures indented between the seeds, which are half enveloped in a pulpy white edible aril.


CEYLON and WESTERN PENINSULA.

A low tree, with slender pubescent branches. Common petiole very short, with a gland between the erecto-patent pinnae; pinna 1-1 1/2 in. long; leaflets bright green, rigidly subcoriaceous, uppermost pair approximated, 1-2 1/2 in. long, obtuse, oblique-obovate; lower smaller, lowest on inside absent. Peduncles slender, pubescent. Calyx campanulate, uricle 1/4 in. Corolla 3-4 times the length of the calyx. Stamens 1/4 in. long. Pod not seen.


WESTERN PENINSULA and CEYLON.—Distrib. Malay isles.

A low tree, with the branchlets sometimes reduced to spines, but with the stipular spines often small and obscure. Leaf-rachis downy, with a gland between the pinna and an obscure one between each pair of leaflets; leaflets subglabrous, rigidly coriaceous, ligulate-oblong, obtuse, 1-1 1/2 in. long, the uppermost pair broader upwards, the lowest on the inner side mostly absent. Heads long-peduncled, few-flowered. Corolla 1/4 in., twice the length of the funnel-shaped calyx. Stamens 3-1 in. Ped very different to those of the other species, recurvate-falcate, indesincent, jointed, 1-3 in. thick, 6-8-seeded.

Series II. Glypearia. Spineless trees with coriaceous twisted pods opening from the lower suture.

* Leaflets few and but slightly oblique at the base.


EASTERN HIMALAYAS, ascending to 3000 ft., WESTERN PENINSULA and CEYLON.—Distrib. Malay isles, Philippines.

A tall tree, with subtcrete branchlets with thin brown pubescence. Pinnae and leaves long-petioled; leaflets subcoriaceous, glabrous above, slightly pubescent at first
beneath, obovate-oblong, acute, the upper 4–6 in. long, the lower shorter, all distinctly stalked. Heads few-flowered, irregular, in copious ample axillary and terminal panicles. Calyx subessile, ⅙ –⅜ in., densely brown-silky. Corolla silky, 2–3 times the length of the calyx. Stamens 2–3 in. Pod once or twice spiral, 3–6 in. by ⅛–⅜ in., the valves rigidly coriaceous, slightly downy, the lower suture not at all repand.


Malacca, Maingay.


6. P. confertum, Benth. in Trans. Linn. Soc. xxx. 577; branchlets downy, pinnae 2, leaflets 4, leaves with glands only at the base of the pinnae, calyx campanulate, pod unknown.

Malacca, Griffith.

Branchlets of the panicle clothed with brown pubescence. Leaflets rigidly coriaceous, shining, strongly veined, oblong, obtusely pointed, 3–4 in. long. Heads in copious short axillary and terminal corymbs. Calyx ⅛ in., glabrous. Corolla ⅛ in.; cylindrical tube as long as lanceolate teeth. Stamens twice as long as the corolla.

7. P. bubalinum, Benth. in Trans. Linn. Soc. xxx. 576; branchlets pubescent, pinnae 2, leaflets 2–4, leaves with glands only at the base of the pinnae, calyx campanulate, pod large downy not lobed. Inga bubalina, Jack. in Malay Misc. ii. 77.

Penang and Malacca.


8. P. microcarpum, Benth. in Trans. Linn. Soc. xxx. 576; branchlets pubescent, pinnae 2–4, leaflets 4–8, leaves with glands only at the base of the pinnae, calyx campanulate, pod small glabrous spiral not lobed. Inga bubalina, Wall. Cat. 5272, non Jack.

Penang and Malacca.

Closely allied to P. bubalinum, from which it differs by its more numerous and less coriaceous leaflets and especially by its pod, which is ¼ in. by under ⅛ in., forms a complete spiral, with thinner valves, which become much twisted when it opens, and seeds not larger than a pea.


Penang, Singapore, Malacca.—Distrib. Malay isles.

A tall tree, with terete branchlets and leaf-rachises. Glands flat, depressed; general and partial petioles elongated; leaflets obovate-oblong, obtuse or subacute, distinctly stalked, rigidly subcoriaceous, quite glabrous on both sides, the upper 6–8 in. long, the lower shorter and more ovate. Heads few-flowered, irregular, sessile or
shortly peduncled, on the elongated glabrous branches of terminal and axillary panicles, with a pair of small spreading lanceolate bracts at the base. Calyx \( \frac{3}{4} \) in., glabrous. Corolla 3 times the length of the calyx. Pod firm, glabrous, 1\( \frac{1}{4} \)-1\( \frac{1}{2} \) in. broad, at first forming a circle or more, the lower suture not at all waved.


**Pegu, Tenasserim and Malacca.—**Distr. Malay isles, Philippines.

A tall tree, with terete grey glabrous branchlets. Leaflets distinctly stalked, acute, oblong or oblong-lanceolate, thin but firm, flexible, glabrous and glossy on both sides, the upper 4-6 in. long. Heads few-flowered, with 3-4 small spreading lanceolate bracts at the base, fascicled on short peduncles in ample copious axillary and terminal panicles. Calyx sessile, glabrous, \( \frac{1}{2} \) in. Corolla 3 times calyx, glabrous. Stamens 1-3 in. Pod firmer than in its allies, 1-1\( \frac{1}{2} \) in. broad, lobed half-way down to the upper suture, into round divisions, which are hemispherical on the face when the seed is ripe.

**Leaflets numerous, more or less trapezoid through the lower border being cut away at the base.**


**Western Peninsula; Amamalay hills, 5-8000 ft., Wight, Beddome. Ceylon, Thwaites.**

A tree 30-40 ft. high, with branchlets clothed with dense brown pubescence. Leaf-rachis with 1-3 petiolar glands, and one midway between the insertion of each pair of pinnae; leaflets oblong-trapezoid, 1-\( \frac{1}{2} \) in. long, rigidly coriaceous, glossy above, densely pubescent below. Heads many-flowered, 1 in. diam., on 1-2-nate axillary peduncles, the uppermost leaves reduced or suppressed. Calyx \( \frac{1}{2} \) in., brown-downy. Corolla funnel-shaped, 3 times the calyx. Pod 3-4 in. long, coriaceous, twisted, 3-6 seeded.


**Penang, Singapore, Malacca.**

Branchlets long and slender, densely clothed with dull brown pubescence. Leaf-rachis downy, with a small depressed petiolate gland and one below the upper pairs of pinnae; upper pinnae 4-6 in. long, lower much shorter, with fewer leaflets; leaflets \( \frac{1}{4} \)-\( \frac{3}{4} \) in. long, obtuse, with the upper and lower edge subparallel, subcoriaceous, shortly pubescent. Panicles deltoid, axillary and terminal, with long slender weak finely grey-downy branchlets. Calyx \( \frac{1}{2} \) in., campanulate. Corolla 3-4 times the calyx. Stamens twice the corolla. Pod \( \frac{1}{2} \) ft. by \( \frac{3}{4} \) in., at first forming a double spiral, splitting open from the lower suture and very much twisted.

Tenasserim, Penang, Malacca.—Distrib. Malay isles, China.

Branches brown-pubescent, with raised lines decurrent from the branchlets. Leaf-rachises acutely angled, with a conspicuous raised gland on the petiole, and one between each pair of pinnae and leaflets; upper pinna 5–6 in. long; lower much shorter, with fewer leaflets; upper leaflets 1–2 in. long, with the lower and upper margin nearly parallel, rigidly subcoriaceous, glossy above, densely downy below; lower becoming gradually smaller. Panicles axillary and terminal, with densely pubescent erecto-patent subulate branchlets. Calyx campanulate, minute, 3–4 times shorter than the whitish corolla. Stamens \( \frac{2}{3} \) in. Pod like that of P. contortum, but rather smaller.


Khasia, Mishmi.—Distrib. Malay isles.

Very near P. Clypearia, with which it quite agrees in vestiture, glands, inflorescence, calyx and corolla. Leaflets close, regular, \( \frac{3}{4} \) in. long, with the midrib as in P. Clypearia, carried from the lowest posterior to the upper anterior corner. Lower pedicels 2–3 times as long as the calyx. Branchlets and leaves below clothed with dense short light brown silky pubescence.


East Himalayas and down the gulf to Malacca.—Distrib. Malay isles.

A tall tree, with stout branchlets with a little fine brown pubescence. Leaf-rachis with a large gland at the base and one between each pair of pinnae and leaflets; lower pinnae and leaflets much shorter than the upper; leaflets rigidly subcoriaceous, oblong-trapezoid, slightly downy below, the upper 3–4 in. long. Panicles copious, ample, axillary and terminal. Calyx \( \frac{3}{4} \) in., campanulate. Corolla white, funnel-shaped, 3–4 times the calyx. Stamens \( \frac{4}{3} \) in. Pod just like those of P. contortum and Clypearia.

132. INGA, Willd.

Shrubs or trees. Leaves simply pinnate. Flowers in spikes or globose heads. Calyx a minute 3-toothed cup. Corolla a cylindrical tube, shortly 3-toothed at the tip. Stamens indefinite, much exceeding the corolla, monadelphous more than half-way up the corolla; anthers minute, with the pollen agglomerated in masses. Ovary sessile, few-ovuled; style subulate, stigma minute, terminal. Pod linear, rigidly coriaceous, with the valves forcibly springing back and each suture expanded into a thick raised border.—Distrib. A large American genus (140 species), of which we have a single unsatisfactory representative, with the pod of Calliandra and simply pinnate leaf of Inga.


Hills of South Travancore, 3–4000 ft., Beddome.

A middle-sized tree, with slender glabrous branchlets. Leaflets 2, sessile at the apex of a very short petiole, rigidly subcoriaceous, venulose, oblique-oblong, subacute, 2–4 in. long. Flowers capitate, on short peduncles. Corolla \( \frac{3}{4} \) in. long. Pod sessile, 3–4 in. by \( \frac{3}{4} \) in. broad, rather decurved, narrowed to the base, 3–4-seeded, with a short hooked beak, the valves glabrous, flat, margined all round with a thick raised border.
Order LI. ROSACEÆ. (By J. D. Hooker.)

Herbs, shrubs or trees. Leaves stipulate, rarely opposite, simple or compound. Flowers usually bisexual and regular (very irregular in Chrysobalanaceæ). Calyx-tube free or adnate to the ovary, limb usually 5-lobed, often bracteolate, imbricate or valvate. Petals 5, rarely 0, inserted under the margin of the disk, deciduous, usually imbricate. Disk lining the calyx-tube or forming a ring at its base. Stamens perigynous, indefinite (rarely 1, 5 or 10) in one or many series, often connate and unilateral in Chrysobalanaceæ; filaments subulate or filiform, usually incurved in bud; anthers small, didymous. Ovary of one or more free or connate carpels, with free or connate styles, which are basal, lateral or subterminal; stigmas simple, penicillate or capitate; ovules 1 or more in each carpel. Fruit variable, of achenes, or berries or drupes, rarely capsular. Seeds erect or pendulous, testa membranous or coriaceous, albumen 0; cotyledons large, plano-convex; radicle short.—Distrib. About 1,000 species, found in all climates and countries, but chiefly in the temperate.

Chrysobalanus Icaco, Linn.; the Cocoa-plum of the West Indies is cultivated in some parts of the Malabar Coast, but not frequently.

A. Carpels free or adnate to the side of the calyx-tube.

Tribe I. Chrysobalanaceæ. Flowers usually irregular. Carpel 1; style basal; ovules 2, ascending. Fruit a drupe. Radicle inferior.—Trees or shrubs with simple quite entire leaves.

Calyx-tube elongate. Stamens many, unilateral. Ovary 2-locellate
Calyx-tube short. Stamens 2. Ovary 1-celled

1. Parinarium.
2. Parastemon.

Tribe II. Prunææ. Flowers regular. Carpel 1, rarely 2; style subterminal, rarely basal; ovules 2, pendulous. Radicle superior.—Trees or shrubs with simple usually serrated leaves.

Calyx 5-lobed. Petals 5, large, glabrous. Carpel solitary
Calyx 5–10-toothed. Petals 5–8, minute or 0. Carpels 1 or 2. Drupe erect, fleshy, with a bony stone
Calyx 5–10-toothed. Petals 5, minute or 0. Carpel 1. Drupe erect, coriaceous
Calyx 5-lobed. Petals 5. Carpel 1. Drupe inverted, style sub-basilar

3. Prunus.
5. Pygeum.
6. Prinsepia.

Tribe III. Spirææ. Flowers regular. Calyx ebracteolate. Stamens 10 or more. Carpels 1–8; styles ventral or basal; ovules 2 or more, pendulous. Radicle superior.—Shrubs, rarely herbs, with entire or serrate simple or compound leaves.

Tribe IV. Rubææ. Flowers regular. Calyx ebracteolate. Stamens very numerous. Carpels many; styles sub-basal or ventral; ovules 2, collateral; pendulous. Fruit of many dry or fleshy carpels not included in the calyx-tube. Radicle superior.—Usually shrubs, with often compound leaves.

Tribe V. Potentilleæ. Flowers regular. Calyx usually bracteolate. Stamens usually numerous, rarely few. Carpels 1 or more; style short or much prolonged after flowering; ovule solitary, ascending. Fruit of many achenes, not included in the calyx-tube. Radicle superior.—Herbs or small shrubs with various leaves.

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Calyx bracteolate. Stamens 4 or more. Styles not elongating. Ripe carpels seated on an elevated dry receptacle. 11. Potentilla.


B. Carpels adnate to the tube of the calyx, or, if free, included wholly within it.

TRIBE VI. PTERIEÆ. Flowers regular, sometimes apetalous. Calyx-tube often urceolate. Stamens 1 or more. Carpels 1-3; style terminal; ovule 1. Achene sunk in the calyx-tube.—Herbs or small shrubs.

Calyx 4-6-bracteolate, or 8-10-12-fld. Petals 0. Carpel 1; ovule ascending. 13. Achemilla.


Calyx 5-lobed, ebracteolate. Petals 5. Carpels 1-3; ovule pendulous. 15. Poterium.

TRIBE VII. ROSACEÆ. Flowers regular. Calyx-tube urceolate. Petals 5. Stamens very numerous. Carpels many, free; ovule 1, pendulous. Achenes included in the fleshy calyx-tube.—Shrubs, leaves compound.

TRIBE VIII. NEURADEÆ. Flowers regular. Calyx-tube enlarged after flowering and becoming confluent with the carpels. Stamens 10. Carpels 5-10, free, or connate into a 5-10-valved fruit; ovule 1, pendulous.—Herbs.

TRIBE IX. Flowers regular. Calyx-tube (or top of the peduncle) becoming fleshy after flowering and enclosing the carpels. Stamens numerous. Ovules 2 or more, ascending. Fruit a pome, berry, or a drupe, with the 2-5 bony or coriaceous 1-2-seeded stones.—Shrubs or trees.

* Ovary 5-celled; cells 3- or more -ovuled. 16. Rosa.

Cells of ovary many-ovuled. 17.* Cydonia.

Cells of ovary 3-ovuled. 18. Dcyrina.

* Ovary 2-5-celled; cells 2-ovuled. 19. Erithotrya.

Flowers panicled. Ovary 5-celled. 20. Pyrus.

Flowers corymbose or fascicled.

Ovary 5-celled. Fruit a pome or berry. 21. Photinia.

Ovary 2-3-celled. Fruit 2-3-celled, endocarp thin; testa coriaceous. 22. Poterhlea.

Ovary 2-3-celled. Fruit 2-3-celled, endocarp thin; testa thick reticulately lacunose. 23. Stranvæsia.


Ovary 2-5-celled. Drupe with 1-5 bony stones. Leaves cut toothed or serrate. 25. Cotoneaster.

. FARINARIUM, Juss.

Trees. Leaves simple, alternate, evergreen, quite entire. Flowers hermaphrodite, in corymbose racemes, 2-bracteolate, white or pink. Calyx-tube oblong campanulate turbinate or funnel-shaped; lobes 5, subequal, imbricate.
Petals 5, sessile or clawed, deciduous. Stamens 6–\(\infty\), filaments united into an incomplete ring at the base, or connate into an unilateral bundle, all perfect or some without anthers. Carpels 1 (rarely 2), adnate to one side of the calyx-tube, 1–2-celled; style basal, filiform; ovules 2 collateral or 1 erect. Drupes spherical oblong obovoid or ovoid, with a 1–2-celled 1–2-seeded coriaceous woody or bony stone. Seeds erect, testa membranous, cotyledons large fleshy, radicle small inferior.—**Distrib.** About 40 species, natives of the tropics of both worlds.

The Indian species of *Parinarium* are very imperfectly known and are probably referable to several genera distinguishable by their fruit more than by any floral character. Of these, *P. costatum*, *polyneurum*, *oblongifolium* and *multiflorum*, may form one genus with a 2-celled 2-seeded drupaceous fruit and short stamens. *P. nitidum* another, with 1-celled hardly drupaceous coriaceous fruit and short stamens; and *P. asperulum* a third, with a globose 1-celled very hard drupe, glabrous, containing a solitary large glabrous seed with a solid ruminated embryo. The seeds of *P. indicum* and *travancoricum* are unknown. *P. Jackianum*, Benth. (*Petrocarya exelsa*, Jack), must, if Jack's account of the drupe being included in the enlarged calyx and having superposed cells be correct, constitute a fourth genus.

**Subgen. 1. Grymania,** Presl, (Gen.) Leaves eglandular or 2-glandular at the base. Stamens equalling or shorter than the calyx-lobes, forming an imperfect ring. Drupes oblong or obovoid with a very thick 2-celled stone, the cells lined with soft wool.

*Leaves eglandular at the base, grey or dirty white beneath, with numerous stout veins. Stamens 6–10, singularly inserted.*


A tree 15 feet (in Penang). Branches slender; bark pale in the Malacca specimens, dark with minute lenticels in the Penang one; petiole \(\frac{1}{2}-\frac{3}{4}\) in. Panicle oblong, much branched, clothed with soft tomentum; branches slender; bracts oblong-lanceolate. Flowers \(\frac{1}{2}\) in. long, shortly pedicelled. Calyx-tube clothed within with long deflexed hairs; tube longer than the lobes. Petals obovate, ciliate, equalling the calyx-lobes. Carpels 2; ovary densely tomentose. Fruit (of Penang specimen) \(\frac{3}{4}-1\frac{3}{4}\) in. long, rounded at the apex, when dry minutely wrinkled and covered with white scurfy spots. Seeds not seen.—But for the smaller leaves with more acuminate points, they agree with *P. sumatranum*, Benth. I have seen no specimen of Blume's *P. costatum*.


Malacca, Griffith; Maingay (*Kew Herb.*, 622).—**Distrib.** Sumatra.

A larger plant than *P. costatum*, differing in the form and size of the leaves and number of nerves; the inflorescence and flower are very similar indeed; the bark of the branches is black with numerous lenticels, which is hardly the case in the Sumatran specimens.

obtuse shining above, base rounded and cordate, nerves 20–30 pair, petiole very stout.

**Malacca, Griffith, Maingay (Herb. Kew. 623).**

This is very near to the two former, differing only in the shape and size of the leaves, their petiole and nervation. I cannot doubt but that one of these three is a form of the *P. sumatranum*, Bth. (Petrocarpa, Jack).

**Leaves 2-glandular at the base, glabrous and shining on both surfaces. Stamen 20–30.**


Eastern Peninsula. Tenasserim or Andaman Islands, Helse; Malacca, Griffith, Maingay.—Distriib. Borneo.

Branches stout, with black bark. *Leaves* 5–6 in., narrowed into the short petiole; nerves much arched. *Panicules* shortly peduncled, closely corymbose, with stout branches and pedicels; bracts very deciduous. *Flower* ½ in. diam. Calyx hoary; tube obconic, gibbous, glabrous within except near the ovary; lobes orbicular, linear. *Petal* ovobate-orbicular, glabrous, equalling the calyx-lobes. *Stamen* 20–30; filaments united above the base into a coriaceous short tube which is open and toothed opposite the ovary. *Ovary* tomentose; style short, curved; stigma capitate. *Drup* 1–1½ in. long, cylindric-ovoid or subclavate, hoary, 2-celled; cells stuffed with brown soft wool.—Differences from the Javanese *P. corimbosum* in the hoary calyx; and from the Philippine Island *P. salicifolium*, Benth. (Grymania, Presl), in the foliage.

**Subgen. II. Leaves eglandular at the base. *Stamen* shorter than the calyx-lobes, irregularly united into a ring. *Drup* small, obovoid, with a thin 1-celled endocarp lined with hairs. *Cotyledons* amygdaloid.

5. **P. nitidum, Hook. f.;** branches and leaves quite glabrous, leaves elliptic or elliptic-lanceolate obtusely acuminate narrowed into the very short petiole polished on both surfaces.

**Malacca, Griffith, Maingay (Herb. Kew 619).—Distriib. Borneo.**

A small tree (Griffith), branchlets slender. *Leaves* 3–4 in., coriaceous, very acute at the base, polished on both surfaces, especially above; nerves very slender, much arched; petiole ½ in.; stipules subulate, *Panicules* axillary and terminal, hoary, narrow, with rather short spreading branches. *Flowers* small, ½ in., very shortly pedicelled. Calyx-tube obconic, pubescent within; lobes short and rounded. *Petal* very small, obovate, tomentose. *Stamen* 5–7; filaments united into a short ring that is toothed opposite the ovary. *Carpel* (1-celled, *Griff.*) inserted almost at the base of the calyx-tube, villous. *Drup* obovoid, ½–1 in. long, yellow, smooth, glabrous.

**Subgen. III. Leaves eglandular or 2-glandular at the base. *Stamen* longer than the calyx-lobes, unilateral. *Drup* large, globose, woody, glabrous within; unknown in *P. indicum* and *travancoricum.*

*Leaves eglandular at the base.*


**Malacca, Griffith, Maingay (Herb. Kew. 618).—Distriib. Sumatra.**

Branches black, slender, and leaves glabrous. *Leaves* 3–4 in., suddenly contracted to the obtuse point, shining above and covered sometimes with minute raised points, base rounded; nerves about 10 pair, very slender with intermediate reticulations; petiole very short. *Spikes* 2–4 in. long, the very stout angular peduncle.
and rachis densely clothed with soft yellowish tomentum; bracts oblong, obtuse. 
Flowers sessile, 1/2 in. long. Calyx-tube clavate, gibbous, clothed with silky hairs 
outside, and with long deflexed hairs inside; lobes broadly ovate, obtuse. Petals 
obovate, sessile, nearly glabrous. Stamens 12-15, 1/3 in. long, circinately incurved, 
united at the base into a unilateral ring which is deficient opposite the single carpel. 
Ovary densely woolly, imperfectly 2-celled; style very long and slender, stigma 
imperfectly formed. Drupe the size of a small apple, spherical, very hard; outer surface rough 
and rust-coloured; endocarp 1/2 in. thick, bony; cavity smooth with a furrow down one 
side and a few very stout sparingly branched raised veins. Seed large, testa thin; 
embryo with the cotyledons consolidated into a ruminated mass.

** Leaves obscurely 2-glandular at the base.


**Western Peninsula; Wynad, in moist woods, alt. 2-3000 ft., Beddome.**

A middling sized tree. Leaves 8-9 by 3 in., slightly undulate; nerves strong 
beneath, much arched; petiole very short. Racemes axillary and terminal, simple, 
stout, rarely divided at the base. Flowers shortly pedicelled, 3-4 in. long. Calyx-
tube campanulate; lobes ovate, acute. Petals ovate, sessile, shorter than the calyx-
lobes. Stamens 12-15, unilateral, twice as long as the calyx-lobes. Ovary hairy, 
2-celled.

8. P. travancoricum, Bedd. *Ic. Pl. Ind. Or.* t. 189; leaves lanceolate 
glabrous, nerves 12-16 pair, racemes silky.

**Western Peninsula, near Courtallum, alt. 2000 ft., Beddome.**

A small graceful tree, young parts grey, silky; branchlets very slender. Leaves 
4-5 by 1-1 1/4 in., obtusely acuminate; margins waved; nerves beneath silky when 
young, finally glabrous; petiole very short. Racemes 1-2 in., few-flowered, simple 
or branched at the base, drooping, silky. Flowers 1/2 in. long. Calyx-tube campanu-
late; lobes ovate, acute. Petals broadly ovate, obtuse, equaling or exceeding the 
calyx-lobes. Stamens 10-12, unilateral, filaments three times as long as the calyx-
lobes. Ovary hairy, 2-celled.

Doubtful, excluded and imperfectly known species.

**P. Wallichianum, Wall. Cat. 7520;** consists of branches with leaves only 
of a most conspicuous plant from Sincapore, which I suspect is a *Dipterocarpus.* 
Branchlets very stout and leaves beneath clothed most densely with appressed 
snow-white almost silvery tomentum; leaves 8-14 by 3-6 in., oblong, abruptly 
acuminate, rounded at the base, quite entire; nerves 30-35 pair, spreading; 
upper surface shining; petiole very short and stout; stipules sheathing, 1 in. long, 
membranous.—Sincapore. A lofty tree (*Wallich).*

**P. Helferi, Hook. f.;** branchlets slender clothed with soft rusty tomentum. 
leaves elliptic-oblong acuminate membranous white and downy beneath, nerves 
about 12 pair, flowers minute in small softly tomentose panicles, calyx-tube shortly 
campanulate, stamens 6-7. **P. sumatrana, Kurz, For. Flor. Brit. Burm.** i. 433, not 
of Benth.?

**Tenasserim, Helfer.**

Leaves 3-4 in., base rounded or acute; petiole and midrib beneath when young 
clothed with rusty soft wool; whole undersurface clothed with loose snow-white 
tomentum when young, hoary when old; nerves spreading, slender. Panicle 1 in. 
long. Flowers 1/5 in., very shortly pedicelled. Calyx-lobes short, rounded. 
Petals very small, ovate. Stamens equalling the calyx-lobes.—I have seen but one 
specimen.

**P. ?** A species, apparently allied to P. *Helferi,* collected by Griffith on hills
at Palor in Mergui; it has broadly linear-oblung leaves 5-7 in., quite glabrous and shining above with 8-10 pairs of very oblique nerves, undersurface also glabrous except the puberulous midrib and nerves; petiole stout, tomentose. Flowers minute, in very small axillary racemes, densely tomentose, too young to discern their parts.

P.? Jackianum, Bentham. in Hook. Niger Flor. 335 (Petrocarya excelsa, Jack, in Mal. Misc. ii. 66); 'a large tree, leaves oblong acuminate glabrous, racemes ferruginous and tomentose strict erect sparingly branched, stamens 11 unilateral twice as long as the petals, drupe enclosed in the enlarged calyx and adnate to it, nuts smooth 1-celled, with an abortive cell usually above the fertile, embryo cylindric.'—Malaya, Jack. But for the description of the fruit, this might be P. asperulum, Miq.

Parinarium dillenfolium, R. Br. in Wall. Cat. 7520 (Petrocarya dillenfolia, Steud.), is Dipterocarpus cornutus, Dyer.

P. excelsum, G. Don, Gen. Syst. Gard. ii. 479; Dalz. & Gibbs. Bomb. Flor. Suppl. 32. A tree introduced at Goa from Mozambique, and called Matomba by the Portuguese, is imperfectly known and should be ascertained.

2. Parastemon, A. D.C.

A shrub or small tree. Leaves simple, alternate, evergreen, quite entire. Flowers polygamo-dicecious, minute, racemose, ebracteolate. Calyx-tube shortly campanulate; lobes 5, imbricate. Petals 5 (or 6), oblong, deciduous. Stamens 2 perfect, unilateral. Carpels 1, adnate to one side of the calyx-tube, 1-celled; style basilar; ovules 2, erect. Fruit oblong, coriaceous, 1-celled, 1-seeded, indehiscent. Seed erect, testa membranous pubescent; cotyledons fleshy, radicle inferior, plumule hairy.


Eastern Peninsula; Singapore, Wallich; Malacca, Griffith, Maingay; Tenasserim or Andaman Islands, Helfer.—Distrib. Borneo.

Quite glabrous. Leaves 2-3 in., elliptic or elliptic-lanceolate, obtusely acuminate, shining, narrowed at the base into the very short petiole; nerves faint. Racemes slender, axillary, equalling the leaves, rarely branched at the base; bracts concave, at the base of the pedicel. Flowers $\frac{1}{2}$ in. diam., shortly pedicelled. Fruit $\frac{1}{2}$ in. long, ellipsoid, quite smooth and glabrous.

3. Prunus, Linn.

Shrubs or trees. Leaves alternate, simple, quite entire or serrate or crenate or glandular-serrate; petiole often 2-glandular. Flowers white or red, solitary fascicled corymbose or racemose. Calyx deciduous in fruit; lobes 5, imbricate. Petals 5. Stamens 15-60, perigynous, inserted in the mouth of the calyx-tube, filaments free. Carpels 1; style terminal; ovules 2, collateral, pendulous. Drupe with an indehiscent or 2-valved, 1-seeded, smooth, or rugged stone. Seed pendulous, testa membranous or coriaceous, albumen scanty or 0.—Distrib. N. temp. regions, rare in the tropics; species 80.

The scented kernels of the European and West Asiatic P. Mahaleb, L., are sold in the bazaars of N.W. India, and the tree is cultivated in Beluchistan, and probably occurs on the N.W. frontier; it is a small tree of the Ceransus section, with ovate crenate leaves, fragrant flowers in peduncled corymbose racemes, and ovoid drupes $\frac{1}{2}$ in. long.

P. AMYGDALUS, Baill.; leaves appearing after the flowers oblong-lanceolate serrulate, petiole glandular as long as the leaf is broad or longer, stipules imbricate, flowers peduncled, calyx campanulate, pericarp 2-valved. Brandis For. Flor. 100. Amygdalus communis, Linn.; Roxb. Fl. Ind. ii. 500.—The almond.

Cultivated in the cooler parts of India.


Cultivated in the cooler parts of India: up to 10,000 ft. in the N.W. Himalaya.

The nectarine is a form with glabrous and the peach with downy pericarp.

SECT. II. Armeniaca. Leaves convolute in bud. Flowers sessile or peduncled. Drupe large, indehiscent, downy; stone bony, smooth.

P. ARMENIACA, Linn.; leaves appearing after or with the flowers broadly ovate acuminate crenate, petiole glandular, stipules lanceolate, flowers shortly peduncled, calyx campanulate, stone with a thickened grooved margin. Roxb. Fl. Ind. ii. 501. Brand. For. Flor. 191.—The apricot.

Cultivated and almost naturalised in N.W. India up to 10,000 ft., and in Tibet. 

VAR. dasycarpa, the black-fruited apricot, is also cultivated in Kashmir. Brandis t. c. Thomson’s Kashmir specimens (cultivated at 5–7,000 ft.) have peduncles longer than the calyx-tube.

SECT. III. Cerasus. Leaves conduplicate in bud. Flowers solitary fascicled or umbellled. Calyx-tube short or long. Drupe glabrous, not glaucous.

* Flowers appearing with the leaves.

P. AVIUM, Linn.; roots without suckers, leaves flaccid drooping oblong-ovobovate acutely serrate pubescent beneath, petiole long 2-glandular, flower fascicled long-pedicelled, flowering buds leafless, calyx-tube urceolate constricted at the top, lobes entire, petals flaccid spreading almost obcurate, fruit sweet or bitter, stone smooth.

P. Cerasus a, Brandis For. Flor. 193.—Sweet cherry or gean.

Cultivated in the N. W. Himalaya up to 8000 ft., and almost naturalised.

P. Cerasus, Linn.; roots with many suckers, leaves erect firm shining crenate-serrate glabrous beneath, petiole short eglandular, flowers fascicled long-pedicelled, flowering buds leafy, calyx-tube campanulate not constricted at the top, lobes crenate, petals erect stiff tip rounded, fruit acid, stone smooth. Roxb. Fl. Ind. ii. 501. P. caproniana, DC. Prodr. ii. 536.—Wild cherry.

Cultivated in the N. W. Himalaya up to 8000 ft.


WESTERN TEMPERATE HIMALAYA from the Sutlej westwards, alt. 5–10,000 ft., Jacquemont, Falconer, etc.—Distrib. Westward to Spain, ascending to 12,000 ft. in Afghanistan.

A scraggy shrub 5–6 ft.; branches hoary, spreading, suberect or prostrate. Leaves $\frac{1}{4}$–1 in., usually snowy white beneath, rarely green, narrowed into the short eglandular petiole. Flowers red, on lateral buds, appearing with the leaves. Calyx-tube $\frac{1}{4}$ in., cylindric, glabrous or pubescent; limb with 5 oblong obtuse entire lobes. Petals orbicular-ovobovate, longer than the calyx, rosy. Stamens much shorter. Fruit $\frac{1}{3}$ in., ovoid or subglobose, red-purple, flesh scarcely edible.

North West Himalaya; Kashmir, alt. 5–6000 ft. Thomson. Western Tibet, Ladak, Moorcroft.—Distr. N. China.


3. **P. rufa**, Wall. Cat. 721 (Cerasus); young branches densely tomentose, leaves elliptic- or oblong-lanceolate caudate-acuminate serrate glabrate, petiole eglandular pubescent, flowers axillary solitary or fascicled, calyx-tube urceolate glabrous. P. ferruginea, Wall. MSS.

Central and Eastern temperate Himalaya, Nepal, Wallich: Sikkim, alt. 10–12,000 ft. J. D. H. Bhutan, Griffith.

A small tree, 15–20 ft., branchlets woody. Leaves 1–4 in., narrowed into the short petiole, very sharply serrate, midrib puberulous above pubescent or glabrate beneath; nerves reticulated; petiole ½ in.; bud-scales linear, membranous, glandular-serrate; stipules filiform laciniate. Flowers pink; peduncles glabrous, longer than the petioles. Calyx-tube ½ in., ventricose at the base, then contracted, mouth spreading, lobes broad short subacute crenulate. Petals small, orbicular. Fruit ellipsoid, on stout lengthened pedicels, red, fleshy, stone rugged.

**Flowers appearing before the leaves.**


Western Himalaya; in the Tibetan region, Jacquemont. Gurwhal, Malari, alt. 9000 ft., Edgeworth; Niti, 11,500 ft., Strachy and Winterbottom. Kunawur, alt. 12,000 ft., T. Thomson.

Branches strict, slender, divaricating, glabrous, or puberulous in the leaf axils and buds. Leaves 1 in., variable in breadth, from linear-oblong to rhomboid-ovobate but usually elliptic, narrowed into the short petiole, rather coriaceous; nerves nearly straight, very oblique; petiole puberulous. (Calyx-tube glabrous except at the base within; lobes short, crenulate. Petals short, obovate. Ovary glabrous, Edgew.) Drupe very shortly pedicelled, fleshy in Jacquemont's specimen, dry globose and cuspidate in Thomson's, stone smooth.

I refer this doubtfully to the section with the flowers appearing before the leaves; the specimens being in fruit only. This is the species mentioned by Brandis (For. Flor. 194, under *P. Puddum*) as *P. humilis*, Bunge, of China, and found from the Chenab to the Jumna, but it differs much from Bunge's *humilis* in the very short peduncles, and much coarser serratures of the leaves. Edgeworth gave it the name of *Amygdalus humilis*, without reference to Bunge's species of *Prunus* of that name.

Temperate Himalaya; from Gurwhal, alt. 3–6000 ft. to Sikkim and Bhutan, alt. 5–5000 ft. Burma, East of Bhamo, Kurz.

A large tree, of brilliant appearance in flower, glabrous except the puberulous young shoots. Leaves 3–6 in., variable in length and breadth, often doubly serrate, glabrous; petiole slender, 1/2–3/4 in.; stipules long, subulate, laciniate. Flowers rose red or white, from lateral buds clothed with concave rounded glabrous scales; peduncles ½–1 in., often subcymose, connate at the base or almost umbellate. Calyx-tube ½ in., glabrous; lobes ovate, acute, quite entire. Drupe oblong or ellipsoid, obtuse at both ends; flesh scanty yellow or reddish, acid; stone bony rugose and furrowed. —Allied to the C. pseudocerasus, of Japan. In Sikkim the ovary is often (from insect puncture) enlarged into a fusiform pale smooth fleshy body 2 inches long gradually narrowed into the elongate filiform style.


6. P. communis, Hiys.; var. insititia; shrubby, unarmed or spinous, leaves obovate ovate or ovate-lanceolate serrulate obtuse acute or cuspitate, nerves hairy beneath, peduncles solitary or in pairs, calyx-tube obconic, drupe globose or ovoid drooping. Brand. For. Flor. 192. P. insititia, Linn.; P. bokhariensis, and P. aloocha, Royle Ill. 205 (names only),

Western temperate Himalaya; cultivated or indigenous from Gurwhal to Kashmir, alt. 5–7000 ft. (‘truly wild,’ T. Thomson).

This, Thomson who gathered it in Kashmir, considers to be the common yellow fruited bullace; its fruit is eatable, and I see no character whereby to distinguish it from that plant. I have seen no specimens of Royle’s P. aloocha and bokhariensis, but have no reason to doubt that they are referable to this. A dark blue damson, probably P. communis, var. domestica, and an orange red larger one, are stated by Madden (As. Soc. Journ. xvii. part i. 445), to be cultivated about Almorah.


Ava Hills, Kurz.—Distrib. China.

A bushy tree, with blackish bark, everywhere glabrous. Leaves 2–4 in., recurved, eglandular at the base, equitant in bud; petiole slender; stipules gland-ciliate. Flowers small, white, very regularly in threes from the buds; peduncle ½ in. Calyx-lobes longer than the tube, ovate, acute, margins glandular. Petals ½ in., broadly obovate. Ovary ovoid, stigma large. Drupe purple, glaucous, grooved on one side; pulp reddish yellow. —I have taken the characters from Roxburgh and Kurz.


* Leaves deciduous.

8. P. Padus, Linn.; leaves oblong-ovate or -lanceolate acuminate, sharply closely serrulate, base rounded or cordate, nerves 10–20 pair, petiole often eglandular, racemes elongate pendulous, flowers 1/2–1 in. diam., stamens 30–40, drupe 1/2 in. diam. globose, stone rugose. —Brandis For. Flor. 194. Cerasus cornuta, Wall. Cat. 716 and 717 in part; Royle Ill. 207, t. 38, f. 2.

Temperate Himalaya, from Murree, alt. 6–9500, to Sikkim, alt. 8–12,000 ft., and Bhutan.—Distrib. Westward to Great Britain, and Siberia to Kamtschatka.
A small nearly glabrous tree, with young parts sparingly pubescent. Leaves very variable, 4-6 in., usually oblong-lanceolate with a cordate base, serratures often double very close-set; nerves often with hairs in the axils beneath, under-surface not glaucous; nerves spreading, slightly arched; petiole ¼-1 in., slender, glands small or 0; stipules linear, membranous, caducous. Racemes from the axils of fallen leaves or terminating lateral leaf-branchlets, 4-10 in. long, drooping; peduncle and rachis glabrous pubescent or tomentose; pedicels ½ in.; bracts linear, caducous. Flowers white. Calyx-tube hemispheric or turbinate; lobes rounded, obtuse, gland-toothed. Petals orbicular, concave. Drupe acid, the size of a large pea; stone thick, rugose,—Wallich’s name of cornuta alludes to a diseased (by insects) condition of the ovary, which becomes elongate curved and fusiform as in P. Puddum. Foliage red in autumn.

9. P. nepalensis, Ser. in DC. Prodr. ii. 540 (Cerasus); leaves lanceolate or oblong-lanceolate acuminate crenate-serrate glaucous beneath, nerves 16-20 pairs, base usually acute, petiole eglandular, racemes elongate, drupe globose, stone smooth ½ in. diam. Cerasus glaucifolia, Wall. Cat. 717. C. Lindleyana, Wall. Cat. 1008.

Temperate Himalaya, from Kumaon, alt. 6000 ft. to Sikkim alt. 7-10,000 ft. Khasia Mrs., alt. 4-6000 ft.

Very difficult to distinguish from P. Padus except by the fruit, which is more than twice as large, with a quite smooth thick-walled stone; leaves usually glaucous beneath and acute at the base, serratures far less sharp and more distant; calyx lobes shorter.


Temperate Himalaya from Kumaon alt. 6-8000 ft. to Sikkim alt. 8-12,000 ft., and Bhutan. Khasia Mrs., Griffith.

Branches slender, quite glabrous. Leaves variable, usually 2-3 in., oblong-lanceolate but often larger and almost linear-lanceolate, base acute or rounded, membranous and undulate when dry; nerves 8-10 pair, slender, spreading and arched; glands 0 or 1 or 2 at the base of the leaf, rarely on the slender petioles. Racemes usually more slender than in the two preceding species, glabrous or puberulous. Flowers white. Calyx-tube glabrous, lobes glabrous or ciliate. Stamens short. Drupe with a thin-walled smooth stone.—Foliage of this is often like that of P. nepalensis, but has usually fewer veins, and the small flowers and drupes well distinguish it—Wallich observes that the foliage is poisonous to goats.

** Foliage persistent.


Eastern Peninsula; Martaban, Wallich; Mergui, Griffith; Andaman and Nicobar, Kurz.

Branchlets quite glabrous. Leaves 5-7 in. long, coriaceous, very smooth on both surfaces, shining above, base rounded; nerves 6-8 pair, arched, very slender; petiole ¼-⅛ in., slender, eglandular. Racemes 1-7 in., usually on the old wood; peduncle and rachis strict; pedicels ⅛ in., stout. Flowers ½ in. diam. Calyx-tube obconic, coriaceous; lobes erect, ovate, obtuse. Petals small, orbicular. Stamens 60-80 in many series. Ovary glabrous, style long, exserted; Drupe 1¼ in. long, cylindrical oblong, pointed, apparently dry; stone thin-walled, smooth.—Foliage like that of P. java-
nica, Miq., but calyx very different and drupe larger. Kurz however refers to this both P. javanica and Jungulkhuniana of Miquel (Journ. As. Soc. Beng. 1871, ii. 52, and Andaman Reports, ed. ii. 37).


Temperate Central and Eastern Himalaya, from Nepal and Sikkim, alt. 5-7000 ft., to Mishmi. *Khasia Mts.* alt. 4000 ft.

A tree 30-40 ft.; branches slender. Leaves 4-7 in., flat, smooth on both surfaces, hardly shining above, base rounded or acute, sometimes dotted beneath with minute glands, or glands 0 or few and scattered; nerves 8-10 pair, obliquely ascending, slender but evident; petiole 1/2 in., eglandular; stipules linear. *Racemes* 3-5 in., suberect or drooping, many-flowered; pedicels 1/2 in., slender; bracts minute. *Flowers* 3/4-1/2 in. diam., yellowish-white. *Calyx-tube* broadly campanulate; limb patent, obscurely 5-toothed. *Ovary* villous. *Drupe* oval, subacute, 1/2 in. long; stone thin, quite smooth.

13. **P. punctata**, Hook. f. & T. in Herb. Ind. Or. (Cerasus); quite glabrous, leaves oblong-lanceolate caudate-acuminate quite entire or serrate dotted with minute glands beneath, racemes subcorymbiform, stamens about 30.

*Khasia Mts.*, alt. 4-5000 ft., Jenkins, etc.

A shrub or small tree with slender pendulous branchlets, the youngest puberulous. Leaves 3-5 in., caudate points curved very long obtuse, base acute, smooth on both surfaces, shining above; nerves 8-10 pairs, slender, obliquely arched; petiole 1/2 in., eglandular; stipules filiform. *Racemes* axillary; solitary, shorter than the leaves, 8-10-flowered; peduncle very slender; pedicels 1/2-1/2 in., subcorymbose towards the top of the peduncle. *Flowers* 1/2 in. diam. *Calyx-tube* obconic; lobes 5, rounded, ciliate. *Petals* orbicular, ciliate. *Ovary* glabrous. *Drupe* globose; stone thin-walled, quite smooth.

14. **P. Jenkinsii**, Hook. f. & Thoms. in Herb. Ind. Or. (Cerasus); leaves linear-oblong caudate-acuminate serrate undulate shining eglandular, racemes axillary short cylindric dense-flowered pubescent, stamens about 50.

*Assam*, Jenkins; at Choopura, (Upper Assam), Griffith.

Branches black, stout, glabrous. Leaves 5-7 in., tip obtuse, base acute, red-brown above when dry, paler beneath, margin undulate, teeth when present remote; nerves 10-15 pair, obliquely arched; petiole 1/2 in., eglandular; stipules linear-lanceolate. *Racemes* 1 1/2-2 1/2 in., strict, erect, usually densely clothed with flowers to the base which is enclosed in concave orbicular scales; pedicels very smooth. *Calyx-tube* turbinate; lobes rounded, ciliate. *Petals* small, orbicular, crenate. *Ovary* glabrous. *Drupe* with the stone 3/4 in., broadly ovoid, obtuse, rugose, and with a thick ridge on one side, walls very thick and hard.


Deciduous leaved trees. Leaves alternate, glandular-fringed or -serrate; stipules conspicuous, gland-serrate. *Flowers* in racemes or corymbs, sub-unisexual. *Calyx-tube* turbinate, 10-lobed, some of the lobes often produced into oblong tomentose petals. *Stamens* 20-30, in one series, filaments incurved; anthers small. **Carps** 1, with a slender style and usually not perfecting, or two with shorter or no styles and larger stigmas, one or both perfecting; ovules 2, collateral, pendulous. *Fruit* an oblong drupe; pericarp thin; stone rather bony. *Cotyledons* thick, oblong. **Distrib.** Two Indian species.

A form between *Pygeum* and *Prunus*, differing from both in the frequent twin
carpels, of which both often ripen, from Pygeum in the form of the fruit habit, and deciduous foliage, and from Prunus in the flower which is altogether that of Pygeum except for the carpels.


Temperate Eastern Himalaya; Sikkim, Lachen River, alt. 8-1000 ft. **Bhotan, Griffith.**

A small tree, 20-30 ft.; bark of branches red brown, shining. **Leaves** 3-5 in., variable in shape, ovate or obovate-lanceolate caudate-acuminate, rather membranous, densely woolly or glabrate beneath, base acute rounded or cordate, cilia of the margin often gland-tipped especially at the base of the leaf; nerves 15-20 pair, oblique and nearly straight; petiole very short indeed; stipules large, linear-lanceolate, membranous, acuminate, gland-serrate. **Racemes** terminal, 1-3 in., dense-flowered. **Flowers** 8-20, white, shortly pedicelled. **Calyx-tube** turbinate; lobes obtuse and petals together 10, the latter minute unequal linear-oblung. **Stamens** 20-30. **Carpels** 1 or 2, fusiform, quite glabrous, tapering into short or long styles with discoid stigmas. **Drupe** ½ in., broadly ovoid; epicarp thin; stone thickly crustaceous, quite smooth.


**Mishmi Hills, Griffith.**

I have very imperfect scraps of this curious species, in unripe fruit only, the pedicels are 2 in. long and each flower has the unripe oblong-carpels ½ in. long.

5. **Pygeum, Gartn.**

Evergreens trees or shrubs. **Leaves** alternate, persistent, usually quite entire; stipules minute, fugacious, basal glands 2 or 0. **Flowers** small, racemose, sometimes unisexual by want of the ovary. **Calyx-tube** obconic urceolate or campanulate, deciduous; limb 5-15-toothed, often unequally. **Petals** minute, 5-6 in the 5-6-toothed calyx, 0 in the 10-15-toothed, villous or tomentose rarely glabrous, often undistinguishable from the calyx-lobes. **Stamens** 10-50, in one or more series at the orifice of the calyx-tube, filaments slender incurved; anthers small. **Carpel** 1, basal in the calyx-tube, ovoid or subglobose; style terminal, slender, exserted from the bud, stigma capitate; ovules 2, collateral, pendulous. **Fruit** a transversely oblong obscurely didymous rarely subglobose drupe, pericarp thin, dry or juicy. **Cotyledons** very thick, hemispheric; radicle minute, superior. **Distrib.** Species about 20, Tropical Asiatic and one African.

Differs from Prunus chiefly in the minute villous petals (when present) and form of the fruit. The often conspicuous basal pair of glands on the leaf are very variable, a few species have scattered glands, and one has bullate glands on the tip of the petiole, formed by a prolongation of the leaf-blade.

* Ovary glabrous or nearly so.


Eastern Bengal; Khasia Mts., Colebrooke, Wallich. **Chittagong, Kurz.**

A tree. **Leaves** 4-6 by 1½-3 in.; nerves spreading; petiole ½ in. **Racemes** almost equaling the leaves, suberect, 4-angled; pedicels slender. **Flowers** yellow-green, inodorous. **Calyx** campanulate, acutely 6-toothed. **Petals** 6, clawed, ovate, villous. **Stamens** 30-40. **Ovary** glabrous; style very slender, exserted. **Drupe** 1 in. transversely, dark-purple.
2. **P. glaberrimum**, Hook. f.; leaves oblong-lanceolate caudate-acuminated-glabrous, basal glands 0 or obscure, racemes slender and petioles glabrous. **P. acuminatum**, Herbd. Ind. Or. H. f. & T.

Eastern tropical Himalaya, Sikkim, alt. 3–5000 ft., J. D. H. Khasia Mts., alt. 3–4000 ft., Simmonds, etc., Chittagong, J. D. H. & T. T.

A branching tree, 50–50 ft., glabrous in all its parts, smelling strongly when bruised of prussic acid. Leaves 4–9 in., base rounded or acute, opaque beneath, with a few large scattered glands or 0; nerves spreading and arching; petiole ½ in. Racemes numerous, erect; rachis and pedicels slender. Calyx-tube obconic; limb ob-securely 6-inmate, disk pubescent at the base. Petals 6, ob lanceolate, obtuse, hooded, quite glabrous. Ovary puberulous, soon glabrate; style slender, exserted, nearly straight; stigma capitate. Fruit on a much elongated thickened peduncle, 1 in. transversely.—Except for the perfectly glabrous inflorescence and petals, this closely resembles *P. acuminatum*.


Western Peninsula; Anamallay, Shevarry, Pulney and Tinevelly ranges, Bed-done. Ceylon; central province, alt. 4–8000 ft., Wight, etc.

A middle-sized tree, glabrous except the young shoots and inflorescence, which are pubescent with dense appressed hairs. Leaves 3–4 in., coriaceous, base rounded or subacute; nerves arched, spreading, prominent beneath; petiole ½ in. Racemes 2–4 in.; axillary, rachis and peduncle stout; pedicels sometimes ¼ in. long. Flowers ½ in. diam. Calyx-tube oblong-ovate or turbinate; limb 5–rarely 4 or 6-lobed, lobes acute. Petals 4–6, oblong, tip rounded, softly tomentose. Stamens about 20. Ovary quite glabrous; style stout. Fruit ⅔ in. transversely, on very stout pedicels.

Var. *parvifolium*, Thwaites Enum. 103; leaves smaller sometimes lanceolate, racemes shorter, pedicels very short, flowers smaller, stamens fewer, fruit ⅔ in. transversely.


Singapore, Lobb.

Branches very slender, young ones and petioles puberulous with appressed hairs. Leaves 3–4 in., base very acute, rather glaucous beneath; nerves very oblique, midrib with a few silky hairs; petiole ¼–⅓ in., slender. Racemes ¼–½ in. chiefly on the branches below the leaves, about 10-flowered, pubescent, sometimes almost globose, subsessile; pedicels ¼ in. Flowers ¼ in. diam. Calyx-tube obtuse, limb very shortly lobed. Stamens about 12; style slender. Ovary perfectly glabrous. Fruit not seen.—Differ from *P. persimilis*, Kurz, in the pedicels and glabrous ovary.

5. **P. Maingayi**, Hook. f.; leaves elliptic-lanceolate acuminate, basal glands obscure or 0, racemes very short axillary solitary densely pubescent, bracts persistent, calyx 6-lobed, petals 0.

Malacca, Maingay (Herb. Kew, 625). Branchlets very slender. Leaves 2–3 in., rather coriaceous, base acute, nerves very faint spreading and arched, perfectly glabrous on both surfaces; petiole ⅓ in., slender, glabrous. Racemes ⅓ in. almost globose, rusty tomentose; pedicels very short, exceeding the oblong bracts. Calyx-tube obconic, glabrous within; lobes oblong, obtuse, villous. Stamens about 15, filament slender. Ovary small, often abortive and slender, style glabrous. Fruit size of a large pea, nearly globose, with a sharp mucronate apex.
6. **P. Andersoni**, Hook. f.; quite glabrous, leaves oblong subacute or obtuse crenate-serrate eglandular, racemes very short axillary dense-flowered glabrous, calyx 5-lobed, petals broadly ovate with villous margins.

**Bengal**, summit of Parusnath, alt. 4000 ft., T. Anderson.

A rigid shrub, quite glabrous except the margins of the petals. Leaves 3 in., coriaceous, smooth above, and bright green, paler beneath with 10-12 pairs of very faint nearly straight ascending nerves; petiole ½ in., **Racemes** 1 in.; pedicels very short; bracts concave, obtuse. **Calyx-tube** hemispheric; lobes broadly ovate, obtuse, ciliate. **Petals** membranous, twice as large as the calyx-lobes. **Stamens** about 15. **Ovary** very minute, glabrous, imperfect.

**Ovary** hirsute or villous.

† Leaves glabrous beneath.


**Tenasserim**, Kurz.

A tree; young twigs sparingly appressed-pubescent. Leaves obtuse and equal or unequal at the base, glabrous above or puberulous along the impressed nerves; petiole ½ in. slender, pubescent. **Racemes** from the scars of fallen leaves, or from the branches; pedicels very short. **Calyx-tube** short, urceolate. **Ovary** densely hirsute; style long, exerted, stigma broad.—Next to **P. Lampongo** (Kurz, l.c.).

I have a specimen from Helfer that may be this, but it is in a most imperfect state; the basal leaf-glands are absent or very obscure, the raceme 1 in. long with persistent bracts; the calyx-tube obconic and limb with 6 oblong obtuse lobes.—A **Malacca** plant (Griffith 2052) may be referable here, but differs in the shorter stout style.

9. **P. polystachyum**, Hook. f.; leaves oblong obtuse young hoary beneath, petiolar glands 2 very tumid, racemes fascicled elongate finely pubescent, calyx-tube shortly 10-obbed, petals 0, stamens 40-50, style glabrous.

**Malacca**, Maingay (Herb. Kew, 627).

'A tree, not lofty, with very thick trunk;' branches very stout, black, youngest and young leaves beneath clothed with very fine hoary down. Leaves 5-7 in., rounded at both extremities, very coriaceous, glabrous above with impressed veins, red-brown beneath with puberulous midrib and stout arching spreading nerves; petiole 1 in., very stout, with two oblong tumid glands at the apex in old leaves (not developed in the young). **Racemes** 2-4 in., axillary and from the scars of fallen leaves, hoary-pubescent, peduncle and rachis stout, strict; pedicels stout, ½ in.; bracts 0; buds globose. **Calyx-tube** ½ in. diam., urceolate; teeth rounded. **Stamens** in several series, filaments not longer than the calyx. **Ovary** hirsute; style stout, exerted.


**Malacca**, Griffith, Maingay.—Distr. Java, Borneo.

A tree; branches stout, lenticellate; young branchlets and racemes tomentose. Leaves 4-6 in., variable in length and breadth, coriaceous, base usually rounded; nerves strong arching and spreading; midrib with fine appressed hairs; petiole ½ in. **Racemes** 1-3 in. long; peduncle and rachis stout; pedicels short; buds almost globose. **Calyx** urceolate; teeth small, obtuse, villous. **Stamens** about 20. **Ovary** densely villous; style slender, hairy. **Fruit** ½ in. transversely, clothed with deciduous hairs.—Bornean specimens have no basal leaf-glands.
11. **P. brevifolium**, Hook. f.; leaves broadly oblong acute or obtuse quite glabrous beneath, basal glands minute or 0, racemes axillary globose tomentose, calyx-limb 5-6-toothed, petals 0.

**Malacca**, summit of Mt. Ophir, Griffith, Lobb.

A shrub, 3-4 ft.; branches woody and leaves quite glabrous. **Leaves** 2-2½ in., coriaceous, usually contracted at the tip and obtuse or emarginate, rarely acute; nerves beneath faint, spreading and arching; petiole ½-1 in. **Racemes** contracted, not ½ in. long, 6-10-ftd; bracts small; pedicels short. **Calyx** urceolate; teeth unequal, obtuse. **Stamens** 10-16, filaments short. **Ovary** villous; style rather short, glabrous.

A specimen of this marked 'Lucon, T. Lobb,' in Herb. Hook., is probably so ticketed by mistake. Lobb having visited Mt. Ophir no doubt collected it there.


**Western Peninsula, Nilgiri Hills, Gardner, Wight. Ghats of Bombay, Ritchie.**

A large tree, glabrous everywhere except the inflorescence. **Leaves** 4-6 in., very coriaceous, base acute or rounded, equal or unequal, nerves oblique; petiole ½-1 in., quite glabrous, or of young leaves silky. **Racemes** 3-4 in., peduncle and rachis stout; pedicels short, stout. **Flowers** ½ in. diam. **Calyx-tube** urceolate; limb with 10-12 obtuse tomentose lobes. **Petals** 0. **Stamens** 12, rather slender. **Ovary** hirsute; style exserted. **Fruit** 1-1½ in., transversely 2-lobed, shining and smooth, apiculate in the sinus at the top.

†† **Leaves more or less pubescent beneath.**


**Ceylon**, warm moister parts of the island, ascending to 3000 ft., Walker, &c.

A rather large tree; branches stout, lenticillate. **Leaves** 5-6 in., coriaceous, base rounded; nerves rather obliquely ascending, upper surface quite glabrous, under closely and finely tomentose. **Racemes** axillary or from the axils of fallen leaves, 1½-2 in., densely rusty-tomentose pedicels short, stout, bracts not seen. **Calyx-tube** villous within, teeth obscure. **Petals** villous, hooded. **Ovary** villous; style glabrous.

14. **P. capitellatum**, Hook. f.; branchlets and leaves beneath finely pubescent, leaves broadly oblong obtuse, basal glands rather large, racemes axillary contracted into globose densely villous heads, calyx-tube campanulate obscurely 10-lobed, petals 0, stamens about 15, style hairy.

**Tenasserim, Helfer.**

**Branchlets** rather stout, densely pubescent. **Leaves** 5-6 in., coriaceous, base rounded, midrib stout, pubescent above, tomentose beneath; nerves rather numerous, 8-10 pair, spreading and arched; petiole ½ in. **Racemes** solitary or crowded, sessile, ½ in. long, very dense-flowered; pedicels very short. **Calyx**-tube villous on the margin. **Stamens** longer than the calyx. **Ovary** villous; style rather short, with long hairs.

15. **P. montanum**, Hook. f.; leaves oblong-lanceolate caudate-acuminate ciliate rugulose above, pubescent or tomentose beneath, basal glands deeply

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A small tree; branchlets stout, young with short stiff hairs, older lenticellate. *Leaves* 4–7 in., coriaceous, young with appressed hairs on the upper surface and densely ciliate margins, base subacute or rounded, tip finely acuminate, above glabrous except the impressed midrib, beneath clothed with short rather stiff hairs; nerves 10–12 pair, obliquely ascending, prominent and reticulate beneath; petiole very short, 1⁄6 in., stout. *Racemes* 1–1 1/2 in., solitary or fascicled on the old wood; pedicels short; bracts not seen. * Flowers* 1⁄6 in. diam. *Calyx* with 5 subulate remote teeth. *Petals* villous, ovate-lanceolate. *Ovary* densely villous; style slender.

15. **P. Griffithii**, Hook. f.; branchlets and inflorescence densely tomentose, leaves oblong or oblong-lanceolate obtuse or obtusely cuspidate minutely puberulous beneath obscurely sinuate-toothed, basal glands small, racemes very short stout, flowers sessile, calyx 6-toothed, petals 0.

*Malacca*, *Griffith.*

**Branchlets** stout. *Leaves* 5–6 in., coriaceous, base rounded or acute, most minutely dotted on both surfaces, smooth and glabrous above with puberulous impressed midrib and nerves, margin ciliate and obscurely toothed, beneath finely puberulous with 8–10 pair of spreading arching pubescent nerves; petiole 1⁄6 in., very stout. *Racemes* 1 1⁄2 in. long, axillary, solitary, few-flowered, densely tomentose, rachis very short. * Flowers* apparently quite sessile. *Calyx-tube* obconic, teeth oblong. * Stamens* 12. *Ovary* globose, hairy.—I have seen but one specimen and the description of the flowers is from Griffith’s MS8. The sinuated margin of the leaf is a remarkable character.

16. **P. arboream**, Endl.; *Kurz* For. Flor. Brit. Burm. i. 435; leaves ovate-oblong or broad-oblong shortly cuspidate glabrous or rusty-tomentose above, brown pubescent or almost tomentose beneath, racemes elongate 2–3 together in the axils of fallen leaves.

*Martaban* hills to Tenasserim, alt. 3–4000 ft., *Kurz.*


**Doubtful Species.**

Maingay’s No. 628 (Distrib. Kew) from Malacca not being in flower is undeterminable; it has slender glabrous branchlets, oblong-lanceolate caudate-acuminata quite glabrous rather membranous leaves 3–4 in. long, with short slender petioles, very short racemes, fruit the size of a large pea, transversely elliptic-globose.


A glabrous spinous shrub. *Leaves* deciduous, lanceolate or obovate; stipules minute, deciduous. *Flowers* in short axillary racemes on the sides of the spines. *Calyx* persistent, tube cupular; lobes 5, unequal, orbicular, imbricate in bud. *Petals* 5, orbicular shortly clawed. *Stamens* numerous, many-seriate,
inserted on the mouth of the calyx-tube, filaments short; anther-calls often unequal, separated by a broad connecting. Carpels 1, sessile; style basal, ascending, stigma capitulate; ovules 2, collateral, pendulous. Drupe obliquely ellipsoid or cylindric, with the remains of the style at its base; epicarp thin; stone coriaceous, smooth. Seed erect, cotyledons amygdaloid, radicle inferior.

1. **P. utilis**, Royle *Il. 200*, t. 33, f. 1; Brandis For. *Flor. 196*; Wall. *Cat. 8554*.

Dry rocky hills on the temperate Himalayas, alt. 4-8000 ft., from HAZARA to SIKKIM ascending to 9000 ft., and Bhotan; KHASIA Mrs., alt. 5-6000 ft.

A shrub, 3-5 ft.; branchlets green, soft, pubescent when young; pith septate. Leaves 1-5 in., coriaceous, acuminate, entire or serrate. Flowers ¼ in. diam., white, usually opening in autumn. Drupes ½-3 in. purple, subtended by the withered calyx.

7. **SPIREA**, Linn.

Perennial herbs or shrubs. Leaves alternate, simple or compound; stipules free or adnate to the petiole, rarely 0. Flowers in axillary or terminal cymes, white or red. Calyx persistent, lobes 4-5, imbricate or valvate in bud. Petals 4-5. Stamens 20-60, filaments free or connate below. Disk fleshy, often hairy; Carpels 5 or more, free or connate below; styles subterminal; ovules 2 or more, pendulous. Follicles 5 or more, few-seeded.—DISTRIB. Temperate and cold regions of the N. hemisphere; species 50.


Western temperate Himalaya, from KASHMIR to KUMAON, alt. 7-12,000 ft.—DISTRIB. Kamtschatka.

A herb, with perennial root, 1-1½ ft., pubescent except the leaves above. Leaves sometimes hoary with thick white tomentum beneath, lateral lobes very variable, 1½-1¼ in., sessile, ovate, acutely toothed; terminal lobe 2-6 in. diam., palmately 3-5-lobed; lobes acuminate, acutely lobulate and toothed. Cymes oblong, much branched, very many-flowered. Flowers white, ¾ in. diam. Calyx small, lobes obtuse. Petals oblong-orbicular. Carpels many, villous, 2-ovuled.—Very similar indeed to *S. Kamtschatica*, a plant confined to the country whose name it bears, and to Mantchuria, but quite distinct by the stipules.

**Sect. II. Aruncus.** Dioecious herbs. Leaves triternately pinnate. Disk tumid. Carpels free; ovules many.


Western and Central temperate Himalaya; from SIRMORE, alt. 10,000 ft., T. THOMSON, to NEPAL, WALlich.—DISTRIB. From West Europe to Kamtschatka and Mantchuria, Japan and E. and W. N. America.

A slender herb, 2-4 ft., with stout perennial rootstock. Leaves with long primary and secondary petioles, petiolules short; leaflets 1-2 in. (1-10 in. in Japan specimens) rather membranous. Flowers dense, white, ½ in. diam. Calyx-tube turbinate, lobes

v 2
oblong-ovate. **Petals** orbicular. **Carpels** 6–8, tumid, glabrous and shining when ripe. The Indian form has smaller and more numerous carpels than the European.

**Sect. III. Sorbaria.** Shrubs. **Leaves** pinnate. **Disk** adnate to the calyx-tube. **Carpels** connate below; **ovules** many.


Western temperate Himalayas; from **Kunawur** to **Kumaon**, alt. 7–10,000 ft.—**Distr.** Altai Mts. to N. China and Japan.

A tall shrub, glabrous or with soft hairs in the young parts, leaflets beneath and in florescence. **Leaves** 8–12 in.; leaflets 2–4 in., sessile, gradually narrowed from near the usually rounded base to the long tip; terminal sometimes lobed at the base; petiole cylindric. **Flowers** white, ½ in. diam. **Calyx-tube** hemispheric; lobes rounded. **Petals** orbicular. **Carpels** 5, glabrous or pubescent; ripe oblong, dehiscing dorsally.

**Sect. IV. Chamaedrya.** Shrubs. **Leaves** simple, **Disk** adnate to the calyx-tube, glandular. **Carpels** free; **ovules** many.


**Khasia Mts.** at Kullung rock, and the Boga Panee, alt. 5–6000 ft., **Simmons, J. D. H. & T. T.**—**Distr.** N. China, Japan.

An erect or straggling shrub, with pubescent or tomentose or glabrate striate branches. **Leaves** 1–4 in., glabrous and glaucous beneath, or more or less pubescent or tomentose, those on young twigs sometimes rhomboid-ovate; petiole very short. **Flowers** ½–1 in. diam., in very open corymbose spreading cymes, pale or deep rose-red, **Calyx-tube** obconic; lobes triangular-ovate, pubescent. **Petals** orbicular. **Disk-glands** prominent. **Ripe carpels** ½ in., dark brown, glabrous, shining; styles nearly as long, as the valves.—I have described this from Khasia specimens, which are usually tomentose on the under surface of the leaf, but some specimens are as glabrous as the Japanese. It is remarkable that neither Jenkins, Wallich, nor Griffith had it from the Khasia Mts.


Temperate Himalaya from **Sirmore** alt. 7–10,000 ft., to **Sikkim** and **Bhotan**, alt. 6–12,000 ft.

A very variable plant, unless, as is probable, two species may be confounded under the above description, which however have not been distinguished by any botanist.—A shrub 2–6 ft.; branches erect or inclined or horizontal. **Leaves** ½–2 in., glaucous beneath and usually glabrate, but sometimes pubescent. The extreme forms are those of **S. bella** proper (callosa, *Wall. not Thunb.*) in which they are broad ovate or oblong obtusely toothed towards the apex only, and of **fastigiata**, *Wall.*, in which they are much larger ovate-lanceolate acuminate and inciso-serrate throughout; the
latter is usually a more erect plant, with shorter stricter stouter stems, and closely resembles \textit{S. callosa}, differing chiefly in the apparently more or less dioecious flowers. \textit{S. bella} proper, on the other hand, is more slender, often nearly prostrate, with arched branches; there are however all manner of intermediate forms, and some specimens have both types of leaf. \textit{Flowers} pink, or rarely white. \textit{Calyx-lobes} acute, tube villous within. \textit{Stamens} minute and deformed in the \( \varphi \) flowers, long in the \( \delta \). \textit{Ovarys} small or absent, those of the \( \delta \) flowers with long styles, of the \( \varphi \) short. \textit{Disk} of broad incurved scales. \textit{Ripe carpels} as in \textit{S. callosa}.

6. \textit{S. micrantha}, Hook. f.; leaves ovate-lanceolate acuminate doubly inciso-serrate glaucous hairy beneath, cymes very broad lax and open, bracteoles filiform often exceeding the calyx, flowers subdioecious, ripe carpels exposed villous. \textit{S. callosa var. macrophylla}, Hook. f. & Thoms. \textit{Herb. Ind. Or.}

Eastern temperate Himalaya; Sikkim alt. 6-8000 ft. \textit{J. D. H.; Bhotan, alt. 5800-10,000 ft.}, Griffith.

Very similar to the fastigiata form of \textit{S. bella}, but more lax in habit, leaves sometimes 7 in., very membranous or coriaceous. \textit{Flowers} \( \frac{1}{4}-\frac{1}{2} \) in. diam., in very long spreading panicles, pale coloured. \textit{Disk-glands} large. \textit{Calyx-tube} villous within. \textit{Bracteoles} filiform, often much produced. \textit{Ripe carpels} much smaller than in \textit{S. callosa} and \textit{S. bella}, clothed densely with spreading hairs.


Temperate Himalaya from Kashmir to Kumaon alt. 6-12,000 ft., and in Sikkim alt. 10-12,000 ft.

A shrub, 6 ft., with densely leafy branches. \textit{Leaves} \( \frac{1}{4}-\frac{3}{4} \) in., coriaceous, acute or obtuse; nerves very oblique; petiole very short. \textit{Corymbs} very numerous, 1-1½ in. diam. \textit{Flowers} pale pink or white, \( \frac{1}{4} \) in. diam. \textit{Stamens} not exceeding the petals. \textit{Disk} with broad notched glands. \textit{Ripe carpels} sunk half or whole way in the turbinate calyx-tube.

8. \textit{S. arcuata}, Hook. f.; glabrate, branches stout arched, leaves small petaled obovate obtusely 3-8-toothed or -lobed at the rounded top rarely entire and acute, coryms small compound puberulous, flowers hermaphrodite, ripe carpels wholly exserted glabrous shining. \textit{S. canescens}, var. glabra, \textit{Herb. Ind. Or. II. f. & T.}

Sikkim Himalaya, subalpine; Yemutong and Lachoong, alt. 12-14,000 ft., \textit{J. D. H.; Jongri, C. B. Clarke}.

A small woody ramous shrub, with very stout horizontal arching glabrous dark brown shining deeply grooved branches, flowering branches very short. \textit{Leaves} \( \frac{1}{4} \) in., glabrous or nearly so, narrowed into a slender petiole. \textit{Corymbs} dense-flowered. \textit{Flowers} \( \frac{1}{2} \) in. diam., red. \textit{Stamens} not exceeding the petal. \textit{Disk} with broad notched glands. \textit{Ripe carpels} not at all sunk in the turbinate very short calyx-tube.—Closely allied to \textit{S. canescens}, but more robust and glabrate, with more petaled leaves, larger red flowers and very different fruit.


Western temperate Himalaya; from Murree to Kumaon.
An erect shrub, with strict hoary branches. Leaves ½-1½ in., usually elliptic and acute at both ends, serratures or crenatures small; nerves beneath faint; petiole ½ in., slender. Corymbs dense-flowered; flowers small, ½ in. diam. Ripe carpels minute, glabrous, half sunk in the villous calyx-tube.


Western temperate Himalaya; Kishitwar alt. 6-8000 ft., T. Thomson.

A graceful shrub, with slender branches, and drooping floriferous branchlets, glabrous throughout or with minutely downy inflorescence. Leaves ½-1 in., very rarely ovate acute and serrate, usually broadly elliptic, thin and almost membranous, flat; nerves very indistinct on both surfaces. Inflorescence sometimes of many simple corymbs with long capillary pedicels (sometimes ½ in.) collected into lax broad panicles that terminate drooping lateral branches; in other specimens the corymbs are branched as in S. bella, &c. Flowers ½ in. diam. Ripe carpels very small, ½ in., half sunk in the calyx-tube, glabrous.—Very near V. chamaedrifolia, L., of Siberia, and perhaps a form of that plant with smaller flowers and laxer habit; it is the only Himalayan species with the ultimate branches of the inflorescence bearing corymbose pedicels. Except that the leaves are acute, which is rarely the ease in our plant, the figure of S. vaccinifolia in Loddiges admirably accords with it. Loddiges says that he raised it from seeds sent from Nepal.

11. S. brahuica, Boiss. Flor. Orient. ii. 690; a small excessively branched shrub, leaves minute obovate-cuneate entire or 3-5-lobed or -toothed tomentose, corymbs few-flowered, carpels minute.

Wuzuristan beyond Peshawur in N. W. India, alt. 5-8000 ft., Stewart.—Distrib. Beloochistan.

A very remarkable little species, forming a low shrub with slender stiff interlaced sometimes spinescent branches. Leaves ½-1 in., usually glabrous or puberulous above, and white with dense pubescence beneath, but in some of Stock's Reluchistan specimens nearly glabrous on both surfaces; petiole very short. Flowers ½ in. diam., in shortly peduncled tomentose panicles.

DOUBTFUL SPECIES.


S. nutans, Royle (argentea, Loudon), is unknown.

S. cerablescence, Poir. Dict. vii. 350; Camb. Monog. in Ann. Sc. Nat. i. 374; DC. Prodr. ii. 544, brought from India by Sonnertat, with axillary panicles, is unknown, but as Sonnerat was never in any part of India where Spiraea is indigenous, his plant is possibly the garden S. cantoniensis, Lour.

S. cummosa, Roxb. Fl. Ind. ii. 512, S. chamaedrifolia, L.? Wall. Cat. 701, is S. cantoniensis, Lour., a native of China only (see Benth. Fl. Hong Kong, 105) and not of the N. of India.

8. RUBUS, Linn.

Creeping herbs or erect or sarmentose shrubs, almost always prickly. Leaves alternate, simple or compound; stipules free or adnate to the petiole. Flowers in terminal and axillary corymbose panicles, rarely solitary, white or red. Calyx-tube broad; lobes 5, persistent. Petals 5. Stamens many. Disk coating the calyx-tube. Carpels many, on a convex receptacle; style subterminal; ovules 2, collateral, pendulous. Drupes many, 1-seeded, crowded upon a dry or spongy
rubus. | li. rosacae. (j. d. hooker.) 327

conical or cylindric receptacle. seed pendulous.—distrib. abundant in the northern hemisphere, rare in the southern; species 100.

a genus of which the western european species are notoriously difficult of discrimination, as are some of the himalayan.

series 1. leaves simple, undivided or lobed.

* herbs with creeping or prostrate stems.

1. r. calycinus, wall. in don prodr. 235; cat. 737; eglandular, stem and petioles hirsute and prickly, leaves orbicular-reniform obscurely lobed toothed hairy above glabrous beneath except on the prickly nerves, flowers axillary, calyx densely prickly, lobes deeply toothed. r. lobatus, wall. mss. dalibarda calycina, DC. prodr. ii. 568.

central and eastern temperate himalaya; nepal, wallich: sikkim alt. 6–9000 ft. bhutan alt. 8500 ft. khasia mts. alt. 4–5000 ft.

almost black when dry; prickles slender, slightly curved on stem and petioles. stem creeping for 1–3 ft. leaves 1–3 in. diam., sometimes hairy beneath; petiole 2–4 in.; stipules ½–¾ in., broadly ovate, serrate. flowers 1 in. diam., solitary or twin, usually on erect 1–2-leaved shoots. calyx-tube densely clothed with long straight prickles; lobes foliaceous, broad. petals shorter than the calyx-lobes, erect in fruit. fruit globose of few large scarlet fleshy carpels; stone rugose.—very near a philippine island species which has stipules cut into narrow lobes and smaller flowers.

** shrubs, erect sarmentose or climbing.

† leaves oblong, entire (obscurely lobulated in r. assamensis); stipules pectinate (except in r. acuminatus and griffithii). carpels few, 6–12.

2. r. acuminatus, Sm. in rees cyclop. xxx. rubus 43; eglandular, quite glabrous, prickles very few scattered curved, leaves ovate or lanceolate caudate-acuminatae doubly serrate, flowers small corymbose long pedicelled, corymb axillary and in elongated terminal panicles, bracts setaceous glandular, calyx-lobes ovate glabrous with pubescent margins, carpels about 8. wall. cat. 726. r. oxyphyllus, wall. cat. 7110. r. betulinus, don prodr. 233. r. triflorus, ham. mss.

central and eastern temperate himalaya from kumaon, blinkworth, and nepal to sikkim, alt. 4–7000 ft. khasia mts. alt. 4–5000 ft.

scandent. branches long, arching, cylindric; prickles very small, flattened, rarely on the petioles. leaves 3–5 in., rather membranous; base rounded; nerves 6–8 pair; petiole slender, ¾–1½ in.; stipules slender, almost setaceous, glandular. panicules sometimes a foot long; bracts small. flowers ½ in. diam., in threes or fives; pedicels ¾–1½ in. calyx-lobes with recurved or hooked sometimes dorsal tips, erect in fruit. petals much shorter than the calyx, white. carpels glabrous. fruit of large globose scarlet drupes enclosed by the calyx, receptacle villous, stone rugose.

3. r. griffithii, hook. f.; eglandular, branches and leaves glabrous, prickles few scattered curved, leaves oblong-lanceolate caudate acuminatae doubly serrate, panicles axillary and terminal elongate, flowers sessile scattered or crowded, bracts linear-oblong serrate, calyx hoary with appressed down.

eastern himalaya; sikkim, herb. griffith.

very similar to r. acuminatus in foliage, but with very short petioles, a totally different inflorescence, the flowers never in corymb or fascicles, a densely tomentose calyx, and linear serrated bracts.—i have seen but one specimen, which is in bud only. possibly the locality is erroneous, as griffiths' collections were in great confusion and it was often difficult to decipher the localities.

4. r. hexagynus, roxb. hort. beng. 39; fl. ind. ii. 516; eglandular,

ASSAM, SILHET and the KHASIA MTS. ascending to 4500 ft. Katchyen hills, AVA, Kurz.—Distrib. Yuman.

Climbing; stem as thick as the arm; prickles flattened. Leaves 1½–4 in., usually cordate at the base, glabrous above, beneath pubescent or tomentose wholly or on the nerves only, usually rugose when dry, not shining; nerves 8–10 pair, spreading and arched; midrib beneath prickly; petiole short, ½ in., stout, tomentose; stipules white and hoary, with no lamina. Panicles large and spreading, densely white-tomentose; bracts ¾–½ in. Flowers ¾–½ in. diam. Calyx-lobes erect in fruit, villous within, entire, rarely 3-fid at the tip. Petals linear, white, shorter than the calyx. Carpels glabrous, with very slender styles. Fruit of 1–6 large red-purple drupes; receptacle villous; stone rugose.—This and the following have been usually confounded with the Java R. pyrifolius which has shorter leaves with fewer and more oblique nerves.

5. R. Hamiltoni, Hook. f.; eglandular, glabrous or pubescent, prickles short stout recurved, leaves oblong-ovate or -lanceolate acuminate serrate, stipules pectinate, panicles terminal, bracts glabrous pectinately lobinate far exceeding the buds, calyx with appressed hairs, tips of lobes long acuminate usually lobinate, petals small, carpels 6. R. pyrifolius, Ham. in Herb. Wall. not ofSmith; Wall. Cat. 725 in part.

Central and Eastern tropical Himalaya; Bhotan alt. 5000 ft., Griffith; Sikkim alt. 2–3000 ft., J. D. H. Assam, Hamilton, Masters, &c.

Very similar to R. hexagynus, but readily distinguishable by its brown colour when dry, usually narrower and more acuminate leaves, less tomentose inflorescence, which is nearly black when dry, and by the very large pectinately lobinate curved bracts which are membranous and curving over the young buds give a curiously criniate appearance to the immature panicles; the sepals also have usually longer tips split into setaceous lobes. Fruit as in R. hexagynus.

6. R. assamensis, Focke Batogr. in Abhandl. Naturwiss. Verein, Bremer, iv. 107 (1874); eglandular, branches petioles and panicles villous with soft spreading hairs, prickles very few short, leaves oblong or ovate-oblong very obscurely lobed acuminate toothed hairy above hoary with whitish down beneath, nerves 5–6 pairs, petioles very short, panicles triangular, flowers small, calyx-lobes tomentose, carpels 10–12 glabrous. Rubus 20 Herb. Ind. Or. H. f. & T.

MISHMI HILLS, Griffith, and KHASIA MTS. at Syong, alt. 5500 ft., H. f. & T.

An erect whitish shrub; prickles hooked. Leaves 3–4 in., acute or obtuse at the base, rarely subcordate, nerves very oblique, margins sometimes without trace of lobing; petiole ½ in.; stipules woolly, small, pectinately pinnatifid. Panicles as broad as long, shortly pyramidal; pedicels short; bracts small, cleft half way into setaceous lobes. Flowers ¾ in. diam., white. Calyx-lobes ovate, long-acuminate, usually quite entire, erect in fruit, inner surface glabrous with a broad tomentose margin. Petals wholly absent in Khasia specimens. Carpels with a few long hairs and very long styles. Fruit (in Mishmi specimens) globose, hardly exceeding the calyx; drupes few; receptacle villous; stone pitted.

†† Leaves lobed at the sides towards the base, normally longer than broad; stipules pectinate. Carpels many.

7. R. glomeratus, Blume Bijd 1111; eglandular, branches slender and leaves beneath tomentose with white or buff down, prickles minute, leaves ovate-cordate acuminate 3–5 lobed, the lateral lobes near the base of the leaf very
shallow toothed, flowers in small axillary and terminal eglandular downy panicles, calyx-lobes villous quite entire, petals obovate equalling the calyx, carpels many. R. Hasskarlilii, Miquel, Flor. Ind. Bat. i. pars, 381. R. acerifolius, Wall. Cat. 744.

Penang, Wallich, Maingay.—Distr. Java, Borneo, Philippines.

This resembles a slender narrow leaved small-flowered state of R. moluccanus, but may at once be distinguished by the narrow leaves, lobed on each side towards the base only. The flowers are small (½ in. diam.) usually in loose panicles, the stipules and bracts laciniate.—I have seen in Mr. Clarke’s collection a small specimen very like this from the Khasia Mts., alt. 4500 ft., but it is so difficult to distinguish imperfect specimens of this from the paniculatus and moluccanus, var. micropetalus, that I hesitate to include the habitat of Khasia.

8. R. paniculatus, Smith in Rees Cyclop. xxx. Rubus 41; eglandular, branches slender, leaves beneath and panicles clothed with white or buff cottony tomentum, prickles very few minute, leaves ovate-cordate or oblong-ovate calyx-acuminate obscurely lobed toothed, nerves 5–7 pair, panicles terminal very lax and much branched, bracts linear-oblong serrate, calyx-lobes silky usually entire, petals very small linear-oblanceolate, carpels many glabrous. Wall. Cat. 740. R. tilicaceus, Sm. l. c.; Wall. Cat. 745.

Temperate Himalaya from Rajaori, alt. 3–7000 ft. to Sikkim, alt. 6–8000 ft. Khasia Mts. alt. 4–5000 ft.

A very rambling climber; all parts except the leaves above densely pubescent or tomentose, with usually cottony white or buff tomentum; prickles hooked, flattened, Leaves 3–5 in., rarely as broad as long, rather membranous, sparsely hairy above, lateral lobes usually very obscure; midrib without prickles; petiole 1–2 in., slender, rarely with a prickles; stipules small, laciniate. Panicles very large and open; bracts small. Flowers ½–1 in. diam., often long pedicelled. Calyx-lobes ovate, acute acuminate or lanceolate and calyx-acuminate, when they are often incised towards the tip, erect in fruit. Petals much smaller than the calyx-lobes, white. Carpels glabrous. Fruit globose, exposed; drupes many, large, black; receptacle villous; stone rugose.

9. R. insignis, Hook. f.; eglandular, clothed with buff cottony tomentum, prickles numerous short, leaves hastate-oblong acuminate toothed lobulate towards the base, nerves 12–15 pair, panicles very long lax open prickly, petals broadly obovate equalling the silky entire calyx-lobes, carpels numerous glabrous.


A very noble species, with the habit of R. paniculatus, but much larger in all but the flowers, and at once distinguished by its prickles, which extend along the petiole and midrib of the leaf beneath, by the numerous nerves, and large almost orbicular petals. Bhotan specimens have the flowers crowded at the end of the long branches of the panicle, whilst in the Khasia ones the branches are open and exceedingly lax to the end. Fruit as in R. paniculatus.


Burma, probably Ava, Kurz.

Very robust; stem and especially inflorescence and petioles densely tomentose; prickles hooked, compressed. Leaves not white or buff beneath; lower 3-5 in. long and broad; lobes deltoid, acute; nerves palmately spreading; petiole 1–2 in., densely
tomentose, often prickly; stipules and bracts pectinately pinnatifid. Flowers $\frac{1}{4}$-$\frac{3}{4}$ in. diam. Calyx-lobes broadly ovate, acute, with 2-5 long marginal teeth, densely tomentose, almost villous, erect in fruit. Petals as long as the calyx, white. Filaments hairy. Carpels numerous, glabrous. Fruit of 20-30 small drupes, stone wavy on the surface.

A specimen from Burma? in Griffith's Herb. is more glabrous with more slender petioles. R. Finlaysonianus, Wall. Cat. 7109, from Siam, known only from a fragment in bud, differs in the apparently entire calyx-lobes clothed with buff tomentum.

††† Leaves normally broader than long, palmately 5-7-lobed; stipules pinnatifid or pectinate. Carpels many.


Stem very robust, with wide spreading subscendent branches, densely clothed with white grey or fulvous tomentum; prickles hooked, flattened. Leaves 2-10 in. diam., most variable in texture and pubescence; upper surface smooth or covered with tubercles answering to the spaces between the nervules; under pubescent villous or clothed with cottony wool, grey or green or buff-coloured, never quite white; petiole 2-4 in., glabrate or tomentose; stipules variable in size, oblong, toothed pinnatifid laciniate or pectinate. Inflorescence usually clothed with silky buff tomentum, rarely white or glabrate. Flowers very variable in size, from $\frac{1}{4}$-1 in., in rather contracted terminal panicles and axillary capitulate clusters; bracts like the stipules, never bearing gland-tipped hairs. Calyx-lobes $\frac{1}{4}$-$\frac{3}{4}$ in. long, usually tri-lobed-ovate, rarely lanceolate, and then pinnatifid in the upper part, erect in fruit. Petals obovate, white, shorter than the calyx-lobes. Filaments glabrous. Carpels numerous, glabrous. Fruit globose, succulent, of many scarlet small drupes; receptacle villous; stone rugose.

I am quite unable to arrange the form of this common and protean plant under recognisable varieties answering to its synonymy. The original R. moluccanus, founded on the plate and description of Rumphius, has leaves with a rugose upper surface (folia superne quam maxime rugosa) and a whitish or ochreous under surface. I have it from Assam, the Khasia Mts., Penang and Java; and with the lobes rather acute from Nepal and almost all localities, where it becomes R. rugosus, Sm., described as such by Wallich (Plant As. Rar.), and figured under its synonym R. Hamiltonianus. Specimens with acuminate leaf-lobes occur at considerable elevations in the Himalaya and Khasia Mts., where the leaves also become more membranous and very large with pale undersurface; at similar elevations and localities large leaved states occur with very large flowers, and lanceolate sepals $\frac{3}{4}$ in. long. The branches and inflorescence of Malacea specimens are most densely
villous with spreading hairs and the basal leaf-lobes overlap. The Western Ghat specimens have the leaves rugose above and thin, and the branches and inflorescence densely clothed with firm buff cottony tomentum. This is also the case with the Ceylon specimens, of which Thwaites distinguishes 4 varieties:—\(a\). bracts ovate entire or cut at the tip, fruit small red (Wight. Ie. t. 225); \(\beta\). leaves smaller narrower more acute, stipules and bracts cut into filiform segments, petals small, fruit dark red (\(R. \)micropetalus, Gard.); \(\gamma\). tomentose, pale, leaves very rugose and coriaceous, stipules and bracts less deeply cut, panicle dense, calyx-lobes ovate-lanceolate toothed, fruit dark red (\(R. \)Fairholmius, Gard.); \(\delta\). prickle short, stipules and bracts less cut, panicles few-flowered, flowers larger, petals about equalling the calyx, fruit larger black (\(R. \)macrocarpus, Gard.); of these \(a\) only inhabits low grounds.

12. \(R. \)reticulatus, Wall. Cat. 747; eglandular, pubescent with white tomentum, prickle few minute or 0, leaves cordate-ovate subacutely 5-7-lobed reticulated on both surfaces finely downy beneath, panicles entire or lanceolate ovate acute, calyx-lobes densely tomentose, fruit globose much larger than the calyx.

Temperate Himalaya; from Kumaon, alt. 7-8000 ft., to Sikkim, alt. 9-10,000 ft.
This I expect will prove another form of \(R. \)moluccanus from a higher region, the leaves of the Kumaon and Sikkim specimens are large broad and rather thin in texture; Wallich’s Nepal ones are more coriaceous, narrower and elongate with many lateral lobes, more like those of \(R. \)paniculatus, to which Wallich says it is ‘valde affinis.’ Sikkim specimens have the cut calyx-lobes. The fruit is very large.

13. \(R. \)lanatus, Wall. Cat. 746; glandular, branches and leaves beneath white cottony, leaves cordate orbicular-ovate acute obscurely lobed serrate glabrous or hairy above, panicles short dense villous and covered with gland-tipped hairs, petals small narrowly linear-oblong, carpels numerous. \(R. \)tiliaceus, Herb. Str. & Winterb.
Central and Western temperate Himalayas. Nepal, Wallich. Kumaon, alt. 5-8000 ft., Madden, Strach. and Winterb.
The very broadly ovate cordate obscurely lobed leaves, white cottony tomentum, and above all the long glandular hairs of the young shoots and inflorescence best distinguish this species, which has the other characters of \(R. \)moluccanus. It may be likened to a dense-flowered glandular \(R. \)paniculatus, with broader leaves.

14. \(R. \)birmanicus, Hook. f.; eglandular, branches petioles and leaves densely clothed with long spreading flexuous hairs, prickle very copious hooked, leaves acutely palmately 5-lobed crenate rugose above white with appressed down beneath, stipules and bracts cut into long capillary lobes, flowers large, calyx-lobes broad, petals orbicular, carpels excessively numerous.

Burma; in the Patkay hills, E. of the Assam frontier, Griffith.
Branches flexuous, hairs red brown when dry; prickles stout recurved flattened extending to petioles and nerves beneath, but not to the panicle, compressed. Leaves 3-4 in. diam., rather coriaceous, lobes extending nearly half way down, triangular, dark above when dry with pubescent nerves, dirty brownish white beneath; petiole 1½ in., stout; stipules ½ in., as broad as long across the almost capillary divisions. Panicle (in bud only) narrow with short branches, and bracts, as large as the stipules; buds very broadly ovoid, densely tomentose but not hairy like the peduncles and pedicels. Calyx-tube hemispheric, lobes broad subacute, entire. Petals equalling the calyx-lobes, clawed. Stamens excessively numerous, in many series. Carpels upwards of 100, glabrous, styles very slender with a few hairs on the stigma; receptacle villous.—A very remarkable species.

15. \(R. \)Treutleri, Hook. f.; more or less glandular, softly tomentose with spreading flexuous hairs, prickles slender nearly straight, leaves orbicular-
cordate with 5-7 shallow crenate lobes, stipules leafy pectinate, flowers large solitary clustered or in short panicles, bracts leafy persistent, petals orbicular small, carpels very numerous hairy.—Rubus No. 24, Hook. f. & Thoms. Herb. Ind. Or.

Eastern temperate Himalaya; Sikkim, alt. 7-10,000 ft., Dr. Treurtler.
A large leafy erect bush, with often glandular bristles mixed with the soft flexuous hairs that cover all parts more or less; prickles passing into bristles, sometimes slightly decurved. Leaves 2-6 in. diam., membranous, green, with scattered hairs above; lobes shallow, rounded or acute, crenatures acute; petiole short or long and slender, sometimes 3 in.; stipules ½ in., almost orbicular in outline, concave, green. Flowers ½-1 in. diam., shortly pedicelled; bracts sometimes reduced to narrow segments. Calyx-tube hemispheric, villous and often bristly; lobes large, often leafy and lanceolate, or pectinately pinnatifid. Petals nearly orbicular, much smaller than the calyx, white or pink. Stamens very numerous. Carpels about 100, style very slender, stigma hairy.—This and R. birmanicus belong to the group with R. Hookeri, all having very numerous carpels and dry fruits.

Series II. Leaves digitately or pedately 3-5-foliolate.

* Leaves glabrous or nearly so beneath.

16. R. fragarioides, Bertoloni Miscell. xxii. 16, t. 5; herbaceous, unarmed, stem petioles and peduncles faintly pubescent, leaflets 3 or 5 obovate or orbicular with a cuneate base lobulate quite glabrous, lobules with acute sinus and coarse teeth, calyx-tube glabrous, lobes ovate-lanceolate quite entire.

Eastern Temperate Himalaya in swamps; Sikkim, alt. 10-13,000 ft., J. D. H., C. B. Clarke.
A very small species; stem chiefly subterranean, slender, woody, sending up very short floriferous branches bearing one or two pedately 3-5-foliolate leaves. Leaflets membranous, contracted into the 1-3 in. very slender petiole; stipules ½ in., broadly ovate, obtuse, toothed or quite entire. Flowers ½ in. diam., white, peduncle ½-1 in. slender. Calyx-tube glabrous; lobes acuminate, tips slender. Petals obovate, acute. Carpels about 5, not seen ripe.—Very near to R. triflorus, Richards. B. japonica of Japan; see Maximovicz Diagnoses, Dec. x. 375.

17. R. alpestris, Blume, Bijd. 1108; erect, nearly glabrous, calyx and stipules eglandular, prickles small scattered, leaflets 3-5 elliptic narrowed at both ends acutely crenate-serrate, stipules linear-lanceolate, flowers 1-3 terminal on slender peduncles, calyx prickly, lobes ciliate, carpels many glabrous. Miquel, Fl. Ind. Bat. i. part 1, 378. R. pentagonus, Wall. Cat. 731.

Temperate Himalayas; from Garwhal, alt. 7-8000 ft., to Sikkim, alt. 8-10,000 ft.—Distrib. Java.
A straggling shrub, with the young parts pubescent; stem stout, cylindric; prickles few, short, slightly curved. Leaflets 2-4 in., membranous, subsessile; terminal the largest, lateral often oblique; nerves 7-10 pair, slender, arched, sometimes faintly pubescent beneath; petiole 1-2 in., sometimes pubescent, usually armed; stipules small, membranous, usually glandular. Flowers ½-1 in. diam., usually solitary, rarely 3-nate; peduncles armed or not, more or less pubescent and glandular. Calyx armed, rarely unarmed, densely pubescent or glabrate; lobes often ½ in. pubescent in the outer margins and within, suberect in fruit. Petals white, orbicular, shorter than the calyx. Stamens 1-seriate. Fruit globose; drupes 12-16, large, glabrous, stone rugose.

18. R. Thomsoni, Focke Batogr. in Abhandl. Naturwiss. Verein, Bremen iv. 198; prostrate, slender, eglandular, prickles few very small, leaflets 3 broad-ovate acuminate two lateral much the smallest crenate or serrate very
membranous, stipules filiform, flowers axillary solitary or in very short racemes or panicles, calyx unarmèd, lobes acute or caudate, carpels many pubescent.

Sikkim Himalaya, alt. 8-11,000 ft., J. D. H., &c.

A slender trailing species, nearly glabrous or with pubescent branches petioles peduncles and nerves of the leaflets beneath, rarely above. Leaflets very membranous, terminal 2 in., often rhomboid-ovate, contracted at the base; lateral usually not half the size, petiolate; petiole slender, 1-2 in., with few prickles; stipules entire or divided. Flowers ½-½ in. diam., peduncles and pedicels short. Calyx-tube nearly glabrous; lobes pubescent, sometimes produced and leafy, suberect in fruit. Petals small, orbicular, red. Fruit globose; drupes many, pale red, pubescent; stone minutely pitted.

** Leaves silky beneath.

19. R. lineatus, Reinv. in Blume Bijld. 1108; eglandular, prickles 0 or few small scattered, leaflets 3 or 5 elliptic oblong or lanceolate ciliate-serrate cuate-accumulate, beneath with many straight nerves and dense silky silvery tomentum, calyx-lobes ovate acuminate silky. Miguel Pl. Ind. Bat. i. part i. 378. R. pulcherrimus, Hook. Ic. Pl. t. 729-730.—Rubus Sp., Clarke in Journ. Linn. Soc. xv. 141.

Sikkim Himalayas, alt. 6-9,000 ft.—Distrib. Java.

A strong suberect herb; branches softly pubescent, young silky; prickles when present straight. Leaflets 3 or 5, 4-5 by ½-2½ in., subsessile, coriaceous, acuminate or cuneate at the base, often doubly-serrate, upper surface glabrous ribbed, under shining with 20-30 straight nerves on each side, one to every tooth; petiole 1-2 in., pubescent; stipules ½-½ in., membranous, ovate-oblong, obtuse, entire, glabrate. Flowers in axillary short heads and terminal elongate silvery panicles, ½-1 in. diam.; bracts large, concave, orbicular, membranous. Petals obovate, shorter than the calyx, white. Drupes numerous, small, red, stone rugose.—Very variable in the size of the flowers and breadth of the leaflets.

Var. 1. angustifolia; smaller, leaflets much narrower.

Var. 2. glabrior; leaflets silky beneath on the nerves only. Mishmi, Griffith.


Sikkim Himalaya, alt. 7-8000 ft., J. D. H., Anderson.

Very similar in foliage to broad-leaved states of R. lineatus, but at once distinguished by the almost setose purple gland-tipped spreading hairs, the long caudate-accumulate calyx-lobes which are also setose, and flowers in terminal broad panicles with long pedicels. It is a very rare plant; I gathered it near Darjeeling, as did Mr. C. B. Clarke, and on Sinchul. Dr. Anderson's specimens are stated to be from Punktabarri in a hot region, but I suspect some error.

Series III. Leaves pinnately 3-foliolate.

* Stems slender creeping or prostrate.

21. R. saxatilis, Linn.; Boiss. Flor. Orient. ii. 691; eglandular, glabrous or slightly pubescent, prickles few slender straight, leaflets 3 rhombic-ovate somewhat lobed acutely doubly-toothed, calyx unarmèd, lobes ovate-lanceolate acute longer than the narrow petals, carpels few glabrous.

Western temperate Himalayas in the Tibetan region from Kashmir to Kumaon, alt. 10-11,000 ft. Western Tibet, Dras, alt. 10,000 ft.—Distrib. Caucasus and westward to the Atlantic, Siberia, Dahuria.
Stems annual from a stout woody rhizome, short, erect. Leaves 2-3 in., membranous, the lateral subsessile with cuneate bases and often a lobed outer margin; petiole very slender, 3-5 in.; stipules linear or linear-oblong. Flowers ½ in. diam., 1-4, shortly pedicelled on the top of a slender axillary peduncle. Calyx-tube short, glabrous, unarmed; lobes lanceolate, erect in fruit. Petals white, small, slender. Fruit with few large scarlet drupes; stone reticulated.


Temperate Himalayas, from Garwhal and Kumaon, alt. 8-10,000 ft.

Stems as thick as a sparrows quill, 1-2 ft. long from a woody rootstock; hairs rather stiff, red-brown when dry. Leaves 1½-3 in. long and broad, membranous, glabrous and dark-green above, hairy along the nerves beneath, base cuneate, lateral shortly petiolulate; petiole 2-4 in.; stipules large, broadly ovate or oblong, entire or toothed. Flowers usually solitary, axillary, 1½ in. diam.; peduncle stout. Calyx-tube villous, lobes ¾-1½ in. Fruit of few scarlet drupes; stone smooth.

Var. nepalensis; more slender, smaller in all its parts, leaflets ¾-1½ in., flowers ½-¾ in. diam., calyx lobes acuminiate, not quite entire.—East Nepal, Tambur River, alt. 9000 ft., J. D. H.

23. *R. Fockeans*, Kurz in Journ. As. Soc. Beng. 1875, ii. 206; eglandular, unarmed, stem petioles and peduncles pubescent, leaflets orbicular finely toothed, nearly glabrous on both surfaces, flowers solitary, calyx-tube glabrous or sparsely setose, lobes ovate-lanceolate quite entire.

Eastern temperate Himalaya; Sikkim on the Lachoong River and Phullalong and Singalelah, alt. 10-14,000 ft. J. D. H., C. B. Clarke.

Stems wholly procumbent, widely creeping, slender, very sparingly pubescent. Leaves ¾-1 in. diam., not shining above, and with very few hairs on the nerves beneath, lateral petiolulate; petiole 1 in.; stipules ¼ in., oblong, obtuse, toothed or quite entire. Flowers on very short lateral shoots; peduncle exceeding the petiole. Calyx ½ in. across the lobes, tube almost glabrous, lobes acuminated. Petals not seen. Fruit a few red drupes; stone quite smooth.—The small size, absence of long hairs, opaque foliage and smooth stone of the drupes distinguish this at once from *R. nutans*.


Eastern temperate Himalaya; Sikkim, alt. 7-9000 ft.

A low shrub, almost hispid with gland-tipped hairs, prickles slender. Leaves petiolulate, often subequal, 2-5 in., bright green, bases acute or rounded, upper surface glabrous with pubescent nerves, under also glabrous with hairy nerves; petiole 2-3 in.; stipules orbicular or broadly oblong, foliaceous, recurved, villous. Flowers 1½-2 in. diam., with often persistent foliaceous pectinate bracts. Calyx pubescent, bristly, lobes 1 in., triangular-ovate, often laciniate, spreading in fruit. Petals much smaller than the calyx, orbicular, greenish-white. Stamens very numerous. Carpels in a dense cluster of 2-300 or more, and base of long filiform conniving styles, vil-
lous. Fruit globose, ½ in. diam.; outer carpels dry, glabrous below villous above, imbricating over the inner succulent carpels; endocarp pitted; receptacle broad, hemispherical, velvety, intruded at the base.

** Stems erect sarmentose or climbing.**

25. *R. niveus*, Wall. Cat. 734; eglandular, bristles 0, branches and petioles glabrous or tomentose, prickles recurved, leaflets 3 (rarely 5) coarsely or finely double-toothed lateral obliquely ovate acuminate terminal elliptic ovate or rounded lobulate or lobed, glabrous above, usually white with dense pubescence beneath, stipules filiform, flowers in lateral and terminal few-flowered tomentose corymb, calyx-lobes acuminate or ciliate, petal hairs obovate pink, carpels many villous. *R. gracilis*, Roxb. Cat. Hort. Beng. 39; Fl. Ind. ii. 519.

Temperate Himalaya, from Kashmir to Bhutan, at elevation of 6–10,000 ft. in the west and 5–11,500 ft. in the east. A large rambling bush, without bristles or gland-tipped hairs; very variable in all its parts. Stem stout and branches often purple, young often quite glabrous and glaucous or thickly or thinly tomentose; prickles short, scattered, pale. Leaflets 1–5 in., entire or lobulate, toothed or crenate, acute acuminate or ciliate, terminal sometimes ciliate, usually membranous and glabrous, above sometimes (*R. concolor*) green and glabrous beneath also; petiole slender, 1–2 in., with usually 1–2 prickles. Flowers ½–1 in. diam., usually on slender unarmed pedicels, lower axillary often solitary, upper corymbose arranged on a long peduncle, nodding; bracts filiform. Calyx tubes short, flat; lobes ovate-lanceolate, quite entire, ¼–½ in., tomentose on both surfaces, spreading or reflexed in fruit. Petals much smaller than the calyx-lobes. Stamen very numerous. Fruit globose, large or small, of few or many dry or fleshy drupes; stone pitted.—Closely allied to *R. lasiocarpus.* I find it impossible to arrange satisfactorily the forms of this most puzzling plant; the following are noticeable.

**Var. niveus** proper (Wall. Cat. 734), softly pubescent, leaflets 2–3 in. membranous ovate-lanceolate ciliate-acuminate lobulate and very acutely deeply toothed, corymb of 10–12 shortly pedicelled flowers ½ in. diam.—Nepal and all along the Himalaya.

**Var. pedunculosus**; more robust, leaflets 3–5 in. broader bases more rounded, flowers solitary or in pairs on slender pedicels ½ in. diam., *R. pedunculosus*, Don Prodr. 234; Wall. Cat. 729.—Nepal, Sikkim.

**Var. racemosus**; softly tomentose, flowers in short terminal racemes shortly pedicelled suberect. Kashmir, Jacquemont, Falconer. Murree, Fleming ("fruit large yellow brown"). Kashmir, Clarke (fruit bright red) who also has a densely cottony subvar. with abbreviated racemes (Kashmir, 8000 ft.). This resembles what a hybrid with *coryllolius* might be.

**Var. hypargyrus**; leaflets ½–1 in., sometimes 5, doubly serrately-toothed membranous hoary beneath all over or on the nerves only, or quite glabrous. *R. hypargyrus*, Edw. in Trans. Linn. Soc. xx. 45. *R. concolor*, Boyle MSS. Approaches *R. lasiocarpus*.

**Var. Aitchisoni**; slender, finely tomentose, leaflets broad membranous with very large crenatures, fruit ½ in. diam. of very numerous orange fleshy almost glabrous drupes. Kashmir common at 7000 ft., Aitchison "fruit eatable."

**Var. microcarpa**; branches and petiole (6 in.) nearly glabrous, leaflets 4–6 in. broad membranous lobulate and crenate, flowers ½ in., fruit very small of 30–40 quite glabrous dry drupes.—Sikkim, Lachen, alt. 9000 ft., J. D. H.

**Var. concolor**; leaflets as variable as any of above forms, usually membranous glabrous or nearly so beneath acutely inciso-serrate or toothed or coarsely crenate, flowers corymbose, sepals ½–1 in. *R. concolor*, Wall. Cat. 733.—From Kashmir to Kumaon. This passes into var. hypargyrus.

**Var. Falconeri**; similar to var. concolor but carpels quite glabrous!—N. W. India, Falconer. On the Kishengunga west from Kashmir, Stewart.—This connects *R. niveus* with R. casius, L.

According to priority, Roxburgh’s name of *S. gracilis* should be retained for this
plant, but I am disinclined to replace so excellent, well known and suggestive a name as niveus for another that is in no way distinctive of the species.


Temperate Himalaya; from Hazara, alt. 4–6000 ft., Stewart, and Kishwar, alt. 5–9000 ft. to Sikkim and Bhutan, alt. 6–9000 ft.

Stems trailing, stout, red-brown, obtusely angled, shining; prickles much flattened, \( \frac{1}{6}–\frac{1}{4} \) in. Leaflets 1–2 in., rigidly coriaceous, brown when dry, glabrous on both surfaces, terminal usually ovate-lanceolate long-acuminate, lateral sessile, smaller, sometimes orbicular; midrib beneath with hooked prickles; petiole stiff, sometimes pubescent along the grooved upper surface. Flowers \( \frac{1}{4} \) in. diam.; peduncles \( \frac{1}{2}–\frac{3}{4} \) in., pubescent, rarely 2–3-flowered. Calyx silky outside, tomentose within; lobes ciliate, erect in fruit. Petals orbicular-obovate, clawed, exceeding the sepals, white. Fruit globose, enclosed in the calyx; drupes 20–30, yellow or red, glabrous, seated on a columnar pubescent receptacle; stone rugose.

27. **R. sikkimensis**, Hook. f.; glandular-hairy and covered with long straight prickles, leaflets 3 ovate acuminate lobulate and coarsely crenate glandular above nearly glabrous beneath, stipules linear, peduncles axillary 1–2-flowered, calyx glandular and hispid, lobes ciliate, carpels numerous glabrous.

Subalpine Sikkim Himalaya; Lachen, alt. 12–13,000 ft., J. D. H.

A small shrub, dark brown when dry; stems stout; gland-tipped hairs long spreading, half as long as the quite-straight shining prickles. Leaflets 1–2 in., terminal, sometimes deltoid-ovate, base rounded or subcordate, lateral subsessile, smaller, narrower; petiole 1–3 in., very slender, pubescent; stipules \( \frac{1}{3} \) in. Peduncles \( \frac{1}{2}–\frac{2}{3} \) in., pubescent glandular and bristly as is the calyx. Flowers \( \frac{3}{4} \) in. diam., inclined. Calyx-lobes lanceolate, pubescent on both surfaces. Petals red-purple.—This in many respects resembles **R. pungens**, Camb., and **R. horridulus**, H. f.


A tall suberect bush; branches stout, spreading and recurved, obscenely angled; hairs red-brown, often very dense, covering a softer down with occasional glandular hairs; prickles stout, hardly compressed. Leaflets 2–4 in., coriaceous, dark green above, rarely glabrous beneath; petiole 1–3 in.; stipules subulate. Panicles small, many-flowered, pedicels short; bracts setaceous. Flowers \( \frac{1}{3}–\frac{1}{4} \) in. diam. Calyx densely pubescent and bristly or not; lobes ovate, acute acuminate or obtuse and mucronate, erect in fruit. Petals obvrate, larger than the calyx, white. Stamen 1-seriate. Fruit globose, exposed; drupes on a cylindrical hairy receptacle, many, golden yellow, succulent; stone rugose.

Var. hirta; leaflets green beneath. R. hirtus, Roxb. Hort. Beng. 38; Fl. Ind. ii.

Western temperate Himalaya, alt. 3-7000 ft. from Murree to Jammu.—Distrib. Afghanistan and westward to the Atlantic.

Stems arched, obtusely angled, channelled; prickles stout. Leaflets sometimes 5 at the base of the stem, 1-2 in., coriaceous, sometimes abruptly acuminate; petiole ½-1 in., flattened above; stipules subulate, velvety. Panicles 6-10 in.; branches short, very stout, densely tomentose; pedicels stout, short; bracts often toothed or laciniate. Flowers ½-¾ in. diam. Calyx-tube short, lobes woolly on both surfaces, sharply reflexed in fruit. Petals obovate, pink. Stamens very numerous, in many series. Fruit small, globose; drupes many, fleshy, black; receptacle deciduous; stone pitted.

30. **R. Clarkei**, Hook. f.; herbaceous?, eglandular, branches petioles and peduncles very slender faintly pubescent and with copious slender acicular straight prickles, leaflets 3 orbicular obtuse and coarsely doubly crenate laxly pubescent beneath, stipules oblong green, peduncles 1-3-flowered axillary, calyx-lobes lanceolate.

Kashmir, at Sonamung, alt. 9250 ft., C. B. Clarke.

A very slender small perhaps herbaceous species; branches probably armed, soft, green, laxly clothed with spreading hairs; prickles numerous, very slender, quite straight, not extending to the midribs. Leaflets 2-3 in. long, nearly as broad, dark green, rounded or cuneate at the base, petiolulate; petiole 1-3 in., slender; stipules persistent, obtuse or acute, entire or serrate, pubescent. Flowers drooping, ½ in. diam., solitary in the lower axils, corymbose in the upper; bracts green, small, oblong, acute. Calyx-tube not bristly, densely pubescent; lobes narrow-lanceolate. Fruit of few glabrous drupes; stone pitted.—Of this very distinct species 1 have seen no flowers.

31. **R. antennifer**, Hook. f.; eglandular, branches petioles and peduncles laxly pubescent and with copious slender straight acicular prickles, leaflets 3 orbicular-ovate acuminate lobulate and acutely doubly toothed, faintly pubescent beneath, stipules linear-lanceolate acuminate, corymbs axillary and terminal, calyx-lobes ovate with long slender tips, carpels very many glabrous.

Kashmir; Sonamung, alt. 8500 ft., C. B. Clarke.

A much stouter plant than *R. Clarkei*, similarly clothed with slender straight prickles and soft hairs, but the leaflets are more coriaceous, very acutely toothed, the lateral sessile, the terminal cordate, and the inflorescence and flowers are quite different. Stipules ¼-½ in., green, persistent, quite entire. Peduncles often 2-3 in., stiff, erect, the terminal continuing the branch and bearing a branched corymb; pedicels often long and slender; bracts filiform. Flowers erect, ¾-1 in. across the sepals. Calyx not or hardly bristly, tomentose; lobes pubescent on both surfaces, ovate, suddenly contracted into filiform tips often as long as themselves. Petals orbicular-ovate, white, about equalling the limb of the calyx. Carpels on a columnar pubescent receptacle.

32. **R. purpureus**, Bunge Enum. Plant. Chin. Bor. 24; glandular, branches petioles inflorescence and calyxes densely covered with small deflexed

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prickles, leaflets 3 (rarely 5) broad-ovate coarsely acutely doubly crenate white beneath, cymes axillary few-flowered, flowers drooping, carpels pubescent.


Branches stout, shining, pale or dark yellowish; purple glandular hairs few, scattered; prickles short, flattened, straighter on the petioles and inflorescence. Leaflets 2-4 in., glabrous above, terminal broad-ovate or orbicular, cordate; lateral sessile, smaller; petiole 1-3 in., stout, pale, coloured like the stem; stipules setaceous, glandular. Flowers ½ in. diam., solitary in the lower axils, 2-4 in peduncled cymes in the upper. Calyx pubescent and bristly; lobes ovate-lanceolate, finely acuminate, erect in fruit. Petals smaller than the calyx, orbicular-oblong, Fruit enclosed in the calyx, globose, red, of many (about 20) tomentose drupes situated on a columnar pubescent receptacle; endocarp pitted. Very near R. colchicus, Herb. Stev., from the Caucasus, if not a few-flowered variety of that plant. Jaeschke sends 5-foliate leaves of apparently this species from Lahul.

Var. subinermis, more slender and lax with the prickles reduced almost to bristles. —Kishtwar, Thomson; Kashmir, Falconer, alt. 9250 ft., C. B. Clarke; common in water channels at 8-10,000 ft., Aitchison. — Clearly a lax state of the Tibetan drier climate prickly plant.

33. R. lucens, Focke Batogr. in Abh.ändl. Naturwiss. Verein, Bremen iv. 199 (1874); eglandular, almost glabrous, prickles scattered short hooked, leaflets 3 ovate elliptic orbicular or ovate-lanceolate caudate-acuminate serrate shining above, stipules linear, racemes axillary and terminal long slender, carpels few hirsute. R. levigatus, Wall. Cat. 1280.

Khasia Mts., alt. 3-4000 ft., Simons, &c.; Assam, Jenkins; Mishmi Hills, Griffith.

Stem very stout, climbing lofty trees; branches angled, grooved, quite smooth; prickles very short. Leaflets 4-5 in., brown when dry, coriaceous, serratures simple, acute, petiolules short and nerves beneath puberulous; petiole 2-6 in., prickles many or few; stipules almost setaceous. Panicles 6-12 in., lower sometimes crowded in the leaf-axils; terminal slender, pubescent; bracts subulate. Flowers small, ½ in. diam., in fascicles or short corymbs; pedicels slender. Calyx densely hoary; tube very short; lobes oblong, obtuse or apiculate, erect in fruit. Petals equalling the sepals, pink or white, obovate, clawed. Stamens 20-30, in one series. Fruit enclosed in the calyx; drupes 6-8, sweet; stone rugose; receptacle low, pubescent.

Sect. IV. Shrubs. Leaves pinnately 5-7-foliate, upper (or all in 37. foliolo8us) sometimes 3-foliate.

34. R. biflorus, Ham.; Smith in Rees Cyclop. xxx. Rubus 9; eglandular, prickles strong hooked, leaflets 3 or 5 ovate lobulate doubly toothed white and tomentose beneath, stipules linear-lanceolate, flowers 1-3 together on axillary slender peduncles drooping, calyx-lobes broad-ovate acuminate, carpels numerous woolly above. Wall. Cat. 735; DC. Prodr. ii. 558; Bot. Mag. t. 4678.

Temperate Himalaya, from Sirmore, alt. 7-9000 ft., to Sikkim, alt. 8000 ft., and Bhotan.

A strong rambling shrub; stems and branches quite glabrous, white with glaucous bloom; prickles very strong and much recurved. Leaves chiefly on short lateral branches; upper sometimes 1-foliate and 3-lobed; leaflets 1-1½ in., rarely more, acutely toothed or serrate, pubescent or hairy above, densely tomentose beneath; petiole slender, 1-2 in., prickly, pubescent; stipules ⅓ in. Peduncles ⅓-1½ in., unarmed or prickly, usually glabrous; bracts subulate. Flowers ⅓ in. diam. Calyx pubescent on both surfaces or glabrate outside; lobes broad, suberect or spreading in fruit. Petals equalling or exceeding the calyx, orbicular, white. Stamens numerous. Fruit globose, ⅓ in. diam.; drupes 20-30 golden yellow, succulent; stone reticulated with pits; receptacle columnar, villous.

Temperate Himalaya, from Murree and Kashmir, alt. 5–8000 ft. (ascending to 1500 ft. in Kumaon), to Sikkim, alt. 4–10,000 ft. *Burma.* Western [Peninsula](#) on the higher Ghats from Canara southwards. *Ceylon*, central province, alt. 4–7000 ft.—*Distrib.* *Java.*

A large rambling very variable plant; branches cylindric, with coloured pruinose bark, the very young only tomentose; prickles compressed, variable in size and curvature, extending to the petioles and rachis, but not or rarely to the inflorescence. *Leaves* 3–10 in.; leaflets 1–3 in., rather coriaceous, opaque, glabrous or silky above, almost plaited by the strong straight nerves, which are very prominent beneath, sometimes very acute, often doubly toothed and mucronate, terminal usually broad-ovate, or even orbicular, rounded acute or cordate at the base; lateral sessile, rarely ovate or orbicular; petiole stout, grooved above, glabrous and shining or tomentose; stipules 1/4 in., linear-subulate. *Corymbs* axillary and terminal, simple or subpanicled, densely tomentose or villous, or merely puberulous, on short or long (1–2 in.) peduncles, 2–many-flowered; pedicels long or short; bracts setaceous or filiform. *Flowers* ½–1 in. diam. *Calyx* densely woolly; tube small; lobes ovate or ovate-lanceolate, acute acuminate or caudate, spreading or suberect in fruit; laciniate and much lengthened in Moulmayne specimens. *Petals* deep pink, orbicular or broadly obovate, rarely exceeding the calyx. *Fruit* ½–3 in. diam. globose, hoary; drupes numerous, dry, or fleshy and then red or orange; stone pitted; receptacle columnar, villous.

It is as difficult to define the varieties of this *Rubus* as it is those of *R. niveus*, to which they are in a degree analogous, and it is also difficult to separate the three following species from it by constant definable characters.


**Var. sericeus**; leaflets 2–3 in. coarsely serrate pale green membranous beautifully silky on both surfaces paler but not white beneath, corymbs many-flowered, sepals lanceolate. *Kishwar, Thompson.*


**Var. roseofolius**; quite glabrous except the branches of the corymbs and margins of sepals, leaflets 1–1 1/2 in. inciso-serrate membranous, dark brown when dry, flowers small in axillary corymbs, sepals with filiform points.—Sikkim, alt. 9–10,000 ft., *J. D. H.*

**Var. subglaber**, *Thwaites Enum.* 101; leaflets 1–1 1/2 in. rounded, finely crenate-
serrate faintly pubescent on the nerves beneath; dark brown when dry, midrib beneath often prickly. Ceylon.—Kurz (Journ. As. Soc. Beng. 1876, pt. ii. 307) refers Roxburgh’s *R. rosalorum* to *R. rosasiliarius*, Sm., but a reference to Hardwick’s description cited by Roxburgh proves that this cannot be correct.

36. **R. racemosus**, Roxb. Fl. Ind. ii. 519; branchlets petiolo and inflorescence clothed with glandular hairs, prickles straight or hooked, leaflets 5-7 ovate or orbicular-ovate acutely toothed, beneath usually densely white-tomentose, stipules lanceolate, corymb axillary and terminal, calyx prickly, petals large red, carpels many villous. *R. lasiocarpus, Sm., Var.? Miq. Fl. Exsicc. Hohenack. No. 1152.*

NILGIRI MTs., Adam, Gardiner, &c. PULNEY MTs., Wight.

I cannot doubt this being an extreme form of *R. lasiocarpus*, readily distinguishable by the copious glandular bristles and hairs, the usually densely tomentose branches, corymb, petiolo, &c., and the prickly calyx and large petals; the leaflets too are usually broader, very coriaceous, glabrous above or with sometimes copious almost woolly hairs. In Hohenacker’s specimens however the branchlets and petiolo are nearly glabrous, and in all the branches are beautifully pruinose. The sepals are ciliate and quite entire. Wight’s Pulney mountain specimens have the leaflets more membranous, almost glabrous beneath except along the nerves, like var. subglaber of *R. lasiocarpa*. I have seen no authentic specimen of Roxburgh’s plant (which Kurz (Andaman Report) refers to *lasiocarpus*) and refer the above to it as the only Peninsular species according with his description.

37. **R. foliolosus**, Don Prodr. 256 (microphyllus, p. 234); eglandular, branches petiolo and inflorescence villous or densely tomentose, prickles straight or hooked, leaflets 3-7 small ovate or almost orbicular coarsely crenate-toothed or serrate white-tomentose beneath, flowers small in axillary branched long peduncled corymb, petals small red, carpels villous.—R. Roylei, Klotzsch in Reise Pr. Waldem. Bot. 154, t. 6. R. parvifolius, Smith in Rees Cyclop. xxx. Rubus 21, not of Linn.; Wall. Cat. 736.

Central and Western temperate Himalayas. NIPAL, Wallich; CHAMBA to KUMAON, alt. 5-8000 ft., Thomson, &c.

Except by its usually prostrate habit and much smaller size, I do not think that this is distinguishable from *R. lasiocarpus*. In Wallich’s specimens the leaflets are $\frac{1}{2}$ in. long, lateral orbicular cuneate, terminal lobed, are very pubescent above and white beneath, but in Thomson’s and others they become more ovate glabrous above and almost silky beneath or even glabrous except along the nerves as in varieties of *lasiocarpus*. The flowers are numerous, about $\frac{1}{2}$ in. diam., with pink petals equaling the calyx-lobes; and the fruit is very small, white and villous. Don, misled by a specimen of *R. biformis* sent under the same name by Wallich (and fastened on the same sheet in Herb. Linn. Soc.), describes the peduncles as 3-flowered. Maximovicz Diagn. x. 392, is certainly wrong in referring this to the *R. parvifolius*, Linn.

38. **R. opulifolius**, Bertol. Misc. Bot. xxii. 16, t. 4; inflorescence glandular-hairy and as well as the stout branches and petiolo densely softly tomentose, prickles few straight or hooked, leaflets 3-5 acute or acuminate crenate-toothed coriaceous densely clothed beneath with white wool, lateral elliptic terminal broader lobed, flowers in axillary and terminal subsessile abbreviated racemes, calyx with glandular bristles, petals small red, carpels many silky.

KHASIA MT., at Mothong, alt. 5500 ft., Griffith; J. D. H. & T. T. Upper Kala Pani, alt. 4000 ft., C. B. Clarke.

A much more robust plant than *R. lasiocarpus*, with dense soft tomentum on the young and even on last year’s branches, the older of which are however glaucous and pruinose (as in all these red-flowered species); prickles when straight large and much flattened. Leaflets $1\frac{1}{2}-2\frac{1}{2}$ in., softly downy or glabrous above, very white
beneath except the nerves which have a yellowish pubescence; petiole stout, prickly or not; stipules setaceous, quite entire. Flowers much crowded, \( \frac{3}{4} \) in. diam.; bracts setaceous, very tomentose. Calyx densely tomentose and bristy; lobes lanceolate, acuminate, quite entire. Petals obovate-oblong. Carpels with long silky hairs, not tomentose as in the ordinary forms of R. lasiocarpus. Fruit globose, of many fleshy orange-red almost glabrous drupes; stone deeply pitted.—This is possibly another extreme form of R. lasiocarpus, which (like R. racemosus) has become glandular.

39. **R. horridulus**, Hook. f.; eglandular, prickles very many crowded hooked, branches arched, leaflets 5-7 densely softly hairy incised-serrate, petioles and single-flowered peduncles densely clothed with hooked prickles, calyx-tube hemispheric densely clothed with straight prickles, petals purple, carpels villous.

**Bhotan**, at Panga, alt. 7600 ft., Griffith.
Branches cylindric, slender, glabrous, with usually straight slightly compressed prickles. Leaves 2-4 in.; petiole very slender, sparingly hairy, with numerous strongly hooked prickles; leaflets \( \frac{1}{4} \)-\( \frac{1}{2} \) in., equally clothed with long soft flexuous hairs on both surfaces, acute or acuminate. Peduncle clothed and armed like the petioles, 1 in., always 1-flowered. Calyx-tube \( \frac{1}{4} \) in. diam., quite clothed with spreading straight shining prickles; lobes large, ovate-lanceolate, long-acuminate, quite entire, pubescent on both surfaces, erect in fruit. Petals small, purple according to Griffith’s notes. Stamens very numerous. Carpels numerous, villous, with long straight white hairs. Fruit small, of 6-12 subpubescent drupes; stone reniform, rugosely pitted.—This appears to be in every way a very distinct species, but it is impossible to say to what extent more copious materials may modify the above description; it is allied to R. sikkimensis, H. f., and pungens, Camb.


**Kashmir**, Falconer, Jacquemont; Shapinga, alt. 7000 ft., C. B. Clarke; woods at Gulmuz at 8600 ft., Aitchison. **Khagan**, 100 miles N.W. of Kashmir, alt. 8000 ft., Stewart.—Distr. Japan (a variety).
Branches long, lax, cylindric, trailing, green, glabrous except the pubescent tips. Leaves 2-4 in., petiole very slender, sometimes glandular, unarmed or with faintly hooked prickles; leaflets 1-\( \frac{1}{2} \) in., sessile, bright-green on both surfaces, quite glabrous or faintly hairy on the nerves beneath, terminal broader, cordate, 3-lobed; stipules narrow lanceolate or setaceous. Flowers nearly 1 in. diam., erect; peduncle stout, slender, prickly and pubescent. Calyx-tube hemispheric; lobes sometimes \( \frac{1}{4} \) in. long, pubescent on both surfaces, spreading in fruit. Petals obovate-spathulate, longer than the calyx, white (?). Fruit globose, small; drupes few, on a conical glabrous receptacle, pubescent, stone minutely pitted.—Clearly closely allied to R. horridulus and sikkimensis, but with more the habit of R. ideus or saxatilis. The petals are multiplied in Falconer’s specimen.

41. **R. rosmarfolius**, Smith Ic. ind. iii. t. 60; glabrous or pubescent, glandular-hairy or not, prickles scattered hooked, leaves long, leaflets 5-7 ovate-lanceolate acuminate doubly inciso-serrate, green on both surfaces, stipules subulate-lanceolate, flowers solitary and in very loose panicles, calyx-lobes caudate, petals white exceeding the calyx, carpels excessively numerous, fruit large of innumerable orange-red minute glabrous drupes. Roxb. Fl. Ind. ii. 518; Wall. Cat. 728; Kurz For. Flor. Brit. Burm. i. 459; Hook. Ic. Pl. t. 349. R. pinnatus, Wild. R. asper, Don Prodr. 234; Wall. Cat. 741. O. sikkim-

Temperate Himalayas; from Kumaon, alt. 7000 ft., to Sikkim, alt. 4-7000 ft., J. D. H. Khasia Mts., alt. 3-4000 ft. Ava and Martaban Hills, Kurz.—Distrib. Java. Naturalised and cultivated in the tropics and warm temperate regions; flowers often double.

Stems erect or inclined; branches slender, glabrous, pubescent or almost villous, as are the petioles and peduncles, sometimes crinitae with long dark-brown spreading simple or gland-tipped hairs (R. sorbifolius, Maxim.); prickles sometimes very numerous, mostly straight on the stem and hooked on the petiole leaflets and inflorescences. Leaves 2-5 in. long, bright green, never glaucous or white beneath; petiole slender, often prickly; leaflets 1-2 in., rarely more, membranous or coriaceous, sessile or petiolulate; stipules linear-lanceolate or filiform, long-acuminate. Flowers 3½-1 in. diam.; peduncles usually slender, prickly. Calyx glabrous or pubescent, not prickly, tube small; lobes acute or acuminate or hair-pointed, or drawn out to a serrated limb nearly an inch long; spreading in fruit. Petals orbicular-ovate. Carpels excessively numerous, glabrous, on a villous receptacle. Fruit globose or more often oblong; drupes smaller than in any other species; stone deeply pitted.—R. paniculatus, Roxb. (R. Roxburghianus, Wall. Cat. 732.) from the Moluccas is R. parvifolius, Linn. & Rumph. (Amboin. v. t. xlvi.), and perhaps also R. fraxinifolius, Poir.; it has larger leaves and smaller calyx and fruit than roseofolius. R. Javanicus, Celebicus and others are in various respects intermediate, and all may prove forms of one common Malayan plant.

DOUBTFUL SPECIES.

R. Hibiscifolius, Focke Batogr. in Abhandl. Naturwiss. Verein, Bremen, iv. 197; unarmed, stem smooth, floriferous branches slender and petioles puberulous, stipules broadly linear obtuse deciduous, leaves petioled ovate or ovate-lanceolate cordate long-acuminate 3-lobed unequally subincised-serrate hairy then glabrate above, paler and puberulous on the nerves beneath, flowers crowded subfascicled shortly peduncled forming a short narrow inflorescence, bracts ovate-lanceolate acute sometimes denticulate, calyx yellow tomentose cleft hardly to the middle, lobes shortly triangular.—Leaves exactly like those of R. palmaus, Th., flowers like those of R. moluccanus. Nipal, Wallich in Herb. Copenhagen (Focke).—I have no idea what this species can be; I find nothing like it in Herb. Wallich.


9. GEUM, Linn.

Erect perennial herbs. Radical leaves crowded, pinnate; terminal leaflet large; stipules adnate to the petiole. Flowers solitary or corymbose, white yellow or red. Calyx persistent, 5-bracteolate; lobes 5, imbricate or valvate. Petals 5. Stamens very many, crowded. Disk smooth or with radiating grooves. Carpels many, on a long or short receptacle; style filiform, elongating much after flowering; straight or bent; ovules ascending. Achenes many, on a dry receptacle, each with a long filiform straight or bent terminal style which is often hooked at the tip.—Distrib. Temp. and cold regions of N. and S. hemispheres; species about 30.

SECT. I. Geum proper. Style in fruit hooked at the tip or below it.


Western temperate Himalaya, alt. 6-11,000 ft., from Murree to Kumaon.—Distrib. Siberia and westwards to the Atlantic.
Stems 1-3 ft., stout or slender, from a woody rootstock. Terminal leaflets of radical leaves 2-3 in. diam., orbicular, lobed and crenate; lateral much smaller, often minute, sessile, cut and lobed; cauline leaves sessile, broad, variously cut and lobed; stipules leafy, lobed and toothed. Flowers ½-1½ in. diam.; peduncle slender. Petals yellow, narrowly ovate, equaling or exceeding the calyx-lobes, which are acuminate and reflexed in fruit. Achenes spreading and recurved, hispid with long hairs; awn ½ in., bent, hooked at the tip; receptacle villous.—C. B. Clarke has a very robust form from Kashmir (Alibad, 9,000 ft.).

Sect. II. Sieversia. Style straight in fruit.

2. G. elatum, Wall. Cat. 711; sparingly hairy, leaves pinnatisect, leaflets very many short lobed and crenate, flowers erect, achenes hispid. Sieversia elata, Royle Ill. 207, t. 39.

Subalpine and Alpine Himalaya; from KASHMIR, alt. 9-12,000 ft. to SIKKIM, alt 12-15,000 ft.

Rootstock stout, woody. Leaves 4-12 in., linear-oblong; leaflets ½-1 in., close and imbricating or scattered, uniform or the alternate smaller, terminal orbicular, all lobed and coarsely crenate, upper or all adnate by a broad base. Flowering stems with few leaves and 1-6 flowers. Flowers 3-½ in. diam. Calyx-lobes: Petals orbicular, yellow, much exceeding the calyx. Carpels sessile on the base of the calyx, clothed with long silky hairs. Achenes elliptic, acute at both ends, hairy; style ½ in., slender.


10. FRAGARIA, Linn. Strawberry.

Perennial scapigerous herbs, with creeping stolons. Leaves digitately 3-5-foliate very rarely pinnate or simple; stipules adnate to the petiole. Flowers white or yellow, often polygamous. Calyx persistent, with 5 bracteoles at its base; lobes 5, valvate in bud. Petals 5. Stamens many, persistent. Carpels many, on a convex receptacle; styles ventral, persistent; ovule 1, ascending. Achenes many, minute, sunk in the surface of a large fleshy receptacle.—

Distrib. Temp. and mountain regions of the N. hemisphere, S. America, Sandwich Islands, Bourbon; species 6 or 7.

* Flowers yellow.


Temperate and subtropical Himalaya and along the foot of the hills from the Punjab to Assam, ascending to 7500 ft. in the east and 8000 ft. in the west. KHASIA MTS. NILGIRI MTS. PENANG (Roxburgh)—Distrib. Afghanistan, Mountains of the Malay Islands, Japan, Corea, and Formosa.

More or less silky hairy. Rootstock stout, with many long slender prostrate stems. Leaves distant; leaflets rarely 5, 1-1½ in., petiolulate or sessile, membranous, simply
or doubly crenate or toothed or serrate, base cuneate entire, nerves parallel; petiole 1-5 in., very slender; stipules leafy, toothed. Peduncles very slender, equaling the petioles, naked. Flowers ½-1 in. diam. Calyx-lobes ovate or lanceolate; bracteoles narrow or broad, often greatly exceeding the calyx-lobes, rarely quite entire. Petals obovate, cordate, yellow. Fruit spherical or oblong, bright red, spongy, insipid; achenes minute, obscurely pitted.

A very variable plant. I refer Potentilla denticulosa doubtfully to it on the authority of J. Gay (in Herb.), who has further verified the reference of the American P. Durandii to F. indica; M. E. Durand in 1860 having informed him that this plant was sent to him from Savannah, where it grew in the streets, and was no doubt introduced.

**Flowers white.**

2. **F. vesca**, Linn.; leaflets sessile or nearly so many-toothed, fruit globose or subglobose, calyx-teeth usually entire.

Var. nubicola; slender, silvery, nearly glabrous, runners filiform, hairs on petioles and few flowered peduncles appressed, calyx-lobes narrow spreading in fruit. F. nubicola, Lindl. in Wall. Cat. 1238.

Var. ? collina, slender or stout runners with spreading hairs, hairs on petioles and few- or many-flowered peduncles more copious spreading, calyx-lobes narrow or broad spreading or suberect in fruit.

Temperate Himalaya, from Murree and Kashmir, alt. 5-10,000 ft., to Sikkim, alt. 6-13,000 ft.—District. F. vesca, Afghanistan, Java, N. temp., zone.

I am quite unable to identify the Indian strawberries by means of the characters given by authors to the European species, which differ in their several works. F. vesca is defined by Boissier (Fl. Orient.) as having the petioles with spreading hairs, and the peduncles with spreading or appressed ones; Ledebour (Fl. Ross.) describes the hairs of its peduncles as appressed, and Decaisne (Jardini fruitier) as spreading. In the common Himalayan *Fragaria* the hairs of both petals and peduncles are appressed in some forms, in others those of the petiole are spreading and of the peduncle appressed, and in still others both petiole and peduncle have spreading hairs. As the specimens with most appressed hairs appear from dried specimens to have spreading calyx-lobes I have referred them to *R. vesca* as var. nubigena. I must remark however that J. Gay, who was the greatest living authority on *Fragaria*, and to whom I sent a series of specimens, has regarded most of them as *F. collina*, but evidently with doubt; for a Simla and a Kashmir specimen he tickets *F. collina*! and then crosses out the mark of interrogation, and a Kishwar specimen he tickets first *elatior*! and then crosses that name out substituting *collina*! and finally crosses out the mark of interrogation; of those marked *collina* by Gay; some have appressed, others spreading hairs on both peduncle and petiole. The Sikkim specimens, again, which I describe above as var. nubicola, are marked *F. vesca* without a doubt by M. Gay. This slender silvery form occurs throughout the temperate Himalaya; it has often small accessory pinnules on the petiole far below the tip and toothed or entire calyx-lobes.


This will probably prove to be another form of *F. vesca*, and I find an approach to it amongst the Himalayan specimens of that plant; and there are specimens of it marked as from Sikkim in Griffiths' collection, but they are probably from Khasia and mislabelled. Gay who elaborately describes it says that the calyx-lobes are erect; this they seem to be in dried specimens, but Wight's excellent figure (which Gay does not refer to) shows them to be spreading. The fruit is white with a pale pink tint, and not worth eating; it is globose and inclined to be conoidal in the Nilghiris, but a very depressed sphere in Khasia.

**Sikkim Himalaya**, alt. 10-15,000 ft., *J. D. H., Kurz, &c.*

A very distinct species, at once recognizable by its smaller proportions, petiolulate leaflets with few teeth, toothed calyx-lobes, bracteoles, and curious fruit, which is often nearly 1 in. by ½ in. broad, of a bright scarlet but with little flavour.


Perennial herbs, rarely shrubs. *Leaves* compound; stipules adnate to the petiole. *Flowers* white or yellow, rarely red, solitary or in corymbose cymes. *Calyx* persistent, 5- rarely 4-bracteolate; lobes as many, valvate in bud. *Petals* as many, sometimes narrow. *Stamens* many, rarely few and definite. *Disk* annular or coating the calyx-tube. *Carpels* many, rarely 1 or few, on a small dry receptacle; style persistent or deciduous, ventral or terminal; ovule 1, pendulous. *Achene* s many, or a dry receptacle.—*Distrib. N. temp., Arctic, and mountain regions, very few are found in the south; species 120.

The species of *Potentilla* are very difficult of discrimination, being chiefly mountain plants varying in habit and stature with elevation, much as *Ranunculus*. I have no doubt that several here regarded as peculiar, will prove forms of more western ones, and those again of one wide spread European, Asiatic, and American plant. Lehman's "Revisio Potentillarum" is of little scientific value, and the 200 species it enumerates are reducible by at least one-third. Boissier in his "Flora Orientalis" has done excellent work. The character of the calyx and petals are excessively variable, and that of the terminal and ventral style is not so good as might be supposed, the outer carpels often differing somewhat from the inner in this respect. Smooth and wrinkled achenes are not always definite characters. I am inclined to think that the structure of the stigma is useful as a guide to the affinities of the species, but I hesitate to introduce it without a study of the whole genus.

**SECT. I. Sibbaldia.** *Stamens* 4, 5 or 10. *Flowers* often unisexual.

* Leaves simple.

1. **P. trullifolia**, Hook. f.; forming dense silky moss-like tufts, leaves trowel-shaped or ¼- orbicular tip truncate 3-fid, stamens 5, achenes many smooth, styles short ventral.

**Sikkim Himalaya**; rocky places on the Tibet frontier, alt. 16-17,000 ft., *J. D. H.* Tufts matted, an inch high, soft, of densely packed short branches from a woody slender rootstock. *Leaves* ½ in., densely imbricate, flat, clothed on both surfaces with long silky hairs, tip with 3 broadly triangular obtuse teeth; petiole short; stipules very broad, membranous, with triangular acute free portions. *Flowers* solitary, subsessile, ½ in. diam. *Calyx* hemispheric, silky; tube very short; lobes ovate, obtuse; bracteoles much smaller, narrow, oblong, obtuse. *Petals* not seen. *Stamens*, rudiments of 5 seen. *Achenes* about 10, on a villous receptacle, quite smooth.

** Leaves digitately 3- or 5-foliolate.


ALPINE HIMALAYA and WESTERN TIBET, alt. 12-15,000 ft.—Distrib. Lofty mountains of the N. temp. zone; Arctic regions. Covered with rather stiff silky hairs; rootstock woody, depressed, branched. Leaves chiefly radical; petiole $\frac{1}{4}$ in., slender; leaflets $\frac{1}{4}-\frac{1}{2}$ in., rounded at the base, lobes short broad subacute, nerves obscure; stipules large, membranous. Flowering stems $\frac{3}{2}-6$ in.; cymes leafy and silky. Flowers pedicellate. Calyx $\frac{1}{4}$ in.; lobes triangular-lanceolate, erect in fruit; bracteoles linear. Petals narrowly obovate, hardly exceeding the calyx. Stamens 5-10 (Edgew.) short. Achenes ovoid, smooth, obtuse, receptacle flat hairy.—I can detect no difference whatever between the Sibbaldia parviflora Willd. and S. procumbens, L., which latter varies greatly in size and hairiness and size of petals. J. Gay (in Herb. Hook.) failed to distinguish them.

Var. micrantha; more densely tufted and smaller in all its parts, flowers sometimes solitary and alternate sessile amongst the leaves, calyx $\frac{3}{4}-\frac{3}{2}$ in. long. Western Tibet; Tibetan region of Sikkim, alt. 16,000 ft.

3. **P. perpusilla**, Hook. f.; very small, silky, leaflets 3 obovate-cuneate truncate 3-fid, flowers in very short cymes 4-merous, achenes smooth, style short ventral.

ALPINE HIMALAYA, from Champura, Jacquemont, to Kumao, alt. 12,000 ft. Strach. & Winterb. (with Potentilla 28), and the Tibetan region of Sikkim, alt. 16,000 ft., J. D. H.

A much smaller plant than P. Sibbaldii in all its parts, and always 4-merous. Leaflets $\frac{1}{4}-\frac{1}{2}$ in. Flowers $\frac{3}{4}$ in. diam. Petals narrowly obovate, Stamens 4. Achenes 10-12.


Forming dense moss-like patches covered with stout silky hairs. Stem densely leafy, 1-2 in. Petiole $\frac{1}{4}-\frac{1}{2}$ in.; leaflets about as long. Flowers rarely on short peduncles, usually sessile amongst the leaves, $\frac{1}{2}$ in. diam. Calyx-lobes triangular; bracteoles linear. Petals obovate, much larger than the calyx, golden yellow. Stamens 4, very short. Achenes glabrous, smooth.

5. **P. axilliflora**, Hook. f.; sparsely silky, stems prostrate very long and slender leafy throughout, leaflets 3 obovate acutely toothed, stipules small ovate acute, flowers all axillary small on capillary pedicels, petals minute, stamens 5, carpels many, styles sub-basal. Fragaria indica, Wall. Cat. 1236, 3 in part.

WESTERN HIMALAYA, KUMAO, Herb. Wallich.

Rootstock as big as a walnut, apparently very short and broad, sending off 60–100 very weak almost filiform stems 1-2 ft. long, which trail on the ground, and are leaf- and flower-bearing along their length. Leaves chiefly cauleine; leaflets $\frac{1}{2}-\frac{3}{4}$ in., sessile, membranous, base cuneate entire; petiole $\frac{1}{2}-\frac{3}{4}$ in.; stipules small, broad, membranous, toothed. Flowers $\frac{1}{4}$ in. diam.; pedicels $\frac{1}{4}-\frac{3}{4}$ in. Calyx hairy, lobes triangular-ovate; bracteoles linear-oblong. Petals very small, oblong, yellow? Sta-

6. **Potentilla purpurea**, Royle Ill. 208, t. 40, f. 3 (Sibbaldia); polygamous, leaflets 5 obovate-cuneate 3-fid, flowers purple 5-merous.

**N. W. Himalaya, Royle.**

I know this plant only from the figure and meagre description published by Royle, who gives no habitat, and I suppose it to be founded on a drawing of a native artist. The figure represents a procumbent branching rooting flexuous rhizome or stem 4 in. long, clothed with stipular sheaths, and bearing short lateral branches with tufts of leaves and flowers. **Leaves** 4–5 in. long, hairy; leaflets 5, sessile, ½ in., obovate-cuneate, 2–3-fid at the apex, green above, paler beneath. **Flowers** ½ in. diam., solitary or twin from the axils of the leaves, peduncle naked. **Calyx** hairy, lobes triangular-ovate; bracteoles linear. **Petal** length that the calyx, narrowly obovate, pale purple. **Disk** dark purple. **Stamens** 5. **Achenes** ovoid, smooth.

***Leaves pinnate.***

7. **Potentilla albiloba**, Wall. Cat. 1018; stems very slender spreading, leaves pinnate, leaflets few subopposite or alternate obovate coarsely toothed white-tomentose beneath, stipules large, flowers solitary axillary, achenes many, style short ventral. Sibbaldia potentilloides, **Camb. in Jacq. Voy. Bot. 54**, t. 97.

Subalpine Himalaya from Kashmir, alt. 8–10,000 ft., to Sikkim, alt. 12–15,000 ft., **J. D. H., C. B. Clarke.**

**Rootstock** stout. **Stems** many, 6–12 in., flexuous, branched, pubescent. **Lower leaves** 2–4 in.; leaflets 5–9, very unequal, ½ in., orbicular or obovate, lateral smaller, lower smallest, green and glabrous above, snow-white beneath; petiole very slender; stipules sometimes 1½ in., loose, sheathing, brown, acute, adnate for half their length to the petiole. **Flowers** ½ in. diam., on slender peduncles 1–2 in. **Calyx** white-tomentose, lobes triangular; bracteoles linear-oblong. **Petal** small, oblong, obtuse, yellow. **Stamens** 5. **Achenes** numerous, large, deeply furrowed; receptacle tomentose.

**Sect. II. Trichothalamus.** **Stamens** numerous. **Flowers** sometimes dioecious. **Receptacle** with long erect stiff hairs, which entirely conceal the achenes.

*Leaves pinnate.*


Temperate and subalpine Himalaya, from Kashmir, alt. 8–12,000 ft., to Sikkim, alt. 12–16,000 ft.—Distrian. N. Asia and Europe to the Pyrenees and England.

A much branched rigid robust erect or prostrate leafy low or tall shrub, 6 in.–4 ft. **Leaves** imbricating, ¾–1½ in.; leaflets ½–1 in., coriaceous; petiole slender; stipules large, membranous, obtuse. **Flowers** usually solitary, ¾–1½ in. diam.; peduncle rarely 1 in., silky; bracteoles entire or 2-fid. **Calyx-lobes** ovate or lanceolate. **Petal** broadly obvate. **Stamens** many. **Achenes** numerous, minute, with long hairs, and sunk in the long hairs of the receptacle.

**Var. glabrata**; very short, glabrate, leaflets lanceolate. Sikkim, alt. 15,000 ft.

**Var. ochreae**; **Lehm.** slender, very silky, almost white, leaflets much-reduced linear-lanceolate with revolute margins, flowers smaller. **P. ochrata**, Lindl. in Wall.
Cat. 1028; *Lehm. Revis. Potentill. 17.* Western Tibet, from N. of Kumaon to Ladak, alt. 13-17,000 ft.

**Var. pumila;** depressed, very dwarf, branches spreading, leaflets very silky \(\frac{3}{4}\) in., flowers sessile \(\frac{1}{3}\) to \(\frac{1}{2}\) in. diam. *P. Lindenbergii,* *Lehm. in Otto Gart. und Blumenzeit.* vii. 339; *Revis. Potentill.* 14, t. 2.

**Var. Inglisi**; very dwarf, most densely tufted, leaflets \(\frac{1}{2}\) in. linear-lanceolate, flowers often peduncled, peduncle bracteate. *P. Inglisi,* *Royle Ill.* 207, t. 41; *Lehm. Revis. Potentill.* 18. Kumaon and West Tibet, alt. 14-15,000 ft.—Very near *P. biflora,* Willd. of the Altai and American Polar regions, which has obcordate petals.

**Var. armeroioides;** dwarf, forming dense hard tufts or cushions, branches with the densely crowded spreading leaves \(\frac{3}{4}\) in. diam., leaflets linear-lanceolate very rigid, margins revolute to the midrib, achenes glabrous. Borders of Sikkim and Tibet, alt. 17-17,500 ft., *J. D. H.*


Western Tibet, Lahul and northern border of Kashmir, alt. 11-14,000 ft.—Distr. Altai and Thian Shan Mts.

**Stems** 1-3 ft., woody and as thick as the finger below. **Leaves** 4-6 in.; leaflets 1-1\(\frac{1}{2}\) in., subopposite, subequal, petiolulate, ciliate, white or green beneath, base rounded; petiole stout; stipules membranous, caduate. **Flowers** 1 in. diam., very numerous, peduncled, in branched leafy cymes. **Calyx** tomentose, lobes ovate or lanceolate, acuminate; bracteoles linear. **Petals** obovate-oblong, exceeding the calyx, white? **Stamens** many, filaments long. **Achenes** minute, many, immersed in the long receptacular hairs, clothed with long silky hairs.

**Leaves digitately 3-foliolate.**


Temperate and Alpine Himalaya; from *Kashmir,* alt. 10-14,000 ft., to *Sikkim,* alt. 9-15,000 ft.

**Rootstock** stout or slender. **Stems** 1-6 in. **Leaflets** \(\frac{1}{4}\)-\(\frac{1}{2}\) in., sometimes as broad as long, sometimes glabrous and glaucous beneath; petiole \(\frac{1}{4}\) to \(\frac{1}{2}\) in.; stipules variable. **Flowers** \(\frac{1}{4}\)-1 in. diam.; peduncle \(\frac{1}{2}\)-1 in., naked. **Calyx** pubescent or glabrate; lobes triangular, acute; bracteoles elliptic, obtuse. **Petals** orbicular, yellow. **Achenes** sunk in the very long receptacular hairs, smooth, clothed with long silky hairs.—Foliage of *P. Sibbaldi.*

11. **P. eriocarpa,** *Wall. Cat.* 1012; nearly glabrous, rootstock very stout, peduncles and long petioles very slender, leaflets 3 cuneate incised and toothed above the middle, flowers solitary, petals much larger than the calyx, achenes very small, style slender terminal. *Lehm. Revis. Potentill.* 22, t. 4.

Tibetan region of Kunawar, Kumaon, Nipal, and Sikkim, alt. 12-14,000 ft. **Rootstock** long; branches like rootstocks, ascending, 4-10 in. long, as thick as a swan's quill, densely clothed with imbricating silky or woolly stipular sheaths; flowering stems from the tips of the branches, very slender, 2-18 in., suberect, glabrous or faintly silky, with one or two subsessile leaves above the middle. **Leaves very few;**
leaflets \( \frac{1}{2} - 1 \frac{1}{2} \) in., thin, bright green on both surfaces, 3-multifid; petiole \( \frac{1}{2} - 3 \) in.; stipules silky, acute. Flowers 1-1\( \frac{1}{2} \) in. diam.; peduncle \( \frac{1}{2} - 3 \) in., naked. Calyx glabrous; lobes ovate, acute; bracteoles broadly elliptic, sometimes exceeding the calyx-lobes. Petals orbicular-obcordate, yellow. Achenes minute, clothed with very long flexuous hairs.

Sect. III. Potentilla proper. Stamens numerous. Achenes not concealed by the long hairs of the receptacle.

- Root perennial.

† Leaves interruptedly pinnate, the alternate one or more pairs much smaller. (See also 19 P. leuconota.)

12. P. Mooniana, Wight Ic. t. 233; hirsute or villous, leaflets very many pair elliptic obtuse serrate paler beneath, the smaller orbicular or cuneate, flowers panicked or corymbose, bracteoles broad toothed, achenes quite smooth, style very short ventral. Lehmann. Revis. Potentill. 54. R. polyphylla and barbata. Wall. Cat. 1030, 1026; Lehmann. l. c. 53; Monogr. Suppl. 1, t. 5. P. sorrida, Klotzsch. in Reis. Pr. Wald. Bot. t. 9.

Temperate Himalaya; from Kumaon, alt. 11,500 ft. to Sikkim, alt. 10-12,000 ft. Khasia Mts., alt. 4-5000 ft. Ceylon, Horton plains, alt. 7000 ft.

A tall erect-branched leafy plant in Ceylon and at the lower elevations of N. India, but becoming stunted with almost prostrate flowering-branches at 12,000 ft., very variable in amount of hairiness, and sometimes having a few of the early leaves silky; rarely (\( P. \) polyphylla) glabrate with appressed hairs. Leaves 6-10 in., narrow, pinnate nearly to the base, the leaflets smaller downwards; larger leaflets, \( \frac{1}{2} - 1 \frac{1}{2} \) in., smaller \( \frac{1}{6} - \frac{1}{4} \) in., all sessile, membranous, coriaceous at higher elevations, brown when dry; petiole slender, silky; lower stipules usually membranous, upper leafy and toothed or lobed. Inflorescence from an open dichotomously branched lax panicle with slender pedicels, to a short almost umbellate corymb with stiff stout pedicels (\( P. \) barbata). Flowers \( \frac{4}{\sqrt{2}} - \frac{5}{3} \) in. diam. Calyx villous, lobes ovate, acute; bracts larger or smaller than the lobes, ovate or cuneate, usually 3-toothed or -lobed. Petals obovate-orbicular. Achenes on an elevated hairy receptacle, quite without wrinkles.—I can find no characters upon which to found definable varieties of this plant, which by its occasional silky leaves shows an affinity with \( P. \) fulgens.


Temperate Himalaya; from Kunawar, alt. 6-7000 ft. to Sikkim, alt. 7-13,000 ft. Khasia Mts., alt. 4-5000 ft.

As variable as \( P. \) Mooniana, and in a very similar manner; and further almost connected with it by var. intermedia; but usually more robust, with more copious spreading hairs on the petiole and stem, and with the brilliant silvery clothing of the under surface of the leaves and inflorescence sometimes extending to the upper surface. Rootstock very stout. Stems 6-24 in., stout, ascending or erect, leafy. Leaves 2-6 in.; larger leaflets \( \frac{1}{2} - 1 \frac{1}{2} \) in., crowded or not, sometimes with deeply impressed nerves above, at others quite flat, teeth very numerous and acute; petiole rather stout; stipules and inflorescence and petals as in \( P. \) Mooniana, but calyx usually very silvery,
lobes acute; bracteoles very variable. Achenes on an elevated hairy receptacle.—Reichenbach figures the petals as retuse; they seem hardly so in our specimens, nor are they so represented in Bot. Mag. Lehmann's name P. Siemersiana published in 1820 has the priority, but is suppressed by the author himself (Revis. 55).

Var. intermedia; leaflets fewer more oblong slightly silvery beneath, calyx green sparsely silky or hairy as in P. Mooniana.—Sikkim at Jongri, alt. 13,000 ft., C. B. Clarke.

14. P. anserina, Linn.; Boiss. Fl. Orient. ii. 707; rootstock sending out long racemes, leaves lanceolate, leaflets 6–10 pair with minute alternating ones obovate or oblong deeply sharply toothed silvery with white hairs beneath, scapes from the rootstock and from nodes on the runners slender naked 1-flowered, achenes many. P. pseudo-anserina, Bertol. Misc. xxiv. 15, t. 3.

Western Tibet, Piti, &c., alt. 12–16,000 ft., Thomson; Balti prov. of Kashmir, alt. 7700 ft., C. B. Clarke.—Distrib. Kashgar, N. Asia, and from Persia westward to the Atlantic, N. America, Australia.

Rootstock very short; racemes a foot and more long. Leaves forming a spreading tuft from the crown, 2–10 in., green above, silky beneath; leaflets ½–2 in., sessile, smaller ones often minute lanceolate and entire; stipules membranous. Flowers ¼–1 in. diam.; scape 1–6 in. Calyx-lobes lanceolate, acuminate; bracteoles lobed or cut. Petals yellow, orbicular. Achenes numerous, smooth, on a villous elevated receptacle.

†† Leaves not interruptedly pinnate (alternate leaflets not smaller except sometimes in 19. P. leucnota).

15. P. Leschenaultiana, Ser. in DC. Prodr. ii. 584; robust, villous, hairs long spreading soft and silky, leaflets 5–7 obovate or broadly elliptic obtuse coarsely toothed white beneath, flowers corymbose, petals obcordate, achenes on an elevated receptacle wrinkled, style subterminal. Wight J. c. t. 990; Wight & Arn. Prodr. 301; Leh. Monogr. Potentill. Suppl. 1, t. 3; Revis. 41. P. Grahamiana, Wight Cat.

Temperate Western Himalaya, from Kashmir to Kumaon. Nilgiri Hills abundant.

Rootstock short, stout. Leaves 1–10 in.; leaflets usually 5, sometimes 9 or even 11, ½–1 in., membranous or rather coriaceous, teeth acute or obtuse; petiole slender; stipules, lower membranous entire, upper often leafy and toothed. Flowering stems erect or ascending, 2–18 in., usually corymbose branched above, the corymb lax and spreading or close. Flowers subsessile or long-pedicelled, ½–¾ in. diam., yellow, rarely white. Calyx villous or silky, lobes triangular or oblong, acute or subacute; bracteoles linear, oblong, acute. Petals longer than the calyx, orbicular obcordate or more obcuncate. Carpels numerous. Achenes on an elevated and often globose hairy receptacle, variable in size, minutely wrinkled.—A most variable plant, often a roadside weed.

Var. bannehalensis; tall, more slender, copiously branched above, leaflets silvery white (rarely green) beneath, flowers 1 in. diam. on slender pedicels, calyx silky, lobes very acute. P. bannehalensis, Comb. in Jacq. Voy. Bot. 52, t. 64; Leh. Revis. Potentill. 41.—Kumaon to Kashmir, alt. 6–12,000 ft.


Temperate Himalaya, from Waziristan, Stewart, to Kumaon and Bhotan.—Distrib. Siberia to China and Japan.
A smaller plant (sometimes only 2 inches high) than *P. Leschenaultiana*, with which it is almost, if not quite, united through its var. *bannehalensis*, less villous, with smaller leaves, more branched open corymb, longer and more slender pedicels, more acute calyx-lobes and smaller fruit.

**Var. stolonifera**; Lehm.; Maxim. Diagn. Dec. xv. 160; stoloniferous, leaflets sometimes 9, the, alternate smaller. Bhotan, *Griffith*; Sirmore, Wallich.—I give the Sirmore habitat on Maximovic’s authority; the specimens in Herb. Wallich have no stolons and are referable to the ordinary form of the plant. According to the same authority this variety is found in Japan and Kamtschatka.

17. **P. Clarkei**, Hook. f.; leafy, stout, hispid with long spreading hairs, leaves short, leaflets 5–7 lower much smaller obovate very coarsely crenate-toothed, flowers pedicelled in dichotomous cymes with very divaricate leafy branches and involucriform cut leaf-bracts, calyx-lobes acute, achenes many minutely wrinkled, style slender terminal.

**Kashmir, Sirinuggur**, alt. 7000 ft., C. B. Clarke.

*Stems* 1 ft., ascending from a woody rootstock. *Leaves* 1–2 in., covered with spreading hairs on the petiole and both surfaces; leaflets 1/2–1 in., approximate, sessile, rigidly coriaceous, toothed 1/2 way down, pale green when dry, lower lateral sometimes cuneate and 2–3-toothed; stipules on the stem large, semi-ovate, leafy, entire or toothed. **Inflorescence** very stiff, spreading, dichotomously branched, with sessile leaves; pedicel stout, 1/2–1 in. **Flowers** 1/2 in. diam. **Petals** obovate, yellow. **Stamens** numerous. **Achenes** rather large, numerous, on an elevated hairy receptacle.—The rigid pubescence, habit, inflorescence and carpels at once distinguish this from its allies; its floral leaves form a sort of involucre of narrow almost pinnatifid spreading leaflets.

18. **P. Griffithii**, Hook. f.; tall, branched, hoary, leafy, leaves short-petioled, leaflets 5–7 white with appressed pubescence beneath 3 terminal leaflets obovate coarsely crenate-serrate lateral smaller orbicular or oblong, stipules leafy deeply toothed, flowers in panicled corymb sessile or pedicelled, calyx-lobes obtuse or subacute, achenes very minute glabrous, style very short subterminal. Potentilla 15, *Herb. Ind. Or. H. f. & T.*

**Eastern Himalaya, Bhotan**, alt. 6–8000 ft., *Griffith*; Sikkim, alt. 7–14,000 ft., J. D. H.

**Rootstock** inclined. *Stem* 10–24 in., erect or ascending, stout or slender. *Leaves* small, 1–4 in.; leaflets 1/2–1 in., green and glabrous or hairy above, quite white beneath and sometimes hairy as well as clothed with white opaque down, base cuneate, lateral very irregular in size and shape, lowest pair often minute; petiole hairy; stipules large. **Flowers** 1/2–1 in. diam.; pedicel 1/2–2 in., pubescent or tomentose. **Calyx** silky, lobes acute or obtuse; bracteoles quite entire, oblong or ovate, acute or obtuse. **Petals** yellow, rounded or retuse at the tip. **Achenes** numerous, exceedingly minute, smooth, on a large globose somewhat hairy receptacle.—Near *P. discolor*, Bunge, of China, of which I have seen only a small specimen, and which is much smaller, with protruding flowers stems and pointed tips to the calyx-lobes.

**Var. 1**; very slender, flowers 1/2–1 in. on slender long pedicels, petals small.—Sikkim, alt. 7–9000 ft.

**Var. 2**; robust, sometimes 1–4 in. high, flowers 1/2–1 in. on stout shorter pedicels, petals large.—Bhotan and Sikkim, alt. 12–13,000 ft.

Alpine Central and Western Himalaya; Nipal, Wallich. Sikkim, alt 12-14,000 ft.; C. B. Clarke.

Rootstock very long and stout, inclined. Leaves 2-18 in., linear- or obovate-oblong in outline, 1-2 in. diam. across the broadest part; leaflets usually close and often imbricate, ½-1½ in., tip rounded, sessile, many-nerved, the alternate nerves smaller, upper decurrent; petiole slender or stout; lower stipules membranous, upper leafy toothed. Flowering stems with one or two leaves and a few-flowered irregular corymb. Flowers ⅔ in. diam.; pedicel elongating after flowering, Calyx silky, lobes triangular acute; bracteoles various, usually toothed. Petals orbicular, yellow. Stamens 20-30. Achenes few, ⅔ in. diam., four times as large as in any other Indian species, dark brown; receptacle low, villous.

Var. obscura; covered with soft spreading hairs, not silvery, leaflets ⅔ in. broadly oblong membranous less closely serrate softly hairy on both surfaces.—Kumaon at Kalari, alt. 13,000 ft., Strach. & Wintetb. I have but one specimen, and though I find no approach to pubescence on it, judging from the variation of P. splendens, Mooniana, and Leschenaultiana, it may well be referable to peduncularis, with which it altogether agrees in habit, flower, and achenes.

Var. Clarkei; dwarf, sparsely silky, not silvery, leaflets narrowly oblong.—Sikkim at Yakla, alt. 14,000 ft., C. B. Clarke.

20. P. leuconota, Don Prodr. 230; leaflets numerous (alternate sometimes minute) oblong obtuse sharply closely serrate clothed beneath with appressed shining silky hairs, flowering stems exceeding the leaves, flowers small subumbellate, bracteoles entire, achenes few hairy or glabrous, style very short ventral. Wall. Cat. 1021 (excl. spec. of peduncularis); Lehm. Revis. Potentill. 65, t. 24.

Alpine Himalaya; Garwhal, 10,000 ft., Madden; Nipal, Wallich; Sikkim, alt. 10-16,000 ft., J. D. H.—Distrb. Borneo (Kina Balou, alt. 11,000 ft., Low).

Rootstock very stout, sometimes 1 in. diam., inclined. Leaves 2-6 in., very numerous, linear in outline or rather broader upwards; leaflets close or sparse, ¼-⅓ in., sessile, glabrous or hairy above; petiole with appressed hairs. Flowering stem erect or ascending, with usually a leaf about the middle, and an imperfect whorl of reduced ones at the inflorescence. Flowers ⅝ in. diam., crowded, the pedicels elongating stiffening and forming an imperfect umbel as the fruit advances. Calyx silky, lobes acute; bracteoles linear-lanceolate, entire. Petals obovate, retuse or rounded at the tip, rather longer than the calyx, yellow. Stamens about 20. Achenes not numerous.

21. P. microphylla, Don Prodr. 231; dwarf, densely tufted, sparingly silky or glabrate, leaflets very numerous small oblong 0-1 rounded pinnatifidly toothed to the middle or deeper, scape exceeding the leaves 1- rarely 2-flowered, petals much exceeding the calyx, achenes many minute quite smooth, styles very short ventral. Wall. Cat. 1010.

Alpine Himalaya, from Garwhal, alt. 10-14,700 ft. to Sikkim, alt. 15-18,000 ft. Very variable in habit and stature, forming at high elevations dense hard moss-like tufts, strewed with golden flowers and with the leaves so small and crowded as with difficulty to be distinguished; at lower elevations the leaves are 4-6 by ⅔ in. Leaflets opposite and alternate, uniform, ½-⅔ in. broad, crowded and overlapping or scattered, flat, or compound; petiole slender; stipules very large, membranous, obtuse. Flowering stem or scape erect, rarely shorter than the leaves, appressed-pubescent or silky, naked or with an undeveloped leaf and bud above the middle, rarely 2-3-flowered. Flowers ½-⅔ in. diam. Calyx lobes acute or obtuse; bracteoles oblong. Petals orbicular or obovate, yellow. Stamens 30-40. Achenes in a globose head on a villous receptacle.

Var. microphylla proper; densely tufted, rootstock stout woody, leaves 1 in., petiole filiform, leaflets ¼ in. 3-5-fid pointing forwards and upwards. P. microphylla, Wall. and 7. depressa, Wall.; Lehm. Revis. Potentill. 30; Monog. Suppl. t. 2; f. 2.

Var. glabrinascula, Wall. Cat. 1010; less densely tufted, leaves 2-3 in., leaflets
nearly orbicular in outline flat cut in rather a fan-shaped manner, glabrous above, silky on the nerves beneath.

Var. 3. latiloba, Wall. Cat. 1010; leaves 2–4 in., leaflets orbicular in outline flat toothed from below the middle to the tip, nearly glabrous beneath, scape slender 2–3-flowered sometimes decurved in fruit. P. microphylla, *Royle Ill. 208*, t. 41, f. 2.

Var. achilleaefolia; leaves 1–2 in., leaflets most densely imbricate pointing obliquely forwards and upwards almost perpendicularly to the plane of the leaf very silky beneath.


Western Tibet, alt. 10–14,000 ft., and Tibetan border of Lahul, Kumaon, and Sikkim, alt. 13–17,000 ft.—Distrib. Soongaria, Altai Mts., Mongolia, Caucasus, Taurus.

Rootstock long, slender, branched, tortuous. *Stems* 4–8 in., suberect or diffuse. *Leaves* $\frac{3}{4}$–2 in.; leaflets $\frac{1}{3}$–$\frac{2}{3}$ in., usually linear-oblong, not toothed or serrate, obtuse or acute, sessile by a broad or narrow base; petiole slender; stipules acute or acuminate. *Flowers* $\frac{3}{4}$ in. diam.; peduncle $\frac{1}{2}$–1 in., naked, flexuous. *Calyx*-lobes broad, rather obtuse. *Petals* obovate, yellow. *Achenes* few, large for the size of the plant, somewhat triangular, obtuse, quite smooth, exceeding the hairs of the elevated receptacle.


Central and Eastern Alpine Himalaya; *Nipal*, Wallich; *Sikkim*, Jongri, alt. 13,000 ft., C. B. Clarke.

Rootstock as thick as the thumb, inclined. *Leaves* excessively numerous, spreading, 2–4 in.; leaflets $\frac{1}{3}$–$\frac{1}{2}$ in. broad, opposite and alternate, sessile, glabrous except a few hairs beneath and at the tip of every segment, cut almost to the midrib in a fan-like manner, primary segments again divided, ultimate ones acute; petiole with appressed hairs; stipules subulate. *Flowering stems* 4–6 in., numerous, deinate and then ascending, with appressed hairs and a few much reduced leaves. *Flowers* $\frac{3}{4}$ in. diam. on slender pedicels. *Calyx* glabrate; lobes triangular, acute; bracteoles linear-oblong, acute. *Petals* twice as long as the calyx, yellow. *Achenes* smooth; receptacle hairy.—The leaflets of the Sikkim specimens are much more finely divided than those of the *Nipal* ones.

24. *P. multifida*, Linn.; *Boiss. Fl. Orient*. ii. 710; stems many and petiole and leaves beneath softly white-tomentose without silky hairs, leaves pinnate or subdigitately 3–5-foliolate glabrous above, leaflets linear-oblong or obovate pinnatifid nearly to the base, segments linear or lanceolate ascending, *VOL. II.*

**Kashmir and Western Tibet**, alt. 10-16,000 ft.; Niti Pass, *Kumaon*, alt. 16,500 ft., *Str. & Wint.*—Distrib. Afghanistan to the Caucasus. Northern and Central Europe and Asia from Lapland and the Pyrenees; China; temperate and Arctic N. America.

As variable in stature as *P. sericea*, and in other respects also. Rootstock short, erect, with many crowns of leaves and stout or slender, subereet or prostrate or ascending stems. Leaves $\frac{1}{4}$-2 in. diam., normally with 5 subdigitate lobes, but often with lobes more pinnately dispersed on the slender petiole which is sometimes 4 in. long; divisions of pinnules $\frac{1}{10}$- $\frac{1}{2}$ in. broad. *Flowers* $\frac{1}{4}$- $\frac{1}{2}$ in. diam., in close or open corymbose cymes, or few, or solitary in reduced forms, subsessile or on long slender pedicels. Calyx silky; lobes ovate, acute; bracteoles linear-oblong, obtuse. Petals orbicular-ovate, retuse. Achene glabrous, exactly like those of *P. sericea*; receptacle hairy.—A considerable number of species in different sections of Lehman's "Revision" are referable to this species. *P. altaica*, Bunge is a state with leaflets reduced to three. *P. verticillaria*, Steaph., referred here by Ledebour, is according to our specimens partly *P. multifida* and partly *sericea*.

Var. glabra; dwarf, rootstock stout, stem prostrate, leaves dense nearly glabrous, flowers small.


Var. Saundersiana; very small, leaves palmately 3-5-foliolate, leaflets $\frac{1}{2}$- $\frac{1}{3}$ in. deeply incised tomentose or silky beneath. *P. Saundersiana*, *Royle Ill. 207*, f. 41, f. 1; *Lehm. Revis. Potentill. 113*. Western Tibet, alt. 15-17,000 ft. Also in Siberia and Arctic latitudes. Very small 3-foliolate specimens are perhaps undistinguishable from *P. nica*, L., and var. hololeuca of *P. sericea* may be referable here. Dwarf forms of these three species are hardly distinguishable in a dry state.


**Western Tibet**, and Tibetan region of the Western Alpine Himalaya, from *Kashmir*, alt. 9-17,000 ft. to *Kumaon*.—Distrib. Afghanistan to the Caucasus and Armenia. Soongaria, N. China, Temperate and Asiatic N. America.

A very variable plant, diminishing in size with the increasing elevation from 18 in. to 3 in.; covered more or less densely with soft shining silky hairs. Rootstock very stout, perpendicular, with many heads. Leaves crowded, 1-6 in. long, rarely more than 1 in. broad; leaflets oblong, all cut nearly to the midrib, rarely only half way to it, the terminal leaflets pedately disposed, the lateral opposite and alternate. Flow- ering stems ascending, densely tomentose, corymbose many-flowered in the larger specimens, few or 1-flowered in the smaller. Calyx-lobes triangular-ovate or lanceolate, acute; bracteoles narrowly oblong, obtuse. *Achene* quite smooth.—I can find no character whereby to separate *P. soongarica* from the common Tibetan form of *sericea* and it is difficult to retain hololeuca and *polyschista* as distinct forms, to which may be added certain forms of *P. pensylvanica*, L.

Var. *polyschista*, *Lehm.*; dwarf, densely tufted, leaflets 3-5 short, flowers smaller—alt. 15-17,000 ft.—*P. polyschista*, Boiss. *Flor. Orient.* ii. 710.

Var. *hololeuca*, Boiss.; *Fl. Orient.* ii. 710 (sp.); dwarf, leaflets 3-5, ovate pinnatidif to the middle, most densely white tomentose beneath, flowers few small. *Lehm. Revis. Pot. 69*, t. 27. Perhaps referable to *P. multifida*—Pugha in Little Tibet,
Potentilla.] LI. ROSACEÆ. (J. D. Hooker.) 355

alt. 14-16,000 ft., Thomson. Small forms of this are undistinguishable in a dry state from those of P. multifida, especially when the leaflets are reduced to 3 or 5; its numerous forms have many names in Europe, Asia, and America.

+++ Leaves digitately 5-foliolate, or upper 3-foliolate. (See also states of 24. P. multifida, 25. sericea, and 37. nivea).


Western Himalaya; in the dry region of Kashmir and Kashmir, alt. 7-9000 ft., Thomson, C. B. Clarke.—Distrum. Soongaria.

All parts covered with soft spreading often glandular hairs. Stems tufted on a woody rootstock, soft, erect or ascending. Radical leaves 4-8 in.; leaflets 1-2 in., entire towards the cuneate base, nerves slender, green on both surfaces; petiole slender, 2-6 in.; cauline leaves short-petioled or sessile, 3-foliolate; stipules ½-¾ in. Flowers ¾-1 in. diam., sunk amongst the uppermost leaves; peduncle elongating in fruit, strict and stout. Calyx large, ¾ in. long; lobes lanceolate, acute; bracteoles entire or 3-fld. Petals orbicular-obovate, dark yellow, not much exceeding the calyx. Achenes very numerous, on a globose villous receptacle. P. Kotschyanus, Fenzl, of Cilicia, &c., seems to me to be this plant.


Western temperate Himalaya, alt. 5-9000 ft., from Murree to Kumaoon.

Stems erect, from a woody rootstock, 1-3-flowered, stout or slender, from densely villous to glabrate. Radical leaves 12 by 3 in.; leaflets sessile, 1-3 by ¼-½ in., membranous, rarely acute, teeth obtuse or acute; base entire, cuneate; petiole slender; cauline stipules ½-1 in., ovate or oblong, lower entire, upper lobed. Flowers ½-1 in. diam.; fruiting pedicels sometimes 3 in., divaricate. Calyx-lobes acute; bracteoles obtuse. Achenes very numerous, on a globose hairy receptacle.—In English gardens this species has been long cultivated and much hybridized.

28. P. kashmirica, Hook. f.; erect, leafy, clothed with spreading hairs, leaves short-petioled 5-foliolate, leaflets obovate-oblong very coarsely serrate lateral lobes softly hairy on both surfaces, flowers in large wide-spreading dichotomous cymes, petals obcordate yellow, achenes deeply wrinkled, style short subterminal.

Kashmir at Nowgunge, alt. 7500 ft., C. B. Clarke.

Stem a foot high, rather slender; hairs soft, flexuous. Leaves 2-3 in.; leaflets 1-½ in., sessile, the lateral much shorter and broader, all cut ½ way down into subacute lobes or serratures, paler and almost silky beneath; petiole 1-2 in.; stipules lanceolate, acute. Inflorescence 6 in. diam., repeatedly forked and more corymbose than panicked, many-flowered. Flowers ½ in. diam.; pedicels slender. Calyx silky; lobes ovate, acuminate; bracteoles obtuse. Petals about ½ larger than the calyx. Achenes many, on a globose hairy receptacle.—A very distinct plant, allied to P. nepa-
lens; distinguished by the shorter petioles, very deeply serrate shorter leaflets the lateral of which are lobed on the lower margin, by the yellow flowers and strongly wrinkled achenes; the broad corymbose inflorescence further distinguishes it from both P. nepalensis and desertorum. Its nearest ally is the European P. hirta, L. which has much larger flowers and achenes.

20. P. argentea, Linn.; Boiss. Fl. Orient. ii. 714; hoary with appressed white tomentum, stems leafy, leaflets 5 obovate pinnatifidly cut into broad subacute teeth, base entire cuneate, flowers very numerous subcor-ymbose, pedicels slender, petals yellow, achenes minute smooth, style subter-minal.

Kashmir, Jacquemont; Pir Punjul, Stewart; Alibad, 8,000 ft., C. B. Clarke.—Distr. Soongaria, N. Asia, Asia Minor westward to the Atlantic.

Stems many from the root, 6-10 in., erect or ascending. Leaflets 1-1½ in., sessile, rather stiff, lobes pointing upwards, margins slightly recurved, glabrous above; petiole 1-2 in.; stipules lanceolate, acuminate, entire. Inflorescence broad, much di-trichotomously branched, leafy. Flowers ½ in. diam.; pedicels ½-1½ in. Calyx densely tomentose; lobes acute; bracteoles entire. Petals rather exceeding the calyx, obovate. Achenes on a villous elevated receptacle.

30. P. reptans, Linn.; Boiss. Fl. Orient. ii. 728; glabrous, sparingly hairy, stolons long slender rooting, leaflets 5 obovate or obovate-oblong serrate, peduncles axillary solitary naked 1-flowered, achenes many smooth, styles subterminal.

Kashmir, Falconer, Jacquemont, Thomson.—Distr. Siberia, Afghanistan westward to Abyssinia and in Europe to the Atlantic, N. China, Japan.

Rootstock woody; runners 1-2 ft., slender, leafy at the nodes. Leaflets 1-2 in., membranous, somewhat pedate, sometimes petiolulate; petiole 1-6 in., slender; stipules small, oblong, entire. Peduncle 1-4 in. erect. Flowers ⅓-⅔ in. diam. Calyx lobes broad or narrow, acute; bracteoles ovate, entire. Petals obcordate, yellow. Achenes dark brown.

Var. minor; leaflets ½ in. rigid obovate quite glabrous.

Var. ? trifoliolata; pubescent, leaflets 3 obovate sparingly silky beneath. Kashmir valley, Thomson.—Probably a different species.

31. P. pteropoda, Royle Ill. 207, t. 40, f. 2; silkily hairy, leaves long-petioled fan-shaped in outline, leaflets 5 cuneate-oblong toothed at the tip, stipules very long adnate to and almost equalling the petiole, stems 1-5-flowered, petals large, carpels ovoid. Lehm. Revis. Potentill. 157.

Mountains surrounding Kashmir, Royle l. c.

This is the only described Indian Potentilla of which I have not seen a specimen. The above character is extracted from Royle's, to which the plate enables me to add that the flowering stems equal or rather exceed the leaves, and that the petals are obcordate and twice as large in the acute sepals. The drawing represents a plant with very much the habit of P. curviseta, but far more robust, with 3-5 much broader leaflets, that have rounded 5-7-toothed tips.


32. P. argyrophylla, Wall. Cat. 1020; tall, leafy, clothed with white silky hairs rarely with opaque tomentum, leaflets 3 elliptic-ovate-oblong-oblique or obovate acutely toothed white beneath, nerves prominent, flowers many in panicled cymes usually long-pedicelled, petals large red purple or yellow, achenes smooth on a densely villous receptacle, style subterminal.
Western and Central Himalaya, from Kashmir, alt. 8–13,000 ft. to Nipal.

Rootstock very stout; stem 2–3 ft., finely pubescent. Leaflets 2–3 in., sessile or petiolulate, green, glabrous or finely silky above, dirty white beneath; nerves not very prominent, teeth acute; petiole 3–6 in.; cauline stipules ovate-oblong, acute. Flowers 3–13 in. diam.; pedicels sometimes 2 in., and very slender. Calyx silky, lobes acuminate; bracteoles elliptic-oblong, obtuse acute or acuminate. Petals obsolete-cuneate, varying from red-purple to almost brown-purple. Stamens about 20, dark purple. Achenes very numerous; styles long.

Except in the colour of the petals I can find no difference between P. atrosanguinea and P. argyrophylla, and I am hence compelled to unite them; in so doing I retain the name of argyrophylla from its representing a character known to both forms.


Var. leucochroa; much smaller, leaflets sometimes ½ in. densely silky often on both surfaces, flowering stems 1-few-flowered, flowers yellow or red. P. leucochroa, Lindl. in Wall. Cat. 1019. P. Cautleyana, Royle Ill. 207, t. 40, f. 1. P. cataclines, Lehm. Pugil. iii. 37; Monog. Potentill. Suppl. i. t. 10; Revis. Potentill. 150. P. vestita, Klotzsch in Reis. Pr. Waldem. Bot. t. 14.—Kashmir to Nipal, alt. 10–15,000 ft.—Lehman (Revis. 171) includes Lindley’s leucochroa under the American P. villosa, which differs totally in the short style and glabrous receptacle.


Western temperate Himalaya; from Kashmir to Kunawur and in Western Tibet, alt. 13–17,000 ft.—Distrin. N. Asia from the Caucasus to Dahuria.

Usually covered with soft spreading hairs, sometimes glandular, rarely somewhat silky. Rootstock rarely large. Leaflets ½–¾ in. long, sessile or petiolulate, usually entire for ½ or ¾ upwards from the base, crenatures very large, sometimes only 4 or 5, and towards the very end of the leaflet, rather membranous, flat, nerves indistinct; petiole ½–1, rarely 2 in.; stipules of cauline leaves ½–¾ in. long, hoary. Flowers ½–1 in. diam., usually 1–4 on slender pedicels. Calyx pubescent or silky. Petals obcordate. Achenes many on an elevated villous receptacle.—A very variable plant. Some specimens of Mr. Clarke’s from Karakoram, alt. 14,500 ft. are upwards of 2 feet high, others from Kumaon are not as many inches and are quite glutinous. The broad entire stipules and almost naked flowering stems are its best character. I do not see how it is to be distinguished from the European P. grandiflora and Siberian P. fragiformis, Willd. (exclusive of the Japan plant so called by A. Gay).


Kashmir, alt. 9–10,000 ft., Jacqueumont, Thomson.

Very similar to P. gelida, but distinguished by the more leafy flowering stems,
the obcuneate cut stipules and trifid bracteoles. It appears to be a very scarce plant, and I regret to find Thomson's specimens have been by me mixed in the distribution with those of *P. gelida*, under the name of *P. grandiflora*.


Alpine Himalaya; from Kashmir to Sikkim, alt. 10,000 to 15,000 ft.

Forming large spreading tufts of leaves and stems 2–12 in. high from a rather small rootstock, very variable in size. *Leaves* radical and cauleine, all short petiolated; leaflets 1/2–3 in., rather soft, glandular-pubescent on both surfaces, crenatures rounded; petiole rarely 1 in.; stipules 1/2–1 in., rarely cut. *Flowers* 3/4–1 in. diam., axillary and subterminal, shortly pedicelled. *Calyx* pubescent, hemispheric; bracteoles often larger than the lobes. *Petals* obovate-lobed, not much exceeding the calyx, yellow. *Achenes* exceedingly numerous and minute, on a globose villous receptacle.—The rounded tips of the sepals and bracteoles are good characters of this species. The Potentilla 26 of Strachey and Winterbottom from 12,000 ft. in Kumaon is, I think, a minute state.

**Var. sibirioripoides**; much smaller, stems filiform prostrate, leaflets 1/2–1 in. broader, flowers 1/2 in. diam., calyx-lobes and bracteoles narrower.—Lachen valley, Sikkim, alt. 11–13,000 ft., *J. D. H.*

36. **P. curviseta**, Hook. f.; rigid, thinly silky, leaflets 3 narrowly linear-cuneate truncate and trifid at the tip, stipules forming a narrow wing to the petiole for half its length, flowering stems slender, pedicels filiform decurved, achenes 5–6 hairy, style terminal.

**Kashmir**; at Tilai, alt. 12,000 ft., *C. B. Clarke*.

Whole plant rigidly elastic when dry. *Rootstock* slender, crowned with stiff recurved almost woody leaf bases. *Leaves* few, 2–3 in. long; leaflets 1/2–1 by 3/4–1 in., suberect, coriaceous, hairy on both surfaces, teeth acute, the lateral leaflets with sometimes an additional tooth on the outer margin; petiole rigid, with a rather membranous brown sheath formed by the stipules which above the base form a green narrow margin along the petiole to its middle; free parts of stipules small, subulate, entire. *Flowering stems* 2–3 in., 2–3-flowered, slender, wiry, with opposite linear bracts at the middle and a cut one at the giving off of the pedicels; pedicels circinnately incurved after flowering, naked or with a bract at the middle. *Calyx* 1/2 in. diam., silky; lobes lancolate, acuminate, much larger than the oblong bracteoles. *Stamens* and carpels about 20. *Achenes* few, large, obliquely ovoid; receptacle flat, villous.—A very remarkable species, allied to *P. tridentata*, L., *P. Saxifraga*, Ard., and *P. alba*, L. The only Himalayan one with hairy carpels. Still more near to the *P. pteropoda*, Royle, which has 3–5 much broader more toothed leaflets rounded at the tip, and apparently larger flowers. I have seen no petals.


**Western Tibetan** and drier Alpine regions of the whole Himalaya, alt. 10–17,000 ft.

—**Distr.** Caucasus and westwards to the Alps, Arctic and cold regions of N. Europe, Asia and America.
A small high Alpine species, very difficult in some of its forms to distinguish from dwarf states of P. multiâda on the one hand, and for the smaller flowers, from P. leucocraea on the other, which again resembles closely P. argyrophylla of the Himalayas and P. villosa of Arctic America.—Rootstock very stout and woody. Leaves 1-2 in.; leaflets 1-1 in., sessile, very coriaceous, glabrous or silky above, snow-white beneath; petiole stout; stipules ovate, acute, downy, entire or toothed. Stem with 1 (rarely more) reduced leaf. Flowers ¼ in. diam., on stout peduncles. Calyx wooly; lobes acute; bracteoles oblong, obtuse. Petals yellow, obcordate. Achenes few, pale, tumid, on a densely woolly low receptacle.

** Root annual.


Temperate Himalaya from Kashmir, alt. 3-7000 ft., to Sikkim, alt. 4-9000 ft. and Bhotan. Khasia Mts., alt 4000 ft. Nilgiri Mts., alt. 6-7000 ft. Ceylon, central province, alt. 6-7000 ft.—Distrib. Yunnan, Java, Japan. Annual. *Stems 3-24 in., flexuous. Leaflets ½-2 in., variable in breadth, membranous or rather coriaceous, entire towards the cuneate base, flat or complicate, beneath glabrous or with silky hairs on the nerves; petiole very slender, 1-4 in.; stipules ½ in., entire or toothed. Flowers ¼ in. diam., usually pedicelled, or in spreading cymes. Calyx sparsely siliky; lobes entire; bracteoles acute or obtuse. Petals yellow, not much exceeding the calyx. Achenes in a globose head with a large glabrous receptacle.—Leaflets very rarely 7, sometimes pedate.


Throughout the warmer parts of India, from Kashmir to Malacca and the Niltvar Hills; ascending the Himalaya to 8500 ft. in the north-west. Iskardo in western Tibet, alt. 7-8500 ft.—Distrib. Affghanistan and westward to the Atlantic, N. Asia and N. Africa.

*Stems very numerous from the root, 6-18 in., spreading, dichotomously branched, prostrate or sub erect, stout or slender. Leaves ½-3 in., flaccidly membranous; leaflets irregular in position form and cutting, usually obovate, often oblong or cuneate, obtusely crenate incised or serrate; petiole slender, ½-2 in.; stipules very broad or narrow. Flowers ½-3 in. diam.; pedicels ½-3 in., slender. Calyx-lobes obtuse or acute, as are the bracteoles. Petals oblong, yellow, smaller than the calyx. Achenes very many, minute, smooth or ridged; receptacle globose, villous. There are two extreme forms of this common plant both found everywhere in Asia and in Africa, and many intermediates; it appears to be very rare in the Western Peninsula absent from Ceylon, which is remarkable for a tropical and subtropical annual that extends to Malacca.

Var. 1; stems excessively numerous from the root slender, flowers ½ in. diam., achenes minute smooth. Plains of India.
Var. 2; stems more robust more dichotomously branched, flowers 1/2 in. diam., achenes larger ribbed. Kashmir.

DOUBTFUL AND UNDETERMINABLE SPECIES.

_Potentilla_ sp. from Shillong, Khasia Mts., alt. 5,000 ft., C. B. Clarke; perennial, sparsely hairy, leaflets 3 sessile 1/2-1 1/4 in. elliptic-ovate or obovate acutely toothed hairy beneath less so above, cauline stipules small cut, flowering stem inclined or prostrate slender 2-5-leaved, cymes corymbose rustly tomentose leafy flowers 1/3 in. diam., calyx-lobes lanceolate acute, bracteoles elliptic obtuse, petals obcordate twice as long as the calyx, carpels many.

_Potentilla Candolleana, Royle Ill. 203, name only._

_Potentilla Atropos and pteropoda_ are names given without description or indication of affinity in Hofmeister's travels, and are no doubt described Himalayan plants.

12. **CHAMÆR Hodos, Bunge.**

Herbs with a woody rootstock, and ascending or erect leafy stems. Leaves alternate, divided; stipules membranous, adnate to the petiole. Flowers small, 5-merous, in branched cymes. **Calyx** persistent, tube ebracteolate; lobes erect, valvate. **Petals** 5, equalling or exceeding the calyx. **Stamens** 5, opposite the calyx-lobes, short. **Disk** lining the base of the calyx; its margins free, bristly. **Carpels** 5, 10, or more, sessile in the base of the calyx; style basilar, deciduous; ovule 1, ascending. **Achenes** few or many, dry, glabrous.—**Distrib.** Mountains of Northern Asia and N. America; species 4 or 5.

1. **C. sabulous**, Bunge; Ledeb. Flor. Ross. ii. 35; Ic. t. 257; tufted, glandular and villous; leaves 3-partite, segments narrow lobed obtuse.

Western Tibet, alt. 12-15,000 ft.—**Distrib.** Altai Mts.

Rootstock short, with many densely tufted short heads. **Stems** 2-4 in., slender, erect or ascending, branched, naked or leafy. Leaves with the slender petiole 1/3 in. Flowers 1/2 in. diam., yellow. Achenes smooth, ovoid, narrowed upwards.

13. **ALCHEMILLA, Linn.** Lady's mantle.

Annual or perennial herbs. Leaves orbicular, lobed or deeply divided; stipules adnate to the petiole. Flowers minute, in lax or crowded corymbose cymes. **Calyx** urceolate, persistent, 4-5-bracteolate; lobes 4-5, valvate in bud. **Petals** 0. **Stamens** 1-4, inserted on the mouth of the calyx. **Disk** coiling the calyx-tube, and all but closing its mouth by its thickened margin. **Carpels** 1-5, basal in the calyx-tube; style basal or ventral; ovule 1, basal. **Achenes** 1-4, enclosed in the membranous calyx-tube.—**Distrib.** Natives chiefly of the American Andes; a few are European, N. Indian, and American; species 30.


Kashmir, alt. 8-9000 ft., Falconer, Stewart, C. B. Clarke—**Distrib.** Persia and westward to the Atlantic, N. Europe and Asia, Greenland and Labrador.

More or less clothed with silky hairs. Rootstock perennial, creeping. **Stems** 6-18 in., ascending, simple. **Radical leaves** 2-3 in. diam., basal lobes overlapping; petiole 6-18 in.; stipules usually spreading out like a fan. **Cymes** glabrous, irregularly racemed or panicled. Flowers 1/2 in. diam., yellow-green; pedicel very short. Achenes 1-2.

Nilgiri Mts., Wight &c. Ceylon; Central Province, alt. 5–7000 ft.

**Rootstock** creeping, woody. Stems prostrate, stout, leafy. Leaves 1–2 in. diam., glabrous or silky above, margins silky, coriaceous, basal lobes overlapping or not; petiole 1–10 in.; stipules ¼–1 in., the free portion membranous, erect or spreading, ciliate. Cymes globose, dense-flowered, on slender axillary peduncles 1–2 in. long. Calyx villous, 1/10 in. long or less.

**Var. sibthorpioides**; very slender, leaves 1/4–3 in. diam., cymes panicled.—Ceylon, Gardner.


Slender erect leafy perennial herbs. Leaves interruptedly pinnate; leaflets cosely serrate; stipules partially adnate to the petiole. Flowers small, yellow, in terminal spikelike racemes, 2-bracteolate; pedicels bracteate at the base. Calyx persistent; tube turbinate, spinous; mouth contracted; lobes 5, triangular, imbricate. Petals 5. Stamens 5–10 or more, inserted at the mouth of the calyx. Disk lining the calyx-tube, its margin thickened. Carpels 2, included in the calyx-tube; styles exserted, stigma 2-lobed; ovule 1, pendulous. Fruit pendulous, of 1 or 2 achenes enclosed in the hardened spinous calyx.—Distrib. N. temp. regions, and S. America; species 8.


Temperate Himalayas, from Murree and Kashmir, alt. 3–10,000 to Sikkim, alt. 7–10,000 ft. Khasia Mts., alt. 4–6000 ft. Mishmi Hills, Griffith.—Distrib. Westwards from Persia to the Atlantic, Siberia and Java, N. America, Java?

**Rootstock** woody, short or long. Leaves 3–7 in.; leaflets 6–21, sessile, alternate often small, hairy on both surfaces; larger 1–3 in., elliptic-ovate or obovate rarely orbicular; smaller often orbicular and minute; petiole slender; stipules large, leafy, ½-lunate, entire or toothed. Racemes slender, lengthening in fruit; pedicels reflexed in fruit; bracts 3-fid or 3-partite. Flowers ½ in. diam. Petals oblong-ovate, yellow. Calyx-tube ⅔ in., hardened in fruit, grooved, lobes connivent in fruit; top of tube with a dense ring of spines which become hooked in fruit and are erect with the outer spreading.—I am quite unable to correlate the India form of this plant with the characters given for the European species so called; all are more or less glandular and have a deeply furrowed calyx-tube and a horizontal rootstock.—A. javanica, Miq. seems not different as far as a single specimen enables me to judge.


Kashmir to Kunawur, alt. 6–8000 ft., Thomson, C. B. Clarke.—Distrib. Russia to Manchuria, China and Japan.

Very similar to *A. Eupatorium*, but more glabrous than its Indian forms, and calyx almost glabrous with erect spines.—I do not see how *A. viscidula* differs.
3. **A. zeylanica**, Moon Cat. 37; villous with long spreading hairs, leaflets nearly orbicular coarsely obtusely toothed, lower bracts broad leafy, calyx-tube villous deeply grooved, spines spreading. *A. Eupatorium, Thwaites Enum. 102; Wight l.c. t. 224.

Ceylon, central province, at an elevation of 5-7000 ft.

I keep up this species with great hesitation, suspecting it to be only a tropical form of *A. Eupatorium*, and there being approaches to it amongst the Sikkim and Khasia specimens of that plant; it is however far more unlike than these to any European form in the villous pubescence, short leaves and rounded leaflets. It is further remarkable that neither this nor any other *Agrimonia* should be found in the Western Peninsular mountains of the Indian continent.

15. **Poterium**, Linn.

Erect perennial herbs. *Leaves* pinnate; leaflets stalked; stipules adnate to the sheathing petiole. *Flowers* small, subsessile, in dense long-peduncled heads or centripetal spikes, bracteate, 2-bracteolate, often polygamous. *Calyx-tube* persistent, turbinate, mouth contracted; lobes 4, petaloid, deciduous, imbricate. *Petals* 0. *Stamens* 4 or more, inserted at the mouth of the calyx, filaments slender pendulous. *Disk* lining the calyx-tube and closing its mouth. *Carpels* 1–3, enclosed in the calyx-tube; styles filiform, stigma penicillate; ovule 1, pendulous. *Achenes* solitary, enclosed in the hardened 4-angled often winged or muricate calyx-tube.—Distr. N. temp. regions; species 20.

* Carpels solitary.

1. **P. filiforme**, Hook. f.; glabrous, very small and slender, leaflets sessile ovate-orbicular or -cuneate deeply toothed, peduncle subradical very long and slender, heads globose white, stamens 6.

**Sikkim Himalaya**; in marshy ground, Lachen valleys, alt. 11,500 ft., J. D. H.

A small and very delicate plant quite unlike its congeners in habit; the stems being short and the heads on very long 6–8 in. filiform peduncles, each with a minute reduced leaf and bud about the middle. *Stems* tufted, ascending. *Leaves* 1–3 in.; leaflets 3–5 pair, ½ in. broad. *Heads* ½–1 in. diam., quite white; bracts orbicular or oblong, membranous, glabrous; flowers monoeious. *Calyx-tube* ellipsoid. *Style* very slender, stigma capitate.

2. **P. diandrum**, Wall. Cat. 710 (Sanguisorba); tall, quite glabrous, leaflets petiolulate oblong-cordate crenate-toothed, heads globose, stamens 2, fruit oblong deeply 4-winged.

Temperate Central and Eastern Himalaya; **Nipal**, Wall. **Sikkim**, alt. 10–13,000 ft., J. D. H.

*Stem* erect, 2–3 ft., branched above. *Leaves* 6–10 in.; leaflets ½–1 in., opposite or alternate, membranous, often complicate when dry, crenatures or teeth variable, acute or obtuse. *Heads* ½–1 in. diam., on slender erect axillary peduncles; bracteoles oblong, fimbriate. *Flowers* dark-purple, hermaphrodite (polygamous?). *Calyx-tube* ellipsoid, 4-gonous, glabrous; segments orbicular, concave, 3-nerved. *Style* short, stigma large plumose. *Fruit* pendulous, ½ in. long, smooth between the undulate wings.


Khasia Mts., alt. 5–6000 ft., Griffith, &c.

Rootstock creeping, stout. Stem 2–4 ft., strict, much branched above. Leaves 10–16 in.; leaflets 1–3 in., rigid, base subcordate oblique, under surface reticulate; petiole stiff, erect; stipules very variable, of radical leaves subulate, of cauline foliaceous fan-shaped and toothed or produced and pinnate, tip rounded. Heads 1–2½ in., panicked, on slender stiff peduncles. Flowers purple, hermaphrodite; bracteoles oblong, fimbriate. Calyx-tube ellipsoid, 4-angled, compressed, pubescent, segments in opposite pairs of which is broader than the other, thick, and thickened towards the tip which is notched with a nucro in the notch and 3-nerved, back with a few hairs. Stamens with slender filaments. Style filiform, elongate, stigma capitate. Fruit broader than long, 1/10 in. long, wings membranous.

• Carpels 2.

5. P. Sanguisorba, Linn.; Boiss. Fl. Orient. ii. 733; sparsely hairy, leaflets petiolulate orbicular deeply toothed, heads globose, stamens about 20, fruit trapezoid acute at both ends.

Wazuristan (N.W. of the Punjab), alt. 5–8000 ft., Stewart.—Distrib. Persia and westward to the Atlantic, N. Asia.

Stems suberect or ascending, leafy, with lax flaccid hairs. Leaves 3–6 in.; leaflets opposite or alternate, 1/4–1/3 in., membranous, base rounded, petiolules very short; petiole slender. Heads panicked.—I have seen flowering specimens only, which seem not to differ in any particular from the European plant.

16. ROSA, Linn.

Erect, sermentose or climbing shrubs, usually prickly. Leaves pinnate; leaflets serrate; stipules adnate to the petiole. Flowers terminal, solitary or corymbose, white yellow or red, bracts rarely persistent. Calyx-tube persistent, globose ovoid or pitcher-shaped; mouth contracted; lobes leafy, imbricate in bud. Petals 5, large. Stamens many, inserted on the disk. Disk coating the calyx-tube, all but closing its mouth by its thickened margin, silky. Carpels many, rarely few, in the bottom of the calyx-tube; styles subterminal, free or connate above, stigma thickened; ovule 1, pendulous. Achene coriaceous or bony, enclosed in the fleshy calyx-tube.—Distrib. N. temp. regions, rare in America; extending into Abyssinia, India, and Mexico; species, about 30 very distinct forms with innumerable subspecies and varieties.

The following roses are so commonly cultivated by the natives of India, that I think it right to give a synopsis of them taken from Brandis’ “Forest Flora,” 199.
A. Styles distinct.

I. Bracteate. Fruit and branchlets densely tomentose; prickles twin, mostly infra-stipular; flowers bracteate; sepals deciduous.


II. Eglanteria, Prickles some stout and some slender; flowers yellow or red; sepals persistent.

3. R. Eglanteria, Mill. See below.


III. Gallica; erect, prickles mixed with glandular bristles; leaflets rugose; flowers rosy or purple; sepals more or less pinnatifid.

5. R. Damascena, Mill.; Wall. Cat. 684; prickles unequal, larger hooked, sepals reflexed in flower.—The commonest Indian garden rose; cultivated for Attar. Native country unknown.


7. R. Gallica, Linn.; prickles slender equal, flowers erect.—Europe, Asia Minor.

IV. Caninae. Prickles uniform; bristles 0; flowers purple red, rosy or white.

8. R. Indica, Linn.; Wall. Cat. 85, 685; evergreen, glabrous, stipules very narrow adnate almost to the top, flowers large on long pedicels rarely single, sepals reflexed. R. chinensis, Jacq.; Roxb. Fl. Ind. ii. 513. R. sinica, Linn. R. frigans, Redouté; R. semperfolia, Bot. Mag. t. 284; Roxb. Fl. Ind. ii. 514; Wall. Cat. 686.—The Indian, China, Bengal and Tea roses, and hybrid perpetuants belong here. China.


10. R. Alba, Linn.; leaflets 5-7 large grey rugose downy and pale beneath, flowers large white pale or blush double, sepals often pinnatifid. R. glandulifera, Roxb. Fl. Ind. ii. 514.—Caucasus, Afghanistan?

V. Banksiae. Climbing; stipules small, often deciduous; flowers rather small, corymbose.


12. R. Microcarpa, Lindl.; prickles hooked, leaflets usually 3 shining, flowers white, sepals deciduous, fruit small globose red.—China.

13. R. Sinica, Ait.; Bot. Mag. t. 2847; Bot. Reg. t. 1922; Wall. Cat. 694; prickles red hooked, leaflets 3 shining, flowers solitary large white, peduncles and calyx clothed with straight prickles, fruit muricate crowned with the spreading sepals. R. triphylla, Roxb. Fl. Ind. ii. 515.—China, Japan.

14. R. Fortuniana, Lindl.; prickles small hooked, leaflets 3 or 5 dark shining, flowers solitary white double, peduncles short bristly, calyx naked and glabrous.—China.

B. Styles united in a column; flowers corymbose; prickles uniform.

15. R. Moschata. See below.

16. R. Sempervirens. See below.

17. R. Multiflora, Thunb.; Bot. Mag. t. 1059; Bot. Reg. t. 425; stipules and bracts pectinate; flowers double rosy; pedioles and inflorescence with long soft hairs and no glands; sepals broad ovate.—Japan, China.
Sect. 1. Styles deciduous in fruit.


By the sides of streams of the Gangetic Plain. Westward to Mt. Aboo in Marwar and eastward to Birma and along the lower Himalaya from Kumaon eastwards, Mysore, Malwa.

A stout bush, erect or with arching subscendent branches; prickles often in stipular pairs, compressed. *Leaves* 3–4 in.; leaflets 3–4 pair, 1½ in. and less, elliptic or oblong, acute or acuminate, finely serrate, shining above, glabrous or both surfaces or tomentose on the under; stipules small lacinate. *Flowers* 2–3 in. diam., white, fragrant, solitary or in short corymb, rarely axillary and longer pedicelled; peduncles and pedicels sometimes with glandular hairs; bracts more or less glandular-serrate, especially below. *Calyx-tube* obovoid; lobes caudate-acuminate, quite entire, deciduous. *Petals* retuse. *Fruit* globose, densely tomentose; mass of stigmas discoid, exserted; achenes very many, ½ in. long, pale.—Except that one is described as scabdent I cannot distinguish *R. involucrata* from *R. Lyelli*. It is the common rose of the Bengal plains and foot of the Himalaya and the only really tropical species of India. Lindley’s varieties *burmana*, *parvifolia*, *glabra*, and *acutifolia* (in Wall. Herb.) explain themselves. Wallich’s specimen of *involucrata* var. *glabra* is stated to come from the mountains of Pundua on the confines of Sylhet, i.e. the Khasia Mts., which I greatly doubt, for I found it in the Jheels only of Sylhet; and Blinkworth’s habitat of the Alps of Sirinuggur probably applies to the Dheyra dhoon. Wallich who procured *R. Lyelli* in Nipal describes it as a large climber in woods, possibly confounding it with *R. moschata*. Crepin points the conjecture that *Lyelli* is a hybrid between *involucrata* and *moschata*, and regards it as a very doubtful plant, under which circumstances I have retained Roxburgh’s name of *involucrata*, which first appeared in his “Cat. Hort. Bot. Calc.” in 1814.

2. *R. anserinæfolia*, Boiss. Fl. Orient. ii. 677; tall, subscendent, prickles hooked, bristles C, leaflets broadly elliptic obtuse simply serrate and petals pubescent beneath or on both surfaces, flowers in few- or many-flowered corymbs shortly pedicelled white, fruit very small globose.

Wuzuristan; alt. 5,000 ft., Dr. Stewart.—Distrib. Affghanistan and Beluchistan.

This is a common wild and cultivated Affghan rose, ascending to 10,000 ft., of which Griffith gathered many specimens, and which no doubt extends within the British frontier, though the nearest hitherto detected habitat is that given above, whence the specimens have very small foliage and flowers.—A shrub often 10 ft.; branches with few or many unequal stout compressed prickles often in pairs; branchlets leaves beneath petals and calyx covered usually with a rather furfuraceous pubescence mixed on the petals and calyx with minute prickles and glands. *Leaves* 1–3 in.; leaflets ½–2 in., rarely glabrous above, sessile, nerves beneath indistinct; petiole slender; stipules broad, with glandular ovate free portion. *Flowers* from solitary to many in a short crowded corymb, ⅔–1½ in. diam., fragrant; pedicels short, glabrous or pubescent; bracts ovate-lanceolate, densely glandular. *Calyx-tube* globose, usually smooth and glabrous; lobes ovate-lanceolate, caudate-acuminate, tomentose, deciduous; tips pubescent, sometimes dilated. *Fruit* smooth, ½ in. diam.; had of stigmas very large; achenes ½–2 in. long.—The above description is of the ordinary state of the plant. Stewart’s specimens have more obovate green leaflets ½ in. long, faintly puberulous beneath, and solitary flowers barely 1 in. diam.
**Sepals persistent in fruit.**


Temperate Himalaya, from Murree, alt. 3500–10,000 ft. to Sikkim, alt. 8–10,000 ft.—*Distrib.* China.

Erect; prickles straight or slightly curved, with broad dilated bases. *Leaves* 2–8 in.; leaflets ½–2 in., usually pubescent beneath, base acute rarely rounded; petiole pubescent; stipules large, broad, spreading. *Flowers* 1–3½ in. diam., bright red, peduncles pedicel; calyx usually very bristly and glandular; bracts foliaceous, oblong or lanceolate, glandular on the margin. *Calyx-tube* ¼–1½ in.; lobes 1–2 in., persistent. *Petals* broadly obcordate. *Fruit* sometimes 2 in. long; styles hairy, exserted; achenes large, often 1½ in. long, few or many.

*Var. minor*, Lindl. l. c.; leaflets ½ in. often obtuse, flowers 1–1½ in. diam.


Drier parts of the inner Himalaya, from KishTwar westward and in Western Tibet, alt. 8–11,000 ft.—*Distrib.* Afghanistan and westward to Asia Minor, and northward to Siberia.

A small bush, very leafy; prickles slender, much compressed, pale. *Leaves* 1½–3 in., leaflets 2–4 pair, ½–1½ in.; petiolarulate, elliptic-ovate or orbicular, obtuse or apiculate, rather membranous, glabrous or sparsely hairy above; petiole pubescent and glandular; stipules broad, free portion half ovate, toothed. *Flowers* 2–2½ in. diam.; pedicel often glabrous; bracts ovate-lanceolate, long-acuminate, glandular. *Calyx-tube* glabrous, unarmed or prickly; lobes long-acuminate, tomentose, persistent, entire or with marginal lacinations; tips usually dilated. *Petals* obcordate, variable in depth of colour.


Drier inner Himalaya, from Kashmir to Kumaon and Western Tibet, alt. 5–13,500 ft.

Glabrous, or with pubescent petioles and leaves beneath; glandular hairs 0 or confined to the inflorescence; prickles copious, ½–3 in., straight or curved, with long bases, yellow. *Leaves* ½–2 in.; leaflets 2–5 pair, ½–2½ in., rarely obovate, entire towards the usually rounded base, rarely pubescent; stipules small. *Flowers* pink, 1–3 in. diam., usually solitary. *Calyx* globose or ovoid, often densely bristly, rarely quite smooth; lobes caudate-acuminate, glandular, often with dilated tips, entire, persi-
tent. Petals obcordate. Fruit ovoid or globose, ½–1 in. diam., glandular or glabrous stigmas villous; achenes many, ½ in. long, pale.—Differs from *R. pimpinellifolia* in the fewer leaflets, uniform prickles, pubescent longer sepals, and fruit not depressed.


Temperate Himalaya, from Kumaon 9–13,000 ft. to Sikkim, alt. 9–14,000 ft. and Bhotan, alt. 5–10,000 ft.—Distrib. China, Yunnan (form with leaves very hairy on both surfaces).

Erect or suberect; branches perfectly glabrous and unarmed or prickly only, or also loosely or densely bristly and glandular; prickles ½–1½ in., straight, brown. Leaves 1–3 in., crowded; leaflets 7–9, ½–1 in., usually oblong, obtuse with an excurrent midrib, rarely villous on both surfaces; stipules oblong, membranous, apiculate. Flowers 2–2½ in. diam., on short lateral shoots, hence almost axillary; peduncle and calyx-tube bristly and glandular. Calyx-lobes pubescent, ovate-lanceolate, persistent. Petals obcordate, rarely 5, white rarely pink or faintly yellowish. Fruit subglobose or broadly pyriform, silky or glabrous; achenes few, ½ in. long.

**Sect. II.** Styles united into a column which is exserted far beyond the calyx-tube.


Temperate Central and Western Himalaya, from Murree to Nipal, alt. 2–11,000 ft.—Distrib. Afghanistan.

A tall climber; prickles scattered, stout. Leaves 2–6 in.; leaflets 2–4 pair, 1–3 in., acute or acuminate, serratures very numerous and acute, base rounded; stipules glandular, free part subulate. Inflorescence pubescent and usually glandular, but not prickly or bristly, bracts subulate. Flowers 1½–2 in. diam., very numerous; pedicels 1–1½ in., slender. Calyx-tube small, obovoid; lobes ½ in., lanceolate, caudate-acuminated, entire or cut or pinnatifid, reflexed after flowering, deciduous. Petals orbicular-ovate, yellowish-white. Fruit ½ in. diam., dark brown, glabrous; styles far exserted.


**Khasia Mts.**, alt. 2–5000 ft. **Mishmi Hills**, *Griffith.*

A tall and often very strong climber, with a stout trunk. Leaves 3–6 in.; leaflets 2–3 pair, 2–3 in., petiolulate, firmly coriaceous, very sharply serrate, quite glabrous, base rounded; petiole stout, often glandular and prickly; stipules with ovate or subulate free portions. Coromby short, more or less glandular, sometimes with minute prickles; bracts large, lanceolate, caudate, glandular all over. Flowers 1½ in. diam.; pedicels rather stout. Calyx-tube broadly obovoid; lobes very large with often ciliate toothed tips, sometimes with a few long teeth at the side. Petals obcord-
date, silkily tomentose externally. *Fruit* $\frac{1}{2}$-$\frac{1}{2}$ in. diam.; styles far exserted; achenes $\frac{3}{4}$ in.—Crepin sums up the distinction between this and its very near ally *R. semprevirens* L., in the more coriaceous leaves with longer tips, the narrower stipules and bracts, the more or less pubescent pedicels and calyx, the narrower sepals, longer buds, and velvety back of the petals. Of these all but the last character are excessively variable, and I expect that the latter even may disappear.—There is a single specimen of this in Herb. Wallich from the Khasia (Pundua) under No. 696.


Western Peninsula; Nilihima and Pulney Mrs.
Very closely allied indeed to *R. brevicaudata*, and I believe only a variety of that plant, itself too near *semprevirens*; it differs in being more glandular, leaflets less acuminate, larger sepals, and petals of the latter which are pubescent only before expansion.

**DOUBTFUL SPECIES.**

R. Moorcroftii, *Wall. Cat*. 693 from Ladak in Western Tibet. The specimen is wanting in Herb. Linn. Soc., but is probably *R. Eglandera*.

R. **JACQUEMONTH, Crep. MSS.**—I have only a fruiting specimen of this, which is quite insufficient for description. It is Jacquemont’s No. 1170, p.

17. **NEURADA, Linn.**


Scinde, Stocks. Southern Punjab, Mooltan and Adunwhari hills.
*Branches* 5–10 in. *Leaves* $\frac{3}{4}$–$\frac{3}{4}$ in., ovate, tomentose on both surfaces. *Flowers* $\frac{3}{4}$ in. diam., shortly pedicelled. *Fruit* $\frac{3}{4}$–$\frac{1}{2}$ in. diam., under surface quite flat. The orbicular fruit forms a persistent collar at the top of the root of the young plant.

17. **CYDONIA, Tourn.**

Bushes with black bark. *Leaves* simple, quite entire; stipules ovate, oblique. *Flowers* large, solitary, white or pink, woolly; bracts herbaceous, toothed. *Calyx-tube* clavate; *lobes* large, spreading, toothed. *Petals* 5, contorted in bud, claw woolly or glabrous. *Stamens* 20. *Ovary* 5-celled; *styles* 5, connate and
woolly below the middle; ovules many in each cell, 2-seriate, ascending or horizontal. Fruit subglobose, intruded at the base and apex, firm and fleshy, fragrant, 5-celled, cells many-seeded. Seeds small, plano-convex, testa mucilaginous. —Distrib. S. of Europe and the East, China.


Cultivated in N. W. India, and up to 5500 ft. in the Himalaya.—Distrib. Native country unknown; is self-sown in the East and in South Europe, &c.—Decaisne refers the Quince of N. W. India to *C. lusitanica*, Mill, but it certainly in no way differs from the common fruit of Europe.


Small trees. Leaves deciduous, simple, lobed in young plants; stipules small, subulate. Flowers white, solitary or fascicled. Calyx-tube clavate; limb shortly tubular, 5-partite; lobes reflexed, toothed. Petals 5, with long woolly claws, imbricate in bud. Stamens 30–50. Ovary 5-celled; styles 5-celled, connate and woolly below the middle; ovules 3, subbasilar in each cell. Fruit rounded ovoid or pyriform, flesh hard; cells 1–3-seeded; endocarp like parchment. Seeds plano-convex, testa coriaceous; cotyledons amygdaloid.—Distrib. Himalaya and the Khasia Mts.


A small tree, 12–15 ft., in a young state like a *Crataegus*, having 3-lobate lobulate and sharply toothed leaves and often spinescent branches; young parts of old plants densely clothed with white woolly tomentum. Leaves 3–4 in., coriaceous, at length quite glabrous, with prominent arched nerves beneath, serratures chiefly beyond the middle; petiole slender, ½–1 in. Flowers 1–1½ in. diam., shortly pedicelled, densely woolly. Calyx-tube pyriform; lobes narrowly lanceolate. Petals spreading. Filaments long, slender. Styles slender, united at the base into a woolly cone. Fruit a nearly spherical yellow green apple, with orange spots, 1–1½ in. diam., and rather longer, rounded at the base and crowned with the broken sepals, usually 5-celled; cells 3-seeded; seeds quite like those of apple—it is rather astringe with a slight quince flavour and forms a good stew.—D. Griffithiana from Bhotan is only *D. indica*.

2. **D. Hookeriana**, Dcne. Mem. Fam. Pom. 131, t. 15; leaves oblong or linear-lanceolate long-acuminate serrat, fruit between fusiform and ellipsoid contracted below the sepals.

Khasia Mts., alt. 5000 ft., at Myrong. J. D. H. & T. T.

Very closely allied to *D. indica*, but the leaves are larger (4–5 in.) and narrower in proportion, and the fruit is of a wholly different shape and not half as long as broad. I have only fruiting specimens; these show no trace of wooliness, but no doubt in a younger state the branches and leaves are as woolly as those of *D. indica*. 

**Vol. II.**
19. **ERIOBOTRYA, Lindl.**

Small or large trees. Leaves simple, entire or serrate, very coriaceous; stipules lanceolate or broad. Flowers in thyrsoid panicles, white. Calyx-tube turbinate obconic or clavate; lobes small, erect or spreading, persistent. Petals 5, contorted or imbricate in bud, obovate or orbicular, usually oblique and notched, margins sinuate, claw glabrous or woolly. Ovary 2–5-celled; styles 5, connate and woolly below; ovules 2 in each cell, basal, ascending, placenta sometimes cupuliform. Fruit a succulent or dry rarely 1–2-celled berry; endocarp membranous, 1–rarely 2–3-seeded. Seeds large, ovoid and cylindric or flattened on one side, testa hard coriaceous and mucilaginous; cotyledons very thick.—**Distrib.** Himalaya, Malay Peninsula, China, Japan.

I cannot distinguish Eriobotrya from Photinia, except by the inflorescence; all the other characters given by Decaisne break down amongst the species enumerated under it; thus the petals are contorted in all but *elliptica* and *japonica*, and their claws are glabrous in several; the styles are only two in all but the above, and one other, which has 3 styles; the crown of the ovary is glabrous in *E. dubia*, and I do not find the calyptriform process of the placenta in any but *japonica*; but I have not examined all for this character, and it is one difficult to detect in dry specimens.

* Petals contorted in bud. Styles 2 or 3.


Eastern Himalaya; Sikkim, alt. 5–9000 ft. Bhotan at Tongsa, Griffith.

A tree; branchlets glabrous. Leaves firmly coriaceous, 6–9 by 3–3½ in.; base acute; petiole 1½–2 in. Panicles 3–6 in. long and broad, branched from the base, very spreading, clothed with rusty tomentum as are the very young leaves on both surfaces. Flowers ½ in. diam., not crowded, slightly pedicelled. Calyx-tube short, obconic; lobes also short, semicircular. Petals contorted, orbicular, concave, claw glabrous. — Misled by the provisional naming of the Indian collections distributed by Dr. Thomson and myself, Decaisne has included this under *E. elliptica*, from which it differs entirely in the longer petioles, appressed almost scurfy tomentum of the panicle and form of calyx.

2. **E. latifolia, Hook. f.**; stout, leaves 6–8 in. long-petioled broadly elliptic acute at both ends quite entire glabrous above beneath with deciduous tomentum, nerves 10–12 pair, panicle softly tomentose.

Moalmayne; on Thoung Gunye, alt. 5000 ft., Thos. Lobb.

A shrub, 12 ft. Leaves firmly coriaceous, 3–4 in. broad, opaque above, quite glabrous beneath when old, without a trace of serratures, narrowed into the stout petiole which is 1½–2 in. long, and glabrous except the young leaves which are softly woolly. Panicle 6 in. long and as broad, much branched, clothed with rusty pubescence. Flowers ½ in. diam., crowded. Calyx-tube broadly obconic; lobes rounded. Petals contorted, broadly obovate or orbicular, claw glabrous. *Styles 2.*

Eriobotrya.]  

LI. ROSEAEE. (J. D. Hooker.)  

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MISUMI HILLS, Griffith.

A shrub, branchlets as thick as a swan's quill. Leaves firmly coriaceous, 1½-1¾ in. diam.; margins revolute (in drying?), perfectly glabrous, hardly shining above; petiole ¼ in. Panicles 4-5 in. long, glabrate; branches rather slender. Flowers shortly pedicelled, white. Calyx pressed-pubescent, tube obconic; limb ½ in. diam.; lobes triangular, obtuse, glabrous within. Petals coileate, claw glabrous. Styles 2, the united part pubescent.—I have not seen the petals, which Decaisne describes; he refers it to Photinia, but the habit foliage and inflorescence are altogether those of Eriobotrya.

4. E. Hookeriiana, Dene. Mem. Fam. Pom. 146; robust, leaves 8-12 in. very shortly and stoutly petioled elliptic- or obleng-lanceolate acuminate sharply, coarsely serrate, more or less pubescent beneath, nerves 20-30 pair, panicle tomentose, branches spreading. Photinia subsessilis, King in Herb. Calc.

Eastern Himalaya; Sikkim, alt. 6500-8000 ft., J. D. H. BHOTAN, alt. 4-6500 ft. Griffith.

A small tree, with very stout branches. Leaves 8-12 by 2-4½ in., when young thickly covered with rusty tomentose, old glabrate or glabrous, very thickly coriaceous, opaque above with impressed close-set nerves, serrated nearly to the truncate rounded or subacute base; petiole ½-1 in., very thick; stipules semi-lunate, very coriaceous. Panicle 4-6 in. and as broad, finely softly tomentose, almost woolly. Flowers ¼ in. diam., white; bracts small, ovate; pedicels short, stout. Calyx-tube shortly obconic; lobes rounded, obtuse. Petals contorted, orbicular, claw woolly. Styles 2, base woolly. Fruit ⅔ in long, ellipsoid, yellow.


Central and Eastern Himalaya; NEPAL, Wallich; Sikkim, alt. 5-6000 ft., J. D. H. BHOTAN alt. 4000 ft., Griffith.

A small tree, 20-40 ft. Leaves thinly coriaceous, not exceeding 1½ in. broad, gradually narrowed at the base into the petiole, which is slender and ¼ in. Panicles 2-4 in. long and broad; branches rather slender. Flowers not crowded, ¼ in. diam., white, shortly pedicelled; bracts short, subulate. Calyx-tube short, obconic; lobes rather variable, short, acute or obtuse. Petals orbicular, claw slightly woolly. Styles 2, glabrous, on the short hemispheric glabrous top of the ovary. Fruit ⅔ in long, shortly ellipsoid, 1-seeded, estabale.


Eastern Himalaya; Sikkim, alt. 4000 ft., C. B. Clarke. KHASIA MTS. and MUKU hills, alt. 3-4000 ft. CHITTAGONG, AVA. Wallich; Tenasserim, Helfer; MALACCA, Griffith, Maingay.—DISTRIP. Bhama.

A large robust tree. Leaves often 2½ and sometimes 3½ in. broad, sometimes acute, obtuse or rounded with coarse lobules or crenatures; petiole stout or slender, ⅓-⅔ in., glabrous. Panicles 3-5 in. long and broad, branched from the base, branches rather stout. Flowers ⅔ in. diam., white, smelling of hawthorn. Calyx-tube obconic; lobes acute or obtuse. Petals orbicular, claw slightly woolly. Styles 2, base very woolly. Fruit ⅔ in. long, ellipsoid, 1-2-seeded, uneatable.—Confounded by Wallich, myself;
and others with *E. dulia*, but very distinct; a much larger tree, with longer broader petioled leaves with slender petioles; the top of the ovary being woolly also well distinguishes it.

7. *E. angustissima*, Hook. fil.; quite glabrous, leaves erect 2–4 in. very narrow linear-lanceolate narrowed into the short petiole obtuse remotely serrate, panicle small glabrous.

KHASIA Mts. alt. 5000 ft. *Simons*; Mooshye, and between Myrung and Nunklow, *Hook. f. & T*.

A very remarkable shrub, 4 ft. high, found by Thomson and myself in but two spots, and there forming a low fastigate brushwood on river banks, with stout dark branches, and erect rigid leaves, not much exceeding ½ in. in breadth; nerves 8–10 pair, ascending; petiole slender, ¼ in. *Panicles* ½ in.; branches short, erect, glabrous. *Flowers* few, ½ in. diam. *Calyx* pubescent; tube short; lobes rounded. *Petals* obovate or obcordate, claw woolly. *Styles* 3, slender, base and crown of ovary woolly.

** Petals quincuncial. ** *Styles* 5.


NEPAL, Wallich; MISHMI HILLS, Griffith.

Similar in many respects to *E. japonica*, but leaves much broader, glabrous beneath, with glabrous petioles 1–1½ in. *Flowers* sessile or sub sessile. *Calyx-lobes* triangular. *Petals* orbicular, claw woolly. *Styles* 5, woolly to the top; stigmas large, spatulate, recurved. Griffith’s specimens have fruit, which is nearly globose upwards of ½ in. diam. and 1-seeded.


Cultivated in many parts of India.

*Branchlets* as thick as the little finger. *Leaves* 6–8 by 1½–3 in., thick and stiffly coriaceous; base obtuse or narrowed into the very short stout woolly petiole; nerves 12–15, very prominent beneath. *Panicles* 3–6 in. long and broad; branches very stout. *Flowers* ½ in. diam., crowded, fragrant. *Calyx-tubes* short; lobes ovate, subacute. *Petals* broadly ovate. *Fruit* 1–1½ in. long, rather narrower, yellow, rarely as many as 5-seeded.

**IMPERFECTLY KNOWN SPECIES.**

*E. macrocarpa*, Kurz, *For. Fl. Brit. Burm.* ii. 443; evergreen, glabrous, leaves 5–6 in., from obovate to oblong-lanceolate shortly subobtusely acuminate quite entire narrowed into the stout ½–3 in. petiole coriaceous smooth glossy, fruit subglobose size of a bullet glabrous crowned with the calyx-limb, peduncle 1–3 in. stout simple glabrous axillary in the upper leaves of the thick branchlets.—BIRMA, rare in forests on N. E. slopes of Kambala-toung; and Pegu at Yomah, alt. 2–3000 ft., Kurz.

20. *PYRUS*, Linn.

Trees or shrubs. *Leaves* deciduous, simple or pinnate; stipules deciduous. *Flowers* white red or pink, in terminal cymes or corymbbs; *bracts* subulate or
linear. *Calyx-tube* urceolate turbinate or obconic, lobes 5 erect or reflexed, persistent or deciduous. *Petals* 5, quincuncially imbricate in bud. * Stamens* 20 or more, filaments sometimes connate at the base. *Disk* annular, or coating the calyx-tube. *Carpels* 2–5, connate and adnate to the calyx-tube, styles 2–5, free or connate below, stigmas truncate; ovules 2 in each cell, basal, collateral, ascending. *Fruit* (a pome) fleshy, 2–5-celled; cells with a membranous or cartilaginous often 2-valved endocarp, 1–2-seeded. *Seeds* when in pairs plano-convex, testa coriaceous; cotyledons amygdaloid.—*Distrib.* N. temp. and cold regions; species 40.

**Sect. I. Malus.** Leaves entire. *Ovary* 3–5-celled; styles more or less united below. *Fruit* globose; flesh of uniform consistence; endocarp coriaceous or like parchment. —Flowers fascicled or subumbellate.


Apparently wild in the North Western Himalaya, ascending to 5000 ft., and to 11,400 in Western Tibet; cultivated in N. W. India, Central India, the Dekkan, &c.—*Distrib.* from Persia westwards to the Mediterranean.


Temperate Himalaya; from Kashmir to Kumaon, alt. 6–10,000 ft. (sometimes cultivated), and in Bhotan, alt. 7500 ft., Griffith. *Khasia Mts.,* alt. 6000 ft.—*Distrib.* Siberia to Manchuria.

A small tree, trunk short, head rounded. *Leaves* 2–3 in., rarely almost orbicular, young glabrous or as well as the petiole pubescent; petiole half the length of the blade. *Flowers* 1½–2 in. diam., in sessile umbels or fascicles, rarely with the pedicels collected on a short peduncle; pedicels slender, 2–3 in. *Calyx* glabrous or puberulous, without tomentum within; lobes lanceolate, deciduous. *Petals* very variable in breadth. *Styles* 3–5, nearly free, very woolly at their united bases. *Fruit* 1½–1 in. diam., red or scarlet, intruded at the base.—The fruit of this is much smaller than in the common form of the plant, and often subpyriform like that figured in Pallus Flora Rossica, i. t. x.

3. **P. sikkimensis,** Hook. f.; leaves ovate or ovate-lanceolate acuminate serrulate tomentose beneath, calyx woolly, peduncles very long, fruit small shortly pyriform.

**Sikkim Himalaya,** alt. 7–10,000 ft., J. D. H. *Bhotan,* Griffith.

Very similar to *P. baccata,* but the leaves (which attain 5 by 3 in.) are more acutely serrate, woolly beneath and on the petiole and on the midrib above, the peduncles and calyx are also very woolly. It is marked by Decaisne as a distinct species (of Malus), but I suspect it will prove a form of *P. baccata.* The claw of the petals is woolly; the limb broadly obovate-oblong or almost orbicular; the styles are united below the middle into a perfectly glabrous column; the calyx-lobes deciduous; the
stamens about 25; the fruit speckled and very good stewed.—The specks on the fruit are like those of *P. variolosa*, but smaller,

Sect. II. **Pyrus proper.** Leaves entire. Petals white, claw glabrous. Ovary 6-celled; styles free. Fruit globose or pyriform, flesh granular.—Flowers in few-flowered corymbs.

4. **P. communis**, Linn.; Boiss. Fl. Orient. ii. 653; leaves oblong ovate acute crenulate or subentire hardly exceeding the slender petiole, corymbs short, calyx-lobes ovate or lanceolate persistent, fruit pyriform. Roxb. Fl. Ind. ii. 510; Brandis For. Fl. 203. (The Common Pear.)

Believed to be wild in **Kashmir** (Brandis); cultivated in the N. W. **Himalaya**, alt. 2-8000 ft., and in **Western Tibet** to alt. 10,000 ft.—Distrib. N. Persia westward to S. Europe.

A tree or shrub, glabrous or with woolly young parts and inflorescence, young often spinous. Leaves variable in breadth and in length of point, of young plant lobed. Corymbs terminating short shoots. Flowers 1½ in. diam. Calyx-lobes variable. Petals obovate, white. Fruit 1–2 inches, gradually narrowed into the peduncle.


Temperate Himalaya from **Kashmir** to **Bhotan**, alt. 2500–8000 ft. (sometimes cultivated, Brandis). **Khasia** Mrs., alt. 5000 ft. **Ava**, Wallich.—Distrib. **Yunan**.

A deciduous tree, in a young state like a Crataegus with 3 lobed and doubly sharply serrated leaves glabrous or woolly beneath, and often spinescent branches; branches dark, woody. Leaves 2–4 in., acuminate, sometimes cuneate, glabrous and black when dry; petiole slender, half the length of the blade. Inflorescence very variable, usually corymbose with a very short peduncle and woolly, but the peduncle sometimes very thin, or is all but absent when the flowers are fasicled or umbelléd; pedicels ½–2 in., slender in flower, stout in fruit. Flowers 1 in. diam. Calyx-lobes ovate, acute, usually very woolly, especially externally. Petals orbicular-ovobate. Stamens about 30. Styles 3–5, quite free, more or less woolly at the base. Fruit very variable in size, 3–1½ in. diam., dark yellow-brown, scurfy, covered with raised white spots, austere, catable when decaying.—A very variable plant, especially in the inflorescence; I was inclined to suppose that Khasia specimens with acutely serrated leaves and longer pedicels were different specifically, but I suspect the leaves were from young trees, and there is every gradation of pedicel from ½–2 in.

6. **P. kumaoni**, Dene. Jard. Fruit. under Pirus Pashia; leaves ovate or ovate-lanceolate acute or acuminate crenulate, glabrous, base acute or rounded, cymes corymbose glabrous, calyx-lobes broad rounded glabrous except the woolly margins, fruit globose warty.

Western Himalaya, from **Kashmir** to **Kumaon**, alt. 5–8000 ft., **Royle, Strach. & Winterbottom**, &c.

Very similar in foliage to *P. Pashia* but at once distinguishable by the more glabrous corymbs and broad rounded calyx-lobes.

7. **P. Jacquemontiana**, Dene. Jard. Fruit. (Pirus) t. 8; leaves ovate or oblong-lanceolate acute crenulate glabrous, base rounded, corymbs laxly tomentose, lobes tomentose above, young fruit glabrate.
Punjab in woods by mountain torrents, Jacquemont.
I know this only by the above characters given by its author, who says that it much resembles P. Pashia, but is easily recognised by its smooth young fruit; he however does not speak positively of its being a distinct species. The form of the calyx-lobes is not stated.


Eastern temperate Himalaya; from Kashmir to Kumaon, alt. 8–10,000 ft.
A middle sized tree, with the young parts densely woolly; bark of branches smooth, dark brown, shining. Leaves 5–8 by 2–4 in., acute, glabrous above when old, except often the midrib; lobules of leaf with many serratures; base acute or rounded; nerves 8–12, nearly straight, petiole 1/2 to 2 in. Corymbs short, 2–5 in. broad, terminal and subterminal, much branched. Flowers shortly pedicelled, 1/2 in. diam., white. Calyx turbinate; lobes short, ovate, acute. Petals narrowly ovate, narrowed into naked claw. Stamens 20. Styles 2–3, densely woolly. Fruit very few in a corymb, or solitary, 4–11 in. diam., globose and 2–3-seeded, or smaller pyriform and 1–2-seeded.—This differs from P. Aria in the lobulate leaves (like those of P. latifolia, Poir.) with regularly serrulate lobes, much larger flowers and fewer very large fruits, the latter of which are very variable in size and shape according to the number of seeds ripened. I have not cited Aria kumaonensis, Dene., or A. lanata, Dene. (Mem. Fam. Pom. 162, 163) under this or the following, the species being so much confounded; one of them is the Sorbus nepalensis of gardens and Crataegus (Aria) cuspidata, Spach. (Suite Buff. ii. 106).

9. P. vestita, Wall. Cat. 679; leaves elliptic acute not or obscurely lobulate serrulate very shortly petioled most densely woolly beneath and on both surfaces when young, corymbs densely woolly, petals woolly within, styles 3–5 woolly at the base only. P. crenata, Lindl. in Bot. Reg. i. 1655, not of Don; Wenzig in Linnea, 1874, 60.

Temperate Himalaya; from Garwhal to Sikkim, alt. 9–10,000 ft.
A tree very closely allied to P. lanata, but distinguished by the more elliptic and more woolly leaves with rarely marginal lobules, and more numerous nerves. The shorter broader petals woolly within and the styles glabrous except at the very base, are excellent characters. The figure in the ‘Botanical Register’ if intended for this, is a very bad one in respect of its representing slender petioles and a want of woolly clothing. I do not understand why Lindley identifies it with Don’s P. crenata; the leaves being serrate and not crenate, and the corymbs compound. Very old leaves have the tomentum on the leaves beneath appressed, polished and silvery.

Var. khasiana; leaves smaller, narrower, very membranous. P. Aria, L.? Hook. f. & T. Herb. Ind. Or.—Khasia, alt. 5–6000 ft.


10. P. Aucuparia, Georum.; Ledeb. Fl. Ross. ii. 100; glabrous or with white woolly down, leaflets 7–12 pair linear-oblong obtuse and apiculate or

Western temperate Himalaya, from Kashmir to Kumaon, alt. 11,500-13,000 ft. Distr. Turkestan and from the Caucasus westward to the Atlantic, and from Siberia to N. China and Japan.

A small tree, young parts with white cottony tomentum which sometimes persists on the petioles and inflorescence. Leaves 4-8 in.; leaflets 3<sup>3</sup>4-1<sup>1</sup>2 in., entire towards the rounded base. Corymbs usually quite glabrous. Flowers 3<sup>3</sup>4-3 in. diam., pedicels short. Calyx glabrous, lobes broad short rounded or subacute. Petals white, orbicular. Styles 2-5, quite free, woolly at the base. Fruit globose, 3<sup>3</sup>4-1 in. diam., red.—Strachey and Winterbottom's specimens have a fine glaucous bloom on the fruit which appears to have been blue like those of *P. foliolosa*, but the specimens want the rusty tomentum of that species.


Temperate Himalaya, from Kunawur to Sikkim, alt. 9-12,000 ft.

Very near *P. Aucuparia*, but a more robust plant with red-brown tomentum on the petioles inferences and midribs of the leaves beneath, at length glabrate; the flowers also are smaller, more densely crowded, with linear bracts intermixed, and have much stouter peduncles and pedicels. Fruit small, bluish-red, ovoid, globose or turbinate. Styles usually 5.—The flowers in Sikkim specimens are greenish white and rather fistid, but Gen. Munro sends a specimen from Kunawur with red flowers. Wallich describes the fruit as red.—There are two specimens under this name and number in Wallich's Herbarium, one with the lithographed ticket 677 attached has also a MSS. label stating it to have been procured from Gossain Than (a locality in Nepal which Wallich did not himself visit); the other specimen has a similar MSS. ticket stating it to be found at Sheepore by himself; on both tickets he has written 'an ab. ursina, Wall. distincta'—Of these the first in no way differs from his three sheets of *P. ursina* (Cat. 675); whilst the second is a totally different plant, viz. *P. Wallichii*, mihi. The description in Wallich's 'Plant. As. Rar.' is that of his *foliolosa* (and ursina) except in that he describes the tomentum of the young plant as white, whereas it is rusty-red, as he says it is on the fully developed leaves &c. As the ursina of Wallich's Catalogue and Herbarium is the *foliolosa* of his Plant. As. Rar., the latter name must replace the former.


Temperate Himalaya; Sirmore, Webb (in Herb. Wall.); Sikkim, alt. 10-14,000 ft., J. D. H., C. B. Clarke.

Possibly only a form (or young state?) of *P. foliolosa* or *Aucuparia*, but a very much more slender subscendent plant with more deeply serrate leaflets, 3<sup>3</sup>4 in. long, very slender flattened petioles, longer peduncles and pedicels and large bluish berries and 5 styles. Wallich's specimens have no flowers, those of Sikkim ones are red, and the globose fruit is white or pale blue. What pubescence is present resembles that of *P. foliolosa*. It is remarkable that no one since Capt. Webb has found this in the Western Himalaya.

13. *P. Wallichii*, Hook. fil.; young parts clothed with white wool, leaflets 5-9 pair 1-2 in. linear-oblong acute or apiculate obscurely serrate.
towards the tip, glaucous beneath, corymbs very tomentose compound, petals broadly obovate. P. foliolaris, Wall. Cat. 677, in part. Sorbus foliolaris, Wenzig in Linneea, 1874, 75, excl. synon.

Central and Eastern temperate Himalaya; NEPAL, Wallich. SIKKIM, alt. 6500-9000 ft., J. D. H., &c.

A small tree, young parts densely woolly, old glabrate except the corymb. Leaves 4-6 in; leaflets coriaceous, sometimes perfectly entire, base very unequal-sided, mid-rib stout; nerves numerous, slender. Corymbs 2-3 in. diam.; peduncle and pedicels stout. Flowers 1-3 in. diam., white. Styles 3, glabrous. Fruit (unripe) very small, ovoid, ½ in. diam.—A very distinct species.

14. P. insignis, Hook. f.; very robust, leaflets 4-6 pair 3-4 in. linear-oblong acutely obscurely crenulate very coriaceous glaucous beneath, fruiting corymbs excessively compound, branches very stout.

SIKKIM Himalaya, alt. 8-11,000 ft., J. D. H., C. B. Clarke.

A small very robust tree; branchlets nearly as thick as the little finger, bud-scales rigid, chestnut-brown, shining; young parts clothed with long rather silky rusty brown wool, old glabrous. Leaves 6-10 in.; leaflets soon glabrate, apiculate in the sinus between the obscure cutaneous, which are incurred in old leaflets, pale, and rather glaucous beneath; base unequal-sided; young petioles densely silky. Flowering corymbs appearing with the young leaves, densely rufously woolly, with stout peduncle and branches. Flowers crowded, ½ in. diam.; bracts linear. Calyx obconic, short, teeth triangular. Styles 3, glabrous. Fruiting corymbs branched from the base, 6 in. long and as broad; branches covered with oblong white spots, pedicels short stout. Fruit globose or broadly ovoid, 3-celled, ½ in. diam. (when dry).

SECT. V. Micromeles (Dene. Gen.). Leaves simple. Calyx-lobes deciduous. Ovary 2-3-celled; styles 2-3, free or united. Fruit globose, umbonate; endcarp membranous or coriaceous.

* Leaves shortly petioled, narrowed to both ends; nerves very oblique close set nearly straight, very prominent.


SIKKIM Himalaya, alt. 6-9000 ft., J. D. H., C. B. Clarke. BHOTAN, Griffith.


SIKKIM Himalaya, alt. 7-9000 ft., J. D. H., C. B. Clarke.

A tree, very young branches and leaves tomentose and hairy, soon glabrous. Leaves coriaceous, very variable in breadth, ½-2 in.; nerves 12-14 pair, very prominent beneath, slightly curved; petiole ½ in. Corymbs branched from the base,
pubescent in flowers, glabrous in fruit. Flowers $\frac{1}{2}$ in. diam., white; pedicels slender. Calyx-tube obconic, hairy; lobes triangular. Petals broadly oblong, glabrous. Stamens long. Disk tumid, 10-lobed, puberulous. Styles 2, slender, united below the middle or free, glabrous. Fruit $\frac{1}{2}$ in. diam., smooth, endocarp thin; cells 2-seeded. Seeds plano-convex.

** Leaves more or less ovate (rarely obovate), petiole slender. Disk in the umbo of the fruit tumid or flat not lobed.

17. **P. khasiana**, Dcne. Mem. Fam. Pom. 109 in part (Micromeles); leaves 4 in. elliptic-obovate rather suddenly acuminate serrate, nerves very oblique nearly straight, fruit $\frac{1}{2}$ in. diam. spotted 4-celled.

Khasia Mts.; at Nungbree wood, alt. 5000 ft., **Griffith**.

A tolerably large tree, in foliage more like *P. rhamnoides* than any of the following species, having many nearly straight nerves. The only specimens (Griffith, 1978, 1044 of Posth. Papers, ii. 67) are in old leaf and fruit, which latter Griffith describes as of the size of a cherry; it is constantly 4-celled; the endocarp thick and coriaceous; the cells narrow 1-seeded, the pulp granular, and is 4-angled when dry and has a narrow depressed umbo with a conical centre.


Khasia Mts.; Griffith; near Churra, Myrung and Mamloo, alt. 4–6000 ft., **J. D. H. & T. T. Martaban**, alt. 7000 ft., **Kurz**.

A shrub or small tree, in a fruiting state perfectly glabrous, branches with oblong white lenticels. Leaves 4–5 in.; stiff; nerves prominent beneath; petiole 1–1$\frac{1}{4}$ in. Fruiting corymb with smooth branches. Fruit with the flesh of large granules, endocarp thickly coriaceous, cells narrow; umbo small depressed with a small conical centre.—Differs from *P. khasiana* in the ovate leaves with arching nerves.

19. **P. polycarpa**, Hook. f.; quite glabrous, leaves ovate-lanceolate long-acuminate serrate, base rounded or acute, nerves 6–8 pair spreading arched, corymbs effuse perfectly glabrous, fruit $\frac{1}{2}$ in. unspotted. **Pyrus**, b. Herb. Ind. Or. H. f. & T.

Khasia Mts., alt 5–6000 ft., **Griffith, Simons, &c**.

A small tree, foliage remarkably similar to that of *P. granulosa*, but the nerves fewer, and at once distinguished by the very small unspotted fruit, with only 2 cells both broad, and small seeds with thick plano-convex cotyledons. The only flower-springing specimen I have is from M. Simons, in it the corymb is much branched, perfectly glabrous, and smooth, somewhat warty in fruit.—Flowers $\frac{1}{2}$ in. diam.; pedicel slender. Calyx-tube rather pyriform; limb expanded; lobes triangular-ovate. Petals nearly orbicular, glabrous, concave. Disk inconspicuous, glabrous. Stamens long, slender. Styles 2, united to the middle, quite glabrous. Fruit rather ovoid, $\frac{3}{4}$–$\frac{1}{2}$ in., umbo large for its size, depressed with a conical centre.


Khasia Mts., alt. 4–5000 ft., **Wallich, &c**.

A large tree, with pale foliage; branchlets stout, studded with oblong lenticels;
twigs and young parts clothed with a flocculent cotton that falls away in white flakes. Leaves 3-4 in., rather membranous, pale green, not shining, point very long; coarsely serrate, base acute or rounded; petiole very slender. * Corymb * more rounded than in its allies, white and tomentose when young, more rusty or glabrous when old; branches rather short; covered when fruiting with raised lenticels. Flowers ½ in. diam.; pedicels slender. * Calyx-tube * pyriform; limb expanded, glabrous within, teeth triangular, acute. Petals obvate, woolly within in bud, claw pubescent. Stamen slender. Disk glabrous, inconspicuous. Styles 2, very slender, united below the middle, glabrous. Fruit ½ in. diam., rather pyriform, crown tubular ⅓ its own diameter, with a deep depression and conical centre.


**Bhotan, Griffith.**

Branchlets with few lenticels. Leaves 2½–3 in., lower half or one-third quite entire, upper surface sparsely pubescent or glabrate; nerves 6-8 pair, spreading and arching; petiole ⅓ in., densely woolly. * Corymb * densely woolly, of few primary subumbellate branches ⅓-⅔ in., which are twice or thrice divided into erect stout pedicels. Flowers ½ in. diam. * Calyx-tube * pyriform; lobes short, triangular, acute, very deciduous. Petals obovate, woolly on the face and claw. Stamen slender. Disk not raised. Styles usually 3, glabrous, united to the middle; ovules inserted in the middle of the axis.

22. * P. Thomsoni, King MSS.; * glabrous, leaves very shortly petioloed, elliptic-lanceolate or -oblanceolate acuminate serrate above the middle, corymbs glabrous, styles 2-4, fruit ¼ in. diam.

**Sikkim Himalaya, alt. 8-10,000 ft., J. D. H., C. B. Clarke.**

A large tree; branches glabrous, sparingly lenticellate. Leaves 3 in., brown when dry, apparently glabrous at all stages; base acute, rarely rounded or obtuse; nerves 8-12 pair, spreading and arched; petiole ¼ in. * Corymb * of few primary subumbellate erect main branches, 1 in. long, di-trichotomously forked. Flowers ½ in. diam.; pedicels slender. * Calyx-tube * pyriform; limb expanded; teeth ovate, obtuse. Petals obovate, claw woolly. Stamen stout. Styles stout, united at the middle or base, glabrous; ovules attached in the middle of the axis. Fruit with few white spots, crown sunk. Seeds tumid.—Young flowering specimens of this were distributed as * Photinia arguta, * Wall., var. ?, and are cited by Decaisne under his * Micromeles verrucosa (Pyrus cuspidata, Bertol.) from which it differs in the glabrous narrow leaves with short petioles serrated only beyond the middle.

**Doubtful Species.**

**P. (Malus) Sieversii, Ledeb. Fl. Alt. ii. 222.** A Soongarian species, closely allied to * P. baccata, * differing in being branched from the base, is enumerated by Decaisne (Mem. Fam. Pirus) as having been found in Kashmir by Jacquemont.

**P. (Micromeles) Castaneifolia, Don. Mem. Fam. Pom. 169; "leaves oblong or oblong-lanceolate acuminate base obtuse acutely serrate glabrous, petiole rather long slender, peduncle and pedicels fuscous when young, fruit small. Sorbus sikkimensis, Wenzig in Linnaea, 1874, 68.** Eastern Bengal, Griffith, No. 2077-1.—I cannot identify this.

**P. (Sorbus) sikkimensis, Wenzig in Linnaea, 1874, 58;** evidently includes more than one species from Sikkim and the Khasia Mts. Thus, var. a, the Sikkim plant included under this variety, I cannot recognise by the description, though it is of a plant stated to be found by myself; the Khasia one includes * P. granulosa * and * verrucosa.—* Var. B. oblongifolia, this I do not recognise though it professes to be a Sikkim 'discovery of mine.—Var. γ. microcarpa, a Sikkim plant, is I suppose * P. Griffithii, * to which
Wenzig doubtfully (and erroneously) refers P. Nussia, Don.—Var. 8. ferruginea is P. ferruginea.

P. crenata. Don, Prodr. 237; "leaves long-petioled ovate acute crenate glabrous above, young beneath and branchlets white-tomentose, corymb simply woolly, calyx-lobes ovate acute.—Suamba in Upper Nepal, Hamilton. Obs. P. Poltiveria differs in the shorter broader serratte not crenate leaves and in the more numerous flowers."—I do not recognise the above.—Can it be the common pear?

21. PHOTINIA, Lindl.

Evergreen small trees or shrubs. Leaves coriaceous, quite entire or serrulate; stipules subulate, deciduous. Flowers small, corymbose, white. Calyx-tube obconic; limb 5-cleft; lobes short, persistent. Petals 5, contorted or imbricate in bud, orbicular or obovate, claw glabrous or woolly. Stamens 20 or more. Ovary with a conical pubescent or woolly crown, 2- rarely 3-celled; styles 2, rarely 3, free, or combined at the base, short; ovules 2, collateral, nearly basal in each cell, ascending. Fruit small, globose or ovoid, 1-2-seeded; flesh rather hard; endocarp crustaceous or membranous. Seeds obovoid, triquetrous or compressed, nearly as long as the fruit, testa coriaceous.—Distrib. Eastern tropical and subtropical Asia; species 7 or 8.

1. P. Lindleyana, Wight & Arn. Prodr. 302; quite glabrous, leaves elliptic oblong or ovate acute crenulate or entire base rounded, nerves 13-15 pair faint, petiole long stout, flowers $\frac{1}{2}$ in. diam., claw of petal villous, fruit turbinate or subglobose. Wight t. 228; Don. Mem. Fam. Pom. 141. P. Notoniana, Wall. Cat. 671, not of Wight & Arn. P serrulata, Lindl. γ. Wenzig in Linnea, 1874, 94.

Nilghirri Hills, Noton, Wight, &c.

A small tree? everywhere glabrous except the crown of the ovary and claw of the petals; branches stout. Leaves 3-6 in., very thickly coriaceous, not shining on either surface, flat; nerves nearly horizontal; petiole 1 $\frac{1}{2}$-2 in., cylindric. Corymb 3-5 in. diam., much branched from the base, branches stout. Flowers $\frac{1}{3}$ in. diam., pedicelled; bracts subulate. Calyx-lobes rounded. Petals orbicular-ovate, claw distinct. Styles 2, very stout, short. Fruit $\frac{1}{2}$ in. long, smooth, glaucous; endocarp crustaceous.—Wallich's P. Notoniana is only a form of Lindleyana, with the crenatures few and confined to near the top of the leaf.

2. P. Notoniana, Wight & Arn. Prodr. 302 (not of Wall. Cat.); leaves elliptic ovate oblong or lanceolate acuminate quite entire base acute or rounded, nerves very many and slender, petiole long (1-1 $\frac{1}{2}$ in.), corymb pubescent or glabrous, flowers $\frac{1}{2}$ in. diam., fruit globose. Wight t. 991; Ill. t. 86; Don. Mem. Fam. Pom. 141; Bedd. Fl. Syth. t. 192. P. Blumei, Don. l. c. 142. Eriobotrya integrifolia, Kurz, For. Fl. Brit. Burm. 1. 442.

Nilgiriri and Pulney Mts., Wight, &c. Khasia Mts., alt. 4-5000 ft. Mataban, alt. 7-7200 ft., Kurz. Ceylon; Central province, alt. 6-7000 ft.—Distrib. Java.

A small tree, glabrous except the inflorescence, which is finely pubescent. Leaves 2 $\frac{1}{2}$-6 in., very variable, sometimes cuneate-acuminate, thickly coriaceous, the numerous nerves very delicate, hardly shining above; petiole $\frac{3}{4}$-2 in., flat or grooved above. Corymb excessively branched, 3-10 in. diam.; branches slender in flower; stout in fruit. Flowers pedicelled, white. Calyx-lobes rounded. Petals orbicular, claw glabrous or slightly villous. Fruit $\frac{1}{2}$ in. diam., blue, glaucous; endocarp membranous. Seeds compressed, radicular end incurred.—I refer Kurz's plant here on the authority of his citation of Beddome; he describes the leaves as sometimes cuneate-oblong and with a few inconspicuous teeth.
Var. ceylanica; leaves sometimes orbicular, inflorescence quite glabrous. Ceylon, alt. 6-7000 ft.—Distr. Java.—Javanese specimens have sometimes crenate leaves.


Var. macrophylla; leaves 7-9 in. ovate-lanceolate caudate-acuminate, petiole 1-2½ in., corymbs quite glabrous. Khasia Mts.


Central and Eastern Himalaya; from Nepal, Wallich, and Sikkim, alt. 4-7000 ft. to Bhotan, Griffith. Khasia Mts. alt. 3-4000 ft.

I have great difficulty in distinguishing this from P. Notoniaea (in the Khasia Mts. especially), its best character is the very short petiole and uniformly oblong-lanceolate smaller leaves 3-5 in. long. In the Himalaya it is very constant in its characters, but in the Khasia Mts. it comes very near small states of Notoniaea, var. macrophylla. Hence though no foliage of allied plants can be more unlike in form than the ordinary states of this plant present, I am in doubt as to their specific differences. P. integrifolia, Miquel (Fl. Ind. Bat. i. part i. 387), from Java, appears to be the same plant. The styles are almost invariably two, but three are said to occur. The crown of the ovary is woolly, but of the fruit glabrous.


Bhotan Himalaya, at Trelagong, Griffith.

A large tree; branchlets rather slender, woolly, pubescence whitish. Leaves 5-7 by 1½-2¼ in., much more membranous than in any preceding species, very finely acuminate, serratures minute, rather shining on both surfaces; nerves arched, 25-30 pair; petiole cylindrical. Corymbs ample. Flowers shortly pedicelled. Calyx-lobes rounded. Petals obovate; claw woolly. Styles 2-3, woolly and connate below. Ovary with a densely woolly crown.—Griffith describes the calyx-lobes and petals as 5 or 6.

5. P. mollis, Hook. f.; branchlets leaves beneath short petiole and inflorescence clothed with white wool, leaves very membranous elliptic or lanceolate acuminate serrulate base acute, corymbs rounded many-flowered, flowers ½ in. diam., styles 2-3 glabrous united at the base.

Sikkim Himalaya, at a low elevation, J. D. H., Gamble.

Tree 20-30 ft. Branches slender, glabrous, with red brown bark and small lenticels; branchlets and other woolly parts white. Leaves 4-5 in., pale when dry, very membranous, serratures fewer and smaller towards the base, rather suddenly acuminate; nerves 6-10 pair, spreading, arched, very slender. Corymbs 2 in. diam., shortly peduncled, branches spreading, rather lax-flowered. Flowers white, pedicelled; bracts minute, linear, caduceous, membranous. Calyx woolly; tube hemispheric; lobes rounded. Petals orbicular, retuse; claw very short, glabrous. Stamens not long, slender. Disk not thickened, woolly at the base. Styles slender; stigma 2-lobed. Fruit ½ in. long, ovoid, crowned with the persistent calyx; endocarp thinly crustaceous, septum membranous. Seeds nearly as long as the fruit.
22. **FOURTHIÆA**, Dene.

Shrubs or small trees, glabrous or woolly when young. Leaves simple, crenate, persistent; stipules minute, subulate. Flowers small, white, in few-flowered corymbs, withwarted fruit-bearing branchlets. *Calyx*-tube obconic; lobes 5, acute. *Petals* 5, contorted, obovate, oblique and notched, claw glabrous. *Stamens* 20, filaments slender. *Ovary* 2–3-celled; styles 2–3, connate high up, stigma capitate 2-fid; ovules 2 in each cell, collateral, basal, ascending. Fruit small, globose or ovoid, 1–2-seeded, flesh granular; endocarp membranous. Seeds ellipsoid, plano-convex; testa thickly coriaceous with reticulated grooves on the convex side; cotyledons plano-convex; radicle curved, short, exserted.—Distr. Himalaya, China, Corea, Japan.


I can distinguish but one Indian species of this very abundant Khasian bush, which occurs all over the range; all have white-woolly young leaves and inflorescence, which is thrown off with age, the fruit varies much in size.

**Var. 1. Wallichii;** leaves 1¾–2 in. coriaceous ovate-lanceolate acuminate quite glabrous in age, nerves 8–10 pair, corymbs subsessile few-flowered sometimes almost capitate, fruit ¼ in. diam. globose. *P. arguta, Dene. l. c.*


**Var. 3. salicifolia;** leaves 4–5 in. coriaceous narrowly lanceolate caudate-acuminate more persistently woolly beneath, corymb effuse, flowers larger. *P. salicifolia, Dene. l. c.* 148.

**Var. 4. membranacea;** leaves 2–3 in. very membranous ovate-lanceolate acuminate or caudate-acuminate, corymbs of few long branches floriferous at the tip. Khasia, Griffith (no number). This is no doubt a lax form growing in woods.

**Var. 5. latifolia;** leaves 4–5 by 1¾–2½ in. rather coriaceous oblong or oblong-lanceolate acuminate more persistently woolly beneath, serratures smaller, corymbs umbelliform, branches 1½ in., flowers longer pedicelled. Hookhoon valley, Birma, Griffith.


23. **STRANVÆSIA**, Lindl.

Shrubs or small trees. Leaves coriaceous, evergreen, quite entire or serrulate; stipules subulate. Flowers small, white, in compound many-flowered corymbs. *Calyx*-tube small, obovoid; limb dilated, 5-toothed. *Petals* 5, obovate, usually contorted in bud, claw naked or bearded. *Stamens* 20. *Ovary* 5-celled; styles 5, connate high up; stigma capitate 2-fid; ovules 2 in each cell, basal, collateral, ascending. *Fruit* globose, rather fleshy, 5-celled; endocarp crustaceous, dehiscing loculicidally; cells 1-seeded. *Seeds* ovoid, plano-convex; testa coriaceous, mucilaginous; embryo plano-convex.—Distr. Himalaya and China; species 3 or 4.

1. *S. glaucescens*, Lindl. in Bot. Reg. t. 1956; leaves obovate or narrowly lanceolate acuminate or obtuse and apiculate entire or serrulate quite glabrous, calyx and pedicels woolly. *Brand. For. Fl. 210; Wenzig

Western and Central Himalaya; Kumao, alt. 3-7500 ft. Nepal, Wallich. Khasia Mrs., alt. 4-5000 ft.

A small leafy evergreen tree, very variable in foliage, young parts tomentose in a very early state. Leaves in Western specimens often 6 in. long and 2-2½ broad, more obovate than is usual in the Eastern, hardly shining above, paler beneath; in Khasian specimens the leaves are sometimes 4 by 1½ in., long-acuminate and curved (var. augustifolia, Dene.), always narrowing into the petiole; nerves very slender; petiole ½-⅗ in. Corymbs 2-4 in. broad; branches slender, hairy or glabrate. Flowers pedicelled, ¼ in. diam., pedicels woolly. Calyx woolly; lobes acute, persistent. Petals spreading, usually notched, not oblique. Ovary small; crown hardly raised, hairy. Style-column woolly below. Fruit ⅛ in. diam., orange yellow, crowned with the incurved calyx-teeth; flesh thin; crown of the crustaceous carpels exerted, glabrous.

24. CRATAEGUS, Linn.

Shrubs or small trees, often spiny. Leaves simple lobed or pinnatifid; stipules deciduous. Flowers in terminal corymbose cymes, white or red; bracts caducous. Calyx-tube urceolate or campanulate; mouth contracted; lobes 5, persistent or deciduous. Petals 5, inserted at the mouth of the calyx, imbricate in bud. Stamens many. Carpels 1-5, adnate to the calyx-tube; styles 1-5; stigma truncate; ovules 2 in each cell, ascending. Fruit ovoid or globose, with a bony 1-5-celled stone, or with 1-5 bony 1- rarely 2-seeded stones.—Distribution. N. temp. regions, chiefly American, extending south into New Granada; species about 50.


Western temperate Himalaya, from Murree to Kishhtwar, alt. 6-9000 ft.—Distribution. Afghanistan and westward to the Atlantic, W. Siberia.

A small tree, 20-30 ft., trunk short, branches spinescent; young shoots and leaves beneath and inflorescence sparsely softly pubescent or glabrate. Leaves 1-2 in.; petiole very hairy; stipules leafy, upper usually falcate, serrate, lower larger orbicular and cut. Corymbs many-flowered. Flowers ⅛ in. diam., white, odorous. Calyx-lobes subacute. Petals orbicular. Styles 1 or 2, slender, glabrous. Carpels adnate by their whole length to the calyx-tube, tips pubescent. Fruit scarlet, flesh scanty; endocarp of 2-3 bony pyrenes more or less firmly united.—Boissier regards the Himalayan plant as C. monogyna (itself a var. of Oxyacantha) but there are commonly 2 and often 3 styles and carpels.

2. C. Clarkei, Hook. f.; softly tomentose, leaves oblong pinnate or pinnatifid, base cuneate or truncate, segments oblong toothed at the broad tip, fruit pubescent globose, carpels 5, free above.

Kashmir, at Hirpoor, alt. 8000 ft., Thomson, C. B. Clarke.

Pubescence soft, white, spreading. Leaves 2-4 in., opaque above, lower segments often free obovate and spreading, tips rounded or acute; petiole slender; stipules very large, semicircular and falcate, toothed, Flowers apparently smaller than in C. Oxyacantha and fewer in the corymb, which is clothed with spreading hairs. Calyx-lobes persistent, obtuse. Petals (from fruiting specimen) orbicular-ovobovate.
**Orategus.**

*Styles* inserted ventrally, free. *Carpels* free for nearly \( \frac{1}{3} \) of the upper part from one another and the calyx-tube. *Fruit* green, 5-lobed when dry, \( \frac{1}{4} \) in. diam., crowned by the reflexed calyx-lobes; pyrenes separable, free above, faces rough.—The structure of the ovary and fruit is essentially the same as in the following species, but the tops of the pyrenes are not so much protruded.


Temperate Himalaya in dry places from the Sirmoor to Bhotan (exclusive of Sikkim), alt. 2500–8000 ft.

A large woody rigid spinescent shrub. *Leaves* crowded on short lateral branchlets, 1–2 in., shining, narrowed into the very short petiole; nerves indistinct. *Corymbs* short, many-flowered, glabrous or puberulous; branches slender. *Flowers* 4–5 in. diam., white; pedicels slender. *Calyx-tube* hemispheric; lobes obtuse. *Petals* orbicular, claw very short. *Styles* 5, inserted ventrally. *Carpels* 5, free for \( \frac{3}{4} \) of their upper part from one another and the calyx-tube. *Fruit* globose, orange-red, crowned with the erect calyx-lobes; pyrenes separable, faces polished, upper \( \frac{1}{4} \) free and protruded between the calyx-lobes.—Differs from the European *C. Pyracantha* in the obtuse leaves and smaller flowers and fruit.

**25. COTONEASTER, Linn.**

Shrubs or small trees. *Leaves* quite entire, coriaceous, usually very downy beneath; stipules setaceous, deciduous. *Flowers* small solitary or in axillary or terminal cymes, white or pink, sometimes polygamous. *Calyx-tube* turbinate or campanulate; lobes 5, short, persistent. *Petals* 5, imbricate in bud. *Stamens* 20, inserted at the mouth of the calyx. *Carpels* 2–5, adnate wholly or by their backs only to the calyx-tube; styles 2–5, free, stigma truncate; ovules 2 in each cell; erect, basal, geminate, raphe lateral. *Fruit* small, ovoid globose or turbinate, with 2–5 bony 1-seeded stones.—**DISTRIB.** Europe, temp. Asia; N. Africa, Mexico; species 15.

A genus distinguishable only by habit from *Orategus*. The species are very variable and difficult of discrimination.

A. *Leaves* deciduous (subpersistent in *nummularia* and *rotundifolia*); margins not recurved.

* Leaves 1–4 in. *Cymes* usually branched and many-flowered.

1. **C. bacillaris**, *Wall.; Lindl. in Bot. Reg. under t. 1229*; a bush or small tree, leaves 1½–3 in. oblong or obovate or oblong-lanceolate woolly or glabrescent beneath acute or obtuse narrowed into the petiole, cymes short many-flowered puberulous, fruit dark brown globose. *Brandis For.* Fl. 208; *Wall. Cat.* 630. *C. obtusa*, *Wall. in Bot. Reg. l. c.*; *Cat.* 659, in part.

Temperate Himalaya, from Waziristan, alt. 4–8000 ft.; *Murree* and *Kashmir*, alt. 4–10,000 ft. to *Nepal*, *Sikkim*? and *Bhotan*?. *SALT.* **RANGE**, alt. 1500–2500 ft. (*Brandis*).

A common and variable deciduous Himalayan shrub; wood much used for walking sticks, whence its specific name. Of Wallich's *C. obtusa*, I cannot distinguish three of the specimens from *bacillaris* even as a variety; Lindley's character of "cymes congested and branchlets glabrous" in *obtusa*, and "cymes divaricate and branchlets pilose" in *bacillaris*, do not distinguish Wallich's var. The other specimens marked
as _obtusa_ are the _C. affinis_ of Lindley and differ only in the tomentose undersurface of the leaves and coryms, which in this respect present every intermediate with _bacillaris_; its leaves are however often smaller rounder and sometimes rounded at the base (_C. rosea_, Edgw.). I am somewhat doubtful of the Sikkim and Bhotan plants here referred to _bacillaris_. I do not remember a black or dark brown fruited large shrubby species in Sikkim, and Griffith's Bhotan specimens are in flower only; one of these has leaves under 1 in. long. The Sikkim specimens doubtfully referred here have the leaves of _affinis_ and a young shoot has them sometimes almost orbicular, rounded at the base (as in _rosea_) and 2 in. diam. Except by the dark berries it is difficult to distinguish var. _affinis_ from _C. frigida_.


Var. _parvifolia_; leaves ½–1 in. elliptic acute or obtuse, cymes short dense-flowered, flowers smaller. Bhotan, Griffith, alt. 7000 ft.


Central and Eastern Himalaya; NIPAL, Wallich, interior of Sikkim, alt. 7–9000 ft., _J. D. H._

A tree, 20 ft. high, or large bush, deciduous, similar in habit and foliage to _C. bacillaris_, but with far more numerous flowers in a cyme and scarlet berries. Hoheacker's Nilgiri specimens, which I take to be _frigida_, are from a tree cultivated in Lord Elphinstone's garden at Kaitee. Decaisne quotes Jacquemont as having found this, but I suspect that _C. bacillaris_ var. _affinis_ is the plant intended, as _C. frigida_ occurs nowhere in Jacquemont's region of travel.

**Leaves ½–2 (rarely 4–5) in. Cymes few-flowered or flowers solitary.**


Temperate Himalaya, from SIRMOR and KUMAON, alt. 4500–12,000 ft., to SIKKIM, alt. 7–13,000 ft.

A deciduous shrub, sometimes 14 ft. high; wood used for walking sticks (like _bacillaris_), the most constant in form of foliage of any Indian species except _Simonssii_, also in their size, about 2 in., though in one of Wallich's specimens they exceed 5 in. !—The fruit varies from turbinate to subcampanulate. The number of flowers in a cyme varies extremely, Brandis says from 2–10, I find 2–5 the average, but solitary flowers are not uncommon.

4. _C. vulgaris_, Lindl.; Boiss. _Fl. Orient._ ii. 665; an erect bush, leaves 4–1½ rarely 2 in. broadly ovate acute or obtuse hoary or glabrous above softly tomentose beneath, cymes short few-flowered glabrescent, fruit globose black or red.

WESTERN TIBET and WAZIRISTAN, alt. 5–11,000 ft.—_Distrib._ Siberia, Soongaria, Persia Westward to the Atlantic.

Usually a slender erect deciduous shrub, varying much in form of foliage and pubescence of both surfaces; its habit, more ovate leaves, and fewer flowered cymes, best...
distinguish it from *C. nummularia*. In lax specimens the cymes have slender peduncles and pedicels and drooping flowers. The character of drooping fruit by which it has been sought to distinguish these two species depends on the length of the peduncle. *Fruit* very variable in size and colour. Specimens apparently of *C. vulgaris*, from Bargil, Kashmir, alt. 10,500 ft., collected by Mr. C. B. Clarke have leaves 2 in. long.


I refer the Garwal plant to Bunge's *multiflora* with some hesitation; it closely resembles the Altit and Soongaria plant in its thin pale leaves glaucous beneath, but they are usually ovate and acute whereas in the Altit and Soongarian ones they are orbicular ovate or obcordate; there are however leaves on some specimens of the Himalayan plant quite like those of the other in being broadly elliptic and rounded at both ends, and Baikal specimens have all the leaves ovate acute. I have seen but few Indian specimens.

6. **C. nummularia**, Fisch. & Mey.; Boiss. Fl. Orient. ii. 666; a straggling or prostrate bush with woody often divericate branches, leaves \(\frac{3}{4}-1\frac{1}{4}\) in. orbicular or obovate obtuse or retuse or apiculate white or densely silky woolly beneath, cymes woolly very short 2–5-flowered, flowers crowded, fruit small obovoid, globose black. *Brandis For. Fl.* 209. C. Lindleyi, Steud.; *Dcne. Mem. Fam. Pom.* 176.

**Western Tibet and Kashmir**, alt. 6–11,000 ft.—**Distr.:** Soongaria, Affghanistan and Westward to Asia Minor.

A smaller subgreen, more woody rigid species than *C. vulgaris*, with smaller leaves sometimes only \(\frac{3}{4}\) in. long, never ovate and often orbicular. *Flowers* small; calyx usually tomentose but sometimes glabrate; fruit black, erect.—Cultivated specimens have orbicular leaves nearly 1 in. diam., and almost glabrous beneath. I do not know upon what grounds Steudel and Decaisne regard the *nummularia* of Loudon which appears to me to be the true plant, as different from that of Fischer.


Central and Eastern Himalaya, alt. 9–11,000 ft.; from *NIPAL*, Wallich, to *STKKIM*, *J. D. H.*, &c., and *Bhutan*, *Griffith*.

A rigid shrub, remarkable for its almost horizontal branches and regular small orbicular mucronate leaves, which are not woolly or downy, but have sparse appressed hairs, they are very coriaceous, often a little recurved, and are subpersistent in England; but as in Wallich's specimens they are all but fallen off, this character probably depends on the severity of the winter. Decaisne (*Mem. Fam. Pom.* 176) refers to this *C. nepalensis*, *alpina* and *Roylei* of gardens, but our *Roylei* is certainly *C. acuminata*. *Baker's C. prostrata* from Saunders' garden is identical with specimens of *rotundifolia* from the Hort. Soc. Gardens in Herb. Bentham, and has the peculiar appressed hairs of the twigs and under surface of the leaves of *rotundifolia*, from which I cannot distinguish it.

8. **C. Simondsii**, Hort.; *Baker in Saunders Refug. Bot.* i. t. 55; an erect bush with slender branches, leaves \(\frac{3}{4}\) in. subdistichous rhombic-orbicular

**Khasia Mts.**
The origin of this is unknown. It is probably named after Mr. Simons who collected largely in the Khasia Mts. and who may have sent seeds to England from thence or from Bhotan. It is remarkable that it occurs in no Indian Herbarium, but so would be the fact, that except this be a native of the Khasia, that range should possess no *Cotoneaster.* It very nearly resembles *C. rotundifolia.*

B. Leaves persistent, rigid, $\frac{3}{4}$ in. long; margins recurved. Flowers almost always solitary. (See also *C. nummularia*, *rotundifolia* and *Simondsii*.)


Temperate Himalaya, alt. 4–8000 ft. from Kashmir to Bhotan;—var. glacialis from 9–14,000 ft.

In a dry state it is very difficult to distinguish this from the following, and from single flowered states of *C. buxifolia.* I suspect that the *C. buxifolia* of Saunders' Refugium is a state of this, though it may be a 1-flowered state of *buxifolia.*

**Var. glacialis**; leaves glabrous and glaucous beneath, flowers smaller often pink. *C. congesta, Baker in Saunders Refug.* i. t. 51.

10. **C. thymifolia**, Hort.; *Baker in Saunders, Refug. Bot.* i. t. 56; an almost prostrate woody intricately branched shrub, leaves $\frac{1}{4}$–$\frac{1}{2}$ in. cuneate-obovate or oblong tip rounded or retuse glossy above pubescent or tomentose beneath, margins recurved, flowers solitary $\frac{1}{4}$ in. diam., fruit small globose scarlet. *C. microphylla, Wall. Cat.* 662, B. *Crataegus integrifolia, Herb. Ham.*

Temperate and Alpine Himalaya from Kashmir, *Falconer,* to Sikkim, *J. D. H.*

This so resembles certain states of *C. microphylla*, that I retain it as a species with great doubt; in habit the two are identical, but *C. thymifolia* has narrower leaves that are never elliptic or ovate or acute, but always broader upwards and rounded or retuse at the tip; the flowers are smaller, but this is not a character of much value. It was distributed with true *microphylla* by Wallich and with *buxifolia* by Strachey and Winterbottom from Nynee Tal.


Western Peninsula, *Nilghiri* and *Pulney* Mts. *Temperate Himalaya from Sirmore,* alt. 4–7000 ft. to *Bhotan,* alt. 10,000 ft., *Griffith.*

I have under *C. microphylla* stated that it is difficult to distinguish dried single-flowered specimens of this from that plant, though in their ordinary states they are very different, *C. buxifolia* having an opaque and often hoary or hairy upper surface to the leaf, which is more regular in shape, and several-flowered cymes, with smaller flower and fruit. I am in great doubt as to any of the Himalayan specimens referred to this being other than 2–3-flowered states of *microphylla.* The *C. lanata* of *Lindley*
is a garden state with rather larger leaves and long branches, both due to alteration in habit induced by culture. Decaisne refers Hohenacker's Nilgiri specimen (n. 1154) to lanata, saying that it is not Wallich's plant, but Wallich's and Hohenacker's specimens are identical in characters and might have come from the same branch; and there is certainly but one species known from the Nilghiris; he further describes the leaves of lanata as deciduous, whereas those of buxifolia are supposed to be persistent. Decaisne (Mem. Fam. Pom.) gives the synonym of C. lanata as a species of Lindley's, but I do not find it alluded to elsewhere, except as a garden name. It is cultivated at Kew, and differs from ordinary C. buxifolia only in its greater development.

Order LII. Saxifragaceae. (By C. B. Clarke.)

Trees shrubs or herbs. Leaves alternate and exstipulate, or stipules adnate to the base of the petiole, or opposite and exstipulate. Inflorescence various; flowers hermaphrodite or polygamo-dioecious, the sepals petals and stamens symmetrically regular. Calyx more or less adnate to the ovary, sometimes nearly free, sometimes quite inferior; lobes imbricate or valvate. Petals 5 or 4, rarely 0, perigynous or epigynous, rarely subhypogynous, imbricate or valvate. Stamens inserted with the petals, equaling or double their number, rarely numerous; staminodes or glands sometimes present between the stamens and the ovary. Ovary of 2 or 3-5 carpels; usually 2- or 3-5-celled with axile placenta, less commonly 1-celled with parietal placenta; styles as many as the carpels, distinct or combined nearly to the summits, stigmas capitate or lateral and subcapitate; ovules numerous, anatropous, erect or pendulous. Fruit capsular or berried. Seeds numerous or several (solitary in Polyosma) albuminous; the albumen rarely scanty or nearly wanting.—Distrib. Species 540; in the cold or temperate regions of the whole world and in the mountains of the tropics; together with a few genera of tropical trees.

Saxifragaceae is now extended to contain Saxifraga on one side, Ribes on another, and the tropical Itea and Polyosma between; and thus has become very difficult of definition. Crassulaceae are generally recognised by their fleshy habit and distinct carpels. Rosaceae are separated by no absolute line; Astilbe in Saxifragaceae touching Spirea in Rosaceae.


- Ovary 2-celled.
  Leaves twice ternate more than a foot long ........................................ 1. Astilbe.
  Leaves simple .......................................................................................... 2. Saxifraga.

- Ovary 1-celled.
  Flowers solitary. Petals 0. Leafy small plants .................................. 5. Chrysosplenium.

Tribe II. Hydrangeae. Shrubs or trees. Leaves opposite, exstipulate, simple. Stamens double the number of petals or more numerous. Ovary inferior or half-superior.

- Stamens 8, 10 or 12.
  Filaments winged .............................................................................. 10. Eutizia.

TRIBE III. Escallonieae. Trees and shrubs. Stamens equalling the petals in number. Ovary inferior or half-superior.

Leaves alternate. Seeds numerous

Leaves opposite. Seeds solitary


Flowers racemose or subsolitary

1. ASTIBLE, Ham.

Erect herbs with a perennial creeping rootstock. Leaves alternate, twice or thrice ternate; leaflets doubly serrate with prominent veins; stipules large, adnate to the petiole, sheathing. Flowers (sometimes polygamous) small, in a terminal panicle, spicate-racemose. Calyx slightly adnate to base of ovary with 5 (rarely 4) imbricate lobes. Petals 5 or 0 (rarely 4) perigynous. Stamens 10 or 5 (rarely 8) perigynous. Carpels 2, united below; narrowed upwards into a short style; stigmas small capitate; ovules numerous axile. Ripe carpels dry, acuminate or acute at the top, divaricating, dehiscing ventrally. Seeds small, narrow, oblong, tailed at both ends.—Distrib. Species 3 or 7; from the Himalaya, Java, Manchuria, Japan and Virginia.

1. A. rivularis, Ham. in Don Prodr. 211; flowers green-yellow, petals 0, stamens 5 opposite the sepals, ripe carpels deflexed. DC. Prodr. iv. 61. Spiraea barbata, Wall. Cat. 705; Camb. in Jacq. Voy. Bot. t. 58.

Temperate Himalaya, from Kashmir to Bhotan, alt. 5000-9000 ft., abundant. Khasia Mts., alt. 4000-6000 ft., very common.

Stems and leaves with long fulvous hairs, especially about base of the petioles. Leaflets 1-4 in., ovate, acuminate, often cordate at the base, generally scabrous on the nerves on both surfaces. Rachis of panicle woolly-pubescent, and brown-villose; pedicels short with a small bract at the base. Sepals green, subglabrous, oblong, obtuse, erect, $\frac{3}{4}$ in. Young carpels but slightly united. Ripe carpels $\frac{1}{2}$ in. long. Seeds numerous.—Spiraea triternata, Wall. Cat. 708 is reduced to Astible rivularis by H. f. & T. in Journ. Linn. Soc. ii. 74, but every Wallichian specimen is referable to Spiraea Aruncus, L. which in fruit requires to be carefully distinguished from Astible by the carpels, suddenly narrowed at top into short divergent beaks, usually 3-4 in number, with fewer and much more tailed seeds. Astible speciosa Junghuhn (Miq. Flor. Ind. Bat. i. pt. i. 393) differs from A. rivularis by the flowers often 4-fid, the stamens 8 or 10, the ripe carpels broader at the base.

2. A. rubra, H. f. & T. in Bot. Mag. t. 4050; petals 5 pale pink linear or linear-spathulate twice or thrice the sepals in length, stamens 10, the 5 opposite the petals shorter, ripe carpels suberect.

Khasia Mts., alt. 4000-6000 ft., Griffith, &c.

Stems and leaves with long fulvous hairs, especially about base of the petioles. Leaflets 1-3 in., ovate, acute, sometimes cordate at the base, generally scabrous on the nerves on both surfaces. Rachis of panicle woolly-pubescent and brown-villose; pedicel short with a small bract at the base. Sepals $\frac{1}{2}$ in., green, subglabrous, oblong, obtuse, erect. Young carpels united for a great portion of their length. Ripe carpels $\frac{1}{2}$ in. long.—A. japonica, Morr. & Decone; A. Thunbergii, Maxim.; and A. chinensis, Maxim., differ by being more slender and less villose.

EXCLUDED SPECIES.

A. Stoliczkai, Kurz in Seem. Journ. Bot. v. 240 with simple leaves, from the North West Himalaya probably does not belong to the genus; may be a Spiraea.
2. SAXIFRAGA, Linn.

Herbs, mostly small perennials. Radical leaves often rosulate; stem leaves alternate (in Sect. Porphyryon subopposite), exstipulate, petiole sheathing at base. Flowers corymbose or paniculate or reduced to 3–1: white or yellow, rarely red. Calyx adnate to the ovary at base (rarely free) 5-fid, imbricate. Petals 5, perigynous. Stamens 10 (rarely 5) perigynous. Carpels 2 (very rarely 3–5) united below, narrowed upwards into a style, stigma lateral subcapitate; ovules numerous, axile. Ripe Carpels dry, opening at the top ventrally. Seeds small, ellipsoid in Indian species.—Distrib. Species 160, almost all in the Northern Hemisphere; inhabiting cool temperate, and especially alpine, localities.

Sect. I. Nephrophyllum. Calyx adnate to the base of the ovary, lobes erect in fruit. Petals white, much exceeding the calyx. Stems erect leafy. Radical leaves peltioled, reniform, lobed. Bracts 2, unequal at base of peduncles.—In the Indian species the surculi are represented by bulbls, covered with fulous hairs, forming a cluster at the base of the stem.


Western Temperate Himalaya, alt. 10,000 ft.; Kumaon, Blinkworth; Kulu, Edgeworth; Gurwhal, Falconer; Lahul, Jaeschke. Laxly villose, 6–10 in. high. Flowers 3–6. Upper leaves few, sometimes 0. In the ripe fruit the calyx-tube is short campanulate or funnel-shaped; the lobes are ovate-linear, approximate, with acute sinuses. This species bears a general resemblance to S. granulata, but the calyx in fruit is very different. It is more difficult to separate it from S. sibirica. Engler (Monog. Saxifrag. 99) has taken Sternb. Saxifrag. Suppl. t. 25 as the type of S. odontophylla, which should rather be referred to S. sibirica.


Western Himalaya and Kashmir, alt. 9000–14,000 ft., frequent; Royle, Falconer, T. Thomson, &c.—Distrib. From Kashmir to the Caucasus and to the Altai.

Stem pubescent, 6–8 in high. Flowers 1–10. Calyx-tube in the ripe fruit short, campanulate or funnel-shaped; lobes ovate-linear, sinuses narrow. Seeds oblong, sub-angular, quite smooth, testa minutely reticulate. Flowers and capsules smaller than those of S. odontophylla. All the Indian specimens referred to S. granulata, Linn. by H. f. & T. in Journ. Linn. Soc. ii. 63 are here reduced to S. sibirica. In the ripe fruit of S. granulata the calyx is divided only about half way down, the tube is hemispherical, the lobes are oblong distant with rounded sinuses.

3. S. cernua, Linn.; DC. Prodr. i. 36; bulbls in the upper axils, flower often terminal solitary all the lower flowers of the raceme being replaced by sessile purple bulbls, or flowers 2–3 pedicelled. Eng. Bot. t. 664; Don in Trans. Linn. Soc. xiii. 364; H. f. & T. in Journ. Linn. Soc. ii. 63; Engler Monog. Saxifrag. 106.

Western Himalaya and Western Tibet, alt. 14,000–17,000 ft.; N. of Ladak, T. Thomson, C. B. Clarke; Nubra, Strachey; Tanglang Pass, Heyde.—Distrib. Alps of Europe, Temperate and Arctic N. America and W. Asia.
Stem 4–6 in. high. Radical leaves reniform, palmately 4–6-lobed; upper leaves 3–1-fid passing into bracts. Calyx-tube in the ripe fruit short, campanulate or funnel-shaped; lobes ovate-linear, approximate, with acute sinuses.—Turczaninow judiciously remarks (Fl. Baikal-Dahur. i. 454) that the only reason for not treating S. cernua as a var. of S. sibirica is its much wider geographical range. The very imperfect specimens collected by Strachey and Winterbottom in Kumaon and referred to S. orientalis, Jacqem., by H. f. & T. doubtfully in Journ. Linn. Soc. ii. 63 are certainly not S. orientalis nor any species of the section Cymbalaria; they have bulbils in the upper axils and belong perhaps to S. cernua, S. palpebrata, Sternum.

SECT. II. Hirculus. Sepals nearly free, in fruit patent or reflexed. Petals yellow, often with 2–4 spots near their base. Stems erect leafy. Leaves entire withering not deciduous, lower petioled, upper sessile more or less stem-clasping.—Distrin. All Himalayan; S. Hirculus extending thence to Europe and North America.

* Stem leaves loosely overlapping each other.


Sikkim, alt. 13,000–15,000 ft.; Tunkra Pass, J. D. H. KUMAON, alt. 13,000 ft., Ralum, Strachey & Winterbottom.

Stems 2–5 in. high. Leaves ciliate; the lowest radical leaves spathulate, obtuse or orbicular; cauline ¼ in. Styles exceedingly short. Ripe carpels hardly equalling the sepals. Seeds trigonous, ellipsoid, smooth.


Sikkim and East Nipal, alt. 12,000–15,000 ft.; Yeumtong and Kambachen, J. D. H.; Yakka Pass, C. B. Clarke.

Stems 2–4 in. high. Leaves ciliate; lowest radical spathulate, obtuse or orbicular; cauline ¼ in. Styles exceedingly short. Ripe carpels hardly equalling the sepals. Seeds ellipsoid, angular, smooth, tests lax somewhat plaited.

6. **S. Lychnitis**, H. f. & T. in Journ. Linn. Soc. ii. 68; tufted, stems 1-flowered, calyx little adnate to the ripe fruit, sepals densely brown-pubescent, petals elongate-spathulate 3-nerved. Engler Monog. Saxifrag. 120.


7. **S. viscidula**, H. f. & T. in Journ. Linn. Soc. ii. 69; stems 3–1-flowered, calyx slightly adnate to the ripe fruit, sepals glandular little pubescent, petals spathulate-oblong 7–5-nerved. Engler Monog. Saxifrag. 120.

Sikkim, alt. 13,000–15,000 ft., J. D. H.


** Upper stem leaves narrow linear, little overlapping each other; stems 1-flowered.

Sikkim, alt. 13,000-18,000 ft.; Yeumtong and Lachen, J. D. H.

Stem-leaves ½ in., shining, glabrous. Sepals glabrous, slightly adnate to the ripe carpels. Petals ¼-½ in. long.

Var. 2; stem-leaves much larger lanceolate-linear somewhat overlapping each other.—Sikkim, Samdong, J. D. H. This variety approaches *S. brachypoda*, Don.


Sikkim, alt. 10,000-18,000 ft.; Lachen, &c., J. D. H. Kumaon, alt. 13,000 ft.; Ralum, Strochey & Winterbottom.

Stem-leaves hardly ¼ in. long, glabrous. Sepals glabrous, slightly adnate to fruiting carpels. Petals scarcely ¼ in. long. Fruit small. Seed trigonous, subglobose, smooth.—Hardly to be distinguished from *S. aristulata.* Moreover Sir J. D. Hooker collected in Sikkim intermediate forms having the woolly pubescent peduncle of *S. saginoides*, with the leaves and stature of *S. aristulata.*

*** Upper stem-leaves not overlapping each other; flowers corymbose, rarely reduced to one in starved examples.


Sikkim, alt. 13,000 ft.; Kankala, J. D. H.

Stems 4-8 in. high, glabrous below, glandular-pubescent above. Leaves oblong-elliptic; radical petiolate, glandulose-ciliate; cauline 1½ by ½-1 in. Petals ovate-oblong, naked at the base, a little exceeding the sepals. Styles very short. Capsule ovate-oblong.—Resembles *S. diversifolia* but has finer flowers.


Var. 1. *typica*; stems 6-12 in. 1-3-flowered, cauline leaves ½-1 in., sepals strongly deflexed, base often brown-villous externally, petals 2-3 times the sepals golden with red dots and 2 pits at the base, styles very short. Not yet collected in India.—Distrib. Arctic regions; Alps of Europe to the Caucasus.

Var. 2. *indica*; peduncles very brown villous, capsule much shorter oval-oblong, sepals hardly deflexed even on the ripe fruit, petals shorter 1-2 times the calyx, styles often wanting, with no obvious stigmas, but the capsules produce good seed.—North Kashmir to Sikkim, alt. 11,000-17,000 ft., *Falconer, T. Thomson, J. D. H.*, &c.

Var. 3. *hirculoides* (sp.) *Don. in Jacq. Voy. Bot.* t. 78; stems 2-3 in. often very villous upwards; like var. 2 but the petals have no pits or glands at the base and are shorter than sepals, or scarcely exceed them.

Kashmir, *Jacquemont.* Western Tibet, alt. 17,000 ft.; *Balch Pass, Strach.* & *Winterb.*

Var. 4. *subdivica*; like var. 3, but the stems are 3-6 in. high, and carry 4-10 shortly corymbose or altogether congested flowers; the stigmas are obscure and some
of the flowers seem functionally male, though in others with no visible stigmas there are perfected seeds. S. Hirculus, var. \( \gamma \). H. f. & T. in Journ. Linn. Soc. ii. 69.

Western Tibet; Falconer; Lanak Pass, alt. 15-17,000 ft., T. Thomson.


Sikkim, alt. 10,000-12,000 ft., J. D. H.

Stem 5-10 in. high, densely glandular-pubescent upwards. Radical leaves petioled, oblong, obtuse; cauline about 1 in., sessile, broadly oblong. Petals pale yellow, spatulate, \( \frac{1}{2} \) times the calyx. Styles short.


Alpine Himalaya; from Kashmir to Bhotan, alt. 9000-17,000 ft., abundant.

Stems 8-18 in. high, leafy, glandular, often finally glabrous. Radical leaves long- petioled, narrowed into the petiole or (var. pannasiifolia) ovate, subcordate; cauline \( \frac{1}{2} \)-2 in., ovate or broad oblong. Sepals at length reflexed. Petals with 4 stalked glands at their base, \( \frac{3}{4} \) times the sepals. Styles very short. Capsule ovate-oblong. Seeds angular, testa smooth somewhat plaited.


Sikkim and Eastern Nipal, alt. 11,000-14,000 ft.; Lachoong, &c., Wallachoon, J. D. H., C. B. Clarke.

Stems 3-8 in. high, much less stout than those of **S. diversifolia**. Stem-leaves \( \frac{1}{2} \)-1 in., oblong or ovate, sometimes sessile and stem-clasping, sometimes narrowed suddenly just above the base. Petals obovate, twice the sepals. Styles short. Capsule ovate; sepals at length deflexed. Seeds ellipsoid, subtrigonous, smooth.

This differs from **S. diversifolia** in being much smaller with smaller leaves and flowers. The starved 1-3-flowered examples of **S. corymbosa** may be distinguished from the Indian **S. Hirculus** by the peduncles being glandular but scarcely brown-villous.

**SECT. III. Boraphila** (as to the Indian species). Sepals more or less united, patent or reflexed in fruit. Petals white. Leaves undivided, dentate or crenate.

15. **S. strigosa**, Wall. in Sternb. Saxifrag. Suppl. t. 22; whole plant strigose, leaves near the base of the stem falsely rosulate, upper leaves small alternating sessile deflexed, calyx in fruit patent nearly free. Wall. Cat. 448; H. f. & T. in Journ. Linn. Soc. ii. 64; Engler Monog. Saxifrag. 136.

Central and Western Himalaya; Nipal; Gossain Than, Wallich; Sikkim, alt. 9000-14,000 ft.; Lachen, Lachoong, J. D. H.; Singalelah, C. B. Clarke. Bhotan, Griffith.

Stem 4-8 in. high, somewhat rigid, paniculate upwards; upper axils generally producing hispid bulbils, so that the flowers are only 1-3. Lower subrosulate leaves
1-2 in., sessile, oblong-lanceolate, with one or two acute teeth. Petals small, exceeding the sepals. Styles short. Capsule less than $\frac{1}{4}$ in. long. Seeds minute, smooth, elliptic, angular.

16. **S. pallida**, Wall. in Sternb. Saxifrag. Suppl. t. 23; scape 2-6 in. leafless with narrow bracts at the divisions of the corymb or simple, calyx in fruit adnate to base of ovary for one-third its length, petals twice sepals, capsule $\frac{1}{3}-\frac{2}{3}$ in. long. *Wall. Cat.* 450; *D.C. Prodr.* iv. 38; *H. f. & T.* in Journ. Linn. Soc. ii. 65; Engler Monog. Saxifrag. 140.

Alpine Himalaya; Sikkim, alt. 13,000-17,000 ft.; Lachen, Kankala, &c., J. D. H. Nipal; Gossain Than, Wallich. *Kumaon*, alt. 14,500 ft.; Barji Kang Pass, Strachey & Winterbottom.

Slightly pubescent, sometimes glabrous. Radical leaves long-petioled, ovate, dentate-crenate. Flowers and fruit very variable in size, sometimes not larger than in the next species. Style hardly any. Seeds ellipsoid, longitudinally striated by 10-12 rows of tubercles.

17. **S. micrantha**, Edgw. in *Trans. Linn. Soc.* xx. 50; scape 4-8 in. high leafless (rarely 1-leaved) with leaflike bracts at the lower divisions of the corymb, calyx in fruit shortly adnate to base of ovary, lobes finally recurved, petals hardly exceeding sepals, capsule seldom more than $\frac{1}{3}$ in. long. *H. f. & T.* in Journ. Linn. Soc. ii. 64; Engler Monog. Saxifrag. 141.

Alpine Eastern and Western Himalaya, alt. 9000-11,000 ft.; Edgeworth; Dhursala, C. B. Clarke; Gurwhal, Falconer. Sikkim, alt. 10,000-14,000 ft.; Lachen, Tung, J. D. H.

Pubescent. Radical leaves long-petioled, ovate, dentate-crenate. Style exceedingly short. Seeds ellipsoid, longitudinally striated by 10-12 rows of tubercles.—This species will perhaps be merged in the preceding when more material accumulates.

**Sect. IV. Microphylla.** Flowers solitary, yellow or white, on leafless peduncles, $\frac{1}{3}$-2 in. high.—Tufts dense formed by the stems 1-3 in. long, branching and crowded, covered upwards with densely whorled undivided obtuse leaves about $\frac{1}{4}$ in. long.


Alpine Himalaya, from Sikkim to Kashmir, alt 12,000-17,000 ft., Royle, Jacquesmont, J. D. H., &c.

Leaves $\frac{1}{3}$-$\frac{3}{4}$ in., obovate-elliptic, glabrous or a little ciliate, hardly glandular. Petals narrow, twice the sepals, deciduous; white (C. B. Clarke noted in the field, also Jacquesmont and Jaeschke); yellow in the figure of Royle. Fruit less than $\frac{1}{4}$ in. long.—All the examples now referred surely to *S. imbricata* at Kew exhibit some perforated leaves; var. $\gamma$ and $\delta$ of *H. f. & T.* (in *Journ. Linn. Soc.* ii. 62) must be referred elsewhere.


Sikkim, alt. 17,000-18,000 ft., Mt. Donkiah, J. D. H.

Lower leaves $\frac{1}{3}$ in., oblong, entire, glabrous, upper shorter, ciliate. Petals 0 in the fruiting specimens alone collected by Sir J. D. Hooker, probably deciduous as in *S. imbricata*. Fruit less than $\frac{1}{4}$ in. long.
20. **S. perpusilla**, H. f. & T. in *Journ. Linn. Soc.* ii. 72; flowers yellow on glandular peduncles $\frac{3}{4}$ in. high, uppermost leaves about $\frac{1}{3}$ in. obvate-oblong concave white ciliate on edges otherwise glabrous, sepals ciliate erect in fruit. *Engler Monog. Saxifrag.* 210.

**Sikkim,** alt. 16,000-17,000 ft.; Mt. Donkiaiah, J. D. H.

Stems scarcely an inch long. *Petals* golden, twice the sepals, oblong, persistent. *Styles* very short. *Fruit* ovate, subquadrate, shorter than the petals.—The tufts are small, the leaves and sepals very small.

21. **S. microphylla**, Royle in *Herb. Bth.* ex H. f. & T. in *Journ. Linn. Soc.* ii. 72; peduncles puberulous about $\frac{1}{4}$ in., leaves oblong glabrous, sepals much adnate below erect in fruit, petals 0 or oblong coriaceous equal to the sepals (green-white?). *Engler Monog. Saxifrag.* 210.


Still smaller than *S. perpusilla*, with inconspicuous flowers. *Ripe carpels* acuminate upwards, sometimes united conically to the top.


Alpine Himalaya, from **Sikkim** to **Kashmir**, alt. 18,000-18,000 ft.; **Jacquemont**, Edgeworth, J. D. H., &c.

Lower leaves $\frac{1}{2}$–$\frac{3}{4}$ in., orbicular or elliptic, glabrescent; upper glandular-pubescent or nearly glabrous. *Petals* $\frac{1}{4}$ in. long, nearly twice the sepals, elliptic, persistent. *Fruit* ovate, shorter than the petals. *Seeds* minute, ellipsoidal, smooth, testa reticulated not tuberculate.

**Var. 2. Stellar-aurea**; (sp.) *H. f. & T. in Journ. Linn. Soc.* ii. 72; peduncles $\frac{1}{2}$–2 in.—From **Sikkim** to **Kashmir**, alt. 18,500-17,000 ft.; J. D. H.

**Sect. V. Flowers** yellow, on sparsely leafy peduncles 1–3 in. from tufts formed by weak stems clothed upwards with subrostrate undivided spathulate-oblong small leaves $\frac{1}{4}$–$\frac{3}{4}$ in. long.


Central and **Western Himalaya**, from **Nipal** to **Kashmir**, alt. 8500-12,000 ft.; **Wallich, Jacquemont, Strachey & Winterbottom**, &c.

*Stems* 2–6 in. long, branches crowded into tufts; branches barren or producing a flower-stem, terminated by rostrate crowded leaves. Rosulate leaves spathulate-oblong, sometimes very small, sometimes $\frac{1}{4}$ in., margins cartilaginous; leaves on the peduncle linear-spathulate or narrow-oblong. *Petals* oborate, clawed, much exceeding the sepals. *Carpels* in fruit narrowed upwards.—A species by the texture and perforations of its leaves allied to *S. imbricata*; which differs by its sessile flowers and its less glandular-pubescent sepals.

Sikkim, alt. 12,000–14,000 ft.; Tungu, J. D. H.
Rosulate leaves \( \frac{1}{2} \) in., cuneiform \( \frac{1}{4} \) in. long, narrow oblong, very glandular-pubescent. Peduncles \( \frac{3}{4} \)–1\( \frac{1}{4} \) in. Petals nearly double the sepals, golden.

Sect. VI. Spinulose. Flowers yellow, peduncled, solitary or few. Stems elongate, 2–8 in. long, uniformly leafy; i.e. no whorled leaves either at the base or summit. Leaves \( \frac{1}{2} \)–\( \frac{3}{4} \) in. long, acute, rigid, often spinulose.


Alpine Himalaya, from Bhotan to Kumaon, alt. 9000–13,000 ft., common.
Leaves about \( \frac{1}{10} \) in., densely imbricate, ascending or reflexed. Sepals ovate, acute, little pubescent, suberect in fruit. Petals broad, golden, much exceeding the sepals. Styles not much shorter than the rips carpels. Seeds ellipsoid, subtrigonic, smooth.


Alpine Himalaya, from Sikkim to Kumaon, alt. 11,000–14,000 ft.; Wallich, J. D. H., Strachey & Winterbottom.
Leaves about \( \frac{1}{3} \) in., densely imbricate, ascending or reflexed. Sepals ovate, obtuse, very glandular-pubescent, suberect in fruit. Petals broad, golden, much exceeding the sepals. Styles not much shorter than the carpels in fruit.—This hardly differs from S. brachypoda.

27. S. filicaulis, Wall. in Sternb. Saxifrag. Suppl. t. 23; stems glandular-pilose much branched, branches 1-flowered, leaves \( \frac{3}{4} \)–\( \frac{1}{3} \) in. linear-oblong minutely denticulate. Wall. Cat. 445; DC. Prodr. iv. 46; H. f. & T. in Journ. Linn. Soc. ii. 66; Engler Monog. Saxifrag. 221.

Alpine Western Himalaya, Gurwhal and Kumaon, alt. 10,000–11,500 ft.; Wallich, Falconer, Edgeworth, T. Thomson, &c.
Bulbiferous sometimes in the upper axils. Sepals small, ovate, glandular-pilose, erect in fruit. Petals golden, more than twice the sepals. Styles in fruit little shorter than the carpels.

28. S. hispidula, Don in Trans. Linn. Soc. xiii. 380; stems hispid glandular simple 1–3-flowered, leaves \( \frac{1}{2} \)–\( \frac{1}{4} \) in. long oblong-lanceolate acute entire or often 1–3-toothed hispid on both surfaces. Don Prodr. 210; DC. Prodr. iv. 46; H. f. & T. in Journ. Linn. Soc. ii. 67; Engler Monog. Saxifrag. 222. S. evolvuloides, Wall. Cat. 447; DC. Prodr. iv. 46; Sternb. Saxifrag. Suppl. t. 25.

Alpine Himalaya, from Bhotan to Nipal, alt. 13–15,000 ft. Nipal, Gossain Than, Wallich; Bhotan, Griffith; Sikkim, Kankola, J. D. H., Jongri, C. B. Clarke.
Secr. VII. **Flagellares.** Flowers yellow, on leafy stems 2-8 in high rising from a basal tuft of rosulate leaves; from this tuft spread horizontally leafless thread-like surculi which terminate in rooting buds. Stem leaves entire, narrow.


Temperate Himalaya, from Sikkim to Kashmir, alt. 16,000 ft.; Wallich, Jacques-mont, T. Thomson, J. D. H., &c.

Glabrous; 2-8 in. high. Rosulate leaves $\frac{1}{4}$-3 in.; cauline usually small. S-pals elliptic-oblong, small, patent in fruit. Petals 3 or 4 times the length of the sepals, oblong-elliptic. Styles short. Seed ellipsoid, smooth, most minutely papillose.

30. **S. pilifera**, H. f. & T. in Journ. Linn. Soc. ii. 06; stems corymbosely 1-4-flowered, pedicels short about $\frac{1}{4}$ in., leaves hardly $\frac{3}{4}$ in. spatulate-linear or oblong, margins not spinulose, petals equalling the sepals. **Engler Monog. Saxifr.** 223.

Sikkim, alt. 14-15,000 ft., J. D. H.

Stems 1-3 in. high, pubescent. Leaves $\frac{1}{4}$-1 in., cauline pubescent, rosulate, nearly glabrous. Sepals much adnate in fruit into a campanulate tube; lobes obtuse, erect. Styles short. Ripe carpels very small.


Alpine Himalaya, from Kashmir and Kumamon, alt. 13,500-17,000 ft., common, to Sikkim, alt. 18,000 ft., Lama Kongra, J. D. H.—Distribr. North Asia, Arctic regions and Rocky Mountains.

Stems pubescent upwards. Sepals oblong, pubescent, slightly adnate and erect in fruit. Petals often with red lines (not dots) near the base. Styles short. Seeds ellipsoid, smooth, testa reticulate and microscopically punctulate.—This species is called polymorphic, but without very good reason, the following three varieties being distinguished by trivial characters only, and running into each other. The Rocky Mountain var. setigera (sp. of Pursh) is more remote by the calyx much adnate to the fruit.

Var. 1. typica; leaves pubescent, margins a little ciliate.

Var. 2. mucronulata (Royle sp.); leaf margins more ciliate or glistening and subspinulose.

Var. 3. stenophylla (Royle sp.); lower leaves and stem less pubescent or nearly glabrous.

Sect. VIII. **Porphyron.** Leaves sub-opposite, small, often with a pore at the apex. Flowers solitary, red or purple.

32. **S. oppositifolia**, Linn. **DC. Prodr.** iv. 17; rosulate leaves $\frac{1}{4}$-1 in. obovate glabrous or the upper ciliolate, no disc surrounding the carpels. **Engl.**
Western Tibet, alt. 15-17,000 ft.; Sassar, T. Thomson.—Distrib. Alps of Europe and Asia, Arctic Regions.

Stems 1-2 in. long, much branched and crowded, forming dense tufts. Leaves densely crowded. Flowering stems from the ends of the branches, $\frac{1}{2}$-2 in. long, with decussate opposite (or altogether alternate) leaves. Sepals ovate-oblong, nearly glabrous, erect in fruit, adnate to the ovary at the base. Petals $\frac{3}{4}$ in. long, obovate-oblong, twice the sepals. Seeds ellipsoid, rugulose, minutely papillose.—In Dr. Thomson's specimens some flowers have 3 carpels.

Sect. IX. Bergenia. Rootstock stout. Leaves ample, undivided, with a large sheath at the base of the petiole. Scape corymbose, 6-18 in. high. Petals white or red. Calyx-lobes erect in fruit. Seeds much larger than in other sections, elongate, subpyramidal, smooth.

33. S. ligulata, Wall. in Asiat. Research. xiii. 398, with a figure; leaves orbicular or obovate quite entire ciliate, base cordate, pedicels and calyx glabrous, calyx-teeth ovate not narrowed at base, fruit-pedicels cernuous. Wall. Cat. 449; Don in Trans. Linn. Soc. xiii. 348; Hook. Exot. Flora, i. t. 49 (excellent); Hook. Bot. Mag. t. 3406 (the sepals too acute, and the leaves too undulate); DC. Prodr. iv. 38; H. f. & T. in Journ. Linn. Soc. ii. 60.

Temperate Himalaya, from Bhotan to Kashmir, alt. 7-10,000 ft., common. Khasia Mts., alt. 4000 ft.

Leaves a foot in diam. in Khasia; smaller in Bhotan until 2 in. diam. in Kumaon; glabrous on both surfaces, dotted on the lower. Petals $\frac{1}{2}$-1 in. long, white or rose or purplish, orbicular with a claw of variable length. Fruit subglobose. Styles very long. Carpels sometimes 3.

Var. 2. ciliata; Royle Ill. t. 49 (sp.); Hook. Bot. Mag. t. 4915; H. f. & T. in Journ. Linn. Soc. ii. 60; leaves hirsute on both surfaces.—Nipal and Kumaon, alt. 6-8000 ft.; Royle, T. Thomson, Edgeworth, Strachey and Winterbottom.

34. S. Stracheyi, H. f. & T. in Journ. Linn. Soc. ii. 61; leaves obovate scarcely cordate at base, pedicels and calyx pubescent or puberulous, calyx-teeth oblong, often wider above their base, fruit-pedicels generally erect. ?? S. ligulata, var. γ., H. f. & T. in Journ. Linn. Soc. ii. 61; Lindl. in Bot. Reg. 1843, t. 65.

Kumaon and Kashmir, alt. 8000-14,000 ft., common.

Leaves glabrous on both surfaces margin either subentire ciliate, or crenate-serrate. Petals white or rose, or (according to a field note of Dr. Thomson's) yellow. Fruit ovate-lanceolate. Styles long.


Doubtful species.

Saxifraga from Karnag in Tibet, stated to be near S. diapensoides by Kurz (Flora, 1872, 286) is quite unknown to me. It is not described.
3. VAHLIA, Thumb.

Annual or biennial herbs. Leaves opposite, entire; stipules 0. Flowers axillary, usually gametate, sub sessile or pedicelled. Calyx-tube entirely adherent to the ovary; lobes 5, valvate, persistent in fruit. Petals 5, epigynous. Stamens 5, epigynous. Ovary inferior, 1-celled, with 2 pendulous many-ovuled placentas; styles 2, stigma capitellate. Capsule dehiscing at the apex between the styles. Seeds numerous, minute, ellipsoid, smooth.—Distr. Species 3; in tropical and subtropical Asia, and in tropical and South Africa.


Glandular-pubescent. Stem 6–12 in. high, erect or diffuse, branched. Leaves */3*/4 in. long, sub sessile, oblong, narrowed at both ends, ovate or lanceolate. Petals about */3*/4 in. long, white (ex Roxb. yellow), obovate. Stamens and styles about */3*/4 in. long, in the Indian specimens, these parts much larger and the filaments pubescent in the African var. Weldeni. Capsule about */3*/4 in. diam., subglobose.—This and the succeeding species when in fruit must be carefully distinguished from Oldenlandia which has the capsule completely 2-celled. The leaves of Vaflia have often a connecting line as if falsely stipulate. Mitreola which differs by its single style is also mixed with Vaflia in Herbaria.

2. V. oldenlandioides, Roxb. Fl. Ind. ii. 89; peduncles */3*/4–*/4* in. long from nearly all the upper axils mostly 2-flowered, filaments naked at the base. W. & A. Prodr. 364; Wight Ill. t. 115; Ic. t. 562; H. f. & T. in Journ. Linn. Soc. ii. 74; Oliv. Fl. Trop. Afr. ii. 383. V. Oldenlandia, DC. Prodr. iv. 54; Wall. Cat. 7187. V. silenoides, DC. Prodr. iv. 54.

Tropical dry portion of the Western Peninsula and Ceylon; Shuter, Perottet, Roxburgh, Wight, &c.—Distr. Tropical Africa.


4. TIARELLA, Linn.

Slender erect herbs; root perennial. Leaves alternate; radical long petioled with large stipules adnate to base of petiole; stipules of upper leaves small. Raceme terminal, sub racemate. Calyx shortly adnate to the ovary; lobes 5, valvate. Petals 5, white, or 0. Stamens 10; the 5 alternate with sepals sometimes without anthers. Ovary 1-celled of 2 carpels ending in two styles; ovules numerous, attached to two nearly basal placentas. Ripe carpels very unequal, diverging at top, and dehiscing ventrally. Seeds 6–16, near the base of the fruit, ellipsoid, smooth.—Distr. Species 5, one Himalayan and Japanese; the other 4 North American.

1. T. polyphylla, Don Prodr. 210; stem-leaves several all petioled cordate-ovate subpentagonal crenate-serrate, petals small linear or 0, fruit cermious

Temperate Central and Eastern Himalaya; from *Bhotan* to *Nipal*, alt. 8-11,000 ft.; *Wallich, Griffith, J. D. H.*, &c.—Distrib. Japan.

Stem 6-18 in. high, pubescent. Leaves pilose on both surfaces, lower long-petioled, blade 1-3 in. diam. Sepals ½ in. long, whitish, glandular. Petals when present shorter than the sepals. Ripe carpels one ½ in. long, the other ½ in.

5. **CHRYSOSPLENIUM**, Linn.

Weak, succulent herbs, growing in damp or watery places. Leaves undivided, petiolated; stipules 0. Flowers axillary and terminal, short-pedicelled, small, green or yellow, 4-merous in the Indian species, rarely 5-merous. Calyx-tube adnate to the ovary; lobes 4, imbricate. Petals 0. Stamens 8 (or 4), subepigynous. Ovary 1-celled, 2-lobed above; styles short; ovules numerous, attached to parietal placenta alternating with the stigmas. Capsule half-superior, dehiscing at top crosswise. Seeds small, ellipsoid.—Distrib. Species 22; North Europe, Asia (South to the Himalaya) and *A. nerica*; in the Andes to Magellan's Straits.

* Leaves opposite.


Temperate Himalaya; from *Bhotan* to *Kumao*, alt. 7000-10,000 ft., frequent. A decumbent, weak species, with branches 6-8 in. long, closely resembling *C. oppositifolium*, L., which only differs in having its leaves entire or obsoletely crenate.

Maximowicz (in *Bull. Acad. Petersb. Mel. Biol.* ix. 767) has founded a new Himalayan species *C. sulcatum*, Maxim. on *Wall. Cat.* 438; which differs from *C. nepalense* in having the seeds profoundly 12-sulcate; but the examples of *Wall. Cat.* 438 at Kew exhibit the smooth seeds of *C. nepalense*.


Temperate Western Himalaya, alt. 7000 ft.; *Edgeworth, Madden*; Dwalli, alt. 8000 ft., in *Kumao*, *Strach.* & *Winterbottom*.

A rather stouter plant than *C. nepalense*, the leaves ½-3 in. diam.

** Leaves alternate; plant glabrous.


Sikkim, alt. 12,000-15,000 ft.; Kankola, *J. D. H.*—Distrib. Alpine and Arctic Europe, Asia and N. America.

Leaves ½-3 in. diam., oval or cordate, rounded at the top, floral leaves golden yellow. Seeds shining, smooth.

4. **C. carnosum**, *H. f. & T.* in *Journ. Linn. Soc.* ii. 73; tufted, stems 2-4 in. high erect thick leafy, radical leaves represented by short sheathing

Sikkim Himalaya, alt. 14–15,000 ft., Yeumtong and Kankola 'near the perpetual snow,' J. D. H.

Leaves about ½ in. diam., glossy, very deep green, elliptic, obtuse, crenate-dentate. Flowers lurid. Calyx segments purple.—This may prove only an extreme form of C. alternifolium.


Bhutan; Griffith.

Leaves ½–1 in. broad; lobes 6–16, very obtuse, often ¼ in. deep.—Very near C. nudicaule, Bunge.


Temperate Western Himalaya; Kedarkanta in Gurwhal, Royle; Madhari Pass, in Kumaon, alt. 10,000 ft., Strachey & Winterbottom.

Stems 1–3 in. long. Leaves ½ in. broad, with 4–8 shallow lobes; radical long-petioled.

*** Leaves alternate; plant pubescent.


Whole plant pubescent and with brown-red wool. Corymb, when well developed, 2–3 in. across, with leaf-like bracts at a few of the divisions.—Sometimes stunted and more compact.

6. PARNASSIA, Linn.

Glabrous perennial scapigerous herbs. Scape angular, 1-flowered, often bearing one leaf in the middle, more rarely naked or with several leaves. Leaves entire, radical long-petioled. Calyx-tube free or adnate to the ovary, the lobes 5, imbricate. Petals 5, white or pale yellow. Stamens 5, perigynous or nearly hypogynous, alternate with 5 large staminodes. Ovary 1-celled; style short with 3–4 (or 5) nearly simple stigmas; ovules numerous attached to the parietal placenta opposite the stigmas. Capsule superior or half-inferior, loculically 3–4-valved. Seeds many, obovoid or subcylindric, smooth, testa sometimes lax; albumen hardly any; (in which point Parnassia differs from the character of the order Saxifragaceae and is therefore placed by some authors elsewhere).—Distrib. Northern temperate hemisphere, extending south to the mountains of the Indian Peninsula. Species 12.


Western Tibet, Falconer; Skardo in Baltistan, alt. 7500 ft. T. Thomson, C. B. Clarke.—Distrib. Subalpine and subarctic regions.

Petals ovate-elliptic with a broad claw. Stamens nearly hypogynous. Carpels 4. Capsule superior or nearly so, oblong-elliptic, much longer than the sepals. Seeds cylindric; testa loosely reticulate.

Sect. II. Fimbripetalum. Staminodes ending in several long gland-bearing processes. Petals fimbriate.


Stem 8–12 in. high. Radical leaves orbicular, deeply cordate. Sepals patent or reflexed. Petals ovate above a short claw, fimbriated around their whole edge. Carpels 4. Capsule superior or nearly so, long-ellipsoidal, much longer than the sepals.

Drude states he had no specimen of P. foliosa. Kew possesses both P. foliolosa collected by H. f. & T., and P. Nummularia collected by Maximowicz; the two are identical.

Sect. III. Nectarotrilobos. Staminodes at the vertex 3- (rarely 5-) lobed, the lobes short or cylindric, not linear. Stem 1- (or 0-) leaved.

* Capsule triquetrous, superior or nearly so.


Stem 8–18 in. high. Leaves often 1½ in., reniform or oval, deeply cordate. Petals (at least in the Khasia plant) light yellow. Placenta near the base of the capsule. Seeds ellipsoidal; testa reticulate, not very lax.

4. P. mysoresensis, Heyne in W. & A. Prodr. 35; petals obovate-oblong, margins not or obscurely fimbriate, staminodes 3-lobed, lobes cylindric or dilated upwards, capsule 3-celled superior obcordate. Wall. Cat. 3754; Wight Ill. t. 21; Arn. in Hook. Comp. Bot. Mag. ii. 315; H. f. & T. in Journ. Linn. Soc. ii. 80; Drude in Linneea, xxxix. 317.

Eastern Himalaya; Sikkim, alt. 8000–12,000 ft.; Lachen and Yeumtong, J. D. H. Mts. of the Western Peninsula. Khasia Mts. alt. 3500–5500 ft.


** Capsule half-inferior.

5. P. nubicola, Wall. in Wight Ill. t. 21; margins of petals not (or slightly) fimbriate, staminodes broadly dilated upwards 3-lobed, capsule ¾ in. long obconic below subhemspheric above, style very short or 0. Wall. Cat. 1246; Arn. in Comp. Hook. Bot. Mag. ii. 315; H. f. & T. in Journ. Linn. Soc. ii. 81; Drude in Linneea, xxxix. 315.

Temperate and Alpine Himalaya from Sikkim to Kashmir, alt. 6000–12,000 ft., frequent.
Parnassia.] LIH. SAXIFRAGACEAE. (C. B. Clarke.) 403

Steam 4–18 in. high, subalate with 4–5 ridges under the fruit. Leaves 1–2 (sometimes 3) in., ovate or ovate-oblong, long. Petals ⅔ in. long, white, obovate. Carpels and stigmas 3; (Drude says 4 but they are nearly invariably 3 in the Kew plentiful examples). Seeds obovoid-ellipsoid, smooth; testa reticulate, not lax.


Temperate and Alpine Himalaya from Sikkim to Kashmir, alt. 8000–15,000 ft., frequent.—Distr. Altai Mts.

Steam 3–8 in. high. Leaves ⅓–⅔ in. ovate or ovate-oblong, often cordate; cauline usually solitary in the lower half of the stem. Petals ⅓–⅔ in. long, spatulate-obovate. Carpels 3, rarely 4. Testa of the seed close (Drude).—This differs from **P. subicola** by the smaller size of all its parts and the manifest style. **P. cabulica**, Planch in Herb. Griffith, differs by the stems being usually leafless. **P. subbaculatis**, Kar. & Kir. differs by the leaves being oblong narrowed at their base; it was collected by Dr. Henderson near Yarkand, and appears in his list No. 136 under the name **P. maisorensis**.


Alpine Himalaya from Sikkim to Kunawur, alt. 12–15,000 ft., Wallich, J. D. H., Munro, &c.

Steam 1–2½ in. long. Leaves ⅓–⅔ in., reniform or ovate-cordate; cauline leaf usually one, often in the upper half of the stem. Petals ⅓–⅔ in. long, obovate. Carpels 3. Seeds ellipsoid, smooth; testa reticulate not lax.—This species should probably be estimated an alpine var. of **P. ova**ta, from which it differs in its stunted size and shorter staminodes.

Sect. IV. Saxifragastrum. Staminodes cylindrical, undivided at the vertex.


Sikkim Himalaya; alt. 10,000–12,000 ft.; Lachen and Lachoong, J. D. H.

Steam 2–5 in. long, weak. Radical leaves ⅔ in. broad, reniform, margin minutely erose; petiole with adnate fimbriate stipules at the base; cauline usually 1, cordate-obovate. Staminodes thick, cylindrical, glandulose, clavate at its summit. Styles 3, short, but manifest. Seeds (immature) of the genus.

7. **HYDRANGEA**, Linn.

Large shrubs or trees, in their young state often subscandent with smaller leaves. Corymbs terminal, with deciduous bracts. Flowers all fertile and small, or the exterior flowers of the corymb sterile apetalous with the calyx-lobes peta-
loid and greatly enlarged. Calyx-tube adnate to the ovary, limb 4–5-fid. Petals 4–5, valvate. Stamens 8–10, subepigynous. Ovary inferior; styles 2–4; ovules very numerous, axile. Capsule 2–4-celled, dehiscing at the apex between the styles. Seeds minute, shortly tailed at each end, very numerous.—Distri n. Species 33 from Java to the Himalaya and Japan (the centre of the genus), Eastern N. America, Western S. America.

The seeds of Hydrangea are described by many authors, as by the accurate Maximowicz, as alate. The seed in its inner coat is a perfectly smooth ellipsoid; the outer coat is a loose long cylindric sack, in the middle of which the nucleus lies; as the seed ripens the empty ends of the sack wither and contract whence results a seed ‘tailed at each end.’

* Fruit truncate at top, petals falling off in a cap, styles very generally not always separate.

1. H. altissima, Wall. Tent. Fl. Nep. t. 50; leaves glabrous except tufts of brown hairs in the axils of the main nerves beneath which hairs sometimes are continued along the veins also, stamens 10. Wall. Cat. 439; DC. Prodr. iv. 14; H. f. & T. in Journ. Linn. Soc. ii. 75; Brand. For. Fl. 211.

Temperate Himalaya from Gurwhal to Bhotan, alt. 4000–8000 ft. (10,000 ft. in Sikkim, J. D. H.), frequent.

A spreading shrub, 8–15 ft. high, branchlets glabrous. Leaves 3–6 in., ovate-lanceolate, sometimes cordate, sometimes narrow-lanceolate; usually finely (sometimes more coarsely) serrate or entire except near the apex; upper petioles often winged and woolly-hairy. Corymb pilose. Flower-buds conical, acute, but the calyptra-like corolla by the rapid swelling of the stamens becomes hemispheric before falling. Sepals of the radiate flowers usually entire; sometimes waved or slightly toothed. Capsule subhemispheric, compressed, broader than long.—H. scandens, Maxim., which includes several Japanese species, only differs by having 15 stamens and rather larger buds.

** Fruit truncate at top, petals expanding.

2. H. robusta, H. f. & T. in Journ. Linn. Soc. ii. 76; leaves large ovate or cordate at base adpressedly brown-hirsute on the nerves beneath and minutely tessellated with white hairs along the tesselations but not tomentose, styles normally 2. H. cyanema, Nutt. in Bot. Mag. t. 5038.

Temperate Eastern Himalaya; Sikkim and Bhotan, alt. 5000–8000 ft., frequent; Griffith, J. D. H., &c.

A spreading shrub, 8–15 ft. high; branchlets hairy or pubescent. Leaves up to 9 in., from narrow oblong to broad cordate, the base never acute, serrate (usually coarsely), upper surface with scattered hairs, and adpressedly brown pilose along the nerves; upper petioles often winged, sometimes incise-serrate and subtruncinate. Corymb hirsute. Sepals of the radiate flowers sharply serrate or crenate or undulate. Petals and stamens blue. Styles not rarely 3. Capsules subhemispheric, compressed, broader than long.

Var. Griffithii; upper leaves narrowed into the petiole, with scattered bristly hairs on the nerves beneath smooth not tessellated between them.—Eastern Bhotan, Griffith.


Arborescent, sometimes 20 ft. high, branchlets pubescent. Leaves 6–8 by 2–3 in.,
upper surface with scattered minute hairs, lower microscopically mealy punctate and densely clothed with long white hairs; petiole of the uppermost leaves not at all or but slightly winged. *Corymb hirsute.* *Sepals* of the radiate flowers usually serrate or toothed, sometimes quite entire. *Styles* not rarely 4, rarely 2. *Capsule* hemispheric, obscurely trigonous or subquadrate.

*** Capsule crowned with a disc formed by the base of the normally 3 styles, petals expanding.


Temperate Himalaya from Bhotan to Kumaon, alt. 8000–10,000 ft.; frequent. *Khasia Mts.*, alt. 4500–5500 ft.


5. **H. stylosa**, *H. f. & T.* in Journ. Linn. Soc. ii. 75; leaves glabrous, nerves beneath pubescent, styles long subulate.

**Sikkim Himalaya,** alt. 8000 ft., Lachen, J. D. H.


**DOUBTFUL SPECIES.**

* H. anomala, *Don Prodr.* 211; *DC. Prodr.* iv. 15; leaves sinuate-crenate nearly glabrous ovate rounded at the base 4 in., radiate flowers 0.—Nipal.—Of this no specimen exists at Kew. Perhaps it is but a synonym of *H. altissima*. *H. f.* & *T.* *(in Journ. Linn. Soc.* ii. p. 76) reduce it to *Dichroa*, but that has not ovate leaves rounded at the base.

8. **PILEOSTEGIA**, *H. f. & T.*

A glabrous shrub with the habit of *Viburnum* and decussate branches. *Leaves* coriaceous, petioled, obovate-oblong, entire, persistent. *Panicles* terminal. *Calyx*-tube adnate to the ovary; lobes 4 or 5, imbricate. *Petals* 4 or 5, valvate, falling off in a cap. *Stamens* 8 or 10, subepigynous. *Ovary* inferior, 4–6-celled; style thick, surmounted by a thicker truncate pyramid the 4–6 angles of which are stigmatic; ovules numerous, elongate, pendulous. *Seeds* (immature) numerous, testa an elongate cylindric sack at the apex of which lies the nucleus.


9. **DICHOA, Lour.**

A shrub. Leaves opposite, serrate, lanceolate, persistent. **Punicle terminal. Calyx-tube adnate to the ovary; limb 5–6-toothed. Petals 5 or 6, thickish, valvate, blue or purplish. Stamina 10 or 12, epigynous. Ovary 3–5-inferior, 1-celled; styles 3–5; ovules numerous, on 3–5 parietal placentae formed by the flexed margins of the carpels. Berry 3–5-inferior, blue. Seeds numerous, small, obovoid; testa with large reticulations.**


**Temperate Himalaya from Bhutan to Nipal,** alt. 5000–8000 ft., abundant. **Khasia Mts.,** alt. 4000–6000 ft.—**Distrib.** Java, China, Philippines. **Stems** 6–9 ft. high, somewhat virgate. **Leaves** 3–8 in., tapering into the petiole, pubescent or puberulous on the nerves, otherwise glabrous, usually narrow, sometimes obovate-lanceolate. **Petals** ½ in. long. **Berry** finally an intense blue.—The Chinese varieties have larger flowers than the Indian.

10. **DEUTZIA, Thunb.**

Shrubs with opposite branches and stellate pubescence. **Leaves** opposite, serrate, ovate or lanceolate, deciduous. **Flowers** white, corymbose in the Indian species. **Calyx-tube adnate to the ovary; teeth 5, small. Petals 5, Stamina 10, subepigynous, filaments broadly winged the wing often ending upwards in a tooth on each side. Ovary inferior, 3–5-celled; styles 3–5, long; ovules numerous, axile. **Capsule** 3–5-celled, hemispheric or ovoid from a rounded base, truncate at the summit, at length septicidal. **Seeds** minute, numerous, obovoid-ellipsoid; testa reticulate, a little longer than the nucleus, appearing at last as a short stalk at its base, as a point at its summit.—**Distrib.** Species 7, Himalaya to North China and Japan; and one outlier in Mexico.


**Temperate Himalaya, from Kashmir to Bhutan,** alt. 6000–10,000 ft., frequent.—**Distrib.** China, Mantchuria, Amurland. **Leaves** 1–2 in., oblanceolate; on the under surface the stellate hairs are often few, sometimes thickly scattered, not matted into tomentum in the mature leaves; under surface sometimes prominently reticulate. **Petals** glabrous or stellately pubescent.—Maximowicz l. c. keeps the Chinese *D. parviflora* still distinct by the puberulous smaller petals, the shorter teeth to the wing of the filament, the leaves more prominently reticulate beneath, &c., none of which distinctions appear to hold in the large Kew collection. The name *corymbosa* can only be preferred to *parviflora* if Brown's naming in Wallich's distribution be reckoned publication.

**Temperate Western Himalaya** to Kashmir, alt. 5000-9000 ft., common. The specimens collected by Sir J. D. Hooker in Sikkim and East Nipal and named *D. staminea* should be referred to *D. corymbosa*.

Leaves 1-3 in., oblong- or elliptic-lanceolate, grey tomentose beneath with stellate hairs.


Western Himalaya; **Kumaon**, alt. 5500 ft.; below Binsur, *Strachey & Winterbottom*.

Leaves 4 in., elliptic-lanceolate from a rounded base, acuminate, with close scattered stellate hairs on both surfaces.

### 11. PHILADELPHUS, **Linn.**

Shrubs with opposite branches. Leaves opposite, deciduous. Calyx-tube adnate to the ovary; lobes 4 (rarely 5), valvate. Petals 4 (rare 5) roundish, convolute in bud. Stamens 20-40, subepigynous, filaments subulate. Ovary inferior, 3-5-celled; styles 3-5, filiform, free or combined at the base; ovules numerous, axile, pendulous. Capsule inferior, corky, 3-5-celled, turbinate from a narrow funnel-shaped base, the summit shortly conical, at length loculicidal. Seeds numerous, oblong, testa loosely reticulated.—**Distrib.** Species 8; central Europe, the Himalaya, Japan and N. America.


Temperate Himalaya; from Kashmir to Bhotan, alt. 5000-9000 ft.; frequent in Gyrwal and Kumaon.

Leaves 1⅓-3⅓ in., ovate-lanceolate, serrate; petiole ¼ in. Cymes few-flowered, often with linear bracts ¼ in. long; pedicels ⅓-¼ in. Calyx-teeth elongate-triangular, acute. Petals ⅓-⅓ in. long, white. Capsule ⅓ in. long.—The typical *P. coronarius* (of which Zeheri, floribundus, verrucosus, latifolius, and many others are varieties) is a native of Europe and the East, extending to North China and Japan.

### 12. ITEA, **Linn.**

Shrubs or trees. Leaves alternate, petioled, glabrous, glandular-dentate or crenate. Racemes axillary and terminal, long, many-flowered. Calyx-tube adnate to base of the ovary, lobes 5. Petals 5, oblong; perigynous, white, valvate. Stamens 5, perigynous. Ovary superior, 2-celled; style short, simple; ovules
many, axile. Capsule 3/4-superior, conical or elongate, many-seeded, splitting through the dissepiments and the style. Seeds elongate, testa loose more or less produced at each end.—Distrib. Species 5, the Himalaya, Indian Archipelago, Japan, Virginia.

1. _I. macrophylla_, Wall. in Roxb. Fl. Ind. ii. 419; leaves large rounded at the base, petals closely reflexed on the pedicel between the calyx-teeth, calyx-tube in fruit somewhat campanulate. Wall. Cat. 7200; DC. Prodr. iv. 6; _H. f._ & T. in Journ. Linn. Soc. ii. 77. Kurrimia?, Wall. Cat. 7200.


A small tree. Leaves often 6 by 3 in., broadly ovate, acute, glandular-dentate, but sometimes not larger than in _I. chinensis_ nor more rounded at the base. Racemes 1-3 from several upper axils, usually shorter than the leaves, and like the calyx-tube puberulous. Capsule 4½-8 in. long, the bases of the carpels clearly sunk below the limb of the calyx-tube; the calyx-teeth finally wear off.

2. _I. chinensis_, Hook. & Arn. Bot. Beech. Voy. 80, t. 39; leaves usually narrowed at the base, petals erect persistent often appressed to the fruit, calyx-tube in fruit turbinate or conical. _H. f._ & _T._ in Journ. Linn. Soc. ii. 77; Benth. Fl. Hongk. 120.

Khasia Mts., alt. 4000-5000 ft., Wallach, &c.—Distrib. China, Hong Kong, Formosa, &c.

A shrub. Leaves usually 3 or 4 in., oblong, narrowed at both ends, glandular-dentate, but sometimes 6 in. by 2½ in. and exactly resembling those of _I. macrophylla_. Racemes 1-2 from several upper axils, about as long as the leaves, and like the calyx-tube puberulous. Capsule 4½-8 in., bases of the carpels hardly sunk below the calyx-tube; calyx-teeth persistent, suberect.


Gurwhal and Kumaon, alt. 3000-5000 ft., Royle, &c.


13. _POYOSMA_, Blume.

Evergreen trees, branchlets petioles and inflorescence pubescent. Leaves opposite or subopposite, petiolate, acuminate. Flowers in terminal racemes (in some non-Indian species solitary) 3-bracteolate. Calyx-tube entirely adnate to the ovary; lobes 4, small, persistent. Petals 4, epigynous, linear, valvate, white yellowish or greenish expanding by recurving, fugacious, very hairy within. Stamens 4, epigynous, filaments hairy. Ovary inferior, 1-celled; style columnar, stigma simple; ovaries numerous, ascending, on two parietal placentae which project considerably into the cavity of the ovary. Fruit sub-baccate, 1-seeded. Seed ascending, subbasal.—Distrib. Species 6, extending from East Bengal through Malaya to tropical Australia and its islands.

f. & T. in Journ. Linn. Soc. ii. 77; Miq. Fl. Ind. Bat. 1, pt. i. 724; Suppl. i. 336. Itea fragrans, Wall. in Roxb. Fl. Ind. ii. 420; Wall. Cat. 8472, partly.

SINGAPORE, Wallich.—Distrib. Sumatra.

Bark of the twigs not lenticellate. Leaves 2–4 in., usually pubescent on the nerves on both surfaces. Lower flowers on the raceme ¼ in. long, quite sessile, yellowish.


A tree 60 ft. high (Blume); bark of the twigs lenticellate. Leaves often 6–8 in., usually pubescent on the nerves beneath. Lower flowers of the raceme ¼–⅔ in. long; pedicels ⅓–⅔ in.—Very near to *P. ilicifolia*, Blume (remarks Mr. Kurz in Journ. As. Soc., 1876, pt. ii. 308) but the flowers are smaller and more hairy; the fruit larger, and the leaves longer and more acuminate. In both Var. 1 and Var. 2 the leaves are sometimes very hairy beneath.

Var. i. typica; leaves quite entire.


Malay Peninsula; Malacca, Griffith, Maingay.—Distrib. Java, Sumatra.

A tree 22 ft. high, with a thick trunk (Maingay); branches and leaves variable in their pubescence (even more than in *P. integrifolia*) from dense woolly to nearly glabrous. Leaves 3–4 by 1–1½ in., quite entire, rarely obscurely glandular-denticulate; upper surface sometimes softly hairy, sometimes shining and glabrous, lower always hairy. Pedicels ¥¼–⅓ in. long, woolly. Flowers ⅓–⅔ in. long. Fruit erect on the pedicels, the bracteoles remaining horizontal become very prominent.—P. latiflorus Griff. is here reduced to *P. mutabilis*, Blume, from Blume’s description only.

14. *RIBES*, Linn.

Prickly or unarmed shrubs. Flowers often unisexual. Pedicels bracteate at the base and 2-bracteolate at the middle. Calyx adnate to the ovary with 4–5 epigynous lobes, or the calyx-tube produced above the ovary. Petals 4–5, small, epigynous, white yellow red or purple-black. Stamens 4–5, epigynous. Ovary inferior, 1-celled; styles 2, free or connate, stigmas simple; ovules numerous, on 2 parietal placentas. Berry oblong or globose, crowned with the calyx, several-seeded.—Distrib. Species 56; temp. Europe, Asia, N. America, and the Andes.


Alpine Western Himalaya, from KUMAON to KASHMIR, alt. 9000-12,000 ft.; frequent.—Distrib. North and Alpine Europe; the Atlas, Greek and"Caucasus ranges.

Prickles usually 3 beneath each axil; stems smooth or with numerous prickly setae. Leaves suborbicular, obtusely 3-5-lobed, the lobes inciso-crenate, somewhat villous beneath. Peduncles usually solitary. Calyx-tube long, produced above the fruit. Berry ¼ in. long, oblong, inedible in the Indian plant.

**Sect. II. Ribesia.** Flowers racemed. Unarmed.

* Calyx-tube hardly produced above the fruit.


KASHMIR and BALTISTAN, alt. 8000-12,000 ft.; Jacquemont, Munro, Royle, &c.—Distrib. Cabul, Persia, Armenia, Asia Minor and Greece.

A shrub 6 ft. high, polygamo-dioecious. Leaves 1-1½ in. diam. Racemes erect, somewhat dense in flower, lax and pendent in fruit. Flowers small, greenish.—R. heterotrichum, Ledeb. Ic. Fl. Ross. t. 235, only differs by the eglandular fruits; and there is a whole series of closely allied species from the Altai to Persia.

3. **R. glaciale**, Wall. in Roxb. Fl. Ind. ii. 513; stem glabrous, leaves glabrous or with scattered hairs above, bracts ¼-⅓ in. linear-lanceolate usually much exceeding the pedicels, calyx-segments oblong, berries ¼ in. long glabrous or minutely pubescent. Wall. Cat. 6833; H. f. & T. in Journ. Linn. Soc. ii. 88; Brand. For. Fl. 214. R. acuminatum, Wall. Cat. 6834.

Temperate and ALPINE HIMALAYA, from BHOTAN to KASHMIR, alt. 7000-12,000 ft.; common and often epiphytic.

Polygamo-dioecious. Leaves 1-2 in., cordate, 3-5-lobed, crenate-serrate, the middle lobe often elongate; or simple, cordate-ovate, acuminate, sometimes 4½ in. long. Racemes pubescent, sometimes elongate. Flowers brownish or pink. Var. 2. laciniatum, H. f. & T. in Journ. Linn. Soc. ii. 87 (sp.), differs by the calyx-segments lanceolate. (The leaves are often not more laciniate than in examples of R. glaciale.)


SIKKIM and BHOTAN, alt. 8500-10,000 ft.; Griffith; Lachen in SIKKIM, J. D. H. Dioecious. Leaves 1-4 in., cordate, 3-5-lobed, crenate-serrate, the lobes often elongate. Racemes pubescent, often elongate. Flowers brownish.—Very near R. glaciale, Wall., differing chiefly by its very hairy berries.

5. **R. luridum**, H. f. & T. in Journ. Linn. Soc. ii. 87; branchlets and leaves glabrous, bracts ⅓ in. long, spatulate-oblong much exceeding the pedicels, calyx-lobes lanceolate, berries glabrous small less than ⅓ in. long.
Sikkim Himalaya, alt. 10,000-12,000 ft.; Lachen, J. D. H.
A shrub, 4 ft. high, with erect twigs, polygamo-dioecious. Leaves 3-5-lobed, 1 by 1½ in., lobes crenate-serrate. Racemes pubescent, erect in fruit, short. Flowers subsessile, chestnut. Calyx-tube of the flower subcampanulate.—Very near R. glaciale; the leaves are in general outline subreniform while those of R. glaciale usually have the middle lobe elongate and acuminate.

** Calyx-tube produced above the fruit.


Temperate Western Himalaya from Kunawar to Kashmir, alt. 7000-12,000 ft., T. Thomson.—Distr. North Europe and North Asia.
Leaves in the Kashmir examples not always punctate beneath. Racemes long, pendulous; no solitary peduncle at their base. Pedicels long. Flowers green.

7. R. Griffithii, H. f. & T. in Journ. Linn. Soc. ii. 88; leaves pubescent on the nerves beneath, racemes 3-6 in. long flexuose pendent very lax, bracts $\frac{1}{4}$-½ in. long linear-lanceolate exceeding the pedicels, berry $\frac{1}{4}$ in. long glabrous red.

Eastern Himalaya; Bhotan, alt. 7500 ft., Griffith. Sikkim, alt. 10,000-13,000 ft., J. D. H.
An erect shrub 8 ft. high. Leaves 2-3 in., 5-lobed; lobes acuminate or caudate, sharply serrate. Calyx-tube in flower and in young fruit broadly campanulate.


Western Himalaya, from Kumaon to Kashmir, alt. 8000-12,000 ft., frequent; Royle, T. Thomson, &c.—Distr. Alpine Europe, Caucasus, Altai.
Leaves long-petioled, petioles often ciliate at the base, ovate-cordate, 3-5-lobed; lobes acute, crenate-serrate; upper surface glabrous or with scattered hairs, lower glabrous or pubescent. Pedicels short. Calyx-lobes short, obtuse. Flowers large, greenish-yellow.


** Order LIII. CRASSULACEAE. **

Herbs, often with a woody perennial rootstock, or under-shrubs, usually succulent. Leaves alternate or opposite, usually simple but divided in Bryophyllum and Kalanchoe; stipules 0. Flowers often cymose, sometimes spicate-racemose in Cotyledon, or paniculate in Bryophyllum, regular, hermaphrodite or unisexual. Calyx 4-5-fid more rarely 6-8-fid, free. Petals as many as the sepals, free or connate. Stamens hypogynous or upon the petals, as many or twice as many as the petals. Carpels usually as many as the petals (fewer in Triactina and in a few Sedums) with a hypogynous gland or scale at the base of
each; free, or connate below, narrowed upwards into the styles; ovules many on the edges of the carpels (few in Tillaea, Triactina and some Sedums). Follicles dehiscing down the inner faces, many-seeded, or 1- few-seeded in Tillaea, Triactina and a few Sedums. Seeds albuminous; embryo terete, cotyledons short.—

DISTRIBUTION. Species 400; spread over nearly the whole globe except Polynesia; rare in Australia and South America; abundant in South Africa; general in the northern hemisphere.

* Stamens as many as the petals, leaves opposite (see also Cotyledon).

Small herbs with minute axillary sessile flowers.............1. Tillaea.

Succulent herbs with flowers in a paniculate cyme.............2. Crassula.

** Stamens twice as many as the petals.

† Petals connate, at least at the base.

Calyx shortly 4-fid..........................3. Bryophyllum.

Calyx 4-partite..............................4. Kalanchoe.

Calyx 5-partite..............................5. Cotyledon.

†† Petals free.

Carpels 5-4 (rarely 3) free or slightly connate.............6. Sedum.

Carpels 6-8..................................7. Sempervivum.

Carpels 3, connate half their length.......................8. Triactina.

1. Tillaea, Linn.

Small glabrous succulent herbs. Leaves opposite, entire, flat in the Indian species. Flowers minute, axillary, often fasciculate, solitary or cymose, white or red. Calyx 4-5-fid. Petals 4-5, free or connate at the base. Stamens 4-5. Hypogynous scales 4-5 or 6. Carpels 4-5, free, narrowed into short styles with minute stigmas; ovules 2 to each carpel in the Indian species. Follicles 2-seeded.—DISTRIBUTION. A genus of 20 species, widely distributed, scarcely separable from Crassula.


Subtropical Himalaya, from Kumaon to Kashmir, alt. 3000-6000 ft., frequent. Deccan Peninsula; Mysore, T. Lobb; Nilgiris, Hohenacker; Concan, Stocks.—

DISTRIBUTION. Tropical Africa, Abyssinia and the Cameroons.

Stems procumbent, branched; internodes shorter than the leaves. Leaves 1-1½ in. long, connate at the base. Calyx-segments lanceolate-acuminate, Petals elliptic, acuminate, white, not exceeding the sepals. Hypogynous scales cuneate, truncate (ex C. A. Meyer).

PUNJAB PLAIN; Hushiarpor, Aitchison; Peshawur, Vicary.—Distrib. Persia, Central and South Africa.

Stem decumbent, branched; internodes longer than the leaves. Leaves $\frac{1}{2}$–$\frac{3}{10}$ in. long, connate at the base. Pedicels very short or $\frac{1}{4}$ in. long. Calyx-segments lanceolate, acuminate. Petals shorter than the sepals, united at the base, very acute or hair-pointed. Hypogynous scales minute, spatulate (ex Richard).—This species is still smaller than T. pentandra, its flowers are less than $\frac{1}{20}$ in. long.

2. CRASSULA, Linn.

Herbs, usually with thick branches and leaves. Leaves opposite, usually connate, fleshy and with cartilaginous margins. Flowers cymose, not large. Calyx 5-5id or 5-partite. Petals 5, free or connate at the base. Stamens 5. Hypogynous scales various. Carpels 5, narrowed into short thick styles; ovules numerous. Follicles 5, many-seeded.—Distrib. Species 120, nearly all from the Cape of Good Hope; a few in Abyssinia, one in the Himalaya.


KUMAON and GURWHAL, alt. 3000–8000 ft., frequent. BHOTAN, Griffith.

Lower leaves 1–1$\frac{1}{2}$ in. long, blunt or shortly acute; stem-leaves sessile, subdcurrent, usually narrow oblind. Panicle sparsely leafy. Petals dull rose, scarcely twice the sepals. Hypogynous glands small, obovate. Seeds very numerous, oblong-ellipsoid, smooth, finely reticulate, quasi- striate.

3. BRYOPHYLLUM, Salisb.

Tall erect herbs, perennials. Leaves opposite, connate. Flowers large, pendant, in spreading panicles with opposite branches. Calyx with a long inflated tube; lobes 4, short, valvate. Corolla with a campanulate tube and shortly 4-5id limb. Stamens 8, in two series, inserted on the middle of the corolla-tube. Hypogynous scales 4, obtuse. Carpels 4, free or connate at the base, attenuated into long styles; ovules very many. Follicles 4, many-seeded.—Distrib. Species 4, in tropical Africa; one extending through the tropics of the whole world.


Tropical plains of India, from the base of the Himalaya to Ceylon and Malacca; universal in Lower Bengal.—Distrib. Throughout the tropics of the world; presumed a native of Africa and an introduced plant in Bengal.

Glabrous. Stems 1–4 ft. high. Calyx 1–1$\frac{1}{2}$ in. long, purplish green. Corolla globose-octagonal at the base, green, constricted in the middle; the exerted parts reddish-purple. Hypogynous scales subquadrate, free or slightly adherent to the carpels. Fruit enclosed in the persistent papery calyx and corolla. Seeds small, oblong-ellipsoid, smooth, longitudinally obscurely striate.

In the crenatures of the leaves of this plant buds are easily formed which develop, drop off, and at once produce new plants.

Erect stout perennial herbs. **Leaves** opposite or the upper alternate. **Flowers** large, erect, in many-flowered subpaniculate cymes. **Calyx** 4-partite, or 4-fid half way down. **Corolla** with a flask-shaped tube and spreading 4-fid limb, much exceeding the calyx (yellow in the Indian species), persistent. **Stamens** 8, in two series, adnate to the corolla-tube. Hypogynous **scales** 4, linear or oblanceolatum. **Carpels** 4, adnate to the base of the corolla-tube, attenuated into long styles; ovules very many. **Follicles** 4. **Seeds** very many, oblong, ellipsoid, with 8–15 longitudinal ribs.—**Distr.** Species 25, chiefly in tropical and South Africa; several in tropical Asia; one in Brazil.

* Calyx divided not more than half way down.


Mrs. of the **Deccan Peninsula**; Heyne; Wight, Ritchie.—**Distr.** Abyssinia.

Stem very thick at the base, 1–2 ft. high. **Leaves** obovate, nearly entire, the lowest 4–6 in. long, much tapering at the base, scarcely petiolar. **Calyx**-teeth ovate, acute. **Corolla-tube** ½ in. long. Hypogynous **scales** linear.—This species connects Kalanchoe with Bryophyllum; it has the tubular calyx and subopposite panicle branches of Bryophyllum; but the erect flowers, spreading corolla lobes, narrow hypogynous scales and seeds of Kalanchoe. The calyx is described as 'vesicular' in fruit; but it is very slightly so either in the Indian or Abyssinian examples.

** Calyx divided nearly to the base.


**Tropical Himalaya**, from Bhotan to Kashmir, alt. 1000–3000 ft.; common. **Burma**; Wallich.—**Distr.** Warm China, Java.

Stem 1–4 ft. high. **Lower leaves** commonly 3–4 (sometimes 10) in. long besides the petiole; upper leaves (with the petiole) often 3–4 in. long by ½ in. broad, frequently sessile. **Corysts** flattened or more rarely elongate, with few scattered linear bracts ¼–½ in. long. **Flowers** clear yellow, the corolla-tube glabrous. **Calyx** in fruit often as much as ½ in. wide.—This species should probably be united with **K. egyptiaca** (which hardly differs except by the orange tint of the flowers) and with **K. crenata** as in **Oliv. Fl. Trop. Afr.** ii. 394; but the Indian plant is very constant in its trifling characteristics and habit.

3. **K. floribunda**, W. & A. **Prodr.** 359; upper parts of the stem and cyme with short spreading glandular hairs, lower branches of the cyme usually

Stem 1–3 ft. high. Leaves ovate-elliptic crenate, cauline 2–3 in. long, petiole short. Cyme with very many flowers. Corolla clear yellow, tube glabrous.

Var. glabra; cyme often level-topped, the branches perfectly glabrous not at all racemose with numerous approximate small lanceolar bracts ½ in. long, calyx-tube in fruit ½–1 in. wide. K. floribunda, *Thwaites Enum.* 129. K. spathulata, *Wall. Cat.* 7224. Cotyledon heterophylla, *Roxb. Fl. Ind.* ii. 456. C. corymbosa, *Herb. Rottl.* —Mts. of the Deccan Peninsula; extending to Ceylon (*Thwaites No. 546*) and Parasnath in Behar, alt. 4000 ft. *J. D. H.*—This should perhaps be united with *K. crenata*; it differs from *K. spathulata* by the wider (elliptic) upper leaves, the much narrower capsule, the cyme less paniculate.


Nilgiri and Pulney Mts., alt. 7000–8000 ft.; *Gardner, Wight,* &c.

Stem, leaves, and panicle often glaucous. Stem-leaves 2–3 in. long, subsessile. Bracts of cyme 2–3 in. long, elliptic, petioled, early deciduous. Sepals united at base for a distance often ½ in. or more.—All the well-developed examples of *K. Wightiana*, *Wall. Cat.* 7225 belong to *K. floribunda* Var. above; but under *Wall. Cat.* 7225 are included several young examples of *K. grandiflora*.


Stem-leaves ½ in. long, elliptic, short petiolate, crenate. Petals hair-pointed (as in the allied Indian species). Flowers white ex Dr. Ritchie’s field note; yellow ex Cambs. and Oliver.—If this plant be united with *K. crenata* as proposed by Britten in *Oliv. Fl. Trop. Afr.* ii. 394 the species here described Nos. 2 to 5 may all be included.


Var. 1. *typica*; leaves once pinnatifid, segments ½–1 in. broad flat incise-crenate sometimes bipinnatifid; cyme-branches and sepals often glabrous.

Var. 2; leaves 2–3-pinnatifid, segments linear, cyme-branches and sepals pubescent.
K. teretifolia, Wall. does not appear separable from this var. K. acutiflora, Haw. in Andr. Bot. Repos. t. 560; Miq. Fl. Ind. Bat. i. pt. i. 728, probably is not an Indian form; it has white flowers.

5. COTYLEDON, Linn.

Herbs, branching or scapigerous. Leaves opposite or alternate, fleshy. Flowers in spicate racemes or cymose. Calyx 5-partite. Corolla 5-fid to the base (or in non-Indian species less deeply). Stamens 10 or 5, inserted on the corolla. Hypogynous scales oblong or quadrate. Carpels 5, free, attenuated into filiform styles; ovules very numerous. Fruit of 5 many-seeded follicles.—Distrib. Species 60; in Eastern Asia, Western and Southern Europe and the whole of Africa; also in Mexico.

The genus as it now stands includes such species as are excluded from Crassula by their alternate leaves, and from Sedum by their spicate racemes or by having only 5 stamens.

* Stem simple, leaves alternate, spike elongate dense, stamens 10.


West Tibet; Falconer No. 482. Baltistan, alt. 10,000–11,000 ft., C. B. Clarke. Height 6–15 in. Leaves 1–1½ in. long. Pedicel ¼ in. long, shorter than its oblong acute bract. Sepals ovate, very acute, greatly exceeding the tube of the corolla.

** Stems several, leaves alternate, cymes small, stamens 5.

2. C. Oreades, C. B. Clarke; annual, glabrous, stems branching from the base, branches ascending leafy, leaves on the sterile branches ¼ in. long, rosiulate narrow lanceolate aristate, flowers at the summit of the branches 3–1 nodding white. Umbilicus Oreades, Dene. in Jacq. Voy. Bot. 62 (U. luteus, Lc. t. 73, except that the stamens are not ten); H. f. & T. in Journ. Linn. Soc. ii. 91.


Stems 2–4 in. long, several, curved. Stem-leaves like the rosiulate leaves but rather smaller. Sepals ¼ in. long, oblong, acute. Petals a little exceeding the sepals, united at their base only. Seeds ellipsoid, microscopically covered with tubercles.—This species has the habit altogether of Sedum, but it cannot be put there because it has only 5 stamens; neither can it be put in Crassula because Crassula has always opposite leaves. Therefore it is put in Cotyledon; though in Cotyledon the corolla should be tubular, the tube at least equaling the calyx. Similar remarks apply to the next species.

Sikkim Himalaya, alt. 10,000-12,000 ft., J. D. H.

Stems 8-6 in. high, throwing decumbent stolons from the base. Cauline leaves ¼ in. long, sessile. Petals united at base only. Stamens 5. Flowers sometimes 4-merous. Seeds ellipsoid, smooth, tailed.

6. SEDUM, Linn.

Succulent herbs. Leaves alternate or rosulate, rarely opposite; entire or laciniate. Flowers cymose, hermaphrodite, or unisexual by abortion. Calyx 5-4-partite. Petals 5-4, free. Stamens 10-8, the alternate ones adnate to the petals. Hypogynous scales quadrate or cuneate, entire or emarginate. Carpels 5-4, free or slightly united at base, narrowed into the styles; ovules very numerous. Follicles 5-4, many-seeded.—Distrib. Species 130; mostly in the cold and temperate regions of the northern hemisphere; one species is found in Abyssinia and one in Peru.

Sect. I. Rhodiola. Rootstock perennial, thick, suberect, with a crown of scales from the axils of which rise the simple leafy annual stems carrying terminal cymes. Flowers dioecious or polygamous, often 4-merous. Petals in the males often much exceeding the sepals; in the females shorter or narrower. Styles usually short, recurved in fruit. Seeds oblong-ellipsoid, compressed, testa loose produced beyond the end of the nucleus, often as a bent short tail.

*Cymes dense, not carrying bracts on the short branches (though there are frequently bracts at the base of the outer branches).


Alpine Western Himalaya; from Kumaon to Kashmir, alt. 12,000-17,000 ft.; frequent.—Distrib. The arctic and alpine regions of America, Europe and Asia.

Very glaucous. Rootstock having an odour of roses. Stems 3-15 in. thick. Leaves ¼-1½ in. long, imbricated (often very closely) from a narrow or broad base. Cyme densely congested. Sepals narrow oblong. Stamens long, exsert. Carpels in fruit ¼ in. long, not narrowed gradually at the base.—The examples of S. imbricatum have dioecious (or functionally dioecious) heads; and the carpels have short recurved styles, altogether as in Sect. Rhodiola.


Temperate and Alpine Western Himalaya, alt. 8000-14,000 ft.; Kashmir, Jacquemont; Kunawur, T. Thomson; Mandala, Cleghorn.

Stems 12-18 in. Leaves loosely imbricate. Cyme very dense, especially in fruit. Otherwise agrees closely with S. Rhodiola, of which H. f. & T. suggest it may be a variety.

3. S. crenulatum, H. f. & T. in Journ. Linn. Soc. ii. 96; leaves elliptic or broad oblong sessile crenulated, cymes sessile enclosed by the upper leaves and outer leaf-like bracts, sepals purple narrow-oblong, petals rose-coloured.
Sikkim Himalaya, alt. 12,000–18,000 ft.; Yeumtong and Mt. Donkiah, J. D. H., W. T. Blandford. Kumaon, alt. 12,000–17,000 ft., Chumpua and Niti Pass, Strachey & Winterbottom.

Dried specimens are a ruddy chestnut colour. Stems 3–8 in.—Very like S. Rhodiola, of which it may be a variety.

** Cymes 1- few-flowered (except S. tibeticum), or in fruit somewhat lax, branches not bearing leaves (though there may be bracts at their bases).

4. **S. tibeticum**, H. f. & T. in Journ. Linn. Soc. ii. 96; leaves subentire oblong or ovate-oblong, cymes 4–20-flowered not very dense in fruit, flowers often 5-merous, sepals on the fruit triangular-acuminate.

Alpine Western Himalaya, alt. 12,000–16,000 ft.; Kunawur (Werang Pass) T. Thomson; Lahul, Jaeschke.—Distrib. Cabul, Griffith.

Glabrous. Stems 4–10 in. Leaves ½–1 in., loosely imbricate, the upper oblong subacute, the lower often ovate. Petals rose or purple. Follicles and seeds as in S. Rhodiola.

Var. Strachyji, H. f. & T. in Journ. Linn. Soc. ii. 96 (sp.); leaves ovate often toothed. Alpine Western Himalaya, alt. 12,000–17,000 ft., T. Thomson, Strachey & Winterbottom, Dr. Henderson.—The leaves sometimes entire, and the upper oblong: it then seems undistinguishable from S. tibeticum.


Alpine Western Himalaya, alt. 11,000–18,000 ft., from Kumaon to Kashmir, frequent. Sikkim, alt. 16,000–18,000 ft., J. D. H.—Distrib. Arctic Russia and Siberia.

Stems and leaves glabrous or puberulous. Leaves ¾ in., sometimes very acute. Petals usually twice the sepals. Hypogynous scales subquadrate (ex H. f. & T.). Follicles with short styles, recurved or sometimes erect, straight.

*** Cymes lax, branches bearing leaves, or the flowers supported by a leafy bract.

6. **S. Himalense**, Don Prodr. 212; leaves ½–¾ in. loosely imbricate narrow-obovate or lanceolate often dentate towards the summit, cymes large leafy, sepals lanceolate-linear, petals deep purple twice the sepals, pedicels much thickened under the fruit. DC. Prodr. iii. 402; H. f. & T. in Journ. Linn. Soc. ii. 97. S. Himalayanum and S. hypericifolium, Wall. Cat. 7236, 7257.

Sikkim and Nipal, alt. 12,000–17,000 ft., frequent; Wallich, J. D. H., &c.

Stems 4–14 in., usually puberulous or pubescent, sometimes glabrous. Petals lanceolate. Hypogynous scales black-purple, broadly triangular (ex H. f. & T.). Follicles ¾ in. long; black-purple.—S. atropurpureum, Turcz. of Central Asia differs among other things by its compact cyme.

7. **S. bupleuroides**, Wall. Cat. 7229; leaves ½–1½ in. long loosely imbricate ovate or ovate-oblong, base cordate or auriculate-bilobate, cymes large leafy, sepals lanceolate-linear, petals lanceolate small black-purple twice the sepals. H. f. & T. in Journ. Linn. Soc. ii. 98.

Nipal; Gossain Than, Wallich. Sikkim, alt. 10,000–14,000 ft.; Tungu, Lachen J. D. H.
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Stems 6-14 in. high, glabrous, or the cyme puberulous.  Hypogynous scales black purple, broadly cuneate-square (ex H. f. & T.).

8. S. elongatum, Wall. Cat. 7233; leaves ¾-2 in. long loosely imbricate oblong narrowed at base almost peltiied or elliptic sessile, cymes large loose, petals lanceolate black-purple.  H.f. & T. in Journ. Linn. Soc. ii. 98.

Alpine Himalaya, from Sikkim to Kashmir, alt. 10,000-12,000 ft.

Stems 8-20 in. high, glabrous, as are the leaves.  Cymes puberulo-pubescent.  Sepals lanceolate-linear.  Hypogynous scales broad, cuneate-square (ex H. f. & T.).  Follicles scarcely ¼ in.

9. S. fastigiatum, H. f. & T. in Journ. Linn. Soc. ii. 98; stems numerous, leaves ¼-½ in. long crowded terete oblong-linear, cymes 3-8-flowered, sepals lanceolate, petals ½ in. long linear twice the sepals.

Sikkim, alt. 14,000-17,000 ft.; Kankola, Lama Kangra, J. D. H.

Stems 2-5 in. curved, glabrous, as are the leaves.  Cymes puberulo-pubescent.  Hypogynous scales square.  Follicles more than ¼ in. long, black-purple.—A species resembling S. quadrifidum but larger with larger flowers and fruit.

10. S. humile, H. f. & T. in Journ. Linn. Soc. ii. 99; densely tufted, stems 1-2 in. glabrous or minutely pubescent, leaves ¼-½ in. long, linear or linear-oblong, cymes 1-4-flowered, sepals ovate acuminate, petals lanceolate wider upwards twice the sepals.

Sikkim, alt. 15,000-16,000 ft.; Yeumtong and Tunkra Pass, J. D. H.

Flowers large for so small a plant.  Hypogynous scales broad quadrate (ex H. f. & T.).—This species is distinct from the other Indian species by its sepals.


Nipal, Wallich.

Like S. tibeticum, var. Stracheyi, but wholly puberulous; the leaves obovate and the cymes few-flowered.

SECT. II. Rootstock thick.  Flowers hermaphrodite, rarely imperfect.  Follicles narrow oblong-lanceolate; style nearly straight, slender, not (or scarcely at all) recurved.  Seeds ellipsoid, compressed, testa loose produced beyond the end of the nucleus, often as a short bent tail.


Sikkim to Kashmir, alt. 11,000-16,000 ft., frequent; Wallich, Falconer, J. D. H., &c.

Glabrous or the cyme branches minutely puberulous.  Hypogynous scales very short, subquadrate (ex H. f. & T.).

Var. Wallichianum, H. f. & T. in Journ. Linn. Soc. ii. 100 (sp.); Hook. Io. Pl. t. 604; leaves broader more denticulate sometimes subpinatifid.—H. f. & T. say that this differs by its red flowers; but Sir W. Hooker says that the plants which flowered at Kew had yellow flowers.

**Temperate Western Himalaya**, alt. 7000–10,000 ft.; *Gurwhal, Kumaon, &c.; Royle, Falconer, T. Thomson, &c.*

A species easily recognised by the large white petals (but *H. f.* & *T.* say red?). Sepals not ovate in Var. *pauciflorum*, but as in the typical *linearifolium*.—Edgeworth's *S. mucronatum* is identically his *S. pauciflorum* as shown by *H. f.* & *T.*

**Var. 1. typica**; leaves dentate.

**Var. 2. pauciflorum**; leaves little dentate or entire.


**Temperate Himalaya** from Sikkim to Kashmir, alt. 6000–12,000 ft., common on rocks and on trees.

Cymes leafy. *Flowers* pedicellated, pink. *Follicles* when ripe very thin-walled.—A well-marked abundant species in which however the leaves vary between the wide limits given above.

**Sect. III.** Annuals, or perennials with no thick rootstock. *Flowers* hermaphrodite. *Seeds* obovoid, not compressed, the testa not loose.

*Follicles* 5, erect in fruit. Radical leaves rosulate.


Stem glabrous, more rarely glandular-pubescent. Rosulate leaves $\frac{1}{4}$–$\frac{1}{2}$ in. spatulate or elongate obovate. Cymes weak, straggling, often subsecund or subscorpioid with long pedicels $\frac{1}{2}$–1 in. long. *Follicles* small, thin-walled, erect. *Seeds* ellipsoid, somewhat obovoid, smooth, longitudinally striate.


Rosulate leaves $\frac{1}{4}$–$\frac{1}{2}$ in. spatulate or elongate obovate. Cymes lax with pedicels $\frac{1}{2}$–1 in. long, often with two or more erect elongate branches. *Follicles* thin-walled, erect. *Seeds* obovoid, ellipsoid, smooth, longitudinally striate.—This species may be generally distinguished from *S. rosulatum* by its larger size, stronger cyme, and more
pubescent stem and sepals: but the only absolute distinction appears to lie in the more acute petals.


**Bhotan; Griffith.**

H. f. & T. probably joined this with *S. adenotrichum* because of the acute petals; but in all other points, especially its weakness and glabrousness, it is nearer *S. rostratum*. It differs from both in the linear cauleine leaves and particularly in the cyme, which is corymbose and somewhat dense, with linear bracts like the cauleine leaves.

18. *S. trullipetalum*, *H. f. & T.* in *Journ. Linn. Soc.* ii. 102; glabrous, stems 2-4$\frac{1}{2}$ in., cauleine leaves $\frac{4}{3}$ in. imbricate lanceolate-linear acute, cymes dense, petals white-yellow with a very long claw and ovate cordate or lanceolate limb.

**Temperate and Alpine Himalaya from Sikkim to Kashmir, alt. 11,000-16,000 ft. Rosulate leaves $\frac{4}{3}$ in. long, ovate-lanceolate. Sepals elliptic-lanceolate, acute.**


**Lahul, in West Tibet; Jaeschke.**

Branches 4-5 in. or less, crowded, simple, or branched from the base. Lower leaves generally densely rosulate; cauleine scattered, smaller, narrower, or crowded towards the end of the branches. Flowers solitary at the end of the branches or crowded in dwarf specimens, nearly $\frac{1}{3}$ in. long. *Calyx* segments $\frac{1}{3}-\frac{2}{3}$ in. long, fleshy, green, similar to and often larger than the leaves. *Petals* double the sepals, lanceolate, obtuse. *Stamens* less than half the length of the petals.

The above is closely copied from Mr. Kurz, who evidently possessed better materials than certain scraps transmitted to Kew by Jaeschke and referred by Dr. Thomson to *S. asiaticum*, which has not the elongate leafy branches of the corymb.

There are several points however in which Mr. Kurz’ description does not fit the flowering slips (3 in. long) at Kew; Mr. Kurz says that the leaves are shorter than the sepals which are but 3 to 4 lines long; in the Kew examples the leaves on the corymbr branches are $\frac{1}{3}$ in. long and more. The Kew slips may however belong to examples of *S. asiaticum* in its first year of flowering.


**Temperate and Alpine Himalaya from Kumaon to Kashmir, alt. 9000-17,000 ft.; frequent.—Distrib. Alpine Siberia and Soongaria.**

Leaves fleshy, glaucous, entire or sinuate. Cymes sometimes less dense, corymbose with alternate branches. That the flowers are ever blue appears to rest wholly on Royle’s figure. *Seeds* ellipsoid, somewhat obovoid, testa not loose.

**Follicles** 3-5, divaricate in fruit.

Sedum.


**Punjab Plain; Peshawur, Vicary; Hurroo and Hassababad, Aitchison.—Distribe. Afghanistan and thence to Greece.**

Glabrous or minutely glandular-pubescent. *Leaves* 1 in., oblong to linear. *Flowers* 5-merous subsessile, white (or rose ex Boissier). *Petals* acute, thrice as long as the triangular acute sepal. *Cyme*-branches minutely glandular, divaricate-recurved in fruit.—A species that has been confounded with *S. multicaule*; it differs in its habitat and is absolutely separate by the seed.


**Temperate Himalaya, alt. 4000–7000 ft., from Kashmir to Bhutan; frequent.** —*Distribe. China and Japan.*

*Leaves* ½–1 in. long, linear-oblong, acute. *Flowers* subsessile, petals yellow. *Cyme* branches divaricate in fruit, usually elongate, subscorpioid.


**Sikkim, alt. 12,000 ft., J. D. H.**

*Leaves* ½ in. long, sessile, oblong or linear. *Cyme* small, leafy. *Flowers* pedicellate, erect. *Sepals* oblong, obtuse. *Petals* white, oblong, a little longer than the sepals. *Follicles* connected ½ their length.—The specimen referred here by *H. f. & T.*, collected in the Western Himalaya has different seeds; it is in too imperfect a state for identification.

7. **Sempervivum**, Linn.

Fleshy herbs, often sending up annual flower-stems from a rosette of leaves crowning the perennial rootstock. *Leaves* alternate. *Cymes* paniculate. *Flowers* in the Indian species 8-merous, more rarely 6–8-merous. *Calyx* divided nearly to the base. *Petals* free, or scarcely cohering at the base, oblong-lanceolate. *Stamens* double the number of the petals, free. Hypogynous *scales* small, bifid, united in pairs. *Carpels* equal in number with the petals, free or adnate to the calyx, narrowed upwards into filiform styles; ovules very numerous. *Follicles* many-seeded.—*Distribe. Species 40, extending from the Canary Islands across South Europe and North Africa to Asia Minor and the Western Himalaya.*


**Alpine Himalaya, from Kunawur to Kashmir, alt. 10,000–15,000 ft.; West Tibet, Strachey & Winterbottom, &c.**


Alpine Himalaya, from Kumaon to Kashmir, alt. 10,000-12,000 ft.; Kumaon, Strochey & Winterbottom; Niti, Edgeworth; Gurwhal, Falconer; Kashmir, Jacqumont.

Stems 2-6 in. high. Rosulate leaves 1-1½ in. lanceolate; cauline sessile, oblong-lanceolate, more or less pubescent. *Cyme* somewhat dense. Petals white, scarcely twice the sepals. Seeds narrowly ovoid, striated longitudinally, hardly half so big as in *S. acuminatum*.


Stems 1-3 in. Rosulate leaves ½ in. long; cauline ¾-½ in. somewhat densely imbricate, sessile, oblong or elliptic, glandular-pubescent. *Cyme* dense. Petals lanceolate (white or rose-white?). Seeds narrowly ellipsoid, minutely striate longitudinally.

8. **TRIACTINA**, *H. f. & T.*


Sikkim, alt. 10,000-12,000 ft.; Lachen, J. D. H.; Tumbok, C. B. Clarke.

Glabrous. Stems 4-10 in. long. Leaves ¼-1½ in. long, entire, narrowly obovate. *Flowers* subsessile. *Sepals* very small. *Seed* ellipsoid, somewhat obovoid, hispid with elongate papille.

This plant by the characters of its carpels and seeds is very closely allied to *Sedum perpusillum* *H. f. & T*. *H. f. & T. in Journ. Linn. Soc.* ii. 99 characterise *Triactina* as having polysperous follicles; the material collected by Sir J. D. Hooker was scanty, and the subsequent collections of C. B. Clarke have all the follicles 1-seeded.

**Order LIV. DROSERACEAE.** (By C. B. Clarke, F.L.S.)

Herbs; catching insects by means of glandular sticky hairs, or by means of petioled leaves with automatically closing laminae. *Flowers* hermaphrodite, regular. *Calyx* 4-5- (rarely -8-) partite, or sepals free imbricate persistent. *Petals* and *stamens* as many as the sepals, hypogynous or nearly so. *Ovary* nearly free, globose or ovoid, 1-3-celled; styles 5-3, capitate fimbriate or bifid; ovules numerous, on parietal placenta equal in number to the styles. *Capsule* membranous 5-3-valved, many-seeded. *Seeds* with fleshy albumen; embryo cylindric or minute.—**Distrib.** Species 110, spread over nearly all temperate and tropical lands except the islands of the Pacific.

Leaves glandular; cauline 0 or alternate . . . . . . . . . . . . . 1. *Drosera*.
Cauline leaves whorled vesicular glabrous . . . . . . . . . . . . . 2. *Aldrovanda*. 
1. **DROSELA, Linn.**

Perennial herbs, scapigerous or with a leafy stem, glandular-pilose. *Leaves* rosulate or alternate, usually circinate in vernation; stipules 0 or scarious and adnate to the petiole. *Calyx* free from the ovary, 4–8-partite, sepals persistent. *Petals* 4–8, hypogynous or scarcely perigynous, white or rose, withering persistent. *Stamens* as many as the petals, hypogynous or scarcely perigynous. *Ovary* 1-celled with 2–5 styles; ovules parietal, numerous. *Capsule* loculicidally 2–5-valved. *Seeds* numerous, in the Indian species obovoid-ellipsoidal with the testa black smooth reticulate not lax.—**Distrib.** Species 100, scattered throughout the world except Polynesia; very numerous in Australia.


Throughout India in the Plains, from Ceylon and Bombay to the base of the Himalaya and Burmah; abundant; ascending to 4000 ft. in the Himalaya, and 8000 ft. in the Deccan.—**Distrib.** China and Japan, Malaya, West Africa, Australia.


Ceylon and the Deccan as far north as Chota Nagpore, frequent; Burma and the Malay Peninsula (but not known in the Gangetic Plain).—**Distrib.** China, Malaya, Tropical Australia, Africa.

*Stems* 2–12 in., simple, rarely branched. *Leaves* 1–3 in., very glandular-pubescent, hardly broader than the glabrous petiole. *Racemes* 2–6 in.; pedicels ½–2 in. *Sepals* lanceolate, minutely glandulose or nearly glabrous. *Seeds* obovoid; testa prominently reticulated, not scrobiculate nor differing essentially from the seeds of the other two Indian species.

Throughout India. Var. 1 confined to the Malayan Peninsula; var. 2 ascending to 10,000 ft. in the Himalaya, and 8000 in the Nilghiris.—Distr. Malay Archipelago to Australia.

Stems 8-12 in. high, simple or corymbose upwards. Racemes subterminal, pedicels ½-2 in. long. Flowers white. Seed as in the preceding species; with a close testa (as Benth. correctly) and not tuberculately, which Planchon says it is. This plant turns very black in drying, but often stains the drying paper purple.

Var. 1. typica; rosulate leaves persistent, sepals very fimbriate. Moulemin and Sincapore.

Var. 2. lanata; rosulate leaves early deciduous, sepals erose or but slightly fimbriate.

[D. intermedia of Herb. Royle is stated to have been collected in N. W. India; which, as Royle’s specimens are D. peltata typica, is improbable. D. intermedia of W. & A. Prodr. 34 is probably founded on the specimen so named and still preserved in Wight’s Herbarium which seems to have been collected, not in India, and by a Dr. Haynes, not Heyne.]

2. ALDROVANDA, Linn.


Salt-pan south of Calcutta; Roxburgh; T. Thomson; S. Kurz.—Distr. Central Europe and Australia.

Order LV. HAMAMELIDÆ. (By C. B. Clarke, F.L.S.)

Trees or shrubs, often with stellate pubescence; prosenchyma of the wood marked with discs as in the Comifera. Leaves alternate, petiolate, simple or palmately lobed; stipules 1-2, rarely wanting, deciduous or rarely persistent. Flowers hermaphrodite or unisexual, collected into heads, spikes, or close racemes, or spikes. Calyx small or 0, adnate to the ovary; free in Distylium. Petals 0, or 4-5 perigynous or nearly epigynous. Stamens 4-∞, perigynous, or in Distylium hypogynous; anthers dehiscing longitudinally; the valves deciduous in Loropetalum. Ovary 2-celled; styles 2, separate and ultimately divaricate, persistent (deciduous in Altingia); ovules 1-∞, axile, pendulous. Capsule woody, dehiscing at the vertex across the dissepiment so as to split each style in two, and in some genera also afterwards imperfectly dehiscing through the dissepiment; endocarp often hairy separating from the exocarp. Seeds 1, or many when usually only the lowest in each cell is perfect.—Distr. Species 30; found in Asia from Persia and the Himalaya to Malaya China and Japan; in North America and in South Africa.
A. Ovules solitary in each cell.

* Petals 0.

Ovary half-inferior. Leaves deciduous. Stamens 5–7 ... 1. Parrotia.
Ovary superior. Flowers separate, not in heads ... 2. Distylium.
Ovary half-inferior. Leaves persistent. Stamens 8 ... 3. Sycopsis.

** Petals present.

Petals 4, linear. Connective horned. Leaves persistent ... 5. Loropetalum.

B. Ovules several in each cell.

Male flowers with a perianth. Leaves cordate-ovate, entire ... 7. Bucklandia.
Male flowers without a perianth. Leaves oblong-lanceolate, serrate ... ... 8. Altingia.

1. Parrotia, C. A. Mey.

Large branching shrubs. Leaves alternate, orbicular or oblong, crenate, deciduous; stipules large, early deciduous. Flowers hermaphrodite, appearing before the leaves, in capitate heads surrounded by large membranous bracts. Calyx half-adherent to the ovary; limb 5–7-fid. Petals 0. Stamens equal in number and opposite to the calyx-lobes, perigynous; anthers dehiscing by a longitudinal slit. Ovary 2-celled; styles 2, soon divaricate, with simple stigmas; ovules solitary in each cell, pendulous. Capsule woody; endocarp horny, separating from the exocarp. Seed narrowly ellipsoid, testa shining stramineous or scarcely brown.—Distrib. Species 2, one in Kashmir, one in Persia.

1. P. Jacquemontiana, Done. in Jacq. Voy. Bot. t. 82; anthers less than \( \frac{1}{2} \) in. long subquadrate, ovary and fruit with long woolly pubescence. H. f. & T. in Journ. Linn. Soc. ii. 85; Brandis For. Fl. p. 216, t. xxviii. Fothergilla involucrata, Fuc. in Proc. Linn. Soc. i. 18 (without description).

Kashmir, alt. 5000-9000 ft.; common.

A gregarious bush 6–12 ft. high, closely resembling a hazel; twigs and leaves beneath with stellate pubescence. Leaves 2–3 in. diam., blunt, petiole \( \frac{1}{2} \) in. long. Flowers small, involucral bracts obovate \( \frac{1}{3} \) in. long. Calyx-segments narrow, oblong or linear. Fruit in harsh spherical heads 1–1\( \frac{1}{2} \) in. diam.


Small trees. Leaves alternate, persistent, coriaceous, entire, oblong-lanceolate; stipules lanceolate, early deciduous. Flowers small, in short upright axillary spikes, polygamous, not congested. Calyx free, deeply 3–5-fid, imbricate; sometimes wanting. Petals 0. Stamens 2–8, hypogynous; anthers dehiscing by a longitudinal slit. Ovary superior, 2-celled; styles 2, soon distant at base, with capitate stigmas; ovule solitary in each cell, attached near the upper inner angle. Capsule woody; endocarp horny, separating from the exocarp. Seed narrowly ellipsoid, testa shining, stramineous.—Distrib. Species 2; one in Khasia, one in China and Japan.
1. **D. indicum**, Benth. in Herb. Griffl. No. 3377; leaves 3-4 in. more or less stellately pubescent beneath, petiole \(\frac{1}{2}\) in., unripe fruit \(\frac{3}{5}\) in. long densely stellate tomentose.

**Khasia Mts.; Griffith.**

Griffith's specimens are all in half-ripe fruit. Bark lenticellled, the end of the twigs and stipules with rusty stellate pubescence. Spikes 1-3 in. long, with stellate pubescence, each bearing 2-4 fruits, pedicels \(\frac{1}{8}-1\) in. long. The calyx seems to have been early deciduous. Styles very long.—This species appears near the typical *D. racemosum*, Sieb. & Zucc. but has larger leaves not glabrous and much larger fruits; the ripe fruits in *D. racemosum* do not exceed \(\frac{1}{3}\) in. long. *D. racemosum* is a tree 25 ft. high.

3. **SYCOPSIS**, Oliv.

A tree (or shrub). Leaves alternate, petioled, entire, coriaceous, lanceolate; stipules minute, early deciduous. Flowers unisexual, in small close axillary spikes, both sexes in the same spike. Male: calyx very small; petals 0; stamens 8 (of which number several appear abortive); rudimentary ovary 2-fid. Female: calyx-tube adnate to the ovary for \(\frac{3}{2}\) its height; petals 0; ovary 2-celled; styles 2 separate; ovules solitary in each cell pendulous.


**Khasia Mts.; Griffith.**

Boughs much branched with lenticular bark. Leaves 2-3 in. with stellate pubescence when young but soon glabrous; petiole \(\frac{1}{2}\) in. long. Spikes less than 1 in. stellately pubescent (and with sheathing bracts Benth. & H. f.). Young fruits \(\frac{4}{5}\) in. diam., white-tomentose with close matted stellate hairs. Anthers dehiscent longitudinally.—Specimens imperfect.


Shrubs in habit leaves and inflorescence resembling hazels. Leaves alternate, petioled, ovate or oblong, serrate, deciduous; stipules large, deciduous. Flowers appearing before the leaves in pendulous racemes, each flower nearly sessile with a large sheathing bract. Calyx-tube adnate to the ovary, limb of 5 valvate lobes. Petals 5, perigynous, obovate-spathulate. Stamens 5, perigynous; anthers separated by a somewhat broad connective, dehiscing longitudinally laterally. Scales 5, alternate with the stamens, or 10-15 irregularly placed. Ovary half-inferior, 2-celled; styles two, soon divaricate; ovules 1 in each cell, pendulous. Capsule woody, endocarp horny, separating from the exocarp. Seeds narrowly ellipsoid, testa black shining.—**Distr.** Species 4, extending from East Bengal through China to Japan.


**Khasia Mts., alt. 4000—6000 ft., common. Bhotan, alt. 5000—8000 ft.; Griffith.**
About 6 ft. high; bark lenticelled. *Leaves* 4 in., round-ovate and acute, or smaller and narrower, often cordate at base with a petiole ¼-1½ in., plicate, glabrous above, pilose silky or tomentose beneath; nerves straight, parallel, prominent. *Petals* obovate or elliptic, unguiculate, yellow-white.—*C. multiflora*, Hance, from the tea districts of Tokien, hardly differs except that the nerves of the leaves are much fewer and wider apart, and that the petals have a very long claw and round limb.

5. **LOROPETALUM**, Br.


**Khasia** Mts. alt. 4000-5000 ft.; J. D. H. & T. Thomson.—Distrib. South China. Twigs and inflorescence with much stellate pubescence. *Leaves* 1-2½ in. long, stellate-hairy on both surfaces (small in the Chinese specimens), acute, from a rounded base; petiole ¼-½ in. long. *Petals* ¼-½ in. long, 4 or 5 times the sepalis, yellowish. *Anthers* short, the edges of the valves bent in to meet the connective, so that the young stamen has 4 pseudo-cells; the valves open from the connective and soon after drop off altogether.

6. **MAINGAYA**, Oliver.

A tree. *Leaves* alternate, undivided, petioled, persistent; stipules small, deciduous. *Heads* peduncled, quasi-terminal, ebracteate, of about 15 flowers. *Calyx*-tube adherent to the ovary; the limb closed, splitting up on one side a little way from the base and then circumscissile deciduous in a cap. *Petals* 5, perigynous, linear, circinate in estivation. *Stamens* 5, perigynous, filaments very short, connective produced as a horn. *Scales* about 10, very small. *Ovary* half-inferior, 2-celled; styles 2 distinct, short; ovule 1 in each cell, pendulous. *Capsule* woody, ovoid, endocarp horny, separating from the exocarp. *Seeds* unknown.


**Penang**; Maingay, No. 1871.

A tall tree with rather small stem (ex Maingay), glabrous, the innovations peduncles and calyx with stellate hairs. *Leaves* 3-5 in. long, oblong-lanceolate, petiole ½-¾ in. long glabrous. *Petals* ½-¾ in. long, 4-6 times the sepalis. Dehiscing *capsule* 2½ in. long and 2½ in. broad.—Maingay differs from Loropetalum in the 5 not 4 petals, in the habit, but particularly in the calyx-limb circumscissile falling off in a cap before the flower expands.
7. **BUCKLANDIA, Br.**

A tree attaining 80 ft. high. **Leaves** alternate, cordate-ovate, acuminate, entire, long-petioled; stipules solitary or in pairs, large, oblong, coriaceous, deciduous. **Inflorescence** of 2–5-peduncled heads, at first enclosed between a pair of stipules; flowers adnate by their calyces, about 8 in a head, polygamous. **Calyx-tube** adnate to the ovary; **limb** 5-lobed. **Petals** in the flower linear-spathulate, fleshy, variable in number; in the ♀ rudimentary. **Stamens** 10–14 (in the ♂ one); filaments long. **Ovary** half-inferior, 2-celled; styles 2, separate, soon divaricate; ovules in each cell 6 in two rows. **Capsule** nearly superior, woody, subglobose, endocarp horny, showing a tendency to separate from the exocarp. **Seeds** in each cell 6, oblong, trigonous; the upper wingless solid, without any embryo, the lower one in each cell winged fertile.

1. **B. populnea, Br. in Wall. Cat. 7414; Griff. in Asiatic Res. xix. 95, with two plates.** B. populifolia, H. f. & T. in Journ. Linn. Soc. ii. 86; Kurz Forest Fl. Brit. Burma, i. 445. Liquidambar tricuspid, Miquel. Ind. Fl. i. pt. i. 1087 and Suppl. 340, with a figure.

**Temperate Himalaya,** from Nepal to Bhotan, alt. 5000–8000 ft., common. **Khasia Mtts.,** alt. 4000–6000 ft., common. **Burmah,** Griffith, Kurz.—**Distrib.** Java, Sumatra.

Branches and adult leaves glabrous. **Leaves** 3–8 in. with a cartilaginous edge, quite entire or 3-cuspidate especially in young plants, petiole 1–5 in. glabrous or when young densely silky with brown hairs. **Peduncles** (at least at first) densely brown silky; as are the young ovaries.—The Malayan Liquidambar tricuspid does not differ in the smallest point from Himalayan specimens some of which have tricuspidate leaves and sericeous petioles. C.f. Kurz in Flora, 1871, p. 289.

8. **ALTINGIA,** Noronha.

**Trees.** **Leaves** alternate, petioled, ovate or oblong, glandular-serrate, persistent; stipules deciduous or persistent. **Flowers** in dense heads; heads wrapped by a large bract, males racemose, females solitary. **Male** heads a mass of stamens with very short filaments, probably representing numerous acharlamydeous flowers. **Anthers** obverse-pyramidal, the valves when young turned in till they reach the connective so that the young stamen is pseudo-4-celled; dehiscing longitudinally. **Female** heads of 12–20 flowers; calyces confluent, without limb. **Petals** 0 (some rudimentary stamens have been taken for petals). **Ovary** ½-inferior, 2-celled; styles 2, separate, deciduous; ovules numerous, axile. **Fruit**-head globose, harsh. **Seeds** numerous; lowest 1–2 of each cell winged fertile, the upper without wing or embryo.—**Distrib.** Species 2; extending from East Bengal to China and Malaya.

Assam and Bhotan; Griffith. Pegu and Mergui, Kurz.—Distrib. Java, Yunan. A tree 60–100 ft. high. Leaves 3–4½ in., glabrous on both surfaces, or with tufts of hairs in the axils of the nerves beneath.—The only other species, A. chinensis, differs in its thicker leaves, less acumin ate, and much more shortly petiolo.

ORDER LVI. HALORAGIDAE. (By C. B. Clarke, F.L.S.)

Herbs, either weak aquatics or small land plants. Leaves opposite or whorled (or in the Indian species occasionally partly alternate) when submersed often pectinately pinnatifid; stipules 0. Flowers axillary, solitary or clustered, sessile less often pedicelled, the whorls often simulating a spike; hermaphrodite or unisexual, always small. Calyx-lobes 4 or 0. Petals 4 epigynous or 0. Stamens 8, 4, or 1 epigynous in the hermaph. flowers. Ovary inferior, 4–2–1-celled; styles 4, 2 or 1, filibrate or simple; ovules 4, pendulous (or in Hippuris 1). Fruit small dry or drupaceous, 4–2–1-celled, indehiscent or separating into its carpels; seeds 4 or more rarely 1.—Distrib. Species 80, many aquatic; spread over the whole globe.

Terrestrial. Flowers all sessile or subsessile. Stamens 8
Terrestrial. Male flowers pedicelled. Stamens 8
Aquatic or subaquatic. Stamens 1. Styles 2. Seeds 4

1. HALORAGIS, Forst.

Branching wiry herbs. Leaves opposite, the upper sometimes alternate, toothed, rigid. Flowers minute, nearly sessile in the axil of bracts, spicate or racemose, partially unisexual or hermaphrodite. Calyx-tube 4–8-ribbed; lobes 4 erect persistent acute valvate. Petals 4 coriaceous, often wanting in the 2. Stamens 8 epigynous. Ovary 2- or 4-celled with 4 pendulous ovules; stigmas 4 (in the females at least) sessile, feathery. Fruit a dry 2–4-celled 2–4-seeded nut; but in the two Indian species by abortion 1-celled 1-seeded.—Distrib. Species 40; reaching from Japan and East Bengal to New Zealand; Australia being the centre of the genus; one species found in Juan Fernandez.


A wiry branching herb, stems 4–16 in. Leaves ½ in., opposite, very shortly petiolo; upper sometimes alternate passing by degrees into the lower bracts. Flowers very small; pedicels about ¼ in. Petals thrice the triangular sepals. Fruit about ¼ in. long, shining, glabrous with 8 ribs, 1-celled, 1-seeded.

Haloragis.]  

LVI. HALORAGEE. (C. B. Clarke.) 431


A suberect rigid herb 4-10 in. high with many branches. Leaves $\frac{3}{4}$ in. in the Khasia examples oblong acute, as in the Chinese; in the New Zealand much shorter often ovate; opposite, the upper sometimes alternate, passing by degrees into the bracts. Flowers sessile, very small. Sepals triangular with a cartilaginous recurved border. Petals twice the sepals, scabrous-pilose on their backs. Fruit with 8 (often obscure) ribs, tubercular, scabrous and covered also with most minute white points, 1-celled, 1-seeded.—The Australian specimens agree with those of Bengal in these minute points; and moreover the fruit appears in the Australian specimens uniformly 1-seeded (as stated correctly by Koenig for the Chinese plant) and not 4-seeded (as stated and figured by La Billardière).

2. SERPICULA, Linn.

Herbs, small, decumbent, branching. Leaves opposite or alternate (often on the same plant). Flowers monoeccious, minute, clustered in the same axils, the females sessile the males pedicelled. Male: calyx-tube short, lobes 4 ovate acute; petals 4, cuculate; stamens 8; stigmas 4, rudimentary. Female: calyx-tube long, lobes 4 ovate acute; petals and stamens 0; ovary 1-celled; styles 4 spreading with papillose or plumose stigmas; ovules 4, pendulous. Nut minute, ovate, 1-seeded, 8-ribbed or smooth.—Distr. Species 2-4 in the marshes of warm Asia, Africa, and America.

1. S. zeylanica, Arn. in Herb.; suffruticose, leaves linear or linear ob-ovate entire or with 1-3 linear small teeth on each edge, fruit glabrous 8-ribbed tuberculate on the ribs. S. indica, Thwaites partim, viz. C.P. No. 447, 146. Haloragis oligantha, Arn. Pugillus Pl. Ind. Or. 18, not of W. & A. Prodr.

Ceylon; Adams Peak, Thwaites.

Glabrous. Stems 6-16 in. Leaves $\frac{1}{4}$-3 in. opposite and alternate on the same stem, densely approximated. Pedicels of the male ft. equaling the leaves. Stamens 8. Fruit most minutely puncticulate between the ribs not pilose.

Var. minor; stems very delicate scarcely 2 in. S. indica Thwaites b. minor No. 146 partly. Ceylon, Central Provinces; Thwaites. Appears worthy of specific distinction, but Mr. Thwaites treats it as a variety.


Ceylon and Mts. of the Deccan Peninsula, alt. 6000-8000 ft., frequent. Mysore, T. Lobb.

Pilose, or sometimes glabrous except the ovary and calyx. Leaves $\frac{1}{4}$-3 in. usually minutely ciliate on the edges, opposite with the upper ones alternate, or with some lower leaves alternate also; or all opposite. Pedicels of the male flowers usually as long as the leaves, often much longer. Stamens 8. Fruit generally very free from ridges or tubercles.
S. veronicaefolia, Bory of Java; Talasne in Ann. Sc. Nat. ser. 4. vi. 126, slightly differs from the most glabrous Indian specimens (S. brevipes W. & A.) by being quite glabrous, more robust in habit, a brighter red colour, and the fruit more tuberculat.

**Serricula verticillata**, Roxb. Cor. Pl. t. 164 and Fl. Ind. iii. 578 is Hydrilla verticillata Richard among the Vallisneriaceae.

### 3. *Hippuris*, Linn.

A glabrous water plant, the stems thick, simple, leafy. **Leaves** in whorls of 4–6-12, linear or oblong. **Flowers** minute, solitary, sessile in the axils of the leaves; hermaphrodite or unisexual. **Calyx-tube** subcylindric, limb entire. **Petals** 0. **Stamen** 1, epigynous. **Ovary** inferior, 1-celled; style 1, linear, stigmatose along nearly its whole length; ovule 1, pendulous. **Drupe** ellipsoid, very smooth, indehiscent, with a thick wall.


West Tibet, alt. 10,000–15,000 ft.; Falconer, T. Thomson, Strachey & Winterbottom.—Distributed. Cabul; Dahuria; and in the frigid or cool temperate waters of the whole Northern Hemisphere; also at Magellan Straits.

**Leaves** in the Tibet specimens about 1 in. 6–10 in the whorl. **Flowers** in the upper part of the stem that emerges from the water; lowest part of the stem losing its leaves.—In all respects agreeing with the common European type.

### 4. *Myriophyllum*, Linn.

**Herbs**, glabrous, their stems floating. **Leaves** dentate-serrate or pectinate-pinnatifid, rarely entire, whorled in the Indian species except *M. intermedium*. **Flowers** small, sessile or nearly so, in the axils of floral leaves or in nearly naked spikes; monocous or hermaphrodite. **Male**: calyx-tube short, limb 2–4-fid or 0; petals 2–4; stamens 2–8. **Female**: calyx-tube deeply 4-furrowed, limb 0 or of 4 minute lobes; petals minute or 0; ovary inferior, 4– or 2-celled; styles 2 or 4, short, usually recurved with plumose stigmas; ovules solitary in each cell, pendulous. **Fruit** 4-furrowed or separating into 4 or 2 carpels.—Distributed. Species 15, found all over the world.

Wight's Herb. No. 942 named *M. indicum* Willd., consisted really of *M. intermedium* DC. and *M. tuberculatum* Roxb. mixed together. The single plate we have illustrating Indian *Myriophyllum* viz. Wight III. t. 102 is made up of a stem of *M. intermedium* together with an analysis of the fruit (very good) of *M. tuberculatum*.

Further, the plate of *Halaragis oligantha* Wight Ic. t. 1061 is *M. intermedium* DC., as are Wight's own herbarium specimens of his *Halaragis oligantha*; but not so Arnott's, as see under *Serricula zeylanica* above.

Lastly, though Wight's Herb. 942 was named *M. indicum*, Willd., Wight's own Herb. No. 1094 is truly *M. indicum* as Arnott quotes it to be in W. & A. Prodr. 339.

1. **M. tuberculatum**, Roxb. Hort. Beng. 12; Fl. Ind. i. 451; spikes in fruit subterminal, floral leaves 4–6 in. linear cuneate toothed upwards, fruit ½ in. long, a broad furrow between the acute carpel-backs, both the ridges and the broad furrows carrying pointed small tubercles. Wall. Cat. 6337; DC. Prodr. iii. 69; Miq. Fl. *Ind. Bat.* i. pt. i. 635. *M. intermedium*, Wight III. t. 102 as to the fruit only. *M. indicum*, Griff. Not. iv. 687.

**Assam and East Bengal.** Very common in the jheels, but no specimen from west of Calcutta.

Upper whorls usually of male flowers, lower of female; hermaphrodite flowers
also occur. Stamens always 4, but the number is probably not constant. Stigmas pink, much fimbriate. Fruit looked down upon appears stellate.

2. **M. indicum**, Wild. Sp. Pl. iv. 407; spikes in fruit subterminal, floral leaves \(\frac{1}{2}-\frac{1}{4}\) in. narrow-lanceolate or linear-lanceolate, upper entire or crenate, fruit scarce \(\frac{1}{6}\) in. long but much broader, carpels 4 rounded on the back but separated by wide furrows tubercled and puberulous or finally quite smooth and glabrous. **Wall. Cat.** 6338; DC. Prodr. iii. 68; W. & A. Prodr. 330; Miq. Fl. Ind. Bat. i. pt. i. 634. M. tetrandrum, Roxb. Fl. Ind. i. 451; Griff. Notul. iv. 636; W. & A. Prodr. 330; Miq. l. c. 634. [M. indicum, *Wight Ill. t. 102 to be altogether excluded.]

**ASSAM and BENGAL**, in the jheels and canals, common, Coromandel coast and Ceylon.


There is a variety with longer floral leaves, so that the inflorescence is hardly terminal, and with the leaves not quite opposite; but the fruit noway approaches that of *M. intermedium*.

3. **M. verticillatum**, Linn.; Boiss. Fl. Orient. ii. 755; whorls of fruit axillary, floral leaves \(\frac{1}{4}-\frac{1}{4}\) in. pectinate, segments linear, fruit about as long as broad not deeply furrowed or tuberculate. DC. Prodr. iii. 68; Engl. Bot. t. 218; not Roxb. Hort. Beng. 12.


Fruit subquadrate, backs of the carpels rounded, furrows between them broad but shallow.

4. **M. spicatum**, Linn.; DC. Prodr. iii. 68; spikes always terminal, bracts oblong entire shorter than the expanded petals, fruit \(\frac{1}{2}\) in. ovoid, backs of the carpels broad flattened furrows very narrow soon becoming deep, carpels more or less tubercled on the back. Engl. Bot. t. 83; Gaertn. Fruct. t. 68; Fl. Dan. iv. t. 681; Boiss. Fl. Orient. ii. 755.

**KASHMIR**, alt. 5000 ft. descending to 1000 ft. along the northern boundary of the Punjab; frequent. **KUMAON**, alt. 5000 ft.—**Distrib.** Cabul, and cold and temperate Northern Hemisphere.

Fruit ovoid, seen from above appears round, the valleys between the carpels being too narrow to be noticed till closely examined. The fruit of the Indian examples is rather larger than that of the European, the backs of the carpels being very flat somewhat coryck and thickened; called *M. spicatum* Linn. var. muricatum by Maximowicz (Diagn. Pl. xv. 183) who quotes correctly *Griff. No. 2442* (Kew Distrib.).

5. **M. intermedium**, DC. Prodr. iii. 69; fruit axillary, floral leaves \(\frac{1}{2}-1\) in. long alternate solitary or 2-3-nate linear and entire to lanceolate and incis-serrate, fruit very small hardly \(\frac{1}{3}\) in. long but less broad, carpels rounded and most minutely scabrous on their backs, furrows shallow. *Miq. Fl. Ind. Bat.* i. pt. i. 634. M. indicum, *Wight Ill. t. 102, the plant only, not the fruit. M. variefolium, Hook. Ic. Pl. t. 289*. M. lineare, *Heyne in Herb. Rottl.* Haloragis oligantha, *W. & A. Prodr.* 338; *Wight Ic. 1061 not of Arn.*


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Leaves in the Indian examples sometimes whorled, more commonly in tufts of 1–3, each tuft placed irregularly round the stem. The Australian M. variegatulum has the leaves usually whorled; but the whorls get broken and the Australian examples become thus exactly like the Indian; the fruit is altogether the same.—The correct name of this plant is open to much question. De Candolle's is the oldest, but the accompanying description was drawn up to fit Hottonia sessiliflora, Vahl Symb. ii. 36 which probably was something altogether different; then a Myriophyllum is discovered in India which De Candolle's description very fairly fits, and Hohenacker and others apply it to the Candollean name.

5. CALLITRICHE, Linn.

Glabrous slender annual herbs growing in moist places, or their branches floating or submerged. Leaves opposite, linear- or obovate-spathulate, entire, the upper ones often rosulate. Flowers minute, axillary, unisexual, usually monoecious, solitary, or sometimes one male and one female in the same axil simulating a hermaphrodite flower; aehlamydeous; bracteoles white, membranous, linear-oblong, very caducous. Male: stamen 1. Female: ovary 4-ridged 4-celled; styles 2, elongate, stigmatose their whole length; ovules solitary in each cell, pendulous. Fruit coriaceous, indehiscent, 4-seeded, the 4 carpels at length separating.—Distr. Species 1 or 2 found almost all over the globe; but some authors allow 10 or 20 species.

The distribution of such critical species as these Callitriches cannot be safely stated; there are examples collected in Sikkim, alt. 8000–9000 ft., by Sir J. D. Hooker which are probably C. verna (and not C. stagnalis), but they show no fruit.]


Temperate Western Himalaya, alt. 5000–8000 ft., Edgeworth; Kashmir, alt. 7000 ft., C. B. Clarke.—Distr. Europe. Cold and temperate Asia and North America.

Order LVII. RHIZOPHOREAE. (By the Rev. G. Henslow, F.L.S.)

Trees or shrubs. Leaves opposite, stipulate (except Anisophylea), usually coriaceous, glabrous; stipules interpetiolar, very caducous. Flowers axillary, usually bisexual, surrounded at the base with connate or cupuliform bracts or ebracteate. Calyx more or less adnate to the ovary (except Blepharistemma); limb produced beyond the ovary, 4–14-lobed; lobes valvate, persistent. Petals equal in number to the sepals, entire emarginate 2-fid or falcate. Stamens usually twice the number of petals, in pairs opposite to and embraced by them, rarely indefinite (Kandelia); anthers 2-celled, rarely multi-locellate (Rhizophora). Ovary from 5- to 1-celled by solution of the septa; styles connate (except in
Anisophyllea); ovules usually 2 in each cell, pendulous. Fruit coriaceous, mostly indehiscent, 1-celled, 1-seeded. Seed pendulous, arillate or not; albumen fleshy or 0; embryo inverted, small if surrounded by albumen, elongated if exalbuminous; radicle macropodous in the tribe Rhizophoreae, perforating the apex of the pericarp and germinating while the fruit still adheres to the tree.—Distr. Tropical plants; many sharing with an arboreal vegetation the muddy shores of the estuaries of rivers. Genera 17, species about 50.

TRIBE I. Rhizophoreae. Leaves opposite, stipulate. Ovary inferior; style single. Embryo exalbuminous, macropodous, germinating while the fruit is still on the tree.


TRIBE II. Legnotidæ. Leaves opposite, stipulate. Ovary half-inferior or superior but adnate to the base of the calyx; style single. Embryo immersed in fleshy albumen.

Calyx-tube minutely ebracteolate, half-superior, lobes erect 5. Carallia.
Calyx-tube ebracteolate, half-superior, lobes reflexed 6. Pellacalyx.
Calyx-tube ebracteolate, adnate to the base of the ovary; cells of the ovary 4-ovuled 7. Gymnotroches.
Calyx-tube with connate bracteoles, adnate to the base of the ovary, lobes patent; cells of the ovary 2-ovuled 8. Weihea.
Calyx-tube ebracteolate, adnate to the base of the ovary, lobes erect 9. Blepharistemma.


Characters of the tribe ........................................................................ 10. Anisophyllea.

1. RHIZOPHORA, Linn.

Trees. Branches marked by leaf-scars. Leaves ovate or elliptic, mucronate. Flowers rather large, on axillary 2–3-chotomously divided and few-flowered cymes. Calyx 4-lobed, surrounding at the base by connate bracteoles. Petals 4, entire, inserted on a fleshy disk. Anthers subsessile, multi-locellate. Ovary 2-celled, half-inferior, projecting beyond the calyx as a fleshy cone; cells 2-ovuled; stigma bifid. Fruit coriaceous, ovoid or obconic, crowned with the reflexed limb of the calyx. Radicle elongated, clavate, perforating the apex of the fruit and descending from the tree into the mud.—Distr. About 5 species; frequent on muddy tropical shores.

Tidal shores from the mouths of the Indus to Malacca and Ceylon.—Distr. Tropical shores of Asia, Africa and Australia.

A large shrub or tree, evergreen. Leaves 3–7 by 1½–4 in., narrowed at the base. Flowers more or less drooping. Calyx-lobes triangular, narrowing upwards. Petals villous, shorter than the calyx-limb, subconnivent, coriaceous; margins involute.—A variety in Malacca, R. stylosa, Griff. (sp.) Notul. iv. 666; and Lc. Fl. Asiat. t. 640, differs according to Griffith from R. conjugata in its smaller stature, length of style, smaller radicle, more villous petals and more elongated base of the flowers, but the description shows a closer agreement with R. mucronata than with R. conjugata.

2. **R. conjugata**, Linn.; DC. Prodr. iii. 33; peduncles arising from the axils of (fallen) leaves of the previous year shorter than the petioles mostly 2-flowered, flowers sessile. R. candelaria, DC. l. c. 32. R. apiculata, Blume Flor. Jav. i. 91, and Mus. Bot. 134; Wight Ill. i. 209, t. 3; Kurz For. Fl. Brit. Burm. i. 447.

Tidal marshes from the mouths of the Indus to Malacca and Ceylon.—Distr. Tropical shores of Asia and Africa.


Trees. Leaves ovate or obovate. Peduncles axillary with subcapitate flowers. Calyx 5–6-merous, surrounded at the base with connate bracts. Petals 5–6, inserted at the base of a 10–12-lobed fleshy disk, emarginate, appendiculate; lobes of the petals with clavate or capitulate bristles. Stamens 10–12, filaments inserted between the lobes of the disk slender; anthers 2-celled. Ovary 3-celled (at least above), cells 2-ovuled; style short, stigma simple. Fruit coriaceous, ovoid, surrounded by the reflexed limb of the calyx, 1-celled, 1-seeded. Germination as in Rhizophora.—Distr. Species 2 or 3, natives of the tropical shores of the Old World.


Tidal forests, &c., from the mouths of the Indus to Malacca and Ceylon.—Distr. of the genus.

A small shrub or small tree. Leaves 2–3 by 1–2 in., obovate, very obtuse, cuneate or attenuate at the base. Flowers in rather loose cymes or subcapitate. Stamens 10, alternately shorter. Ovary half-inferior, 3-celled. Fruit small, club-shaped or subovate, surrounded near the base by the reflexed segments of the calyx.


Tidal forests from the Sunderbunds to Malacca.—Distr. of the genus.

A dwarf tree or shrub. Leaves 1–4 by 3 to 2 in., narrowed at the base, very obtuse, reddish brown beneath, glabrous. Inflorescence of small axillary cymes or glomerules. Peduncle very short. Stamens 10–12.
3. **KANDELIA, Wight & Arn.**


SUNDERBUNDS and tidal shores of both Peninsulas and Ceylon.—*Distrib.* Malay Islands.


4. **BRUGUIERA, Lam.**

Trees. *Leaves* usually coriaceous, oblong, quite entire. *Peduncles* axillary, recurved, 1-∞-flowered. *Flowers* rather large, coriaceous. *Calyx* 8-14-merous, obconical or campanulate, bracteate, adnate to the base of the ovary; lobes subulate-lanceolate, valvate. *Petals* oblong, 2-lobed, appendiculate, embracing the stamens which spring elastically from them when mature. *Stamens* 16-28, filaments filiform; anthers linear, mucronate, about as long as the filaments. *Ovary* 2-4-celled, included in the calyx-tube; cells 2-ovuled; style filiform, stigma 2-4-lobed minute. *Fruit* turbinate, coriaceous, crowned with the calyx-limb, 1-celled, 1-seeded. *Germination* as in *Rhizophora*.—*Distrib.* Species about 8 in the tropics of the Old World.


Littoral and especially estuarine forests of India from the mouth of the Indus to Malacca and Ceylon.—*Distrib.* Tropical Asia, Australia, Africa and the Pacific.

A large evergreen tree. *Leaves* slightly acuminate, 3-6 by 1½-2½ in.; stipules oblong, very deciduous. *Peduncles* cernuous, shorter than the pedioles. *Flowers* about 1 in. diam. *Calyx-tube* almost campanulate, limb 10-14-cleft. *Petals* 10-14. *Radicle* fusiform with about 6 prominent angles, apex obtuse.—A variety (B. Wightii, Bl. sp.) growing at the mouth of the Ganges and Indian Archipelago only differs apparently from the preceding by the entire margins of the petals being more or less hairy.

Malabar; at Quilon, Wight. Malayan Peninsula, Griffith.—Distrib. Malay ArchipelaGo, China.

A tree. Leaves ovate or oblong, acuminate at both ends. Calyx-lobes from 9–14, somewhat triquetrous, suberect in fruit. Anthers linear.


Tidal forests of India, from Malabar to Malacca and Ceylon.—Distrib. Malay ArchipelaGo.

A small tree. Leaves oblong to oblong-lanceolate, acuminate at both ends, scarcely coriaceous. Peduncles shorter or nearly equalling the petioles, 1–5– usually 3-flowered; buds subacute, pedicelled. Calyx-tube obtuse at the base, not ribbed. Fruit about \( \frac{1}{4} \) in., urceolate, slightly constricted below the calyx-limb. Radicle subclavate, subacute.

4. B. malabarica, Arn. in Wight Ill. i. 210; peduncles about 3-flowered, calyx about 8-cleft, lobes subobtuse reflexed about \( \frac{1}{4} \) in. and half the length of the tube in fruit, ovary 2-celled. Rhizophora cylindrica, Linn. sp. 635 in part. —Rheede Hort. Mal. vi. t. 33.

Malabar Coast; Rheede, Wight.

A tree. Leaves herbaceous. Peduncles equalling the petioles, 3-flowered. Buds obtuse, sessile. Fruit about \( \frac{1}{4} \) in. long, campanulate, not or scarcely constricted below the calyx-limb. Radicle as in the last species but apparently much softer than that of any other.—This may prove to be a variety or subspecies of B. caryophylloides.


Littoral forests, from the Sunderbunds to Malacca.—Distrib. Malay ArchipelaGo.

A shrub or small tree. Leaves oblong or broadly lanceolate. Peduncles once or twice trichotomous. Calyx-tube tapering at the base, ribbed; lobes very short and rigid.
5. Carallia, Roxb.

Trees and shrubs. Leaves petiolate, ovate or elliptic. Peduncles short, rather thick. Flowers small, in short 3-chotomous axillary branching cymes, sessile and often crowded. Calyx-tube minutely bracteate at the base; limb 5–8-lobed, campanulate; lobes erect, short, valvate. Petals 5–8, inserted on the margin of a crenulated disk lining the calyx-tube, clawed, orbicular, 2-fid or entire, sub-serrate or lacerate at the apex. Disk epignous, 10–16-lobed. Stamens inserted with the petals, filaments filiform; anthers small, oblong. Style subulate or filiform. Fruit small, globose, coriaceous, 1-celled, 1-seeded. Seed globose-reniform; tests fibrous; embryo curved.—Distrib. Species about 7, natives of the Indian Ocean.


Forests of the outer 'Sikkim Himalaya, Bengal, Assam, Silhet, Burmah, both Peninsulas and Ceylon.—Distrib. Malay Archipelago, China, Australia.

An evergreen tree with very lucid foliage. Flowers small, white. Berry globose, size of a peppercorn, usually 1-seeded.—The leaves vary excessively. The Cingalesse specimens are often all obovate and very obtuse; in some Chinese and Philippine Islands ones they are narrow-oblong and acuminate; in the majority from the greater part of the area, viz., Ceylon and the Indian Peninsulas, China, the Indian Archipelago and N. W. Australia, they are elliptic-ovate: Bentham (Journ. Linn. Soc. i. c.) has shown good cause for setting aside Roxburgh's specific name of C. lucida.

2. C. lanceafolia, Roxb. Fl. Ind. ii. 481; leaves elliptic or oblong regularly serrulate, flowers 6-8-merous subcapitate, petals embracing the filaments. Wight Ic. iii. t. 604; Kurz For. Fl. Brit. Burm. i. 437; Wight Ic. t. 604. C. confinis, Blueme Mus. Bot. i. 129. C. lucida, Roxb. Cor. Fl. iii. t. 211; Wight Ic. iii. t. 605. C. lanceolaria, Wall. Cat. 4881.

Tropical forests of Tenasserim, Kurz.—Distrib. Sumatra.

Cymes less crowded than in the last species. Petals reniform, crenulate. Fruit larger than the preceding, turbinato-globose, 2–3-seeded.

3. C. calycina, Thwaites Enum. 121; leaves ovate or elliptical quite entire, peduncles rather long dichotomous, cymes slightly branching above the middle.

Ceylon, Singh Rajah forest, between Galle and Ratnapura, at no great elevation, Thwaites.


Var. B. Thwaites l. c.; leaves shorter more rounded and coriaceous. Central Province, alt. 4–5000 ft., Thwaites.
6. PELLACALYX, Korth.

A small tree, ferruginously pubescent. Leaves oblong, minutely serrulate or entire, subscabrous above, rufescent with stellate pubescence beneath. Flowers subsolitary or in dichotomously branched glomerules. Calyx ebracteolate; limb 5-8-fid, recurved, campanulate above the ovary. Petals 2-6, tips lacerate. Stamens 10-12, inserted with the petals on the margin of a crenulated disk lining the calyx-tube, filaments short subulate; anthers small. Ovary with the ovuliferous part inferior, 5-10-celled; style subulate, stigma discoid, 5-10-lobed; ovules many in each cell, fascicled, pendulous from the axis. Fruit pisiform or turbinate, black, fleshy, 5-10-celled, many-seeded. Seeds ovoid, testa striated; embryo becoming green, straight, in the axis of the albumen; cotyledons scarcely broader than the terete elongated radicle.

1. P. axillaris, Korth in Van der Hoew. et de Vries Tijdschr. iii. 20, t. 2; Benth. in Journ. Linn. Soc. iii. 75; Griff. Notul. iv. 429; Le. Pl. Asiat. t. 480 (Cunoniaceae).

Penang and Malacca, Griffith.
Leaves 5-8 by 1½-3 in., shortly acuminate. Flowers small, shortly pedicelled, erect. Calyx-tube ½ in. long, densely ferruginously pubescent.

7. GYNOTROCHES, Blume.

Small trees and shrubs. Leaves oblong; stipules deciduous. Flowers small, axillary, fascicled; pedicels jointed in the middle. Calyx ebracteolate, 4-5-partite; segments valvate, reflexed. Petals 4-5, inserted below the margin of an 8-10-lobed perigynous disk, clawed, spathulate, fimbriate-lacerate. Stamens 8-10, inserted in the disk, filaments filiform; anthers small. Ovary superior, adhering by a broad base to the calyx, ovoid-globose, 3-6-angled, 3-6-celled; style columnar, fimbriate, conical at the base; stigma 3-6-lobed, lobes emarginate recurved; ovules 4 in each cell, ascending, fascicled. Berry globose, 4-6-celled, many-seeded. Seeds small, obovoid, testa crustaceous wrinkled, albumen fleshy; embryo terete.—Distrib. Species 2, natives of the Malay Islands.


Leaves 2-5 in., oblong or elliptic, acuminate, coriaceous. Flowers small, numerous, axillary, subdiplose: male with petals and perfect stamens; ovary often empty; stigma not dilated; female or hermaphrodite flowers with longer pedicels; petals and stamens often smaller, the latter sometimes effete; stigma radially lobed. Fruit baccate, ½ in. diam.

8. WEIHEA, Spreng.

Trees or shrubs. Leaves oblong, quite entire or obtusely serrate; stipules interpetiolar, oblong, deciduous. Flowers in axillary 1- or more flowered pedicels. Calyx with connate bracts; limb 4-5-fid, patent. Petals inserted under the margin of an obscure disk, clawed, spathulate, fimbriate-lacerate,
longer than the sepals. **Stamens** 10–30, inserted on the margin of the disk; filaments filiform; anthers oblong. **Ovary** superior, 3–5-furrowed, 2–4-celled; style filiform, stigma with 2–4 radiating lobes; ovules 2 in each cell, collateral, pendulous. **Fruit** globose, fleshy, 2–4-celled, septicidally but slowly dehiscent into 2–4 valves; cells 1–2-seeded. **Seeds** arillate, ovoid, subtrigonal, testa coriaceous; embryo straight, cotyledons elliptical, radicle terete.—**Distr.** Species 5, natives of S. and Trop. Africa, Madagascar and Ceylon.


**Maisor and Carnatic, Wight, c.c.** **Ceylon,** Galle District, Trincomalee, &c., at no great elevation.

A very much branched shrub or small tree. **Branches** terete. **Leaves** 3–3½ by 1½ in., petiolated, glabrous, acuminate, rounded at the base, green and shining above, pale beneath, nerves reticulate prominent on both surfaces; petiole about ¼ in. **Peduncles** solitary or in pairs, shorter than the pedioles. **Flower-buds** of full size six months before opening. **Calyx-limb** 4-fid; segments ovate, acute, persistent, densely covered with adpressed hairs, valvate. **Petals** 4, hypogynous, cuneate, imbricated in bud. **Stamens** about 30, hypogynous; anthers erect, cordate, obtuse. **Ovary superior,** 3-celled; style simple, persistent. **Berry** thick, spongy. **Embryo** in the axis of fleshy albumen; cotyledons flat, veined; radicle thick, elongated and directed upwards.

9. **BLEPHARISTEMMA,** Wall.

A shrub? **Leaves** opposite, petiolate, membranous, elliptic-oblong, acuminate, crenately-toothed; stipules small, caducous. **Flowers** in 2–3-chotomous many-flowered axillary cymes, polygamo-dioecious. **Calyx-tube** ovoid, ebracteolate; lobes 4, minute, triangular, erect. **Petals** 4, twice the length of the calyx, inserted round a disk at the base of the calyx-tube, clawed; tips lacerate. **Disk** free; of the male, 8-toothed; of the female often cleft. **Stamens** 8, inserted upon the margin of the disk; in the female small, filaments ciliated; anthers small, oblong. **Ovary** obously subtrigonal, contracted at the base, ovoid, free, 3-celled; cells 2-ovuled; style of the female flower longer than the calyx, stigma obsolescently 3-lobed. **Fruit** unknown.


**Western Peninsula, Heyne, c.c.**

Glabrous, excepting the inflorescence and buds. **Leaves** 1½–2½ in.; stipules lanceolate, membranous, pubescent. **Calyx** minutely roughened above. **Stamens** ciliated like the claws of the petals. **Disk** almost entirely free from the calyx. **Ovary** narrow, empty; style short. **Petals** in the female flowers, shorter. **Stamens** less; anthers small, effete. **Disk** smaller. **Style** longer than the calyx.

10. **ANISOPHYLLEA,** Br.

Trees and shrubs, glabrous, young parts silky. **Leaves** exstipulate, distichous; alternate ones smaller or minute, and often stipuliform or 0?, oblique, ovate lanceolate or elliptic, with 3–5 main nerves branching from the base, quite entire. **Flowers** minute in axillary simple or fascicled spikes, ebracteate or minutely bracteolate bi- or unisexual. **Calyx-tube** ovoid, adnate to the ovary, terete or ribbed; limb 4-fid, lobes erect. **Petals** 4, small, involute, entire, lobed or lacerate. **Stamens** 8, filaments short, subulate; anthers small, didymous, pro-
bably abortive in the females. *Ovary* inferior, 4-celled; styles 3-4, subulate, erect or recurved, stigmas acute or subcapitate; ovules solitary in each cell, pendulous, anatropous. *Fruit* coriaceous, oblong or pyriform, ribbed or smooth, 1-seeded. *Seed* pendulous, exalbaminous, testa coriaceous; embryo clavate, cotyledons very small or 0, radicle large.—*DISTRIB.* Species 5, natives of Tropical Asia and Africa.


**CEYLON;** southern and central parts ascending to 1500 ft.

A tree 40–50 ft.; bark smooth; lower branches horizontal, upper suberect; twigs puberulous. *Leaves* glabrous on both surfaces, younger red; pairs opposite in vertation, the smaller squamiform 1-nerved caduceous, the larger 5-nerved with involute margins. *Flowers* small, subsessile. *Bracts* minute. *Calyx-limb* superior, 4-cleft; lobes acute, valvate, persistent. *Petals* somewhat fleshy, lanceolate, induplicate in aestivation; segments 5, linear-subulate. *Stamens* 8, alternately shorter; filaments subsessile, inserted on the calyx; anthers versatile. *Styles* 4, erect, conico-subulate, stigmas capitatum.


**MALAY PENINSULA;** *Jack. SINGAPORE.—DISTRIB. SUMATRA.*

A shrub with rusty hairy branches. *Leaves* in two series, one of large leaves and another of very small stipuliform ones inserted below the insertion of the larger so as to overlap their bases; the larger 1–1½ in., subsessile, nearly glabrous above, beneath with short appressed hairs, the smaller ½ in., similar in shape but more acute. *Calyx-lobes* persistent. *Petals* shorter than calyx, 3-fld. *Stamens* as long as the petals; anthers 2-celled. *Ovary* 4-ovulose, ferruginous, 4-celled; *styles* 4, equalling the stamens; stigmas simple. *Drupe* oblong-ovate, red; stone with 8 longitudinal furrows, 1-seeded.

3. **A. Griffithii**, Oliver *in Trans. Linn. Soc.* xxiii. 460, t. 48; leaves lanceolate or ovate often slightly acuminate, spikes solitary or geminate.

**MALACCA, Griffith.**

Probably a tree. *Leaves* 3-4 by 1–1½ in., petiole ½ in., coriaceous, turning yellow on drying; nerves 3, 1 central, 2 closely parallel to the margin. *Flowers* sessile, somewhat remote. *Calyx-lobes* coriaceous, triangular, valvate. *Petals* shorter than the sepals, coriaceous, broadly quadrate-oblong, entire or scarcely 3-lobed. *Stamens* 8, 4 opposite to and closely embraced by the petals, filaments rather stout; anthers small, rounded or didymous. *Ovary* 4-celled below; *styles* 4.

4. **A. grandifolia**, G. Henslow; leaves oblong acuminate scarcely narrowed at the base 5-nerved quite entire, panicles axillary with subfasciate branches.

**PENANG, MAINGAY.**

A tree about 50 ft., trunk very stout. *Leaves* large, 3½–10½ in., coriaceous. *Inflorescence* of several somewhat flattened or fasciate branches, forming an irregular panicle; pedicels bearing numerous minute sessile male flowers with a few female possessing rudimentary? stamens; male buds ⅓ in. in diam., female rather larger. **MALE FL.** *Sepals* 4, valvate, puberulous; lobes triangular. *Petals* 4, fringed. *Sta-

mens* 8, opposite to and embraced by the petals; filaments short. *Pistil* rudimentary;
styles 4?, minute, densely hairy. **Female Fl. Calyx-limb partially lined with a disk, lobes each bearing a minute rudimentary stamen; anthers dehiscing in bud?** Styles 4, spreading, subulate, densely hairy. Drupe narrowly pyriform, 3 by 1½ in.

**Order LVIII. Combretaceae.** (By C. B. Clarke, F.L.S.)

Trees, or shrubs often climbers. Leaves alternate subopposite or opposite, sometimes ternate, pectioid, entire, simple (in *Illigera* 3-foliolate); stipules 0. Flowers bracteolate at base, in the tribe *Gyrocarpeae* cymose; in the *Combretaceae* spicate or racemose (the racemes often panicked); not rarely polygamo-moneocious. Calyx-tube adnate to the ovary and produced above it (sometimes to a great length), the limb of 4–5 (rarely 4–7) valvate lobes. Petals 4–5 or 0 (rarely 6–7). Stamens 4–5 or 8–10 on the calyx; in the *Gyrocarpeae* the filaments have staminodes attached at the base, and the anthers dehise by recurved lateral valves. Ovary altogether inferior 1-celled; style simple, stigma simple or in *Illigera* sinuate almost lobed; ovules 1–7 (usually 2–3) pendulous from the apex of the cell. Fruit coriaceous or drupaceous, generally indehiscent, ovate, angular or very commonly winged; in *Calycopteris* and *Gyrocarpus* crowned by the greatly enlarged calyx. Seed 1, without albumen; cotyledons in *Terminalia* and others convolute; in *Combretum* and others plano-convex.—**Distrib.** Species 240, in the tropics of the whole world; and in S. Africa outside the tropic.

**Suborder I. Combretae.** Calyx-lobes valvate. Stamens without glands or staminodes at their base; anthers dehiscing by a longitudinal slit. Ovules 2–7, suspended by long funicles. Flowers racemose or spicate.

* Petals 0. Calyx-limb (except in *Calycopteris*) deciduous.

Flowers spiked or racemose. Calyx-limb deciduous ........ 1. **Terminalia.**
Calyx-limb much accrescent on the fruit .................. 2. **Calycopteris.**
Flowers capitate. Calyx-limb deciduous .................. 3. **Anogeissus.**

** Petals 5–4 (except in *Combretum apetalum*).

† Calyx limb persistent.

Leaves alternate. Growing with the Mangroves .......... 4. **Lumnitzera.**

†† Calyx-limb deciduous.

Calyx-tube above the ovary less than ½ in. long ........ 5. **Combretum.**
Calyx-tube above the ovary more than ½ in. long .... 6. **Quisqualis.**

**Suborder II. Gyrocarpeae.** Calyx-lobes valvate or imbricate. Stamens with glands or staminodes at their base; anthers opening by recurved lateral valves. Ovule 1, suspended by a short funicle. Flowers cymose.

Scandent. Leaves 3-foliolate ............................. 7. **Illigera.**
Erect tree. Leaves entire or lobed ..................... 8. **Gyrocarpus.**

1. **Terminalia**, Linn.

Large trees. Leaves alternate or subopposite, exstipulate, entire or slightly crenulate, often with glands on the petiole or near the base of the midrib beneath. Flowers small spicate, the racemes spikes sometimes panicked, hermaphrodite or the upper flowers on the racemes males; a narrow bract at the base of each
flower, soon deciduous. *Calyx*-tube produced above the ovary with a cam-
panulate mouth, limb of 5 short valvate triangular lobes, deciduous. Petals 0.
*Stamens* 10 inserted on the calyx-tube; epigynous disc within them densely
hairly. *Ovary* 1-celled, inferior; style long, simple; ovules 2 or 3, pendulous
from the summit of the cell. Fruit ovoid, very various in size, smooth or
angular or winged with 2–5 wings, indehiscent, coriaceous. *Seed* solitary, ex-
albuminous, cotyledons convolute.—**Distrib.** Species 80; in the tropics of
the whole world, less numerous in America.

T. angustifolia, Jacq. Hort. Vindob. t. 100 not of Roxb.; leaves attenuated at
both ends lanceolate, with two glands at the apex of the petiole, fruit narrowly
349; *Wall. Cat.* 3976. Catappa Benzoin, Gaertn. *Fruct.* ii. 127, is included in the
Peninsula Flora of W. & A., but there is nothing to show that it has ever been found
wild in the Deccan.—Distrib. Central Malayan Islands.

**Sect. I. Catappa** (including *Myrobalanus*). *Fruit* not winged, ovoid
or subcompressed, sometimes showing (especially when dry) two or five obscure
lines or ridges.

towards the ends of the branches very short-petioled obovate from a cordate
but very narrow base, spikes solitary axillary simple, fruit 1–1 ½ in. ellipsoid
slightly compressed so as to show two ridges. *Roxb. Hort. Beng.* 33 and *Fl.
Ind.* ii. 430; *Lamk. Ill.* t. 848; *DC. Prodr.* iii. 11; *Wall. Cat.* 3975; W. &
A. *Prodr.* 313; *Wight* t. 172; *Bot. Mag.* 3004; *Mig. Fl. Ind. Bat.* i. pt. i.
Diet.* i. 349, not of Roxb.; *DC. Prodr.* iii. 11; *Willd. Sp. Pl.* iv. 96 ex-

Wild in the lowlands of *Malaya*, and perhaps of the Transgangetic Peninsula;
largely planted in all *India* from the North-West Provinces to Ceylon and Burma,
mostly at 0–1000 ft. alt.—Distrib. Planted in nearly all tropical countries.
Attains 80 ft., with branches in horizontal whorls. *Leaves* 6–8 in., deciduous in
the cold season, usually softly hairy when young, when adult hairy or glabrous,
with two glandular depressions near the base of the midrib on the under side which are
often obscure or wanting; petiole ¼–½ in. *Spikes* (and innovations) grey or rusty
tomentose or pilose, the upper flowers male, the lower hermaphrodite, the bracts mi-
nette. *Calyx*-teeth glabrous or nearly so within and without. Young *ovary* glabrous
or hairy. *Fruit* finally glabrous.—This species may generally be recognised by the
short petiole and the very narrow but cordate base of the leaf.

2. **T. procera**, *Roxb. Hort. Beng.* 33 and *Fl. Ind.* ii. 249; leaves alter-
mate clustered towards the ends of the branches obovate attenuated into a very
short petiole, spikes solitary axillary simple, fruit ellipsoidal obscurely 5-sided,

**Andamans**: *Roxburgh, Kurz.* **Nicobars**: *Kurz.*
Attains 100 ft. with branches in horizontal whorls. *Leaves* 6–12 in., with two
glandular depressions near the base of the midrib on the under side which are often
obscure or wanting, glabrous when adult; petiole ¾ in. Upper flowers of the spikes male, lower hermaphrodite. *Fruit* 1–1½ in.—Much resembles *T. Catappa*.

3. *T. foetidissima*, Griff. *Notul.* iv. 685; leaves alternate clustered towards the ends of the branches, obovate attenuated into the petiole, spikes solitary axillary simple, fruit 1½ in. obovate ellipsoid subacute, compressed with one face convex the other flat.

**MERGUIL and MALACCA; Griffith. Malacca, Maingay No. 644, 643¼.**

*Leaves* 6 in., glaucescent reticulate beneath, coriaceous with cartilaginous margin, without glands; petiole 1 in. *Flowers* all or very nearly all hermaphrodite. Young *ovary* and bracts very hairy. Calyx-teeth glabrous or nearly so within and without.

Reduced by Mr. Kurz in *Journ. As. Soc.* 1877 pt. ii. 53, 54, to *T. belerica*; from which it differs so greatly in leaves and fruit that it raises a suspicion whether Mr. Kurz had the true plant of Griffith before him.

4. *T. belerica*, Roxb. *Char. Reform.*; leaves alternate clustered towards the ends of the branches broadly elliptic narrowed equally at both ends, petiole very long, spikes solitary axillary simple, fruit ½—¾ in. diam. globular suddenly narrowed into a short stalk smooth covered by a close fulvous tomentum, when dried obscurely 5-angled.

Throughout *India*; common in the plains and lower hills, extending to *Ceylon* and *Malacca*; not in the desert region of the West of *India*.—**Distr.** Malaya.

Attains 60–80 ft. *Leaves* 3–6 in., deciduous in the cold season, when mature glabrous and generally punctate on the upper surface; the punctations being much more permanent than in the other species (whence Roth's name); petiole 1–1¼ in. *Bracteoles* minute. Upper *flowers* of the spikes male, lower hermaphrodite. Young *ovary* always tomentose. Calyx-teeth pubescent within and without. *T. moluccana,* *Miq. Fl. Ind. Bat.* i. pt. i. 601 differs from *belerica* by its short petioles; the description appears compounded out of two plants.


It is remarkable that not one specimen of this typical *belerica* Roxb. exists at *Kew*; and that both W. & A. (Prodr. 313) and Brandis (Forest *Fl.* 222) expressly state that they have never been able to discover a single example. The distinction between it and Roxburgh's *eglandulosa* (moluccana, *Wildl.* in *Fl. Ind.*) is indeed trivial; but the absence of the glands seems without exception in the Indian so-called *belerica*; while Roxburgh founded his *belerica* on the single character that it had two glands, thereby differing from his *T. eglandulosa*, which he subsequently renamed *T. moluccana*, *Wildl.*, a species made up of two trees.

**VAR. 3. laurinoides**, *Miq. Fl. Ind. Bat.* i. pt. i. 600; leaves obovate or obovate-elliptic shortly acuminate much thinner than in the typical *belerica*. *Mergui; Griffith. Ceylon; Thwaites, Gardiner, Col. Walker.—Distr. Java, Malaya. T. nitens* *Prestl. Epimel.* 214 is very near but has long subpersistent bracteoles.

*T. bialata* is much mixed (in absence of fruit) with *T. belerica*, but may generally be distinguished by the absence of punctations on the leaves.

Abundant in Northern India from Kumaon to Bengal, and southward to the Deccan table lands at 1000—3000 ft. alt., and Ceylon, Burma and the Malay Peninsula.—*Distrib.* Siam, Malaya.

Attains 80—100 ft. Leaves 4—5 in., deciduous in the cold season, more or less hairy when young; petiole about 1 in. often with two glands near its summit. *Racemes* terminal. *Bracteoles* conspicuous in the young spikes, exceeding the flowers pubescent, but soon deciduous. *Flowers* all hermaphrodite. *Calyx-teeth* hairy within.

**Var. 1, typica**; adult leaves nearly glabrous beneath or the interstices of the ultimate nerves with minute sunk white tomentum, young ovary shaggy without, calyx-teeth without glabrous.—Deccan, Ceylon, and Burma and Malay Peninsula.

**Var. 2** (*T. citrina of authors partly*) differs from var. 1 only in having the young ovary quite glabrous; it has the ovate fruit and round-based leaves of *T. Chebula*. Common in Northern India from Kumaon to Bengal, and in Chota Nagpore.

**Var. 3**; adult leaves very shaggy beneath, fruit much smaller, often only \(\frac{3}{4}\) in. Gnarléd small trees on the summit of Parasnath in Behar alt. 4000 ft.: but pass by degrees into var. 2 the common form at the base of Parasnath.

**Var. 4, tomentellta**, *Kurz For. Fl.* Brit. Burma i. 455 (sp.); leaves when young densely coppery-pubescent beneath, when adult pubescent or glabrous beneath, young ovary glabrous, fruit ovoid hardly 1 in. Pegu, up to 2000 ft. alt.; *Kurz*.—This is reckoned, perhaps rightly, a species by *Kurz*, but the leaves are less hairy, the fruits less reduced in size than those of the preceding var.

**Var. 5, gangetica**; *Roxb. Hort. Beng.* 33 and *Fl. Ind.* ii. 437 (sp.); adult leaves with brown-red silky hairs on both surfaces. *Wall. Cat.* 3967 E.; *Miq. Fl. Ind. Bat.* i. pt. i. 602. Banks of the Ganges; *Roxburgh*. North-west India, cult. Edgeworth. Very unlike the typical *Chebula* by the brown silky hair which covers the twigs leaves and whole inflorescence. It may be a good species but the fruit is similar to that of *Chebula*.—Roxburgh remarks that this tree ripens its fruit on the banks of the Ganges, a remark he would hardly have made had he thought the tree indigenous. It is therefore likely that *T. gangetica*, *Roxb.* does not grow wild within the limits of the Indian Flora.

**Var. 6, parviflora**, *Thwaites Enum.* 103 (sp.); calyx-teeth pubescent without. *T. zeylanica* Heurck & Mull., *Arg. Obs. Bot.* 220. *Ceylon*; *Thwaites*.—The flowers are not smaller nor the fruits more acutely ribbed than in some examples of *T. Chebula*.


**Assam, East Bengal, Burma and Tenasserim**; frequent. *Malacca* at Mount Ophir.
Attains 80 ft. Leaves 3–6 in., when adult glabrous shining, the interstices of the nerves beneath with sunk close white tomentum; petiole ½ in. usually with two glands at the top or on the base of the leaf beneath. Bracteoles linear, conspicuous on the young spikes. Flowers all hermaphrodite. Calyx-teeth glabrous without, hairy within. Young ovary glabrous.—The examples from other parts of India than the East referred to T. citrina by collectors are in the present enumeration supposed included under T. Chebula. T. citrina has a straighter stem, a brighter foliage and narrower fruits, but ought perhaps hardly to be reckoned a distinct species.

Var. 2. malayana, Kurz. in Journ. As. Soc. 1876, part ii. 130; petioles longer, fruits smaller. Nicobars; Kurz. Maingay sends a similar form from Malacca No. 643.

Sect. II. Pentaptera. Fruit with 5 acute subequal wings. Spikes usually panicled.


Deccan, Ceylon and the sub-Himalayan tracts of the North West Provinces. Very common.

Attains 60–80 ft. Leaves usually 4–6 in. (sometimes 10 in.), suddenly narrowed at the base, often cordate, obtuse or very shortly acute at the apex; petiole rarely more than ½ in., often very short, with two glands near its apex. Bracteoles very small. Calyx-teeth nearly glabrous both within and without. Young ovary very small, covered with crisped brown or rufous hair. Wings of the fruit usually truncate or suddenly narrowed at the top.—Dr. Brandis states that T. Arjuna is common in Bengal; it is unknown in east and central Bengal but abounds in Southern Behar, Chota Nagpore and on the Sone—i.e. along the whole northern face of the Deccan table-land.

Var. 2. angustifolia (i.e. Pentaptera Roxb. and not Terminalia angustifolia Roxb.). Leaves narrow elongate-oblong suddenly narrowed into the petiole. Southern Peninsula and Concan. Wall. Cat. 3971.

8. T. tomentosa, Bedd. Fl. Sylv. t. 17; leaves subopposite or uppermost alternate elliptic or ovate glabrous or very hairy beneath when adult, spikes panicled, fruit 1–2 in. glabrous or hoary obovoid-oblong, wings broad striations carried horizontally to the edge. Brand. For. Fl. 225.

Deccan, Ceylon, and the sub-Himalayan tracts of the North West Provinces, Nipal, and Sikkim, ascending to 4000 ft.; very common. Burma; Brandis, Kurz.

Attains 80–100 ft. Leaves 4–8 in., petiole ½ in. Flowers often attacked by a Cynips containing numerous galls which simulate fruit. Bracteoles very small. Calyx-teeth without tomentose villous or glabrescent.

VAR. 2. crenulata; leaves narrowed into the petiole often obvate-elliptic adult nearly glabrous beneath, young ovary glabrous. T. crenulata, Roth Nov. Sp. 380; W. & A. Prodr. 314. Pentaptera crenulata, Roxb. Hort. Beng. 34, Fl. Ind. ii. 438; DC. Prodr. iii. 15; Wall. Cat. 3978. P. macrocarpa, Wall. Cat. 3982.—Deccan and the sub-Himalaya; common. Burma; Kurz. Kurz For. Fl. Brit. Burma i. 458 states T. crenulata, Roth, to be T. Arjuna of Beddome and Brandis. But both Beddome and Brandis have stated that T. crenulata W. & A. is a variety included under their T. tomentosa. Kurz has not communicated any example of his T. crenulata, nor in his description does he notice the character of the venation of the fruit, by which Dr. Brandis has separated T. Arjuna and T. tomentosa. The synonym T. crenulata Kurz remains therefore doubtful. Perhaps as Mr. Thwaites hints T. Arjuna (T. glabra, Enum. 104) and T. tomentosa should be made one species.

VAR. 3. coriacea; leaves as in T. tomentosa typica but beneath with a close hard fulvous tomentum rather than villous, fruit pubescent with minute fulvous hairs. T. coriacea, W. & A. Prodr. 315. Pentaptera coriacea, Roxb. Hort. Beng. 34, Fl. Ind. ii. 438.—Mountains of the Coromandel Coast; Roxburgh. Deccan; Herb. Rottler, Malabar Hills; Dr. Ritchie.

SECT. III. Chuncoa. Fruit with three very unequal wings, rarely more than ½ in., often much smaller.


Malabar; lower hills from Bombay to Cochin; common: Nilghiri and Kurun mountains.

A large tree, the innovations rusty-tomentose. Leaves 4–7 in., lower subopposite, upper alternate, base cordate, two glands generally present near the base of the mid-rib beneath; petiole ½–2 in. Spikes very dense, bracteoles and young ovaries villous. Fruit about ½ in. long, with one wing ½ in. broad, the other two wings hardly ½ in. broad.

10. T. pyrifolia, Kurz For. Fl. Brit. Burma i. 457; leaves crowded towards the ends of the branches oblong- or broadly-lanceolate glabrous, spikes simple, fruit indistinctly brown velvety with two broad wings and one very narrow one. Pentaptera pyrifolia, Presl Epimel. Bot. 215.

 Pegu to Tenasserim, frequent; Kurz, Hefel (ex Presl). Promé; Macelland. Attains 80 ft. glabrous except the innovations and spikes. Leaves 2–4 in., coriaceous, narrowed into the petiole; petiole ½–1½ in., without glands. Calyx densely tawny or brown-pubescent. Fruit ½–2 in. long, the two lateral wings about ½ in. broad, chartaceous, rounded and striated.—Mr. Kurz cites as a doubtful synonym T. javanica, Miq. Fl. Ind. Bat. i. pt. i. 602; the example of which at Kew agrees, but has no fruit.


Subtropical valleys in Sikkim and Bhutan, alt. 1000–3000 ft., abundant. Assam Hills; Simons, Griffith.—Distrib. Ava, Bhamo.

Attains 80–100 ft., the innovations pubescent-tomentose. Leaves 4–8 in., base obtuse, nerves numerous and very parallel, upper subopposite; petiole about ½ in.,
usually with two glands at its apex. Spikes dense, bracteoles and young ovaries villose. Epignous disc with very little or no hair. Fruits \( \frac{3}{4} - \frac{3}{5} \) in. long, exceedingly numerous, minutely villous, broad wings each \( \frac{1}{2} \) in. wide puberulous, the third acute hardly winged. The top of the tree in flower appears pink, the middle white, from the panicles changing colour.

Sect. IV. Fruit large, 1-1\( \frac{1}{2} \) in., with two very broad wings. (Really allied to Sect. Catappa).

12. **T. bialata**, Kurz For. Fl. Brit. Burma i. 456; leaves clustered near the ends of the branches obovate narrowed into a very long petiole, spikes axillary simple elongate, fruit 2-3\( \frac{1}{4} \) in. wide rusty tomentose. Pentaptera bialata, Roxb. Hort. Beng. 34; Fl. Ind. ii. 441; Wall. Cat. 3986.

Burmua and the ANDAMANS; Maclelland, Kurz.

Attains 80-100 ft. Leaves 5 in., glabrous when adult; petiole 2\( \frac{1}{2} - 3\frac{1}{2} \) in. Spikes very long, the upper flowers male, the lower hermaphrodite. Young ovary and calyx brown-pubescent or tomentose. Calyx-teeth hairy within. Fruit 1\( \frac{1}{2} - 1\frac{1}{4} \) in. long.

**Var. cuneifolia**, Wall. Cat. 3972; leaves lanceolate rather than obovate, fruit less than 1 in. long and nearly glabrous.—Prome; Wallich. Tenasserim and Andamans; Helfer No. 2182 Kew Distrib.

Doubtful Species.

T. MOLUCCANA, Wall. Cat. 3969 consists of leaves generally resembling those of *T. procera*, and a detached fruit which also resembles that of *T. procera*. But the petioles have a thickening simulating an articulation, and M. Planche has suggested (by a note on the specimen) that the leaves are those of an *Ellocarpus*.

T. ANGUSTRIFOLIA, Roxb. Hort. Beng. 33 and Fl. Ind. ii. 437; a large tree, tender parts hairy, leaves narrow-lanceolate acuminate glandular on the margin at the base, fruit scarcely distinguishable from that of *T. Chebula*, young leaves with much ferruginous hair. *T. travancorensis*, W. & A. Prodr. 314. Tinnevelly and Travancore, Roxburgh.—No example known and not seen by anyone except Roxburgh; if it be not a variety merely of *T. Chebula*.

T. BENGALENSIS, Roxb. in DC. Prodr. iii. 12; leaves alternate obovate obtuse entire glabrous on both surfaces and the petioles without glands. In Bengal.—This species is not known by any authentic specimen and is insufficiently described; it is improbable that it is distinct from all the other known species.

2. **CALYCOPTERIS**, Lamk.

A diffuse shrub with drooping branches. Leaves opposite, shortly petioled, elliptic or ovate, acuminate, entire. Racemes dense, axillary, and crowded towards the ends of the branches so as to form large panicles. Flowers small, greenish, each with a lanceolate bract. Calyx-tube 5-striate, produced above the ovary; limb 5-fid, persistent and much enlarged in fruit. Petals 0. Stamina 10, the five upper ones between the calyx-teeth, the five others alternate with them and lower down on the calyx-tube. Ovary 1-celled, inferior; style subulate, simple; ovules 3, pendulous from the top of the cell. Fruit narrow ovoid, 5-ribbed, villose, 1-seeded, surmounted by the enlarged calyx. Cotyledons convolute.

3. ANOGEISSUS, Wall.

Trees or shrubs. Leaves alternate or falsely opposite, petioled, entire. Flowers in dense globose heads, on axillary peduncles much shorter than the leaves. Calyx-tube long attenuated above the ovary, subpersistent; limb small with 5 lobes, deciduous. Petals 0. Stamens 10 in two series. Ovary inferior, 1-celled; style filiform, simple; ovules 2 pendulous from the top of the cell. Fruits small, coriaceous, compressed 2-winged, packed horizontally into dense heads. Seed 1; cotyledons convolute.—Distrib. Species 5: of which one is Tropical African, the other four Indian.

1. A. latifolia, Wall.; Bedd. Fl. Sylv. t. 15; leaves broad elliptic obtuse at both ends, peduncles 1 or more from the same axil often branched, bracteoles inconspicuous, ripe fruits shining glabrous the beak as long as the nucleus or longer. Wall. Cat. 4015; Brand. For. Fl. 227. Conocarpus latifolia, DC. Prodr. iii. 17; Roxb. Hort. Beng. 34 and Fl. Ind. ii. 442; Royle Ill. t. 45; W. & A. Prodr. 316; Wight & Arn. t. 994; Dalz. & Gibbs. Bomb. Fl. 91; Miq. Fl. Ind. Bat. i. pt. i. 605. Andersonia altissima, Herb. Madr.

From the Himalaya to Ceylon; very common, ascending to 3000 ft. Not in the Transgangetic Peninsula.

Attains 80 ft., but usually occurs as a small tree; leafless during most of the hot season. Leaves sometimes 5 in. with a petiole ½ in., usually much smaller, sometimes acute, never acuminate. Innovations and peduncles more or less rusty-pubescent. Fruit sometimes ½ in. (excluding the beak) by ½ in. including the wings, usually smaller, more or less rusty-pubescent when young.

Var. glabra; leaves glabrous beneath.

Var. villosa; leaves small densely rusty villose on both surfaces. Mysore, C. B. Clarke.

Var. parvifolia; leaves small (½ in.) silky pubescent. Central Provinces. Brandis For. Fl. 228.

Anogeissus,] LVIII. COMBRETACEÆ. (C. B. Clarke.) 451

Var. 1. typica; leaves usually broad-lanceolate fulvous beneath, peduncles with obovate bracts often leaflike large, fruit very broadly winged (twice as broad as high) with a deflexed pubescent beak much longer than the nucleus. Andersonia acuminata, Herb. Rottl.

The northern edge of the Deccan ascending to 3000 ft. Bundelkund, Edgeworth. Mountains above the Circars; Roxburgh. Godavery forests; Brandis. North-west India, Royle.

A tree, sometimes attaining 60 ft.; trunk rarely straight, when young armed with long spines (Kurz). Leaves commonly 2½ by 1 in., upper becoming smaller, often obovate, passing into bracts; petiole less than ¼ in. Peduncles and neck of ovary rusty-tomentose.

Var. 2. lanceolata, Wall. Cat. 4014 F; leaves usually narrow-lanceolate grey beneath, bracteoles on the peduncles small linear very deciduous, fruit winged sub-quadrate with an erect beak shorter than the nucleus. Andersonia lanceolata, Herb. Rottl.

Pegu, Tenasserim and Kookie-land.

An erect elegant tree 60–100 ft. high. Leaves commonly 2 by ½ in., upper long-lanceolate; petiole scarcely any. Peduncles and neck of ovary with dense rusty spreading hairs. Fruits sometimes ½ in. broad.


Prome; Wallich.

Apparently a shrub or small tree. Leaves 1½ in., subsessile, narrowed at base, glabrous or silky beneath. Peduncles ¼–⅓ in., solitary or clustered, rusty-pubescent, much less shaggy than in A. acuminata var. lanceolata. Fruits about ⅔ in. broad.—Kurz, in Journ. As. Soc. 1874, pt. ii. 188, reduces this to A. acuminata; but from the example he has communicated to Kew it appears that his A. phillyreafolia is not the plant of Heurck & Muell, but A. acuminata var. 2 above. The present species however may prove only a more extreme form of A. acuminata.

4. A. pendula, Edgw. Cat. Pl. Banda, p. 47; leaves elliptic or obovate acute or obtuse always narrowed at base, peduncles solitary simple, fruit sub-quadrate ultimately glabrous, beak much less than half the height of the nucleus. Brand. For. Fl. 229. A. myrtifolia, Wall. Cat. 4017; Royle Ill. p. 209.

Bundelkund; Edgeworth. North-west India; Royle. Common in Rajputana; Brandis. Deksa; Stocks.

A gregarious bush or small tree. Leaves ¾–1 in., usually glabrous, sometimes silky beneath. Peduncles sometimes with an elliptic leaflike bract.—A species which may be distinguished at once by its small leaves.

4. Lumnitzera, Willd.

Large glabrous shrubs or small trees, growing in tropical salt marshes along with Mangroves and closely resembling them in habit. Leaves clustered towards the ends of the branches, alternate, thickly leathery; subsessile, narrow-obovate, entire or scarcely crenate. Flowers in racemes. Calyx-tube with two adnate bracteoles near the base, oblong, narrowed at both ends, produced above the ovary; lobes 5 persistent. Petals 5, oblong. Stamens 10 in two series, or fewer. Ovary inferior, 1-celled; style subulate, simple; ovules 2–5 pendulous from the top of the cell. Fruit woody, elliptic-oblong, ½–1 in. including the calyx-limb, longitudinally striate or nearly smooth. Seed 1; cotyledons convolute.—Distr. Species 2; on the shores of the tropics of the Old World, and of Polynesia.

**MERGUI; Griffith.** *NICOBARS; Kurz.* **MALACCA; MAINGAY, Griffith.—DISTRIB.** Malaya, North Australia, Polynesia.

A small tree 20–40 ft. high. *Leaves* 2–3½ in. *Stamens* 5–10, usually 7; twice as long as the petals, filaments crimson.


On the coasts of *INDIA*, Ceylon and the Trans-Gangetic Peninsula as on the Andamans and Nicobars (Kurz); general.—DISTRIB. Tropical Africa, Malaya, North Australia and Polynesia, in the Mangrove swamps.

A small tree 20–40 ft. high. *Leaves* usually 2–3 in. sometimes only 1 in. *Stamens* sometimes 5, sometimes 10 (always 10 Kurz) about as long as the petals, filaments white. *Racemes* in fruit ascending.

5. **COMBRETUM, Linn.**

Large shrubs (except *C. nanum*) with long pendent or scandent branches, without spines (except *C. spinescens*). *Leaves* entire, petioled, opposite or more seldom alternate or ternate. *Flowers* polygamo-dioecious, often in paniced spikes or racemes; bracteoles small. *Calyx*-tube constricted above the ovary, shortly or long produced, urceolate, funnel-shaped or tubular; limb 4–5-lobed, deciduous. *Petals* as many as the calyx-lobes (0 in *C. apetalum*) placed on the calyx-limb. *Stamens* twice as many as the petals, inserted in two series with them. *Ovary* inferior, 1-celled; *style* 1, subulate, simple; ovules 2–5, pendent from the top of the cell. *Fruit* with 4–5 wings angles or ridges, dry, generally indehiscent. *Seed* 1; cotyledons plaited or flat, in a few species convoluted.—DISTRIB. Species 120, common in the tropics of America, Africa, and Asia; also in South Africa, but not in Australia or Polynesia.

**SECT. I. POIVREA.** *Flowers* 5-merous. *Fruit* 5-winged or 5-ridged.

* Fruit with 5 membranous wings.


Bengal, abundant, alt. 0–3000 ft. North Deccan plateau very common, less common South. North West Provinces nearly to the Punjab. Tenasserim and the Andamans.
An exceedingly large shrub with many branches pendent and subscandent, conspicuous in flower by the floral leaves (bracts) becoming cream-white. Leaves opposite, 4–5 in., somewhat hairy when young, when old glabrous or rarely with tufts of hairs in the axils of the nerves beneath; petiole ½ in. Racemes numerous, very villous, in large terminal quasi-paniciles, the leaves thereon 2–3 in., becoming petaloïd at the time of flowering; bracteoles linear, ½ in., somewhat persistent. Ovary sessile. Calyx segments lanceolate-subsutulate, suberect. Petals oblong, glabrous, hardly exceeding the calyx or twice as long as the calyx (Kurz). Disc covered with short hairs. Fruit ¾–1½ in., oblong or elliptic, subquadrate, nearly smooth.


East Bengal; alt. 0–1000 ft., from Silhet to Mergui frequent.

A large scandent shrub without thorns, the innovations densely rusty-villous. Leaves opposite, 4–8 in., usually when adult with some rusty hair at least on the lower surface (but some of Griffith's specimens are quite glabrous); petiole ½–1 in. Bracteoles ¼ in., narrow-lanceolate, somewhat persistent. Ovary sessile. Calyx-tube upwards 5-fluted, the segments triangular acute erect. Petals narrow-obovate, far exceeding the calyx, with rusty silky hairs on their backs. Disc low in the funnel of the calyx with short hair. Fruit 1 in., elliptic or circular, usually pubescent, sometimes glabrous.

Var. 2. **spicenses**; with stout stipes at the base of the branchlets, otherwise does not differ. Irrrawaddy bank; Wall. Cat. 4006. Cachar, Keenan.

Here perhaps belongs the very doubtful species described by Kurz in Forest Fl. Brit. Burma i. 462 under the name C. ovale, R. Br., which is said to differ from C. pilosum by having the innovations puberulous instead of pubescent. The fruit is unknown. It can hardly be C. ovale, R. Br. which considerably differs as see under C. aculeatum, Vent. in Oliv. Fl. Trop. Afr. ii. 423.


PEEU; Wallisoh, Maclelland, Kurz.—Distrib. Burma.

A scandent shrub or (ex Kurz) a weak tree 15–20 ft. high. Leaves 1–4 in., sub-opposite, the petiole ¼–½ in., and midrib beneath usually grey puberulous, sometimes long fulvous hair near the base of the main nerves beneath. Racemes long, undulating, very narrow, the flowers though numerous being very small; bracteoles ¼ in., linear, exceeding the young ovaries. Ovary sessile. Calyx-teeth lanceolate, erect. Petals 0. Disc covered by short hairs. Fruit ¾ in., elliptic, nearly circular, glabrous, surface between the wings covered with close sessile circular glands.


PEEU; Kurz.—Distrib. Burma.

A scandent shrub, with the habit of *Combretum ovalifolium*, the innovations rusty puberulous. Leaves 1½–2 in., opposite or alternate, punctate on the upper surface,
petiole ¼ in. Fruit ½-3 in., glabrous.—Herbarium twigs of this species are much like whole plants of *C. nanum*, but the fruits are hardly half as long.

** Fruit with 5 sharp angles.**


Transgangetic Peninsula from Pegu to Singapore, alt. 0—1000 ft., frequent.—Distrib. Burma, Java.

A scandent shrub. Leaves 2–4½ in., opposite, not seldom ternate, sometimes sub-alternate, usually shining, the petiole ½–3 in. (and sometimes the midrib) pubescent. Bracteoles linear, small, early deciduous. Ovary sessile. Calyx-teeth lanceolate, erect. Petals narrow, little exceeding the calyx. Disc and base of the calyx-tube within covered with long hair. Fruit about 1¼ in., and half as broad, shining, black.

Sect. II. *Tetragonocarpus*. Flowers 4-merous. Fruit with 4 obtuse or acute ridges, the ridges not expanded into thin papery wings.

6. *C. tetralophum*, C. B. Clarke; leaves lanceolate glabrous or nearly so, racemes in subterminal panicles which are ferruginous and covered with scales but only slightly villose, calyx-tube constricted above the ovary then urceolate covered with ferruginous scales, fruit with very acute ridges.

MALACCA, Griffith (Kew Distrib. No. 2195) =Combretum No. 19 of Hk. f. & T. distrib.—Distrib. Siam, Borneo.

A scandent shrub. Leaves 4–5 in., opposite, shining, often with a little rusty hair along the base of the midrib beneath; young remotely glandular-punctate; petiole ½–3 in. Bracteoles ½ in., soon deciduous. Constricted part of the calyx-tube nearly as long as the young ovary, the teeth triangular erect covered without by close flat sessile ferruginous glandular scales. Petals narrow, hardly exceeding the calyx-teeth. Disc and base of the calyx within densely covered by long fulvous hair. Fruit ½–1 in. and half as broad, shining, black.—This species in the fruit and leaves so much resembles *C. trifoliatum* above that it has been mixed with it as a 4-fid variety: but the flowers are altogether different, and there is not one 5-angled fruit on any of the *Kew* specimens.


Swamp forests of Pegu; frequent, Kurz.

A glabrous large scandent shrub. Leaves 3–5 in., younger remotely glandular-punctate; petiole less than ¼ in. Flowers small. Calyx-tube short; limb cup-shaped with 4 short acute teeth, scaly and pubescent without, densely villous within. Petals minute. Fruit 1 in. and more, glabrous, pale brown, elliptic-ovate, the angles thick coriaceous sharp prominent and almost winglike, much narrower than the diameter of the nut.

The example of this species communicated to *Kew* by Kurz exhibits neither fruit nor flowers; the character of the species is therefore copied from Mr. Kurz.
It is evidently allied to *C. tetralophum*; the leaves on Mr. Kurz' specimen are very unlike those of *C. tetralophum*, but in many *Combretum* while the typical leaves are acute lanceolate there may be found on the same shrub lower branches with obtuse obvate leaves. Kurz however says that the calyx-tube in *C. tetragonocarpum* is "short oval," whereas in *C. tetralophum* it is "elongate nearly filiform," so that the two species must be distinct. He has placed this species in his section with 10 stamens and 5-merous flowers: this it is presumed is a slip.


Transangetic Peninsula from Assam to Singapore, alt. 0-1000 ft., plentiful Ceylon; Thwaites, Mrs. Walker. Madras Peninsula? *Wight* No. 1014 (Wight's specimen is typical *acuminatum* but may have come from Ceylon).—Distrib. Malaya to the Philippines.

A large scandent shrub. Leaves often 6-8 in., cordate or acute at the base, somewhat densely glandular-punctate beneath, the glands often prominent or becoming scales; petiole often very short, rarely exceeding 3 in. *Bracteoles* minute, soon deciduous. Young ovary and calyx-tube scaly, hardly pubescent. Calyx-limb campanulate, grooved or fluted (at least in the dried specimens), teeth erect short triangular. Petals narrow, small. Disc and base of calyx-tube with short hair or nearly glabrous. Fruit 1-2 in. about ¾ as broad as long, puberulous brown.—In this species, and in some others, in the hermaphrodite flowers before the calyx expands a very small hole appears at the top through which the style is long protruded; subsequently the calyx opens and the stamens are long extruded.

The examples of *C. acuminatum*, Roxb. at Kew are abundant, but the name *C. costatum* Roxb. does not occur in the Kew Herbarium nor is the fruit described by Roxb. It is clear that Mr. Kurz understands by *C. costatum*, Roxb. the plant named *C. acuminatum*, Roxb. at Kew. It is almost certain that the two species of Roxburgh are but one. The two names are of one date, and in this list the name taken up by Wallich and subsequent Indian botanists is preferred to the name taken up by Mr. Kurz, especially as there is no doubt at all what Roxburgh's *C. acuminatum* was, while a doubt may be still raised about his *C. costatum*.

Sect. III. *Eucombretum*. Flowers 4-merous. Fruit with 4 papery wings. Calyx not long-tubular-campanulate above the constricted portion.

† Surface of the fruit between the wings covered densely with lanceolate-linear scales ¼–¹/₄ in. (Subsection Flagrocarrpeae).


Northern and Eastern Bengal, ascending the hills to 5000 ft. alt.; very common, extending to Chittagong.—Distrib. Upper Burma.
A large scandent shrub. Leaves 4–6 in. (always large and generally more than 2 in. broad), even on the upper surface glandular-punctate and pubescent on the nerves, only ultimately becoming glabrous; petiole $\frac{1}{4}$–$\frac{1}{3}$ in., linear, subpersistent. Calyx-teeth erect, short, triangular. Petals obovate, much longer than the calyx. Disc and base of calyx within clothed with short hair. Fruit 1–1$\frac{1}{4}$ in. long and as broad, puberulous, brilliantly red or dark brown.

10. **C. Wallichii**, DC. Prodr. iii. 21; leaves opposite elliptic or orbicular acuminate adult glabrous beneath with tufts of yellow hair in the axes of the main nerves, racemes rusty-puberulous undivided axillary solitary and approximated almost panicked in the uppermost axils, calyx shortly constricted above the ovary then funnel-shaped or subcampanulate puberulous without. Wall. Cat. 3996.

**Nipal**; Wallich. Interior of Sikkim, alt. 4000–5000 ft. (Kulhait), C. B. Clarke.

A scandent shrub. Leaves 2–4 in., glandular-punctate on both surfaces; petiole $\frac{1}{4}$ in. Bracteoles minute, fugacious. Calyx-tube filled densely with long hairs exsert from the mouth, teeth short triangular suberect. Petals small, obovate. Fruit $\frac{3}{4}$–1 by 1$\frac{1}{4}$–1$\frac{1}{2}$ in., rich dark-brown, puberulous.—The tufts of hair are seen in all the axils of the nerves beneath of C. Wallichii, in none of C. flagrocarpum; also the leaves of C. Wallichii are smaller and thinner than those of C. flagrocarpum; the constricted part of the calyx-tube of C. Wallichii is shorter and the flower within densely filled with fulvous hair; the bracteoles are different.—As to Combretum Wallichii, Hassk. in Flora 1844, p. 106, and Miq. Fl. Ind. Bat. i. pt. 1. p. 608, which these authors suggest to be allied to C. latifolium or C. Wightianum, it can only be said that as they did not possess the fruit of C. Wallichii it is impossible to guess to what species their remarks refer.

†† Surface of the fruit between the wings glabrous, pubescent, or with sessile glands, but not with elongate scales.


Northern and Eastern Bengal near the foot of the mountains from Nipal to Chittagong and thence to Singarpore; plentiful.—Distr. Malaya to the Philippines.

A large scandent shrub. Leaves 4–6 in. from a broad base, prominently covered with flat circular glandular scales on both surfaces, those on the upper surface sometimes ultimately disappear; upper leaves usually much smaller and narrower, often lanceolate. Axillary racemes usually divided, panicked, but on some branches all undivided; bracteoles subulate, fugacious. Calyx-teeth short, triangular. Petals obovate, small. Disc and base of calyx-tube within clothed with long fulvous hairs which are not exserted. Fruit $\frac{1}{4}$–1$\frac{1}{4}$ in., sometimes broader than high or not; clothed between the wings with close flat round glands.

**Var. aureum**, Wall. Cat. 3988. C. malulsea, Wall. Cat. 3991; same as the type, but turns a rich brown in drying.

12. **C. quadrangulare**, Kurz in Journ. As Soc. Beng. 1874, pt. ii. 188; leaves subopposite lanceolate or elliptic attenuated into the petiole, racemes lateral compound and terminal covered with round flat glandular scales, flowers small, calyx-tube above the ovary campanulate. C. attenuatum, Wall. Cat. 3989.
Moulmein, Wallich. Tenasserim, Holzer No. 2181, Kew Distrib.

Whole plant covered with sessile flat circular scales, otherwise glabrous or nearly so. Branchlets quadrangular. Leaves 3–4 by 1½ in. Fruit ½–⅔ in.—Hardly distinguishable from C. aquosum Roxb. but by the small flowers and the leaves attenuated at the base. C. Van Heurkii, Muell. in Heurck & Muell. Arg. Obs. Bot. 227, may as far as the description goes be this plant but the fruit is not described. Griffith’s No. 726 quoted cannot be found at Kew.

13. C. dasystachyum, Kurz Journ. As. Soc. Beng. 1874, pt. ii. 187; leaves opposite and often ternate elliptic- or obovate-oblong acuminate densely pubescent on the nerves beneath, racemes rarely divided axillary solitary and subterminal 2–4 together, young ovary (and calyx without) glandular and minutely pubescent, calyx-tube distinctly constricted above the ovary then funnel-shaped, fruit large.

Pegu; Kurz. Chittagong; Hk. f. & Th. Assam; Jenkins. Cachar; Keenan.


Transgangetic Peninsula from Assam to Tenasserim and Penang; alt. 0–1000 ft. frequent.—Distrib. China, according to Roxburgh.

A scandent shrub, nearly glabrous. Leaves 3–5 in., punctulate on both surfaces, the points often obscure in age; petiole ⅔–1 in. Calyx-teeth triangular, erect. Petals narrow-obovate, small. Disc and base of calyx within densely covered with long fulvous hair. Fruit about as broad as high, subglabrous.—There is no example of C. chinense Roxb. at Kew; Mr. Kurz has applied that name to var. ternatum, and the description fits well.

Var. ternatum, Wall. Cat. 4002 (sp.); leaves often 3-nate obovate obtuse usually narrowed into the petiole, uppermost sometimes lanceolate.

Var. 2. Portoritanum, Wall. Cat. 4000 (sp.); leaves never 3-nate lanceolate or oblong distinctly acuminate.

15. C. nanum, Ham. in Don Prodr. 219; leaves opposite or all alternate from round obovate to lanceolate glabrous, racemes undivided subterminal generally few with one greatly elongated, young ovary and calyx without glabrous sparsely glandular punctulate, calyx-tube constricted above the ovary then funnel-shaped, fruit 1½ by 1 in. or somewhat smaller puberulous or sub-glabrous. DC. Prodr. iii. 21; G. Don in Trans. Linn. Soc. xv. 429; Wall. Cat. 3904. Brand. For. Fl. 221.

Himalaya Terai from Sikkim to the Punjab; Wallich, Royle, Edgeworth, Vicary, Strachey & Winterbottom, J. D. H.

A decumbent low shrub, burnt down annually by the forest fires; branches 6–18 in., glabrous, the racemes minutely pubescent. Leaves typically 4 by 3½ in., but often much smaller and narrower, shining, coriaceous, with scattered points on
both surfaces; petiole \( \frac{1}{4}-\frac{3}{8} \) in. Raceme often subterminal and solitary, 6–7 in. with a peduncle 1–2 in.; bracteoles \( \frac{1}{8} \) in., linear-spathulate. Calyx-teeth triangular, erect. Petals narrow-obovate, far exceeding the sepals. Disc and base of calyx within covered by long fulvous hairs.


Throughout the Deccan Peninsula, common; and in Ceylon.

A large scandent shrub, nearly glabrous. Leaves typically \( \frac{4}{5} \) by 3 in., but often shorter and much narrower, shining, quite glabrous or more rarely with some brown hair about the base of the midrib beneath; petiole \( \frac{1}{2} \) in. Bracteoles minute; buds subglobose, obtuse. Calyx-teeth triangular, acute, reflexed. Petals narrowly obovate, scarcely exceeding the calyx. Disc and base of the calyx within with much long hair. Fruit \( \frac{1}{2} \) in long and nearly the same in breadth, dark brown, nearly glabrous.

—Mr. Thwaites has sent to Kew (under number 1601, named *C. Wightianum*) two plants, viz., *C. ovalifolium* Roxb. and *C. extensum* Roxb.; upon which Van Heurck and Müll. Arg. have founded two new species.

**Sect. IV. Quisqualoides.** Fruit with 4 membranous wings. Calyx constricted above the ovary and then produced into a cylindrical tube \( \frac{1}{8}-\frac{1}{2} \) in., terminated by a short campanulate 4-fid limb.


**Deccan Peninsula.** Ceylon. Transgangetic Peninsula from Silhet to Singapore.—Distr. Malaya.

A large scandent shrub, glabrous or nearly so. Leaves 4–8 (sometimes 10 in.) punctate on both surfaces when young; petiole usually short but sometimes 1 in. Racemes very thickly covered with flowers, sometimes short but generally elongate 4–6 in. Calyx with a ring of hairs at the base within, but not entirely filled by long hair. Petals narrow-obovate, slightly exceeding the calyx. Fruit \( \frac{1}{4} \) in. and nearly as broad, puberulo-glandular or nearly glabrous.

18. **C. sundalicum**, Miq. Fl. Ind. Bat. Suppl. 327; leaves opposite ovate or oblong suddenly acuminate mature nearly glabrous, spikes subglobose dense in ample terminal panicles, young ovary and calyx without punctate-glandular
sarcely pubescent, calyx-teeth triangular acuminate reflexed, buds ovate very acute.

MALACCA, Maingay No. 1681.—Distr. Sumatra.
Leaves 3–5 in., punctulate on both surfaces; petiole ½ in. Calyx with a ring of hairs at its base within but not densely filled with long hair. Fruit 1 in. and nearly as broad, brown, nearly glabrous.—This species so exactly coincides with C. extensum in its flowers and fruits that it may be doubted whether it is specifically distinct. The leaves appear smaller and thinner, and the dense heads of flowers at the ends of the branches of a large panicle give it a very different aspect.

EXCLUDED AND DOUBTFUL SPECIES.

COMBRETUM sp. 2. Griff. Notul. iv. 682 is probably one of the large Terminalias.

COMBRETUM (Sect. Poivrea) semi-adnatum, Heurowk & Muell. Arg. Obs. Bot. 244; leaves ternate short-petioled elliptic acuminate at first simply puberulous, racemose axillary long-peduncled dense, flowers long pedicelled, bracteoles adnate to the pedicels for half their length. "In the East Indies."—This must be very distinct from all the known Indian species by its long-stalked ovary; otherwise it might be C. tri-foliatum.

COMBRETUM OVALE, Br. See under 2. pilosum.

6. QUISQUALIS, Linn.

Rambling subscandent large shrubs. Leaves opposite, oblong or obovate, acuminate, entire. Flowers in short spikes, axillary and terminal, white or red. Calyx-tube prolonged long and slender above the ovary, deciduous; limb 5-fid. Petals 5. Stamens 10, short. Ovary 1-celled; style filiform, somewhat adherent to the calyx-tube, stigma subcapitate; ovules 3–4, pendulous from the apex of the cell. Fruit dry, coriaceous, 5-angled or 5-winged, subindehiscent. Seed 1, cotyledons (occasionally 3, Kurz) not convolute.—Distr. Species 4, tropical; 3 Indian, 1 African.

Known from Combretum Sect. Poivrea by the elongate calyx-tube, and from Combretum Sect. Quisqualoides by the 5-merous flowers and the fruit.


Throughout India, alt. 0–1000 ft., cultivated; wild probably in the Transgange-tic Peninsula.—Distr. Cultivated generally in the tropics, wild in Malaya.

Leaves 4 in., nearly glabrous or in var. villosa shortly pubescent beneath; petiole ¾ in., rusty villous as are the innovations. Spikes somewhat dense; bracteoles ¾ in., usually lanceolate, but variable, generally subpersistent. Petals rose or scarlet, oblong or nearly round. Fruit ¾–1¼ by scarcely ¾ in., glabrous, black, very acute at the top.
2. **Q. densiflora**, Wall. Cat. 4011; tube of the calyx above the ovary \(\frac{1}{2}-\frac{3}{2}\) in., calyx-teeth lanceolate-subulate, fruit distinctly winged. Miq. Fl. Ind. Bat. i. pt. i. 611. S. confertum, Jack in Hook. Comp. Bot. Mag. i. 155; Miq. l. c. 611.

**Penang**; Wallich. Moulineix; Falconer. Malacca; Griffith. Sincapore; Lobb.

Leaves 4-6 in., nearly glabrous; petiole \(\frac{1}{2}-\frac{1}{2}\) in., rusty-pubescent. Spikes dense, fulvo-pubescent; bracteoles \(\frac{1}{4}-\frac{2}{2}\) in., lanceolate, pubescent, subpersistent. Petals less than \(\frac{1}{2}\) in., scarlet. Fruit 1 by \(\frac{1}{2}\) in., shining, quadrangular, oblong; the wings narrow but distinct, papery.—This species seems congeneric with *Combretum pilosum* above.

3. **Q. malabarica**, Bedd. Ir. Pl. Ind. Or. t. 155; calyx-tube above the ovary \(\frac{3}{8}\) in., calyx-teeth lanceolate-subulate, petals \(\frac{1}{2}\) in. and more.

**Deccan Peninsula**; Carcoor Ghat, Wynad, alt. 1500 ft., Beddome.

A large climber, nearly glabrous, the petioles becoming permanent as rigid spines. Leaves 4-5 in.; petiole \(\frac{3}{8}\) in., glabrous. Spikes somewhat few-flowered, minutely grey-puberulous or pubescent; bracteoles \(\frac{1}{4}\) in., linear. Petals pink. Fruit unknown. —Much more glabrous than *Q. densiflora*, the bracteoles much smaller, the petals much longer.

7. **ILLIGERA**, Blume.

Scandent shrubs. Leaves alternate, petiolated, with three entire petiolulated leaflets. Flowers in elongate lax peduncled cymes; bracteoles 1-3 at the base of each flower. Calyx-tube shortly constricted above the ovary; limb of 5 valvate oblong deciduous lobes. Petals 5, valvate, oblong, alternate with and as long as the calyx-lobes. Stamens 5, epigynous, filament near the base carrying on each side a staminode; anthers dehiscing by lateral valves. Ovary 1-celled; style 1, filiform, ending in a dilated undulate sinuated stigma; ovule 1, pendulous from the apex of the cell. Fruit broadly 2-4-winged (2-winged in the Indian species known) the wings veined. Seed with plane-convex (not convoluted) cotyledons.—Distrib. Species 7 or 1, extending from Khasia to Singapore, Malaya and the Philippines: and one aberrant species in Angola having 5 leaflets.


**Mergui**; Griffith. Tenassserim, Helfer (Kew Distrib. No. 4341 partly). **Andaman**; Kurz.

Stem striate, nearly glabrous. Petiole 2-4 in. petiolules \(\frac{1}{2}-\frac{1}{2}\) in. (variable as in most of the species), more or less fulvo-pilose; leaflets 2-4 in., oblong or broadly-elliptic, suddenly acuminate, usually cordate at base but sometimes acute; the lower leaves often much larger and their leaflets nearly orbicular. Cymes open 6-8 in.; bracteoles minute, ovate, and the calyx without minutely pubescent. Fruit 1 by \(\frac{1}{2}\) in. including the wings, softly minutely pubescent.—Kurz (in Journ. As. Soc. 1877, pt. ii. 59) unites the two species of Meissner, viz., *I. Coryzadenia* and *I. appendiculata*.

2. **I. Kurzii**, C. B. Clarke; leaflets glabrous epi-punctate very coriaceous with an incurved cartilaginous margin, staminodes sub-petaloid hooded and enfolded not emarginate, fruit 2\(\frac{1}{4}-3\frac{1}{2}\) in. wide 2-winged.
BURMA (Karens); Kurz. Mikir Hills, Khasia; Simons. Tenasserim; Helfer (Kew Distrib. No. 4341) partly. MALACCA, Maingay No. 649, 650.

Stem striate, nearly glabrous. Petiole 2–5 in.; petiolules 1/2–1 in.; leaflets elliptic-lanceolate, those from the lower stem broader sometimes nearly orbicular. Cymes often 6–8 in.; bracteoles very small, ovate, and as the calyx without minutely pubescent. Fruit 1 in. long, the wings brown nearly glabrous with horizontal striations.

—If Meissner's species are united as proposed by Mr. Kurz, this must be regarded as a variety.

3. I. Khasiana, C. B. Clarke; leaflets glabrous with tufts of long yellow hairs in the nerve-axils beneath and sometimes minutely setose on the midrib on the upper surface, staminodes not petaloid concave deeply emarginate, fruit 2 1/4 in. wide (not quite ripe) 2-winged.

Khasia; Griffith (Kew Distrib. No. 4340); Churra, alt. 3000–4000 ft., J. D. H. & T. Thomson; Likinsow, 2500–3000 ft., C. B. Clarke.

Stem striate, nearly glabrous. Petiole 2–5 in.; petiolules 1/2–1 in.; leaflets elliptic-lanceolate (no lower leaves preserved). Cymes often 6–10 in.; bracteoles very small, ovate, and as the calyx without minutely pubescent. Fruit 1 in. long and more, the wings brown nearly glabrous with horizontal striations.

DOUBTFUL SPECIES.

I. obtusa, Meissn. in DC. Prodr. xv. pt. i. 251 founded on Wight's Herb. No. 394 is said to have drupes 5 lines long 4 lines thick, and therefore cannot belong to the genus Illigera as at present defined. There is no example in the Kew Herbarium of any Illigera from the Deccan Peninsula.

8. GYROCARPUS, Jacq.

A tall tree. Leaves alternate, long petioled, large, entire or lobed, clustered towards the ends of the branches. Flowers small, unisexual, very numerous, clustered in large branched cymes without bracts. Male flowers very numerous; calyx 4–7-partite; petals 0; stamens 4–7, inserted at the base of the calyx with as many alternate clavate glands, anthers dehiscing by valves; ovary 0. Female or hermaphroditic flowers few; calyx-tube adherent to the ovary, limb 2-partite, persistent, enlarging in fruit; petals and stamens 0; ovary 1-celled; style 0, stigma sessile; ovule solitary pendulous from the apex of the cell. Nut bony, crowned by the elongate spatulate coriaceous calyx-lobes. Seed with convolute cotyledons.


Deccan Peninsula, alt. 0–1000 ft., frequent. Bengal, rare. Malay Peninsula, frequent.—Distrib. The tropics of the whole world near the sea.

Attains 60–80 ft. (Kurz). Leaves (of full-grown trees) 4–5 in. and as broad, broadly ovate, acuminate, entire, generally glabrous, those of young plants often very large deeply lobed and more or less pubescent. Peduncles 1–3 in., in the upper axils. Drupes 1/2–3 in., ovoid; calyx-lobes 2–3 in.
Order LIX. **Myrtaceae.** (By J. F. Duthie, F.L.S.)

Trees or shrubs, rarely herbs. *Leaves* opposite, seldom alternate or whorled, petioled, simple, entire, rarely denticulate or crenate, 3-nerved or pinnately-nerved and usually with an intramarginal nerve, generally coriaceous and dotted with pellucid glands. *Stipules* if present small and deciduous. *Flowers* regular, very rarely irregular, hermaphrodite or polygamous by arrest, axillary, solitary or in spikes cymes coryumbs or heads, naked or with an involucre, often with 2 bracts at the base, white, pink, purple, or yellow, never blue. *Calyx* superior or \( \frac{1}{2} \)-superior, limb 4–5-many-fid or -partite, persistent or deciduous, valvate or imbricate, sometimes entire or closed in bud. *Petals* inserted on a disk surrounding the cavity of the calyx, equal in number to the calyx-lobes and alternate with them, rarely 0. *Stamens* usually \( \infty \), inserted with the petals in several rows, rarely definite and alternate with the petals; filaments free or more or less coherent at the base or in bundles opposite the petals; anthers small roundish with parallel cells bursting longitudinally. *Ovary* inferior or \( \frac{1}{2} \)-inferior, crowned by a fleshy disk, 1-celled with 1 or more ovules, or 2–many-celled with \( \infty \) ovules; placentation axile (parietal in *Rhodannia*); style terminal rarely lateral, smooth or bearded at the summit; stigma undivided. *Fruit* usually crowned with the calyx-limb, either 1-celled and 1-seeded by arrest, or 2–many-celled with loculicidal or septicidal dehiscence; or baccate and indehiscent with the cells many-seeded or 1-seeded by arrest. *Seeds* angular cylindric or compressed; testa hard or membranous, sometimes winged; albumen 0; embryo straight curved or spirally twisted, cotyledons usually short and obtuse sometimes combined into a mass with the radicle, very rarely leafy, radicle often thick close to the hilum.—Distr. Tropical and subtropical regions of both hemispheres; species upwards of 1800.

Species of the Australian genus *Eucalyptus* are being successfully cultivated on the Nilghi hills and in other parts of India. The common Myrtle (*Myrtus communis*, L.) is extensively grown in India, the leaves being used in native medicine; it extends from the Mediterranean region as far as Afghanistan and Beluchistan. Allspice (*Pimenta acris*, Wight), a West Indian tree, is much cultivated for the sake of its aromatic leaves and berries.


A. Fruit capsular.

**Tribe I. Leptospermeae.** *Ovary* 2–5-celled. Fruit opening by as many valves.

Leaves narrow.

Stamens definite (10 or fewer) free, in one series. Leaves alternate. Flowers few or solitary in the axils

Stamens \( \infty \), free, in one series. Leaves alternate. Flowers few or solitary in the axils

Stamens \( \infty \), slightly combined below into bundles opposite the petals and exceeding them. Flowers in heads or spikes

Leaves broad. Stamens \( \infty \), united into 5 bundles opposite the petals. Flowers in axillary cymes

1. **BECKEA.**

2. **LEPTOSPERMUM.**

3. **MELALEUCA.**

4. **TRISTANIA.**
B. Fruit fleshy.

TRIBE II. Myrtacae. Ovary 2- or more-celled (except Rhodamnia). Fruit a berry or drupe.


Limb of calyx 4-5-lobed or -partite in bud, not becoming further divided when in flower.

Ovary 1-celled with 2 parietal placentas. Leaves 3-nerved 5. Rhodamnia.

Ovary 1-3-celled with double rows of ovules in each cell separated by spurious partitions. Leaves sometimes 3-nerved 6. Rhodomyrtus.

Ovary 5- rarely 4-celled with 2-6 ovules in each cell. Embryo long and narrow, curved, circular, or spiral, with small cotyledons 7. Decaspermum.

Ovary 2-3-celled with several ovules in each cell and without spurious partitions. Embryo thick and fleshy, not divisible, or with 2 thick fleshy cotyledons and a short radicle 8. Eugenia.

TRIBE III. Lecythideae (Sub-tribe Barringtoniaceae). Ovary 2- or more-celled. Fruit indehiscent, hard and fibrous or fleshy. Leaves alternate, not gland-dotted.


Outer or inner stamens or both without anthers. Fruit ovoid or globular, fleshy, many-seeded 10. Careya.

1. Bæckea, Linn.

Glabrous heath-like shrubs. Leaves opposite, narrow, pointed, with many pellucid glands. Flowers normally 5-merous, axillary, peduncled, with 2 minute bracts at their base. Calyx-tube campanulate; lobes 5, membranous, persistent. Petals 5, suborbicular. Stamens 10 or fewer, shorter than the petals. Ovary inferior or ½-inferior, 2-3-celled, with several ovules in each cell. Capsule bursting from above loculicidally. Seeds angular; embryo straight with short cotyledons.—Distrib. Species about 50, the greater number Australian, a few in New Caledonia, one only extending into India.


Eastern Peninsula; Malacca, Griffith, Maingay, Cuming, Lobb, Low.—Distrib. Sumatra, Borneo, Philippines, S. China.

A slender shrub with rod-like branches. Leaves small, ½-1 in. long, flat or somewhat channelled above, convex beneath. Peduncles usually solitary and short with 2 minute bracts at the base. Flowers small, white, 5-merous, occasionally 4-merous. Calyx-tube campanulate.
2. **LEPTOSPERMUM**, Forst.

Shrubs, rarely small trees, glabrous or silky-pubescent. *Leaves* alternate, entire, rigid, with 1–3 nerves or nerveless. *Flowers* solitary in the axils of the leaves, or 2–3 together at the ends of the branches, rarely peduncled, sometimes polygamous; bracts broad, scarious, often imbricate, the lower ones soon falling off. *Calyx-tube* broadly campanulate or turbinate, adnate to the ovary below, the free upper part broad; lobes 5. *Petals* 5, spreading. *Stamens* 5, in a single series, not longer than the petals; anthers versatile, their parallel cells bursting longitudinally; connective swollen, gland-like. *Ovary* inferior or \( \frac{1}{2} \)-inferior, enclosed in the calyx-tube, 5- or more-celled, rarely 3- or 4-celled; style filiform, inserted in a deep depression of the ovary, sometimes short, stigma capitate or peltate. *Capsule* usually exceeding the calyx-tube, opening loculicidally from above. *Seeds* 5, linear or winged, often sterile; embryo straight.—*Distr.*. Species upwards of 25, chiefly Australian, a few in New Zealand and New Caledonia.


*Malacca*; *Griffith, Maingay, Low.—Distr.*. Indian Archipelago, and from Queensland to Tasmania.

A shrub. *Leaves* 1 in. and smaller, 1–3-nerved or the nerves indistinct, narrowly or broadly oblong or even obovate. *Flowers* sometimes \( \frac{1}{2} \) in. across. *Calyx* glabrous, tube broadly campanulate; lobes rather shorter than the tube. *Anthers* attached to a purplish gland-like connective. *Ovary* glabrous, prominent above the calyx-tube, and with a central depression round the style.


*Moulmein*; exposed rocks, alt. 5000 ft., *Lobb.—Distr.* Java, Sumatra?

A shrub, \( \frac{1}{2} \)-1 ft. high. *Leaves* \( \frac{1}{2} \)-1 in. by \( \frac{1}{4} \) in., narrowly obovate with silky hairs on the edges and beneath, midrib prominent beneath, lateral nerves soon vanishing upwards. *Flowers* about \( \frac{1}{2} \) in. across, few or solitary, axillary. *Calyx-lobes* ovate, obtuse, membranous, deciduous. *Anthers* attached to a dark-coloured gland-like connective. *Style* about \( \frac{1}{2} \) in.; stigma capitate. *Capsule* 5-celled, smooth, smaller than in Miquel’s specimens from Java.

3. **MELALEUCA**, Linn.

Trees or shrubs. *Leaves* alternate, rarely opposite, entire, lanceolate or linear, flat or subterete, 1–3–many-nerved. *Flowers* in heads or spikes, each sessile in the axil of a floral leaf, 5-merous; bracts deciduous. *Calyx-tube* subglobose; lobes 5, imbricate or open. *Petals* 5, spreading, deciduous. *Stamens* \( \infty \), more or less united at their bases into 5 bundles opposite the petals; anthers versatile, the cells parallel and bursting longitudinally. *Ovary* infe-
rior or $\frac{1}{2}$-inferior, enclosed in the calyx-tube, usually with many ovules in each cell. Capsule opening loculicidally from above by 3 valves. Perfect seeds cuneate; embryo straight, cotyledons longer than the radicle.—Distrib. Upwards of 100 species, all Australian, one of them extending into Tropical Asia.

1. **M. Leucadendron**, Linn.; leaves alternate elliptic or lanceolate straight oblique or falcate 3-7-nerved with anastomosing nerves, spikes long interrupted solitary or 2 or 3 together terminal at first and then surmounted by leafy branches, racish and calyx glabrous or woolly. *Benth. Fl. Australl.* iii. 142; *Kurz in Journ. As. Soc. Beng.* xlvi. (1877) pt. ii. p. 61; *For. Fl. Brit. Burm.* i. 472.

TENASSERIM and MEGHOU, Griffith; MALACCA, MAINGAY, Cuming.—Distrib. Malay Islands to Australia.

A tree, often of large size, with a thick spongy bark peeling off in layers, and pendulous branches; or stunted and with stiff erect branches. Leaves often vertical, acuminate acute or obtuse, narrow and 6-8 in. or broader more rigid and 2-4 in. *Flower-spikes* 2-6 in. Calyx-tube ovoid; lobes roundish and often scarious at the margin. Petals $\frac{3}{4}$ in. Staminal bundles under $\frac{1}{4}$ in., each with 5-8 filaments. Ovules $\infty$, ascending, attached to an oblong placenta. Fruiting-calxy about $\frac{3}{4}$ in. in diam. Seeds obovoid or cuneate; cotyledons obovate, thick, much longer than the radicle.

The following are the principal varieties of this species, concerning which Mr. Bentham remarks (Fl. Austral. iii. 142):—“This species, very widely spread and abundant in the Indian Archipelago and Malayan Peninsula, varies exceedingly in the size, shape and texture of the leaves, in the young shoots very silky-villous or woolly, or the whole quite glabrous; in the short and dense or long and interrupted spikes; in the size of the flowers; in the greenish-yellow, whitish, pink or purple stamens, etc., and at first sight it is difficult to believe that they all can be forms of one species; but on examination none of these variations are sufficiently constant or so combined as to allow of distinct races.”


Miquel (Fl. Ind. Bat. l. c.) describes *M. Cumingiana* as specifically distinct, distinguishing it from *M. lancifolia* by the absence of auricles to the staminal bundles; the existence of these however in the latter does not appear to be evident. Mr. Bentham (Fl. Austral. l. c.) considers that both of them belong to one of the common Archipelago forms with twin leaves and small flowers.


Tall shrubs or trees. Leaves alternate or crowded at the summit of the branches, rarely opposite. Flowers small, yellow or white, arranged in axillary cymes; bracts deciduous or 0. Calyx-tube turbinate campanulate or open, attached below to the ovary; lobes $\delta$, imbricate in aestivation, persistent. Petals

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5, spreading. Staminens 8, shorter than the petals, usually united in 5 bundles and opposite to them; anthers versatile, cells parallel and opening longitudinally. Ovary inferior or 1/2-superior, 3-celled; ovules many in each cell, suspended or horizontal. Capsule loculicidally 3-valved. Perfect seeds few, linear, cuneate, or winged at the upper part; embryo straight, cotyledons broad, longer than the radicle.—Distrib. Upwards of 14 species inhabiting the Malay peninsula and islands, New Caledonia, and Australia.

1. T. Wightiana, Griff. MSS.; leaves alternate shortly petioloed oblong-lanceolate acuminate glabrous closely pinnate-nerved, cymes corymbose dichotomous long peduncled terminal and axillary equalling or exceeding the leaves, branches angular pubescent, bracts leaf-like, flowers small on short pedicels, staminal bundles 3-androus, capsule very small almost wholly exerted, seeds narrow compressed winged. T. sumatran, Miq. Fl. Ind. Bat. Suppl. 308. Hypericinea pimentifolia, Wall. Cat. 4828.

MALACCA, Griffith; SINGAPORE, Wallich, Lobb; PENANG, Walker.—Distrib. Java, Sumatra, Borneo.

A shrub. Bark reddish-brown. Leaves 4½–6 by 2–2½ in., gradually narrowing towards the base, obtusely acuminate or cuspidate, shining above, dull and tawny-coloured beneath, margins revolute, lateral nerves slender uniting in a continuous intramarginal one. Primary and secondary branches of inflorescence very long. Calyx-tube broadly campanulate above, spreading or reflexed in fruit, its inner surface and the ovary clothed with pure white pubescence. Petals nearly round, glandular. Style short. Seeds 4–5 in each cell.


TENASSERIM, Helfer; MOULMEIN and MALACCA, Falconer, Griffith, Wallich; PEQU, Kurz.—Distrib. Java and Borneo.

A shrub upwards of 8 ft. Bark grey. Young parts and upper branches of inflorescence pubescent. Leaves 2–4 by 4½–13½ in., shining above, lighter below or rusty-coloured, coriaceous, margins revolute, dots inconspicuous, lateral nerves slender, prominent, unting in a continuous loop one near the margin; petiole 1/3 in. or less. Cymes compact, dichotomous. Petals nearly round, shining. Ovary silky-pubescent; ovules many, suspended. Capsule 1/3 in. Seeds compressed.

Var. tomentosa; leaves ochre-coloured hairy on both surfaces towards the base and along the prominent midrib, cymes nearly sessile compact and densely clothed with yellow tomentum, flowers larger and calyx-tube broader above, style longer, stigma capitulate, young capsule rugose pubescent, seeds about 4 in each cell.—"A small tree," Tenasserim mountains, 4000 ft., C. Parish. There are no ripe capsules on the single specimen preserved in the Kew Herbarium. Possibly a distinct species.

Var.?; leaves longer (2–5 in.), cymes lax, peduncles 3½ in., the capsules and seeds however are similar to those of Wallich's Hypericinea microntha; there are no flowers on this specimen.—Near Moulmein, alt. 1000 ft., C. Parish.

3. T. merguensis, Griff. in Journ. As. Soc. Beng. 1854, 637; leaves alternate or the upper nearly opposite very shortly petioloed or sessile obovate-lanceolate obtuse or obtusely acuminate glabrous, paniciles on long peduncles, branches angular pubescent above, bracts leaf-like, calyx-lobes oblong rounded
at the apex, staminal bundles 6-10-androus, capsule roundish large exerted nearly \( \frac{1}{4} \) in., seeds compressed. **Kurz For. Fl. Brit. Burm. i. 473.** "Tristania affinis," **Griff. Notul. 650; Ic. Pl. Asiatic. t. 636, f. 3.** Melaleuca eugeniifolia, **Wall. Cat. 3648.** M. decurrens, **Wall. Cat. 3649.**

**MERGUI, Griffith ; TENASSERIM or ANDAMAN ISLANDS, Helfer ; MALACCA, Finlayson, Wallich ; Mount Ophir, Griffith.—DISTRIN. Borneo. Cap. Rochardo, Wallich.**

A tree with pendent branches. **Leaves** 2-7 by \( \frac{2}{3} \) in., gradually narrowing towards the base, often retuse at the apex, pinnate-nerved, rusty red beneath, darker above and punctate. Branches of the inflorescence compressed, angular, furrowed, upper part together with the bracts and calyx covered with stiff whitish hairs. **Calyx-tube** rather less than \( \frac{1}{4} \) in., broadly campanulate in fruit, its nearly truncate limb spreading or reflexed; lobes obtuse. **Petals** small, transversely oblong with a minute claw at the base. **Filaments** hairy below. **Ovary** pilose; style rather long, stigma slightly capitate; ovules \( \infty \), pendulous from the apex of the cells. Valves of the capsule transversely wrinkled externally. **Seeds** about \( \frac{8}{1} \) in each cell, compressed, \( \frac{1}{4} \) in. long.—Griffith remarks that the flowers are white and disagreeably scented. In Wallich’s *M. decurrens* the blade of the leaf extends to the base, and the leaves are less conspicuously dotted.

4. **T. Maingayi, Duthie**; leaves alternate shortly petioled narrowly oblanceolate attenuated at each end obtuse coriaceous glabrous, cymes chiefly from the upper leaf-axils, branches compressed or angular pubescent, flowers sessile 3-4 together, staminal bundles 5-11-androus, capsule rather large about \( \frac{3}{4} \) in roundish exerted \( \frac{1}{4} \) its length, seeds winged 9-10 in each cell.

**MALAYA, Maingay; Kew Distrib. 767 in part.**

**Leaves** 1\( \frac{1}{4} - 2 \frac{1}{2} \) by \( \frac{1}{2} - \frac{3}{2} \) in., dark and polished above, rusty-yellow beneath, dotted, margins slightly revolute, nerves not prominent. **Cymes** dichotomously branched; peduncles \( \frac{1}{4} - 1 \frac{1}{4} \) in.; pedicels and calyx covered with light yellow tomentum, lobes rounded at the apex or subacute. **Petals** small, transversely oblong or orbicular, hairy outside. **Filaments** hairy below. **Ovary** pubescent with white hairs. **Capsules** \( \frac{3}{4} \) in. in diam.


**MERGUI, Griffith; Pegu, Kurz.**

A shrub. **Leaves** coriaceous, pellucid-punctate. Terminal buds with imbricating membranous scales. **Calyx-tube** turbinate; lobes 5, ovate, acuminate, falling off circumcisssly at the apex of the fruit. **Petals** round. **Filaments** nearly equal to the petals. **Style** filiform, shorter than the stamens; stigma capitate.—I have not seen specimens.

4*. **PSIDIUM, Linn.**

Trees or shrubs. **Leaves** opposite, entire, not dotted. **Peduncles** 1-few-flowered; flowers large, white. **Calyx** urceolate or obovate; limb undivided in aestivation, separating valvately into 4-5 lobes when in flower. **Petals** 4 or 5, free. **Stamens** \( \infty \). **Ovary** 2- or more-celled with many ovules in each cell. **Berry** many-seeded. **Seeds** with hard testa; embryo curved, radicle long, cotyledons short.—DISTRIN. Tropical and subtropical America; about 100 species have been enumerated.

Naturalised throughout India.

A small tree, pubescent on the young branches. **Leaves** on very short petioles, ovate or oblong, and usually acuminate, 3–4 in. long, glabrous or nearly so above, softly pubescent beneath and with the principal nerves prominent. **Peduncles** axillary, ⅓ in., 1–3-flowered; buds ovoid in the adnate part, the free part also ovoid but larger and more or less pointed. **Petals** broad, ⅓ in. in diameter. **Fruit** globose or pear-shaped.—"Indigenous in Mexico and possibly in other parts of Tropical America, cultivated and naturalised in most tropical countries. In India the Guava is cultivated almost everywhere except in the north-western corner of the Punjab. It often run wild, but there is no ground for supposing that the Guava is indigenous in India. Wood compact, close-grained, takes a beautiful polish." (Brandis l.c.)

**Var. pyriferum**, Linn. (sp.); peduncles 1-fld, fruit pyriform. Roxb. Fl. Ind. ii. 480.

**Var. pomiferum**, Linn. (sp.); peduncles usually 2–3-fld, fruit globose or ovoid. Roxb. Fl. Ind. ii. 480.

5. **RHODAMNIA**, Jack.

Shrubs or small trees. **Leaves** opposite, 3-nerved, hoary or pubescent beneath. **Flowers** rather small, pedicels short, sometimes very shortly fasciculate or in lax racemes; bracteoles small, deciduous. **Calyx-tube** ovoid or subglobose, not produced beyond the ovary; segments 4, persistent. **Petals** 4, spreading. **Stamens** 8, in many series, free; filaments filiform; anthers versatile with parallel cells dehiscing longitudinally. **Ovary** 1-celled with parietal placentation and many ovules; style filiform, stigma peltate. **Berry** globose, crowned with the limb of the calyx. **Seeds** few, reniform, globose or variously compressed, testa hard; embryo horseshoe-shaped, radicle long, cotyledons very short.—**Distr.** About 12? species; 3 in Australia, and the rest natives of Tropical Asia.


**Tenasserin**, Heifer; **Malacca**, Cuming, Griffith; **Sincapore and Penang**, Walker, Wallisch; **Nicobar Islands**, Kurz.—**Distr.** Malay Islands and Philippines to Australia.

A small tree or shrub with greyish wrinkled bark and pilose branchlets, young parts and inflorescence often densely silky. **Leaves** variable in size, 4–6 by 1¼–2½ in., sometimes rugose beneath, shortly petioled, subacute at the base. **Peduncles** varying in length, shorter than the leaves. **Flowers** white, fragrant. **Petals** twice as long as the calyx-lobes, hairy outside. **Stamens** nearly as long as the petals. **Berry** about ⅔ in. in diam.—I have adopted Mr. Kurz’s nomenclature which includes the various forms under the following varieties.


**Var. spectabilis**; leaves silvery-white beneath or greyish when old, flowers usually
fewer 2 or solitary. R. spectabilis, Blume Mus. Bot. i. 78; Miq. l. c. 479; Kurz l. c. R. cinerea, Jack in Mal. Misc. Monoxora spectabilis, Wight Ill. ii. 12, t. 97*, f. 5. R. Nageli, Miq. l. c. R. subtriflora and R. Mulleri, Bl. l. c. 79.

6. RHODOMYRTUS, DC.

Trees or tomentose shrubs. Leaves opposite, 5- or 3-nerved. Flowers rather large, axillary. Calyx-tube turbinate, oblong or subglobose, hardly produced above the ovary; lobes 5 rarely 4, herbaceous, persistent. Petals 5, rarely 4, spreading. Stamens \( \infty \), free, in many series. Ovary 1-2-3-celled with spurious partitions, or divided into numerous 1-ovuled superposed cells; style filiform, stigma capitulate. Berry drupelike, globose or ovoid, with few or numerous seeds not distinctly superposed in rows. Seeds compressed, reniform or nearly orbicular, horizontal, testa hard; embryo curved or spiral, radicle very long, cotyledons small.—Distrib. 5 species, 4 of them inhabitants of E. Australia, and 1 widely distributed over Tropical Asia, especially throughout the Indian Archipelago as far as China.

1. R. tomentosa, Wight Spicil. Neily, i. 60, t. 71; branches downy above slightly compressed, leaves elliptic or obovate obtuse shortly petioled 3-nerved hoary on the underside with soft tomentum, peduncles axillary shorter than the leaves 1-3-fl., flowers with 2 ovate bracteoles at the base, calyx tomentose 5-cleft, lobes unequal, berry oval or subglobose 3-celled, seeds compressed forming 2 rows in each cell. Miq. Fl. Ind. Bat. i. pt. i. 477; Bentham. Fl. Hongk. 121; Bedd. Fl. Sylv. Anal. Gen. t. xiv. Myrtus tomentosa, Ait.; DC. Prodr. iii. 240; Vahl Symb. ii. 56; Blume Bijdr. 1081; W. & A. Prodr. i. 328; Wight Ill. ii. 12, t. 97*, f. 3, Ic. 522; Roxb. Fl. Ind. ii. 498; Wall. Cat. 3630; Korth. in Ned. Kruidd. Arch. i. 197. M. canescens, Lowr. Fl. Cochinc. i. 311.

Western Peninsula, Pulney Hills, Beddome; Nilgirris, Adam. Eastern Peninsula, Malacca, Griffith. Maingay; Sincapore and Penang, Thomson, Anderson. Ceylon, alt. 6-8000 ft., Walker, \&c.

A shrub, 4-5 ft.; young parts clothed with thick tomentum. Lower leaves in threes, upper ones and those of the branches opposite, 1-2½ in. with 3 or rarely 5 prominent nerves starting from near the base, dark brown above, at length glabrous and shining, hoary beneath and rugose. Peduncles about half the length of the leaves, bearing 1-3 large pink flowers \( \frac{1}{2}-\frac{3}{4} \) in. across. Petals downy outside, shortly clawed. Berry about the size of a cherry, dark purple, pulp fleshy, sweet and aromatic.—Col. Beddome says that this is abundant on the higher mountains in the Madras Presidency, and is known at Ootacamund as "Hill Gooseberry." The fruit is eaten raw, or made into jam called "Thaonty." Its wood is white with pink heart, the grain close and cutting like cheese, but splitting when seasoned; useful for small turnery.

7. DECASPERMUM, Forst.

Shrubs or small trees. Leaves opposite, pinnate-nerved. Flowers small, in axillary racemes, and sometimes forming terminal leafy panicles, occasionally polygamous. Calyx-tube campanulate, scarcely or not at all produced above the ovary; lobes 4 or 5, spreading. Stamens \( \infty \), in several series, free, filaments filiform; anthers small, versatile, with parallel cells opening longitudinally. Ovary 4- or 5-celled with 2 or very few ovules in each cell; cells often divided by spurious disseminations; style filiform, stigma peltate. Berry
globular, crowned with the calyx-lobes. Seeds few, reniform; testa hard; embryo hippocrepiform or circular, with a long radicle and short linear cotyledons.—**Distrib.** Species about 4, inhabiting Tropical Asia and Australia, and the Pacific Islands.

Closely related to *Myrurus*.


**Eastern Bengal, Khasia Mts.; Pegu, Kurz; Mergui, Griffith; Malacca, Maingay, Cuming.**—**Distrib.** Java, Philippines, Australia.

A shrub or small tree; young parts and inflorescence covered with silky pubescence. Leaves 2 by about 1 in., abruptly contracted at the base, cuspidate-acuminate, dark and glossy above, paler and often of a reddish colour beneath. Panicles ascending, equalling or exceeding the leaves; bracts leaflike, or small and deciduous. Flowers small, crowded. Calyx-tube more or less clothed with white hairs; lobes usually less hairy or nearly glabrous. Petals ciliate. Style exserted. Berry globose, about $\frac{1}{2}$ in.—This plant varies much in the size of the flowers, the shape of the calyx-lobes, and in the degree of hairiness. I have given M. pallescens as a synonym on the authority of Kurz (Journ. As. Soc. Beng. xl. 57). Some of Maingay's Malacca specimens with an abnormally congested leafy inflorescence somewhat resemble *N. leucocoma*.

**Var. khasiana;** leaves narrower, panicles long peduncled lax few-flowered, flowers larger, petals $\frac{1}{2}$ longer than the calyx.—Khasia, Griffith, J. D. H. & T. T., Kurz.

**Var. Finlaysoniana;** leaves thicker, panicles shorter than the leaves, calyx-tube densely clothed with white tomentum, lobes all rounded and less hairy, stamens nearly equalling the petals. N. polymorpha, Blume Mus. Bot. i. 75, t. 1x.; *Hirsea* Finlaysoniana, Wall. Cat. 7263.—No locality given, Finlayson, Lobb.

8. **Eugenia, Linn.**

Trees or shrubs, smooth or rarely tomentose or villous. Leaves opposite rarely alternate, coriaceous or membranous, pinnate-nerved. Inflorescence centripetal with solitary axillary flowers, or in short racemes (leafless branches), or centrifugal in dense terminal cymes, or in terminal or lateral trichotomous panicles. Bracts usually small and deciduous. Calyx-tube globose or more or less elongate; lobes 4 rarely 5. Petals 4 rarely 5 or more or 0, free and spreading or united in a calytra. Stamens $\propto$, in many rows, free or slightly combined into 4 bundles, filaments filiform; anthers small, versatile, bursting longitudinally. Ovary 2- rarely 3-celled; style filiform, stigma small; ovules $\propto$ in each cell. Berry drupelike, rarely dry and fibrous, crowned with the persistent calyx-limb. Seeds few, globose, variously compressed, testa membranous or cartilaginous; embryo thick and fleshy, radicle short, cotyledons thick more or less united or distinct.—**Distrib.** Upwards of 700 species inhabiting chiefly tropical and subtropical America, tropical Asia, a few in Australia and Africa.
Sect. I. Jambosa. Inflorescence cymose. Calyx usually with a thickened staminal disk and 4 conspicuous persistent lobes. Flowers showy, usually 4-merous. Berries large, turbinate or ovoid. Seeds large, with a thick fleshy endocarp. (To p. 481).

* Flowers lateral, sessile or subsessile, usually from leafless axils.


A lofty tree with wide-spreadinging branches. Bark soft, ash-coloured, marked with the scars of fallen leaves. Branchlets alternately compressed or subtrigonous. Leaves crowded at the ends of the branchlets, 5–upwards of 16 by 4–4½ in., very coriaceous, shining above, paler beneath; midrib stout; lateral nerves prominent beneath, uniting within the margin. Flowers large, purple turning to red, scentless. Peduncles fleshy, branches clavate jointed near the middle; bracteoles 2, minute. Calyx-tube much produced; lobes spreading, orbicular. Petals twice as large as the calyx-lobes, shortly clawed. Stamens many, very long. Ovary turbinate. Berry size of a walnut, 2-celled, smooth, shining, white, insipid. Seeds large, rugose, greenish.


Chittagong, Roxburgh.

A stately tree. Trunk tolerably straight, quickly dividing into numerous spreading branches. Bark of woody parts brown. Leaves 6–8 by 3–4 in. Peduncles trifid, each division 3-flowered. Flowers large, white, scentless. Berry greenish-yellow when ripe.—Kurz in Journ. As. Soc. Beng. l.c. refers to specimens in Herb. Brandis collected in Upper Tenasserim as coming very near to this species, and only differing from Roxburgh’s figure by having a terminal inflorescence. In the figure given by Rumphius l.c. the leaves are acute at the base.

Rumph. Herb. Amb. i. 121, t. 37 (not good) and 38, f. i.; DC. l. c. 288; Blume Mus. Bot. i. 91; Miq. Fl. Ind. Bat. i. pt. i. 411; Berg in Fl. Brazil xiv. pt. i. 376. Myrtus macrophylla, Spreng.; Blume Bijdr. 1084. M. malaccensis, Spreng.; Blume l. c. 1083.—Burm. Fl. Ind. 114; Rheede Hort. Mal. i. 29, t. 18.

MALAYA. Maingay, Griffith. CHITTAGONG (cult.) J. D. H. & T. T. Tenasserim.—Distrib. Malayan Islands.—Many varieties are cultivated in different parts of the world.

A shrub, 6-8 ft. high, with terete-compressed branchlets. Leaves 9-12 by 3½ in., glossy on both surfaces; dots inconspicuous; nerves indistinct above, the primary ones few prominent beneath and uniting more or less distinctly within the margin, sometimes in double loopings; petiole stout, channelled above, ¼-½ in. Flowers large and handsome. Calyx-tube ¼ in.; lobes unequal, rounded, with membranous edges, the larger pair ½ in. long. Petals large, suborbicular, glandular. Stamens numerous, about 1 in. in length. Style long, persistent, nearly equalling the stamens. Fruit large and juicy, very generally eaten, but insipid (Roxburgh).—In a cultivated species from Chittagong the leaves are distinctly pellucid-punctate with large glands.

Var. purpurea; fruit ovoid dark purple. E. purpurea, Roxb. Hort. Beng. 37; Fl. Ind. ii. 483; Wight Ill. ii. 14; Ic. ii. 549. J. purpurea, Wall. Cat. 3610. J. domestica, var. purpurea, Blume Mus. Bot. i. 92; Miq. l. c.—J. nigra, Rumph. Amb. 125, t. 38, fig. 1?


**Silhet, Wallich; Khasia Mts., Griffith; Chittagong, Roxburgh.**

A small tree. Leaves 4-5 in. by nearly an inch in width, midrib and lateral nerves prominent beneath, uniting close within the margin. Flowers smaller than those of *E. diospyrifolia*. Calyx-tube broad, and rather more than ¼ in. long when in flower. —Roxburgh says (l. c.) that this flowers in March and April, and the fruit ripens in June and July; it is readily known by its many (12-16) petals and the ternate leaves. Allied to *Jambosa amula*, Blume, and *J. media*, Korth.

**Flowers terminal and axillary.**

† Calyx-tube broadly turbinate.

§ Calyx ½ in. or more in length.

5. **E. diospyrifolia**, Wall. Cat. 3617; leaves long and narrow ovate-lanceolate or oblong acutely acuminate cordate at the base and nearly sessile, flowers terminal few, calyx-tube about ¾ in. long produced beyond the ovary, lobes very broad.

**Silhet, Wallich; Khasia, Griffith.**

Leaves 6-7 by 1½ in. pale coloured and with a yellowish tinge beneath.—Allied to *E. Munronii*, but the lateral nerves of the leaf are much less prominent beneath and do not form by their union such a distinct intramarginal one; the flowers are fewer on shorter peduncles, and the calyx-tube is broader above and not so attenuated below.

6. **E. Munronii**, Wight Ill. ii. 14; Ic. t. 546; leaves shortly petioled narrowly lanceolate obtusely acuminate somewhat cordate at the base very coriaceous, nerves prominent beneath uniting in a thick waving intramarginal one, cymes terminal, flowers large reddish or white, calyx-tube attenuated

A middling-sized tree, 12-20 ft. in height. Leaves 6-9 by 2½-3 in. Calyx-lobes somewhat membranous.—Some of the Khasia specimens appear to be intermediate between this and E. aqua; the leaves are less attenuated at the apex, and not quite so prominently nerves; the flowers are rather larger than in either; and the calyx not so slender below as in typical examples of this species.


Chittagong, Ava, Pegu, Martaban, and Tenasserim (apparently only planted, Kurz).—Chyton, ascending to 5000 ft.

A middling-sized tree, 20-30 ft., much-branched, variable in the form of its foliage, the shape of the calyx-tube, and the colour of the flowers. Bark smooth, ash-coloured. Leaves coriaceous, black-dotted, 1½-2½ by 1-1½ in.; midrib prominent below, primary nerves 8-10 on each side forming inconspicuous loops near the margin. Flowers large, white, red, or pale purple. Calyx-tube turbinate or cylindrical, about 1 in.

8. E. densiflora, DC. Prodr. iii. 287 under Jamboa; leaves petioled oblong or oblong-lanceolate rounded at both ends or shortly acuminate the apex coarsely nerves and reticulated, cymes compact terminal, flowers 2 or 3 together on short pedicels, "calyx and petals tinged with clear rose-colour, filaments long rose-coloured" (Maingay MSS.), fruit nearly spherical 2-seeded. E. corymbosa, Roxb. Fl. Ind. ii. 497; Wight Ic. t. 627? Jambosa densiflora, Korth. in Ned. Kruidk. Arch. i. 200; Blume Mus. Bot. i. 93; Mig. Anal. Ind. i. 17; Fl. Ind. Bot. i. pt. i. 416. Myrtus densiflora, Blume Bijd. 1087.

Malacca and Singapore, Maingay, No. 758, 760, 7604.—Distrib. Malayan Islands.

Upper branches stout, 4-gonous, with reddish bark peeling off in shreds. Leaves from 4 to upwards of 10½ by 1½-3 in., slightly polished above, often conspicuously dotted beneath; midrib stout; primary nerves distinct on both surfaces, prominent beneath and unifying to form two conspicuous intramarginal nerves; petiole ⅛ in. Branches of inflorescence thick and 4-gonous, often articulated and breaking up into cubical segments. Calyx-tube turbinate, ⅜ in.; lobes 4, large, rounded, with membranous edges, opposite pairs equal. Style long, persistent. Fruit ⅛ in. in diam., crowned with the persistent calyx-lobes.—Allied to E. Jamboa, from which it differs in the shape and nerving of the leaves, smaller flowers and more unequal calyx-lobes. The leaves of the Singapore specimens are much smaller and less distinctly punctate below. Miquel says (Fl. Ind. Bot. i. c.) "seems to be the same as E. corymbosa, Roxb. (Wight Ic. ii. 627)," but the petals in Roxburgh’s coloured fig. No. 1143 are bright yellow.

Indigenous in the Sikkim Terai (Brandis); Burma (cult. only Kurz), Pegu, McClelland; Penang, Wallach.—Distrib. Yunan to Australia. (Said to be naturalised at Hong Kong).

A moderate-sized tree; branchlets compressed or sub-4-gonous. Leaves variable in length, 1½—2 in. broad; nerves reticulate beneath; midrib stout; petiole short and stout, ½ in. or less. Calyx-tube produced above the ovary; lobes round. Berries 1—2 in. diam.

**Var. divaricata;** branchlets stout distinctly 4-gonous, cymes terminal and from the upper axils dense subsessile, branches stout spreading. Penang (Maingay, 735).

—This resembles *E. densiflora* in its inflorescence.


Assam and Chittagong, Wallach; Cachar, Keenan; Moulmein, Falconer; Malacca, Griffith, Maingay (736 Kew Distrib.); Pegu and Martaban, ascending to 2000 ft., Falconer, Brandis.—Distrib. Malay Archipelago.

Branchlets 4-gonous. Leaves rarely subalternate, or in threes, 5—10 by ½—4 in.—In Maingay's Malacca specimens the angles of the branchlets are winged, and the bark is of a reddish colour; the petioles are stout, rather less than ½ in.; calyx-tube ½ in.; style long and persistent. Roxburgh describes the fruit as about the size of an orange, and resembling that of *Dillenia indica*; it is eaten, and ripens in August and September. In Roxburgh's figure a section of the fruit shows it to be 5-seeded. The leaves are drawn too acute. Keenan describes it as being rather a tall tree with short horizontal branches; buds roundish, rosy; the bruised leaves smell like cinnamon, and the stamens are clove-scented. In Griffith's plant the calyx-tube is finely striate, and there is a slight constriction near the middle.

(Myrtus); Berg in Fl. Brazil vol. xiv. pt. i. 377. J. macrophylla, DC. Prodr. l.c. in part.

MALACCA, Griffith; ANDAMAN and NICOBAR ISLANDS, Kurz.—Distrib. Malay Islands.
A tree; trunk rarely straight and soon divided, branchlets terete or terete-compressed. Leaves 5–6½ by 1½–2½ in., or larger in cultivated examples; nerves indistinct above, slender but prominent beneath and uniting in loops within the margin. Calyx-tube turbinate, about ½ in., slender below; lobes 4, rather unequal, membranous at the edges. Berry size of a medlar, white or red.—This tree, according to Mr. Kurz, flowers in March and April, and the fruit ripens in May and June.

Var. Roxburghiana, Wall. MSS. (sp.); leaves shortly petiolar cordate at the base rounded at the apex, cymes compact terminal. E. decora, Wall. Cat. 3608. Chittagong.

12. **E. pendens**, Duthie; young branches terete, leaves shortly petiolar oblong or ovate-lanceolate narrowed below obtusely acuminated subcoriaceous pellucid-punctate, principal lateral nerves prominent beneath and widely separated, cymes terminal and axillary 5–7-flowered, flowers large the lower ones long pedicelled, calyx-tube turbinate.

MALACCA, Griffith, 2349, Maingoy, 747.
“Rather a small tree with pendent branches” (Griffith). Leaves shining a little on the upper surface, 5–8 by 2–3½ in.; nerves indistinct above prominent beneath, uniting in a distinct looping one within the margin; petiole ½ in. Pedicules equaling the petioles or a little longer; lower pedicels about ¼ in. Calyx-tube ½ in.; lobes 4, rounded, with membranous edges, opposite pairs equal, reflexed after flowering. Petals large, orbicular. Style very long, 1¼ in., persistent.

§§ Calyx less than ½ in. in length.
a. Flowers pedicelled.

13. **E. Wallichii**, Wight Ill. ii. 17; Ic. t. 536; leaves lanceolate or elliptic-oblong acuminated acute at the base dark and shining above, lateral nerves uniting twice within the margin, cymes corymbose axillary and terminal shorter than the leaves, calyx-tube suddenly contracted at the base lobes prominent persistent, petals frequently expanding before falling, berries oblong. C. bifaria, Colebr. in Wall. Cat. 3606. E. procox, Roxb. Fl. Ind. ii. 488?; Wight Ic. t. 619; Kurz in Journ. As. Soc. Beng. xlv. (1877) pt. ii. p. 66; For. Fl. Brit. Burm. i. 483.

A tree; branchlets stout, quadrangular. Leaves 4½ by 1¾ in., coriaceous, rusty-coloured beneath; petiole about ¼ in. Flowers white. Calyx-tube about ½ in. long. Stamens about 4 times the length of the calyx. Style long, persistent. Berry about ¼ in., crowned with the cup-shaped calyx-limb.—In Roxburgh’s figure of *E. procox* the inflorescence is more branched and the flowers rather smaller; the leaves are drawn acutely acuminate.

Var. lancefolia; leaves rounded at the base, petiole much shorter; E. lancefolia, Roxb. Hort. Beng. 37; Fl. Ind. ii. 494. SILHET FORESTS, Roxburgh. CHITTAGONG, J. D. H. & T. T.

β. Flowers sessile.

14. **E. grandis**, Wight Ill. ii. 17; Ic. t. 614; leaves large thick hard and coriaceous shining broadly obovate or suborbicular abruptly acuminate or

**Eugenia.**

**Silhet, Wallich; Pegu, Martaban, and Tenasserim, Brandis; Moulmein and Mercui, Griffith; Malacca, Griffith, Maingay; Singapore, Walker; Ceylon, Thwaites, ascending to 4000 ft.—Distrib. Borneo, &c.**

A large tree. Leaves 4–8 by 3–3½ in.; lateral nerves sometimes forming double loopings within the margin; petiole 2½–3 in. Calyx-lobes short, rounded, unequal. Berries 1 in. to 1½ in.—Blume distinguishes his *J. firme* specifically by the nerves not being impressed on the upper surface, and by the more unequal calyx-lobes. The Ceylon specimens have the leaves very much polished, the lateral nerves more numerous and uniting closer to the margin, the cymes more lax and fewer-flowered. A plant from Amherst named *E. fieifolia*, MSS. in Herb. Wallich 3603 B, has the leaves very large and more rounded at the base.


**Pegu and Tenasserim, Brandis; Malaya, Griffith, Maingay; Singapore, Wallich.—Distrib. Sumatra.**

Branchlets greyish, more or less compressed at the nodes. Leaves thick, coriaceous, smaller than those of *E. grandis*; midrib furrowed above, stout beneath; petiole about ⅓ in. Panicle branches angular, much compressed below the nodes. Calyx pedicel-like below; lobes rather unequal, rounded, with membranous edges. Berries about ⅓ in., subglobose, crowned with the cup-like calyx-limb, often prominently ribbed longitudinally.

**Var. minor**; leaves and flowers smaller, panicles axillary and terminal; flowers crowded in umbel-like heads.—The leaves resemble those of *E. mangifolia* and the inflorescence has more the habit of *E. Wallichii*.—**Malaya, Griffith** (2416).

15*. **E. Beddomei**, Duthie; leaves crowded broadly ovate abruptly attenuate below very coriaceous polished above, midrib and stout lateral nerves prominent beneath freely anastomosing towards the margin and uniting at some distance from it, inflorescence elongate, branches acutely 4-ous, petals free.

**Tinnevelly Hills**; alt. 5000 ft., *Beddome*. 

A large tree. Leaves 4½ by 3 in., rounded or emarginate at the apex; petiole ½ in. or less, stout; midrib channelled above. Flowers like those of *E. grandis*.

16. **E. tetraëdra**, Miq. Fl. Ind. Bat. Suppl. i. 310 (Jambosa?); branchlets compressed acutely 4-ous or the older ones suberete, leaves broadly elliptic often folded very coriaceous shining above rusty coloured beneath, nerves prominent on both surfaces, cymes terminal and axillary with divaricate
branches, calyx-tube about \( \frac{1}{2} \) in. gradually tapering to the base, lobes 4 prominent, petals free or slightly united, berry ovoid or subglobose size of cherry.

MALACCA, Griffith, Maingay, 732.—Distrib. Sumatra.

A large tree. Leaves 3–6 by \( \frac{1}{4}–2\frac{1}{4} \) in.; lateral nerves uniting close to the margin; petiole \( \frac{3}{4} \) in. Branches of inflorescence flattened below the flowers. Calyx-lobes with pale membranous edges.—Kurz in a MS. note on a specimen in the Calcutta Herbarium suspects that this is the E. tetraëdra of Miquel, but with some hesitation on account of the terete branchlets. The examination of a more complete series of specimens in the Kew Herbarium enables me to confirm his suspicion.

17. **E. pachyphylla**, Kurz in Journ. As. Soc. Beng. xlii. 332 (1873); *For. Fl. Brit. Burm.* i. 490; leaves obovate or obovate-oblong more or less cuneate at the base acuminate thick and coriaceous, flowers usually solitary or in threes sessile arranged in short stout terminal 3-chotomous panicles, branches 4-gonous articulate, calyx about \( \frac{1}{3} \) in. long obconical attenuate below, lobes 4 rounded persistent.

TENASSERIM, Brandis, alt. 3000 ft. MALACCA; Griffith, Maingay.

A tree. Branchlets white. Leaves 3–4 in., turning dark when dried; lateral nerves slender, prominent, distant; petiole thick, \( \frac{1}{4}–\frac{3}{4} \) in.—Flowers in April.


TENASSERIM, Brandis.

A tree. Branchlets terete, thick, pale brown. Leaves 4–5 in., opaque; lateral nerves rather distant, stout, prominent. Berry 2- or 1-seeded. Calyx-lobes \( \frac{1}{4} \) in. (in fruit) rounded.

†† Calyx-tube hemispherical.


From S. CANARA to CAPE COMORIN, at about 3000 ft. alt., *Kuro Msns., Anamallay* and *Tinnevelly Ghats*, Beddome. *Ceylon*, up to alt. 4000 ft., *Thwaites*.

A large tree, upper branches subtetragonal. Leaves minutely dotted, 2–6 by \( \frac{3}{4}–2 \) in.; nerves inconspicuous above more prominent beneath, and uniting within the margin but not very regularly, with sometimes a second but fainter nerve close to the edge; petiole \( \frac{3}{4}–\frac{3}{4} \) in. Inflorescence pyramidal. Peduncles 6–9-flowered. Flowers large, white, varying in size. Berries about 1 in. in diam.—This species varies much in the shape of the leaves and in their appearance when dried. The timber is useful for various purposes.


SILHET, “Roxburgh.”

A small tree 10–12 ft. in height. Flowers very large, rosy, and somewhat
fragrant. Fruit size of small apple, not eaten.—Col. Beddome believes it to be closely allied to *E. hemispherica*. I have not seen specimens.

†† Calyx-tube slender, conical or clavate.

§ Flowers on long slender pedicels.

21. **E. bifaria.** Wall. Pl. As. Rar. ii. 47, t. 161, not of Wall. Cat. 3606; leaves very shortly petiolated crowded oblong acuminate rounded at the base shining and convex above, lateral nerves uniting at some distance from the margin in two conspicuous ones, corymbs axillary solitary branched few-flowered, calyx-tube clavate narrowed into a slender pedicel, lobes 4 roundish unequal, berry oval about 1 in. long crowned with the incurved calyx-lobes. Wight Ill. ii. 14; Ic. t. 600. E. laurifolia, Roxb. Hort. Beng. 92; Pl. Ind. ii. 489; Wall. Cat. 3605. Jambosa bifaria, Miq. Fl. Ind. Bat. i. pt. i. 422. J. laurifolia, DC. Prodr. iii. 287.

**Silhet Mts., Wallich.**

A tree, quite glabrous; branches terete or alternately compressed, or the ultimate ones obscurely 4-gonous, swollen at the nodes, ashy-coloured. Leaves about 5 in., twice or three times longer than the internodes; nerves prominent beneath nearly transverse; petiole terete, ½ in. Corymb rather lax, two or three times shorter than the leaves, rather peduncled. Flowers large, white, on slender pedicels. Petals orbicular, shortly clawed, twice as large as the calyx-lobes, minutely crenulate. Stamen numerous, long, spreading. Berry pendulous, 1½ in. long, yellow.—In some of Wallich’s specimens named *E. laurifolia* the corymbs appear to be terminal.

22. **E. filiformis.** Wall. MSS.; leaves petiolated rather small nearly ovate with a broad obtuse acumen coriaceous pellucidly dotted, cymes laxly racemose terminal or lateral, flowers solitary on long slender pedicels, calyx-tube turbinate or subcyllindrical, lobes nearly equal, berries ovoid or roundish crowned with the 4 reflexed calyx-lobes 2-seeded. Syzygium filiforme, Wall. Cat. 3580. S. capillare, Wall. Cat. 3578.

**Singapore and Penang, Wallich; Malaya, Maingay, Griffith.**

Upper branches slender, rod-like, terete, or subcompressed at the nodes. Leaves 2–3 by 1½–1½ in.; midrib prominent beneath, lateral nerves spreading out nearly at right angles with the midrib; petiole about ½ in. Pedicels ½ in. Calyx-tube ½ in. Berries ½ in. long by ⅜ in.—One of Maingay’s specimens has a much longer almost cylindrical calyx-tube. Wallich’s *E. (Syz.) capillaris* seems to be only a state of *E. filiformis* with thinner narrower leaves, shorter pedicels, and smaller flowers.


**Sikkim, alt. 1–5000 ft., J. D. H.; Assam, Jenkins; Khasia Mts., Kurz; Mishmi, Griffith; Cachar, Keenan; Peou and Martaban, Kurz.**

A large tree 90–100 ft. Branchlets white, compressed or subtetragonal. Leaves 4–7 in., shining a little on the upper surface; lateral nerves slender but prominent; petiole ¾–⅜ in. Cymes about 5-flowered. Calyx-tube ¾–⅞ in., the produced portion ½ in.; lobes ½ in., reflexed after flowering. Petals ½ in. Filaments slender. Style persistent. Berry ½–¾ in., 1–2-seeded, smooth, crowned with the spreading calyx-
24. **E. albiflora**, Duthie in Journ. As. Soc. Beng. xlvi. (1877) pt. ii. 68; Kurz For. Fl. Brit. Burm. i. 491; leaves obovate or nearly ovate shortly and bluntly acuminate acute at the base, cymes from the upper axils or terminating older shoots few-flowered shorter than the leaves, calyx-tube narrow and slender below, lobes 4 rounded or subacute, petals united white.

BURMA, alt. 1000 ft., Griffith (2419).

A small tree with terete branchlets. Leaves 3–5 by 2–2½ in., smooth, pale and indistinctly nerved above; lateral nerves rather distant and prominent beneath faintly uniting within the margin, interspaces finely reticulate; petiole ¼ in. "Buds white" (Griffith MSS.). Calyx-tube about ½ in. long.

§§ Pedicels shorter and more erect.

25. **E. fusiformis**, Duthie; young branches 4-gonous, leaves petioled obovate-lanceolate cuneate below subcoriaceous pellucid-punctate, lateral nerves rather close, cymes terminal compact branches angular and somewhat winged, flowers 2 or 3 together on short pedicels, calyx-tube narrowly fusiform much produced above the ovary.

MALAYA, Maingay No. 743.

Bark yellowish. Leaves 4½ by 3 in., shining a little above, minutely dotted; midrib and nerves dark-coloured; lateral nerves uniting within the margin; petiole about 3 in. Calyx-tube ¼ in. in length and ½ in. across at the widest part; lobes 4, rounded, reflexed after flowering. Style persistent, exserted portion equaling the calyx-tube.—Closely allied to No. 2236 of Beccari’s Borneo plants.

26. **E. laeta**, Ham. in Trans. Wern. Soc. v. 338 (excl. syn. Rumph.); leaves rather thin shortly petioled ovate-lanceolate attenuated at the base with a longish obtuse acumen pellucid-punctate, primary nerves directed upwards not distinctly uniting within the margin, peduncles terminal and axillary 1–few-flowered often jointed in the middle, calyx-tube long cylindrical tapering to the base, stamens crimson or purple numerous exceeding the large rounded petals, berry ovoid. Jambosa laeta, Blume Mus. Bot. i. 104.

Moist Western Ghat forests from Bomrav southwards, Hamilton, Beddome, Gibson, Ritchie, Stocks.

A small or middling-sized tree; branchlets terete, Leaves 4–5 by 1½–1⅜ in., secondary nerves crossing the primary ones more nearly at right angles with the midrib; petiole ¼ in. Flowers large, 2–3 in. when expanded, crimson or white. Calyx-tube ⅔–1 in.; lobes rounded, unequal, reflexed when in flower. Petals white, glandular. Style 1½ in. persistent.—Hamilton’s type specimen in the British Museum from Mysore is certainly identical with the Western Ghat specimen named *S. pauciflora* in the Kew Herbarium.


27. **E. cylindrica**, Wight. Ill. ii. 14; Ic. t. 527; ultimate branches terete, leaves shortly petioled ovate-lanceolate acuminate coriaceous minutely pellucid-punctate, primary nerves prominent beneath forming double loops within the margin, cymes terminal or from the upper axils 3–8-flowered shorter

Ceylon, ascending to 3000 ft., Walker, Thwaites.

A moderate-sized tree. Leaves 4–6 by 1½–1½ in. The nervation forms a characteristic feature in this species, the lateral nerves uniting in a double system of inframarginal loopings, the inner one being situated about half-way between the midrib and the margin; petiole ½–1½ in. Flowers large, ½ to nearly 1 in. diam., white, turning to purple. Calyx-tube ¾ to nearly 1 in. long. Petals orbicular, dotted. Fruit ¾–1½ in. diam.—Blume (Mus. Bot. i. 114) compares this with his Clavimyrtus virens; but the latter is distinguished by a more contracted inflorescence and the calyx shorter and less attenuated below.

28. E. ramosissima, Wall. Cat. 3004; leaves lanceolate or oblong-lanceolate attenuated towards the base acuminate subcoriaceous pellucid-punctate, cymes axillary and terminal much branched, branches spreading, calyx-tube clavate or narrowly obconical, lobes rounded nearly equal, petals densely glan dular. Clavimyrtus ramosissima, Blume Mus. Bot. i. 115.


A tree; branchlets terete, with a pale yellow bark. Leaves 3–4 by about 1½ in., shining above, obscurely dotted, with a long acumen, narrowing at the base into a short petiole, reticulate-nerved beneath; midrib prominent; primary nerves few, slender, uniting in a looping one within the margin. Calyx-tube ¾ in., tapering gradually to the base with nearly straight sides.—This species resembles Jambosa glabrata DC. but differs in the less slender and more branched peduncles; the leaves are narrower at the base and the nerves are more prominent.

29. E. Helferi, Duthie; upper branches 4-gonous, leaves shortly petioled lanceolate or ovate-lanceolate acuminate coriaceous pellucid-dotted, nerves inconspicuous primaries numerous uniting within the margin, interspaces finely reticulate, cymes terminal and from the upper axils branched shorter than the leaves, calyx-tube clove-shaped ¾ in., lobes ¼, opposite pairs equal.

Mergui, Helfer (2418). Singapore, Lobb.

Bark of upper branches and of inflorescence reddish, deciduous. Leaves 3½–4 by 1½–1½ in.; petiole about ½ in.—Allied to J. Teysmannii, Miq. and E. ramosissima; from the latter it differs in having thicker leaves, the primary nerves much closer and less prominent beneath, but with a more distinctly continuous marginal one, branches of the inflorescence more erect, and flowers smaller.

30. E. mangifolia, Wall. Cat. 3619; leaves ovate-lanceolate acuminate thick coriaceous nervation prominent on both surfaces interspaces finely reticulate, cymes axillary and terminal corymbose, flowers large numerous, calyx-tube ⅛ in. dilated above, petals free. E. reticulata, Wight Ill. ii. 16; IC. t. 541.

Assam, Griffith, G. Mann; Silhet, Wallich; Khasia Mts., alt. 3–4000 ft., J. D. H. & T. T.

Branchlets terete. Leaves 3–5 by 1–2 in., shining above; lateral nerves uniting close to the margin sometimes in two continuous ones. Calyx much produced above the ovary.—This differs from E. inophylla in the more prominent nerves of the leaves and in the shape of the calyx. Miquel (Fl. Ind. Bat. i. pt. i. 435) speaks of it as being closely related to Jambosa conferta, Korth.

31. E. inophylla, Roxb. Hort. Beng. 37; Fl. Ind. ii. 496; leaves shortly petioled ovate-oblong with an acute base obtusely acuminate closely nerved dark above and shining, cymes terminal corymbose, calyx clove-shaped,

**Sylhet, Wallich; Mergui, Griffith; Singapore and Penang, Wallich.**

A tree. *Trunk* straight. Young branches terete-compressed, polished. *Leaves* upwards of 4½ by 2½ in., thickly coriaceous; lateral nerves rather close, spreading transversely; petiole about ½ in. *Calyx* ½ in.—In Wallich’s specimens (3600) the petals appear to be calyptrate. Although resembling the clove-tree it possesses no kind of fragrance; the large pear-shaped berries are not eatable (Roxburgh).

**Sect. II. Syzygium.** Flowers small, in compact cymes. *Calyx* without a thickened seminal disk, tube turbinate rarely elongate; limb 4–5-lobed, or truncate. *Petals* usually calyptrate. *Berries* small, globose pyriform or oblong, 1–2-seeded (to p. 500).

* Cymes terminal and axillary, rarely from leafless axils (to p. 496).

† Petals usually free (to p. 488).

§ *Calyx* short, turbinate or subcylindrical.

‡ *Berries* globose or subglobose.

a. *Lateral nerves of leaves rather distant.*

32. *E. anisosepala,* Duthie; leaves ovate-lanceolate acuminate lateral nerves close uniting at some distance from the margin, cymes terminal coriaceous, calyx-tube turbinate about ½ in. lobes unequal, petals free or slightly combined.

**Malacca, Griffith, Maingay 753.**

“A very large tree” (Griff.); branchlets terete, grey, polished. *Leaves* 3–3½ by 1½–1¼ in., shining above, dark when dry. *Inflorescence*-branches sharply angled, alternately compressed upwards. Inner *calyx*-lobes broad and petaloid, appearing to fall early with the corolla, the two outer ones narrower and gibbous below. *Style* long, persistent.—In Griffith’s plant the inflorescence is more branched and longer than the leaves, and the flowers are smaller (½ in.).

33. *E. Griffithii,* Duthie; leaves ovate or oblong-lanceolate narrowed at both ends coriaceous smooth and shining above, nerves impressed above prominent beneath, cymes terminal or from the upper axils, flowers 2 or 3 together at the ends of long compressed branches, calyx-lobes unequal, petals free thick edges membranous.

**Malacca, Griffith 2375.**

Branchlets terete. *Leaves* 5–6 by 2–2½ in., shortly petioled; lateral nerves unifying in conspicuous loops at some distance from the margin and with a fainter set near the margin, interspaces reticulate. *Calyx*-tube about ¼ in.


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Marshy parts of Pegu forests, Kurz. Rangoon, Maingay. Amherst and Moulmein, Wallich; Tenasserim, Helder.

Branchlets terete, compressed. Leaves 5–8 by 2½–3½ in., coriaceous, reticulate beneath; petiole ¼ in. Branches of inflorescence lax, quadrangular, many-flowered, bracteate.—A specimen in the Kew Herbarium under this name (I can find no type-specimens) is certainly Wallich's *S. speciosum*. Roxburgh's incomplete description and unfinished drawing (No. 2510) as far as they go agree fairly well with this latter. The flowers are sometimes 5-merous.

**Var. ferruginea**, Wight t. 554 (sp.); petals 8. *E. octopetala*, Ham.—Mergui, Griffith.


**Chittagong forests, Roxburgh. Tenasserim from Moulmein to Mergui, Griffith, Kurz.**

Large tree; branchlets terete or subcompressed, white. Leaves 4½–6½ in., turning black or reddish when dried; lateral nerves slender, uniting distinctly within the margin; petiole about ¼ in.? Panicles on longish peduncles, but falling short of the leaves.—Closely allied to the preceding. The leaves are of a thinner texture, the stamens longer, and the sepals and petals larger (Kurz).

b. Lateral nerves of leaves close.


**Cachar, Keenan; Silhet and Tavoy, Wallich; Burma, Griffith; Moulmein, Helder; Malacca, Maingay, Griffith; Singapore and Pulo Dinding, Wallich, Kurz.** —Distrtn. Java.

A large shrub or tree. Leaves 2–3 in., rounded at the base, smooth and polished above, often glaucous, with a longish slender but obtuse acumen; lateral nerves not very distinct, uniting close within the margin; petiole ¼–½ in. Peduncles equaling the petioles or shorter. "Berries slightly depressed at the apex, purple-black when ripe" (Maingay MS.).—Wallich's *E. concinna*, which I refer here doubtfully, has the leaves rather longer and more oblong; the petals appear to be free though not expanding; the specimens however are too incomplete for a proper determination.

**Var. rostrata**; leaves with a long slender acumens more prominently nerved, lateral nerves spreading out towards the margin, petiole longer, calyx nearly truncate. —The leaves which remain green after drying resemble those of *E. verecunda*. *E. rostrata*, Bedd. MS.—Anamallys. Perhaps a distinct species.

37. **E. toddalioides**, Wight Ill. ii. 16; Ic. t. 542; leaves lanceolate acuminate attenuate towards the base coriaceous pellucid-punctate, cymes lateral
di- tri-chotomous each branch 1-3-flowered, calyx-limb dilated tube contracted not thicker than the pedicel, lobes 4 unequal shallow, petals free but not expanding.

Sikkim, alt. 4000 ft., Gamble? Mergus, Griffith in Hb. Wight.
A small tree. Branchlets subterete. Leaves 2-3 by 1-13 in.; lateral nerves many uniting close within the margin. Flowers about $\frac{1}{4}$ in.—Habit of E. Gardneri and E. lissophylla but the petioles are shorter than those of the former and the inflorescence is different from both.


E. Bengal, Griffith; Pegu, McClelland; Singapore, Wallich.—Distr. Sumatra, Borneo.
A shrub or small tree with 4-gonous branchlets. Leaves 12-3 by 3-1 in., shining above, often rusty-red beneath. Cymes many-flowered, shorter than the leaves. Petals free or slightly united. Style persistent, exserted portion twice the length of the calyx-tube.—Affords a dark strong wood.


Ceylon, central province, alt. 3-5000 ft., Thwaites, Gardner.
A moderate-sized tree. Leaves 2-4 by 3-2 in.; petiole $\frac{3}{8}$ to nearly $\frac{1}{4}$ in.—In Wight's herbarium there are specimens of this named *E. rubicunda*, which it resembles in many respects.


Mergus, Helfer; Malacca, Malagay; Penang, Porter.—Distr. Java.
Branchlets terete or subtetragonal. Leaves 3-6 by 1$\frac{1}{4}$-2 in.; lateral nerves slender beneath; petiole $\frac{1}{4}$ in. Inflorescence-branches long, angular. Calyx saucer-shaped above after flowering. Petals only slightly united.—In Helfer's plant the lateral nerves unite at some distance from the margin with a second fainter one close to the edge, the inflorescence is more lax and divaricate.

†† Berries oblong.

41. *E. Arnottiana*, *Wight Ill*. ii. 17; *Ic*. t. 990; leaves elliptic-oblong acuminate coriaceous closely nerved, cymes dense from the upper axils branches stout, flowers subsessile in umbels of 8-12, bracteoles long caducous, petals dis-

Common on the Nilghiri and Pulney Hills, alt. 6-7000 ft., Wight, &c. Anamallay Mts., alt. 4000 ft., Beddome.

A large spreading tree, trunk low; branchlets 4-gonous. Leaves 2-3 by 1-1½ in., obscurely dotted, the numerous nerves uniting close within the margin; petiole ½-nearly 1 in. Flowers cream-coloured, crimson in bud. Fruit dark purple.—Timber valuable (called "Naval"); the fruit is eaten but astringent (Beddome).


A specimen in the Kew Herbarium from the Pulney Hills (No. 254 of Beddome's collection) I find a difficulty in placing satisfactorily. To the above species it bears a great resemblance but for the elongate calyx-tube.

§§ Calyx elongate.

† Flowers axillary, racemose, calyx ½-1 in. long.

42. E. Maingayi, Duthie; leaves shortly petioled long oblong-lanceolate acuminate rounded at the base, racemes short axillary or from the leafless axils of the rugged lower branchlets, calyx-tube elongate clavate about ⅞ in. glandular, lobes 4 rounded deciduous.

Malaya, Maingay 750.

Older, branchlets with rugged corky bark, upper stout, terete, reddish. Leaves 4½-7½ by 1½-2½ in., indistinctly nerved above, midrib stout beneath; petiole ¼ in. Style short, acute.—This plant differs from the other members of the section in the rounded base of the leaves; it seems to approach nearest to E. claviflora, and has a general resemblance to E. borneensis, Miq. Fl. Ind. Bat. i. pt. i. 434 (Jambosa), but the petioles of the latter are much longer.


Sikkim and Khasia Mts., alt. 2-1000 ft., J. D. H. & T. T.; Silhet and Chittagong, Wallich; Pegu, Kurz; Nicobar and Andaman Islands, Kurz; Tenasserim, Helfer; Singapore and Penang, Wallich.

A tree. Leaves 3-6 by about 1½ in., rather closely nerved. Berry about an inch long.—In Chittagong this grows to be a stout useful timber-tree of very considerable size; it flowers in March, fruits in May; fruit eaten (Roxburgh). Wallich's specimens named S. excavatum have very thick coriaceous leaves somewhat revolute at the margin; the berries are ⅞ in. long including ⅛ in. of projecting calyx-limb.

44. E. leptantha, Wight Ill. ii. 15; Ic. t. 528; leaves from ovate-elliptic to oblong-lanceolate obtusely acuminate narrowed into a very short petiole, cymes raceme-like arranged on the leafless axils or at the nodes of denuded branches, calyx-tube long narrow clavate, limb with broad shallow teeth or nearly truncate, berry clavate-oblong. Benth. Fl. Austral. iii. 283 (Syz.); Kurz in Journ. As. Soc. Beng. vol. xlvi. pt. ii. p. 65; For. Fl. i. 450. Syzygium suavissimum, Wall. Cat. 3573. Syzygy, Griff. Notul. 654.

Sikkim, foot of hills, J. D. H. & T. T.; Pegu, Kurz; Rangoon, Cleghorn; Moulmein, Fa'aconer; Mercui, Griffith; Amherst, Wallich; Singapore and Penang,
Wallich; Andaman Islands, Helfer, Kurz.—Distrib. Malay Archipelago to Australia.

A moderate-sized tree. Leaves 4-5½ by 1½ in., pale, finely nerved. Calyx-tube about ½ in., finely attenuated towards the base; limb dilated and much produced beyond the ovary. Berry about ¾ in.

45. *E. Wightiana*, Wight Ill. ii. 15; Lc. t. 529; leaves elliptic-oblong tapering at each end, peduncles axillary or in racemes on the leafless branches or shoots, calyx elongate clavate repandly 4-5-lobed, petals 12 or fewer by abortion the outer ones occasionally expanding. *E. lanceolata*, Lam. Dict. iii. 200; Wight Ill. ii. 15; Lc. t. 530; DC. Prodr. iii. 284; Bedd. Fl. Sylv. Anal. Gen. ex.; W. & A. l. c. (Syz.); Thwaites Enum. 119 (Acmena). Syzygium Wightianum, Wall. Cat. 3577; W. & A. Prodr. i. 330. Myrtus Sonerati, Spreng. Syst. ii. 485.

Concan, Stocks; Nilghirii and Dindygul Mrs., Quilon, Wight. Ceylon, ascending to 2000 ft., Walker, Thwaites.

A very showy tree when in full blossom (Beddome). Leaves 3-5 by 1½ in., pellucid-dotted. Flowers nearly sessile.—This varies much in the length of the calyx-tube, and the number of flowers. Its numerous petals give it a relation similar to *E. polyptala* in the Jambosa section.

+++ Flowers in terminal and axillary corymbs. Calyx shorter.

46. *E. pellucida*, Duthie; leaves narrowly oblong or oblongate rounded or subacute at the apex finely and closely nerved nerves and dots pellucid, cymes terminal and axillary, flowers crowded at the ends of the longish ascending branches, calyx-tube ¼ in. slender below, lobes 4 prominent opposite pairs equal. *E. contracta*, Wall. Cat. 3602; Kurz in Journ. As. Soc. Beng. vol. xlii. pt. ii. p. 65; For. Fl. i. 451, not of Poir.

Martaban to Tenasserim, Helfer (2406, 2407), Kurz.

A shrub; branchlets terete. Leaves 2-6 by about 1 in., chocolate-coloured above when dry, paler beneath; nerves rather prominently reticulated; petiole ¼ in. Cymes sometimes exceeding the leaves. Petals orbicular, free or slightly combined.

Var. contracta; leaves narrower, lateral nerves directed upwards, cymes mostly axillary and falling short of the leaves. Syz. contractum, Wall. Cat. 3602; not of Poir. in DC. Prodr. iii. 259 (Eng.).—Attran river, Wallich. Mr. Kurz is of opinion that the Martaban specimens with dry blackish and less distinctly-nerved leaves may prove to be distinct, or may be a large and long-leaved variety of *E. cuneata*, Wall.


Western Peninsula, from Concan southwards; Silhet; Malay Peninsula to Singapore; Penang; Andaman Islands, Kurz; Ceylon, up to 4000 ft., Thwaites. —Distrib. Sumatra, Borneo.
A large shrub or moderate-sized tree; young branches often acutely quadrangular or winged. Leaves 1-5 in., varying in width from 1/4-2 in., rounded or tapering at the base, giving off an aroma when bruised; petiole 1/4-1 in. Flowers in clusters of 3-5, shortly pedicelled. Calyx and pedicels usually rough with glands. Petals soon falling off. Berry about the size of a pea.—According to Thwaites the narrow-leaved form is the most abundant in Ceylon.

Var. laxiflora, Bedd. l.c.; flowers in lax racemes, panicles exceeding the leaves.

In a specimen collected by Col. Beddome on the Tinnevelly Hills some of the flowers have the pedicel-like calyx-tube unusually long.

48. **E. grata**, Wall. Cat. 3586 (Syzygium); leaves ovate-lanceolate narrowly acuminated rounded or subuneate at the base distinctly punctate above glaucous globose, flowers in dense clusters terminal and axillary, calyx narrowly campanulate smooth, berries black oval or subglobose crowned with the persistent calyx-lobes. Wight Ill. ii. 15; Kurn in Journ. As. Soc. Beng. vol. xlv. pt. ii. p. 65; For. Fl. i. 480. E. seabra, Wall. Cat. 3564 D. Myrtus quadrangularis, Ham.

Assam, Jenkins, Griffith; Khasia Mts., Griffith; Pegu, Kurz; Moultéin, Wallich; Mergui, Griffith.

A small tree. Leaves 3-5 by 1-2 in., sometimes almost acutely acuminated. Calyx-tube tapering below, pruinose, usually quite smooth or longitudinally ribbed when dried. Berry about 1/4 in. long.—The flowers are rather larger than those of E. zeylanica, to which it is closely allied.

49. **E. linearis**, Wall. Cat. 3596 (Syzygium); leaves linear-lanceolate acuminated subfalcate indistinctly nerveed above, flowers crowded at the ends of the branchlets, calyx campanulate pruinose limb 4-partite, petals free, berry size of a pea crowned with the persistent calyx-lobes.

India? Herb. Wallich (without locality).

Leaves 2-3 by 1/4-1 in., conspicuously dotted above; lateral nerves distant, uniting within the margin; petiole about 1/4 in. Flowers larger than those of E. zeylanica; pedicels equal in length to the calyx-tube. Style nearly twice as long as calyx-tube.

A specimen of this in Rottler's Herbarium is named Myrtus ruscifolia, Willd., and is said to come from India.

50. **E. penangiana**, Duthie; leaves thick elliptic-obovate obtusely acuminate attenuate at the base nerves close indistinct on both surfaces, cymes short crowded towards the ends of year-old branchlets, calyx-tube narrowly clavate or subcylindrical nearly 1/2 in. much produced lobes 4 small, petals free?.

Penang, Government Hill, Maingay, 744.

Branchlets terete. Leaves 2 1/4-3 1/2 by about 1 in., brownish-yellow when dried.—Allied to E. chlorantha, and No. 1567 of Becarri's Borneo plants.

A specimen at Kew, collected by Helfer (no locality given), comes near to this. The calyx-tube is rather longer and more spreading above after flowering; the leaves are of thinner texture, and more conspicuously nerveed.

51. **E. skiophila**, Duthie; leaves elliptic-lanceolate with a slender obtuse acumens narrowed at the base subcoriaceous pellucid-punctate, calyx-lobes 4 incurved, petals small free spreading distant, berry red size of a pea.

Penang, Government Hill, Maingay, in deep shaded ravines.

A small tree, 15 ft. Branchlets terete. Leaves shortly petioled, 4 1/8-6 by 1 1/2-2 in.; midrib rounded beneath; lateral nerves close, inconspicuous above, spreading at right angles and uniting close within the margin. Calyx-tube 1/4 in. Stamens short.
52. **E. chlorantha**, Duthie; leaves ovate acuminate thick opaque shining nerves numerous close, cymes in short racemes from the upper axils or terminating previous year's shoots, calyx-tube \( \frac{1}{4} \) in. cylindrical below, petals free greenish, berry globose about \( \frac{1}{2} \) in. crowned with 4 rounded unequal calyx-lobes. Syz. rigidum, Wall. Cat. 3581; not of DC. (Eug.).

MALACCA, Griffith, Maingay, 733; SINGAPORE, Wallich.—Distrib. Malay Islands. "A very elegant tree when in flower" (Maingay MS.). Branchlets terete. Leaves 21\(-\)51 by 1\(\frac{1}{2}\)-3 in.; midrib impressed above, prominent beneath; primary nerves slender prominent on both surfaces, uniting in loops within the margin, interspaces finely reticulate. Calyx-tube furrowed below. Petals \( \frac{1}{2} \) in., reflexed. Filaments bright red.

53. **E. lineata**, Blume Bijd. 1087 (Myrtus); Mus. Bot. i. 116 (Clava-myrtus); leaves lanceolate-oblong or nearly elliptic obtusely acuminate narrow at the base, cymes axillary and terminal shorter than the leaves, calyx-tube clavate lobes 4, petals free, berry size of large pea crowned with the constricted calyx-limb. E. corymbosa, Wall. Cat. 3566 F. Jambosa lineata, DC. Prodr. iii. 287; Miq. Fl. Ind. Bat. i. pt. i. 428.

MALACCA, Maingay (720), Griffith (2390 in part); PENANG, Jack.—Distrib. Java, Borneo, Sumatra.

A shrub or small tree. Branchlets terete. Leaves 2-31 by 1-2 in., coriaceous, shining above, finely nervet. Extreme branches of inflorescence 3-fl. Calyx-tube about \( \frac{1}{4} \) in.; lobes about equal, persistent. Petals shortly clawed, suborbicular, twice the calyx-lobes.

54. **E. rubricaulis**, Miq. Fl. Ind. Bat. i. pt. i. 432 (Jambosa); leaves elliptic from an acute base long and obtusely acuminate shining above, smaller nerves and dots pellucid, cymes axillary and terminal, calyx-tube \( \frac{3}{4} \) in. obovate-cylindrical, lobes 4, petals free.

TENASSERIM, Holfér; MALACCA, Griffith.—Distrib. Java.

Branchlets subterete, reddish. Leaves 2-3 by \( \frac{3}{4}-\frac{1}{2} \) in., stiffly cartilaginous; midrib prominent beneath, tinged with red; lateral nerves close, distinct beneath, interspaces subreticulate; petiole \( \frac{1}{12}-\frac{1}{8} \) in., channelled above. Flowers nearly sessile. Calyx-lobes ovoid, rounded, scarious at the edges. Anthers cordate-aponicate.

55. **E. pyrifolia**, Wall. Cat. 3584 (Syzygium) not of Desv.; leaves ovate or oblong-lanceolate with a long obtuse acumen coriaceous dark and shining above, corymbs terminal trichotomous long-peduncled, calyx-tube about \( \frac{1}{4} \) in. gradually tapering to the base lobes 4 shallow, petals united, berry oblong. Syzygium pyrifolium, DC. Prodr. iii. 201 (Syzyg.); Korth. in Ned. Kruidk. i. 204; Miq. Fl. Ind. Bat. i. pt. i. 457. Calyptranthes pyrifolia, Blume Bijd. 1090.

SINGAPORE, Wallich.—Distrib. Java.

A tree. Leaves 1\(\frac{3}{4}\)-3 by \( \frac{3}{4}-\frac{1}{2} \) in.; acumen sometimes \( \frac{1}{2} \) in. long; lateral nerves close, conspicuous; petiole about \( \frac{1}{4} \) in. Flowers sessile, in threes.—Syz. punctulatum, Wall. Cat. 3583, with less acuminate dull-coloured leaves, nerves less distinct, and more elongate fruit, may perhaps belong here; there are no flowers with the specimens.

56. **E. tumida**, Duthie; leaves oblong-ovate or obovate shortly acuminate narrowed at the base closely nerved, cymes terminal and axillary equalling or exceeding the leaves, calyx-tube \( \frac{3}{10} \) in. narrow swollen below the middle.

MALACCA, Maingay, 755.

Branchlets terete. Leaves 2\(\frac{1}{2}-\frac{3}{2} \) in., chocolate-coloured above, rusty-yellow.
beneath when dried; lateral nerves slender, uniting close within the margin; petiole ½ in. Panicles lax, spreading; branches acutely angular. Calyx with 4 nearly equal shallow lobes.—The petals are probably free, though not expanding. The swollen part of the calyx-tube is occupied by the ovary.

†† Petals usually united and falling in one piece (to p. 496).
§ Cymes terminating the young shoots (to p. 495).
‡ Leaves broad, oblong or lanceolate (to p. 494).
|| Branchlets 4-angled.

57. E. montana, Wight Ic. t. 1006; young shoots acutely 4-angled, leaves petioloed coriaceous lanceolate with a short obtuse acumen to obovate or orbicular obtuse, cymes terminal very numerous coriaceous many-flowered branches often leafy, flowers small sessile or subsessile, fruit globose size of a currant. Bedd. Fl. Sylv. Anal. Gen. cvii.

NILGHIRI Mts., Wight, Gardner, Schmidt.
A very large tree; branchlets winged at the angles. Leaves occasionally alternate or subalternate, 5-6 by 2½ in., smooth and shining above; primary nerves prominent beneath, becoming less distinct towards their union within the margin; midrib stout, channelled above; petiole 4-nearly ½ in. Peduncles angled, often very flat and broad. Flowers in threes at the apex of each extreme division. Calyx obtusely 4-lobed. Petals calyptrate. Fruit purple, crowned with the calyx.—The wood is used for building purposes, &c.

58. E. bracteolata, Wight Ill. ii. 15; Ic. t. 531; young branches 4-angus angles subacute, leaves short-petioloed elliptic-lanceolate or oblanceolate acute or slightly acuminate at both ends pellucid-dotted, cymes terminal and from the upper axils shorter or not much longer than the leaves, the extreme divisions terminating in a cluster of 6-9 sessile flowers, each division and each flower with 2 small acute bracteoles, calyx-tube conical 4-angus, limb repandly 4-lobed. Kurz in Journ. As. Soc. Beng. vol. xlvi. pt. ii. p. 66; For. Fl. i. 482.

TENASSEMERIM, Griffith, Helfer; MERGUI, Griffith; MALACCA, Maingay.
A shrub or small tree. Leaves 4½-7 by 1½-2½ in.; midrib rather prominent beneath, primary nerves slender and uniting close within the margin, coriaceous, more or less polished above, dots not conspicuous; petiole about ½ in. Branches of inflorescence with acute angles. Flowers conspicuous, white according to Maingay.


CONCAN, Stocks; NILGHIRI Mts., Herb. G. Thomson; CEYLON; forests in the Central Provinces, alt. 3-5000 ft., Thwaites.
A moderate-sized tree. Branchlets quadrangular. Leaves 1½-3 by ½ to about 1 in.; petiole ½-½ in.—This plant much resembles E. Gardneri, but can be distinguished by its 4-sided branchlets, narrower leaves and shorter petioles.

60. E. venusta, Roxb. Hort. Beng. 37; Fl. Ind. ii. 491; arboreous with numerous drooping branchlets, leaves shortly petioloed oblong or broadly lanceolate obtusely acuminate, panicles axillary rarely terminal shorter than the leaves bractiate ultimate divisions 3-flowered, flowers myrtle-like, calyx 4-toothed, petals 4 orbicular reddish. Wight Ic. t. 625; Kurz in Journ. As. Soc. Beng. vol. xlvi. pt. ii. p. 67; For. Fl. i. 487.
Tipperah Hills, Roxburgh; Pegu, Kurz.
Bark dark brown, smooth. Ovary 2-celled.—Wight's figure is copied from Roxburgh's (Le. t. 1560) with the addition of a terminal panicle. Miquel (Fl. Ind. Bat. i. pt. i. 456) compares it with Syz. Kalahsiense, Korth, but the leaves of the latter are smaller and of a different shape. In Kurz' specimens the branchlets have white bark.

61. E. Gardeneri, Thwaites Enum. 117 (Syzygium); leaves pale green ovate-lanceolate rostrate-acuminate faintly parallel-nerved beneath pellucid-punctate, cymes axillary and terminal shorter than the leaves, calyx obscurely 4-toothed, berry spherical size of a small cherry.

Anamallay and Tinnevelly Ghats, up to 4000 ft. alt., Beddome; Ceylon, Central Provinces, alt. 2–4000 ft. alt., Thwaites.

A moderate-sized tree; branchlets terete or subtetragonous. Leaves 2½–4 by 1–1½ in.; petiole slender, about ¼ in. Flowers small. Petals cohering and falling together.—Very close to E. venusta, Roxb., with which Mr. Kurz unites it; the marginal nerves are further from the edge, and the panicles are mostly terminal and more compact.

62. E. subavenis, Duthie; leaves ovate shortly and obtusely acuminate or retuse narrowed to the base quite smooth on both surfaces nearly nerveless, cymes longer towards the leaves. E. umbrosa, Thwaites Enum. 118 (Syz.), not of Berg; Bedd. Fl. Sylv. Anal. Gen. cviii.

Ceylon; open grassy places in the Central Provinces, alt. 5–6000 ft., Thwaites.

A moderate-sized tree, very much branched; ultimate branches 4-angled. Leaves 1–2 in. by 3½–nearly an inch in width; petiole about ¼ in.—This differs from E. lissophylla in the shape and nervation of the leaves; the inflorescence is similar in both (Thwaites).

63. E. valdevenosa, Duthie; leaves large elliptic acuminate petioloed, midrib very prominent beneath, lateral nerves uniting to form a conspicuous marginal one interspaces finely and sharply reticulate, cymes terminal lax, calyx-tube of a small cherry crowned with the slightly projecting calyx-limb. E. elliptica, Wall. 3587 (Syz.); not of Lam. nor Smith.

Penang, Wallich; Malacca, Maingay (723 & 762).
A tree, about 15 ft. high (Maingay); branchlets tetragonous. Leaves 8–13 by 3–4½ in.; primary nerves ½–1 in. apart; marginal nerves double; petiole ¼ in. or more. Branches of inflorescence angled and winged. Calyx-tube about ¼ in. Petals falling together. Style persistent.

64. E. scoparia, Wall. Cat. 3594 (Syzygium); branchlets virgate 4-phonous leaves shortly petioloed ascending elliptic-lanceolate acuminate minutely and densely glandular lateral nerves inconspicuous, cymes ascending lax few-flowered, flowers small, calyx squarrose very shortly 4-lobed, corolla calytrate, stamens short, fruit small spherical.

Singapore, Wallich.
Leaves 2½–2¾ by 3–1 in., reddish-brown above and yellowish beneath when dried, margins slightly revolute; petiole ¼ in. Berry crowned with the remains of the calyx-limb, wrinkled in drying. Style short, persistent in the pit formed by the produced calyx-limb.—Resembles Syzygium avene, Miq. Fl. Ind. Bat. Suppl. i. 312, and perhaps not specifically distinct.

| Branchlets terete. |
| Calyx-limb almost truncate. |
| Calyx-tube shortly turbinate. |
65. **E. crenulata**, *Duthie*; leaves broadly ovate-oblong or suborbicular very thick and coriaceous shortly obtusely acuminate crenulate, nerves close prominent on both surfaces, cymes terminal corymbose main branches long, calyx-limb truncate, petals united in a thick calyptra.

**Malacca**, *Maingay*, 739.

*Branchlets terete. Leaves* 4½-6 by 3–4 in., dull, black-dotted; midrib stout; lateral nerves uniting close within the margin, interspaces reticulated. *Cymes* exceeding half the length of the leaves. *Branches* small at the base of the flowers and at the joints of the inflorescence-branches. *Calyx-tube* about ¼ in., turbinate, much produced above the ovary.—The foliage very much resembles that of *E. grandis*.

66. **E. venulosa**, *Wall. Cat.* 3585 (*Syzygium*); leaves ovate or broadly obovate obtuse or shortly acuminate attenuated below into a short petiole very coriaceous polished above, nerves slender but prominent on both surfaces, flowers in terminal corymb, branches lax spreading exceeding the leaves, calyx-tube obconical ½–3 in. limb nearly entire, corolla calyptrate, fruit subspherical crowned with the circular rim of the calyx-limb.

**Malacca**, *Wallich*, *Maingay* 741, &c.; *Singapore*, *Wallich*, *Walker*.

*Bark* grey; branchlets terete. *Leaves* 1½–3 by 1–2 in.; primary nerves uniting close within the margin, interspaces reticulate, dots inconspicuous; petiole about ½ in. *Main branches of inflorescence* 1–2 in. *Berry* about ¼ in. in diam., longitudinally furrowed.—In Maingay’s plant, which I would refer here, the corolla is rather more exserted in bud.


S. **Canara**, *Law*; *Travancore*, *Wight*; *Concan*, *Stocks*; *Nilghiri Mts.*, *Kurz*, *G. Thomson*; *Ceylon* up to 3000 ft. alt., *Walker*, *Thwaites*.—*Distr. Bornéo*.

A large shrub, or middling-sized tree; branchlets terete. *Leaves* 3–4 by about 1½ in., subcoriaceous, dark above (when dried), rusty-red beneath, inconspicuously dotted. *Calyx* shortly turbinated, lobes 4 shallow.—A distinct species though varying considerably in the foliage. *The fruit is eaten*.

68. **E. frondosa**, *Wall. MS.*; leaves ovate-lanceolate with a long obtuse acumen cuneate at the base polished above lateral nerves slender prominent on both surfaces, cymes axillary and terminal shorter than the leaves, calyx-tube about ¼ in. narrow below suddenly enlarging above lobes very shallow, petals united. *Syz. venosum*, *DC. Prodr.* iii. 260; *Mém. Myrt. t.* 17; *Wall. Cat.* 3500.

**Nipal**, *Wallich*.

*Branchlets* terete. *Leaves* 3–4 by about 1½ in., subcoriaceous; petiole ¼–½ in.—Habit of *E. mangifolia* but smaller in all its parts.

69. **E. areolata**, *DC. Prodr.* iii. 260 (*Syzygium*); *Mém. Myrt.* t. 18; leaves elliptic cuneate at the base acuminate subcoriaceous nerves reticulate marginal double, peduncles paniculate axillary and terminal 2 or 3 times shorter than the leaves, buds globose, calyx quite entire, corolla calyptrate.
NIPAL, Wallich.
Very nearly related to E. frondosa.—There are specimens in the Kew Herbarium, probably belonging to this species, fastened down on the same sheet with it, in which the leaves have dried of a fresher tint, and the difference in the nervation is considerable; the flowers also are rather larger.

b. Calyx-tube slender and tapering.

70. E. khasiana, Duthie; leaves narrowly lanceolate acuminate at both ends and dots pellucid, cymes from the upper axils or terminal lax, flower-buds pyriform \( \frac{1}{2} \) in., limb of calyx truncate.

**Khasia Mts., Griffith, J. D. H. & T. T.**
Branchlets terete. Leaves 3-4 by 1 in., smooth and shining above, finely reticulate between the lateral nerves which unite close within the margin; petiole \( \frac{1}{2} \) in. Inflorescence-branches long and slender, acutely quadrangular. Calyx spreading above after flowering.

71. E. oblongifolia, Duthie; leaves oblong acuminate narrowed towards the base nerves rather close slender but prominent on both surfaces, cymes terminal coriaceous much branched shorter than the leaves, calyx-tube \( \frac{1}{4} \) in. or less gradually tapering to the base limb truncate, petals calyptrate.

**Malacca, Maingay (746).**
Branchlets terete or subtetragonous; bark greyish. Leaves 3-4 \( \frac{1}{2} \) by 1\( \frac{1}{4}-1\frac{1}{2} \) in., shining a little above, lateral nerves uniting close within the margin, interspaces reticulated. Inflorescence-branches sharply 4-angular, compressed towards the nodes. Filaments slender; anthers small.

72. E. expansa, Wall. Cat. 3567 (Syzygium); leaves shortly petiolo ovate or oblong-lanceolate obtusely acuminate subcoriaceous, cymes axillary or terminating previous year's shoots, flowers small crowded at the ends of the long peduncles, calyx nearly truncate.

**Penang, Wallich.**
Young branches subterete, compressed at the nodes. Leaves 3-6 by 1\( \frac{1}{4} \)-2 in., polished a little above; lateral nerves slender, raised on both surfaces, uniting within the margin, interspaces reticulate; petiole \( \frac{1}{3} \) in. Calyx-tube \( \frac{1}{3} \) in., gradually tapering to the base. Fruit not seen.

\[\text{Calyx-limb 4-5-lobed.}\]


**Ceylon; Ambagamowa and Ratnapoora districts, up to 3000 ft., Thwaites.**
A very large handsome tree; branchlets terete. Leaves 6-8 by about 3 in., often larger, thick and coriaceous, polished above; midrib stout and prominent beneath; lateral nerves usually not very distinct, sometimes forming double loopings within the margin. Calyx-tube about \( \frac{1}{2} \) in.; lobes 4. Petals calyptrate. Berries subglobose, about an inch in diameter.—E. androsemoides of Wight's Herb. is E. obovata, Wall.

74. E. subdecussata, Wall. Cat. 3589 (Syzygium); leaves ovate or very shortly petiolo oblong-lanceolate cordate at the base subacute thick and
coriaceous midrib keeled beneath lateral nerves indistinct, cymes terminal corymbose branches stout angled compressed and flattened upwards, flowers crowded, calyx-tube shortly obconic obscurely 5-lobed, petals calybrate.

SINGAPORE, in very dense woods, Wallich; Government Hill, PENANG, MAINGAY, 740.


75. E. colorata, Duthie; leaves very shortly petioled elliptic or oblong-obovate rounded or subcordate at the base rather acutely acuminate very thick and coriaceous, cymes terminal, branches stout alternately compressed shorter than the leaves, flowers crowded in compact coryumbs, petals united, calyx about ¼ in. with 5 shallow lobes.

MALACCA, MAINGAY, 749.

Branchlets terete, reddish-brown. Leaves 4–5½ by 1¾ to 2½ in.; midrib angled beneath, tinged with red; nerves indistinct above, slender beneath, uniting close within the margin, interspaces reticulate.

76. E. revoluta, Wight Ill. ii. 17; IC. t. 534; leaves lanceolate with a small obtuse point to ovate or broadly obovate and obtuse coriaceous margins often revolute, cymes terminal longish peduncled, flowers sessile congested at the ends of the branchlets, fruit spherical reddish size of a small cherry. Bedd. Fl. Sylv. Anal. Gen. cvii.; not of Berg. Syzygium revolutum, Thwaites Enum. 117.

NILGIRI MTS., HB, HOHENACKER. CEYLON, in the Central Provinces, alt. 3–6000 ft. (Adam’s Peak), Walker, THWAITES, &c.

A moderate-sized tree; branchlets terete or obscurely 4-gonous. Leaves shortly petiolated, variable in size, polished above, dull and glaucous beneath. Calyx 4–5-toothed. Petals free, or cohering and falling off as a lid.—The Nilghiri specimens have the leaves smoother above and more conspicuously dotted, the nervation is not so prominent beneath. There is a small-leaved form of this in Wight’s Herbarium collected in Ceylon by Col. Walker, and called var. pareifolia; the leaves are about 1 by ¼ in.


ASSAM, JENKINS; KHASIA MTS., SILHET, CHITTAGONG, PROU, and MARTABAN to TENASSEERIM; PENANG and SINGAPORE, WALLICH.—Distrib. YUNAN.

A tree; branchlets terete, reddish-brown. Leaves 3–4 in., often with a long slender point, shining above, turning dark when dried; petiole ¼–¾ in. Cymes trichotomous, on long peduncles. Flowers rather large, sessile. Calyx-tube about ¼ in., gradually tapering to the base; lobes 4 or 5, unequal, persistent. Stamens numerous, long; anthers with an apiculate connective.

78. E. lœvicaulis, Duthie; leaves ovate-lanceolate acuminate nerves close uniting very near the edge, cymes terminal and axillary short contracted branches ascending, calyx-tube about ¼ in. turbinate lobes 5, fruit roundish or flattened at both ends size of a cherry.
Malacca, Maingay, 753–2.

Branchlets terete, polished. Leaves 3–4 by 1–1½ in., chocolate-coloured and shining above, rusty-red beneath when dry; petiole ¼ in. Calyx-lobes distant. Style long, persistent.—Allied to E. oblata, but with smoother branchlets and narrower more contracted inflorescence.


Ceylon; common up to an elevation of 3000 ft., Walker, Thwaites.

A very large tree; branchlets terete. Leaves about 4 by 1½–2½ in., shining above, rusty-coloured beneath, and minutely and densely punctate, closely nervèd, the lateral nerves horizontal and uniting close within the margin, margins somewhat revolute; petiole 1½–2 in.—In Wight’s figure the leaves are drawn too acute.

80. E. assimilis, Thwaites Enum. 116 (Syzygium); leaves petioloed ovate-lanceolate or obovate more or less abruptly acuminate narrow at the base rarely rounded, cymes crowded at the ends of the branchlets half as long as the leaves, berries spherical. Bedd. Fl. Sylov. Anal. Gen. cvii.

Ceylon; up to alt. 5000 ft., Thwaites.

A moderate-sized tree. Leaves 2–5 by 1½–2 in.; petiole ¼–nearly ½ in. Peduncles obtusely 4-sided. Flowers rather large, about ½ in. in diam. Petals falling in one piece.—Differs from E. Arnottiana in the larger leaves and flowers, the united petals, and in the shape of the fruit; the nervation of the leaves is less close, and the marginal nerve is more distant from the edge.—A variety of this with larger leaves and flowers is also found in Ceylon.


Ceylon; up to 3000 ft. alt., Thwaites, Gardner.


82. E. microcalyx, Duthie; leaves nearly sessile ovate or elliptic-obovate obtuse or shortly acuminate polished above nerves faintly impressed above prominent beneath, cymes terminal and axillary often exceeding the leaves, bracts small acute persistent, flowers very small, calyx-tube short subcylindrical 1½ in. or less lobes 4 distant subacute nearly equal, petals united.

Malacca, Griffith, Maingay, 727 & 731.—Distr. Borneo?.

Branchlets subterete. Leaves 2–4½ by 1½–2½ in., dark above when dried, reddish beneath; lateral nerves uniting some way within the margin. Bracts often in threes.

—in Maingay’s No. 727 the leaves are less distinctly nerved, the lateral nerves faintly unite close within the margin, and the flowers are rather smaller. No. 3354 of Beccari’s Borneo may perhaps be referred to this species. Habit of E. olivifolia.
Leaves suborbicular.

83. **E. cyclophylla**, Thwaites MSS. (*Syzygium*); leaves shortly petioled or nearly sessile broadly ovate to nearly orbicular very thick and coriaceous margins revolute, cymes terminal not exceeding the leaves, branches stout 4-gonous, berries nearly spherical crowned with the remains of the 4-fid calyx-limb.

Ceylon; Adam's Peak, Thwaites (C.P. 3915).

Leaves 2½–3 in. by 2 in., margins broadly and irregularly recurved in the dried specimens, black-dotted above, not glaucous beneath; midrib very stout; marginal nervation double. Berry about the size of a pea.—This differs from *E. revoluta* in the rounder more coriaceous leaves, shorter petioles, and the stouter inflorescence branches.

84. **E. sclerophylla**, Thwaites Enum. 118 (*Syzygium*); leaves small sessile very coriaceous obovate or nearly round cordate at the base glabrous above nerved beneath, midrib thickened towards the base, cymes about equal to the leaves, berries spherical size of a small cherry.

Ceylon; Central Provinces, alt. 6–8000 ft., Adam's Peak, Thwaites.

A moderate-sized tree; branchlets 4-gonous. Leaves ⅓–1 in. dull. Berries crowned with the cup-shaped calyx-limb, turning black.


Ceylon; Central Provinces, alt. 6–8000 ft., Gardner, Thwaites.

A small tree or shrub; young branches 4-gonous. Leaves ⅓–⅔ in. long, nerved beneath, margins revolute. Calyx obovate, shortly 5-toothed. Berries red turning to black.—Closely allied to the preceding species, differing chiefly by its petioloed glossy leaves.


Nilgiri, Wight, Adam, Gardner; Sisparah, Wight. Ceylon, Adam's Peak, alt. 6–7000 ft., Thwaites.

A large spreading tree with a fine umbrageous head; young branches 4-gonous. Leaves glabrous, about 1 by ⅔ in., reticulate beneath when dry, not dotted. Calyx repandly 4-toothed. Petals orbicular, falling together in one piece. Fruit succulent, dark purple, edible.


Ceylon; Ambagamowa district, alt. 3–5000 ft., Thwaites.

A small tree; upper branches 4-gonous, angles winged. Leaves ⅙–nearly 1 in. by ⅛–½ in., shortly petioled. Bracts equal to about half the calyx-tube. Calyx-tube campanulate, much produced; lobes 4, rather conspicuous. Berries spherical, red turning black, size of a pea.
Leaves narrow.

88. **E. olivifolia**, Duthie; leaves small shortly petioled spatulate obvate or lanceolate obtuse shining above dull beneath and densely glandular, lateral nerves few directed upwards, cymes about equal to or shorter than the leaves, flowers small shortly pedicelled. *S. spathulatum, Thwaites Enum. 118; not of Berg (Eng.); Bedd. Fl. Sylv. Anal. Gen. cviii.*

**Ceylon**, alt. 3–5000 ft., Thwaites. A small tree. *Leaves* 1–1 ½ by ¾–⅔ in. *Berries* spherical, red turning to black, size of a pea.—This plant differs from *E. rubicunda* in the direction of the lateral nerves, and in the shape of the calyx-tube, which becomes more suddenly narrowed towards the base.


**Tinnevelly District**, common up to 3000 ft. alt., Beddome. A small tree, or large shrub; branchlets 4-gonous. *Leaves* 2½–3 by about ½ in.; petiole ½–⅔ in.—The leaves are narrower and more prominently nerved than in *E. lissophylla*, from which however Col. Beddome believes it to be not specifically distinct.

90. **E. cuneata**, Wall. Cat. 3598 (*Syzygium*); leaves narrow obovate-lanceolate obtuse tapering below into a short petiole lateral nerves horizontal, cymes from the terminal axils exceeding the leaves, flowers small, calyx-tube narrowly turbinate ⅓–⅔ in. truncate above, petals calyptate, berry size of a pea.


§§ Cymes terminating previous year’s branches.

91. **E. papillosa**, Duthie; under surface of leaves young branches and pedicels clothed with rusty-coloured scurf, leaves large subsessile and somewhat amplexicaul obovate-oblong midrib and nerves very prominent beneath, cymes crowded at the extremities of year-old branches, calyx close-shaped.

**Malay Peninsula**, Maingay, 737. Branchlets terete or subtetragonous, stout. *Leaves* 7–9 by 3½ in.; lateral nerves uniting conspicuously within the margin, dark above when dry, reddish beneath. *Inflorescence*-branches long, stout, compressed upwards. *Bracts* 2 at the base of each flower. *Calyx-tube* ¼ in.; lobes 4, prominent, subtriangular, obtuse, reflexed. *Petals* falling together.—One of Beccari’s Borneo plants No. 2521, with larger leaves and flowers, has a similar clothing of reddish scurf.

92. **E. pustulata**, Duthie; leaves oblong acuminate narrowed below subcoriaceous nerves whitish prominent beneath distant uniting conspicuously within the margin, cymes terminating year-old branches, sepals acute, petals falling in one piece.

**Malacca**, Maingay, (751). Branchlets terete; rough with prominent glands, especially the upper branches, and the midribs and nerves of the leaves. *Leaves* 4½–7 by 1½–2½ in., indistinctly
nerved above; midrib rounded beneath. Inflorescence-branches short, stout, 4-angular. Flowers about \( \frac{1}{4} \) in.

93. **E. brachiata**, Roxb. Hort. Beng. 37; Fl. Ind. ii. 488; leaves abruptly ovate or elliptic tip rounded or very shortly acuminate, panicles axillary or from the leafless axes much branched shorter than the leaves, flowers minute, calyx-tube obconic about \( \frac{1}{12} \) in. lobes 4 shallow, corolla calyptrate, berry spherical. E. odorata? Wight III. ii. 16; not of DC. (Syz.). Syzygium brachiatum, Miq. Fl. Ind. Bat. i. pt. i. 460. E. cinerea, Kurz in Pegu For. Rep. Append. B. p. 50; For. Fl. i. 483. S. cinereum, Wall. Cat. 3576. S. ribesoides, Wall. Cat. 3553 A.

Pekou, Kurz; Mergui, Griffith; Amherst and Penang, Wallich.—Distrib. Amboina.

A tree. Branchlets terete or subteragonous; bark white. Leaves 2\( \frac{1}{2} \)-6 by 1\( \frac{1}{2} \)-3 in., shortly petioled, glossy above, paler beneath; nerves finely impressed above, prominent beneath. Branchlets ovate, acute, persistent. Flowers sessile in clusters of 6-9. Berries purplish to black.—The leaves of Wallich's specimens are much broader at the base than those of Wight. In Wallich's S. ribesoides the leaves are broader and less acuminate, the peduncles are shorter and the branchlets whiter.

94. **E. verecunda**, Wall. Cat. 3579 (Syzygium); leaves ovate with a long point, nerves close reticulate, petiole about \( \frac{1}{2} \) in., corymb lax about half the length of the leaves, flowers very small, calyx with 4 shallow distant lobes broadly expanding above after flowering, petals calyptrate.

Malacca, Griffith; Penang, Wallich.

Branchlets terete, compressed at the nodes. Leaves 2\( \frac{1}{2} \) by 1\( \frac{1}{2} \)-1\( \frac{1}{2} \) in., pale yellow; petiole midrib and margin tinged with orange.—Wallich was inclined to connect this with his *S. concinnum*; the latter however differs by having shorter petioles, the leaves less distinctly reticulated, larger flowers, free petals, and the calyx-tube more gradually tapering to the base.

**Cymes lateral, mostly from the scars of fallen leaves.**

† Petals free.

95. **E. nitida**, Duthie; leaves broadly ovate or oblong tip rounded or shortly acuminate polished above coriaceous, primary nerves few prominent beneath and uniting at some distance from the margin, cymes lateral chiefly from the leafless axes, calyx-tube spreading and recurved after flowering lobes prominent subpersistent, petals ?.

Malay Peninsula, Maingay, 728.

Branchlets terete, reddish-brown. Leaves 3-3\( \frac{1}{2} \) by 2 in., black and shining above, rusty-red beneath, dots inconspicuous not pellucid, nerves indistinct above; petiole \( \frac{1}{2}-\frac{3}{2} \) in.—Herbarium specimens resemble *E. brachiata*, but the flowers are larger, and the leaves broader and more shining.

96. **E. polyantha**, Wight Ill. ii. 17; Ic. t. 543; leaves obovate or oblongaceous obtusely acuminate cuneate at the base dark and shining above rusty-red beneath dots not pellucid, cymes short many-flowered axillary and from the leafless axes, flowers small, calyx rather deeply 4-lobed, petals free and expanding. *Not of Wall. Cat. 3603; not of Miq. (Syz.). E. lucidula, Miq. Fl. Ind. Bat. i. pt. i. 444. Myrtus cymosa, Blume Bijld. 1086, not of Spr. (ex Miguel l. c.).*

Tenasserim, Heifer; Moulmein and Mergui, Griffith.—Distrib. Java.

A slender tree, upwards of 80 ft. (Griffith MS.). Branchlets 4-gonous. Leaves the same size as those of *E. balsamea*, which it resembles in habit. Petals white,
97. E. malabarica, Bedd. Fl. Sylv. t. 199; Anal. Gen. cvii.; leaves ovate-spathulate or quite obcordate rarely oblong marginal looping inconspicuous, cymes from the old wood below the leaves rarely in the lower axils very short, flowers numerous very small bracteolate, calyx-tube with 4 indistinct triangular lobes, petals opening separately, fruit spherical about \( \frac{1}{4} \) in.

Western Peninsula; Wynaad, jungles, 2-4000 ft. alt., Beddome.

A middling-sized tree. Branchlets terete. Leaves 2-5 by 1-2\( \frac{1}{2} \) in., minutely dotted beneath; petiole \( \frac{1}{2} - \frac{1}{3} \) in. Cymes about \( \frac{1}{2} \) in. Calyx-tube more or less truncate in age, about \( \frac{1}{12} \) in. diam. Petals orbicular with a slight claw, pointed, very soon deciduous.

98. E. conglomerata, Duthie; leaves obovate or oblongate rounded at the apex or shortly and obtusely acuminate tapering gradually to the base margins revolute, flowers from the leafless axils in dense sessile or subsessile clusters, calyx-tube broadly campanulate lobes 4 rounded persistent, petals free.

Malayan Peninsula, Maingay, 745.

Bark of older branchlets grey; upper branchlets subtetragonous. Leaves 3-4 by 1-1\( \frac{1}{2} \) in., sometimes subfalcate, coriaceous, dark and shining above, rusty-red beneath, minutely black-dotted; midrib stout beneath, lateral nerves few, prominent beneath and uniting distinctly in loops within the margin; petiole about \( \frac{1}{3} \) in. Bracts oblong, obtuse. Filaments short, stout.—Resembles No. 3326 of Beccari’s Borneo plants, but the flowers are larger and the peduncles longer in the latter.

++ Petals united.

§ Leaves alternate.

99. E. alternifolia, Wight Ill. ii. 16; Ic. t. 537; leaves alternate suborbicular thick and coriaceous, cymes lateral longish-peduncled corymbose dense sometimes congested near the apex of year-old branches, fruit subspherical size of a cherry. Bedd. Fl. Sylv. t. 198.

Kurnool, Cuddapah, and N. Arcot districts, Leddome; Balaghat, Wight. Assam, Nagari Hills.

A large tree. Branchlets terete. Leaves 3-8 in., rounded at the apex or rather suddenly obtusely acuminate, dark green and shining above paler beneath, minutely dotted; primary nerves numerous, uniting close within the margin; petiole 1 in. or more. Flowers yellowish-white, sweet-scented. Calyx viscid and shining, entire or with 4 very minute teeth. Petals calyptrate.

§§ Leaves opposite.

100. E. tetragona, Wight Ill. ii. 16; branchlets stout acutely 4-gonous, leaves ovate-oblong or nearly oval thick and coriaceous, lateral and marginal nerves very prominent beneath, cymes from the lower leafless axils shorter than the leaves, fruit globose size of a large pea. Syzygium tetragonum, Kurs in Journ. As. Soc. Beng. vol. xlvi. pt. ii. p. 66; For. Fl. i. 484; Wall. Cat. 3550. S. ficifolium, Wall. Cat. 3558. S. rameum, Wall. Cat. 3595.


A large tree; branchlets with the angles often winged. Leaves 5-6\( \frac{1}{2} \) by 2\( \frac{1}{2} \) in., attenuated at each end, dots minute but not pellucid; petiole about \( \frac{1}{2} \) in. Calyx-tube narrow below, suddenly enlarging at the throat; lobes small, rounded. Petals calyptrate.—The flowers are sweet-scented according to Wallich.

The branchlets are not so acutely 4-gonous in Wallich’s S. ficifolium and S. rameum, and the leaves of the former are broader.

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101. **E. oculusa**, Miq. Fl. Ind. Bot. i. pt. i. 460 (Syzygium); leaves on longish petioles elliptic obtusely acuminate at base coriaceous shining above paler beneath, lateral nerves distant indistinctly uniting within the margin, flowers rather large in condensed lateral panicles, calyx-tube broad above and with a truncate margin.

**Nicobar Islands**, Kurz.—Distrib. Java.

Branchlets terete or subcompressed upwards, light brown or whitish. Leaves 2-4 in., varying in width, rusty-brown when dried; midrib furrowed above; petiole about 1 in. Panicles shorter than the leaves, branches divaricate or subdeflexed. Buds globose. Calyx-tube upwards of 1 in.—The calyx and corolla are apparently fused together in the calyptrae operculum. Under this species Mr. Kurz refers *E. cerasoides*, Roxb., *E. polyantha*, Wight, and the specimens 2394 & 2395 of Griffith's and Helder's collection.

102. **E. operculata**, Roxb. Hort. Beng. 37; Fl. Ind. ii. 486; leaves broadly ovate or elliptic rounded at the apex or obtusely acuminate narrowed below lateral nerves few distant prominent becoming fainter towards the margin, panicles from leafless axils lax divaricate, berry globose or ovoid. *Wight* Ic. t. 552; Brandis For. Fl. 234; Kurz For. Fl. i. 483. *E. cerasoides*, Roxb. Hort. Beng. 92; Fl. Ind. ii. 488; *Wight* Ic. t. 615; *Miq. Anal. Bot. Ind. i.* 27; Fl. Ind. Bot. i. pt. i. 449; *Kurz in Journ. As. Soc. Beng.* vol. xli. pt. ii. 66; For. Fl. i. 484.


**Sub-Himalayan** forests from the Jumna to Assam, ascending to 2000 ft. Oudh and Gorakhpur forests, Cachar, Chittagong, Pegu, Kurz. Ceylon, up to 3000 ft.—Distrib. Indian Archipelago and S. China, Yunnan.

A large tree; branchlets subterete or 4-gonous. Leaves 3-8 by 2-4 in., subcoriaceous, dots often black (in the dried specimens), rarely pellucid; primary veins 8-12, curving into a rather faint intramarginal vein; petiole 1-1/2 in. Inflorescence often thyrsoidal. Peduncles long, acutely angled. Flowers small, greenish, in threes, nearly sessile, odorous. Calyx campanulate, with short obtuse lobes, or nearly truncate. Petals united and falling in one piece, calyptra often apiculate. Berry 1/4-1/2 in., rugose, juicy. The wood is used for building and for agricultural implements. The fruit is eaten.


103. **E. Stocksii**, Duthie; leaves elliptic-obovate rounded or obtusely acuminate at the apex indistinctly nervéd dots not pellucid, cymes axillary and from the leafless axils half the length of or equalising the leaves, flowers small, petals calyptrate.

**Concan**, Stocks. **Wynaad**, Beddome.

A lofty tree; branches acutely 4-gonous. Leaves 4-6 by 1-1/2 in., thin; lateral nerves few slender below curving upwards and becoming faint towards the margin.


Branchlets suberecte or obscurely 4-gonous. Leaves 3-5 by 1-1½ in.; petiole ⅛ in. *Inflorescence-branches compressed, angular. Calyx-tube truncate. Petals united, or sometimes becoming free.*


**Silhet and Chittagong, Roxburgh, Wallich; Pegu, Kurz; Tenasserim, Helder.**

A large shrub or small tree. **Leaves** variable as to size, very similar to those of *E. Jambolana*; petiole shorter. **Panicle-branches divaricate, acutely angular. Calyx** very short. **Corolla** calyptrate. **Berries** size of pea.—Resembles *E. polyantha*, Wight, in its inflorescence.


Common (wild or cultivated) and generally distributed throughout India in both peninsulas and in Ceylon; from the plains to 4-5000 ft.—Dist. Malay Archipelago to Australia.

A tree, usually of considerable size with a thick and rather crooked trunk. **Leaves** 3-6 in., extremely variable in shape, smooth and shining, the numerous nerves unifying within the margin; petiole ½-1 in. **Cyme** short and compact or laxly paniculate. **Flowers** numerous, about the size of those of *E. operculata* or much smaller, sweet-scented. **Berries** often obliquely oblong.—The wood is whitish, close-grained, and durable; the bark affords brown dyes, and a kind of gum kino. The fruit is often eaten. Roxburgh mentions a variety having fruit of a superior quality, and as large as a pigeon’s egg; probably the result of cultivation.


VAR. obtusifolia; leaves obtuse, berries oblong. E. obtusifolia, Roxb. Hort. Beng. 37; Fl. Ind. ii. 485; Wight Ic. t. 520. Jambolifera pedunculata, Gaertn. Fruct. i. 78, t. 36.—Rumph. Herb. Amb. i. t. 42. The emargination in the leaves of Rumphius' figure is an error.

107. **E. tenuis**, Wall. Cat. 3570 (Syzygium); leaves ovate or ovate-lanceolate obscurely acuminate narrowed at the base; coriaceous pale pellucid-punctate lateral nerves slender close interspaces finely reticulated, panicles from the leafless axils dense, calyx-tube broadly campanulate much produced lobes 4 shallow. Calyptranthes tenuis, Ham. MSS.

**Sukanagha**, Hamilton.

Leaves 2½—2¾ by 1—1½ in.; margins slightly revolute; midrib slender, orange-coloured as well as the edges of the leaves; petiole about 4 in. Peduncles 5 in. or less. Corolla calyptrate. Style persistent, exserted.—The leaves have a close resemblance to those of *E. verecunda*.

108. **E. Heyneana**, Wall. Cat. 3599 (Syzygium); leaves narrowly oblong or elliptic obtusely acuminate narrowed at the base into a short petiole finely and closely nervet, cymes lateral from the scars of fallen leaves rarely axillary, calyx-lobes unequal, petals united, berries oblong. Calyptranthes Danca, Ham. in Herb. E. salicifolia, Grah. Cat. Bomb. Pl. 73; not of DC.; not of Berg. or Wall. Cat. 3597 (Syz.); Wight Ill. ii. 16; Ic. t. 539; Dalz. Bomb. Pl. 24 excl. syn. Wall.; Bedd. Fl. Sylv. Anal. Gen. cix.

Western Peninsula; beds of river in Behar; Bombay Ghats and Concan, Stocks; Canara, Ritchie; Coong, Heyne; Sagar, Vicary.

A small tree or shrub. Leaves 3—5 by 2½—1 in. pellucid-punctate. Cymes lax, much branched. Flowers small, white. Berries ¾ in. or more in length, crowned with the cup-like calyx-limb.

*E. salicifolia* of Wight's Herbarium is certainly the *E. Heyneana* of Rottler's and Wallich's herbaria. Wallich's *E. salicifolia* is *E. rubicunda*, W. & A., a plant having very much the habit of this, but with the inflorescence terminal. The wood is used for rafters (Beddome).

VAR. alternans; cymes from the axils of the upper leaves. S. alternans, Miq. in Herb. Hohenacker.—Concan and Canara, Stocks, Hohenacker. The leaves are very like those of *E. pellucida*.

**Sect. III. Eueugenia.** Flowers solitary or in fascicles. Petals distinct. (To end.)

* Young parts and inflorescence fulvous or silvery pubescent. (To p. 504.)

† Staminial disk broad.


**Seyagherry Hills**, Tinnevelly District, Wight, Beddome; Courtallum, Wight. A small tree or shrub. Leaves 1—1½ by ¾—2 in., revolute at the edges; nerves inconspicuous above. Peduncles 3 in. long. Calyx-tube subglobose; lobes rather unequal. Petals hairy, ¾ in. long.
110. _E. floccosa_, Bedd. _Fl. Sylv._ t. 200; young branches densely floccose, leaves ovate or suborbicular sometimes lanceolate obtuse densely floccose at length glabrous except on the ribs minutely dotted beneath coriaceous, edges revolute, flowers terminal in very short few-flowered cymes or solitary and large, calyx coriaceous densely pilose furnished at the base with 2 large bracteoles, petals exceeding the calyx-lobes white hairy at the back, fruit large size of a pigeon's egg densely woolly crowned with the persistent calyx-lobes.

S. TINNEVELLY GHATS above Calcd, 3-4000 ft., Beddome.

A large and beautiful tree. Leaves very thick, 3-5 by 2-3½ in.; nerves quite inconspicuous except in dried specimens, penninerved, with the usual marginal looping or occasionally 3-nerved at the base, the two lateral nerves not prominent; petiole densely floccose, ¾-3 in. Flowers about 1 in. diam. Disk large, subglobose, woolly.

111. _E. codyensis_, Muaro in Wight _III._ ii, 13; leaves short-petioled ovate-oblong or obovate tapering towards the base shortly obtusely acuminate, flowers nearly sessile clustered in terminal heads at the extremities of short abortive branches or axillary and solitary or few together, fruit globose 1-2-seeded.

NILGIRI and KURG MTS., Muaro.

A shrub with stout terete branchlets; young parts clothed with white pubescence. Leaves 1½-2½ by ¾-1½ in., coriaceous, glabrous, shining above; dots minute, pellucid; lateral nerves slender, prominent, uniting within the margin; petiole ¾-½ in. Calyx-tube campanulate, silky-pubescent; lobes 4, broad, persistent, ciliate. Petals oblong, twice the length of the calyx. Berries about ½ in. in diameter.—Judging from the specimen in Wight's Herbarium it seems to be closely allied to _E. elliptica_, Lam., of which it is perhaps only a variety; the leaves are rather longer petioled and the flowers larger.

Allied to this is _E. buxifolia_, Lam., a native of the Mauritius.

112. _E. lucida_, Lam. _Dict._ iii, 203; young parts and inflorescence covered with light-coloured cottony pubescence, leaves petioled broadly obovate or nearly orbicular revolute at the edges very coriaceous, flowers large solitary in the axils or collected 3 or 4 together at the ends of the former year's branches each with 2 small subacute bracts, calyx-lobes rounded unequal. Jossinia lucida, _DC. Prodr._ iii. 237. _E. cotinifolia_, Jacq. _Obs._ iii. 3 t. 53 in _part._ E. hypoleuca, _Thwaites MSS._ C.P. 3864 & 3865; _Bedd. Fl. Sylv._ Anal. Gen. cxii. Myrtae cotinifolia, _Spreng._ Syst. ii. 481 in _part._ M. Commersonii, _Spreng._ L. c. 470.

_Ceylon_; Wattekelle Hill, 5000 ft. alt., _Thwaites._—**Distrib.** Bourbon, Mauritius.

Leaves 1½-2 by 1½-1¾ in.; nerves indistinct above, slender beneath and uniting within the margin; petiole about ½ in. Flowers upwards of an inch in diam. Pedicels ¼ in. or less. Calyx-tube ½ in. "Fruit obovate or globose glabrous crowned with the obtuse calyx-lobes" (Decandolle, l. c.).

113. _E. macrosepala_, Duthie; leaves petioled ovate or oblong-lanceolate subacute at the base obtusely acuminate or sometimes rounded at each end coriaceous, flowers lateral from leafless axils sessile solitary or in pairs each with 2 linear pilose bracts equalling or exceeding the calyx-tube, calyx-lobes 4 long narrowly lanceolate acute exceeding the obtuse petals.

N. CANARA, Stocks.

Upper branches stout, terete or compressed at the nodes; bark brownish. Leaves 3-4½ by 1½-1¾ in., shining a little above and of a reddish tinge; nerves inconspicuous above, slender but prominent beneath uniting within the margin. Calyx-lobes clothed with long spreading white hairs. Petals ovate, pilose at the back and ciliate at the margin. Staminiferous disk not so broad and square as in _E. elliptica_, Lam.
114. **E. calcadensis**, Bedd. *Ic. Pl. Ind. Or. 35*, t. 102; *Fl. Sylv. Anal. Gen. ex.*; young parts rusty-pubescent, leaves opposite or subalternate elliptic to subobovate obtuse very rugose on the upper surface but glabrous in age except the channelled midrib, peduncles axillary solitary about equal to the pedioles 2—rarely 1-flowered, flowers showy white, ovary 2-celled with numerous ovules.

Calced Hills in S. Tinnevelly, up to 2000 ft., Beddome.

A small tree. *Leaves* 2½—3 by 1-1½ in., coriaceous, not dotted; nerves inconspicuous above slightly prominent beneath, the primary ones joining within the margin; petiole 4—½ in. *Pedicels* 1—1½ in., with a subulate bract at the base of each. *Flowers* 1—1½ in. in diam., with 2 small linear bracts at the base. *Calyx-lobes* rounded. *Petals* oblong ciliate 4—½ in. long. *Disk* suborbicular, densely woolly, covering the whole of the top of the ovary at the apex of the calyx-tube. *Stamens* inserted all over the disk.

†† **Staminal disk not enlarged.**

§ **Flowers** pedicelled.


Silhet and Plains of S. India, especially near the sea; Madras, G. Thomson, Wight, Hunter; Anamalay Mts., up to 3000 ft. alt., Beddome; Ceylon, Jaffna, Gardener.

A shrub or small tree. *Leaves* 1½—2 by about ¾ in. Calyx-lobes broad, unequal, reflexed after flowering. *Petals* ovate-oblong, twice as long as the calyx-lobes, pubescent at the back, margins ciliate.


Rottler's specimens in the Kew Herbarium, and those of Arnott from Ceylon named *E. zeylanica* have the leaves upwards of 4½ in. long. In Wight's figure the peduncles are incorrectly represented as 2-flowered.


116. **E. Rottleriæana**, *W. & A. Prodr.* i. 331; much branched, young shoots petiolo peduncles and calyx covered with rusty-silky tomentum, leaves very narrow lanceolate tapering at both ends obtuse glabrous on both surfaces except when young pellucid-dotted, peduncles axillary or somewhat lateral 3—4 together or sometimes solitary filiform scarcely one-fourth the length of the leaves, bracteoles 2 under the calyx, calyx-segments 4 triangular ovate obtuse, petals 4 much longer than the calyx villous on the margin. *Wight Ill. ii. 13; l. c. 100; Bedd. Fl. Sylv. Anal. Gen. ex.*
Southern provinces of the Western Peninsula, Wight, Beddome; Courtallum, Wight.

A small tree or shrub. Leaves 1–2 by ½– 1½ in.; petiole ¼ in. or less.—Col. Beddome mentions two distinct forms, the one with leaves 1–1½ by ½ in., the other 2 in. by ½ in. The former coming very near E. wilddenowii (of Wight).


Ceylon; up to no great elevation, Thwaites.

A middling-sized tree; branchlets terete. Leaves 2½–5 by ½–2 in., membranous, faintly reticulate; lateral nerves prominent beneath, 5–8 on each side marginal often double; petiole ¼–½ in. Peduncles axillary and terminal, short, few-flowered; pedicels about equalling the petioles. Petals white, twice as long as the rounded calyx-lobes. Berry downy, size of small cherry.


Ceylon; near the coast between Galle and Colombo, Thwaites.

A low tree. Leaves 2½–4 by 1½–2½ in.; petiole ⅛ in. Berries ¼–⅓ in., ochraceous.—Diffs from *E. terpnophylla* in having more numerous primary nerves, in their being less prominent beneath, and uniting closer to the margin; and in the ochraceous berries which are often 2–4-seeded (Thwaites l.c.).


Ceylon, near Avishavelle, Thwaites.

A tree, 30–40 ft. Leaves 4–5 by 1–1½ in. or much narrower in some of Mr. Thwaites’ specimens; petiole about ⅛ in. Calyx-lobes unequal, obtuse or subacute. “Diffs from *E. terpnophylla* by the leaves being pilose beneath, and the primary nerves anastomosing nearer the margin” (Thwaites l.c.).


S. India, Wynnaad, alt. 3000 ft., Beddome.

A small tree or shrub. Leaves 4–5½ by 1½–1⅝ in.; nerves rather prominent beneath, lateral spreading nearly at right angles from the midrib and running into a regular looped nerve near the margin. Peduncles 1 in. long, from the old axils or axillary. Flowers ½ to nearly ⅝ in. across. Fruit about the size of a large cherry, black when dry, crowned with the persistent calyx-lobes.
§§ Flowers sessile or subsessile.


CEYLON; Reigam Corle, at no great elevation, Thwaites.
A small tree; branchlets terete. *Leaves* acutely acuminate, 4–8 by 1–2 in., at length glabrous; primary nerves rather prominent beneath, joined into a marginal looping one; petiole ¼–½ in. *Petals* white, equalling the calyx-lobes, ½ in.


CEYLON; Pasdoon Corle, at no great elevation, Thwaites.
A small tree with terete branchlets. *Leaves* coriaceous, 4–6 by 2½–3 in., the young ones rusty-tomentose beneath; petiole about ⅕ in.


CEYLON; banks of streams in the Singherajah forest between Galle and Ratnapura, at no great elevation, Thwaites.
A small tree with terete branchlets. *Leaves* 10–14 by 3–4½ in.; midrib stout longitudinally striated; principal nerves very prominent below and uniting to form a conspicuous intramarginal one; petiole about ⅓ in. *Petals* oblong; pale purple, ⅔–⅚ in.

124. *E. insignis*, Thwaites Enum. 416; young parts covered with white fugacious down, leaves rather large glabrous oblong acuminate smooth above ribs channelled paler beneath, primary nerves about 12 prominent anastomosing near the margin, interspaces smooth, flowers axillary and on the branches few sessile small, calyx with white hairs or floccose, fruit spherical. *Bedd. Fl. Sylv. Anal. Gen. cxi.*

CEYLON; Galpara in the Reigam Corle, Thwaites.

** Whole plant nearly glabrous.

† Flowers sessile.


CEYLON; Galle, at no great elevation, Thwaites, Champion.
A small tree; young branches terete. *Leaves* 4–5 by about 2 in.; petiole ⅓ in. *Flowers* white. *Berries* red or nearly black, ½ by ⅔ in.—Champion's single specimen from Galle has only one flower terminating a lateral branch; the calyx-tube is spa-
Eugenia.]  LIX. MYRTACEAE.  (J. F. Duthie.)  505

ringly clothed with adpressed hairs, the lobes large unequal rounded and ciliate, the petioles are glandular and ciliate at the edges.

†† Flowers pedicelled.


CEYLON, Kokool Corle and Delosbage District, up to 1500 ft., Thwaites.

A small tree; branchlets terete. Leaves 2–6 by 1½–2½ in.; nerves inconspicuous above, more prominent beneath and uniting in a distinct marginal nerve with often a second fainter one nearer the edge. Pedicels ¼–⅓ in. Bracts ovate, acute. Petals 4, oblong, white, about ¼ in. length, longer than the roundish calyx-lobes.—Some of Mr. Thwaites' specimens, and which he considers to be merely a state of this species, have the leaves much thinner, broader at the base, and with rather different nervation, the pedicels are shorter, and the calyx-lobes sometimes acute.

127. E. Mooniana, Wight ill. ii. 13; ic. ii. 551; not of Gardner in Hook. Journ. of Bot. ii. 352 (1843); shrubby, glabrous or the young shoots puberulous, leaves short-petioled ovate acuminate tapering at the base, peduncles axillary solitary or 2 together 1-flowered, flowers small, calyx-tube ventricose oblong, lobes 4 reflexed pointed, fruit globose or oblong size of cherry. Thwaites Enum. 114; Bedd. Fl. Sylv. Anal. Gen. ex.

Courtallum, Wight; NILGIRI HILLS, Hb. Hohenacker; SEVAGHERRY HILLS, Wight; CONCAN, Stocks; CEYLON, up to 4000 ft., Thwaites.

A most variable species in the shape of the leaves and the length of the petioles and flower-stalks. Leaves 1½–2½ by ⅜–1¼ in.; acumen short and obtuse, or prolonged to a fine point. Pedicels about ¼ in., axillary or from the old wood below.—It approaches E. uniflora, but the leaves are thicker and the pedicels are less slender.—Col. Beddome says (l.c.) "I have another species allied to this which may prove to be new (specimens imperfect) the peduncles are several-flowered."


A native of S. America, becoming naturalised in CEYLON and parts of India.

Var. subcordata; leaves slightly cordate at the base. W. & A. Prodr. i. 331; Wight ill. ii. 13.


CEYLON; Central Provinces 4–7000 ft. alt., Moon, Gardner, Thwaites.

A shrub; much branched. Leaves resembling those of Maba buxifolia, ¼–2 by ¼–1¼ in.

129. E. microphylla, Bedd. Fl. Sylv. Anal. Gen. ex.; glabrous in all its parts, young branches angled and winged, leaves opposite occasionally alter-
nate thickly coriaceous linear obtuse nerves inconspicuous, peduncles axillary solitary shorter than the leaves 1-flowered, fruit size of large grain of pepper.

Banks of rivers, Asamboo Hills, Travancore, 4-5000 ft. alt.

A small tree, much branched and very dense. Leaves \( \frac{1}{3} \) by \( \frac{1}{3} \) in., bright red, quite glabrous when young, prominently black-dotted; petiole \( \frac{1}{3} \) in.—I have seen no specimens.


Ceylon, Ambagamowa District, Thwaites.

A tree; branchlets terete. Leaves sparingly pilose, at length glabrous, 3-5 by \( \frac{1}{3} \) in.; petiole nearly \( \frac{1}{3} \) in. Pedicels about \( \frac{1}{3} \) in. or more. Calyx-lobes unequal. Petals ciliate, downy outside. Berries red, about \( \frac{1}{3} \) in. in diameter.

131. E. singampattiana, Bedd. Jc. Pl. Ind. Or. 65. t. 273; leaves ovate or ovate-oblong retuse or subacute subcordate at the base coriaceous deep green above very pale beneath quite glabrous, flowers white in very short terminal crowded racemes, calyx and bracts slightly pubescent.

Singampatty Hills, Tinnevelly Ghats, moist forests, alt. 3000 ft., Beddome.

A small dense tree. Leaves about 3 by \( \frac{1}{3} \) in.; primary nerves numerous, forming a continuous looping one near the margin. Flowers about \( \frac{1}{3} \) in. across. Petals prominently nerved.

DOUBTFUL AND EXCLUDED SPECIES.

E. Caryophyllata, Willd. (the Clove-tree) is a native of the Molucca Islands and not indigenous in India.

E. sp. (No. 2420 of Griffith's Herbarium) is too imperfect for description.

E. Pulchella, Roxb. is a native of the Molucca Islands.

E. Wynaadensis, Bedd. in Mad. Lit. Soc. Journ. ex Jc. Pl. Ind. Or. 35, t. 161; Fl. Sylv. Anal. Gen. cx.; young parts and inflorescence densely fulvo-tomentose, leaves oblong-lanceolate with a long blunt acumen quite glabrous on both surfaces when old, peduncles supra-axillary, calyx-lobes lanceolate acuminate a little longer than the corolla, bracts 2 linear much longer than the flowers, stamens inserted round the edge of the disk, ovary 2-celled, ovules pendulous from the apex about 4 in each cell.

Western Peninsula; Wynaad, alt. 2-3000 ft., Beddome.

A small tree or shrub. Leaves 3-3\( \frac{1}{3} \) by 1-1\( \frac{1}{3} \) in., rather thin; lateral nerves indistinct above, slender beneath and uniting into a continuous one within the margin; petiole \( \frac{1}{3} \) in. Peduncles \( \frac{1}{3} \) in. Fruit.?—This is probably, as Col. Beddome suggests, the type of a new genus intermediate between Pimenta and Eugenia. The materials at my disposal are too incomplete for the preparation of a proper generic description. The above is compiled from Col. Beddome's description of the plant.

SUBTRIBE BARRINGTONIÆ. (By C. B. Clarke.)

9. BARRINGTONIA, Forst.

Trees. Leaves alternate, crowded towards the ends of the branches, entire or slightly crenate-serrate, pinnate-nerved, not dotted. Flowers in elongated terminal and lateral racemes, less often in interrupted spikes; bracts small, deci-
duous. Calyx-tube scarcely produced above the ovary; lobes 2–4 valvate, or 3–5 imbricate. Petals 4, rarely 5, much imbricate, somewhat adnate at the base to the staminal tube. Stamens very many, in several series, connate shortly into a tube at the base; filaments filiform, long, all bearing anthers. Ovary inferior, 2–4-celled, crowned with an annular disc; style long, simple, stigma small; ovules 2–8 in each cell. Fruit fibrous or somewhat berried, globose ellipsoid or quadrangular, crowned with the calyx, by abortion 1-seeded. Seed ovoid or ellipsoid, without albumen; embryo large, exhibiting two layers, cotyledons nearly obsolete.—**Distrib.** Species 20; in tropical Asia, Africa, Australia and Polynesia, often near the sea.

**Sect. Butonica, Juss.** (gen.). Calyx valvate, 2–3- (rarely 4-) lobed. (Barringtonia, Agasta and Butonica of Miers).

* Leaves entire.


CEYLON, Thwaites (Southern Deccan Peninsula probably not wild ex Beddome); ANDAMANS, Kurz; SINGAPORE, T. Anderson; on sea-coasts.—**Distrib.** The shores of Malaya, Australia and Polynesia.

Tree 30–50 ft., glabrous. Leaves often 15 by 7 in., obtuse, narrowed at the base, quite entire, sessile. Raceme short, erect; lower pedicels with a leaf-like bract, upper bracts much smaller. Calyx closed over the bud; lobes 2, 1½ in., oblong. Petals white. Ovary 4-celled; ovules about 6 in each cell. Style often exceeding 4 in. Fruit 3 by 3 in., quadrangular or nearly ovoid, by abortion 1-seeded.—Mr. Miers founds a second genus on a drawing of Forster which represents the fruit as 4-celled. But the drawing appears to be taken from the fruit of B. speciosa, the very anomalous embryo having misled Forster to sketch in faintly four septa.

**Leaves crenate-denticulate.**


On sea-coasts. CONCAN; Stocks. QUILON, Wight No. 1064. From the Soonder-bun to MALACCA; Wallich, Kurz, Griffith, Mainay. ANDAMANS; Kurz.—**Distrib.** Malaya and Polynesia.

An evergreen tree attaining 50 ft., glabrous. Leaves 10 by 3 in., cuneate-oblong, lightly crenate-denticulate; petiole ⅛–¼ in. Racemes 12–18 in., pendulous, flowers distant, pedicels ⅛–¼ in. Calyx-lobes ⅛ in., ovate. Style often 1½ in. Fruit 1½ by 1½ in., ovoid, obscurely quadrangular below when quite ripe; in ripening attaining
nearly its full length before one-third its full breadth; in Maingay's examples nearly ellipsoid: exocarp very thick, fibrous.

3. **B. ceylanica**, Gardn. MS.; racemes pendulous pedicels $\frac{1}{2} - \frac{1}{2}$ in., calyx-tube in the bud broadly funnel-shaped segments 4 at first rounded rather than ovate. **B. racemosa** var. $\beta$, Thwaites Enum. 119. Butonica ceylanica, Miers in Trans. Linn. Soc. ser. ii. Bot. i. 77.

Ceylon, south of the island abundant; Thwaites.

Treated by Mr. Thwaites as a var. of *B. racemosa*, and after specific separation by Miers i. c. reduced to *B. racemosa* again by Kurz in Journ. As Soc. 1877, pt. ii. 70. Butonica intermedia, Miers i. c. from New Caledonia differs by calyx-lobes 2–3, ovate.


Moulmein; Wallich. Coast forests of Tenasserim; Kurz. Malacca; Griffith. An evergreen shrub or small tree (Kurz), glabrous. Leaves 7 by 2½ in., oblong, narrowed downwards, at the very base cordate, crenulate-serrulate or nearly entire; petiole $\frac{1}{4}$ in., thick. Raceme 4 in., lax, but erect; pedicels $\frac{3}{4} - \frac{1}{2}$ in., glabrous (or somewhat puberulous, Kurz). Calyx-tube broad at the base, the 8 descending processes often manifest in the bud as figured by Griffith. Calyx-lobes usually 2, $\frac{1}{2}$ in., ovate. Petals and style as in *B. racemosa*. Fruit $\frac{1}{2}$ by 1 in., conically ovoid, broadest at the very base and there 8-winged; wings produced downwards in 8 semi-cordate processes.—Mr. Miers i. c. has asserted that Griffith's figures are mixed, and that part of them refer really to B. alata, Miers: but Kurz has rectified this in Journ. As Soc. 1877, pt. ii. 70. Griffith's figures agree more closely with the material than do Miers's.

**Sect. Stravadium, Juss. (gen.).** Calyx lightly imbricate, 3–5– (usually 4–) lobed. (Stravadium and Doxomma of Miers).

* Ovary 2-celled, whole calyx less than $\frac{1}{2}$ in. (Stravadium, Miers).


Throughout India from the Himalaya to Ceylon and Singapore very common; no tree is more plentiful in the plain of Bengal.—Distrib. Malaya; and North-West Australia (if Stravadium gracile Miers be considered the same species as by Bth. Fl. Austral. iii. 288).

Attaining 30–40 ft., glabrous. Leaves 5 by 2 in., minutely denticulate-crenate, narrowed into the petiole $\frac{1}{4} - \frac{1}{2}$ in. Racemes often 1 foot, glabrous, rachis not succulent; pedicels 0–$\frac{1}{4}$ in. Calyx-tube in the bud very short, funnel-shaped; lobes $\frac{1}{4}$ in., roundish, not longer on the fruit. Petals $\frac{1}{4}$ in., pink. Filaments long, usually red. Fruit 1–1½ by $\frac{3}{4} - \frac{1}{2}$ in., broadest in the middle, angles broad, rounded.—"Indian Oak" of the English denizens.
Var. pubescens, sp. Miers, l. c. 83 (Stravadium); leaves pubescent on the nerves beneath, racemes and pedicels often more or less pubescent. Deccan Peninsula; frequent.

** Ovary 4-celled, whole calyx more than $\frac{3}{8}$ in. (Doxomma, Miers).

† Petiole short usually less than $\frac{3}{4}$ in.


Moulmin and Tavoy; Parish. Amherst; Wallich. Tenasserim; Kurz.
An evergreen tree 30–50 ft. Leaves 14 by 7 in., narrowed to the base, minutely serrulate or nearly entire, glabrous; petiole $\frac{3}{4}$ in. Raceme sometimes 3 ft., always elongate with a thick rachis, pendulous; bract to each flower $\frac{1}{2}$ in., ovate or lanceolate, caducous. Calyx total length $\frac{1}{2}$ in., minutely white-tomentose. Petals $\frac{3}{4}$ in., ovate, white (Parish). Fruit (half-ripe) 1 in., ellipsoid, somewhat obovoid, quadrangular, wings 4, narrow.


Tenasserim and Andamans; Helfer (Kew Distrib. No. 2426).
Leaves 20 by 4 in., narrowed to the base, minutely serrulate or nearly entire, glabrous; petiole $\frac{1}{4}$ in. Raceme exceeding 1 ft., pendulous, glabrous or minutely puberulous. Calyx total length $\frac{1}{2}$ in., obscurely puberulous; tube in the bud terete or very obscurely quadrangular; whereas in B. augusta (to which Helfer's plant is referred by Miers) the wings are broad sinuous even in the bud.

†† Petiole long, usually more than $\frac{3}{4}$ in.

8. B. pterocarpa, Kurz in Journ. As. Soc. 1873, pt. 234; For. Fl. i. 498; leaves obovate-lanceolate petiole often 1 in., spike 20 in. pendulous, flowers sessile, calyx-tube in the bud 4-winged. [The syn. D. magnificum Miers, quoted by Kurz in Journ. As. Soc. 1877, pt. ii. 70, does not belong.]

Pegu and Martaban to Tenasserim; Kurz No. 3021.
An evergreen tree, 30–50 ft., glabrous. Leaves 10 by 3½ in. (attain 16 in. ex Kurz), acute, attenuated at the base, minutely serrulate or nearly entire. Rachis of spike thick, glabrous or obscurely puberulous. Calyx total length $\frac{3}{4}$ in., tube obscurely puberulous, distinctly 4-winged in the bud but much less so than in B. augusta. Fruit (ex Kurz) 2 in. oblong, quadrangular, angles with narrow but thick wings, fibrous-fleshy.—This seems very near B. augusta, as Mr. Kurz states.


Mergui; Wallich, Griffith, Parish. Malacca; Griffith, Maingay No. 763.—Distrib. Malaya to Borneo.
An evergreen glabrous tree 30–40 ft. Leaves 12 by 3½ in., much narrowed at either end, minutely crenulate-dentate; petiole longer than in the other species and dilated at the base. Spike with thickened rachis, glabrous or scarcely puberulous; bracts subulate, small, caducous. Calyx total length 2½–1 in., tube quadrangular, not winged in the bud. Petals high red, filaments white. Fruit 2½ by 1½ in., ellipsoid, equally tapering to each end, roundish but with 4 distinct ribs.—Kurz has reduced all the synonyms above except Careya pendula of Griffith, of which he appears to have possessed no example and which he supposed to differ by having the flowers pedicelled. But in Griffith’s Careya pendula the flowers are sessile or sub sessile, and it does not appear to differ in any way from Barringtonia macrostachya.


**Malacca; Maingay, No. 767.**

Leaves 12 by 3½ in., glabrous, acute at each end, entire or very nearly so; petiole 1½ in., not dilated at the base. Spikes from axils not close to the end of the branches, rusty brown. Fruits ½ by ½ in., sessile, approximated, erect, with 4 obtuse angles, nearly equally wide their whole length, subtruncate at apex and base, fibrous.—This species is quite unlike all others of the section: the fruits are more like those of sect. *Siraadamium*, but Miers has satisfied himself that they contain 3 abortive cells: flowers unknown.

10. **Careya**, Roxb.

Trees or very small shrubs. Leaves alternate, crowded towards the ends of the branches, membranous, slightly crenate-serrate, pinnate-nerved, not dotted, narrowed at the base, sessile or petioled. Flowers large, in racemes or interrupted spikes. Calyx-tube campanulate or funnel-shaped, hardly produced above the ovary; lobes 4, ovate, imbricate. Petals 4, imbricate. Stamens very many, in several series, slightly connate at the base; filaments filiform, innermost and outermost without anthers. Ovary inferior. 4–5-celled, crowned by an annular disc; style long, simple, stigma small; ovules very many on axile vertical placentas, in two rows in each cell. Fruit large, globose, fibrous, crowned with the calyx; dissemination absorbed or obscure. Seeds numerous, lying in pulp, ellipsoid; albumen 0; embryo large, cotyledons obsolete.—Distribution. Species 3; confined to India.

1. **C. herbacea**, Roxb. Cor. Pl. iii. 13, t. 217; *Fl. Ind. ii. 638; a small undershrub, leaves cuneate-oblong or obovate serrulate. DC. Prodr. iii. 205; Wall. Cat. 3638; Wight & t. 557; Brand. For. Fl. 237; Kurz For. Fl. i. 409; Miers in Trans. Linn. Soc. ser. ii. Bot. i. 96.*

Terai of the Himalaya and Khasia Mts., alt 0–1000 ft.; from Kumaon to Chittagong; extending throughout dry jungles in the plain of Bengal; not rare; especially in sun-grass Terai jungles annually burnt in the dry season.

Rootstock woody, perennial; herbaceous leafy flowering shoots 6–8 in. Leaves 7 by 2½ in., obtuse, long attenuate at the base, glabrous or obscurely puberulous; petiole 0½ in. Flowers 1–2 rarely several on each shoot, terminal; peduncles ½–1½ in. grey puberulo-pubescent; bracts 2, 1½ in., linear, at the base of the calyx; flower subarticulated within the bracts. Calyx total length 3 in.; tube campanulate, terete; lobes ovate, obtuse. Petals 1½ in., greenish-purple, elliptic. Fruit 1½ in. diam., globose, crowned by the persistent calyx and often by the style.—*Careya herbacea*, Griff. Notul. iv. 660 is a confused description only partly referring to the present plant; perhaps mixed in the editing, as Miers suggests.
2. **C. arborea**, Roxb. Cor. Pl. iii. 14, t. 218; Fl. Ind. ii. 638; a tree, leaves obovate or oblong, spikes about 3-flowered, petals obtuse. DC. Prodr. iii. 205; Wall. Cat. 3640; W. & A. Prodr. 334; Wight. Ill. 99, 100; Dalz. & Gibbs. Bomb. Fl. 95; Bedd. Fl. Sylo. t. 205; Brand. For. Fl. 236; Kurz For. Fl. i. 499; Miers in Trans. Linn. Soc. ser. ii. Bot. i. 97.—Rheede Hort. Mal. iii. 36.

Throughout INDIA, alt. 0–4000 ft.; from the Himalaya to Travancore and Tenasserim: no example from Ceylon.

Attaining 30–60 ft. Leaves 12 by 6 in., oblong or orbicular, obtuse or shortly acuminated, narrowed at the base, crenate-denticulate, glabrous; petiole 0–1 in. Spikes 3–8 in.; flowers usually few, sessile; bracts 3, unequal. *Calyx* total length $\frac{3}{4}$–1 in., terete, campanulate, obscurely pubescent; lobes ovate, obtuse. *Petals* 1$\frac{1}{2}$ in., white, elliptic. *Filaments* red. *Ovules* in two rows in each cell of the ovary (*Kurz*). *Fruit* 2$\frac{1}{2}$ by 2 in., globose, surmounted by an enlarged mouth having a depressed pit at the vertex within the calyx-teeth. *Seeds* $\frac{3}{4}$–$\frac{1}{4}$ in., ellipsoid.—Disseminations of the fruit permanent, at least sometimes. *C. orbiculata*, Miers l. c. i. 98 t. 16, fig. 6–8 (founded on Griffith's example Kew Distrib. No. 2428 collected at Mergui) has the ovary slightly verrucose, apparently from the attack of some insect.

3. **C. sphaerica**, Roxb. Fl. Ind. ii. 636; a tree, leaves obovate or orbicular, spikes many-flowered, petals acute white. Wall. Cat. 3639; Wight i. c. t. 147, 556; Kurz For. Fl. i. 500; Miers in Trans. Linn. Soc. ser. ii. Bot. i. 97, t. 16, fig. 9–15.

Mountains of CHITTAGONG, Roxburgh.

This is very doubtfully separable from the preceding species: Roxburgh says that in each cell of the ovary the ovules are in six rows (not in two as in *C. arborea*). Mr. Kurz does not appear to have seen the tree, and closely follows Roxburgh. Neither Col. Beddome nor C. B. Clarke have ever distinguished *C. sphaerica* alive. Mr. Miers has set aside in the herbarium (as *C. sphaerica*) examples collected as *C. arborea* by Wallich, Rottler, Ritchie and J. D. H., so that none of these could have distinguished the tree in the field.


Trees. Leaves alternate, crowded towards the ends of the branches, membranous, crenulate, pinnate-nerved, without dots. *Racemes* short, terminal; flowers greenish-yellow or white. *Calyx-tube* turbinate, scarcely produced above the ovary; lobes 4, imbricate. *Petals* 4, imbricate. *Stamens* very many, in several series, slightly connate at the base, innermost without anthers. *Ovary* inferior, 3–4-celled, crowned by an annular disc; style long, simple, stigma small; ovules many in each cell. *Fruit* (ex Miers and Kurz) large, 3–1-celled, fibrous, ovoid, crowned by the calyx. *Seeds* several, ellipsoid, lying in pulp; albumen 0; embryo horseshoe-shaped, cotyledons short.—Distrib. Species 2, extending from the Andamans to Australia.


Andamans, in the evergreen coast-forests; Kurz.

An evergreen tree 40–60 ft. Leaves 7 by 3$\frac{1}{2}$ in., obtuse or scarcely acute, much narrowed at the base, denticulate; petiole $\frac{1}{2}$ in. *Raceme* short, terminal; flowers middle-sized. *Calyx-tube* $\frac{1}{2}$ in., top-shaped, obsolescent 8-angled; segments $\frac{1}{2}$ in., ovate, rounded. *Petals* 1 in., obtuse, reflexed. *Filaments* $\frac{1}{2}$ in., purple.—(Description chiefly copied from Kurz).
DOUBTFUL GENUS.

Lencymmaea, Presl. Epimel Bot. 211, a genus supposed by Kurz to come next Planchonia, has opposite leaves and branches, and is probably stipulate (from Presl's description): at all events it cannot be allied to Planchonia.

ORDER LX. MELASTOMACEÆ.  (By C. B. Clarke.)

Herbs or shrubs, more rarely trees, sometimes climbers. Leaves opposite or rarely whorled, generally petioled, entire or nearly so, often palmately 3–5–7-nerved from near the base to the apex (usually pinnate-veined in Memecylon); stipules 0. Flowers spikes panicled or corymbed, rarely solitary or clustered, regular, hermaphrodite. Calyx-tube united by vertical walls to the ovary, rarely nearly free; limb usually 4–5– (sometimes 3 or 6-) lobed, sometimes truncate, rarely falling off in a cap. Petals as many as the calyx-lobes, contorted in the bud, on the margin of the calyx-limb. Stamens as many or more than (frequently twice as many as) the petals, inserted with them; alternate stamens often shorter sometimes rudimentary, filaments bent inwards in the bud; anthers opening at the summit by one or two pores, rarely by slits down the face; connective often appended near the base by bristles tubercles or a spur. Ovary 4–5– (rarely 3 or 6-) celled (in Memecylon 1-celled); style simple, filiform, rarely short; ovules very many (except in Memecylon); placents in the Melastomaceæ axile, in the Astro-nieæ parietal, in Memecylon free central. Fruit included in the calyx-tube, capsular or berried, breaking up irregularly or by slits through the top of its cells. Seeds minute, very many (in Memecylon one only); albumen 0; cotyl edons short (or in some of the Memecyleæ long thin convolute).—Distrib. Species 1800, tropical with a few subtropical; very many in America, many in south-east Asia, a few in Africa and Polynesia.

SUBORDER I. Melastomaceæ. Ovary 3–6– (usually 4–5–) celled. Ovules very many, on placents radiating from the axis. Seeds very many. Anthers opening by a single terminal pore (rarely by 2).

TRIBE I. Osbeckieæ. Seeds curved through half a circle, minutely punctate.

Stamens all alike. Fruit capsular . . . . . . . . . . 1. Osbeckia.
Stamens all nearly alike. Fruit a berry . . . . . . . 2. Otanthera.
Stamens very unequal . . . . . . . . . . . . . . . . . . . . . . 3. Melastoma.

TRIBE II. Oxysporææ. Seeds straight, oblong or cuneate, raphe often excurrent. Ovary with the vertex usually free conical. Petals more than 3. Inflorescence not scorpioid. Fruit capsular.

* Inflorescence terminal (see also Ochthocharis).

Panicles broad showy . . . . . . . . . . . . . . . . . . . . . . . 4. Oxyspora.
Large climber. Flowers umbellate . . . . . . . . . . . . . 5. Kendrickia.
Panicles narrow. Flowers minute . . . . . . . . . . . . . . . 6. Allomorphia.

** Inflorescence axillary, stamens equal, flowers minute.

Stamens 4 . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . 7. Blastus.
Stamens 10 . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . 8. Ochthocharis.
Stamens 8 . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . 9. Anericulestis.
TRIBE III. **Sonerileæ.** Seeds straight, oblong or cuneate, often angular, raphe sometimes excurrent. **Ovary** flattened or depressed at the vertex. **Fruit** capsular.

Petals 3. Inflorescence scorpionid. 10. **Sonerilla.**
Petals 4. Flowers nearly sessile. 11. **Sarcopyramis.**
Petals 4. Flowers in a long-peduncled head. 12. **Phyllagathis.**

TRIBE IV. **Medinilleæ.** Seeds straight, cuneate or obovate, often angular. **Connective** often appendaged near the base. **Fruit** baccate.

* Longer stamens having two long bristles attached to the base of the connective in front.

-Cymes lateral. 13. **Marumia.**
-Panicles terminal. 14. **Dissocheta.**

** Longer stamens having the connective at base variously appendaged but not with two long bristles in front.

Four vertical plates on the ovary. 15. **Anplectrum.**

*** Stamens equal or nearly so.

Connective at base without bristles behind. 16. **Medinilla.**
Connective at base with bristles behind. 17. **Pogonanthera.**

**SUBORDER II. Astronieæ.** Ovary 4–5-celled; ovules very many on parietal nearly basal placentas. Seeds very many. **Anthers** short opening by slits. **Fruit** baccate.

-Calyx-tube smooth. Panicles terminal. 18. **Astronia.**
-Calyx-tube verrucose. Cymes small. 19. **Ptternandra.**
-Calyx-tube with scales. Flowers solitary or clustered. 20. **Kibessia.**

**SUBORDER III. Memecyleæ.** Ovary 1-celled; ovules about 9 on a basal short free central placenta. **Stamens** equal; anthers short, opening by pores or short slits. **Berry** 1-seeded.—**Leaves** usually pinnate-nerved.

Stamens 8. 21. **Memecylon.**

1. **Osbeckia,** Linn.

Herbs or shrubs, mostly erect and setose; branches commonly tetragonous. **Leaves** opposite or sometimes ternate, entire, subcoriaceous, 3–7-nerved. **Flowers** terminal, solitary capitate or paniced, purple mauve or white, often bracteate. **Calyx-tube** ovoid, carrying stellate hairs or pectinate scales; limb 5– or 4-fid, usually stellately hairy (in *O. aspera* and *O. Rheedii* with simple hairs). **Petals** 5–4. **Stamens** 10 or 8, equal or subequal; anthers oblong, truncate attenuate or beaked; connective not produced at the base, slightly swollen or with two tubercles. **Ovary** inferior, 4–5-celled, more or less adherent to the calyx, setose at the apex; style long, simple; ovules very numerous on placentas radiating from the axis. **Capsule** opening by 4–5 pores in its free vertex. **Seeds** very many, curved through half a circle, covered with minute elevated points.—**Distrib.** An eminently Indian genus; 29 out of the 32 species being found in India, two in Malaya, one in Australia; and one Indian species extending also to China and North Australia.
[With regard to the following generally accepted sections of Osbeckia founded primarily on the 4-fid or 5-fid flowers it should be premised that several Osbeckias which have the flowers normally 4-fid carry also a few 5-fid flowers on the same plant; and that sometimes a strong plant may produce all or nearly all the flowers 5-fid. This occurs eminently in O. crinita and in O. cupularis.]


1. O. truncata, Don ms.; W. & A. Prodr. 322; hairs on the stem patent, flowers capitate often with two or four leaves close under the head, bristles on the apex of the ovary 10–20, fruit $\frac{1}{5}$ in. broad 8-ribbed ovoid-oblong. Wight. Ic. t. 375; Triana in Trans. Linn. Soc. xxviii. 53. O. muralis, Naund. in Ann. Sc. Nat. Ser. 3. xiv. 56. O. Leschenaultiana, Dalz. & Gibs. Bomb. Fl. 92. O. zeylanica, Steud. in Herb. Hohenack. No. 577.

Throughout the Deccan Peninsula, alt. 0–4000 ft.; extending plentifully to Chota Nagpore. East Bengal, Mudhopoor; C. B. Clarke.

Stems 4–16 in., annual, 4-angled. Leaves 1 in., elliptic, subacute, 3-nerved, hairy on both surfaces, drying yellow; petiole $\frac{1}{2}$ in. Bracts ovate or oblong, glabrous on their backs. Calyx-tube and teeth with stalked stellate hairs; teeth erect, subpersistent. Petals less than $\frac{1}{4}$ in. purple. Capsule occasionally 5-celled.

Var. Kurzii; plant scarcely 2 in. with very small leaves and flowers, capsule ovoid ribs altogether obscure.—Parasnath Summit, Behar, alt. 4200 ft.; Kurz.

2. O. cupularis, Don ms.; W. & A. Prodr. 323; flowers subcapitate often with two or four leaves close under the head sometimes more lax, bristles on the apex of the ovary very numerous, fruit rarely less than $\frac{1}{4}$ in. broad obscurely many-ribbed ovoid. Naund. in Ann. Sc. Nat. ser. 3. xiv. 61; Triana in Trans. Linn. Soc. xxviii. 55. O. brachystemon, Naund. l. c. 57 and xiii. t. 7, f. 1; Triana l. c. 63. O. truncata, Arn. in Hook. Comp. Bot. Mag. ii. 308; Naund. l. c. 57. O. confragiflora, Naund. l. c. 59. O. Leschenaultiana, Wight Ic. t. 906; Thwaites Enum. 104 partly; not of DC. O. Wightiana, Benth. in Wall. Cat. 4074 (not in Wall. Cat. 4069).

Mountains of the southern part of the Deccan Peninsula and of Ceylon; Wight No. 1148 and 1095 (and No. 1093 with 4-fid and 5-fid flowers). Mysore; Lobb. Bababoodan Hills; Law. Nilghiris; Hohenacker No. 963 (named O. Leschenaultiana). (Mergus! Herb. Griffith). Ceylon; Gardner.

Annual and biennial, drying yellow. Stems 8–20 in., tetragonal, glaucous upwards, with simple ascending often closely-adpressed hairs. Leaves 1–2 in., elliptic, subacute, 3- (or sub- 5-) nerved, hairy on both surfaces; petiole $\frac{1}{2}$–$\frac{1}{4}$ in. Bracts ovate or oblong, glabrous on their backs. Calyx-tube and teeth with stalked stellate hairs; teeth patent subpersistent. Petals $\frac{3}{3}$–$\frac{3}{4}$ in. dark-purple or nearly white.

Var. erythrocephala, Naund. in Ann. Sc. Nat. ser. 3. xiv. 58. O. Leschenaultiana, Thwaites Enum. 104.—Ceylon, alt. 6000 ft.; Thwaites No. 1576 and 284, Gardner, Walker.—Turns black in drying; stem below with deflexed hairs; stellate hairs about the inflorescence a rufous-brown; fruit sometimes large somewhat glaucous and slightly produced at the vertex; flowers in this variety seem always 4-fid.—Triana distinguishes (under the name O. cupularis) Wight’s No. 1093 which has sometimes 5-fid flowers, the stamens 8, 9 or 10, from Wight’s No. 1148 which he takes as O. brachystemon: but the two seem identical. Mr. Thwaites makes but one species here. Triana arranges the main sections of Osbeckia according as the flowers are 4-fid or 5-fid; he thus places O. cupularis in the 5-fid section at a great distance from O. brachystemon; then he says (under the head of O. Leschenaultiana) that O. cupularis has 4-fid flowers. O. Leschenaultiana is the name generally found in herbaria for this variable species, but Triana is right in saying that DC. meant by O. Leschenaultiana a very different plant.

**CEYLON**, Walker No. 332.

Small, woody, procumbent, with the habit of Thyme. *Leaves* \(\frac{1}{2}\) in., ovate-subacute, nearly sessile, shortly setose on both surfaces, drying black. *Calyx-tube* and teeth with stalked stellate rufous hairs; teeth suberect, subpersistent.—Mr. Thwaites treats this also as a var. of *O. cupularis*, and it has all the appearance of being an alpine form of that plant.

4. **O. Rheedii**, *Thwaites Enum.* p. 104; stiffly shrubby, scabrous, leaves rigid 3-nerved harshly scabrous on both surfaces or glabrous above, flowers 1–4 clustered, calyx-tube with adpressed simple hairs, teeth long-lanceolate with erect simple hairs.

**CEYLON**; *Wight, Walker, Thwaites*.

Small, woody, much branched. *Leaves* 1 in., elliptic or oblong, narrowed at both ends; petiole \(\frac{1}{3}\) in. *Petals* \(\frac{3}{8}\) in., pale purple. *Fruit* \(\frac{1}{2}\)–\(\frac{3}{4}\) in. broad, ovoid, truncate.—Mr. Thwaites states the flowers 4-fid, as they are in all the Kew examples; Triana puts the species in his section *Asterostoma* with 5-fid flowers without explanation. The plant differs from *Asterostoma* in the smaller flowers and (what is of more importance) in the anthers which are truncate at top and altogether those of section *Amblyanthera*.

**SECT. II. Genuinae.** Flowers normally 4-fid, not large. Calyx campanulate, not produced or produced into a short neck in the fruit. Anthers beaked.


**HIMALAYA TERAI** from KUMAO to BHOTAN, up to 4000 ft. alt. Abundant in NORTHERN and EAST BENGAL including ASSAM and KHASIA and thence to SINGAPORE. Also in CHOTA NAGPORN, alt 2000–4000 ft.—DISTR. Through China and Malaya to Japan and North Australia.

Stems 2 ft., branches descending, tetragonal, with adpressed hairs. Leaves commonly 2 in., narrow-oblong, sometimes 6 in., long-linear, in the Parasnath variety elliptic-oblong from a subcordate base, acute, 3–5-nerved, hairy on both surfaces; petiole less than \(\frac{1}{3}\) in. Bracts ovate, on the back glabrous or with a few scattered hairs. Calyx-teeth lanceolate, glabrous, not keeled on the back, ciliate on the margin; hairs at their tips not spreading stellate. Petals \(\frac{1}{2}\) in., mauve. Anthers with a beak about half their own length. Bristles on the apex of the ovary about 16. Fruit \(\frac{3}{4}\) in. wide (or much larger in the Parasnath variety), ovoid, with a short neck, often glabrous, sometimes with few or several bristles, calyx-limb never persistent; in the Pegu examples the neck is much prolonged widened at the top.—The figure *Bot. Mag.* t. 4026 rejected by Bentham and Triana, admitted by Naudin, is the true plant: the anther is drawn too long-beaked for *O. octandra* to which Triana refers it, and the accompanying text states the anthers to be "longish beaked"; also the plant is stated to
have been imported from China where *O. chinensis* is common, *O. octandra* unknown. Triana appears to have rejected the figure because it shows 5 petals; the accompanying text states the calyx to be 4-5-fid. Now there are several instances of normally 4-fid Osbeckias having some or many 5-fid flowers; but there is no recorded instance of a normally 5-fid Osbeckia producing 4-fid flowers. The *Bot. Reg.* t. 542 is an inferior figure, but from similar reasoning is probably *O. chinensis* also.


A perennial herb 8—20 in., branched from the base; branches tetragonal, with adpressed bristles. *Leaves* 1 in., hairy on both surfaces, 3-9-nerved, nerves deeply sunk on the upper surface in the dried specimens. *Bracts* ovate, acute, hairy on the back. *Calyx-tube* sometimes densely covered with clustered bristles, often with pectinate bristle-bearing scales at the apex only, sometimes even when young altogether glabrous. *Petals* ½ in., mauve. *Anthers* with a beak more than half their own length. Bristles on the apex of the *ovary* about 16. *Fruit* ovoid, ½ in. wide, often glabrous, sometimes more or less bristle-bearing; neck short, calyx-limb never persistent.


Tropical Deccan Peninsula, *Wight* No. 1143; Bababoodun Hills, Malabar; *Law. Ceylon; Thwaites.*

 Erect, annual, 3-15 in.; branches ascending, tetragonal, with adpressed bristles or nearly glabrous. *Leaves* ½—1 in., hairy on both surfaces. *Bracts* very narrow. *Calyx-segments* keeled on their backs, often setose, ciliate on the margin, with stellate prominently-spreading bristles at their tips. *Petals* ½ in., purple-mauve. *Anthers* with a beak more than half their own length. Bristles on the apex of the *ovary* about 16. *Fruit* ½—1½ in. broad, ovoid-oblong, calyx-limb deciduous.

*Var. Helferi*; neck of fruit more produced upwards with 8 ribs, pectinate scales on the lower half of the fruit placed in three whorls encircling it horizontally.—Tennasserim and Amadans, *Helfer.* *Wallich, No. 4069 partly.*—*O. zeylanica* is united with *O. chinensis* Linn. by Kurz in *Journ. As. Soc. 1877*, pt. ii. 74.

**SECT. III. Ceramicalyx.** Shrubs or stout herbs. Perianth normally 4-merous. *Calyx* campanulate produced in fruit into a long or short neck or altogether truncate. *Anthers* large, produced into a very long beak.


**Mysore; Wostara,** Cleghorn. Deccan Peninsula; Munda Rani, *Wight* No. 1100. Suffrutescent, erect; branches stout, tetragonal. *Leaves* 4—6 in., lanceolate, narrowed at both ends, with strong bristles scattered on both surfaces or in one specimen nearly glabrous, nerves 3 strong and 2—4 faint; petiole ½—¾ in. *Corymb* about 5-flowered; flowers dark crimson (Wight). *Calyx-tube* with scattered penicillate
bristle-bearing scales. *Anthers* with a beak much longer than half their length, with two tubercles at the base. Bristles on the apex of the ovary more than 50. *Fruit* \(\frac{4}{5}\) in. broad, urn-shaped, entirely without neck; scales permanent, calyx-segments deciduous.


**Himalaya Terai from Kumaon to Bhotan**, common; ascending the hills to 5000 ft. alt. *Chittagong*; *Roxburgh*.—**Distr. Canton.**

Shrub 4–6 ft.; branches tetragonal. *Leaves* 3 in., lanceolate, 5-nerved, with short hairs on both surfaces or in hot moist valleys glabrous, narrowed or subcordate at the base; petiole \(\frac{3}{5}\) in. *Flowers* large, rose-purple, clustered or in somewhat close corymbs; bracts ovate, acute, not very hairy on the back. Calyx-tube so densely clothed with hairs as to have a woolly appearance and texture. Bristles on the apex of the ovary about 20. *Fruit* \(\frac{3}{5}\) by \(\frac{4}{5}\) in. including the short neck, ovoid-oblong, densely woolly.—Don's description of *O. stellata* says the flowers are 4–5-fid; as 5-fid flowers are not known in our *O. stellata* but are frequent in our *O. crinita*, Don probably included under one name both our species. Naudin's descriptions of *O. stellata* and *O. crinita* only differ in assigning the long-necked fruit to *O. stellata*; therefore Naudin's *O. stellata* is our *O. crinita*. As Triana gives no descriptions or remarks, but quotes both Wall. Cat. 4062 and Naudin's *O. stellata* as one species, it cannot be guessed which of the two forms Triana took as *O. stellata*. The real distinction between *O. crinita* and *O. stellata* lies in the extreme thick wooliness of the covering of the calyx-tube in our *O. stellata*; consequently Sir J. Smith has written on the original Wall. Cat. 4062 (type spec.) "Osbeckia? nov. sp. (crinita)." Sir W. J. Hooker states (Exot. Fl. i. c.) that he changed the name from *O. crinita* to *O. stellata* and got Don to accept the name *O. stellata*. Subsequently Mr. Bentham gave the name *O. crinita* to the next species which has a less hairy calyx.


Shrub 4–8 ft., much branched. *Leaves* 2–4 in., lanceolate or elliptic-lanceolate, bristly on both surfaces, narrowed or subcordate at the base; petiole \(\frac{5}{4}\) in. *Flowers* large (generally smaller than those of *O. stellata*), 4-fid and not infrequently 5-fid, purple or pure white, in somewhat close corymbs; bracts ovate, acute, usually very hairy on the back. Bristles on the apex of the ovary about 20. *Fruit* \(\frac{4}{5}\) in. including the neck, ovoid, suddenly narrowed into the cylindrical neck, often nearly glabrous.—The bushes of *O. crinita* at Darjeeling have usually a few 5-fid flowers at the summits of the branches: and there is a large-flowered white variety at 4000 ft. alt. which has all the flowers 5-fid. *O. speciosa*, Herb. Hook. (not Don) is a low-level form with spreading hairs on the stem but the stellate hairs of the calyx white or yellow not rufous.

In the swamps at the foot of the Himalaya, from NIPAL to BURMA; abundant in NORTH and EAST BENGAL including ASSAM at 500–1000 ft. alt.; and (ex J. D. H.) ascends the hills to 4000 ft. alt.

Erect, 4–8 ft., virgate, hardly divided except towards the corymb. Leaves 3–8 in., 5-nerved, often in whorls of three, broadly lanceolate, glabrous or with long hairs scattered on both surfaces; petiole ½-1 in. Corymb often with elongated branches; bracts ovate, glabrous or little hairy. Calyx when young glabrous or somewhat densely stellate hairy. Petals rose-purple. Bristles on the apex of the ovary 0 or about 20. Fruit ½ in., generally glabrous finally, sometimes with scattered stellate hairs.—A species easily recognised by its habitat (Terai- or rice-swamps), its erect undivided stem and its rose-purple flowers. It varies greatly in hairiness.

VAR. 1. pulchella, Benth.; stem leaves calyx and apex of ovary absolutely glabrous.

VAR. 2. longicollis, Wall.; stem with hispid patent scattered bristles, leaves bristy-hairy on both surfaces, young calyx somewhat densely stellate-hairy, fruit with scattered stellate hairs.

VAR. 3. O. marginulata, Wall. Cat. 4064; stem and capsule with ascending hairs.

—Burma.

SECT. IV. A shrub. Perianth large 4-merous. Anthers without beaks.

12. O. gracilis, Bedd. in Trans. Linn. Soc. xxv. 216; erect, slender, nearly glabrous, leaves 2½–3 in. narrow lanceolate 3-nerved bristle-hairy on both surfaces, petiole ½-1 in., peduncles with 2–3 large flowers, calyx-tube with a few remote bristles lobes ciliate ended by a bunch of bristles, anthers without beaks. (Resembling O. longicollis Wallich i.e. O. rostrata above).

DECCAN PENINSULA; Anamallay Mts.; alt. 4000 ft., Col. Beddome.

This species (only known from Col. Beddome's description here copied) is referred by Triana (Trans. Linn. Soc. xxvii. 54) to his section Ceramicalyx, which has very long beaks to the anthers. Col. Beddome's plant seems really nearer O. octandra DC. below.


[The series of species following from No. 12 to No. 19 inclusive is quite unbroken: the flowers, anthers, fruit and hairs on the ovary are much the same in all. The species are separated by minute or trifling characters only; Triana makes more than the following eight, Thwaites less, out of the same material.]


CEYLON, alt. 6000–8000 ft.; Walker, Gardner, Thwaites.

Small, woody, branched; branches and innovations rufous shaggy. Flowers 1–3, clustered at the end of the branches. Fruit campanulate, truncate, rufous-hairy.

VAR. 1. typica; hairs on the calyx-tube with a long stem standing at right angles to the surface of the tube very stellate.

VAR. 2. minor, Thwaites No. 2618; hairs on the calyx-tube simple villous adpressed, flowers smaller than in the type.

**Deccan Peninsula; Wight. Ceylon; at no great elevation, Thwaites.**

A low shrub, woody below; branches often elongate, adpressedly scabrous. **Leaves** 1-2 in.; petiole \( \frac{1}{3} \) in. *Corymb* usually 3-6-flowered. *Calyx-lobes* much longer than broad. **Fruit** \( \frac{1}{4} \) in. broad, campanulate, truncate.—Triana founded his new sp. *O. minor* on Mr. Thwaites’ No. 1569; and does not state in what particulars the species differs from *O. aspera*, *O. Kleini* and *O. glauca*; but they must be very minute.

**Var. 1. typica; no stellate hairs on the calyx.**

**Var. 2. Kleini; several or very few stellate hairs on the calyx-tube, hairs at the summits of calyx-lobes clustered but hardly stellate.**

15. **O. glauca**, Benth. in *Wall. Cat.* 4073; leaves elliptic narrowed or obtuse at either end softly hairy on both surfaces, calyx-tube with scattered small stellate hairs teeth \( \frac{1}{12} \) in. obtuse glabrous on the back ciliate with one stellate hair at the summit. *Triana in Trans. Linn. Soc. xxviii*. 54. *O. aspera*, *Bot. Mag.* 5085.

**Trincomalee, Travancore, Quilon are the localities on the examples of Wall. Cat. 4073.**

Small, woody, branching; branches adpressedly hairy, glaucous upwards. **Leaves** 1-1 1/2 in.; petiole \( \frac{1}{3} \) in. *Calyx-lobes* much broader than long. **Fruit** \( \frac{1}{4} \) in. broad, campanulate, truncate.—With larger flowers and more silky hairs than *O. aspera*. 105


**Ceylon; alt. 6000-8000 ft.; Walker, Gardner, Thwaites No. 1571.**

A small shrub; branches hispid. **Leaves** 1 in., 3-nerved; petiole \( \frac{1}{3} \) in. *Flowers* 1-3, in terminal clusters. *Calyx-tube* with small clustered substellate hairs. **Fruit** \( \frac{1}{4} \) in. broad, campanulate, truncate.—This species is close to *O. buxifolia*, *Arn.* from which it differs by the petioled leaves without recurved margins, and by the adpressed hairs on calyx-tube. But Thwaites’ specimen No 2618 has leaves with recurved margins and adpressed hairs on the calyx-tube; and is called *O. buxifolia* *B. minor* by Thwaites, *O. Walkeri* *B. Bechetii* by Triana.

17. **O. Wightiana**, Bent.h. in *Wall. Cat.* 4060; silkily hairy towards the ends of the branches, leaves 5-7-nerved softly hairy on both surfaces elliptic or oblong usually acute, flowers 1-5 clustered, calyx-tube densely covered with pectinate scales fringed by long bristles, teeth \( \frac{1}{3} \) in. ovate-oblong obtuse covered with simple or somewhat clustered hairs. *W. & A. Prodr.* 323; *Wight Ic. 908; Naud. in Ann. Sc. Nat. ser. 3. xiv. 63; *Triana in Trans. Linn. Soc. xxviii*. 54.

**Deccan Peninsula, Southern Mountains. Ceylon, alt. 3000-5000 ft., Thwaites (No. 1570 var. *A*).**
A branched shrub. Leaves 1½-3½ in.; petiole ¼-½ in. Fruit ½ in. wide, campanulate, truncate._United by Mr. Thwaites with O. aspera above, from which it differs by the more pectinate-scaly calyx, and hardly by any other character.

18. **O. Leschenaultiana**, DC. Prodr. iii. 142; flowers 1–5 clustered with much rufous hair, leaves subsessile ovate obtuse or elliptic acute usually somewhat rounded at the base, calyx-tube densely clothed with stalked stellate rufous hairs teeth ½ in. oblong obtuse with clustered bristles. _Triana in Trans. Linn. Soc._ xxviii. 54. O. Gardneriana, _Wight_ t.c. 997.

Nilghiri Mts., alt. 6000–8000 ft., frequent.

A branched shrub; stem usually patently hairy. Leaves 1–1½ in., 3–5-nerved, hairy on both surfaces. Fruit ½ in. wide, campanulate, truncate.


_Ceylon:_ Wight, Walker, Gardner.

A branched shrub. Leaves 1–2 in., usually rounded at the base. Calyx-teeth ¼ in. Fruit ½ in. wide, campanulate, truncate._—Triana reduces here _O. elliptica_, Naud. i. c.; but Naudin says his _O. elliptica_ has short triangular calyx-teeth: while _O. rubicunda_ only exists as a species upon its lanceolate acute calyx-teeth. Thwaites is probably right in referring _O. elliptica_ Naud. to _O. cupularis var. erythrocephala_ above.

20. **O. reticulata**, Bedd. in Trans. Linn. Soc. xxv. 216; branches densely clothed with adpressed hairs, leaves ovate acute petioled densely hairy on both surfaces and also alveolate-reticulate beneath, flowers 1–3 clustered, calyx-tube with large densely clustered bunches of hairs teeth short oblong obtuse densely ciliate scabrous and with a large terminal substellate hair. _O. alveolata_, Bedd. _t.c. 168.

_Deccan Peninsula_; Anamallay Mts., above 6000 ft. alt.; _Col._ Beddome.

A branched shrub. Leaves 1–4 in., round or subcordate at the base, 5–9-nerved; petiole ½–1 in. Fruit ½ in. broad, campanulate, truncate.


_Ceylon_; Colombo and Saffragam District; somewhat rare, Thwaites.

Stems elongate, roundish, with scattered lax hairs. Leaves 1–3 in., broad-elliptic, acute, 5-nerved, hairy on both surfaces; petiole ¼–¼ in. Peduncles ½–1½ in., solitary or few and subumbellated, carrying small round or ovate bracts. Calyx-tube densely clothed with stalked stellate hairs standing at right angles to the surface. Fruit less than ¼ in. broad, campanulate or somewhat ovoid, truncate.


_Tenasserim or Andamans_, Helfer No. 2244.

Leaves elliptic-lanceolate, rounded at the base, 5–9-nerved, hairy on both surfaces. Bracts lanceolate, caducous. Calyx-tube with scattered adpressed simple
hairs and a few compound hairs near the top, teeth long-lanceolate with simple hairs on the back. *Ovary* crowned with many long bristles. *Petals* ½ in. *Fruit* ½ in.

23. **O. octandra**, DC. *Prodr.* iii. 142 ex *Triana*; branches and branchlets woody, leaves oblong to lanceolate short-petioled 3-nerved sparingly scabrous or quite smooth on the upper surface, flowers scattered or 2–5 shortly pedicelled, calyx-teeth ovate-oblong, fruit scarcely ½ in. broad obscurely ribbed or smooth sometimes with scattered stellate hairs. *Triana in Trans. Linn. Soc.* xxviii. 54 excl. nearly all syn. O. virgata, W. & A. *Prodr.* 323; Thwaites *Enum.* p. 105; *Naud. in Ann. Sc. Nat. ser.* 3. xiv. p. 61. O. polyccephala, *Naud. l. c.* 67. O. Wightiana, *Benth. in Wall. Cat.* 4074. [Of the figures quoted by *Triana, Bot. Mag.* 2235 and Wight *IC.* 908 do not refer to the present plant; *Bot. Mag.* 4026 has been referred above to *O. chinensis*; and *Wight IC.* 376 may represent our var. *major* but does not give any idea of the typical *O. octandra*, DC.]

**South Deccan Peninsula** in and near the mountains; plentiful. **Ceylon**, up to 3000 ft. alt.; *Thwaites*. Branches subquadrangular with adpressed hairs, or woody nearly round and glabrous. *Leaves* (in the typical *O. octandra*) not more than 1 in.; petiole ½ in. *Calyx-tube* with scattered stellate hairs, teeth usually ciliate and with one stellate terminal bristle, sometimes perfectly glabrous.—This typical woody small-leaved shrub appears very distinct, but even the small-leaved branches carry sometimes large leaves also; and it thus graduates into—

**Var. major**; leaves larger often 2 in. frequently hairy on the upper surface often whitened beneath, heads flowers and fruit larger than in the type. O. virgata, *Wight IC.* t. 376.—This variety is confounded by many authors with *O. cupularis*; but it differs in the perianth being more constantly 5-merous, and in its anthers which are not truncate nor suddenly narrowed into a very short beak, but gradually narrowed upward. It has also been mixed with *O. aspera*, but differs by the ovary having much fewer bristles on the top.

24. **O. nutans**, *Wall. Cat.* 4068; leaves narrowly lanceolate 3-nerved glabrous striolate above scabrous on the nerves beneath, flowers in small clusters, calyx-tube nearly glabrous with pectinate scales between the bases of the calyx-teeth, calyx-teeth large broad lanceolate glabrous ciliate on margin hairy at the vertex, fruit often nodding. *Triana in Trans. Linn. Soc.* xxviii. 54.

**Subtropical Himalaya** from Sikkim eastwards, alt. 500–2500 ft., frequent to the upper end of *Assam*; also on the northern base of the *Khasia* Mts.

A woody branching small shrub. *Leaves* commonly 1½ by ¾ in.; petiole ½ in. *Flowers* mauve-purple, not very large. *Fruit* ½ in. broad, campanulate, truncate.

25. **O. Wynaadensis**, C. B. Clarke; stems with adpressed short hairs, leaves 5 in. oblong-lanceolar petiole ¼ in., flowers in subterminal corymbs, calyx-tube with scattered flat setigerous scales otherwise glabrous teeth large broad-lanceolate glabrous shortly ciliate.

**Deccan Peninsula**, *Wight No.* 1099; Wynaad, alt. 4000 ft.; C. B. Clarke.

*Leaves* 5-nerved, scabrous-hairy on both surfaces. *Fruit* ½ in. broad, ovoid, truncate, the free part of the ovary with a ring of short hairs (joined at their base into a narrow tube) near its top, otherwise glabrous.

26. **O. nepalensis**, *Hook. Fl. Exot.* t. 31; leaves 3–4 in. elongate oblong-lanceolate 5-nerved softly hairy on both surfaces petiole less than ½ in., flowers in small rather close corymbs, calyx-tube with large flat scales fringed with bristles of which 5 prominently alternate with the calyx-teeth, calyx-teeth large broad-lanceolate glabrous ciliate. *DC. Prodr.* iii. 142; *Wall. Cat.* 4061;
2. OTANTHERA, Blume.

Shrubs. Leaves subcoriaceous, entire, 3–5-nerved. Panicles small, terminal and subterminal. Calyx-tube ovoid, carrying pectinate scales or simple hairs or subglabrous; teeth 5–6, deciduous. Petals 5–6, ovate. Stamens 10–12, alternate slightly longer; anthers opening by one pore at the summit, not beaked; connective not produced at the base, augmented by two auricles which are close to the anthers in the shorter stamens a little removed below them in the longer. Ovary half-inferior, apex carrying bristles, 5–6-celled; style filiform, simple; ovules very numerous, placentas axile, radiating. Fruit a berry. Seeds very many, curved through half a circle, minutely punctate.—Distrib. Species 2 or 3, extending from Burma to Singapore, Malaya, the Philippines and North Australia.

Otanthera comes between Osbeckia and Melastoma: the alternate stamens being auricled at the base exactly on the plan of those in Melastoma, but in a much less degree.


Mergui; Griffith (Kew Distrib. No. 2253).—Distrib. Moluccas; Sierra Leone (Triana).


[O. braeetata, Korth. has the calyx-tube covered with long simple approximated ascending bristles, the broad bracts on the pedicels several close together subsistent: otherwise it is much like O. moluccana. Kurz in For. Fl. i. 502 and in Journ. As. Soc. 1877, pt. ii. 75, says O. braeetata, Korth, is not unfrequent in Tenasserim. But Griffith’s Mergui plant is clearly O. cyanoides Triana as appears from examples named by Triana’s hand, while Kurz quotes Triana for O. braeetata.]


Nicobars; collected by the Novara expedition and communicated by them to the Buitenzorg Botanic Garden; Kurz (Journ. As. Soc. 1876, pt. ii. 131).

A low shrub; branches tetragonal, subglabrous, but hairy at the nodes. Leaves ½–3 in. ovate or oblong-ovate, acuminated, rounded at the base, 5-nerved, shortly strigose on both surfaces; petiole ¼ in. Petals 5, purple. Stamens subequal, anthers with two auricles added at the base.—Not seen.
EXCLUDED SPECIES.

O. rubro-limbata (Lachnophodium rubro-limbatum, Blume) is figured by Link & Otto, Il. Pl. Sel. t. 41, as a plant raised in European gardens from the “East Indies.” It is more likely from Malaya than India, and Mr. Bentham in Fl. Austral. iii. 292 thinks it probably identical with Otanthera bracteata.

O. Kotigueda, Naud. in Ann. Sc. Nat. ser. 3. xiv. 64, is reduced to O. Wightiana by Triana; but Naudin describes its calyx-teeth short.

3. MELASTOMA, Linn.

Strigose or villous shrubs. Leaves petioled, oblong or lanceolate, entire, 3-7-nerved. Flowers terminal, solitary clustered or panicked, showy, purple, 5-(rarely 6-7-) merous. Calyx-tube with simple (rarely with penicillate) hairs, lobes deciduous. Petals equal in number to the calyx-lobes. Stamens twice as many as the petals, very unequal, alternate longer ones with purple anthers having the connective long-produced at base and terminating in two lobes, the shorter ones having yellow anthers the connective not produced but with two tubercles in front. Ovary more or less united to the calyx-tube, 5-(rarely 6-7-) celled, apex bearing bristles; style filiform, simple; ovules very numerous, placenta axile, radiating. Fruit coriaceous or somewhat berried, bursting irregularly. Seeds minute, very many, curved through half a circle, minutely punctate.—Distrib. Species 40 or 8 in South-East Asia and its islands, extending to North Australia and Polynesia.

* Hairs closely adpressed at their base to the calyx-tube.

1. M. malabathricum, Linn.; DC. Prodr. iii. 145; stems with short dense hairs adpressed or spreading, leaves with adpressed scabrous hairs above, scabrous on the nerves beneath and shortly hairy or nearly glabrous between them, bracts large elliptic narrowed into a stalk generally enclosing the buds, scaly hairs on the calyx-tube flat lanceolate, calyx-teeth long (or very long) ovate-lanceolate to narrow-lanceolate, glabrous within or with a few short hairs near the tip only. Roxb. Hort Beng. 33; Fl. Ind. ii. 405; Wall. Cat. 4040; Bot. Reg. t. 672; W. & A. Prodr. 324; Wight Ill. t. 95; Dalz. & Gibbs. Bomb. Fl. 92; Naud. in Ann. Sc. Nat. ser. 3, xiii. 285; Thwaites Enum. 106 (a. and β.); Kurz For. Fl. i. 503, not of Miqu. Fl. Ind. Bat. i. pt. i. 507. ? M. obvolutum, Jack in Trans. Linn. Soc. xiv. 3. Trembleya rhinanthera, Griff. Notul. iv. 677, cf. Kurz in Flora, 1871, p. 289.

Throughout India very abundant, from sea-level up to 6000 ft. alt. “Indian Rhododendron” of the English denizens. Not towards the Indian Desert.—Distrib. Not found out of India: i.e. the above description has been narrowed to the Indian typical plant which is not found in Malaya, etc.

A spreading shrub 6 ft. Leaves 3-4 in., broad-lanceolate; petiole ½ in. Flowers 1-5, clustered, mauve-purple. Fruit ¼ in. wide, short-ovoid, truncate, becoming pulpy within. Calyx-teeth often ¾ in., not shorter than the tube.—Mr. Bentham in Fl. Austral. iii. 293 proposes to include 24 species of Naudin under M. malabathricum, Linn.

Var. adpressum, Wall. Cat. 4081; leaves narrow-lanceolate smaller than in M. malabathricum with a rigid more harshly scabrid pubescence. M. anoplanthum Naud. in Ann. Sc. Nat. ser. vol. xiii. 277.—Mergui to Singapore, and in Penang. The Java plant under this name in the Kew Herbarium is as different from Wall. Cat. 4081 as is any Melastoma in this section.

2. M. polyanthum, Blume in Mus. Bot. i. 52, t. 6; stems with short dense hairs adpressed or spreading, leaves with short hairs above adpressed or
subpatent, with short often soft hairs between the nerves beneath, bracts lanceolate or lanceolate-ovate much smaller than the buds and early deciduous, scaly hairs on the calyx-tube flat lanceolate, calyx-teeth triangular acute glabrous within shorter than the tube and often (O. brachyodon, Naud.) very short. 


4. M. imbricatum, Wall. Cat. 4047; stem densely clothed with adpressed ovate obtuse scales, leaves beneath with very small scabrous hairs, scales on the calyx-tube flat ovate acute, calyx-teeth ovate acuminate hairy within half-way down, fruit ovoid the margin at the top somewhat dilated. Triana in Trans. Linn. Soc. xxviii. 60, but the syn. M. fasciculare Naud. is doubtful.

5. M. sanguineum, Sims in Bot. Mag. t. 2241; stem with scattered long harsh patent hairs, leaves glabrous above scabrous beneath on the nerves and minutely hairy between them or nearly glabrous, calyx-teeth linear-lanceolate. DC. Prodr. iii. 145; Don in Mem. Wern. Soc. iv. 289; Miqu. Fl. Ind. Bat. i. pt. i. 504; Naud. in Ann. Sc. Nat. ser. 3. xiii. 281. M. decemfidum, Jack in Trans. Linn. Soc. xiv. 6; Roxb. Fl. Ind. ii. 406; Wall. Cat. 4042; DC. Prodr. iii. 146; Naud. l. c. 282; Kurz in Journ. As. Soc. 1877, pt. ii. 75.

PEGU, Kurz. Tenasserim or Andamans; Helfer (Kew Distrib. No. 2241). Leaves 4-5 in., broad-lanceolate; petiole 1-3 in. Flowers clustered. Hairs on calyx-tube 1/2 in.—This species is essentially like M. sanguineum, but the indumentum of the stem and branches is of a widely different character: as to the leaves, the indumentum of M. sanguineum var. molle is exactly half-way between that of M. sanguineum and M. Houtteanum.

DOUBTFUL SPECIES.

As to the numerous species of Melastoma admitted by Triana in Trans. Linn. Soc. xxviii. 59, 60 as native in India, the names M. triflorum, Naud.; ellipticum, Naud.; microphyllum, Naud.; lanuginosum, Blume; Rogenii, Blume; longifolium, Naud. are not found in the Kew collection. So far indeed from multiplying species out of the existing material, it would be better to reduce the whole of the Indian forms to three, viz., M. malabatricum (including M. polyanthum and M. imbricatum); M. normale; and M. sanguineum (including M. Houtteanum).

As to the 13 species of Melastoma described by Roxburgh, the first eight are octandrous; the next two have been admitted; the last two are outside the limits of the present Flora.

M. FINDLAYSONII, Wall. Cat. 4041, has not the place of collection given, and it is doubtful whether it was found within the limits of the Flora Indica. The Wallichian example shows the leaves and fruit, which might be those of Osbeckia Leschenaultiana above described; but Triana (assuming probably that had the stamens been all similar Wallich would have named it Osbeckia and not Melastoma) has called it Dissotis Findlaysonii.

M. CURVA, Roxb. Fl. Ind. ii. 406. “Shrubby, all the tender parts strigose, leaves petioled ovate-cordate 5-7-nerved finely serrulate, panicles terminal subeorymbiform supra-decompound, flowers 10-androus, petals cordate ciliate.”—Chittagong. Neither figure nor specimen is known: the description is too short for safe identification.

4. OXYSPORA, DC.

Large spreading shrubs with drooping branches terminated by large, lax, almost naked panicles of rose-purple flowers. Leaves opposite, long-petioled, large, 5-7-nerved, ovate, acuminate, uppermost pair below the panicle often sessile much smaller and subcordate at base. Panicle long; sometimes narrow; branches decussate; bracts very small. Calyx-tube ovate-cylindric; teeth 4, short, triangular. Petals 4, subacute. Stamens 8, of which 4 are purple with longer filaments, 4 are yellow; anthers narrowed upwards, at top opening by one pore, produced at base, connective with or without appendage. Ovary inferior, 4-celled, apex glabrous; style simple, elongate; ovules very many, placentas axile, radiating. Capsule dry, elliptic, elongate, with 8 ribs. Seeds very many, falcate; raphé lateral, produced at top in front into a point.—Distrib. Species 4, whereof 3 are in East Bengal, 1 in Sumatra.

1. O. paniculata, DC. Prodr. iii. 123; branchlets panicles and nerves of the leaves beneath with some stellate pubescence, capsule long-elliptic very little narrowed below the calyx-mouth, seeds with a sharp right angle at the top of the back and a produced angular point at the top in front. Wall. Pl. As. Rar. t. 88; DC. Mem. Melast. t. 4 (not correct as to the base of the connective); Wall. Cat. 4076; Mig. Fl. Ind. Bat. i. pt. i. p. 556. O. vagans, Bot. Mag. t. 4553; Lemaire Jard. Pl. t. 79. Arthrostemma paniculatum, Don in Mem. Wern. Soc. iv. 299; Prodr. 222 (partly). Melastoma rugosa, Roxb. MS.

SUBTROPICAL and TEMPERATE HIMALYA, from NEPAL to BHOTAN; alt. 3000-7000 ft. KHASIA MTS.; alt. 3000-5000 ft., common. Abundant in the interior of Sikkim covering the hill sides.
Leaves 4–5 in. (in some examples attaining 14\(\frac{1}{2}\) in.), ovate, acute; petiole 1–2 in., at its apex are some rough bristles. Longer stamens with the anther-cells diverging below the truncate base of the connective where the filament is attached. Fruit \(\frac{3}{8}\) by \(\frac{3}{4}\) in.

2. **O. vagans**, Wall. Cat. 4075, partly; branchlets petioles and nerves of the leaves beneath with some scattered patent villous hairs, capsule elliptic prominently narrowed below the enlarged calyx-mouth, seeds blunt-headed with a sharp right angle at the top of the back and a very short point at the top in front. O. vagans, var. a. Wall. Pl. As. Rav. p. 78; Triana in Trans. Linn. Soc. xxviii. 73; Kurz For. Fl. i. 505. Melastoma vagans, Roxb. Hort. Beng. 33; Fl. Ind. ii. 404. Homocentria vagans, Naud. in Ann. Sc. Nat. ser. 3. xv. 308.

**Mishmee; Griffith. Khasia Mts., alt. 1000–3000 ft., common. CHITTAGONG; Roxburgh.**

A rather smaller shrub than the preceding with the panicle generally more slender. Longer stamens with the anther-cells slightly produced at the base, connective having added to its base a linear spur.—Wall. Cat. 4075 contains some *O. paniculata* not any *O. cernua*.


**Mishmee; Griffith (Kew Distrib. No. 2262); CHITTAGONG, alt. 0–1000 ft.; H. f. & T.**

A shrub, generally resembling *O. paniculata*. Leaves commonly 6 in., attaining 12\(\frac{1}{2}\) in. in some examples; petiole 2 in. Rachis of the panicle somewhat sharply quadrangular at the base, but cannot be said to be 4-winged in any of the specimens at Kew (as Roxburgh states it to be). Longer stamens with the anther-cells shortly produced and diverging below the truncate base of the connective where the filament is attached.

5. **KENDRICKIA, Hook. f.**

A climber, ascending to the top of the highest trees, when in blossom ting- ing the forest red. Leaves opposite, petioled, oblong or obovate, obtuse, fleshy. Flowers terminal, in few-flowered umbels or solitary, large; peduncles stout, 2-bracteolate. Calyx urn-shaped, rose-purple; limb shortly 4-toothed, greenish. Petals 4, fleshy, a fine red. Stamens 8, equal; anthers at the attenuated summit opening by one pore, at the base shortly produced, connective having a horn about \(\frac{2}{3}\) in. at the base. Ovary inferior, 4–6-celled; style simple, filiform; ovules very many, placentas axile, fleshy. Capsule globose, 1-celled by absorption of the septa, opening at the apex by 4–6 valves. Seeds very many, minute, prismatic.


**ANAMALAYS; Col. Beddome. Ceylon, alt. 3000–5000 ft.; Wight; Walker; Gard- ner, Thwaites.**

Stems in their lower part creeping up trees like ivy, hence flattened with the leaves
distichous; at the summits spreading pendent with leaves on both sides. Leaves 1–2 in., narrowed at the base, minutely furfuraceous or nearly glabrous, 3-nerved from the base with two additional nerves from the midrib much higher up; petiole 1 in. Petals 2 in.—“One of the most beautiful of Ceylon plants” (Thwaites).


Shrubs, tall or short. Leaves opposite, long-petioled, large, lanceolate ovate or orbicular, 15-nerved, glabrous or nearly so. Panicles terminal, compound, with small flowers in clustered whorls. Calyx-tube funnel-shaped or campanulate, limb of 4 very short lobes. Petals 4, rose or white, small. Stamens 8, nearly equal; anthers attenuated at the top with one pore, cells long-produced and diverging at their bases; connective without appendage. Ovary 3- (rarely 4-) celled enclosed by but nearly free from the calyx-tube; style filiform, simple; ovules very many, placentas axile, 2-fid. Capsule small, dry, urn-shaped or subcylindric, ribbed, opening at the top by 3–4 valves. Seeds very many, narrowly obtrapezoidal.—**Distr.** Species 5: whereof 4 are from the Malay Peninsula and its attached islands; 1 from Canton.

1. **A. exigua**, Blume in Flora, 1831, p. 526; leaves lanceolate or ovate-lanceolate not cordate at the very base, petioles in fruit not more than ½ in., fruit ovoid 3-celled prominently 6-ribbed contracted at the top below the permanent calyx-rim. Naud. in Ann. Sc. Nat. ser. 3. xv. 310; Triana in Trans. Linn. Soc. xxviii. 74. Melastoma exigua, Jack in Trans. Linn. Soc. xiv. 10; DC. Prodr. iii. 149; Wall. Cat. 4048.

**Pensang** and **Malacca**; Wallich, Griffith, &c.—**Distr.** Philippines.

A tall shrub, nearly glabrous. Leaves often 9–10 in.; petiole 1–3 in. Panicle minutely rusty-pubescent; bracts 1–1⅓ in., lanceolate or narrow-spathulate. Calyx-tube most minutely hairy. Ripe fruit 1⅔ in. broad.

2. **A. umbellulata**, Hook. f. ms.; Triana in Trans. Linn. Soc. xxviii. 74; leaves lanceolate or elliptic-lanceolate often cordate at the very base, pedicels umbellulate in bud ½ in. and more. Kurz For. Fl. i. 506.

**Tenasserim** or **Andamans**; Holfer (Kew Distrib. No. 2260).

Shrub 10 ft. (Holfer); nearly glabrous except the panicle which is minutely pubescent and much more lax than that of **A. exigua**. Flowers larger than those of **A. exigua**. Calyx-tube in the young flowers funnel-shaped rather than campanulate; teeth more prominent. Fruit unknown.

3. **A. Griffithii**, Hook. f. MS.; Triana in Trans. Linn. Soc. xxviii. 74; leaves round obtuse cordate at the base, panicle elongate with small distant whorls which are shortly corymbose rather than umbelliferous or clustered.

**Malacca**, Griffith, Walker, Maingay No. 775.

Almost stemless; rootstock woody. Leaves 5–6 in. long and more broad, glabrous or slightly puberulous beneath. Panicle about 12 in., rusty-pubescent. Calyx-tube campanulate, minutely hairy. Fruit unknown.

4. **A. hispida**, Kurz in Flora, 1871, 290; petioles thick 5 in. hispid bristly, leaves 8–9 in. ovate 9-ribbed sparsely bristly above more densely beneath especially on the nerves, panicles glabrous or with bristles at the divisions, pedicels slender about ⅙ in. so that the flowers are in subsessile clusters, calyx-tube 4-ribbed carrying some long bristles short campanulate with minute teeth, ovary adnate to the calyx near the base only.

**Burma**, Martaban; Dr. Brandis (Kurz).

Not seen: the above is copied from Kurz.
7. BLASTUS, Lour.

A shrub with round branches. Leaves opposite, petiolated, oblong-lanceolate, 3-5-nerved. Flowers very small, in axillary clusters; peduncles short, without bracts. Calyx-tube oblong, puberulous, limb shortly 4-lobed. Petals 4. Stamens 4, equal; anthers attenuate at the top, opening by one pore, cells produced and diverging at their bases; connective without appendage. Ovary inferior, 4-celled, puberulous at the apex; style filiform, simple; ovules very many, placentas axile, paired. Capsule small, obscurely 4-furrowed, opening at the summit by four pores. Seeds very many, raphe long, testa long-linear, produced at each end much beyond the small oblong nucleus.


Assam; Masters. East Bengal (prob. North-East Assam); Griffith.—Distrib. Hongkong and Formosa.

A shrub 6 ft., glabrous, innovations minutely puberulous. Leaves 3-4 in., lanceolate or elliptic-lanceolate; petiole ¼-½ in. Peduncles in fruit ¼ in. or less. Fruit less than ½ in. broad.

8. OCHTHOCHARIS, Blume.

Small erect glabrous shrubs, branches round. Leaves opposite, petiolated, oblong or lanceolate, 3-5-nerved, minutely denticulate-serrulate. Flowers minute in axillary clustered cymes, rarely in axillary and terminal lax cymes. Calyx-tube ovate, smooth; teeth 5, small, persistent. Petals 5. Stamens 10, equal; anthers oblong, obtuse at the top opening with one pore, at the base shortly produced; connective without appendage. Ovary inferior, 5-celled, glabrous at the apex; style simple, filiform; ovules very many, placentas axile. Capsule globose, 5-valved, enclosed by the membranous calyx-tube. Seeds very many, irregularly club-shaped.—Distrib. Species 4 or 5, extending from Singapore to Borneo.


Singapore; Wallich.—Distrib. Malaya.

Branches quadrangular, nearly glabrous, becoming minutely rusty towards the panicle. Leaves attaining 5 in. by 2, lanceolate, 5-nerved, glabrous or minutely rusty on the nerves; petiole ⅙ in. Panicle 1½ by 1½ in., rusty puberulous, short-peduncled; branches opposite, supported by small linear bracts ⅛-⅜ in., the ultimate pedicels ⅛-⅜ in. Calyx-tube campanulate, nearly glabrous; teeth 5, minute. Petals 5, ⅜ in., ovate, subacute, rose-purple. Fruit (not ripe) ⅝ in. diam. subglobose.


A small shrub, 2–3 ft. Leaves 2½ in., lanceolate or narrow lanceolate, narrowed at both ends, sparsely minutely bristle-serrate; petiole ¼ in. Fruit ½ in. diam., sub-globose.—The closely allied Malayan species have the cross secondary nerves very conspicuous; by which they differ from the present fleshy seashore plant.


Large villous shrubs; branches round. Leaves petioled, ovate or lanceolate, entire, 5–7-nerved, with scattered hairs above, villous beneath. Flowers minute (in very small axillary clusters in the Indian species). Calyx-tube campanulate, densely hairy; lobes 4, very small. Petals 4, minute, glabrous. Stamens 8, equal; anthers attenuate at the top, opening with one pore, scarcely produced at the base; connective with or without a short spur. Ovary nearly free, 4-celled; style filiform, simple; ovules many. Capsule opening by 4 large pores at the summit. Seeds exceedingly minute, cuneate-ovoid.—Distrib. Species 3; Tenasserim coast, Mergui and Sumatra.


   **Mergui**; *Griffith, Helfer* (Kew Distrib. No. 2304).

   Leaves 6 by 4 in.; petiole 2 in. Clusters of flowers ½ in. Fruit ½ in., ellipsoid.

2. **A. Griffithii**, Hook. f.; *Triana in Trans. Linn. Soc. xxviii. 75*; branches densely clothed with brown soft spreading and deflexed hairs, midrib of the leaves beneath densely clothed with similar patent hairs, calyx-tube with somewhat spreading hairs. *Kurz For. Fl.* i. 507.

   **Mergui**; *Griffith* (Kew Distrib. No. 2304).

   Exactly as the preceding species except as to the small differences in the indumentum above stated. Probably will be found to be a variety only when more material is obtained.


Herbs, sometimes woody at the base, nearly always small, many stemless. Leaves opposite, equal or unequal, from round to linear, entire or serrulate, 3–5-nerved. Flowers in racemes or scorpoid spikes, mostly red. Calyx-tube campanulate or long-funnel-shaped; teeth 3, short. Petals 3, acute or obtuse. Stamens 3 (in *S. obliqua* 6), equal; anthers obtuse or attenuate at the top, cells at the base shortly divaricate; connective without appendage. Ovary inferior, 3-celled, glabrous at the apex; style simple, filiform; ovules many, placentas axile. Capsule obovoid, trigonous, elongate funnel-shaped, or campanulate, opening at the top by 3 valves. Seeds very many, smooth or covered by glandular points or small tubercles, ovoid or ellipsoid; raphé simple or running out into a lateral appendage, sometimes overtopping the seed.—Distrib. Species 58; 45 tropical Indian and Malayan, and 1 in South China.

**Section A.** Stamens 3. (To Species 42.)

* Anthers short, truncate or acute at the top.

† Species not of Ceylon or the South Deccan Peninsula.

**VOL. II.**
1. **S. tenera**, Royle Ill. 215, t. 45; stem 2-4 in. erect little-divided, pedicels 0-½ in., anthers short oblong truncate nearly narrowed at the top. *Wall. Cat. 4098 partly.*

**Subtropical Western Himalaya**, Royle, Edgeworth. Chota Nagpore, alt. 1000-2000 ft., abundant; C. B. Clarke.

Stem weak, sometimes winged, puberulous or minutely pubescent. Leaves ½-2 in., ovate, nearly entire, equal or unequal, with a few scattered lax hairs; petiole less than ½ in. *Calyx-tube* puberulous and with a few scattered lax hairs; teeth (at time of flowering) ovate, acute, as long as broad. *Petals* ½ in., ovate, acute, rose-purple. *Capsule* nearly 2 in., trigonous, elongate funnel-shaped, ribs between the angles very obscure, often narrowed at the base so as to be subessisile. *Seeds* ovoid, smooth; raphe not excurrent.—Wallich has distributed with Royle's *S. tenera*, a Tavoy plant, *S. stricta*, and Royle has not detected the error. The pubescence of the stem as given in the figure of Royle is very unlike nature. Triana has named Royle's original specimen "potius *S. brachyandra*, Naud." a Manilla species, and has made Edgeworth's specimen and some Khasian ones of *S. stricta* the type of *S. tenera*.

2. **S. stricta**, Hook. in *Bot. Mag.* t. 4394; stem 3-7 in. erect often branched, pedicels in fruit often nearly ½ in., anthers ovate much narrowed at the top.

**Khasia Mts., alt. 3000-4000 ft., plentiful. Pegu to Tenasserim, frequent.**

Stem more or less puberulo-pubescent, and also with long lax spreading hairs. Leaves ½-1 in., lanceolate or elliptic, narrowed at each end, with scattered lax hairs. *Calyx-tube* puberulous and with a few scattered lax hairs, teeth broader than long. *Petals* ½-2 in., obovate, rose-purple. *Capsule* 2 in., trigonous, elongate funnel-shaped, ribs between the angles very obscure. *Seeds* ovoid, smooth; raphe not excurrent.—The type of this species is *S. burmannica* *Wall. Cat. 4098*, but the striking form *S. stricta* was first published and the name must therefore be maintained. The true *S. Rottleri* Wall. is a Courtallum species and widely different, but Wallich seems in hand-and-eye distribution to have mixed the present species with it.

**Var. typica**; leaves with a few denticulations, uppermost sometimes in whorls of 4, often purplish beneath.—Moulmein; *Lobb No. 347; Parish, No. 427.*


†† Species of Ceylon and the South Deccan Peninsula.

Ceylon, alt. 6000 ft.; Thwaites, Walker.

Stems 4-12 in. with many spreading branches. Leaves 2-3 in., ovate or narrow-oblong, acute, denticulate, with a few scattered hairs above otherwise glabrous; petiole 0-1 in. Calyx-tube glabrous or with a few lax hairs. Petals ½ in., purple or white, ovate, acute. Capsule about as long as its pedicel. Seeds with minute glandular elevated points, raphe excurrent but hardly overtopping the seed.—S. zeylanica is only separated from S. rostrata and S. affinis by the authors, which (as above stated) are usually ½-2 in. long in S. zeylanica while in S. affinis they are usually ½ in. In those cases where the anthers of an authentic example of S. zeylanica are actually longer than those of some examples of S. affinis, we endeavour to fall back on the degree and nature of the attenuation of the anthers, which should be acute in S. zeylanica, acuminate in S. affinis. The var. pumila is more distinct from S. zeylanica than are S. rostrata and S. affinis. Triana has placed Thwaites’ numbered specimens of these species under various others.

Var. pumila, Thwaites Enum. 109 (sp.); anthers short-oblong very truncate.

Var. Walkeri; seed without elevated points, excurrent raphe very much overtopping the seed, being exactly over the top of the seed like a cap.—Perhaps a species. Ceylon; Walker.


Ceylon; Saffragam, Thwaites.

Branched, 10 in. high. Leaves ovate and ovate-oblong, minutely denticulate, with a few scattered hairs above, slightly pubescent beneath. Petals ½ in., ovate, acute, white or pale rose. Pedicels as long as or longer than the capsule.

6. S. Brunonis, W. & A. Prodr. 321; stem a foot high somewhat stout branched nearly glabrous, leaves oblong-lanceolate longitudinally 5-7-nerved from near the base with very rarely one or two fainter nerves from the midrib higher up. Wight Ill. 94, 1c. t. 1050.

South Deccan Peninsula; Courtallum; Wight No. 1142. Ceylon, Newera Ellia; Thwaites.

Stems 4-angled. Leaves 1½-2½ in., with a few scattered hairs above and microscopic puberulous dots beneath; petiole ½-1½ in. Petals ½ in., mauve-purple, ovate acute. Capsules ½ in., narrow-funnel-shaped, with six thick ribs, longer than the pedicels, clustered on the shortened racemes. Seed obovoid with glandular elevated points, raphe not excurrent.—The present species is exceedingly like S. versicolor or S. axillaris, but (as Wight observes) may always be recognised by the longitudinal nervation of the leaves.

7. S. pedunculosa, Thwaites Enum. 109; stem 3-10 in. weak rooting at the nodes, peduncles quasi-terminal very long, capsule ¾-1 in. funnel-shaped subtrigonomously obscurely 6-ribbed usually shorter than the pedicel. Triana in Trans. Linn. Soc. xxviii. 75. S. Rottleri, Wall. Cat. 4007, partly.

Travancore, Quilon; Wight No. 1111. Ceylon; tropical; Thwaites.

Stems and peduncles glabrous or pubescent. Leaves 1-2½ in., ovate or oblong, minutely serrulate, sparsely pilose above minutely dotted beneath; petiole ½-1½ in. Peduncles 2-6-flowered. Calyx-tube glabrous or with a few scattered hairs. Petals ½ in., ovate, acute, reddish. Seeds with elevated points, raphe much excurrent on the side near the top.

S. S. Arnottiana, Thwaites Enum. p. 108; stem 12 in. high round branched upwards at least rufous-villous, petioles nerves of the leaves beneath
and peduncles with brown-red hairs, capsule $\frac{1}{6}$ in. broadly funnel-shaped trigonous 6-ribbed somewhat scabrous usually longer than the pedicel. Bedd. \textit{Pl. Ind. Or.} t. 300.

\textbf{Ceylon,} alt. 6000 ft.; \textit{Thwaites.}

\textit{Leaves} nearly 2 by $\frac{2}{3}$ in., oblong or ovate, with 3-5 longitudinal nerves, nearly glabrous or with few scattered hairs above, minutely serrulate; petiole $\frac{1}{3}-\frac{3}{4}$ in. \textit{Calyx-tube} with lax spreading hairs. \textit{Petals} $\frac{1}{3}$ in., ovate, acute, purple. \textit{Seeds} covered with elevated points, raphe excurrent the whole length of the seed.

\textbf{Var. tenella,} Beddome in Trans. Linn. Soc. xxv. 217; stem leaves petioles and calyx-tube nearly glabrous.—A Namalalles; alt. 3000 ft., Beddome. Stated by Col. Beddome to be allied to \textit{S. Arnottiana}, \textit{Thwaites}, and reduced to it by Triana in \textit{Trans. Linn. Soc.} xxviii. 75. The examples communicated by Col. Beddome to Kew do not show fruit but seem the same as \textit{S. Brunonis}; they differ considerably in their glabrousness from \textit{S. Arnottiana}.

9. \textit{S. Wightiana,} \textit{Arn. in Hook. Comp. Bot. Mag.} ii. 307; stem attaining 15 in. round branched very brown-villous, petioles nerves of the leaves beneath and peduncles with brown or yellow hair, capsule $\frac{1}{4}$ in. funnel-shaped trigonous 6-ribbed scabrous usually shorter than the pedicel. \textit{Triana in Trans. Linn. Soc.} xxviii. 75.

\textbf{Ceylon:} Adam's Peak; \textit{Thwaites.}

\textit{Leaves} $\frac{3}{4}-1\frac{1}{2}$ in., elliptic or oblong, with 3-5 longitudinal nerves, serrulate, with scattered scabrous hairs often on both surfaces; petiole often 1 in. \textit{Calyx-tube} with lax spreading hairs. \textit{Petals} $\frac{3}{4}$ in., purple, ovate, acute. \textit{Anthers} ovate-oblong, obtuse. \textit{Seeds} covered with elevated points, raphe scarcely excurrent.—This species only slightly differs from \textit{S. Arnottiana} by its greater hairiness, its rather larger flowers, and more elongate capsule.

10. \textit{S. Hookeriana,} \textit{Arn. in Hook. Comp. Bot. Mag.} ii. 308; stem attaining 10 in. round branched and petioles and peduncles with red villous tomentum, leaves with scattered hairs on both surfaces, nerves beneath with spreading dense red or yellow hairs, capsule $\frac{1}{5}$ in. funnel-shaped trigonous 6-ribbed scarcely scabrous usually longer than the pedicel. \textit{Naud. in Ann. Soc. Nat. ser. 3. xv. 321; Triana in Trans. Linn. Soc.} xxviii. 75.

\textbf{Ceylon.} Adam's Peak; Walker, \textit{Thwaites No.} 173 and 426 partly.

\textit{Leaves} $\frac{4}{6}-1\frac{1}{2}$ in., ovate or oblong, with 3-5 longitudinal nerves, serrulate; petiole $\frac{1}{3}-\frac{3}{8}$ in. \textit{Calyx-tube} with many spreading rufous hairs. \textit{Petals} $\frac{3}{4}$ in., ovate, acute (pale?). \textit{Anthers} ovate-oblong, obtuse. \textit{Seeds} with subtubercular raised points, raphe much excurrent near the top of the seed.

11. \textit{S. Gardneri,} \textit{Thwaites Enum.} p. 107; stem 12 in. round rufous-villous, leaves ovate from a broad base short-petioled, petals $\frac{1}{4}-\frac{3}{6}$ in. broad-elliptic, capsule $\frac{1}{4}$ in. ovoid trigonous slightly scabrous and hispid usually longer than the pedicel. \textit{Triana in Trans. Linn. Soc.} xxviii. 75; Bedd. \textit{Pl. Ind. Or.} t. 298.

\textbf{Ceylon,} alt. 5000 ft.; Horton Plains, \textit{Thwaites.}

\textit{Leaves} $\frac{4}{3}-1$ in., minutely serrate with scattered hairs on both surfaces, nerves beneath rufous-villous; petiole $\frac{3}{4}-\frac{3}{4}$ in. \textit{Peduncles} short and with the \textit{calyx-tube} rufous-villous. \textit{Petals} mauve-purple. \textit{Anthers} ovate-oblong, obtuse. \textit{Seeds} subtuberculate with raised points, raphe elongated both above and below the seed.—This species is well separated from the preceding species by its ovoid not funnel-shaped capsule.

\textbf{Var. firma,} \textit{Triana l. c.;} leaves sessile. \textit{S. firma,} \textit{Thwaites ms.—Ceylon,} alt. 5000 ft., Central Province at Wattabelle; \textit{Thwaites No.} 3873.—The example of this communicated by Mr. \textit{Thwaites} to Kew is in flower and does not show fruit. It seems exactly \textit{S. Gardneri} except as to the sessile leaves, but the fruit may prove it to be something quite different.
**Anthers long attenuated or acuminate upwards.

† Plants with distinct stems, the leaves of each pair not very unequal.

§ Species of Ceylon and the South Deccan Peninsula.


Branches ascending, round, with harsh or soft hairs. Leaves 1/2 in., nearly entire. Calyx-tube with many spreading hairs. Petals 1/2 in., elliptic, acute, purple. Anthers attenuated, long. Capsules 3–6 to the raceme, nearly sessile. Seeds with raised points, raphe excurrent on one side near the top.

Var. *glabricaudis*, *Thwaites* ms.; stem 4-angular nearly glabrous, leaves sessile nearly glabrous beneath.—Ceylon; at Boputalanda, Central Provinces, *Thwaites* No. 3955.

13. *S. Harveyi*, *Thwaites* Enum. 107; stem 18 in. erect with ascending quadrangular branches nearly glabrous, calyx-tube glabrous, anthers subacuminate but much shorter and less attenuate than in *S. robusta*.

*Ceylon*, Central Province, alt. 6000–7000 ft.; *Thwaites* No. 2974.

Leaves 6 in., rhomboid-oblong, unequal-sided, obtuse or subcordate at the base, glabrous on both surfaces, denticulate; petiole about 1/2 in. Racemes short. Petals 1/2 in., elliptic, acute, purple.—*Triana in Trans. Linn. Soc. xxviii. 76* has erroneously called this species *S. Hartwegi*, and altered the naming of *Thwaites’* examples so as to confuse it with No. 12 *S. robusta*.


*Ceylon*, Central Province, alt. 4000 ft.; *Thwaites*; *Gardner, Walker*.

Leaves 6 in. (sometimes much smaller), thin, sparsely pilose above, minutely glandular-dotted and sometimes thinly hairy beneath; petiole 6 in. Calyx-tube nearly glabrous, or with a few lax hairs. Petals 6 in., ovate, acute, mauve. Anthers oblong, attenuated upwards. Seeds with raised points, raphe excurrent on one side near the top.—See the remarks under No. 4 *S. zeylanica*.

Var. *rostrata*, *Thwaites* Enum. 108 (sp.); anthers more attenuated, leaves less serrated, flowers usually a deeper colour.—Ceylon, alt. 1000–2000 ft.; *Thwaites* No. 2644.

15. *S. rhombifolia*, *Thwaites* Enum. 108; glabrous, stem 1–2 ft., leaves rhomboid narrowed at both ends crenate-serrate, capsule 3 1/2 in. funnel-shaped trigonous 6-ribbed about as long as the pedicel.

*Ceylon*; at no great elevation, *Thwaites*.

Leaves 1 in. 3-nerved the lateral nerves near the margin, minutely glandular-punctate; petiole 3 1/2 in. Petals 3 1/2 in., purple-mauve. Seeds with raised points, raphe excurrent on one side near the top.

16. *S. amabilis*, *Triana in Trans. Linn. Soc. xxviii. 76*; branches woody round with scattered ascending bristly hairs, leaves oblong petioled 3-nerved subentire with scattered bristly hairs on both surfaces, capsule 3/2 in. funnel-shaped or somewhat campanulate trigonous 6-ribbed smooth.
SOUTHern DeCCAN PeninsuLA. Timivelly, alt. 2000 ft.; Col. Beddome.

Leaves 1½ in. narrowed to each end, obtuse; petiole ½ in. Racemes 3-6-flowered, crowded. Calyx-tube with few lax hairs. Petals ⅔-⅔ in., mauve. Anthers long, much attenuate.—Mr. Kurz had published a very different species as Sonerila amabilis, namely, S. Kurzii (No. 38).

17. S. travancorica, Bedd. IC. Pl. Ind. Or. t. 156; branches stout round adpressly villous, leaves elliptic acute subentire pinnate-nerved with many long brown hairs on both surfaces, capsule ⅓ in. subcampanulate trigonous 6-ribbed smooth longer than the pedicel. **Triana in Trans. Linn. Soc. xxviii. 76.**

Travancore, alt. 4000 ft.; Col. Beddome.

Leaves 1½-3 in., acute but scarcely acuminate, glandular-dotted, shaggy on the nerves beneath; petiole ⅛-⅓ in. Racemes 3-9-flowered, short, pedicels with few scattered hairs. Calyx-tube glabrous or sparsely pilose. Petals ⅔-⅔ in., mauve, elliptic, acute. Anthers oblong, much attenuated upwards. Seed with raised points, raphe excurrent on one side near the top.

18. S. hirsutula, Arn. in Hook. Comp. Bot. Mag. ii. 307; branches with spreading rufous hairs, leaves ovate or oblong subentire with many long brown hairs on both surfaces glandular-dotted and shaggy on the nerves beneath, calyx-tube with many lax patent rufous brown hairs. **Thwaites Enum. p. 108; Triana in Trans. Linn. Soc. xxviii. 76.**

Ceylon, Central Province, alt. 6000-7000 ft.; Walker, Thwaites No. 276.

Stem 1-2 ft. high, erect; branches round with four lines. Leaves 1-3 in., 5-nerved from near the rounded or cordate base or imperfectly pinnate-nerved; petiole often 2 in. Racemes short-peduncled, about 4-flowered. Petals ⅔ in., elliptic, acute, mauve. Anthers greatly elongate. Capsule ⅓-⅓ in., subcampanulate, strongly 6-ribbed, longer than the pedicel.—This species is very near S. travancorica; it differs by the patent (not adpressed) hairs on the stem, and the broad or cordate (not acute) base of the leaves.

19. S. pilosula, Thwaites Enum. p. 108; leaves ovate-lanceolate pinnate-nerved with short hairs over both surfaces very unequal at the base, calyx-tube with many short patent hairs, petals ⅔ in. purple-red. **Triana in Trans. Linn. Soc. xxviii. 76.**

Ceylon, Walker; Saffragam District, alt. 1000-2000 ft., Thwaites.

Stem 6-18 in. round, striated, with many short patent hairs. Leaves 2-3½ in., entire, somewhat acuminate; petiole 1-2½ in. Racemes short, 6-12-flowered. Anthers much elongate. Capsule funnel-shaped, 6-ribbed (Thwaites).—This species is marked by the very unequal base of the leaves; one side of the blade being often continued for ⅔ in. along the petiole. Perhaps a form of No. 22 S. elegans.

20. S. speciosa, Zenk. Pl. Ind. 18, t. 18; stem nearly or quite glabrous below ending in a long peduncle villous upwards, leaves 5-9-nerved from the base, petals ⅔ in. mauve round-elliptic acute, capsule ⅔ in. hispid oblong trigonous from a subcampanulate base. **Zenk. in Ann. Sc. Nat. ser. 1. vi. 151; Bot. Mag. t. 5026; Wight Ic. t. 905-2; Triana in Trans. Linn. Soc. xxviii. 76.**


Hills of the South Deccan Peninsula, frequent: Nilgiris, Wight; Mysore, T. Lobb; Courtallam, Wight; &c.

Stems attaining 9-12 in., upper half often naked. Leaves 2-3 in., ovate or elliptic.
acute, glabrous or nearly so, denticulate or subserrate; petiole 1–2 in. Raceme often subpaniculate with 8–14 flowers and very hisrate. Calyx-tube generally with much lax brown hair. Anthers shortly beaked. Capsule definitely but lightly 6-ribbed, erect, usually longer than its pedicel. Seeds with raised points; raphe large, excurrent, like a hood near the top of the seed on one side.


22. S. elegans, Wight 1o. t. 905–3; leaves pinnate-nerved with a very few scattered hairs above nearly or quite glabrous beneath, raceme pubescent, pedicel and calyx-tube hairy, capsule finally with its pedicel stiffly scabrous.

*Nilghiris*, Sispara; Wight No. 1109 partly, McIvor. Suffrutescent; branches glabrous or with few scattered hairs. Leaves 2–4 in., elliptic-lanceolate from a rounded base, minutely serrulate, sometimes purpuraceous beneath; petiole 1–2 in. Racemes lateral and terminal, long-peduncled. Petals ¾ in., light mauve. Capsule ¾ in., erect, funnel-shaped, trigonous, rather obscurely 6-ribbed, longer than its pedicel. Seeds with prominent raised points, raphe much excurrent near the top on one side.—This has been confused with the next species by Triana (Trans. Linn. Soc. xxvii. 76) and in Herbaria. It decisively differs by the very scabrous ripe capsules: also the indumentum of the leaves is different, and the peduncle longer. *S. pilosula* Thwaites (No. 19) may be a form of this with more pubescent leaves.

23. S. versicolor, Wight 1o. t. 1057; leaves pinnate-nerved with scattered hairs on both surfaces, raceme nearly glabrous, pedicel and calyx-tube glabrous, capsule finally quite glabrous. *S. axillaris*, Wight. 1o. t. 1058.

*Nilghiris*; Wight; Gardner, &c. Mysore, T. Lobb. Suffrutescent, branches pubescent. Leaves 2–4 in., elliptic-lanceolate from a rounded base, finely serrulate, sometimes purpuraceous beneath, hairs above sometimes with vesicular bases (giving the leaves a spotted appearance); petiole 1–3 in. Racemes terminal and many lateral. Petals ¾ in., mauve. Capsule ¾–1 in., erect, in crowded clusters, narrowly funnel-shaped or almost oblong, rather obscurely 6-ribbed, longer than the pedicel. Seeds with prominent raised points, raphe excurrent near the top on one side.—*S. axillaris* Wight is exactly the same plant the axillary racemes being placed alternately up the stem on short peduncles with some regularity. *S. pilosula* (No. 19) differs by its hairy racemes and calyx-tube. In both *S. versicolor* and *S. elegans* the leaves are more or less unequal at the base.

24. S. lanceolata, Thwaites Enum. p. 107; leaves sessile long-lanceolate from a rounded base glabrous, capsules 3–4 in. clustered glabrous oblong somewhat funnel-shaped distinctly 6-ribbed longer than the pedicel. Triana in Trans. Linn. Soc. xxviii. 76; Bedd. 1o. Pl. Ind. Or. t. 209.

Ceylon, alt. 1000 ft., Walker, Thwaites. Suffrutescent; branches round, glabrous. Leaves 2–3 in., 3-nerved from the base distantly serrulate upwards; petiole less than ¾ in. Petals ¾ in., mauve, broad elliptic, acute. Anthers not much attenuated. Seeds smooth or nearly so; raphe large, hooded, excurrent the whole length of the seed.
25. **S. angustata**, *Triana in Trans. Linn. Soc. xxviii. 76*; glabrous, leaves narrowly lanceolate 1-nerved, capsule $\frac{1}{2}$ in. short funnel-shaped cernuous about equal in length to the pedicel. *S. rhombifolia* *B. angustata*, *Thwaites ms.*

**Ceylon**; District Gallee, *Thwaites No. 2799* partly.

Stem 6 in.; branches wiry, subquadrangular. Leaves $1\frac{1}{2}$ by $\frac{1}{4}$ in., with remote shallow creatures upwards; petiole $\frac{1}{4}$ in.—The species is distinguished from No. 15 *S. rhombifolia* *Thwaites* by *Triana*, and the leaves appear very different. The specimen of *Thwaites* has no flowers.

§§ *Species of the Transgangetic Peninsula.*


Leaves $\frac{3}{2}$–2 in., unequal, often pilose above; petiole $\frac{1}{2}$–$\frac{1}{4}$ in. *Anthers* oblong, attenuated. Capsule $\frac{1}{2}$–$\frac{1}{4}$ in., trigonous, shorter than its pedicel, mouth $\frac{1}{2}$–$\frac{3}{4}$ in. broad. Seeds with raised points, raphe excurrent on one side near the top.

27. **S. linearis**, *Hook. f. ms.; Triana in Trans. Linn. Soc. xxviii. 76*; nearly glabrous, leaves linear-spathulate sessile minutely distantly toothed or subentire, capsule $\frac{1}{4}$ in. campanulate narrow-cylindric glabrous faintly 6-ribbed longer than the pedicel. *Kurz in Journ. As. Soc. 1877*, pt. ii. 78.

**Moulmein**, on Mount Gerai, alt. 3000 ft., *T. Lob*, *No. 345, 425*.

Very erect, 15 in., with small round branches. Leaves 1 by $\frac{1}{16}$ in. *Racemes* terminal, 2–4-flowered. Calyx-tube minutely puberulous. Petals $\frac{1}{4}$ in., mauve. *Anthers* slender, attenuated upwards.


**Mergui**, *Griffith*; Moulmein, *T. Lob*, *Parish.—Distr. Sumatra.*

Stem 4–8 in., little divided, pubescent or submentose upwards. Leaves 1–4 in., nearly glabrous, pubescent on the nerves beneath, usually none of the nerve quite basal and 2–3 nerves high up the midrib, blotched white or not along the midrib above; petiole $\frac{1}{2}$–$\frac{3}{4}$ in. Capsule (ex Korthals) funnel-shaped, trigonous, sparsely pilose. Seeds with raised points, raphe very excurrent, hooded.

Var. **Lobii**; stem very rusty tomentose, leaves small scarcely 1 in.—*Top of Thongyene, Moulmein, alt. 4000 ft.; T. Lob*.

29. **S. secunda**, *R. Br. in Wall. Cat. 4004*; stem weak pubescent simple, leaves elliptic acute pinnate-nerved, peduncle capsules and pedicels glabrous, capsule $\frac{1}{4}$ in. funnel-shaped subtrigonous as long as the pedicel, ribs not prominent. *Benn. Pl. Jav. Rav. 216*; *Triana in Trans. Linn. Soc. xxviii. 76*; *Kurz in Journ. As. Soc. 1877*, pt. ii. 78.

**Tavoy**; *Wallich*.

Stem 2–4 in., with 4–5 large leaves approximated at its summit. Leaves 2–4$\frac{1}{2}$ in., minutely denticulate, with scattered long lax hairs on both surfaces, hairs some-
times vesicular at the base, sometimes blotched along the midrib above; petiole \(\frac{1}{2} - \frac{3}{4}\) in. Peduncle terminal, 2-3 in. Flowers not seen.

### Species of Bengal.

30. *S. squarrosa*, Wall. in Roxb. Fl. Ind. ed. Carey & Wall. i. 182; stem 2-4 in. little divided thick, leaves crowded towards the upper part of the stem spathulate-lanceolate serrulate, petioleJointed on a tubercle of the stem which is supported on each side by rufous bristles, flowers racemose. *Wall. Cat. 4093, Pl. As. Rar. t. 102; Naud. in Ann. Sc. Nat. ser. 3. xv. 325; Triana in Trans. Linn. Soc. xxviii. 76.*

**Khasia Mts., alt. 3000-4000 ft.; frequent.**

Leaves \(\frac{3}{4} - 1\frac{1}{4}\) in., glabrous, attenuated into the petiole; stipules \(\frac{3}{4} - 1\) in. Racemes few-flowered; peduncles subterminal, short. **Calyx-tube** glabrous. **Petals** \(\frac{3}{4} - \frac{1}{2}\) in., ovate, acute, mauve. **Capsule** \(\frac{1}{2}\) in., glabrous, funnel-shaped, subtrigoneous, hardly ribbed, pedicel very short. **Seed** obovoid, without raised points, raphe not at all excurrent.

31. *S. arguta*, R. Br. in *Wall. Cat. 4095*; stems 0-2 in., leaves elongate spathulate, petiole jointed on a tubercle of the stem which is supported on each side by a rufous bristle, peduncle 1-flowered. *Naud. in Ann. Sc. Nat. ser. 3. xv. 326; Triana in Trans. Linn. Soc. xxviii. 76.*

**Khasia Mts., alt. 3000-4000 ft., Wallich, H. f. & T., C. B. Clarke.**

Leaves (including the petiole) 1-4 by \(\frac{3}{4} - \frac{1}{2}\) in., attenuated into the petiole, with scattered large hairs above or glabrous, 1-nerved, very minutely denticulate. **Peduncle** \(1\frac{1}{2} - 2\) in. **Calyx-tube** glabrous. **Petals** \(\frac{3}{4} - \frac{1}{2}\) in., mauve, elliptic, acute. **Capsule** \(\frac{1}{2}\) in., oblong, glabrous, subtrigoneous, ribs obscure. **Seed** obovoid, with minute raised points, raphe not excurrent.—One example collected by Sir J. D. Hooker has broadly lanceolate leaves, \(\frac{3}{4}\) in. broad, but agrees otherwise with the type.

32. *S. maculata*, Roxb. Fl. Ind. i. 177; stem short decumbent round often divided and with several lateral racemes, leaves pinnate-nerved ovate or lanceolate from a rounded or narrowed base ciliate scarcely serrulate usually with many long hairs on both surfaces sometimes nearly glabrous, peduncles not very long, capsules glabrous cuneiform in clusters of 5-15. *Wall. Cat. 4001; Triana in Trans. Linn. Soc. xxviii. 76; Kurz in Journ. As. Soc. 1877, pt. ii. 78.*


**NipaL; Wallich. Assam Hills and Khasia Mts., alt. 1000-5000 ft., plentiful. Martaban and Tenasserim, Kurz.**

Leaves often \(\frac{1}{2}\) by 2 in., frequently unequal at the base, sometimes appearing spotted above from vesicular-based hairs; petiole 1-2 in., usually ciliate and pubescent. **Calyx-tube** puberulous, and generally with a few scattered hairs. **Petals** mauve, elliptic, very acute. **Capsule** \(\frac{1}{2}\) in., oblong or somewhat funnel-shaped, slightly trigoneous, obscurely ribbed, much longer than the pedicel. **Seeds** with prominent raised points, raphe only slightly excurrent near the top of the seeds on one side.—*Wall. Cat. 4090 marked Sonerila angustifolia Roxb. is an Argostemma.*

†† Plants with distinct stems, the leaves of each pair exceedingly dissimilar.

33. *S. moluccana*, Roxb. Fl. Ind. i. 178; stem short hirsute, larger leaf of each pair 4-5 in. with a petiole of 1 in, the smaller one \(\frac{1}{2}\) in., capsule

PINANG; Wallich, Griffith, Maingay. MALACCA; Maingay. SINGAPORE; Wallich, Lobb.—Distrib. Malay.

Leaves ovate-lanceolate, very unequal at the base, pinnate-nerved, with much rufous or brown hair on both surfaces, ciliate, hardly serrulate. Calyx-tube very shaggy. Petals ⅛ in., elliptic, acute. Capsule less than ⅛ in., broad-campanulate, longer than its pedicel. Seeds almost epuncate, raphe very strongly excurrent near the top on one side.

+++ Stemless or almost stemless species (the stem sometimes elongate in S. Griffithii).

§ Capsule subhemispheric, i.e. short with the three angles obscure.


South Malabar Ghats. COCHIN, Johnston; ANAMALLAYS, Beddome; BABABOODUN HILLS, Law.

Leaves from ¼ to 5 in. often broad or cordate at the base sometimes acute, minutely denticulate or entire, usually puberulous and also with a few scattered hairs; petiole 0–2½ in. Peduncle 1–8 in.; flowers 3–17, crowded, subumbelled; pedicels glabrous. Petals ¼ in., elliptic, acute, mauve. Anthers not greatly elongate. Capsule ½–1 in. exclusive of the margin, shorter than the pedicel.

35. S. scapigera, Dalz. in Hook. Lond. Journ. Bot. vii. 672, t. 23; leaves served from near the base ovate or ovate-oblong, capsule campanulate glabrous crowned by a very narrow margin, seeds without raised points or excurrent raphe. Dalz. & Gibbs. Fl. 93; Triana in Trans. Linn. Soc. xxviii. 77.

BOMBAY GHATS, Dalzell; CONCAN and Bababoodun Hills, Law; MYSORE, Lobb.

Leaves commonly ½–1½ in., broad or cordate at the base, minutely crenate-serrate, glabrous, sometimes glandular puberulous dotted above; petiole often 2 in. Peduncle 1–3 in.; flowers 4–10, crowded, subumbellate; pedicels glabrous or nearly so. Petals ¼–⅓ in., elliptic, acute, mauve. Anthers much elongate. Capsule ½–1 in., shorter than the pedicel.—The peduncle pedicels and petioles frequently become succulent and much thickened. Generally resembling S. Wallichii and closely allied to it.

36. S. rotundifolia, Bedd. in Trans. Linn. Soc. xxv. 216; leaves orbicular or ovate served from near the base, peduncles 1–4-flowered, raceme glabrous or nearly so, capsule short hemispheric glabrous crowned by a narrow margin, seeds with raised large subtubercular points raphe not excurrent. Triana in Trans. Linn. Soc. xxviii. 77; Bedd. Ic. Pl. Ind. Or. t. 169.

SOUTH DECCAN; Anamallays, alt. 5000 ft.; Beddome.

37. **S. Kurzii**, C. B. Clarke; leaves orbicular nerved from the base, pedicels 3–5 with many patent hairs, capsule short (Kurz). *S. amabilis, Kurz in Flora, 1871, 200."

Sikkim; Rungait Valley, alt. 4000–5000 ft., Kurz; Runglee Valley, alt. 2000–3000 ft., Jaffrey.

Leaves \(\frac{3}{4}–\frac{3}{2}\) in. diam., with many long patent hairs, subentire, cordate at the base; petiole \(\frac{3}{4}–\frac{4}{5}\) in., with long patent hairs. *Peduncle* 1–2 in., with many patent hairs; pedicels crowded, subumbellated. *Petals* \(\frac{3}{4}\) in., broadly elliptic, obtuse, rose-mauve. *Anthers* narrower upwards, hardly acuminated.

**§§ Capsule oblong funnel-shaped, distinctly trigonous.**

38. **S. Griffithii**, C. B. Clarke; leaves glabrous minutely dotted puberulous beneath, capsule \(\frac{1}{2}\) in. funnel-shaped, pedicel nearly \(\frac{1}{2}\) in., seeds with very minute points raphe prominently excurrent on one side near the top.

Malacca, Mount Ophir; Griffith (Kew Distrib. No. 2300), T. Lobb, Maingoy No. 781.

Stemless, or the stem 1–2\(\frac{1}{2}\) in. **Leaves** \(\frac{3}{4}\)–1 in., ovate, glabrous or with scattered bristy hairs above, minutely denticulate, subciliate, nerves from near the base; petiole \(\frac{4}{5}–1\) in. *Peduncle* 1–4 in., 2–6-flowered; raceme short, glabrous or nearly so. *Petals* \(\frac{3}{4}\) in., broadly elliptic, acute. *Anthers* long, attenuate.

39. **S. nudiscapa**, Kurz in Journ. As. Soc. 1877, pt. ii. 78; leaves with flaccid scattered hairs beneath, capsule \(\frac{3}{8}\) in. narrow funnel-shaped, pedicel much shorter, seeds with very small minute raised points raphe scarcely excurrent.

Mergui; Griffith (Kew Distrib. No. 2303). **Tenasserim of Andamans, Helfer** (Kew Distrib. No. 2303).

Nearly stemless. **Leaves** 1–2 in., very thin, ovate or elliptic-oblong, obtuse, nearly entire, somewhat pinnate-nerved; petiole 0–\(\frac{3}{4}\) in. *Peduncle* 1–1\(\frac{1}{2}\) in., 3–8-flowered; raceme short, glabrous or nearly so. *Petals* \(\frac{1}{2}\) in., elliptic, acute. *Seeds* hardly half as large as in any other species.

40. **S. violæfolia**, Hook. f. ms.; Triana in Trans. Linn. Soc. xxviii. 77; glabrous, bundles of rufous bristles \(\frac{3}{4}–\frac{3}{2}\) in. about the base of the petioles, capsule \(\frac{3}{8}\) in. funnel-shaped usually shorter than the pedicel, seeds with minute raised points raphe not excurrent. *Kurz in Journ. As. Soc. 1877*, pt. ii. 78.

Moulmein; Lobb No. 356.

Stemless. **Leaves** 1–2 in., ovate, entire or minutely denticulate, 5-nerved, the upper two nerves often branching from the midrib at a point some way above its base; petiole \(\frac{3}{4}–2\frac{1}{2}\) in. *Peduncle* 1–3\(\frac{1}{2}\) in., 3–8-flowered. *Petals* \(\frac{1}{2}\) in., mauve, elliptic, acute. *In this and the next species the rufous bristles at the base of the petiole are exceedingly like those in *S. arguta* and *S. squarrosa*, but they are in numerous tufts (not 2 only and quasi-stipular as in those species) and the petiole is not jointed on a tubercle of a woody stem as in those species.*

41. **S. khasiana**, C. B. Clarke; bundles of rufous bristles \(\frac{3}{4}–1\) in. about the base of the petioles, leaves usually with scattered bristy hairs above, capsule \(\frac{3}{8}–\frac{3}{5}\) in. oblong shorter than the pedicel, seeds with minute dots raphe not excurrent.

Stemless. Leaves less than 1 in., ovate, often acute, entire, ciliate but scarcely serrate, 5-nerved from the base or the two upper nerves from the midrib; petiole ½-1½ in. Peduncle 1-2½ in., 1-4-flowered. petals ½ in., mauve, elliptic, acute. Anthers long, narrowed upwards but scarcely acuminate.—Near S. violæfolia, and possibly a hairy dwarf mountain form of it.

SECTION B. Stamens 6.

42. S. heterostemon, Naud. in Ann. Sc. Nat. ser. 3. xv. 326, xvi. t. 18, f. 4; glabrous or nearly so, leaves unequal, stamens 3 with longer filaments and purple anthers somewhat produced at base 3 with yellow anthers not produced, capsule broadly funnel-shaped sessile.

MALACCA; Griffith, Lobb, Cuming, Singapore; Maingay.—Distrib. Malaya. Stems attaining 18 in., much branched, with many lateral racemes. Leaves 2-4½ in., elliptic, acuminate or acute, broad often unequal at the base, entire, with 5-7 main longitudinal nerves; petiole ½-1½ in. Racemes on short peduncles, elongate in fruit, 10-20-flowered. Seeds with raised points, raphe excurrent the whole length of the seed. —The sessile broad funnel-shaped capsules readily distinguish this species. The leaves are sometimes puberulous subpubescent on the nerves, and sometimes show spots on the upper surface. This species is reduced to S. obliqua, Korth. Verh. Nat. Gesch. Bot. p. 250 by Triana and probably correctly; but S. obliqua Korth. is classed as triandrous by all who quote it: cf. Micr. Fl. Ind. Bot. i. pt. i. 563.

43. S. Bensoni, Hook. f. in Bot. Mag. t. 6049; glabrous below, peduncle upwards and raceme hairy, stamens equal, anthers all yellow not produced at the base.

Raised in London from seed sent from the Malabar Ghats by Col. Benson. This plant seems exactly S. speciosa (No. 20). The change of habitat and forcing in rich soil in an English stove may have developed the three stamens usually suppressed in the genus (?).

DOUBTFUL SPECIES.

S. HULLATA, Griff. Notul. iv. 675, from Malacca, is not identifiable. Triana (Trans. Linn. Soc. xxviii. 77) thinks it may be a Diessenia, but the terminal panicle points rather to Allomorpha.

S. GLABERRIMA, Arn. in Hook. Bot. Mag. ii. 307. The specimen thus named in Wight’s Herbarium is S. rhombifolia. We have seen no other.

S. HELFERI, C. B. Clarke; stem 8 in. branched woody round rusty-pubescent, leaves ½ in. elliptic acute entire 3-nerved from the base rusty shortly pubescent on both surfaces as is the petiole (½ in.), racemes lateral 2-4-flowered on peduncles less than ½ in., capsule ½-3 in. funnel-shaped subsessile nearly glabrous with triangular erect teeth.—Tenasserim or Andamans, Helfer (Kew Distrib. No. 2295).

S. MAGULATA; Rheed’s plant (Hort. Mal. lx. t. 65) usually referred to S. maculata is certainly not that plant; it may be No. 20 S. speciosa, Zenk.

11. SARCOPYRAMIS, Wall.

An erect glabrous herb; stem quadrangular. Leaves petioloed, ovate or lanceolate, serrulate, 3-nerved. Flowers in small clusters, pedicelled or nearly sessile, axillary and terminal, small, rose-purple. Calyx-tube glabrous, obpyramidal, 4-winged; limb very short, 4-toothed. Petals 4, ovate. Stamens 8, equal; anthers oblong, scarcely produced at the base, connective appendaged at the base with a spur. Ovary half-ovulate to the calyx, 4-celled; style filiform; ovules very many, placentas axile. Capsule crowned with four large scales,
opening by 4 valves at the top. Seeds numerous, obovoid, covered with prominent raised points, raphe not excurrent.


NIPAL and SIKKIM, alt. 4000–9000 ft.; plentiful. **Khasia Mts.**, alt. 4000–6000 ft.; plentiful. **Burma and Malay Peninsula**; **Griffith, Kurz.**

Stem often 2–6 in., succulent, weak, sometimes 18 in. with thick woody branches. Leaves 2–4 in., from ovate to lanceolate, long-acuminate; petiole ½–1 in. Calyx-tube glabrous, sometimes with minute bundles of hairs between the bases of the teeth. Petals scarcely ¼ in. Fruit about ⅓ in., quadrangular, mouth of the calyx-tube very wide.

—Triana reduces (in **Trans. Linn. Soc.** xxviii. 77, 78) to this species **Sonerila Naudini**. **Niq. Fl. Ind. Bat.** i. pt. i. p. 565 with syn. But Miquel removed this plant from **Sarcopyramis** because it had 6 stamens: there is no authentic specimen of it at Kew.

12. **PHYLLAGATHIS**, Blume.

Herbaceous small shrubs with very short stems. Leaves opposite (or the terminal leaf solitary), large, petioled, orbicular, cordate, 7–9-nerved. Flowers in a peduncled dense head, purple. Calyx-tube campanulate, glabrous or with long bristles near the top, teeth 4 (rarely 3), acute, long-setose. Petals 4 (rarely 3), ovate, acute, glabrous. Stamens 8 (rarely 6), equal; anthers elongate, scarcely produced at the base, connective without appendage. Ovary adnate to the bottom of the calyx-tube, 4–(rarely 3-) celled, glabrous at the apex; style filiform; ovules very numerous, placenta large axile. Capsule broadly funnel-shaped, opening by 4 valves at the top. Seeds ellipsoid, somewhat obovoid, with glandular hardly raised dots, raphe slightly excurrent along one side of the seed its whole length.—**Distr.** Species 2; one Malayan, one Bornean.


**Malacca**; **Griffith, Maingay.** ?**Tenasserim** or **Andamans**, **Helfer No. 2266.**

Leaves usually 4–9 in. diam., obtuse or acute, entire, usually red beneath; petiole 2–5 in., with long pendent coarse bristles or nearly glabrous. Bracts to the flower head red, ½ in. wide and upwards. Calyx-teeth from short-ovate with a mucro to ovate-lanceolate attenuate. Capsule about ¼ in., fruiting pedicel about ½ in.—Helfer's No. 2266, in fruit, shows the capsule trigonous with smooth almost convex faces: the other typical examples show the fruit 6–8-ribbed, the ribs prominent; in all these the fruit is over-ripe and the wall partly broken down. Helfer's plant may be a new species or even a new genus; but the leaves are exceedingly like the well-marked leaves of **Phyllagathis**.


Twining shrubs; branches round, thickened at the nodes. Leaves opposite, short-petioled, coriaceous, elliptic-lanceolate, cordate at the base, 3-nerved from the base besides two submarginal nerves, entire, tomentose beneath. Cymes axillary; flowers 3–5, large, pedicelled, purple or white. Calyx-tube cylindric,
tomentose (and often bristly or stellate-hairy); lobes 4, persistent. Petals 4, obovate. Stamens 8, unequal; anthers elongate, opening by a single pore; connective of the longer anthers carrying in front two long bristles and behind often one or two spurs or several twisted bristles. Ovary at the base (or half its height) adnate to the calyx, 4-celled, densely hairy at the apex; style filiform; ovules numerous, placenta axile. Berry ellipsoid, crowned by the calyx-limb. Seeds numerous, oblong-ellipsoid, with glandular scarcely raised dots, raphe slightly excurrent along the whole length of one side.—Distrib. Species 10, extending from the southern half of the Transgangetic Peninsula to Borneo and the Philippines.


Leaves 3–4 in., shining, minutely puberulous above, rufous-stellate beneath; petiole ¼ in. Peduncle 1–2 in.; pedicels ¼–½ in. Connective of the longer anthers at the base with two long bristles in front and several short twisted hairs behind.


Leaves 3–4 in., shining above, rufous-stellate beneath; petiole ½–¼ in. Peduncle 1 in., pedicels ¼–½ in. Connective of the longer anthers at the base with two long bristles in front and several short twisted hairs behind.

Var. subglabrata; leaves beneath glabrous except the nerves. Singapore, T. Anderson.


**MALAY PENINSULA**: Griffith (Kew Distrib. No. 2269). **MALACCA**: Maingay No. 784.—Distrib. Sumatra and Java.

Leaves 2–3½ in., shining impressed-reticulate above, with scattered stellate pubescence beneath; petiole ¼ in. Peduncles ½–1 in., chiefly from the upper axils forming a quasi-terminal panicle; pedicels ¼ in. Connective of the longer anthers at the base with two long bristles in front; anthers very long, sigmoid.—M. oligantha, Naud. in Ann. Sc. Nat. ser. 3. xv. 300; Miq. Fl. Ind. Bat. i. pt. i. 534 is said by Triana to be also a syn. of M. reticulata, Blume.

Shrubs, usually twiners. Leaves opposite, petioloed or nearly sessile, elliptic or oblong-lanceolate, rounded at the base, 3-nerved from the base besides two submarginal nerves, entire. Flowers large or small, in terminal sometimes leafy panicles, purple or white, bracts large or small. Calyx-tube campanulate-cylindric, densely stellate-tomentose pubescent or glabrous; limb obscurely 4-lobed, more rarely distinctly 4-toothed, persistent. Petals 4. Stamens 8, unequal, 4 shorter sometimes wanting, connective of the 4 longer with 2 long bristles in front at the base (in all the Indian species). Ovary adnate to the calyx, 4-celled, apex glabrous or densely hairy; style filiform; ovules very many, placentas axile. Berry ovoid or elliptic, crowned with the calyx-limb. Seeds ellipsoid, flattened on the side of the raphe.—Distrib. Species 16, extending from Pinang and Malacca throughout Malaya to the Philippines.

* Anthers very long, attenuate upwards.

1. **D. annulata**, Hook. f. ms.; Triana in Trans. Linn. Soc. xxviii. 83; branches panicled and leaves beneath with much rufous stellate tomentum, panicle narrow leafy with large bracts to the young flowers, calyx-tube of the buds more than 1/3 in. densely woolly-rufous and stellate-hairy, teeth distinctly triangular. Melastoma bracteatum, Wall. Cat. 4044, partly.


Leaves 3-4 1/2 in., glabrous above or minutely pubescent on the nerves; petiole 1/2 in. Pedicle consisting of axillary cymes (exactly resembling that of Marumia reticulata); bracts 2/3 in., oblong, caducous; pedicels less than 1/4 in. Fruit (not ripe) ellipsoid, calyx-mouth enlarged, teeth somewhat rounded.—The stem of this plant has rings at the nodes as in Marumia; its natural affinity seems altogether with Marumia reticulata and M. nemorosa: it recedes from M. reticulata only by the absence of the long bristles on the calyx-tube so common in Marumia; from M. nemorosa it recedes by the quasi-paniculate inflorescence and the absence of any twisted hairs at the base of the connective other than the two long bristles in front.


**Malacca**; Griffith (Kew Distrib. No. 2291); Maingay No. 789. Singapore and Pinang; Walker.

Leaves 2 1/2-3 1/2 in., glabrous above, with scattered dark-red stellate hairs beneath; petiole 1/2-3/8 in. Pedicel terminal, pedicels hardly more than 1/3 in. Fruit (not ripe) campanulate (seems about to become ovoid), calyx-teeth not then prominent, nor the mouth enlarged.

3. **D. bracteata**, Blume in Flora, 1831, 405; branches upwards and panicle with small stellate pubescence, panicle somewhat spreading not leafy, bracts large oblong longer than the expanding buds, calyx-tube of the buds 1/3-1/2 in. with more or less stellate pubescence limb (in the bud) nearly entire or very obscurely 4-toothed. Miquel, Fl. Ind. Bat. i. pt. i. 529; Triana in Trans. Linn. Soc. xxviii. 84. D. bracteosa, Naud. in Ann. Sc. Nat. ser. 3. xv. 76; Miquel, Fl. Ind. Bat. i. pt. i. 527. Melastoma bracteatum, Jack in Trans. Linn. Soc. xiv. 9; Wall. Cat. 4044, partly.
4. **D. pallida**, Blume in Flora, 1831, 500; branches and panicle minutely puberulous with microscopic stellate often evanescent hairs, panicle somewhat spreading not leafy with minute lanceolate caducous bracts, calyx-tube of the buds $\frac{1}{2}-\frac{1}{2}$ in. minutely puberulous or glabrous, limb (in the bud) nearly entire or very obscurely 4-lobed. *Naud. in Ann. Sc. Nat. ser. 3. xv. 77, t. xv. f. 4; Miq. Fl. Ind. Bat. i. pt. i. 528; Triana in Trans. Linn. Soc. xxviii. 83. D. superba, *Naud. l. c.; Miq. l. c.* D. ovalifolia, *Naud. l. c. 76; Miq. l. c. 527.* D. astrosticta, *Miq. Fl. Ind. Bat. Suppl. 318.* Melastoma pallida, *Jack in Trans. Linn. Soc. xiv. 12; DC. Prodr. iii. 150; Wall. Cat. 4049.*

**Anthers short, oblong, truncate, not narrowed upwards.**

This section is much more distinct from section * than the latter is from *Maru-mia*; there is no case of intermediate anthers, they are either decidedly truncate or very elongate. The three species of this section ** are very closely allied; the panicle is large and lax, the ultimate pedicles short, the bracts caducous, the flowers small, the calyx-limb from the bud truncate or only very obscurely 4-lobed.

5. **D. intermedia**, Blume in Flora, 1831, 493; leaves beneath and panicle stellately tomentose sometimes furguginous, fruit $\frac{1}{2}$ in. broad more or less pubescent crowned by the enlarged calyx-mouth not distinctly ribbed. *Naud. in Ann. Sc. Nat. ser. 3. xv. 72; Miq. Fl. Ind. Bat. i. pt. i. 524; Triana in Trans. Linn. Soc. xxviii. 83.* Melastoma rubiginosum, *Wall. Cat. 4052, partly.*

**Leaves 3 in.; petiole $\frac{1}{2}$ in. Nodes of panicle often much thickened. Flowers rather larger than in the two following species.**


**Leaves 3 in.; petiole $\frac{1}{2}$ in. Nodes of panicle often much thickened.—Not well distinct from the preceding species.**

7. **D. gracilis**, Blume in Flora, 1831, p. 498; leaves beneath and panicle glabrous or very nearly so, fruit less than $\frac{1}{2}$ in. broad glabrous ovoid much nar-

**PINANG and SINGAPORE; Wallich.**—**Distrib.** Malay Archipelago.

Leaves 3 in.; petiole sometimes \(\frac{3}{4}\) in. Nodes of panicle often thickened. Stamens 8 or 4, as in the two preceding species. Petals nearly white (Jack). Bracts \(\frac{1}{2}\) in., oblong, much exceeding the expanding buds.

### 15. ANFLECTRUM, A. Gray.

Twining shrubs. Leaves opposite, short-petioled, entire, oblong, narrowed upwards, 3-5-nerved from the base. Flowers not large, white, in terminal panicles sometimes leafy at the base. Calyx-tube ovoid, limb obscurely 4-lobed or truncate. Petals 4. Stamens 4 perfect; anthers attenuated upwards, opening by one pore, connective at base shortly appended or subnude, never with two long bristles in front; imperfect stamens 4, 2, or 0, with a rudimentary anther often bicaudate. Ovary 4-celled, free at the apex, with 4 vertical ridges; style simple; ovules many, placetas axile. Berry ovoid or globose, crowned with the calyx-limb. Seeds very many, small, falcate, obovoid; raphe long, lateral.—**Distrib.** Species 12, extending from Mergui, Pinang and Singapore to Borneo, and the Philippines.


**PINANG; Wallich. Mergui and Malay Peninsula; Griffiths (Kew Distrib. No. 2289); Maingay No. 793-2. Tenasserim or Andamans; Helfer (Kew Distrib. No. 2290).**—**Distrib.** Malay Archipelago.

Flowers cernuous. Shorter stamens 4, 2 or 0. Fruit \(\frac{1}{2}\) to \(\frac{3}{4}\) in. broad. Pedicels and calyx-tube minutely puberulous, plant otherwise glabrous.—*A. cyanocarpum,* *Triana.* has the stem somewhat thickly covered with long spreading bristles. None of the plants collected within the area of the Indian Flora show such bristles: the two species may not be distinct, but Mr. *Kurz,* while not uniting them, says that Helfer's No. 2290 is *Triana's* *A. cyanocarpum,* which must be wrong, as *Triana* has written *A. glaucum* on Helfer's No. 2290.

2. **A. pallens,** *Blume Mus. Bot.* i. 38; leaves \(1\frac{1}{2}-2\frac{1}{2}\) in. glabrous or minutely puberulous beneath 3-nerved (scarceiy 5-nerved) suddenly narrowed into a long obtuse subcaudate tip. *Naud. in Ann. Sc. Nat.* ser. 3. xv. 304; *Miq. Fl. Ind. Bat.* i. pt. i. 554; *Triana* in *Trans. Linn. Soc.* xxviii. 84; *Melastoma petiolare,* *Wall. Cat.* 4053.

**PINANG; Wallich, Porter. Malacca; Maingay No. 795, 2663.**—**Distrib.** Sumatra, Borneo.

Shorter stamens usually 0. Fruit \(\frac{1}{2}\) in. broad, glabrous. Young calyx-tube often minutely but densely rufous tomentose.—Some of the Archipelago examples have leaves \(4\frac{1}{2}\) in. and are then very like *A. glaucum.*

**VOL. II.**

**Pinang**; *Wallich, Walker*. *Malacca*; *Griffith, Maingay No. 794*; *Cuming, No. 2259*. —Distr. Java to Philippines. Leaves usually 2–2 1/2 in., oblong, acute, glabrous above or rufous stellate-tomentose on the nerves; petiole 1/4–1 in. Young calyx-tube densely stellate-tomentose. Shorter stamens often 2, sometimes 4 or 0. Fruit less than 1/2 in. broad, finally glabrous.

4. **A. annulatum**, Triana in *Trans. Linn. Soc.* xxviii. 84; branches nearly glabrous but with scattered patent bristly hairs, more thickened at the nodes than the other species and with a ring of dense rufous tomentum below each node, leaves nearly glabrous beneath. *Melastoma annulatum*, *Wall. Cat.* 4056.

**Pinang**; *Porter*. Leaves 4–5 in., glabrous, oblong, cordate at the base; petiole 1/4–1 in., with spreading bristles. *Panicle* with spreading bristles, and rufous-tomentose. Young calyx rufous-tomentose. Fruit 1/2 in. broad, ovoid, ultimately glabrous or nearly so.

**Doubtful Species.**

*A. assamicum*, C. B. Clarke; stem with coarse spreading bristles somewhat annulated at the nodes, leaves very large short-petioled elliptic-lanceolate with spreading bristly hairs on the nerves beneath otherwise glabrous.

Assam, foot of the Naga Hills, and BHOTAN; *Griffith (Kew Distr. No. 2285).*

Branches stout. Leaves 5–7 in., very acute, cordate at the base; petiole 1/4–4 in., densely coarsely bristly. *Panicle* (in fruit) terminal, large, repeatedly trichotomous; fruits very numerous (like those of *Anplectrum*), smooth, campanulate at the base (not ripe 1/2 in. broad).—*Flowers not seen.*


The Wallachian example exhibits neither inflorescence, flowers nor fruit, and is indeterminable. Leaves 4 in., ovate, shortly acuminate, glabrous; petiole 1/2 in., glabrous but with a dense erect fringe of rusty bristles on its upper face; stem nearly glabrous.


Branching shrubs, erect or scandent. *Leaves* opposite or whorled, entire, often fleshy, glabrous in all the Indian species, usually longitudinally 3–9-nerved. *Flovers* in terminal panicles or lateral cymes, white or rose, with or without bracts, 4– or 5–rarely 6-merous. *Calyx-tube* ovoid or cylindrical, limb truncate or obscurely toothed. *Stamens* twice as many as the petals, equal or nearly equal (rarely unequal); anthers opening at the top by one pore; connective not (or very shortly) produced at the base but having two tubercles in front and a spur behind. *Ovary* inferior, 4–6-celled, usually glabrous at the apex; style filiform; ovules very many, placentas axile. *Berry* crowned by the limb of the calyx. *Seeds* very many, ovoid or subfalcate, raphe often thickened and excurrent.—

*Distr.* Species 50; mainly in Malaya, East Bengal and Ceylon; a few are found in the Fiji Archipelago and in the East African islands.
* Flowers in axillary cymes (see also 10. M. himalayana).

† Leaves whorled.


**Malacca,** Mount Ophir; **Griffith** (Kew Distrib. No. 2282), **Maiingay** No. 796.—**Distrib.** Marianne Islands.

**Leaves** 1½ in.; petiole ¼ in. **Cymes** 3-10-flowered. **Flowers** large. **Anthers** shortly produced at the base, connective having a short spur. **Berry** nearly ¼ in. broad, ovoid. **Seeds** falcate-ellipsoid, raphe not excavent.

2. **M. macrocarpa**, Blume Rumph. i. 14, t. 2; branches round, leaves obovate-oblong acute 3-nerved, flowers 5-merous. *Naud. in Ann. Sc. Nat. ser. 3. xv. 293; Miq. Fl. Ind. Bat. i. pt. i. 544; Triana in Trans. Linn. Soc. xxviii. 86.*

**Malacca; Maiingay** No. 799.—**Distrib.** Malay Archipelago.

**Leaves** 2½-4 in.; petiole ¼-½ in. **Cyme** 3-10-flowered. **Flowers** large. **Calyx-limb** even in the bud truncate entire in **Maiingay**'s examples. **Anthers** long, produced at the base, spur of the connective long. **Berry** ½ in. wide, hardly narrowed upward. **Seeds** falcate-ellipsoid, smooth, raphe not excavent.

†† **Leaves** opposite.

3. **M. Hasseltii**, Blume in Flora 1831, p. 513; branches round verrucose, leaves lanceolate, flowers 4-merous, fruit ovoid, calyx-rim not produced far above the fruit, seeds obovoid smooth slightly flattened on the side of the raphe which is not produced. *Miq. Fl. Ind. Bat. i. pt. i. 542. M. crassifolia, Triana in Trans. Linn. Soc. xxviii. 86,** partly. Melastoma laurifolium, **Wall. Cat.** 4084.

**Singapore; Wallich. Malacca; Maiingay** No. 797.—**Distrib.** Java, Sumatra.

**Leaves** 4-7 in., 3-nerved, an obscure pair of nerves very near the margin sometimes added, very acuminate, narrowed at the base in the Indian examples (less so in Blume's authentic specimen); petiole ½-¾ in. **Anthers** at the base distinctly but shortly produced, spur of the connective short. **Fruit** ½ in. diam.—Reduced to **M. crassifolia** by Triana; but, as Blume observes, the leaves are much longer, with shorter petioles, and the flowers 4-merous. The true **M. crassifolia**, Blume, has not been found in British India.

**Var. Griffithii**; cymes lateral on short peduncles but greatly developed repeatedly divided with opposite branches at right angles and sometimes 40 flowers on one cyme.—Mount Ophir, Malacca; **Griffith** (Kew Distrib. No. 2282).

4. **M. rubicunda**, Blume in Flora, 1831, 512; branches round somewhat striated, leaves elliptic or lanceolate, flowers 4-merous, fruit ovoid, calyx-rim very short, seed obovoid smooth slightly flattened on the side of the raphe which is not produced. *Naud. in Ann. Sc. Nat. ser. 3. xv. 288, t. 13, fig. 1; Miq. Fl. Ind. Bat. i. pt. i. 539; Triana in Trans. Linn. Soc. xxviii. 86. M. erythrophylla, Lindl. in Paxt. Mag. Bot. x. 79; Naud. l. c. 289; Miq. l. c. 540. Melastoma rubicunda, Jack in Trans. Linn. Soc. xiv. 18; DC. Prodr. iii. 148; **Wall. Cat.** 4086. M. erythrophyllum; **Wall. Cat.** 4085.

**Subtropical Himalaya** from Sikkim eastward. **Khasia** Mts., alt. 2000-5000 ft., common. **Pinang; Wallich.**—**Distrib.** Sumatra.

**Leaves** 2-6 in., narrowed at both ends, 3-5-nerved, one pair of nerves often starting ¼ in. above the base of the leaf; petiole 0-½ in. **Peduncles** rarely 1 in.
Anthers at the base very shortly produced, spur of the connective very short. Fruit \( \frac{3}{4} \) in. diam., when ripe black, edible though insipid, rim of the calyx then evanescent.—This plant really differs little from *M. Hasseltii*; but in its typical form the leaves are elliptic nearly sessile: also the anthers at the base and the spur of the connective are even shorter.


Ceylon; Gardner; Newera Ellia and Horton Plains, Thwaites.

*Leaves 2–3\( \frac{1}{2} \) in., 3–5-nerved, minutely glandular beneath (Thwaites). Peduncles solitary; pedicels and calyx rose-purple. Petals a fine lake below, white at top. Anthers shortly produced at the base, connective with a short spur. Fruit \( \frac{1}{2} \) in. diam., subglobose.—The specimens of this very succulent plant are imperfect and the above description is mainly compiled from Gardner and Thwaites' description.*


Ceylon; Central Provinces, alt. 3000–5000 ft., Thwaites, Macrae, Walker.

*Leaves \( \frac{3}{4}–1\frac{1}{2} \) in., 3-nerved, minutely glandular beneath (Thwaites). Calyx-tube green-red. Petals \( \frac{1}{2} \) in., pale-rose. Anthers shortly produced at the base, connective with a short spur. Fruit \( \frac{1}{2} \) in. broad, very small, subcampanulate.

Var. Thwaitesi, leaves cuneate-obovate.—Ceylon; Hellesseen, Pasdoon Corle, Thwaites No. 3443.


*Leaves 1–1\( \frac{1}{2} \) in., 3-nerved, much thicker than those of *M. maculata*. Petals (in Wight's own No. 1151) more than \( \frac{1}{2} \) in. Beddome says the flowers are "14–15 lines long." Anthers prominently produced at the base, spur of the connective also prominent; four additional imperfect stamens sometimes present (ex Beddome).—This plant wholly differs from *M. maculata* (with which Triana unites it doubtfully) by its much larger flowers as well as different leaves and anthers. It does not appear however that Triana ever saw Wight's No. 1151. Nor did Beddome, who doubts if it can be the same as his *M. radicans*: with which however it agrees perfectly.*

8. **M. malabarica**, Bedd. Ic. Pl. Ind. Or. 157; branches round striate somewhat verrucose, leaves 2–3 in. elliptic narrowed to both ends 3–5-nerved, petiole less than \( \frac{3}{4} \) in., flowers 4-merous, anthers oblong short truncate subnude at base.

*Anamallays and Nilghiris, alt. 3000–4000 ft.; Beddome.*

*Peduncles axillary, 1–3-flowered. Flowers large. Filaments long, anthers short with two glandular swellings at the apex of the filament inside, spur of the connective perceptible behind but very small.—This species in leaves and inflorescence is much like *M. rubicunda*; but in its anthers it is altogether remote, and approaches *Pachycentria.*

**Flowers in terminal panicles or quasi-lateral cymes.**

**MALAYA**; *Maingay No. 798.—Distrib. Java, Moluccas.

Panicles long, branches whorled; bracts ½ in., narrow obovate-lanceolate; pedicels calyx and petals rose. *Anthers* shortly produced at the base, spur of the connective short. *Fruit* ⅙–¼ in. broad, ovoid, rim of the calyx shortly produced above the fruit.


**SIKKIM**; alt. 3000–6000 ft.; *J. D. H. Khasia Mts. ; Surareem, alt. 5000 ft.; J. D. H., C. B. Clarke.

Leaves 2½ in., 3–5-nerved almost from the base, obtusely acuminate; petiole not ⅓ in. *Flowers* ⅔ in. diam., rose. *Anthers* 2-tubercled at the base, connective without a spur. *Berry* ⅔ in. diam., spherical.—This species has been confounded in herbaria with *M. rubicunda*, which is found over the same area. In *M. himalayana* the terminal panicle is small and often only quasi-axillary panicles are seen: but the peduncle is much longer than in *M. rubicunda* and the branches of the panicle in fruit are divaricate, not ascending as in *M. rubicunda*.


**Sikkim** at Darjeeling; *Herb. Griffith* (Kew Distib. No. 2283).

Leaves 1¼ in., 3-nerved from the base, abruptly acuminate. *Flowers* ⅔ in. diam., very shortly pedicelled. *Calyx-tube* campanulate, limb obscurely 4-toothed. *Anthers* small, linear, with two tubercles at the base, connective without a spur.—Only one example of this has been seen: the inflorescence is strictly terminal; the locality is not quite certain and may be “East Himalaya.”

**IMPERFECTLY KNOWN AND DOUBTFUL SPECIES.**

**M. MAINGAYI, C. B. Clarke**; glabrous, branches round smooth, leaves 1–1½ in. opposite sessile cuneate-obovate obtuse 3-nerved, flowers 4-fld, petals ½ in., anthers oblong narrowed upwards opening by a terminal pore with two tubercles at base and no distinct spur on the connective, seeds oblong elliptic smooth larger than in the other species of *Medinilla*.—**MALACCA**; *Maingay No. 807, 806.

There is nothing to show the nature of the inflorescence or the shape of the berry.

**M. GRIFFITHII, C. B. Clarke**; glabrous, branches round remotely verrucose, leaves 5–7 in. elliptic acuminate at both ends 3-nerved, petiole ⅔–⅓ in., inflorescence in weak axillary cymes, fruit small, seeds of the genus.—**MISHMEE**; *Griffith* (Kew Distib. No. 2281).

This differs by its large long-petioled leaves from all the other species.

**M. Merguensis, C. B. Clarke**; glabrous, branches round smooth, leaves 2–3½ in. obovate-elliptic obtuse 3-nerved, petiole ⅓–⅓ in., cyme compound, anthers oblong narrowed upwards with a terminal pore, a long spur to the connective near the base but the tubercles at the apex of the filament very obscure.—**Mergui**; *Griffith* (in Herb. Wight).

Only a detached fragment of the panicle is preserved. This may be a *Pachycentria*.
17. **POGONANTHERA**, Blume.

Shrubs, nearly glabrous; branches round, minutely scaly. *Leaves* opposite, petioled, oblong or ovate, entire, glabrous, 3-nerved. *Flowers* small, pulvinate, in small terminal panicles having opposite branches. *Calyx*-tube campanulate, subquadrangular; limb 4-toothed. *Petals* 4, lanceolate. *Stamens* 8, equal; anthers oblong, acute, opening by a terminal pore, not produced at the base; connective at the base bearded behind with a tuft of hairs, not spurred. *Ovary* half-inferior, 4-celled, with a tuft of hairs at the apex; style filiform; ovules very many, placetas axile. *Berry* small, globose, 4-celled, crowned with the calyx-limb. *Seeds* very many, obovoid-oblong, smooth.—Distrib. Species 2; in Malaya from Malacca to Borneo.


**MALACCA** and **SINGAPORE**; **Wallich, Griffith, Maingay.**—Distrib. Through Malaya to Borneo.

*Leaves* 3–4½ by 1–2½ in., narrowed to both ends, 3-nerved with sometimes other two faint nerves close to the margin; petiole ½–¾ in., with two tubercles or auricles at its apex. *Panicle* 2–3 in. and as much broad, short-peduncled, with minute bracts at the divisions. *Berry* about ½ in. broad, narrowed beneath the small calyx-limb.—Blume distinguishes as *P. reflexa*, a form with white transparent petals having a minute tooth on each margin, and which occurs creeping on rocks near the seashore as noted by Jack and Griffith, from the typical *P. pulverulenta* which occurs in the forests, and which has red petals powdered with yellow and a tooth on each side. The distinction between the limb of the petal being toothed or only tumid cannot be traced in the dried specimens: and Blume's subsidiary distinctions regarding the texture of the leaves and the presence or absence of the extra pair of submarginal veins do not hold. Jack named the white-flowered form *rubicundum* because the panicle and calyces are in it a fine rose-purple.


Shrubs with round branches. *Leaves* opposite, petioled, ovate or oblong, entire, 3-nerved. *Flowers* in terminal panicles, small, white or purple. *Calyx*-tube campanulate, glabrous or puberulous; limb irregularly truncate or 3–8-lobed. *Petals* 4–5. *Stamens* 8–10–12, equal; filaments short, broad; anthers short, obtuse, opening by sits down the front, connective spurred at the base or unappendaged. *Ovary* inferior, 2–5-celled, glabrous at the apex; style short, stigma capitellate; ovules numerous, placetas axile, nearly basal. *Capsule* finally breaking up irregularly. *Seeds* very many, linear, raphe excurrent.—Distrib. Species 12; in Malaya, the Fiji and Navigator groups and Tahiti.


**PINANG**; **Wallich. MALAYA**; **Maingay No. 808.**
Leaves 4–5 in., lanceolate and broad-lanceolate, narrowed to both ends; petiole ½–1½ in. *Panicle* 1–3 in., ultimate pedicels 0–⅓ in. *Petals* less than ⅓ in., obovate. Capsule ⅓–½ in. broad, ovoid or hemispheric.


Glabrous shrubs with round branches. *Leaves* opposite, sessile or short-petioled, ovate or lanceolate, entire, coriaceous, 3-nerved. *Flowers* small, in axillary (and terminal) small cymes or panicles. Caryx-tube verrucose, campanulate; limb truncate, obscurely 4-toothed. *Petals* 4, blueish or white. Stamens 8, equal; filaments short, subulate; anthers broad-oblong, obtuse at both ends, opening by slits, connective simple at the base or very shortly spurred behind. **Ovary** inferior, 4-celled, apex flat glabrous; style long, stigma clavate; ovules very many, placentas sub-basal. **Berry** ovoid, truncate. **Seeds** very many, cuneate-obovoid, raphe excurrent on one side towards the end, somewhat angular.—**Distrib.** Species 6 (or perhaps 2 only), from Pinang and Malacca through Malaya to the Philippines.


**Pinang** and **Malacca**; Wallich. **Mergui**; Griffith. **Tenasserim**; Helfer. **Nicobars**; Kurz. **Malacca**; Cuming, Griffith.—**Distrib.** Through Malaya to the Philippines.

*Leaves* narrowed at the base; petiole 0–½ in. *Panicles* 1–3 in., terminal and in the upper axils, very short-peduncled, often crowded with many flowers; ultimate pedicels very short, bracts minute. **Berry** ⅔ in. broad, narrower at the mouth.

**Var. Jackiana**; petioles attaining ¾ in., cymes axillary few-flowered.—Malacca; Griffith; Maingay No. 801.


*Leaves* widest near the base; petiole less than ¼ in.—Doubtfully distinct from *P. caeruleascens*: the leaves are usually much larger while the cymes are smaller.


**Pinang**; Porter. **Malacca**; Griffith (Kew Distrib. No. 2273).—**Distrib.** Sarawak.

The normal leaves are about 5 by 2 in., the abnormal leaves on the "panicles" are very narrow lanceolate, often 1 by ⅔–⅗ in.—This is probably only a proliferous state of *P. caeruleascens* as Korthals and Miquel treat it.
Large shrubs, glabrous or minutely pubescent. Leaves opposite, short-petioled, ovate or oblong; entire, coriaceous, 3-nerved. Flowers axillary, long-peduncled, solitary or clustered, large (except in K. tuberculata); peduncles 1–3-flowered, pedicels 2-bracteolate in the middle. Calyx-tube campanulate or hemispheric, covered with elongated scales or simple tubercles; limb 4-lobed and persistent or calyptrospiriform and deciduous. Petals 4, ovate or oblong. Stamens 8, equal, filaments short, subulate; anthers short, very thick, opening by slits, connective at the base naked or shortly spurred. Ovary inferior, 4-celled, apex glabrous depressed; style filiform, stigma clavate; ovules very many, placentas sub-basal. Berry subglobose, covered with scales or tubercles, or in K. tuberculata ultimately nearly smooth. Seeds cuneate-ovoid, angular.—Distrib. Species 14; confined to Malaya, from Pinang to Borneo.


Pinang and Malacca; Wallich, Griffith, &c. Singapore; T. Anderson.—Distrib. Borneo, Philippines.

Young branches obscurely quadrangular, rusty puberulous. Leaves 2–3 in., oblong or elliptic, acuminate, when young pubescent beneath, when mature glabrescent or with rusty pubescence on the nerves; petiole ¼–¹/₄ in. Peduncles 1- (less often 3- ) flowered; bracts nearly ¼ in., oblong, persistent. Scales of the calyx-tube minutely rusty pubescent.

2. **K. pubescens**, Dcne. in Ann. Sc. Nat. ser. 3. v. 318; leaves oblong base somewhat rounded or subcordate, calyx-tube with triangular short subulate scales, those towards the top of the tube scarcely ⅕ in., limb 4-lobed persistent, fruit ⅛ in. broad. Triana in Trans. Linn. Soc. xxviii. 152. Pterandra echinata, Wall. Cat. 4078, letter a only.

Pinang, Wallich.

Young branches obscurely quadrangular, rusty puberulous. Leaves 2–3 in., oblong or elliptic, acuminate, when mature with minute rusty pubescence beneath, nerves with longer pubescence; petiole hardly ½ in. Scales of the calyx-tube minutely rusty-pubescent. Apex of the ovary in fruit concave, with 16 radiating lines.—Very near the preceding species.

3. **K. acuminata**, Dcne. in Ann. Sc. Nat. ser. 3. v. 316; leaves narrowed or rounded at the base nearly glabrous, calyx-tube with triangular scales those towards the top of the tube linear elongate, limb calyptrospiriform acuminated into a linear point. Triana in Trans. Linn. Soc. xxviii. 153.

Singapore; Walker, Maingay No. 804.

Young branchlets and peduncles minutely rusty pubescent. Leaves 2–3 in., oblong or elliptic, acuminate, when mature glabrous or scarcely rusty pubescent on the nerves beneath; petiole scarcely ⅕ in. Bracts of the buds ½ in., ovate.

**Malacca;** Maingay No. 805.—**Distrib.** Sumatra.

Branchlets round, glabrous. Leaves 2–3 in., ovate or elliptic, shortly acuminate, glabrous; petiole $\frac{1}{2}$–$\frac{1}{2}$ in. **Peduncles** glabrous, clustered, 3–5-flowered; bracts less than $\frac{1}{2}$ in. **Fruit** $\frac{3}{2}$–$\frac{5}{2}$ in. diam.


**Shrubs or trees,** glabrous. Leaves opposite, short-petioled or sessile, coriaceous, orbicular ovate or lanceolate, entire, pinnate-nerved rarely 3-nerved. **Flowers** usually in small axillary rarely terminal simple or panicked cymes or umbels. Calyx-tube campanulate, glabrous; limb dilated, truncate or shortly 4-lobed. Petals 4, blue or white, rarely reddish. Stamens 8, equal, filaments long; anthers short, opening by slits in front, connective ending in a horn behind. **Ovary** inferior, 1-celled; apex glabrous surmounted by a convex or depressed disc with 8 radiating grooves; style filiform, simple; ovules 6–12 (in **M. Maingayi** 20 at least), whorled on a free central placenta. **Berry** globose or ellipsoid, crowned with the calyx-margin, 1-seeded. **Seed** large, cotyledons convolute.—**Distrib.** Species about 100 (but very difficult and many doubtful of determination) numerous in South-East Asia and its islands; a few extending into Polynesia and Australia, several in tropical Africa.

The following is merely an artificial key to the material at Kew: the species which appear tolerably distinct from **M. edule** are taken first; and the last group contains the enormous mass of specimens which appear difficult to separate from **M. edule**.

I. Leaves 3-nerved from the base.


**Ceylon;** "at no great elevation," Thwaites, Walker.

Shrub 10–12 ft.; branchlets slender, round. Leaves 2–2$\frac{1}{2}$ in., somewhat distichous, elliptic, suddenly acuminated, base roundish, punctate on both surfaces; petiole scarcely $\frac{1}{8}$ in. **Peduncles** solitary; flowers few, very small, sessile at their apex; petals white (Thwaites). **Berry** scarcely $\frac{1}{2}$ in. diam., globose, areola $\frac{1}{8}$ in. wide.—A variety communicated by Mr. Thwaites has the leaves much larger, 4$\frac{1}{2}$ in., the acuminate apex much shorter.

2. **M. Gardeneri**, Thwaites Enum. 113; leaves acute scarcely acuminate, inflorescence clustered, peduncle 0–$\frac{1}{4}$ in. **Triana in Trans. Linn. Soc.** xxviii. 159.

**Ceylon;** alt. 2000–5000 ft.; Thwaites.

A small tree; ultimate branchlets quadrangular. Leaves broad-elliptic, narrowed at the base, opaque, pellucid-punctate; petiole $\frac{1}{2}$ in. **Flowers** white (Thwaites), very small; buds very acute. Calyx-tube at the time of flowering funnel-shaped, distinctly 4-toothed. **Berry** size of a pea, spherical, purple-black.

II. Leaves pinnate-nerved, often very opaque, midrib always conspicuous, nerves conspicuous or obscure.
• Ultimate branchlets quadrangular (see also No. 21, 22, 24, 37, 40).

† Leaves usually more than 4 in. (nerves often distinct).

3. M. Wightii, Thwaites Enum. 113; leaves 3-4½ in. sub sessile elliptic-lanceolate base cordate, peduncle 0, pedicels clustered 1/3½ in., calyx-tube at the time of flowering subcampanulate.

WESTERN PENINSULA; Canara; Ritchie. CEYLON, alt. 3000-4000 ft., Thwaites.


CEYLON; alt. 1000 ft.; Thwaites.
An erect shrub 8-12 ft., sparingly branched; ultimate branchlets stout, acutely quadrangular. Leaves very conspicuously nerv'd, secondary nerves running into a conspicuous marginal nerve. Buds obtuse, but apiculate; calyx-limb obscurely 4-lobed. Petals blue. Berry ¾ in. diam., spherical, finally black-purple.—Thwaites has sent (under No. 2686*) examples marked "M. Hookeri, variety with exalate branchlets, sessile flowers." These examples have perfectly round branchlets and seem in all respects identical with No. 25 M. macrophyllum, Thwaites.

5. M. Griffithianum, Naud. in Ann. Sc. Nat. ser. 3. xviii. 274; leaves 5-7 by 1-1½ in. nearly sessile linear-lanceolate rounded or somewhat acute at the base, peduncle 0, pedicels ½ in. clustered. Triana in Trans. Linn. Soc. xxviii. 168, not of Kurz, in For. Fl. i. 515. M. ceruleum, var. 3 Griffithianum, Kurz, For. Fl. i. 511.

MERGUI; Griffith (No. 2323 Kew Distrib.).
Ultimate branchlets 4-winged. Leaves somewhat opaque, secondary nerves visible, marginal quite obscure; petiole 0-½ in. Flowers rather large, pale blue (Griffith); buds obtuse. Calyx-tube at the time of flowering funnel-shaped, limb nearly truncate. Disc depressed, conspicuously rayed.—M. Horsfieldii, Miquel, said by Kurz (Journ. As. Soc. 1876, pt. ii. 54) to be a synonym of M. Griffithianum, widely differs; of M. Campongium, Miquel, also given as a synonym by Kurz, no authentic specimen exists at Kew. In Journ. As. Soc. 1877, pt. ii. 82, and For. Fl. i. 515, Kurz quotes for M. Griffithianum Helfer's No. 2331, from which it is clear that he refers to No. 20 M. grande, Retz, var. merguica.

6. M. elegans, Kurz in Journ. As. Soc. 1872, pt. ii. 307, For. Fl. i. 514; leaves 3-4 in. elliptic obtuse narrowed at the base, petiole ½ in., peduncles ½ in. 3 or 4 together carrying mostly simple umbels, pedicels ½ in.

SOUTH ANDAMAN ISLAND; Kurz.
A shrub; ultimate branchlets distinctly quadrangular. Leaves with the secondary nerves visible, marginal quite obscure. Peduncles quadrangular. Flowers blue (Kurz). Calyx-tube somewhat large, at the time of flowering saucer-shaped; disc on the apex of the ovary depressed, prominently rayed.

Var. dichotoma; leaves 3-4 in. sub sessile ovate-elliptic acute or shortly acuminate, cymes very short, peduncle 0-½ in., pedicels ½ in. Malacca, Griffith (No. 2324 Kew Distrib.); Mount Ophir, Maingay No. 818, 820. Branchlets somewhat flattened, repeatedly forked, ultimate quadrangular, at least under the nodes. Leaves at the base rounded or acute but not at all acuminate, secondary nerves conspicuous,
marginal obscure; petiole sometimes manifest, attaining $\frac{1}{10}$ in. *Flowers* blue, somewhat large, buds obtuse. *Calyx* -tube truncate even in the bud. *Disc* depressed, distinctly rayed. *Berry* $\frac{1}{4}$ in. diam., spherical, areola very small, about $\frac{1}{15}$ in. wide.

†† *Leaves rarely attaining 4 in., usually opaque, nerves obscure.*

7. **M. amabile**, Bedd. *Ex. Pl. Ind. Or.* t. 163; leaves $\frac{1}{4}$ - $\frac{2}{4}$ in. nearly sessile oblong-lanceolate opaque, base cordate, peduncles $\frac{1}{4}$ - $\frac{2}{4}$ in. 1-3 together axillary and terminal, pedicels $\frac{1}{6}$ in.

**South Canara Ghats**, up to 2000 ft.; Beddome.

*Cymes* small, simple on each peduncle or compound but close. *Calyx*-tube funnel-shaped at the time of flowering, limb truncate; buds obtuse. *Petals* blue. *Disc* plane (Beddome).—Very probably a form of *M. terminale* No. 22 with quadrangular branchlets; but the peduncles are rather shorter, and the flowers smaller.

**Var. malaccensis**; leaves $\frac{1}{2}$ - $\frac{2}{4}$ in. oblong acuminate base rounded very opaque coriaceous, peduncles $\frac{1}{4}$ in. clustered axillary and terminal, cymes simple, pedicels less than $\frac{1}{3}$ in.—Malaca, *Maingay* No. 819.—Branchlets quadrangular, 4-winged below the nodes. *Petiole* $\frac{1}{10}$ in. *Buds* acute, not large. *Calyx*-tube saucer-shaped at the time of flowering; limb in the bud nearly truncate. *Disc* depressed, obscurely rayed. —This is perhaps really allied to *M. pauciflorum* No. 10, but the leaves differ materially in their rounded base and acuminate apex.


**Ceylon**; Saffragam district at no great elevation; Thwaites.

*Leaves* acute at the base, nerves obscure; petiole $\frac{1}{6}$ in. *Flowers* white. *Berry* spherical, the size of a pea.

9. **M. gracile**, Bedd. *Ex. Pl. Ind. Or.* t. 164; leaves 1-1$\frac{1}{2}$ in. elliptic-lanceolate acuminate apex obtuse, peduncles solitary $\frac{1}{3}$ in. 3-flowered, pedicels $\frac{1}{6}$ in.

**Travancore and Tinnevelly Ghats**; Col. Beddome.

A small tree or large shrub; branchlets slender, distinctly quadrangular. *Leaves* opaque, nerves very obscure; petiole $\frac{1}{10}$ - $\frac{1}{8}$ in. *Petals* pale blue. *Disc* distinctly rayed.—Beddome describes the pedicels as 2-3 in. long, probably a misprint for 2-3 lines.

10. **M. pauciflorum**, Blume *Mus. Bot.* i. 356; leaves $\frac{1}{4}$-1$\frac{1}{4}$ in. subsessile rhomboid oblong or elliptic obtuse or acute but not acuminate opaque acute at the base, peduncles scarcely any, pedicels less than $\frac{1}{4}$ in. *Miq. Fl. Ind. Bat.* i. pt. i. 578; *Triana in Trans. Linn. Soc.* xxviii. 158; *Kurz For. Fl.* i. 514. *M. australre*, *F. Muell. ex Triana in Trans. Linn. Soc.* xxviii. 159. *M. umbellatum*, *Benth. Fl. Austral.* iii. 203, not of others.


A tree 20-25 ft. high. *Flowers* minute, whitish (*Kurz*). *Calyx* at the time of flowering saucer-shaped. *Disc* distinctly rayed. *Buds* very acute or rostrate. *Berry* $\frac{1}{4}$ in. diam., spherical, areola scarcely $\frac{1}{12}$ in. wide; pedicel $\frac{1}{4}$ - $\frac{3}{8}$ in.—Miquel (*Fl. Ind. Bat.* i. pt. i. p. 578) says that *M. pauciflorum* is hardly more than a form of *M. myrsinoides* Blume; and Blume’s authentic specimens hardly differ except
by the leaves being considerably larger. Triana in Kew Herb. has referred a
totally different plant to M. myrsinoides, viz. Wall. Cat. 4019 (M. umbellatum,
Wall.), which has round stems, petioled leaves, buds not rostrate, and is M. edule or
very near thereto.

11. M. ellipticum, Thwaites Enum. 112; petiole 0–¾ in. but often
distinct, leaves 2¼ in. broad-elliptic obtuse or shortly acuminate apex obtuse,
base round or acute not acuminated, peduncles clustered 0–⅓ in., pedicels at-
taining ½ in. Triana in Trans. Linn. Soc. xxviii. 159.

CEYLON; between Galle and Ratnapoora at no great elevation; Thwaites, Walker,
Gardner.

A small tree. Calyx at time of flowering saucer-shaped, small. Flowers white.
Nerves of the leaves obscure, but the marginal ones visible.—Mr. Thwaites appears
to have issued his No. 1557 without name: it seems the same as 3479, and has small
globose berries about ½ in. diam., the areola scarcely ¼ in. wide.

12. M. varians, Thwaites Enum. 112; leaves ¼–1½ in. oblong acute or
obovate rhomboid or elliptic obtuse always narrowed at the base, nerves very ob-
scure, petiole 0–½ in., inflorescence densely clustered hardly extending ½ in. from
the stem, buds obtuse, calyx-tube at the time of flowering saucer-shaped, disc
very obscurely rayed. Triana in Trans. Linn. Soc. xxviii. 159. M. parvi-
folium, Thwaites Enum. 113; Triana l. c.

CEYLON; alt. 2000–7000 ft., Thwaites.

A small tree. Petals white or blue. Berry ¼–½ in. diam., spherical, shortly pedi-
celled, areola ¼ in. diam., prominent.—Thwaites says that his M. parvifolium is
possibly a variety of his M. varians but that the leaves are cuneate at the base and a
good deal smaller; but in 2927 (marked M. varians) the leaves are smaller than in
most of his M. parvifolium and very cuneate at base. This species is very near M.
ellipticum Thwaites, but differs by its leaves not acuminated. It is also very near
M. parviflorum (No. 10) which differs in its rostrate buds and strongly radiate disc.
Lastly the branchlets are sometimes nearly round and then it has been named M.
capitellatum or M. edule.

** Ultimate branchlets round.

† Berry large, ½ in. diam. or more.

13. M. procerum, Thwaites Enum. 415; leaves 6–10 in. elliptic acumi-
unate subacute at the base, petiole ½–⅓ in., berry 3–⅓ in. diam. subsessile areola
prominent ⅜ in. wide. Triana in Trans. Linn. Soc. xxviii. 158.

CEYLON; Pasdoon and Hinidoon Corle, Thwaites.

A tree 30–40 ft. high. Leaves thick, but both the secondary and looped marginal
nerves can be seen, much paler beneath; petiole grooved on the upper surface. Calyx
⅜ in. broad (in flower?).

14. M. ovoideum, Thwaites Enum. 112; leaves 3 in. round-elliptic
base cordate sessile or exceedingly shortly suddenly narrowed into a minute
petiole, peduncle 0, pedicels very short clustered. Triana in Trans. Linn. Soc.
xxviii. 159. M. macrocarpum, Thwaites Enum. 110.

CEYLON; alt. 4000–5000 ft., near Adam’s Peak; Thwaites.

A small tree; branchlets thick. Leaves very thick, coriaceous, nerves obscure.
Berry ¼ in. diam., areola raised on a cylindric neck, disc within the mouth elevated
and strongly rayed in the ripe fruit.—Thwaites ovoideum No. 2622, among other
things differs in the mouth of the fruit which is depressed not radiate and is to be
referred to M. revolutum No. 27.

**Burma and Malay Peninsula;** Griffith (No. 2337 Kew Distrib.). **Malacca; Maingay No. 816.** **Singapore; Maingay No. 815.—Distr.** Sumatra and Java.

Leaves acute, but not at all acuminate at the base; both the secondary and marginal nerves prominent. **Calyx-tube** saucer-shaped at the time of flowering, limb truncate even in the bud. **Disc** flat, prominently rayed, *Berry* 1⁄2 in. diam. or more, areola 1⁄8 in. wide, somewhat prominent, disc much depressed.

16. **M. cerasiforme**, Kurz, *For. Fl.* i. 516; leaves 3–4 in. elliptic acuminate at both ends coriaceous, berries in short cymes 1⁄4 in. diam. very succulent.

**Chittagong; Kurz.**

Leaves dried olive-yellow, lateral nerves obscure; petiole 1⁄4 in. **Flowers** not seen. **Peduncles** (of the fruits) 1⁄4 in., pedicels 1⁄8 in. **Berries** blue-black unusually succulent.

17. **M. Maingayi**, C. B. Clarke; leaves 8 in. subsessile oblong-lanceolate rounded or subcordate at the base secondary and marginal nerves prominent, cymes clustered axillary, peduncles and pedicels about 1⁄8 in. stout, flowers very large, buds obtuse, calyx-tube at the time of flowering campanulate limb truncate disc somewhat convex very prominently rayed.

**Malacca; Maingay No. 814.**

The finest species of the genus. the flowers being far larger than in any other species, the calyx-tube in bud nearly 1⁄4 in. wide. Maingay's example does not show fruit, but from the size of the flower it may be presumed that it would be large.

18. **M. microstomum**, C. B. Clarke; leaves 5 in. sessile ovate or oblong subobtuse cordate at the base opaque, flowers small densely clustered axillary, berry nearly 1⁄4 in. diam., calyx-limb 0, areola scarcely 1⁄20 in. diam.

**Malacca; Keddah Peak, Maingay No. 821.** ? **Malay Peninsula, Col. Low.**

A small tree (Maingay). **Leaves** thick, subamplexicaul, marginal nerves obscure, secondary visible. **Pedicels** less than 1⁄8 in., slender. **Buds** obtuse; calyx-tube funnel-shaped at the time of flowering, rays of the disc very obscure.

†† **Berry** less than 1⁄8 in. diam. **Inflorescence** 2 in. or more, except in *M. mergicum* and *M. grande*.


**Amherst; Wallich.**

Flowers in close umbels at the summits of the ultimate branches of the panicle.—

Differs from *M. paniculatum*, Jack, in the much smaller and thicker leaves.


**Ceylon; Thwaites, No. 3442.** **Singapore; Wallich.—Distr.** Java, edul. 2
Nerves of the leaves subprominent, marginal more obscure, apex obtuse often out of one plane so that in drying it is either broken off or crumpled and turned on one side. Branches of the cyme glabrous. Buds obtuse, not large. Calyx-tube at the time of flowering saucer-shaped, limb truncate. Disc scarcely depressed, rays prominent.—As regards the name of this species, that of Retz is cited by Triana, and his description suits the species, but will also suit several others. As regards the plant itself, the flowers and fruit are identical with *M. edule var. ovatum*; but the leaves are rather larger and the inflorescence rather more effuse. Thwaites is very likely right in regarding it as a variety of *M. edule*.


Var. 2. *pubescens*; leaves 3–4½ in. glabrous elliptic suddenly acuminate, cymes proliferously umbellate, branches distinctly rusty-pubescent.—Malacca; Griffith (Kew Distrib. No. 2938). Branchlets round. Leaves acute, hardly acuminate at the base, secondary and marginal nerves somewhat prominent; petiole ½ in. Inflorescence in young flower 2 in. Calyx (in flower time) very small, shallow, saucer-shaped. Disc rayed. Fruit not seen.—This variety is marked by Triana, *M. ambiguum* Bl.?.

Var. 3. *khasiana*; leaves 3–4 in. elliptic acuminate at both ends, apex acute, petiole ¼ in., fruit in a lax panicle extending 2–3 in., berry ⅓ in. wide areola somewhat prominent ⅜ in. wide.—Khasia Mts.; Griffith (No. 2333 Kew Distrib.). Leaves dried yellow, not very thick but rather opaque, nerves evident, marginal obscure. Peduncle in fruit 1–1½ in., pedicels often ¼ in. The remains of the disc in the mouth of the fruit show that it was in flower prominently rayed.—Very near var. *Horsfieldii* but has the leaves more acuminate at both ends.

Var. 4. *merguica*; leaves 4–6 in. elliptic and broad-elliptic obtuse narrowed gradually to the base subpetiolate, nerves somewhat distinct, peduncles solitary or clustered ⅝–¾ in., cymes compound. *M. Griffithianum*, Kurz in Journ. As. Soc. 1877, pt. ii. 82, not of Naud.—Mergui; Griffith. Tenasserim or Andamans; Helfer (No. 2331 Kew Distrib.). Leaves (in all the examples) with scattered glands on the lower surface. Calyx-tube at the time of flowering saucer-shaped or almost funnel-shaped, limb subtruncate. Buds medium-sized; obtuse; disc on the apex of the ovary rayed prominently. Fruit ¼ in. diam., areola ¼ in. wide.


**MALACCA**; Maingay No. 813.—DISTRIB. JAVA, SUMATRA, BORNEO.

A small tree; branchlets round but with four short acute wings at the base of the leaves. Calyx-tube at the time of flowering campanulate, limb truncate. Disc depressed, rays prominent. Berry ¼ in. ellipsoid, longer than broad; areola prominent, more than ⅜ in. wide.—A species well marked by the prominent short wings on the branchlets at the base of the very short petiole.

††† Berry less than ½ in. diam. Inflorescence less than 2 in. Leaves cordate at the base, sessile or very shortly petiolate.


*Southeast Ghats of the Deccan Peninsula; CANARA; Gibson, Dalzell.*
A shrub 2-3 ft. (Dalzell). Calyx-tube at the time of flowering saucer-shaped, limb truncate. Buds not large nor acute. Disc depressed, rays obscure. Berry ½ in. wide, ovoid, subglobose (broader than long), areola ⅛ in. wide.—This species has the branchlets with 4 lines and sometimes almost quadrangular: it is probably not distinct from M. amabile No. 7.

### 23. M. caeruleum, Jack in Mal. Misc. i. 26 (not of Guill. & Perr.);

Southern MALAY PENINSULA with its islands, plentiful.—DISTRIBUTION. Philippines.

Shrub 10 or 12 ft. Leaves opaque, sessile, rounded at the base, secondary and marginal nerves inconspicuous. Peduncles clustered, thick; inflorescence 1-1½ in. Calyx-tube at the time of flowering funnel-shaped; buds obtuse. Flowers somewhat large, intense blue. Disc much depressed, rays obscure.—Widely cultivated in Bengal. &c., for the sake of its bright blue flowers. The branchlets are round as Jack states and not quadrangular as Presl states: but there is no doubt as to Presl’s plant as he describes from Cumming’s No. 2322 which is M. caeruleum. Of Kurz’s M. caeruleum, var. 2. floribundum, I know nothing.

VAR. pulchrum, Kurz For. Fl. i. 510 (sp.); peduncles and pedicels more slender. —Andamans, Kurz. Kurz’s specimens have the inflorescence hardly more slender than in M. caeruleum. Kurz appears to have abandoned the distinction he founded on the less ellipsoid berry.


### PINANG

ROXBURGH, WALlich.

Leaves sometimes acuminate, secondary nerves prominent. Buds small, obtuse. Flowers pale yellowish-blue. Disc depressed, rays obscure. Berry not longer than broad.—This (and not M. caeruleum, as Triana says) is certainly Roxburgh’s M. amplexicaule, for, besides other reasons, Roxburgh’s figure, preserved at Kew, has yellow flowers.

VAR. 1. malabarica; leaves often not exceeding 2-3 in., sometimes distinctly peltiole, never acuminate, secondary nerves obscure.—Nilghiris, Mts. of Kurz, &c., plentiful. Not from Ceylon, for Thwaites, No. 2570 cited by Triana is M. Wightii, No. 3.

VAR. 2. cordata, Wight mss.; branchlets distinctly quadrangular.—This seems not remote from No. 7 amabile.

### 25. M. macrophyllum, Thwaites Enum. 111; leaves 6-12 in. oblong-lanceolate, peduncles 0, pedicels short, berry ⅛ in. diameter, spherical. Triana in Trans. Linn. Soc. xxviii. 158.

CEYLON; alt. 1000-3000 ft., Thwaites.

Leaves with the nerves little impressed but both the secondary and marginal
are visible. Petals pale blue (Thwaites).—Neither Mr. Thwaites' examples nor his description show this species to differ from *M. amplexicaule* except by the leaves being larger (see No. 4. M. Hookeri).


Ceylon; alt. 1000 ft., Hinidoon Corle; Thwaites.


Ceylon; alt. 5000 ft., Rambodde; Thwaites.

A small tree. Flowers small, white. Berry black-purple. Whole inflorescence not exceeding 1 in. in the fruiting example communicated by Mr. Thwaites, but Mr. Thwaites' picture shows it 2 in. very dense and compound in flower.


Deccan Peninsula; *Wight*.

Branches with 4 lines, ultimate branches terete. Leaves rounded and almostcordate at the base, opaque, thin, secondary nerves not prominent; petiole ½ in.—separated by *Triana* from *M. Heyneanum* from which it considerably differs. As to *Wight* Lc. t. 278 it exhibits exactly the leaves of the present species, but the inflorescence appears rather to belong to the next.

†††† Berry less than ½ in. diam. Inflorescence less than 2 in. Leaves 4–6 in., long-petioled, narrow-lanceolate, acuminate at the base.


Deccan Peninsula; Courtallum &c. *Wight*. Ceylon; up to 3000 ft., Thwaites.

Calyx-tube at the time of flowering broadly funnel-shaped, limb truncate. Disc obscurely rayed. Berries less than ¼ in. diam., spherical, nearly sessile.—The typical *M. Heyneanum* Benth. is a well marked and easily recognised plant: but the two varieties of Mr. Thwaites could never have been referred to it in the herbarium. Mr. Thwaites says the berry is as much as ⅜ in. diam. in the Ceylon plants, but his specimens at Kew do not show fruit.

Var. 1. *latifolius*; leaves broader a fresh green colour narrowed almost to the base so that there is scarcely any true petiole, nerves visible but slender and hardly impressed.—Thwaites No. 2468.

Var. 2. *aquistifolius*; leaves linear-lanceolate when dry orange yellow thick and opaque.—Thwaites No. 1555.
††††† Berry less than ¾ in. diam. Inflorescence less than 2 in. Leaves usually less than 4 in., distinctly acuminate, often rostrate, base not cordate, petiole short. (See also M. grande above). N.B. This series only differs from the M. edule series by the more distinct acumination of the leaves.


TAVOY; Wallich. TESSERASSIM and ANDAMANS; Helfer (Kew Distrib. No. 2328). MALACC; MAINGAY No. 817.—DISTRIBUT. Java, SUMATRA, Borneo.

Branchlets round (Blume says subquadrangular in M. leavigatum, terete in M. Myrtilli; but they seem all the same and never distinctly quadrangular). Leaves somewhat thin but opaque, nerves obscure but can be seen. Peduncles occasionally terminal as well as axillary. Calyx-tube at the time of flowering more than ½ in., wide, saucer-shaped. Disc on the apex of the ovary obscurely rayed. Berry ¾ in. diam., globose, subsessile, mouth small.

Var. sylvaticum, Thwaites Enum. 110 (sp.); petiole somewhat shorter, leaf long decurrent (but in Thwaites' example No. 1567 the leaves are petioled exactly as in M. sylvaticum).—Ceylon; alt. 2000-4000 ft.; common, Thwaites. As Mr. Thwaites remarks, some of his examples of M. sylvaticum are very near M. edule; they differ by the more acuminate leaves and the larger, sharply acute buds. Triana in Herb. inquires how the two differ.


TESSERASSIM OF ANDAMANS; HELFER (Kew Distrib. No. 2335).—DISTRIBUT. SUMATRA, JAVA.

Leaves somewhat thin, nerves all slender but visible. Calyx-tube at the time of flowering saucer-shaped. Disc on the apex of the ovary obscurely rayed.—This species is exceedingly near M. leavigatum; the leaves are narrower with a longer acuminations; the simple umbels at the summit of manifest peduncles give a slightly different look to the inflorescence.

32. M. plebejum, Kurz For. Fl. i. 513; leaves 2½-3½ in. elliptic-lanceolate acuminate acute at the base, petiole ½-¾ in., cymes lateral short, otherwise like M. edule.

PEGU; KURZ.

Leaves opaque, nerves scarcely visible, marginal quite obscure.—Kurz' example communicated exhibits neither flower nor fruit, so there must be doubt whether the subjoined var. belongs.

Var. silhetense: peduncles 0-½ in. clustered, inflorescence extending hardly ½ in., calyx-tube at the time of flowering saucer-shaped or somewhat funnel-shaped small, disc on the apex of the ovary prominently rayed. Chattuck, in the plain of Sylhet. H.f. & T.—Leaves exactly those of M. plebejum Kurz. Marked M. leavigatum Blume? by Triana, but the inflorescence as well as the leaves must be nearer M. plebejum, unless all are referable to one species.

VOL. II.
33. M. acuminatum, Smith ex Triana in Trans. Linn. Soc. xxviii. 158; leaves 2-2 1/2 in. broad-elliptic acuminated at both ends apex long rostrate obtuse, petiolo 1/4-1/2 in., peduncles solitary (or 2 together) 1/4-1/2 in., cyme somewhat lax compound, buds very acute not large.

Malacca; Griffith (Kew Distrib. No. 2325-1). Leaves nearly concolorous, opaque. Peduncles sometimes terminal as well as axillary. Disc on the apex of the ovary distinctly rayed.—This can hardly be more than a variety of M. levigatum; it differs by its decisively rostrate leaves and smaller flowers. Memecylon Maingay No. 810 (from Malacca) slightly differs by having the leaves much lighter coloured on the lower surface and shortly rostrate, the peduncles shorter, and is still nearer M. levigatum.

Var. flavescens; leaves 2 1/2-3 in. elliptic acuminated at both ends apex rostrate obtuse secondary and marginal nerves distinct, petiolo 1/4-1/2 in., inflorescence extending 1-1 1/2 in., peduncles clustered about 1/4 in., cyme-branches repeatedly shortly divided, flowers very small. Malacca; Griffith No. 2325-2.—Leaves concolorous, greenish yellow in the dried examples. Branches of the cyme minutely scabrous almost puberulous. Calyx-tube at the time of flowering saccus-shaped, limb truncate. Disc on the apex of the ovary distinctly rayed.—Marked as "nov. sp." by Triana.

34. M. fusescens, Thwaites Enum. 111; leaves 2-2 1/2 in. nearly sessile elliptic acuminate rostrate base acute, nerves slender but visible, inflorescence extending less than 1/2 in. Triana in Trans. Linn. Soc. xxviii. 159.

Ceylon; Kokool Corle, at no great elevation; Thwaites No. 2926, 287. Berry 1/4 in. diam., spherical, ex Thwaites.—Mr. Thwaites in a note on No. 2926 doubts if it is really distinct from M. levigatum var. sylvaticum (No. 36 above).

35. M. rostratum, Thwaites Enum. 111; leaves 1 1/2-2 in. elliptic acuminate rostrate apex obtuse base attenuate opaque coriaceous; inflorescence extending less than 1/2 in. Triana in Trans. Linn. Soc. xxviii. 159.


36. M. rhinophyllum, Thwaites Enum. 110; leaves 2-3 in. sub sessile elliptic acuminate apex obtuse base acute opaque nerves very obscure, inflorescence extending less than 3/4 in. Triana in Trans. Linn. Soc. xxviii. 159.

Ceylon; Central Province up to 3000 ft.; Walker, Thwaites, No. 2928, 2572. A small tree. Peduncles about 1/4 in., clustered; cymes small, somewhat dense; buds small, not acute. Flowers pale blue. Berry 1/4 in. diam., black-purple, spherical.—Diffs from the last species by its leaves sessile not acuminate at the base. These three Ceylon species (41, 42, 43) seem very close together, but Mr. Thwaites, who knows them alive, keeps them separate. But they are not so near together as the Malayan species of Blume in this same series. In this (as in so many other cases) there are only two courses open in order to represent all the material, viz., either a large grouping of existing species or the founding of a number of new ones on very slender grounds.

+++ Berry less than 1/4 in. diam. Inflorescence less than 2 in. Leaves usually less than 1/2 in., not acuminate though often acute, base not cordate.

38. **M. phyllanthifolium**, Thwaites ex Triana in Trans. Linn. Soc. xxviii. 159; leaves ¾ in. nearly sessile narrow-oblong obtuse narrowed at the base coriaceous opaque.

**Ceylon**, alt. 5000 ft.; Thwaites. Branches wiry, leaves approximate, resembling a small woody Phyllanthus. Flowers very small, usually 3 on an axillary peduncle about ¾ in. Berry small, spherical, crowned prominently by the calyx-limb, but not ripe.—Entirely unlike every other species in the genus.

39. **M. campanulatum**, C. B. Clarke; leaves 2½-4 in. subpetiolate elliptic acute base attenuated opaque, calyx-tube at the time of flowering distinctly campanulate.

**Malacca**; Griffith, Memecylon No. 5 (No. 2325 (not 2325–1 nor 2325–2) of Kew Distrib.).

Leaves suddenly narrowed, sometimes very shortly acuminate. Peduncle 9; pedicels ½–¾ in., clustered. Calyx-tube even in the bud campanulate, limb truncate. Buds somewhat acute. Disc on the apex of the ovary depressed, very obscurely rayed.—This has been treated as a var. of No. 23 M. coriuleum, Jack; it seems very much nearer M. levigatum, from which it differs chiefly in the round (not acute) base of the calyx-tube at the time of flowering.

40. **M. edule**, Roxb. Cor. Pl. t. 82; leaves 1½–3½ in. elliptic or ovate acute at both ends hardly acuminate, petiole ½–¾ in., nerves obscure, calyx-tube at the time of flowering saucer-shaped limb truncate.

**Eastern Peninsula and Ceylon.**

Flowers medium-sized, blue rarely white; buds obtuse or at least not very acute. Calyx-tube at the time of flowering saucer-shaped, limb truncate. Disc at the apex of the ovary depressed, obscurely rayed. Berry ½ in. diam., black-purple, globose or slightly ovoid, mouth about ¼ in. wide.—The first three varieties run completely together which will account for the variety of quotation of the synonyms by authors: var. 4 recedes further from the type. The remaining varieties are called species by most authors. _M. myrinosoides_, Blume, differs from _M. edule_ by its quadrangular branchlets. Triana reduces _M. umbellatum_, Wall. Cat. 4109, to _M. myrinosoides_, Blume: but the examples of Wallich 4109 have the branchlets exactly round.


Var. 2. _ramiflora_; inflorescence densely clothing the branches, peduncle often (but not always) wanting. _M. edule_, Lamk. Dict. iv. 88; DC. Prodr. iii. 6; W. & A. 0 0 2


VAR. 5. leta; nerves distinct, peduncles elongate often 1–1½ in., pedicels 0, calyx prominently 4-toothed. M. capitellatum, Thwaites Enum. 110 (not of Linnaeus).—Ceylon; Thwaites No. 1564, 1565; Walker; Moon; Major Champion.—Called Samara leta by Moon in Herb. by which he understood Burmann's Fl. Zeyl. t. 30; also M. Walkeri, Hook. in Herb.: also marked nov. sp. by Triana in Herb. Hook.

VAR. 6. rubro-cereulea, Thwaites Enum. 415 (sp.); Triana in Trans. Linn. Soc. xxviii. 159.—Ceylon; East Matelle; Thwaites.—Mr. Thwaites says this differs from M. edule by the leaves more acuminated with the base more rounded. But the specimen (No. 3809) sent to Kew has the leaves very obtuse not at all acuminated, and narrowed into the petiole at the base: in short it is a typical example of M. edule var. 1 typica.

VAR. 7. cuneata, Thwaites Enum. 112 (sp.); Triana in Trans. Linn. Soc. xxviii. 159.—Ceylon; alt. 3000 ft.; Thwaites No. 2538.—The leaves are cuneate attenuate at the base, so that in some there is hardly any petiole; otherwise the same as M. edule.

VAR. 8. leucantha, Thwaites Enum. 110 (sp.); Triana in Trans. Linn. Soc. xxviii. 159.—Ceylon; alt. 3000–5000 ft.; Thwaites; Gardner.—This differs from M. edule by its white flowers and its leaves more distinctly nervied.

VAR. 9. scutellata, Triana in Trans. Linn. Soc. xxviii. 157. M. myrtifolium, Wall. Cat. 4111. M. obtusum, Wall. Cat. 4110. M. punctatum, Prest. and scutellatum, Naud. ex Kurz For. Fl. i. 513.—Transgrangetic Peninsula from Chittagong to Singapore.—Distrib. Malay Archipelago. Leaves very thick, opaque, obscurely punctulate on both surfaces, narrowed much at the base, subepi-petioled; otherwise much like M. edule type.—Kurz separates specifically M. punctatum, Prest, having the calyx with a tuberulated base, from M. scutellatum, Naud.; having the calyx with a smooth base. But both these descriptions of calyx may be seen on one branchlet, as in Hefler No. 2380 Kew Distrib.; the tuberulation is caused by an insect.

VAR. 10. Thwaitesii; calyx-tube in the bud distinctly campanulate, teeth after flowering triangular. M. umbellatum, Thwaites No. 387, not of Burmann.—Ceylon, alt. 3000 ft.—Burmann states that his umbellatum, Fl. Zeyl. t. 31 is called Wary-kaha by the Cinghalese, a name attributed by Thwaites to M. capitellatum, Linn. It appears closely allied to M. capitellatum, Linn. but the very broad base of the calyx in bud is unlike M. edule.

VAR. 11. Rottleriiana; inflorescence lax extending 2–2½ in.—Deccan Peninsula?—Called M. capitellatum by Heyne in Herb. Rottler and probably the extreme form of that variety.

VAR. 12. molesta; branchlets distinctly quadrangular. Anamallay Mts.; Wight No. 1072.—Wight's specimens are ample and beautifully preserved: they are exactly M. edule var. 2. ramiflorum, except that the branchlets (and even the branches) are quadrangular. They are sufficient to shake the faith of any botanist in the whole existing arrangement of the species of Memecylon.

DOUBTFUL AND EXCLUDED SPECIES.

M. subquadrangulare, DC. Prodr. iii. 6; no example known, and not recognizable from description.

M. Royenii, Blume Mus. Bot. i. 360, is probably some form of M. edule, Roxb., for Blume states that it is the Wellie Kala of Burmann's herbarium.

M. Floribundum, Wall. Cat. 4113 is a Eugenia.
M. pyriforme, Wall. Cat. 4106 is not Melastomaceous.
M. pachylobum, Wall. Cat. 4114 is Canthium gomertum, Miq.
M. acuminatum, Wall. Cat. 4105 is not a Memecylon.
M. surcinervium, Miq. var. grandifolia, Kurz in Journ. As. Soc. 1876, pt. ii.
131, from the Nicobars, with leaves 8–10 in., and obovoid-oblong berries \(1\frac{3}{4}\) in. diam.,
is perhaps next to M. heteropleurum No. 19, but we have seen no specimen.
Two branches with detached leaves and fruits collected by Dr. T. Anderson at
Singapore are referred by Triana to Pachycentria tuberculosa, Korths, a Borneo
species. The identification appears correct; but this very imperfect material is the
only ground for supposing that the species has been collected within the limits of the
present Flora.

ORDER LXI. LYTHRACEAE. (By C. B. Clarke, F.L.S.)

Trees shrubs or herbs; branches often quadrangular. Leaves entire, oppo-
site, sometimes alternate or whorled; stipules 0. Inflorescence various, often in
cymes or panicles. Flowers hermaphrodite, regular, rarely oblique, unisexual in
Crypteronia. Calyx-tube free, persistent; lobes 3–6, valvate, accessory often
added. Petals as many as the calyx-teeth, rarely 0, inserted near the top of the
calyx-tube. Stamens definite or very many, inserted on the calyx-tube. Ovary
free, in the bottom of the calyx-tube (rarely inferior), 2–6-celled; style long,
stigma capitate rarely 2-lobed; ovules very many, placentas axile (rarely pa-
rietal). Fruit coriaceous or membranous, free or more or less adnate to the
base of the calyx, 2–6-celled or by imperfection of the partitions 1-celled,
dehiscent or not. Seeds many, various in shape, angular round or winged,
albumen 0; embryo straight, cotyledons convolute in Sonneratia and Punica.—
DISTR. Species 250; in the tropics of the whole world especially of America;
a few species scattered over the temperate zones.

Nesia triflora, Kunth, introduced into Wight and Arnott's Prodromus (p. 307),
is a Mauritian plant collected occasionally in India.

TRIBE I. Ammanniaeæ. Low or aquatic herbes with small or minute
flowers. Calyx membranous.

Herbs growing in moist places .......................... 1. Ammannia.
Herb growing in water the flower-spike exsert .................. 2. Hydrolythrum.

TRIBE II. Lythraceæ. Trees or shrubs. Calyx herbaceous or coriaceous.
Petals often large wrinkled.

* Calyx curved, flowers secund.

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** Calyx straight, flowers symmetric.

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| 6-fid. | circumsciss. | | 4. Pemphis.
| 4-fid. | irregularly breaking up | | 5. Lawsonia.

Anomalous genera with inferior ovary:

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<td>11. Axinandra.</td>
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I. AMMANNIA, Linn.

Annual glabrous herbs growing in damp places; branches often quadrangular. Leaves opposite and alternate, sometimes whorled, entire; stipules 0. Flowers small, axillary, solitary and subsessile, or in small trichotomous cymes; bracteoles usually 2. Calyx campanulate or tubular-campanulate, 3-5-toothed, often with minute interposed teeth or folds. Petals 3-5 or 0, small, inserted between the calyx-teeth. Stamens 2-8, inserted on the calyx-tube. Ovary enclosed in the calyx-tube, 1-5-celled, the septa very thin often absorbed; style filiform or short, stigma capitate; ovules very many, placenta axile. Capsule membranous, globose or long-ellipsoid, enclosed in the calyx, 2-3-valved, or irregularly breaking up or circumsciss. Seeds many, often nearly covering the placenta which is often ultimately free central, small, smooth, round on the back, raphé on the inner face, ellipsoid or nearly hemispheric.—Distri. Species 80, in the tropics and warm temperate zones of the whole world.

Subgenus I. Rotala. Flowers axillary, solitary or in sessile spikes. Capsule 2-4-valved.

* Calyx in fruit campanulate, longer than broad.


India; common, in rice fields &c. throughout the plains and in warm places in the lower mountains.—Distri. Malaya to the Philippines and Canton; Cabul and Persia.

Stems decumbent often rooting or erect, 3-12 in. high. Leaves opposite, larger on the main stem, ½-3 in., elliptic, narrowed at the base, sometimes almost petiolated. Flowers often approximate in numerous sessile axillary spikes, solitary, sessile in the axils of reduced floral leaves; bracteoles 2 minute, lanceolate: or flowers sometimes strictly axillary, distant. Calyx-tube long-campanulate, scarcely striate; teeth 4, often pink, acute, triangular in fruit, accessory teeth obscure or 0. Petals 0; or 4 small. Capsule ellipsoid, longer than broad. Seeds pink, somewhat angular, hilum quite obscure.

2. A. Ritchiei, C. B. Clarke; cauline leaves elliptic nerves not prominent beneath, capsule 4-valved, seeds nearly hemispheric.

Belgum, in rice fields, Ritchie.

Stems 6-12 in. rooting amongst floating weeds (Ritchie). Leaves opposite, cauline ½-3 in., elliptic, sessile. Flowers solitary, distant, lower distinctly pedicelled. Calyx long-campanulate, truncate; teeth 4, minute, hardly so large as the minute interjected ones. Petals 4, minute, rose. Capsule ellipsoid, longer than broad, as long as the calyx-tube. Seeds brown-yellow, elliptic, peltate.

3. A. rotundifolia, Ham. in Don Prodr. 220; leaves orbicular, flowers sessile close-packed in terminal spikes, capsule 4-valved. Roxb. Fl. Ind. i. 425;
Ammannia.]

LXI. LYTHRACEE. (C. B. Clarke.)


India; common, in rice fields &c. throughout the plains and in warm places in the lower mountains; not received from Ceylon.—Distrib. China, Formosa.

Rooting and creeping extensively so as often to form large patches in moist turf; stems usually 4-6 in., roundish and leafy. Leaves ½ in. diam., opposite, sessile or shorty petioled, nerved, approximate below becoming distant towards the spikes. Flower-spikes dense, pedunculate, often 3 sometimes one only, sometimes panicked; floral leaf one to each flower, ovate or oblong, bracteiform, bracteoles 0 or most minute. Calyx-tube campanulate, not elongate; teeth 4, acute, triangular, without interjected folds. Petals 4, obovate, twice the length of the calyx-teeth, bright rose. Capsule ellipsoid, a little longer than broad. Seeds brown-yellow, elliptoid, peltate.—In this species, in A. floribunda below, and probably in others, the flowers are dimorphic; one kind has the stamens included and the style very long-exserted, the other kind has the stamens long-exserted and the style short: these are doubtless reciprocally fertile in the manner discovered by Mr. Darwin for Lythrum Salicaria. No stress must be laid on the descriptions of the length of the style in this genus.


Central India from Banda to the Concan and Behar. East Bengal; Griffith No. 2310.

Erect, or but shortly creeping at the base; varying from simple stems 3-4 in. to very compound stems 8-10 in. Leaves ½-½ in., sessile or nearly so, often acute. Flower-spikes dense, on filiform peduncles; floral leaf one to each flower, oblong or lanceolate, bracteoles lanceolate, exceeding half the length of the calyx. Calyx-tube campanulate, much more elongate than that of A. rotundifolia; teeth 4, acute, without interjected folds. Petals 4, obovate, not much longer than the calyx-teeth. Capsule ellipsoid, much longer than broad. Seeds brown-yellow, elliptic, peltate.

5. A. floribunda, C. B. Clarke; leaves alternate, upper narrow-oblong or linear, flowers sessile close packed in terminal spikes, capsule 2-valved. Ameletia floribunda, Wight Ill. 206, not good and the reference to the figure wrong; Hook. Ic. Fl. t. 826; Dalz. & Gibbs. Bomb. Fl. 96. Nimmonia floribunda, Wight in Madras Journ. of Science vi. 34, t. 20.

Mahabaleshwar Hills, Bombay; Law, Stocks.

Erect or but shortly creeping at the base; stems often much branched, 8-10 in. Lower leaves 1-2 in., broad-oblong, obtuse, sessile, base broad, upper leaves ½-½ in., linear or narrow-oblong. Flower-spikes dense on filiform peduncles; floral leaf one to each flower, oblong or lanceolate; bracteoles lanceolate, exceeding half the length of the calyx. Calyx-tube campanulate, elongate, like that of A. tenuis; teeth 4, acute, without interjected folds. Petals 4, obovate, nearly twice the calyx-teeth, bright rose. Capsule ellipsoid, much longer than broad. Seeds brown-yellow, elliptic, peltate.—Very closely allied to the preceding species.


**Sikkim Terai near Siligori; Kurz, C. B. Clarke.**

**Stems** 2–4 in., procumbent. **Leaves** 1/2–1 in., linear or narrow oblong, obtuse. **Flowers** scattered, not at all spicate. **Calyx-tube** elongate-campanulate, 5-ribbed; **teeth** 5, triangular, acute; **petals** and sometimes the whole tube with minute scattered hairs, accessory **teeth** 0. **Petals** minute. **Capsule** ellipsoid, much longer than broad. **Seed** half-ellipsoid, excavated on the plane face.

**Calyx in fruit hemispheric, tube as broad as or broader than long.**


**Khasia Mts., alt. 2000 ft., H. f. & T.; Rajmahal Hills (Bengal), Kurz; throughout Chota Nagpore, alt. 1000–2000 ft., C. B. Clarke. Calcutta; Botanic Garden, Kurz.**

**Stems** tufted, 1–3 in. **Leaves** 1/2–1 in., linear or narrow-oblong, at the base narrower almost petioled, obtuse often with two points (as described by Harvey in Suffrenia capensis). **Flowers** not spicate, most minute. **Calyx-tube** short; **teeth** 4, triangular, accessory **teeth** 0. **Petals** if any minute, not yet seen. **Stamens** 2 (occasionally 3–4 Kurz). **Capsule** spherical, slightly acute. **Seeds** black, half-ellipsoid or nearly half-spherical, excavated on the plane face.—Kurz says the capsule is 3-valved: the very perfect examples from Chota Nagpore have the capsule 2-valved *Suffrenia capensis*, Harvey *Thees. Capens*. ii. t. 189, differs from the Indian plant only in the larger and longer capsule. Compare *Rotala filiformis*, Hiern in *Oliv. Fl. Trop. Afr.* ii. 468, where Harvey’s linear-leaved plant is united with the European *Suffrenia* which has oblong, broad-based leaves.


**Chittagong; tropical rice fields; H. f. & T., Kurz.**

**Stems** decumbent, 1–2 1/2 in. **Lower leaves** 1/2 in., almost petioled, upper somewhat obovate. **Flowers** small, lower distant, upper approximate. **Calyx-tube** short; **teeth** 4, triangular, accessory **teeth** 0. **Capsule** globose, much longer than the calyx. **Seeds** black, subhemispheric, excavated on the plane face.

Throughout Tropical India, in moist places, very common.—DISTR. China, Malaya: and (including the varieties below enumerated) Australia and Tropical Africa.

Stems 6-12 in., often with many opposite branches divergent at right angles and covered with flowers. Cauline leaves usually 1 in., upper floral leaves becoming bracteiform, oblong, base broader. Flowers often approximate, never in distinct spikes; bracteoles subulate as long as the calyx. Calyx-teeth 5, lanceolate, very acuminate; accessory teeth 5, subulate, often as long as the primary teeth. Petals 5, narrow-ovate, small or 0. Capsule spherical or globose-depressed. Seeds black, hemispheric, excavated on the plane face.


Var. fimбриата, Wight Ic. t. 217 (sp.); cauline leaves longer narrower often cor date, at the base, petals larger sometimes fimбриate. A. Ḥeyneana, Wall. Cat. 2104. A. hexandra, Wall. Cat. 2103.—Wallich's example has six stamens, otherwise is exactly A. fimбриата, Wight.

Subgenus II. Eu-Ammannia. Flowers in whorls, cymes or clusters. Capsule circumsciss or bursting irregularly.


Cryptotheca apetala, Blume Bijtd. 1128; DC. l. c. 76.


Glabrous, erect, 6-8 in. sometimes 2 ft. Lower leaves and branches usually opposite; cauline leaves 1-2½ in., usually narrow but obtuse. Calyx-tube hemispherical; teeth 4, broad, triangular, accessory folds or teeth small. Petals usually 0, or small. Capsule depressed, imperfectly circumsciss above the middle. Seeds black, subhemispheric, excavated on the plane face.


Punjab; Edgeworth, T. Thomson. Kumaon, alt. 4000 ft.; Strachey & Winterbottom. Behar; J. D. H. East Bengal; Griffith. Concan; Stocks, Ritchie. Deccan Peninsula; Wight 981; Perrottet.—DISTR. Tropical Africa.

Glabrous, erect, sometimes 2 ft. high, leaves and branches opposite. Cauline leaves often 2 in. by less than ½ in., frequently coriaceous at the base. Calyx in fruit hemispheric; teeth 4, erect, triangular, too short to close over the capsule; accessory
folds usually present but small. **Capsule** reddish, exactly like that of *A. baccifera*. Seed half-obovoid, excavated on the plane face, one end much smaller than the other.—*A. verticalissima*, Boiss. Fl. Orient. ii. 743, has the leaves attenuated to the base; and is therefore *A. baccifera*, Linn., for the only character by which *A. baccifera* can be distinguished from *A. salicifolia*.


**Eastern Bengal, Noakhali, C. B. Clarke. Deccan Peninsula; Wight. Ceylon; Thwaites.**

Glabrous, erect, 12–18 in., leaves and branches opposite. Cauline leaves 1–1½ in., margins often white cartilaginous. **Flowers** very shortly pedicelled, but not congested. **Calyx-tube** campanulate with 4 green striations; teeth 4, triangular, connivent over the capsule; accessory teeth as 4 small prominent horns. **Capsule** globose, much larger than that of *A. salicifolia*, not becoming red pseudo-baccate as does that of *A. baccifera* and *A. salicifolia*. **Seeds** subhemispheric, excavated on the plane face.

14. **A. lanceolata**, Heyne in **Wall. Cat.** 2106 B., C.; leaves opposite oblong-elliptic attenuate to the base scarcely petioled, flowers 2–5 shortly pedi- celled in each axil, calyx campanulate minutely pubescent, petals large. *A. verticalissima*, W. & A. Prodr. 304, **excl. all syn.** *A. salicifolia*, *Thwaites* Enum. 121, as to var. a. only.—**Rheed* Hort. Mal. ix. t. 84?.

**Deccan Peninsula, Wight. Red hills of the Carnatic; G. Thomson. Ceylon; Thwaites.**

Erect, 4–16 in., branches numerous, opposite. Cauline leaves 1–1½ in., margins often white cartilaginous, younger leaves usually puberulous punctate or subpubes- cent. **Flowers** not congested, often whorled; bracteoles linear, obtuse, green, as long as the calyx. **Calyx-tube** campanulate, ovoid; teeth 4, triangular, short, with 4 shorter triangular exterior teeth. **Petals** exceeding much the calyx, larger than in any other species of *Eu-Ammania*. **Capsule** globose. **Seed** subhemispheric, ex- cavated on the plane face.


Glabrous, erect, 6–24 in., branches sharply quadrangular. Cauline leaves 1–2 in. **Bracteoles** on the cyme-branches minute, linear. **Calyx** campanulate, with 4 or 8 green lines becoming indistinct in fruit; teeth 4, broad-triangular, teeth obscure. **Petals** 0 or caducous. **Stamens** 6 or 8. **Capsule** becoming ultimately red, much exceeding the calyx-tube. **Seeds** half-ellipsoid, excavated on the plane face.—This species is distinct so far as the Indian material is concerned. Some *African* ex- examples have the cyme much closer and are doubtfully separable from *A. salicifolia* above. *Kurz* (in **Journ. As. Soc.** 1877, pt. ii. 85. 86) gives Chittagong as a locality for this plant: which may be so, or his plant may have been *A. cordata* No. 13.

16. **A. multiflora**, Roxb. Fl. Ind. i. 426; leaves opposite elongate-oblong sessile subauriculate at the base, cymes peduncled compound, capsule 1⁄2 in. diam. globose. **DC. Prodr.** iii. 79; **W. & A. Prodr.** 305; **Wall. Cat.** 2101;
2. HYDROLYTHRUM, Hook. f.

A glabrous aquatic herb. Lower leaves whorled, linear. Spikes exsert out of the water with oblong bractiform leaves. Flowers whorled, sub sessile in the axes of bracts, lower whorls distant, upper approximate, often with opposite bracts; bracteoles 2, subulate. Calyx campanulate; teeth 4, triangular; accessory teeth 0. Petals 4, inserted between the calyx-lobes. Stamens 4, on the middle of the calyx-tube. Hypogynous scales 4, bifid. Ovary in the bottom of the calyx, free, 2-celled; style simple, stigma capitulate; ovules not many, placentas axile. Capsule small, globose, 2-celled. Seeds 3 or 4 in each cell, ovoid, concave.—A genus only separable from Ammannia by habit: for hypogynous glands exist in Amm. rotundifolia.


Stems 8 in., weak, little divided, probably erect in the water. *Leaves* ½-⅓ in., about 8-12 in each whorl; emersed leaves ¾ in., acute or obtuse. *Calyx* without accessory teeth. *Petals* elliptic, rose-coloured, far exceeding the calyx-teeth. *Capsule* not ripe in the Indian examples, dehiscing septicidally from the apex in the African. —Mr. Hiern says (in *Oliv. Fl. Trop. Afr.* ii. 469) that the Angola plant is conspecific with the Tavoy plant; but it appears conspecific.


A shrub. *Leaves* opposite, subsessile, entire, lanceolate, beneath whiter and with black glandular dots. *Flowers* in short panicked cymes on axillary peduncles, rarely solitary, scarlet; pedicels 2-bracteate at their base. *Calyx* long-tubular, slightly curved, mouth oblique; teeth 6, short, with 6 minute accessory teeth. *Petals* 6, small or 0, inserted at the top of the calyx-tube. *Stamens* 12, declinate, inserted on the calyx-tube below its middle. *Ovary* at the bottom of the calyx-tube, free, sessile, oblong, 2-celled; *style* filiform, stigma small; ovules very many, *placentas* axile. *Capsule* ellipsoid, membranous, included in the calyx. *Seeds* very many, narrowly cuneate-ovulate, quite smooth, without hairs or papillae.


Throughout India, common; ascending to 5000 ft.; but not seen in the alluvial mud of Bengal.—Distr. Beloochistan, Tropical Africa, Madagascar, China.

A shrub with long spreading branches, brilliantly red with flowers in the hot season. *Leaves* 2-4 in., opposite or subopposite, usually rounded or cordate at the base (but one African form has leaves attenuate at the base); usually grey pubescent beneath, sometimes quite glabrous. *Calyx* ½-⅓ in., bright red. *Petals* scarcely longer than the calyx-teeth. *Seed* (figured by Blume and by Beddome as densely covered by long papillae and stated by Kurz to be papillose-pilose) in every example at Kew entirely glabrous not exhibiting at any period of its development the smallest trace of a papilla.—This shrub is very uniform in character throughout India: the African examples vary much more. It is trimorphic after the manner described by Mr. Darwin in *Lythrum Salicaria*. See *Hiern in Oliv. Fl. Trop. Afr.* ii. 481.

4. **PEMPHIS**, Forst.

A maritime shrub or tree, attaining 35 ft. *Leaves* opposite, oblong, entire, very thick, fleshy. *Flowers* axillary, solitary, peduncles 2-bracteate at their base. *Calyx-tube* campanulate, 12-∞-ribbed; teeth 6, short, with 6 shorter accessory teeth. *Petals* 6, inserted at the top of the calyx-tube, nearly as long as
it, obovate, wrinkled, white or rose. *Stamens* 12, inserted in two series towards the middle of the calyx-tube. *Ovary* free, at the bottom of the calyx-tube, 3-celled at the base; style long, stigma capitate; ovules many, ascending, placenta 3 sub-basal. *Capsule* coriaceous, obovoid or nearly globose, included in the calyx-tube or exerted nearly half its length, circumsciss somewhat irregularly, ultimately 1-celled. *Seeds* very many, long cuneate-obovoid, angular, smooth, standing out in all directions from what appears to be a free central placenta.


Southern coasts of both Peninsulas and of Ceylon.—Distr. Tropical coasts of the Old World

Branchlets young leaves and inflorescence with short grey hairs. *Leaves* 1 by $\frac{3}{8}$ in. *Peduncle* $\frac{3}{4}$ in. *Capsule* $\frac{1}{2}$ in. diam.

5. **Lawsonia**, Linn.

A glabrous erect shrub with round branches, sometimes spinous. *Leaves* opposite, entire, lanceolate. *Flowers* rather small, in large terminal panicked cymes; bracts small, deciduous. *Calyx-tube* exceedingly short; lobes 4, ovate. *Petals* 4, obovate, wrinkled, inserted at the top of the calyx-tube. *Stamens* usually 8, inserted in pairs between the petals, sometimes 4 only or 8 not paired. *Ovary* free, 4-celled (or 4-celled at the base); style very long, stigma capitate; ovules many, placenta axile. *Capsule* coriaceous, globose, exert, irregularly breaking up, ultimately 1-celled. *Seeds* many, angular, pyramidal, smooth, packed on a central placenta.


Throughout India, very common, cultivated; perhaps wild in Western India.—Distr. Cabul, Persia. Cultivated in many tropical and warm temperate regions.

About 6 ft. high, often trimmed so as to make a close fence. *Leaves* $\frac{3}{4}$-1$\frac{1}{2}$ in., narrowed at the base, sometimes very shortly petioled, acute or obtuse. *Flowers* $\frac{1}{4}$ in. diam., sweet-scented, rose or white. *Sepals* $\frac{1}{3}$ in., permanent. *Capsule* size of a pea.

6. **Crypteronia**, Blume.

Trees. *Leaves* opposite, petioled, entire, ovate or lanceolate. *Racemes* elongate, in branched panicles. *Flowers* minute, white or green, with short linear bracts at the base of the pedicels, polygamo-dieicious. *Calyx-tube* short, saucer-shaped, or longer subhemispheric; teeth 5 (rarely 4), valvate, persistent. *Petals* 0. *Stamens* as many as the calyx-teeth, inserted between them near the
top of the calyx-tube. **Ovary** free, globose, 2-celled; style long, stigma capitulate sub-2-fid; ovules many, placentas axile. **Capsule** 2-celled, globose, pubescent, crowned by the persistent style, dehiscent at the vertex across the dissemination so as to divide the style; fruit-pedicel deflexed. **Seeds** many, long-ellipsoid, tests produced at each end.—**Distrib.** Species 5 extending from Eastern Bengal to the Philippines.—The branches appear all functionally dioecious; those that perfect seed have all the stamens with short filaments; those that have stamens with long filaments have an ovary and style but set no seed.


Rangoon; **McClelland**. **Mergui**; **Griffith**, No. 2512–2 (marked **H. affinis** by Planchon). **Pinang**.

**Tree** 80 ft. (attaining 80 ft. fide Kurz); branchlets nearly glabrous. **Leaves** 3–4¼ in., from broad-elliptic to lanceolate, narrowed at both ends; pubescence beneath yellowish or brownish. **Panicules** pubescent; pedicels scarcely 1/32 in. **Calyx** very small, in fruit being quite flat, not at all cup-shaped. **Capsule** in **H. pubescens** Wall. exactly the same size as in **H. affinis** Planch.; in both the fruits are sometimes barren and twice the normal size, probably from the attack of an insect.

**Var. Hookeri**; leaves glabrous beneath, panicle pubescent or rarely glabrous. **C. paniculata**, Kurz in Journ. As. Soc. 1877, pt. ii. 86; **For. Fl.** i. 519, not of Blume. Henslovia Hookeri, Wall. Cat. 8566. **H. affinis**, as to the glabrous portion, Planch. in **Hook. Lond. Journ. Bot.** iv. 477. **H. pubescens**, **Griff. Notul.** iv. 404 and **Ind. Pl. Asiat.** t. 564, fig. ii.—Amherst and Tavoy; **Wallich**. **Mergui**; **Griffith** and **Helfer** (No. 2512 Kew Distrib.). **Malaya**; **Maingay** No. 650–2.—**Henslovia teptostachys**, Planch. (with which **H. paniculata**; **Miq. coincides**) differs by the smaller flowers much more remotely placed on more slender racemes. From Kurz's description (glabrous leaves) it seems that his **C. paniculata** exactly coincides with Wallich's **H. Hookeri**, and does not include (as Mr. Kurz supposes it does) the plant of Griffith. **C. pubescens** and **C. glabra** may possibly be united under **C. paniculata**, Blume, but **C. Griffithii** is distinct.


**Khasia** Mts., alt. 1000–3000 ft.; **Wallich**; **H. f. & T. Chittagong**, alt. 1000 ft.; **H. f. & T.**—**Distrib.** **Philippines**.

An erect tree, 50–60 ft. **Leaves** lanceolate or elliptic-lanceolate, narrowed at both ends, membranous, nerves prominently raised beneath but slender. **Panicle**-branches glabrous or minutely pubescent; pedicels 1/32 in.


**Malacca**; **Griffith No. 2513. Malaya**; **Maingay**.

**Leaves** 5–7 in., elliptic-lanceolate, the nerves raised beneath and thick.—This is very near **C. Cumingii**, Planch. of the Philippines, and may be a variety of it. **C. Cumingii** has a grey pubescence on the panicle, the pedicels are 1/8 in. or more, the calyx is smaller.
Trees or shrubs. Leaves opposite, distichous (or the uppermost alternate), entire, oblong or ovate. Panicles axillary and terminal, usually trichotomous, sometimes dense; peduncles 2-bracteate at their apex; pedicels 2-bracteolate. Flowers often large. Calyx-tube funnel-shaped, smooth grooved angular or subulate; lobes 6 sometimes 7–9, ovate, subacute, valvate. Petals 6 sometimes 7–9 (or 0), inserted at the summit of the calyx-tube, clawed, wrinkled, margin crisped erose or fimbriate. Stamens very many, inserted near the bottom of the calyx-tube; filaments long, exsert. Ovary sessile, in the bottom of the calyx, 3–6-celled; style long, bent, stigma capitate; ovules very many, ascending, placentas axile. Capsule more or less adnate to the calyx, ellipsoid, coriaceous, smooth, 3–6-celled, 3–6-valved. Seeds many (rarely few), elongate, flat, erect, winged from their summit.—Distrib. Species 18, in South-east Asia extending to Australia; Burma being the centre of the genus.


* Calyx glabrous or puberulous, not fulvous-tomentose.


Throughout India; common in gardens; possibly wild in the eastern boundary:—Distrib. Cultivated throughout the warm parts of Asia originally from China.

A shrub, showy in flower. Leaves 2 in., glabrous, elliptic or oblong, sessile, acute or somewhat obtuse at each end, never acuminate. Panicle not condensed, minutely pubescent or glabrous. Petals bright pink. Calyx-teeth on the fruit long-triangular, erect but distant, thin not woody. Seed ¼ in. including its wing.

2. *L. parviflora*, Roxb. Hort. Beng. 38; Cor. Fl. t. 66; Fl. Ind. ii. 505; leaves glabrous or shortly pubescent beneath, petiole less than ½ in., petals less than ¼ in., calyx-teeth ultimately woody erect closely adpressed to the fruit. DC. Prodr. iii. 93; Wall. Cat. 2119 altogether not partly as say W. & A. Prodr. 308; Wight Ic. t. 60; Griff. Ic. Pl. Asiatic. t. 592; Bedd. Fl. Sylv. t. 31; Dalz. & Gibbs. Bomb. Fl. 98; Brand. For. Fl. 239; Kurz For. Fl. i. 521. L. Fatiaoa, Blume Mus. Bot. ii. 125. Fatiaoa nepaulensis, Wall.; DC. Prodr. iii. 89.

At the base of the Western Himalaya, alt. 1000 ft. Throughout the Deccan Plateau (i.e. everywhere south from the Gangetic Plain), alt. 1000–3000 ft.; abundant. Not in Central Bengal, nor Ceylon.—Distrib. Aya.

A tree, attaining 60 ft. Leaves 2–3½ in., glabrous in the typical plant, oblong, acute or acuminate with the apex obtuse, beneath a lighter colour, often prominently reticulate. Panicles many- or few-flowered, not condensed. Calyx glabrous puberulous or minutely pubescent, in fruit somewhat funnel-shaped at the base, teeth small. Petals narrow, white. Capsule variable in size, in the typical plant ½–1 by ½–¾ in. Seeds (with the wing) ½ in. and upwards.

Var. 1. *majuscula*; leaves glabrous larger sometimes 4–5 by 2 in., fruit very large, sometimes exceeding 1½ by 1 in. L. lanceolata, Bedd. Fl. Sylv. t. 32, not of Wall.—Common on the north-eastern edge of the Deccan Plateau in Chota Nagpore and Behar.—Dr. Brandis (For. Fl. 240) supposes that Col. Beddome has made the grave
error of adding the fruit of one species to the leaves and flowers of another. Col. Beddome's figure is correct, but it is not *L. lanceolata* Wall. *L. corymbosa*, Griff. in *Herb.* is this, but the ticket of locality "East Bengal" is doubtful. This variety is not known from East Bengal.

**Var. 2. benghalensis**; leaves pubescent beneath at least on the midrib, fruit smaller than in the type, often less than \( \frac{3}{8} \) in., fruit-calyx campanulate instead of funnel-shaped at base. — Nipal; *Wall. Cat.* 2119 partly. Sikkim; alt. 1000–5000 ft.; J. D. H., Gambel, C. B. Clarke. Assam; Mrs. Mack. Birma; Griffith, whence his *Lc. Pl. Asiat.* t. 502.


**Malabar Coast**; from Bombay to Travancore, plentiful; no specimen from Coromandel.

Tree 30–50 ft. *Leaves* 3 in., elliptic-lanceolate, narrowed to both ends. *Panicle* generally compound, never condensed. *Calyx* rarely glabrous usually pubescent, sometimes white and shortly tomentose. *Capsule* usually smaller than that of *L. parviflora*, \( \frac{3}{8} \) by \( \frac{3}{8} \) in.—A species distinguishable from all the forms of *L. parviflora* by its calyx-teeth patent in fruit and its longer petioles. Wallich's name is adopted in preference to that of Wight who confounded the plant with *L. parviflora*.

4. **L. venusta**, Wall. *Cat.* 2117; calyx-tube in bud smooth ovoid white puberulous with 6 linear accessory teeth outside the primary teeth, appearing as prominent horns on the buds.

**Birma**; Melloon on the Irrawaddy near Thayet Myoo; Wallich.

*Leaves* 3–4\( \frac{3}{8} \) in., elliptic-oblong, acute, glabrous. *Panicle* large, not condensed, white, puberulous. *Bud* as large as a pea, much larger than that of *L. parviflora*.

**Calyx** with abundant fulvous or brown-red tomentum.

5. **L. Rottleri**, C. B. Clarke; leaves stellately fulvous-tomentose beneath, capsule \( \frac{3}{4} \) in. resembling that of *L. parviflora*.

**Deccan**; Rottler.

*Leaves* 3 in., lanceolate, glabrous above, midrib tomentose; petiole \( \frac{3}{8} \) in. *Panicle* lax, tomentose. *Calyx* in the bud fully \( \frac{3}{8} \) in., with dense brown-red stellate wool without any trace of grooves or ribs. *Seed* \( \frac{3}{8} \) in. including the wing.—Named by Rottler *L. hirsuta*. *Rheede Hort. Mal.* iv. t. 22; but this species, which is only known from Rheede's figure, is represented as having a deeply-grooved calyx.

6. **L. calyculata**, Kurz in *Journ. As. Soc.* 1872, pt. ii. 307; *For. Fl.* i. 522; leaves puberulous beneath, capsule \( \frac{3}{4} \) in.

**Martaban**; Kurz.


**Sect. II. Adambea.** Calyx-tube grooved, ribbed or subulate.

† Adult leaves glabrous or nearly so.

From Assam to Malacca, abundant. Hills of the Deccan Peninsula, common; and in Ceylon. In North-West India only cultivated?—Distr. Malaya and China, in many cases perhaps cultivated.

A tree, reaching 50-60 ft., sometimes when old having on its trunk and larger branches a few strong straight spines 1-3 in. (See *Hain. in Trans. Linn. Soc.* xvii. 177.) Leaves 4-8 in., from broad-elliptic obtuse to long-lanceolate. Panicle large, lower branches often 6 in., curved, ascending, flowers scattered. Petals commonly 1 in. (sometimes more), mauve, margins erose-undulate, hardly filbriate. Calyx in fruit thickened, wooly; lobes triangular spreading. Fruit large, sometimes reaching 1½ in. by 1 in. (Wallich reduced his *L. macrocarpa* number 913 to *L. Flos-Reginae*, and also sank his herbarium names *L. oblonga* and *L. glaucescens.*)

**Var. augusta**, *Wall. Cat.* 2113; leaves 15 (excl. petiole) by 6 in.; fruit 1½ in., more acute at the apex. Irrawaddy, *Wallich*. Rangoon; *McClæland*.—This may possibly be the plant which Mr. Kurz (*For. Fl.* i. 524) means to preserve as the species *L. macrocarpa*. Not merely the leaves on young plants but the leaves on Wallich’s specimens near the panicle are very large.


**Andamans. Kurz.**

Tree 60-70 ft. Leaves 6-8 in., from ovate to ovate-lanceolate, acuminate or scarcely acute, attenuate or obtuse at the base. Panicle large, 1 ft. long, narrow-elongate, white, puberulous. Petals \( \frac{1}{2} \) in., oblong, lilac, undulate on the margin (*Kurz*). Capsule \( \frac{3}{4} \) in. (*Kurz*), oblong, mucronate, woody. Calyx much more acutely ribbed than that of *L. Flos-Reginae*, but the teeth of the alternate ribs are very obliquely excurrent in Mr. Kurz’s specimens.


Burma to Singapore; frequent.—Distr. Siam, Malaya, China.

Tree 30 ft. Leaves 5-7 in., oblong, acute, sub sessile, rounded at the base. Panicle large, lower branches often 6 in., ascending, curved, with rich brown stellate woolly tomentum. Calyx nearly equally 12 -ribbed accessory teeth obsolete or obscure. Petals smaller than in *L. Flos-Reginae*, at first of a more rosy colour but withering to mauve-purple. Fruit \( \frac{3}{4} \) by \( \frac{1}{2} \) in.; calyx-teeth spreading, small, not woody.

**Var. cuspidata**, *Wall. Cat.* 2116 (sp.); accessory teeth of the calyx in the bud prominent appearing as 6 cusps at the summits of the alternate ribs.—Tavoy, Amherst, *Wallich*, who marks the species as *L. floribunda* prox. It differs from the type in no point except the cusps mentioned.

10. **L. hexaptera**, *Miq. Fl. Ind. Bat.* i. pt. i. 623; calyx 32-ray puberulous, teeth 6-9, ribs 6-9 almost winged alternate with the teeth. **Ind.**-teeth in fruit spreading woody.

**Vol. II.**
MALACCA; Maingay No. 653, 654.—Distrib. Celebes.
A moderate-sized tree (Maingay). Leaves 2-3 in., narrow elliptic-oblong, not acuminate, oblique, twisted at the apex, minutely ashy-puberulous beneath; petiole ¼ in. Panicle 4-6 in.; branches stout, ashy-grey-puberulous. Calyx in the bud funnel-shaped not campanulate, smaller than that of L. Flos-Regina. Petals ¼-½ in., flat, shortly clawed, sparingly erose-undulate on the margin. Fruit ½ by ½ in., calyx-wings slightly enlarged on the fruit.—The specimens of Maingay are very perfect but are identified with Miquel's plant from his description only.

† Adult leaves pubescent beneath.


BURMA; Griffith (Kew Distrib. No. 2240); McClelland (Lagerstroemia sp. 0); John Scott; Kurz.
Tree 40-50 ft. (Kurz); branchlets panicles and leaves ashy-grey, pubescent. Leaves 2-3 in., finely acuminate, narrowed to the very short petiole. Buds very small, calyx-tube smooth, ribs only to be seen near the summit of the tube as six horns alternating with the primary calyx-teeth. Capsule ½-¾ by ¼ in., the calyx-tube finally distinctly ribbed.—The name villosa is not in Wallch's Catalogue nor does it exist on any specimen at Kurz, so that it cannot be guessed where Mr. Kurz found it; but the species is very good and unmistakable.


BURMA; Griffith & Helfor (Kew Distrib. No. 2238, 2239); John Scott; Kurz No. 1976; Brandis.
Tree 70-100 ft. (Kurz); branchlets petioles and panicle fulvous stellate-woolly tomentose. Leaves 3-6 in., elliptic-lanceolate to narrow-lanceolate, adult glabrous reticulate above except the midrib which is fulvous stellate-tomentose; petiole ¼-½ in. Calyx in the bud fulvous, tomentose, with 12 blunt ribs to the base. Petals ½ in., finely clawed, erose, subfimbriate on the margin. Capsule by ½ in., calyx-tube ultimately 6-ribbed (ribs corresponding to the primary teeth becoming obsolete); teeth triangular, reflexed.—In fruit the capsule and calyx become exactly like those of L. villosa and when the condensed panicle of L. villosa opens out in fruit, the two species are easily confounded. One sheet of Wall. Cat. 2112 marked L. pubescens is really L. villosa, but all the other sheets of Wall. Cat. 2112 are true. Among other tests, the leaves of L. pubescens are stellately hairy beneath, those of L. villosa are simply pubescent.

VAR. Loudoni, Teym. & Binn. Pl. Nov. in Hort. Bogor. cult. 1863, p. 27; leaves acute not acuminate, flowers not larger than in the type. Kurz For. Fl. i. 523.

8. DUABANGA, Ham.

Large glabrous trees with pendent quadrangular branches. Leaves opposite, distichous, large, short-petioled, long-oblong, acute, entire, cordate or rounded at the base. Panicles large, terminal, with opposite branches; flowers large. Calyx-tube 1 wide, adnate to the base of the ovary; lobes 4-7, thick, valvate in the bud. Petals 4-7, clawed, obovate, crisped and undulate, white. Stamens very many, inserted on a perigynous ring. Ovary conical, 4-8-celled; style
bent, long, stigma capitate 4–8-lobed; ovules very many, ascending, placenta
covering nearly the whole interior surface of the ovary-cells. Capsule globose
on the thick spreading calyx, coriaceous, perfectly or imperfectly 4–8-celled,
4–8-valved. Seeds innumerable, minute, ellipsoid, testa produced at both ends
in two tails much exceeding the length of the nucleus.—Distrib. Species 2,
extending from Nipal south-eastwards to the Philippines and Borneo.

1. D. sonneratioides, Ham. in Trans. Linn. Soc. xvii. 178; flowering
calyx nearly 1 in. wide at the base, petals 4–7 nearly 1 in., capsule 4–8-
valved. Hook. f. Ill. Hist. Pl. t. 11; Kurz For. Fl. i. 525. Lagerstremia
grandiflora, Roxb. Hort. Beng. 38; Fl. Ind. ii. 503; DC. Prodr. iii. 93; Wall.
Cat. 2111; Blume Mus. Bot. i. 100. Leptospartion grandiflorum, Griff. Ic. Pl.
Asiât. t. 591.

NIPAL to MARTABAN; alt. 500–3000 ft.; common in the SIKKIM and BHOTAN
TERAI.

Tree attaining 100 ft. Leaves commonly 10 by 3½ in.; petiole usually
¾–¾ in.—D. notuwana differs by the calyx in flower much narrower at base, the petals smaller,
the capsule 4-valved: but agrees closely in habit.

9. SONNERATIA, Linn. f.

Trees, growing near the sea, glabrous. Leaves opposite, petioled, coriaceous,
entire. Flowers without bracts, large, three together at the summits of the
branches, or axillary solitary. Calyx thick, coriaceous; lobes 4–8, lanceolate,
valvate. Petals 0 or as many as the calyx-lobes and linear-oblong. Stamens
very many, inserted in a circular band on the calyx-tube. Ovary nearly free, or
adnate at the base to the calyx-tube, many-celled; style long, stigma capitata;
ovules very many, ascending, placenta axile. Berry subglobose, supported by
the persistent calyx, 10–15-celled. Seeds very many, small, curved, angular;
cotyledons convolute.—Distrib. Species 4–5 on the tropical sea-shores of the
Eastern hemisphere.

† Stigma very large, umbrella-shaped.

1. S. apetala, Ham. in Syne Emb. Aea iii. 313, t. 25; leaves narrow-
oblong, calyx-lobes 4, petals 0, stigma more than ½ in. broad, capsule ¾–¾ in.
broad globose. DC. Prodr. iii. 231; Roxb. Hort. Beng. 38; Fl. Ind. ii. 506;
650; Kurz For. Fl. i. 527.

Common in the SONDBEDUN. DECCAN PENINSULA as far as the CONCAN, LAW.
TRANSGANGETIC PENINSULA to Moulmein, FALCONE.

Tree attaining 40 ft., growing in mangrove swamps flooded by the tide. Leaves
3–4 by 1–1½ in., always narrow, attenuated at the base; petiole ¾ in. Calyx in
flower ¾ in., style included or scarcely exert. Capsule broader than high, convex at
the top, walls not thickened.

†† Stigma capitata, not very large.

2. S. acidà, Linn. f. Suppl. 252; leaves oblong or narrowly obovate-
eliptic, calyx-lobes 0, petals 0 linear-oblong dark-red, capsule globose much
depressed often 2 in. broad. Roxb. Hort. Beng. 38; Fl. Ind. ii. 506; Roth Nov.
Sp. 233; DC. Prodr. iii. 231; Wall. Cat. 3641; W. & A. Prodr. 327; Wight
Ic. t. 340; Griff. Notul. iv. 652; Blume Mus. Bot. i. 336; Mis. Fl. Ind. Bot. i.
pt. i. 496; Dalz. & Gibs. Bomb. Fl. 98; Brand. For. Fl. 242; Kurz For. Fl.
PP 2


A small tree, not exceeding 15 ft. (Kurz), growing in mangrove swamps flooded by the tide. Leaves 3-4 by 1-1 ½ in., attenuate almost to the base so that the petiole is subobsolete. Buds elliptic, calyx-tube not in the least angular. Calyx in flower 1 in. or more; style long-exserted sometimes 3 in. Capsule thick-walled, sometimes more than 2 in. broad, concave at the summit.—The Kew specimens are all narrow-leaved, the flowers 6-fid not 7-8-fid; but the examples are few and it is probable that to the synonyms above cited should be added S. Pagpat, obovata, evenia, lanceolata for which see Miq. Fl. Ind. Bat. i. pt. i. 496, 497.


Burma; Griffith (Kew Distrib. No. 2433). Pegu and Tenasserim; Kurz.

Leaves 3 by 2½ in., narrowed at the base; petiole more than ½ in. Buds flowers and calyx exactly of S. acida; calyx-tube ovoid, perfectly free from ribs, petals wanting. Fruit unknown.—This seems an apetalous form of S. acida, but the leaves slightly differ from all the examples of that plant.

4. S. alba, Smith in Rees Cyclop. xxxiii. No. 2; leaves elliptic obtuse or obovate narrowed to a short petiole, calyx-tube 6-8-angular (obscurely so in the bud distinctly in fruit), lobes 6-8, petals 0, fruit broadly obconic. DC. Prodr. iii. 231; Blume Mus. Bot. i. 338; Miq. Fl. Ind. Bat. i. pt. i. 497; Kurz For. Fl. i. 526. S. mossambicensis, Klotzsch in Peters Reis. Mossamb. Bot. t. 12. S. acida, Bentham in Fl. Austral. iii. 301; Hiern in Oliv. Fl. Trop. Afr. ii. 483.—Rumph. Amb. iii. t. 73.

Mergui; Griffith (Kew Distrib. No. 2432). Pegu; Kurz. Malaya; Maingay No. 654-2.—Distrib. Tropical shores of Africa with its islands, Malaya and Australia.

A small tree not exceeding 15 ft. (Kurz), growing in the saline littoral forests. Leaves 3 in., oblong or nearly round, narrowed at the base; petiole ½-1 in. Flowers the size of S. acida, with a very long style. Fruit 1 in. broad, calyx obconical at the base (not flat as in S. acida) ribbed as shown in Klotzsch's picture above cited.—This species was united with S. acida by Mr. Bentham, and the other writers at Kew have followed. Mr. Kurz has pointed out the distinction in the calyx; and there is a wide difference between the fruits so far as at present known; but the material is not ample.

10. PUNICA, Linn.

A large shrub; branchlets round, often armed. Leaves opposite subopposite or clustered, oblong or obovate, obtuse, entire. Flowers shortly pedicelled, axillary, solitary or somewhat clustered. large, orange-red. Calyx-tube funnel-shaped, coriaceous, adnate to the ovary below, enlarged above the ovary; lobes 5-7, persistent on the fruit. Petals 5-7, lanceolate, wrinkled, inserted between the calyx-lobes. Stamens very many, inserted round the mouth of the calyx. Ovary inferior with many cells in two whorls; style long, bent, stigma capititate; ovules very many, placentas in some cells axile in others parietal. Berry inferior, globose, many-celled. Seeds very many, angular, testa coriaceous with a watery outer coat; cotyledons convolute.

Cultivated throughout India; probably wild in the north-west.—Distr. Wild in Cabul and Persia; cultivated throughout the warmer regions of the globe.

Leaves commonly 2 by 1/2-2 in., narrower at both ends especially at the base, intramarginal nerve distinct or obscure. Flowering calyx about 1 in., mouth 1/2 in. broad. Petals 1/2 in. or more. Fruit often 2 in. diam., containing much red juice round the seeds. (The Pomegranate.)

11. **AXINANDRA, Thwaites.**

Trees, glabrous or nearly so, branches quadrangular or terete. Leaves opposite, pETOLED, coriaceous, entire, acuminate, finely nerved beneath with an intramarginal nerve. Racemes simple, axillary, erect, the 3-5 terminal panicled; flowers small, pedicels short; bracteoles 3 at the base of each pedicel, minute, linear. Calyx superior, 5-lobed. Petals 5, small, triangular, caducous, inserted at the top of the calyx-tube. Stamens 10, in two whorls, 5 alternating with the petals and 5 others inserted just below; connective large; anthers small, subterminal. Ovary inferior, 5-6-celled; style straight, stigma simple; ovules in each cell 1-2, erect. Capsule half-superior, woody, ellipsoid, below adnate to the calyx-tube, above loculicidally 3-4 (rarely 5-6-) valved. Seeds erect, oblong, compressed, produced upwards into a wing; cotyledons flat.—Distr. Species 4-5 from Ceylon, Malacca and Borneo.


Ceylon; Ambagamowa district, alt. 1500 ft.; Thwaites.

A large tree, 50-60 ft. (Thwaites). Leaves 4 by 2 in., gradually or suddenly acuminate. Racemes 2 in.; pedicels less than 1/2 in., hardly lengthened in fruit. Calyx glabrous or microscopically puberulous. Petals falling off in a cap before expansion (Thwaites). Capsule 1 by 1/2 in.; valves usually 3, very thick, woody.

B. Naxandira, Baillon. Petals induplicate-valvate. Ovules 2 in each cell.

2. **A. Maingayi**, C. B. Clarke; branchlets terete, leaves narrowed at the base, petiole often 1/2 in., calyx-tube at the time of flowering 10-ribbed, style long (exserted portion longer than the whole flower).

Malacca; Maingayi No. 654-2. Leaves 4 by 2 in., gradually or suddenly acuminate. Racemes 2 in., more panicled than in A. zeylanica, panicle-branches quadrangular. Calyx and pedicel minutely puberulous, larger than in A. zeylanica. Petals expanding but caducous. Fruit not seen.—Closely allied to A. Beccariana, Baill. in Bull. Soc. Linn. Paris 1877, No. 16, 127, which has rather slenderer racemes and smaller flowers, the calyx hardly ribbed at the time of flower.

**Genus imperfectly known.**

**Dichotomanthes**, Kurz in Seemann Journ. Bot. ix. 194, is a tree imperfectly known possibly Lythraceae, collected by Dr. John Anderson in Yunan, as yet not found within the limits prescribed for the Flora of British India.
Order LXII. ONAGRAEE. (By C. B. Clarke, F.L.S.)

Herbs, rarely undershrubs, sometimes aquatic. Leaves opposite or alternate, entire or toothed, undivided (in Trapa the submersed leaves pinnatifid), exstipulate. Flowers hermaphrodite, mostly axillary and solitary, or spiked or racemose towards the ends of the branches; subirregular. Calyx-tube wholly adnate to the ovary (half-adnate in Trapa), limb of 2-5 valvate lobes. Petals epigynous, alternate with the calyx-lobes, rarely 0. Stamens as many or twice as many as the petals, inserted with them. Ovary inferior (half-inferior in Trapa), 1-6-celled, most often 4-celled; style 1, cylindric or subulate, stigma capitate or nearly 2-lobed or 4-fid; ovules one or many in each cell, pendulous or half-ascending, placenatas axile. Fruit various, dehiscent or indehiscent, membranous capsular or bony, 1- or several-celled, 1 or \( \alpha \)-seeded. Seeds without albumen, or nearly so.—Distrib. Species 300, spread throughout the world, most abundant in the North Temperate Zone.

* Emothera* is an American genus of which several species are cultivated in India; and among these *E. rosea* has run wild in the North-west Himalaya and in the Nilghiris; *E. tetrapeta* and *E. odorata* have also run wild on the Nilghiris.

* Seeds very many.*

† Seeds comose.

†† Seeds not comose.

Stamens twice as many as calyx-lobes ............. 2. Jusslea.

Stamens as many as calyx-lobes ............. 3. Ludwiga.

** Seeds one or two.**


Aquatic. Stamens 4 ............. 5. Trapa.

1. *Epilobium*, Linn.

Herbs. Leaves alternate or opposite, undivided, entire or toothed. Flowers axillary and solitary, or racemose or spiked towards the ends of the branches, purple or white, regular or irregular. Calyx-tube scarcely produced above the ovary, linear; teeth 4, lanceolate, deciduous. Petals 4, obovate, retuse or notched. Stamens 8, epigynous, 4 shorter. Ovary inferior, 4-celled; style cylindric, stigmas 4 spreading or more or less combined; ovules many, axile, ascending, attached along a double placental vertical line in the inner angle of each cell. Capsule linear, 4-celled, dehiscing from the apex loculicidally, valves 4 recurved from the seed-bearing quadrangular column. Seeds very many, obovoid or ellipsoid, crowned by long silky hairs.—Distrib. Species 50; spread throughout the temperate and cold regions of the world, plentiful in New Zealand: appearing in the mountains only of the warmer regions.


1. *E. angustifolium*, Linn.; Boiss. Fl. Orient, ii. 745; leaves narrow lanceolate glabrous beneath or nearly so reticulating nerves prominent primary nerves diverging nearly at right angles from the midrib, peduncles approximate
in long terminal spikes. E. spicatum, Lamk. Dict. ii. 373; DC. Prodr. iii. 40; Wall. Cat. 6824.

Temperate Western Himalaya, alt. 8000-12,000 ft.; from Kashmir and Baltistan to Gurwhal.—Distr. Western Asia, Europe, North America.

Glabrous or nearly so, except the calyx-tube which is covered with close white tomentum. Stem 2-4 ft. Leaves often 4-6 by 3 in., all scattered, nearly sessile, acute, entire or obscurely denticulate. Spike of flowers soon naked, bracts narrow, caducous. Calyx-segments lanceolate, acuminate, purplish, subpetaloid, free to the base. Petals 1/2-5/8 in., rose-purple, obovate, clawed. Style somewhat hairy above the base; stigmas 4, distinct, spreading. Capsule 2 1/2-3 1/2 in., closely pubescent. Seed narrowly obovoid, smooth, coma fulvous.

2. E. reticulatum, C. B. Clarke; leaves narrow-lanceolate pubescent beneath reticulating nerves prominent primary nerves diverging at acute angles from the midrib, peduncles distant in the axils of leaves that are not bractiform nor caducous.

Sikkim; alt. 10,000-14,000 ft.; Lachoong and Kongra Lama; J. D. H.

Stem round, uniformly pubescent, apparently of the height of that of E. angustifolium. Leaves 4 by 1/8 in., all scattered, nearly sessile, minutely denticulate, acute. Calyx-segments broad-lanceolate, acuminate, purplish, subpetaloid, free to the base. Petals 1/2-5/8 in., rose-purple, obovate. Style densely hairy above the base; stigmas 4, distinct, spreading. Capsule (not ripe) 3 in. on a peduncle 1 1/2 in.—This species has leaves somewhat like those of E. angustifolium but the inflorescence of E. latifolium.

3. E. latifolium, Linn.; DC. Prodr. iii. 40; leaves oblong narrowed at both ends glabrous or minutely pubescent without reticulating veins, peduncles distant in the axils of leaves that are not bractiform nor caducous. E. spicorum, Dcone. in Jacq. Voy. Bot. t. 69. E. Gerardinianum, Wall. Cat. 6826.

Alpine Western Himalaya; alt. 11,000-14,000 ft. Kashmir; Jacquemont, C. B. Clarke. Simore; Gerard, Edgeworth. Kumaon; Strachey & Winterbottom.—Distr. Dabarla, Altai, Arctic Asia, Europe and America.

The typical plant is 1 ft. high and glabrous except the calyx-tube; some of the Himalayan examples have the stem pubescent apparently much taller and the leaves minutely pubescent. Leaves 1 1/2-3 by 1/2-1/4 in., scattered and opposite, entire or very obscurely denticulate, obtuse rarely somewhat acute. Calyx-segments broad-lanceolate, acuminate, purplish, subpetaloid, free to the base. Petals 1/2-5/8 in., rose-purple, obovate. Style with a few scattered hairs above the base; stigmas 4, distinct, spreading. Capsule 3 in., closely pubescent. Seeds narrowly obovoid, smooth, coma fulvous.

SECT. II. Lysimachion. Flowers regular. Stamens and style erect.

* Stigma distinctly 4-cleft with spreading lobes.


Temperate Western Himalaya; alt. 5000-7000 ft.; from Kashmir to Kumaon; Royle, Madden, Jacquemont, T. H. Thomson, &c.—Distr. Europe, Africa, Asia from the Himalaya northwards and westwards.

Stem 2-5 ft., round, uniformly hairy with glandular pubescence, and with scattered long white hairs numerous towards the ends of the branches. Middle cauline leaves usually opposite, often 3 in. or more by 3 in., sessile, semi-amplexical but not decurrent as lines down the stem, green and softly pubescent on both surfaces. Sepals green, oblong, acute in the expanded flower, in restitution mucronate. Petals 3/8 in. Stigmas 4, distinct, spreading. Capsule 2-3 1/2 in., hairy, lower peduncles 1/4-1 in.
Seeds ellipsoid or obovoid, 2½ times as long as broad, little narrowed at the base, punctate, not papillose, coma fulvous.

**Var. sericeum**, Benth. in Wall. Cat. 6325 (sp.); pubescence of the stem and leaves densely white silky (not tomentose). E. tomentosum, Vent. Hort. Cels. t. 90.—Distrib. the same as that of the typical E. hirsutum; into which this variety graduates.

**Var. latum**, Wall. Cat. 6320 (sp.) in part; middle cauline leaves much smaller often about 1 in. not semi-amplexicaul at the base little pubescent, no white silky hairs on the plant.—Kashmir; Jacquotmont. Chumba, alt. 3000 ft.; C. B. Clarke. Kumaon; Wallich; near Alma, alt. 5000 ft.; Strachey & Winterbottom. Julundur, alt. 1000 ft.; C. B. Clarke.—This plant has been from the leaves supposed near E. tetragonum; but the examples show the stigmas decisively spreading, so that it is either a var. of E. hirsutum or a new species.


**Western Himalaya; Edgeworth; Simla, T. Thomson.**—Distrib. West Asia, Europe, North Africa.

Stem 2–3 ft., round, without lines, pubescent and with much crisped white hair. Middle cauline leaves 1½–2 by 2–2½ in., dentate, pubescent over both surfaces. Sepals green, oblong, acute, in the bud mucronate. Petals usually smaller than those of E. hirsutum but are ⅜ in. in the Himalayan plant. Stigmas 4, distinct, spreading but hardly revolute. Capsule 2–3½ in., sparingly hairy, lower peduncle ½–1 in. Seeds ellipsoid or obovoid, 2½ times as long as broad, little narrowed at the base, punctate, not papillose, coma fulvous.—Seed exactly as that of E. hirsutum; punctulate by raised points, but these papillose excessively minute.

**Var. vestitum**, Benth. in Wall. Cat. 6327 (sp.); stem and leaves with fulvous shaggy hair, the stem itself somewhat glaucous.—Nipal; Wallich.

**Stigmas combined or stigma clavate.**

† Stem round, the hairs sometimes in lines and the bases of the leaves somewhat decurrent in lines, but the stem not clearly quadrangular.

6. **E. roseum**, Schreb.; Boiss. Fl. Orient. ii. 749; stem uniformly hairy or with hairy lines, leaves petioled (shortly in nearly all the Indian forms) from ovate to narrow-lanceolate, seeds obovoid not fusiform nor gradually narrowed at the top.

**Temperate Himalaya, alt. 5000–11,000 ft.; common.**—Distrib. West Asia and Europe.

**Var. indicum**; middle cauline leaves lanceolate or ovate with crisped pubescence on the midrib beneath, lateral nerves slightly raised glabrous or hairy, capsules scattered long-pedicelled, seed punctulate points raised most minutely.—Baltistan and Kashmir to Kumaon, alt. 5000–11,000 ft., common.—Stem 2 ft., usually hairy all round, sometimes with four well-marked lines. Middle cauline leaves 1–2 in. opposite sometimes ternate, sometimes glabrous beneath except the midrib, more often with crisped hairs on the primary nerves also; petiole often less than ½ in. but sometimes nearly ¾ in. Peduncle of the lower capsules often 1 in. or more. Coma of the seed very white in well-preserved examples, but often discoloured in others.—E. latum, Wall. Cat. 6329, belongs mainly to E. hirsutum; but some of it belongs here and some to E. tetragonum. Large quantities of the form of this plant with broad ovate leaves and a petiole of ⅘ in. or thereabout constitute E. montanum var. himalayense of Indian herbaria; but in all these the style is unmistakably clavate, not at all (or most obscurely) lobed at the summit.

**Var. Dalhousianum**; capsules often approximate, the lowest with a very short peduncle, seed rather narrowly ellipsoid prominently papillose.—From Kashmir to Sikkim, alt. 6000–9000 ft.; abundant about Dalhousie.—Stem round, uniformly pu-
bescent. *Capsules* typically in erect clusters, lowest peduncle usually less than ¼ in.

—This is one of the best marked forms of Indian Epilobiums and may be a good species; it is common in herbaria marked *E. montanum* var., or *E. origanifolium* var. (by H. f. & T., *roseum* var).

Var. *anogalldifolium*, Lamk. (sp.) in *Syme* Engl. Bot. t. 506; stem 4–12 in. glabrous near the base with hairy lines in the middle uniformly minutely pubescent near the top, leaves small oblong obtuse nearly glabrous beneath, seeds most minutely papillose.—West Tibet: *Thomson*.—Agrees exactly with the figure of *Syme*: reduced to *E. alpinum* Linn. in Boiss. Fl. Orient. ii. 750 and in *Hk. f. Student’s Brit. Fl*. 145. It differs slightly from *E. alpinum* by the less elongate seed very obtuse at the summit and the more petioled leaves; but runs into var. *indicum*.

Var. *cyldriicum*, Don Prodr. (sp.) 222; stem glabrescent often with distinct hairy lines, leaves linear-lanceolate on longer pedicels very little pubescent, capsules long-peduncled, seeds obovoid most minutely papillose. *DC. Prodr*. iii. 43; *Wall. Cat.* 6328.—From Kashmir to Sikkim, alt. 6000–10,000 ft.—This plant has numerous axillary short branchlets covered with linear-lanceolate leaves and has thus a general resemblance to *E. palustre*, but the pedicels are long and the seeds not elongate.

7. **E. Hookeri**, C. B. Clarke; stem without lines uniformly pubescent, middle cauleine leaves opposite nearly sessile elliptic-oblong broad or rounded at the base, glabrous beneath except the greatly raised nerves, seeds elliptoid. *Epilobium* No. 11, *Herb. Ind. Or.*, *H. f.* § T.


*Stem* 2–3 ft., quite round. *Leaves* 1½ by ¾ in., approximate, clothed with tawny hair, nerves impressed. *Petals* ½ in. and upwards. *Stigma* clavate, very obscurely lobed. *Capsules* 2–3 in., scattered, little pubescent, *lower* peduncles ¾–1 in. *Seeds* obtuse, not narrowed at the summit, only slightly narrowed at the base, most minutely papillose, coma fulvous.—This differs from *E. Hookeri* in its villous indumentum and very large flowers, but may be a form of it. It also in its hairiness and shape of the leaves resembles *E. parviflorum* var. *vestitum*; but the stigma in *E. khasianum* is hardly lobed.

9. **E. palustre**, Linn.; *DC. Prodr*. iii. 43; stem without lines glabrous or with scanty sparse pubescence, leaves narrow-oblong rarely elliptic sessile or nearly so glabrous or nearly so, seeds (in the Indian forms) obvoid not narrowed upwards. *Boiss. Fl. Orient*. ii. 748.

Northern Kashmir and Baltistan; alt. 8000–14,000 ft.; T. *Thomson*, C. B. Clarke.—Distrib. Northern Asia, Europe and America; but the Indian three forms all recede from the European type in their abbreviated seeds.

Var. *typicum*; stem 8–10 in., middle cauleine leaves 1–1½ by ¼ in., entire or scarcely dentate, capsules 2 in., scattered, lower peduncle often ½ in., seeds ellipsoid, not at all narrowed at top not greatly narrowed at the base most minutely papillose, coma fulvous.—This form agrees closely with the European type, but the seed is entirely without the beak or production of the testa at the apex.

Var. *majus*; stem 1–2 ft., middle cauleine leaves 2–3 in. often much denticulate sometimes petioled and sometimes broader elliptic when the plant can only be dis-
tinked from E. rosmum var. indium by its greater glabrousness and obtuser leaves.

Var. minimum; stem 3–4 in. with 1–2 capsules, flowers and leaves very small. —This in general appearance coincides with E. alpinum, Linn. but the seeds are broadly obovoid at not all elongate upwards.

10. E. origanifolium, Lamk. Dict. ii. 376; middle cauline leaves opposite sessile or very shortly petioled ovate or ovate-oblong, seeds elongate narrow obovoid somewhat narrowed at the top. DC. Prodr. iii. 41; Boiss. Fl. Orient. ii. 750.

Alpine Himalaya, alt. 9000–14,000 ft.; from Kashmir to Sikkim.—Distrib. Northern cool temperate and Arctic zone.

Greatly varying in the size of stem, leaves and flowers. Stem usually 8 in., sometimes 2 ft., usually with 2 hairy lines, sometimes exactly terete and uniformly pubescent. Middle cauline leaves usually 1 in., sessile, ovate, pubescent only on the somewhat raised nerves beneath; but the leaves are sometimes petioled, nearly 3 in., pubescent, sometimes ½ in. sessile glabrous. Flowers usually few, approximated towards the ends of the branches. Petals usually less than ¼ in.; in the var. Baliuese Boiss. (collected by J. D. H. also in Sikkim) the petals exceed ½ in. Capsule 1½–3 in., peduncle also variable in length. Seed minutely puncticulate, coma fulvous.

Var. villosum; stem villous, leaves ⅔–1 in. villous over both surfaces sessile ovate. —Sikkim, alt. 10,000–12,000 ft.; Latong, J. D. H. Epilobium No. 7, Herb. Ind. Or. H. f. & T.—Stems 4–8 in., little divided. Leaves acute, nearly all opposite. Flowers few, approximated, not large. Stigma clavate. Capsule half-ripe, seeds not seen.—A remarkable plant. The lowest leaves are small thick obovate rounded glabrous, greatly resembling the similar leaves in E. origanifolium.

11. E. alpinum, Linn.; DC. Prodr. iii. 41; stems weak somewhat pubescent, middle cauline leaves opposite small subsessile narrow-elliptic glabrous or pubescent on the nerves beneath, flowers few towards the end of the branches. Boiss. Fl. Orient. ii. 750.

Sikkim; alt. 12,000 ft.; Lachen, J. D. H.; Jongri, C. B. Clarke.

Stems 2–10 in., slender, scarcely divided. Middle cauline leaves ½–1 in., denticate obscurely or prominently, scarcely acute. Capsule 1½ in., peduncle ½–3 in. Seeds minutely papillose, narrowly ellipsoid, little narrowed at the summit; coma silky, white.—This is perhaps E. alpinum of Boissier but is not the ordinary European plant which has a beaked seed as described in Hk. f. Student's British Flora, p. 145; the European examples also have a fulvous coma.

†† Stem clearly quadrangular.

12. E. tetragonum, Linn.; DC. Prodr. iii. 43; middle cauline leaves mostly opposite obovate or narrow-elliptic glabrous but with crisped hair on the raised nerves beneath usually denticate-serrulate rarely acute. Boiss. Fl. Orient. ii. 748. E. brevifolium, Don Prodr. 222.

Sikkim, alt. 5000–12,000 ft., very common. Khasia Mts., alt. 4000–6500 ft., common.—Distrib. Cold and cool temperate zones of both hemispheres, and at temperate elevations on mountains in the warmer zones.

Stems 1–3 ft., with crisped pubescence on the four angles. Middle cauline leaves opposite, ½–2 in., usually sessile, but in some Indian examples distinctly petioled, nerves beneath raised often very prominently, above much impressed. Flowers rose or purple, rather small. Capsule 1½–2 in.; peduncle ½–3 in. Seeds narrowly elliptic, not narrowed at the summit, very little narrowed at the base, minutely papillose, coma fulvous.
Epi\(l\)obium.]  

\textbf{LXII. ONAGRACEÆ. (C. B. Clarke.)}  

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\textbf{Var.? am\(p\)lectens,} Wall. Cat. 6330; stem obscurely quadrangular or the bases of the leaves confluent and decurrent in two hairy lines, leaves nearly sessile often somewhat rounded at the base. —Kumaon; Wall. Sikkim, alt. 10,000–13,000 ft. (Tungu and Lachen); \textit{J. D. H.}

Except that the hairy lines down the stem are strongly marked this plant might be \textit{E. origanifolium} above.

\textbf{DOUBTFUL SPECIES.}

\textit{E. laxum}, \textit{Royle Ill.} p. 211, t. 43. The figure shows the stem uniformly hairy, while the letterpress states that there are four lines on the stem.

\section*{2. \textbf{Jussiea,} Linn.}

Herbs or undershrubs, growing usually in swamps. \textit{Leaves} alternate, undivided, mostly entire. \textit{Flowers} yellow or white, axillary, solitary; pedicel usually 2-bracteate at the apex. \textit{Calyx-tube} scarcely produced above the ovary, linear; teeth 4–6, acute, persistent. \textit{Petals} 4–6, epigynous. \textit{Stamens} double the number of petals, epigynous. \textit{Ovary} inferior, 4–5-celled; style simple, usually very short, stigma 4–5-lobed; ovules \(\alpha\), axile, in several vertical rows at the inner angle of each cell. \textit{Capsule} linear, round or angular, 4–5-celled, 8–10-ribbed, opening septically in valves separating from the persistent ribs or irregularly between the ribs. \textit{Seeds} very many, without coma. —\textit{Distrib.} Species 30, in the tropics of the whole world, most numerous in America.


Throughout \textit{India} with \textit{Ceylon}; very common. —\textit{Distrib.} The warmer parts of the whole world.

Herbaceous, often creeping on the margins of tanks, the stems also spreading on the water and sustaining themselves on the surface by white vesicles \(\frac{1}{3}–1\frac{1}{2}\) in. \textit{Leaves} very variable in size, \(\frac{1}{2}–3\) in., usually glabrous sometimes hairy, upper usually 1–2 in., nearly always obtuse in the Indian examples. \textit{Pedicel} usually as long as the capsule, sometimes quite short. \textit{Petals} about \(\frac{1}{4}\) in., obovate. \textit{Capsule} \(\frac{1}{2}–1\frac{1}{2}\) in., linear-cylindric, glabrous or with scattered hairs. \textit{Seeds} smooth, reticulated.

In all India except the western desert region; and in Ceylon.—Distrib. The warmer moist parts of the whole world.

Erect, branching, sometimes 4–6 ft. Leaves 3 by $\frac{3}{4}$ in., more or less villous (rarely in Indian examples subglabrous), sometimes short, ovate-lanceolate, sometimes nearly linear, short-petioled or sessile. Pedicel very short, bracts inconspicuous, or (in var. bracteata of Rottler) foliaceous, 1 in. Petals $\frac{4}{5}$–$\frac{5}{6}$ in. Capsule 1–2 in., linear-cylindric, more or less villous or finally glabrous, 8-ribbed, membranous, breaking up between the ribs.—The form called J. angustifolia which has very narrow nearly glabrous leaves is found in Burma and thence to Australia, but there are no examples from Cis-Gangetic India.

3. LUDWIGIA, Linn.

Herbs. Leaves alternate, undivided, subentire. Flowers usually axillary, solitary, sessile or nearly so, peduncle 2-bracteate at its apex. Calyx-tube scarcely produced above the ovary, linear in the Indian species; teeth 3–5, acute, persistent. Petals 3–5 (or 0), epigynous. Stamens equal in number to the calyx-segments, epigynous. Ovary inferior, 4–5-celled; style simple, stigma capitate; ovules very many, attached in 2 or more vertical rows to the inner angle of each cell. Capsule linear or oblong (in the Indian species), 4–5-celled, opening by terminal pores or breaking up irregularly along the sides. Seeds numerous, obvoid, smooth, raphe obscure or prominent but not large, without coma.—Distrib. Species 20, mostly in North America; extending from the cool temperate zone to the equator; chiefly inhabiting marshes.

1. L. parviflora, Roxb. Hort. Beng. 11; Fl. Ind. i. 419; capsule $\frac{3}{4}$ by $\frac{5}{12}$ in. linear-oblong, seeds in many rows in each cell, raphe obscure. DC. Prodr. iii. 59; Wight Ill. t. 101; W. & A. Prodr. 336; Dalz. & Gibbs. Bomb. Fl. 99; Benth. Fl. Austral. iii. 307; Boiss. Fl. Orient. ii. 752; Kurz in Journ. As. Soc. 1877, pt. ii. 91. L. lythroides, Blume Bijd. 1134; DC. l.c. D. jussieoides, Wall. Cat. 6335 not of Linn. and others.


Erect, 8–24 in., glabrous. Leaves 2–3 by $\frac{3}{4}$–$\frac{3}{4}$ in., lanceolate or linear-lanceolate, narrowed to the base. Flowers very shortly pedicelled, commonly 4-fld. Petals small, yellow. Capsule inflated, smooth, the seeds not separately distinguishable through its walls.

2. L. prostrata, Roxb. Hort. Beng. 11; Fl. Ind. i. 420; capsule $\frac{1}{2}$–$\frac{1}{2}$ by in. linear, seeds in one row in each cell, raphe narrow but prominent. DC. Prodr. iii. 59; Wight 1. c. t. 762; Kurz in Journ. As. Soc. 1877, pt. ii. 91. L. diffusa, Ham. in Trans. Linn. Soc. xiv. 301 Wall. Cat. 6336. DC. l.c. L. fruticulosa, Blume Bijd. 1133; DC. l.c. Nematopyxis prostrata, pusilla, and fruticulosa, Miq. Fl. Ind. Bat. i. pt. 1. 630.


Prostrate, or decumbent and then erect, 8–24 in., glabrous. Leaves 2–3 by $\frac{1}{4}$–$\frac{3}{4}$ in., lanceolate, narrowed to the base. Flowers sessile, 4-fld. Capsule not inflated, the walls drawn tightly over the seeds so that each seed can be counted from without.—This species of Roxburgh’s was extricated by Mr. Bentham in Fl. Austral. iii. 308, where the synonymy is cleared up. Some of the Silhet examples however have some of the capsules very like, those of L. parviflora, and others inflated for half their length like L. parviflora, and for the other half linear constricted like L. prostrata. The two species are identical except as to their capsules and seeds.
4. **Circæa**, Linn.

Herbs. *Leaves* opposite, petioled, ovate, sinuate-dentate, membranous. *Flowers* small, white, pedicelled, in terminal and lateral peduncled racemes, finally lax; pedicels spreading, with minute-subulate (or 0) bracts at their base. *Calyx*-tube ovoid, scarcely produced above the ovary, limb bipartite. *Petals* 2, obcordate, 2-lobed, epigynous. *Stamens* 2, epigynous. *Ovary* inferior, 1-2-celled; style filiform, stigma capitate almost 2-lobed; ovules attached to the inner angle of the cells, solitary or rarely 2 superimposed. *Fruit* small, pyriform, subcoriaceous, indehiscent, 1-2-celled. *Seeds* 1 in each cell, ellipsoid.—**Distrib.** Species 2 or 3, in subarctic and cool temperate regions of the northern hemisphere, extending southwards to the tropics on mountains.

1. **C. lutetiana**, Linn.; *DC. Prodr.* iii. 63; leaves ovate-lanceolate more or less pubescent not pellucid, fruit 2-seeded narrowed at the base patent-flexed shorter than its pedicle covered with long hooked hairs. *Lamk. Ill.* t. 16, fig. 1; *Boiss. Fl. Orient.* ii. 753. C. repens, *Wall. Cat.* 6341.

**Temperate Himalaya** from Kumaon to Sikkim, alt. 7000–10,000 ft.; *Wallich*, Major *Maddon*, J. D. H., T. *Thomson*; examples few.—**Distrib.** The northern hemisphere, extending south to near the tropic of Cancer.

*Stems* 1–2 ft., erect or decumbent at the base only, puberulous or pubescent. *Leaves* 2 by 1-1½ in., long-petioled, rounded or narrowed at the base. *Bracts* 0. *Petals* white or pinkish. *Fruit* ½ in., ovoid, the hooked hairs usually longer than half the width of the fruit.—The *C. repens* of *Wallich* agrees closely with the European common type; the stem is decumbent for a short space at the base only.

2. **C. cordata**, *Royle* *Ill.* t. 43; leaves ovate-lanceolate cordate at the base more or less pubescent not pellucid, fruit 2-seeded broad-elliptic patent-flexed little longer than broad from a broad rounded unequal base covered with long hooked hairs, not shorter than its pedicle.


*Stems* 1–2 ft., stouter and more hairy than of *E. lutetiana*, erect. *Leaves* 3½ by 2 in., sometimes larger; petiole often 1½ in. *Bracts* 0. *Petals* yellow (ex *Royle*) and appear so in the dried examples. *Fruit* scarcely ¾ in., nearly or quite as much broad, the two carpels at the base generally descending unequally on the pedicle.

3. **C. alpina**, Linn.; *DC. Prodr.* iii. 63; leaves ovate glabrous or slightly pubescent often pellucid, fruit 1-seeded narrowed at the base shorter than its pedicle, glabrous or not densely hairy. *Lamk. Ill.* t. 16, fig. 2; *Wight Ill.* t. 101*; *Boiss. Fl. Orient.* ii. 753. C. intermedia, *Wall. Cat.* 6342.


Erect, 6–8 in., typically nearly glabrous. *Leaves* ¾ in., and about equally broad, long-petioled, rounded or cordate at the base, often deeply sinuate-toothed subangulate, glabrous or pubescent on the nerves. *Bracts* minute, subulate, sometimes obscure. *Petals* white. *Fruit* less than ¾ in., obovoid, sometimes nearly glabrous, sometimes with many hooked hairs, but the hairs neither so many yellow nor long as commonly are those of *C. lutetiana*.

**Var. himalaica**; stem taller 10–18 in., leaves much larger 1¼ in. more pubescent not pellucid.—In the Himalaya only; the type of *Wallich’s C. intermedia*. This plant has only one seed to the fruit and differs only in trivial characters from *C. alpina*. 
5. Trapa, Linn.

Floating herbs. Leaves dimorphic; submersed opposite, root-like, pinnatifid, with filiform segments; emersed rosulate, rhomboidal, the petiole with a spongy dilatation near its apex. Flowers axillary, solitary, peduncled. Calyx-tube short, adnate to the lower part of the ovary; limb 4-partite, 2 or all of the segments persistent and becoming spinescent on the fruit. Petals 4, white, small, inserted at the margin of an epigynous disc. Stamens 4. Ovary half-inferior, with a conical vertex, 2-celled; style subulate, stigma capitulate; ovule solitary in each cell, pendulous from the upper inner angle. Fruit bony, 1-celled, large, obovoid, with 4 angles, 2 or all of which carry spines, indesincent, with a short cylindrical beak at the top through which the radicle is protruded. Seed 1, inverse, cotyledons very unequal.—Distr. Species 2, extending through the warmer parts of the Old World, from Central China to Japan and to Tropical Africa.

1. T. bispinosa, Roxb. Cor. Fl. 234; Hort. Beng. 11; Fl. Ind. i. 428; leaves usually very villous beneath, fruit with 2 angles spinescent. DC. Prodr. iii. 64; Wall. Cat. 6339; W. & A. Prodr. 537; Meq. Fl. Ind. Bat. i. pt. i. 636; Dalz. & Gbs. Bomb. Fl. 99; Kurz in Journ. As. Soc. 1877, pt. ii. 91. T. quadrisspinosa, Wall. Cat. 6340 not Roxb.—Rheede Hort. Mal. xi. t. 33.

Throughout India and Ceylon.—Distr. South-eastern Asia and Malay; Tropical Africa.

In the Roxburghian type, floating leaves 2 by 2½–3 in., very villous beneath, posterior margin entire, anterior lightly crenate; petiole 4–6 in., woolly. Fruit ⅕ in. long and broad, glabrous or hairy; two opposite angles each with an often retrorsely scabrous spine, the other two angles sometimes obsolete.—Very doubtfully distinct from the next species as Wallich has noted on his specimens.

Var. incisa, Wall.; leaves much smaller about ⅗ in. much less villous beneath incisurate serrate on the anterior margin.—Marked also T. quadrisspinosa by Wallich; but though the leaves are the leaves of T. natans, the fruit is that of T. bispinosa.

2. T. natans, Linn.; DC. Prodr. iii. 63; leaves sparingly villous on the nerves beneath, fruit with all 4 angles carrying spines. Linn. li. t. 75; Boiss. Fl. Orient. ii. 753. T. quadrisspinosa, Roxb. Hort. Beng. 11; Fl. Ind. i. 451; DC. l. c.

Kashmir; Falconer, Jacquemont. Silhet; Roxburgh (but no example thence at Kew).—Distr. Persia to Central Europe and the Upper Nile.

Floating leaves 1 in., dentate or incise-dentate on the anterior margin; petiole 2–4 in., glabrescent. Fruit ⅕ in. broad, the 4 angles all spinescent but the two lateral spines shorter.

Order LXIII. Samydacæ. (By C. B. Clarke, F.L.S.)

Trees or shrubs. Leaves alternate, often distichous, petioled occasionally sessile, simple, entirely or lightly crenate or serrate, often closely punctulate beneath; stipules small, deciduous. Flowers regular, small, axillary, shortly peduncled, densely fascicled or in long simple or paniced racemes. Calyx coriaceous, persistent; tube short, free, or longer and adnate to the ovary; limb 3–7-fid. Petals as many as the calyx-lobes (or 0), perigynous, imbricated. Stamens definite or indefinite, often with staminodes between or united in a tube with them. Ovary superior or half-superior, 1-celled; style 1, capitate or
3-fid at the apex, or styles 2–5; ovules many or several, placentas 2–5 (usually 3), parietal. Fruit loculicidally 2–5– (usually 3)–valved, valves carrying the seeds on their median line. Seeds several (usually few sometimes many), oblong or angular, albuminous, usually drilled.—**Distrib.** Species 150, scattered through the tropical regions of the globe, rarely also in the subtropical.

Petals 0, flowers in axillary fascicles
Petals 0, racemes slender in a terminal panicle
Petals present, racemes axillary and terminal

1. Casearia, Jacq.

Shrubs or small trees. **Leaves** alternate, distichous, peltioed, undivided, entire or slightly serrate, often minutely punctate beneath; stipules small, lateral, caducous. **Flowers** small, greenish-yellow, clustered in the axils (in the Indian species); pedicels short, jointed above their base, surrounded by small scales. **Calyx** inferior, deeply 4–5-lobed; lobes imbricate, obtuse, persistent. **Petals** 0. **Stamens** double the number of calyx-lobes or thereabout, united in a tube with staminalodes alternating with the free portion of the filaments; staminal tube hypogynous, sometimes very short so that the filaments are nearly or quite free. **Ovary** free, ovoid, 1-celled; style simple; stigma capitate or 3-fid; ovules many, parietal. **Capsule** succulent, globose or ovoid, ellipsoid (when dry somewhat 3-angular or 6-ribbed), 3–rarely 2-valved. **Seeds** many, angular or obovoid, with a fleshy usually coloured aril; embryo straight.—**Distrib.** Species 80, in the warmer parts of the whole globe, most plentiful in America.

* Adult leaves and petioles glabrous.

1. C. glomerata, Roxb. Hort. Beng. 33; Fl. Ind. ii. 419; leaves lanceolate or elliptic-lanceolate acuminate denticulate or crenate often obscurely and minutely so but never quite entire, acute or obtuse but not rounded coriaceous at the base, pedicels with minute yellow hair, fruit ½ in., ellipsoid. **DC. Prodr.** ii. 49; Benth. **Fl. Hongk.** 122; **not of Kurz Flor. Fl.** i. 530. C. ovata, Wall. Cat. 7192 E, **not of Roxb.**

Sikkim, Bhotan and Khasia, alt. 3000–5000 ft., common.—**Distrib.** Hong Kong (and probably Malaya, for the examples of C. glabrata Miq. collected in Sumatra appear C. glomerata).

A shrub, or in interior Sikkim a tree 20–30 ft.; branchlets somewhat angular, glabrous, not or but little lenticellate. **Leaves** commonly 4 by 1½ in. (in Sikkim frequently 9 in.); petiole ½ in. **Pedicels** usually very many, ½ in. **Calyx** small, more or less pubescent in the bud. **Stamens** 7–10, staminalodes yellow.—A plant collected in Sikkim by Mr. Kurz, marked "C. glabra," has bark densely uniformly lenticellate, petioles 1½ in. and the young buds and pedicels without the smaller yellow hairs; it can scarcely be Roxburgh's C. glabra from the Moluccas and which is not represented in the Kew Herbarium.

2. C. leucolepis, Turcz. in Bull. Soc. Nat. Mosc. 1858, pt. i. 463; leaves oblong acute crenulate base rounded unequal, pedicels with minute grey hairs. ? C. viridiflora Lamk. **Dict. vi. 493.**

Singapore; T. Lobb.—**Distrib.** Java, Philippines.

Branchlets nearly glabrous. **Leaves** 5–6 by 2 in.; petiole ¼ in. **Pedicels** ¼ in.; buds minutely hairy, larger than those of C. glomerata.—There is a doubt whether Thos. Lobb's No. 468 on which Turczaninow founded the species was not collected at Luzon instead of Singapore. If so the species has not yet been found in British India.
Also, Turczaninow’s description is not correct as to the absolute glabrousness of the species. The sepals and tips of the branchlets of Lomb No. 468 are minutely pubescent; and the examples of C. angustata, Teys. & Binn. (see Mig. Fl. Ind. Bot. i. pt. i. 710) only differ by being slightly more pubescent. Lastly, the whole does not differ from C. glomerata so much as C. glomerata if cultivated at Singapore might be expected to vary from the Sikkim type.


GURWHAL and KUMAON; Royle, Wallich, &c. SIKKIM; alt. 1500 ft., C. B. Clarke. DECCAN PENINSULA, especially the western side, common; Wight, &c. BURMA; McClelland, Kurz.

A shrub or tree 20 ft.; branchlets glabrous to the final stipules. Leaves (in the type) ½ by 2½ in., broadly elliptic, little acuminate, rounded at the base; petiole ⅔ in.; but the leaves are often narrower, almost lanceolate, and acute at the base. Pedicels usually short, sometimes ½ in., jointed at or above the base, aurico-pubescent below the articulation glabrous above to near the base of the calyx. Calyx always pubescent at the base, above sometimes densely aurico-pubescent sometimes glabrous.—This species is to be separated from C. glomerata by the pedicel glabrous above its articulation and by its geographic locality; from C. esculenta by its less entire less thick leaves and the calyx pubescent at its base. As to the Wallichian Number quoted: in the large paper type, Wall. Cat. 7195, A and one sheet of B is C. graveolens; the other part of B does not belong to the genus. The Burmese plant is distributed by Mr. Kurz under the name C. Hamiltoni, Wall. correctly: but in Journ. As. Soc. and For. Fl. he has changed the name to C. Canziula, Wall. (see 10. C. tomentosa.) Now Roxburgh says his C. ovata has the leaves downy beneath, whereas Mr. Kurz says (truly) that his plant has all parts glabrous: Wallich’s own Canziula is hairy.


MALABAR, from BOMBAY to KURG, frequent. CEYLON, plentiful; Thwaites. MOULMEIN and SINGAPORE, Lomb. Griffith, Mainagay.

A shrub or small tree, branches glabrous. Leaves 3-6 by 1-2 in., broad-lanceolate, narrowed to both ends, entire or most obscurely crenate, thick, subcoriaceous; petiole ⅓-¼ in. Pedicels short, usually less than ¼ in. in fruit, jointed at the base. Carpels 2, with 2-fid stigma (Thwaites No. 2604, 2657); but carpels often 3 (see Beddome Fl. Sylv. 208).—C. Championii Thwaites with very entire coriaceous acuminate leaves is exactly the form sent from Moulmein and Singapore.

Var. angustata; leaves narrow-lanceolar 4 by 1 in.—CEYLON; Thwaites No. 2603 reduced with hesitation to C. esculenta by Mr. Bentham in Fl. Austral. iii. 309.

5. C. coriacea, Thwaites Enum. 20; leaves obovate obtuse or rounded at the vertex entire, pedicel above its articulation and calyx glabrous, fruit ⅔-¾ in. ellipsoid. C. varians var. γ obovata Thwaites l. c.

CEYLON, alt. 6000-8000 ft.; Thwaites, Gardner, Walker.

A small tree, branches glabrous. Leaves 2 in., much narrowed at the base; petiole ⅓ in. Carpels always 2 (Thwaites).

**Bombay Ghauts, Concan and Kurig; Dalzell, Stocks, Ritchie.**
A shrub 4–6 ft. (Dalzell); branches glabrous to the final stipules. *Leaves 4½ by 2¼ in., acuminated, coriaceous often ruddy (but not more so than some examples of C. esculenta); petiole ½ in. Pedicels short, usually less than ¼ in., jointed at the base. Calyx-lobes broadly, minutely pubescent.—This species is here distinguished from C. esculenta solely by the minute pubescence of the pedicels.*

7. **C. macrocarpa**, C. B. Clarke; leaves narrowly lanceolate, pedicels glabrous, fruit 1¾ by ½ in.

**Pinang; Maingay 660–2.**
Branchlets redish, glabrous. *Leaves 5 by 1¾ in., entire, acute at both ends, reddish, reticulate, shining; petiole ¼ in. Pedicels few, not exceeding ¼ in., glabrous, reddish, buds glabrous. Seeds ¼ in., obovoid, compressed.*

8. **C. albicans**, Wall. *Cat.* 7197; leaves oblong acute at both ends, pedicels glabrous, fruit 2 by 1½ in. ovoid bright yellow when ripe (Maingay).

**Pinang; Walllich. Malacca; Maingay, No. 660.**
Branchlets thick, glabrous, striate. *Leaves 9 by 2¾ in., entire, coriaceous, nerves much raised beneath; petiole ⅔ in. Pedicels clustered, ¼ in., buds glabrous.—It is possible that this species may prove a variety of the preceding, but the leaves are much broader, the fruit ovoid (instead of narrowly ellipsoid) as noted by Dr. Maingay.*

**Adult leaves on the midrib beneath together with the petiole more or less pubescent.**


**Terai of the Himalaya from Sikkim eastward and of Khasia, at 500–3000 ft. elevation, plentiful.—Distrib. Ava.**
A shrub, branchlets pubescent. *Leaves 3½ by 1½ in., often somewhat ciliate, obtuse suddenly narrowed but sometimes acuminate; petiole ¼ in. Pedicels less than ¼ in., usually jointed far above the base, very hairy below the articulation. Stamina tube elongate, stamens often 10. Seeds in bright red pulp.—The leaves have regularly and closely placed serrations which prominently mark this species from all others and appear to have completely protected it against synonyms.*


Throughout *India and Ceylon*, common.—*Distrib.* Malaya and North Australia. 

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A shrub, or tree attaining 25 ft.; branchlets tomentose pubescent or nearly glabrous. *Leaves* 4 by 1½ in., tomentose beneath or pubescent or only slightly hairy about the base of the midrib, rarely so closely serrate as in *Wight* *t.* 1849, often nearly entire; petiole variable from 4–¾ to 6 in. in Central India examples. *Pedicels* usually numerous, less than ¼ in.; buds usually hairy, sometimes nearly glabrous. *Staminal* tube short, stamens 7–10 (sometimes 12 Benth.). *Seeds* in red pulp.—The typical C. *tomentosa* of North-West India has softly villous oblong nearly entire leaves; the South Indian examples (var. *elliptica*) have the leaves more glabrous, more crenate-serrate and more narrowed at base. With these the Malayan examples agree. As to C. Canzioia, *Wall.* *Cat.* 7,192 stated by *Wall.* to be equivalent to C. *ovata* Roxb. the numerous examples of *Wight* and *Wallich* have the pedicels buds and leaves beneath villous and if it is separable as a species it is certainly not C. *graveolens.* Willdenow says his C. *elliptica* has glabrous leaves and *Roxburgh* says his C. *glabra* has glabrous leaves; so that these synonyms as known only from description must be excluded. But it is very probable that they relate to the nearly glabrous form C. *Dallachii* (see Benth.* Fl. Austral.* iii. 309).


Moulmin and Singapore, T. Lobb; Malacca, Griffith.

Branchlets round, softly hairy. *Leaves* 2½–3½ by ¾–1¼ in.; petiole ½–¾ in. *Buds* most minutely pubescent. *Fruit* subsessile.—Scarcely differs from *C. tomentosa* but by the more acuminate leaves.


Malacca, Maingay No. 659, 661.—Distrib. Malaya to the Philippines.

A small tree (Maingay), branchlets more or less pubescent. *Leaves* 7 by 2½ in.; petiole ½ in. *Pedicels* often ¼ in., jointed at the base, buds generally pubescent.—Diffs. little from *C. tomentosa* but by the cordate base of the leaves as *Ventenat* mentions. *Miquel* says his *C. subcuneata* differs from the typical *C. grewiæfolia* in being less hairy; but in *Miquel’s* own communicated examples there is hardly any difference even in this respect.


**Wynaad**; alt. 2000–3000 ft.; *Beddome*.

A small tree (Beddome), branchlets aureo-villous. *Leaves* 4–6 by 1½–2 in.; petiole ¼–¾ in. *Pedicels* not very many together, ½ in. or less; buds minutely pubescent. *Stigma* 4-lobed (Beddome).—Diffs. considerably from *C. tomentosa* among other things by the leaves being acuminated to a very sharp point.

14. **C. Kurzii**, *C. B. Clarke*; leaves lanceolate or oblong-lanceolate narrowed at the base with spreading yellow hairs beneath crenate or nearly entire, pedicels pubescent very long, fruit ellipsoid (¾ in., ?). C. *glomerata* var. *puberula*, *Kurz in Journ.* *As.* *Soc.* 1877; pt. ii. 92; *Por.* *Fl.* i. 530.


Branchlets minutely pubescent. *Leaves* 5 by 2 in.: petiole nearly ¼ in. *Pedicels* not very many together, ¼–½ in. *Calyx* minutely pubescent. *Fruit* not ripe but
cannot become very large.—The pedicels are much longer in this species than in any of the others; and the pubescence of the leaves beneath differs from all except that of C. grevillifolia. A Casearia collected by Griffith in fruit in Assam may be this, but the pedicels are shorter, and some of the leaves rounded at the base, approaching thus C. grevillifolia.

IMPERFECTLY KNOWN AND EXCLUDED SPECIES.

C. ASTYLA, Turcz. in Bull. Soc. Imp. Mosc. 1863, 608; branchlets pubescent, leaves glabrous, sterile stamens densely white-hirsute, style 0.

East Indies; Roxburgh (vide Turcz.).

Leaves lanceolate, somewhat long but obtusely acuminate, margin revolute entire, shining, not punctate; petiole short. Pedicels 3 or few. Calyx-tube top-shaped, contracted in the middle, segments reflexed.—A very distinct species in the structure of its flowers, forming the type of a separate subgenus.—Not seen; the foregoing is taken from Turczaninow.

CASEARIA ? CORIACIA, Wall. Cat. 7196, is Chatocarpus castanocarpus, Thwaites Enum. 275.

CASEARIA ? ACUMINATA, Wall. Cat. 7198, has opposite leaves and is remote from the genus and order.

CASEARIA ? LUCIDA, Wall. Cat. 7199, is a Euphorbiaceous plant, possibly the male of Wall. Cat. 7196.

2. OSMELIA, Thwaites.

Trees. Leaves alternate, petioled, ovate or oblong-lanceolate, entire or obscurely serrate, puberulous; stipules minute, deciduous. Flowers small, very nearly sessile, in long racemes which are simple or panicled. Calyx inferior, divided nearly to the base; lobes 5, rounded, imbricate. Petals 0. Stamens 10 (or 8), 5 alternating with as many 2-lobed hairy scales and 5 inserted in the notches of those scales. Ovary superior, 1-celled; styles 3, short, with capitellate stigmas; ovules few, placentas 3, parietal. Capsule subglobose, 3-valved. Seeds few, subglobose, with red fleshy aril.—Distrib. Species 3; one in Ceylon, two in the Philippines.


Ceylon; Gardner; Central Province, alt. 3000 ft., not common; Thwaites.


3. HOMALIUM, Jacq.

Shrubs or trees. Leaves alternate, crenate or subentire, petioled or sessile, rarely punctulate. Flowers hairy, small, in slender axillary and sub-terminal simple or panicled racemes; bract at the base of the pedicel often prominent but caducous. Calyx-tube funnel-shaped, adnate to the base of the ovary; lobes 5–7, narrow, persistent. Petals 5–7, inserted in the throat of the calyx, linear-oblong, persistent. Disk tomentose. Stamens solitary or in fascicles of 1–7, opposite the petals with alternating glands. Ovary half-superior, 1-celled;
styles 2–5, filiform, stigmas capitellate; ovules many or several, placentas parietal, extending only down the upper free portion of the ovary Capsule half-superior, coriaceous, 2–5-valved at the apex. Seeds few, angular or oblong. —DISTRIB. Species 30, scattered over the hot regions of nearly the whole globe.

As no one of the Indian specimens exhibits fruit, the description of the capsule and seeds in the above diagnosis has been assumed to apply to the Indian species.

Sect. I. Blackwellia. Stamens 1 opposite each petal.

* Racemes paniced.

1. **H. nepalense**, Benth. in Journ. Linn. Soc. iv. 34; leaves ovate or elliptic subacute petioled crenate glabrous, panicles with divericate branches minutely tomentose or nearly glabrous. Blackwellia nepalensis, Wall. Fl. As. Rar. t. 179; Wall. Cat. 4900; DC. Prodr. ii. 54. B. (Astranthus) acuminata, Wall. in Herb.

Leaf: Nipal; Wallich.
Leaves 4½ by 2¼ in., subacute obtuse or scarcely rounded at the base; petiole ½ in. Panicles 3–4 in. long and broad, axillary. Flowers small, short-pedicelled, 6–7-fid.

** Racemes elongate simple.

2. **H. tomentosum**, Benth. in Journ. Linn. Soc. iv. 34; leaves nearly sessile obovate repand-crenate pubescent or tomentose beneath, flowers clustered subsessile. Kurz For. Fl. i. 531. Blackwellia tomentosa, Vent. Choix t. 57; DC. Prodr. ii. 55; Mag. Fl. Ind. Bat. i. pt. i. 714. B. spiralis, Wall. Cat. 4897, partly; DC. l.c.

Persu; Wallich, Kurz.—DISTRIB. Java.
Leaves 5 by 3 in., narrowed or scarcely rounded at the base; petiole ½ in. or less. Racemes 6 in., axillary, scattered, tomentose. Flowers small, 5–6-fid. Calyx-tube not elongated, segments about equalling the petals.

3. **H. longifolium**, Benth. in Journ. Linn. Soc. 35 (excl. syn.) leaves petioled oblong or oblong-lanceolate not rounded at the base entire or nearly so glabrous, flowers clustered pedicelled, calyx-tube short segments nearly as long as the petals. Blackwellia macrostachhya, Turcz. in Bull. Soc. Imp. Mosc. 1863, 610 ex descr.

Pinang; Phillips. Malay; Maingay No. 665.
Tree not very large but high (Maingay). Leaves 4–7 by 1½–2½ in.; petiole ¼ in. Racemes 6 in., axillary, scattered, but mostly towards the ends of the branchlets, tomentose or scarcely more than puberulous; pedicels short, usually less than ½ in. Flowers small, 6–8-fid.—For the synonym Wall. Cat. 4897 in part adduced by Mr. Bentham see H. propinquum below.

4. **H. minutiflorum**, Kurz For. Fl. i. 532; glabrous, leaves petioled oblong coarsely crenate, pedicels glabrous, flowers minute about ½ 24 in. long.

Burma, probably Martaban or Tenasserim; Brandis.
An evergreen tree. Leaves 3–5 in., obtusely apiculate, thin, coriaceous; petiole ½ in., stout. Racemes glabrous, simple or slightly branched, in pairs or solitary, axillary. Calyx glabrous; segments oblong-linear, villous-ciliate. Filaments slender, one before each petal.—Not seen: description copied from Mr. Kurz.

5. **H. zeylanicum**, Benth. in Journ. Linn. Soc. iv. 35; leaves petioled elliptic narrowed at both ends crenate glabrous, flowers clustered pedicelled,

MALAYAR, up to 4000 ft., not uncommon; Law, Stocks, &c. Ceylon, moister parts up to 3000 ft.; Walker, &c.

A tree 40–50 ft. Leaves 4 by 2 in., obtusely acuminate; petiole ½ in. Racemes axillary, scattered, also approximated at the ends of the branches, often dense with flowers; pedicels short, usually about ½ in. Flowers small (but varying considerably in size), 4–6-fid. Styles 3–4.

SECT. II. Racoubea. Stamens 2–7 opposite or subopposite each petal: some of the filaments sometimes having no anthers.

* Racemes panicled or more or less divided.

6. H. Schlichii, Kurz For. Fl. i. 532; leaves petioled elliptic narrowed at both ends coarsely crenate glabrous, racemes terminal or subterminal, panicled grey-pubescent, stamens 3 before each petal.

Chittagong, in tropical forests; Kurz.

7. H. propinquum, C. B. Clarke; leaves petioled oblong undulate-crenate pubescent on the midrib beneath, racemes often simple, flowers clustered pedicelled, calyx-tube oblong top-shaped segments nearly as long as the petals. H. longifolium, in part Benth. in Journ. Linn. Soc. iv. 35. Blackwellia propinqua, Wall. Cat. 4898. B. spiralis, Wall. Cat. 4807 A.

Pegu; Wallich.

Leaves 4–8 by 1½–3 in., obtuse, base usually narrowed sometimes unequally rounded; petiole scarcely ½ in., villous. Racemes 6 in., towards the ends of the branches, villous-tomentose, simple or branched once; pedicels about ½ in. Flowers small, 6-fid. Stamens 2 before each petal, both bearing anthers.

** Racemes elongate, simple.


Mergui, Griffith No. 991. Tenasserim, Helfer.

Branchlets with spreading yellow hairs. Leaves 3 by 2 in., not much acuminate, above densely yellow villous-pubescent on the nerves with scattered hairs on the surface especially near the margin; long golden spreading hairs on the midrib beneath, and bundles of similar hairs in the axils of the nerves; petiole scarcely ½ in., densely villous. Racemes 6 in., tomentose; pedicels very short, less than ½ in. Flowers small, but larger and much more hairy than those of H. fetidum. Calyx-segments shorter than the petals. Styles 5.—Griffith states in Notul. that his plant has two stamens before each petal, as his specimens clearly show: it is by oversight that Mr. Kurz has described one only.

9. H. fetidum, Benth. in Journ. Linn. Soc. iv. 37; leaves petioled elliptic narrowed at both ends glabrous crenate, flowers clustered pedicelled 6–8-fid, calyx-tube short segments a little shorter than the petals. Blackwellia fetida,
MALACCA; Griffith, Maingay No. 664.—Distrib. Malaya.


10. *H. grandiflorum*, Benth. in Journ. Linn. Soc. iv. 37; leaves short-petioled elliptic-oblong entire coriaceous glabrous, flowers pedicelled solitary 6–7-fid, calyx-tube short, segments enlarged after flowering and longer than the petals, stamens about 7 to each petal.

MALACCA; Griffith.—Distrib. Sumatra.


11. *H. travancoricum*, Bedd. Fl. Sylv. t. 211; leaves petioled elliptic crenate glabrous, flowers subsessile clustered usually 5-fid, calyx-tube short turbinate segments hardly the length of the petals, stamens 3–4 opposite each petal.

SOUTH MALABAR MTS.; Travancore and Tinnivelly Ghauts; Beddome.

A handsome middle-sized tree (Beddome). *Leaves* 3–4 by 1½–1⅓ in., obtuse acute or acuminate, base subacute or obtuse hardly rounded; petiole less than ¼ in. *Racemes* 2–4 in., axillary, puberulo-pubescent, not so dense-flowered as in *H. zeylanicum* (ex Beddome); but the flowers appear as dense as in other species.

Doubtful Species.

*H. fœtidum*, Kurz For. Fl. i. 532 not of others; all parts quite glabrous, leaves broadly-oblong coarsely crenate, stamens in pairs opposite the petals, ovary glabrous.

*Tenasserim, Kurz.*

The ovary is densely villous in all the Kew *H. fœtidum*.

Order LXIV. **Passifloræ**. (By M. T. Masters.)

Twining herbs or shrubs, rarely erect. *Leaves* alternate, stipulate, simple or lobed, pinni- or palmi-nerved, frequently glandular beneath. *Petiole* usually provided with glands. *Stipules* foliaceous or minute. *Tendrils* axillary or 0. *Inflorescence* axillary, cymose, sometimes with one or more branches cirrose, rarely flowers solitary. *Bracteoles* 3, minute and scattered, or foliaceous and forming an epicalyx, rarely 0. *Flowers* regular, unisexual or bisexual. *Calyx* tubular at the base, fleshy, subcoriaceous or membranous; segments imbricate, 5. *Petals* 0 or as many as the calyx-lobes, springing from the tube of the calyx, membranous or fleshy, imbricate, marcescent. *Corona* of one or more rows, filamentous or membranous or both, arising from various portions of the calyx-tube, rarely 0; basilar corona urceolate or cup-shaped, surrounding the base of the androecium, sometimes represented by five separate glands of the disc; rarely 0. *Stamens* 5, on a gynophore or free at the base, perigynous; anthers oblong, 2-celled, basi- or dorsi-fixed, dehiscing laterally or intorosely. *Ovary* superior, on a gynophore or subsessile, 1-celled with 3 parietal placentas, rudimentary or absent in the male flowers. *Styles* 1 or 3; stigmas reniform,
capitate or flattened. **Ovules** numerous, pendulous, anatropous; funicle expanded into a cup-shaped arillus. **Fruit** baccate or capsular. **Seeds** numerous, ovoid or flattened, often pitted, covered with a fleshy arillus, albumen fleshy, rarely scantly; embryo straight, cotyledons flat leafy, radicle short terete.—**Distrib.** Chiefly tropical; most numerous in South America. Genera about 20; species about 300.

**Carica Papaya, L.** The Papaw is commonly cultivated, and is more or less naturalized in various parts of India.

**TRIBE I. PASSIFLOREÆ.** Flowers hermaphrodite. **Stamens** hypogynous.

Twining herbs or shrubs . . . . . . . . . . . . . . . . . . . . . . . 1. **Passiflora.**

**TRIBE II. MODECÆ.** Flowers unisexual. **Stamens** perigynous.

3. **Modecca.**

1. **PASSIFLORA,** Linn.

Twining shrubs. **Leaves** simple or palmilobed, usually with glands on the under surface and on the petiole; stipules thread-like or leafy. **Flowers** pedunculate; peduncles simple or cymose. **Bracteoles** 3, small, scattered. **Calyx-tube** fleshy, limb 5-lobed. **Petals** 5, springing from the throat of the calyx. **Corona** of one or more rows of fine threads springing from the throat of the calyx-tube and of one or more membranous folds arising lower down. **Gynophore** surrounded at the base by a shallow membranous cup or basilar corona; filaments 5, flat; anthers oblong, 2-celled, dorsifixed; pollen grains reticulate on the surface. **Ovary** 1-celled; styles 3, stigmas reniform-capitate. **Fruit** baccate. **Seeds** arillate.—**Distrib.** A large genus most abundant in tropical and subtropical America. A few are Malayan and two Chinese.

In addition to the following species, several others are cultivated in Indian gardens, and some have become more or less naturalized, as indeed in all hotter countries. Among these may be mentioned varieties of **P. fedida** and **suberosa.** A form of the latter species was described by Wight as indigenous to Ceylon under the name of **P. Walkeriæ,** 39 Ill. ii. (t. 108), but there is no reason to suppose it indigenous.

1. **P. Leschenaultii,** DC. **Prodr.** iii. 326; leaves semiorbicular truncate palminnerved shortly 3-lobed glandless pubescent especially beneath. **Wall. Cat.** 1231; **W. & A. Prodr.** 352; **Hook. Fl. Pl.** t. 355; **Wight** Fl. t. 39.

**Khasia, Pulney and Nilghiri Mts.**

A climbing shrub. **Branches** slender, angular. **Leaves** broader than long, more or less pubescent, especially on the under surface and along the 3 nerves, rarely entirely glabrous, base rounded or cordate, apex truncate 3-lobed, lateral lobes spreading lanceolate, central lobe very small; petiole 1 in., with 2 sessile glands below the middle. **Peduncles** in pairs in the axils of the leaves, simple, longer than the petiole; bracteoles 3, remote, linear. **Flowers** 2 in. diam.; tube short, saucer-shaped. **Sepals** oblong, obtuse. **Petals** white, equalling the sepals in length but narrower. **Outer corona** near the base of the tube, of two rows of linear filaments, the outer rather shorter than the petals, the inner much shorter; **inner corona** short, tubular, membranous, plicated, margin incurved and crisped; **basilar corona** small, cup-shaped, surrounding the base of the gynophore. **Anthers** linear. **Ovary** elongate-oblong. **Fruit** 1½ by 1 in., ovoid, glabrous, yellowish; rind leathery.

**Nepal**, Wallich. Sikkim, alt. 4-6000 ft. *Khasia Mts.*, alt. 3-6000 ft., H. f. & T. A glabrous climber with slender angular branches and distant leaves. *Stipules* ⅓ in., linear-subulate. *Leaves* 2⅓-4 by 2-3 in., thin, membranous, deep green above, glaucous beneath, marked near the base with 2-3 flat circular glands, rounded or cordate at the base, apiculate, 1- or sub-3-nerved, nerves prominent, smaller nerves arched, remote, inconspicuous; petiole ⅓ in., usually with two glands above the middle. *Peduncles* simple, in pairs in the axils of the leaves, about half the length of the petiole, slender, 1-flowered, jointed above the middle, rarely cymose; cymes lax, few-flowered. *Flowers* less than ⅔ in. diam., cup-shaped; tube short, cylindrical. *Calyx-lobes* longer than the tube. *Petals* equal to the calyx-lobes. *Corona* of many rows of short threads. *Gynophore* shorter than the flower. *Ovary* ovoid or subglobose, glabrous. *Fruit* subglobose, the size of a large pea, purplish.

**EXCLUDED SPECIES.**

P. caloneura. *Kurz in Journ. As. Soc.* 1877, ii. 95, described as from “Burma probably Upper Tenasserim or Martaban, *Brandis*,” is, according to an authentic specimen sent by Dr. Kurz from the Calcutta Herbarium, the *Aristolochia trifolbata*, L., of the West Indies and South America, no doubt introduced into India; it is not in flower or fruit, but the nervation of the leaf, no less than its form and indumentum, leaves no doubt as to this identification.

P. Heyneana, *Wall. Cat.* 1233 bis (alias 2248) is an *Olacinea*, probably referable to *Erythropalum populifolium*, Mast.

2. **PAROPSIA**, Noronh.


**Malacca**, Maingay, *Griffith*.

A shrub. *Leaves* 3½ by 1 in.; petiole ½ in. *Flowers* ⅔ in. in diam. *Calyx* campanulate, tube short covered with tawny down; lobes oblong, obtuse, 4 or 5 times longer than the tube. *Petals* oblong, 1-nerved, half the length of the sepals. *Corona* of a single row of flat, villose threads, half the length of the petals and arising with them from the margin of the tube. *Gynophore* shorter than the petals. *Stamens* 5, filaments filiform; anthers oblong. *Ovary* globose, villose. *Stigmas* large, capitate-reniform.


**Malacca**, *Griffith*.

Shrub, more or less rusty pubescent. *Leaves* 6 by 2¼ in., coriaceous, glabrous
above; petiole under \(\frac{1}{4}\) in. Peduncles \(\frac{1}{6}\) in. Flowers nearly \(\frac{1}{2}\) in. Calyx-segments leathery. Petals narrow at the base, ciliated. Ovary turbinate, villose. Fruit the size of a hazel nut, subglobose; rind dry, leathery. Seeds ovoid, flattened, pitted.—Larger in all its parts than \(P.\) malayana.

3. **MODECCA, Lam.**

Twining herbs or undershrubs. Leaves entire or palmilobed, usually with two or more flat, circular glands on the under surface and with similar glands at the apex of the petiole. Cymes axillary, few- or many-flowered, on long peduncles one or more of which is sterile and tendril-like. Male flower: Calyx tubular or bell-shaped; limb 5-lobed, lobes leathery, imbricate. Petals 5, free, membranous, 1-nerved, springing from the calyx-tube. Corona a ring of threads arising from near the base of the calyx-tube, or wanting. Glands of the disc 5, opposite the sepals, strap-shaped or capitate. Androecium cup-shaped, membranous beneath; filaments 5, linear-subulate; anthers linear-oblong, 2-celled. Ovary rudimentary or 0. Female flower: Calyx and corolla as in the male. Corona a membranous fold, springing from near the base of the calyx-tube or none. Glands of the disc 5, strap-shaped, capitulate, opposite the sepals. Stamina 5, forming a membranous cup surrounding the base of the ovary, above dividing into barren filaments. Ovary globose or elliptic, sessile or stalked; style cylindrical or none; stigmas 3, capitate or flat and dilated. Fruit capsular, 3-valved. Seeds numerous, attached by long funicles to parietal placertas.—**Distrib.** A small genus, native of the tropics of the Old World.

**Sect I. Microblepharis, W. & A.** Petals springing from the throat of the calyx-tube, stigmas sessile.

1. **M. Wightiana, Wall. Cat. 6764;** leaves membranous uniform or diverse all cordate ovate acute or some more or less palmately 3-lobed. *Wight* Ic. 179; *W. & A. Prodr.* i. 353; Thwaites Enum. 128. *M. diversifolia, Wall. Cat. 6763.*

Hills of the Western Peninsula, and Ceylon.

Root tuberous. Branches striated, roughish. Leaves 2–3 by 2 in., glabrous, from ovate entire rounded or slightly cordate at the base to hastate or palmately lobed; the central lobe longest, obtuse; nerves remote; petiole about 1 in., with a sessile gland on each side at the top. Peduncles axillary, filiform. Flowers not seen. Calyx, according to Wight’s figure, small; tube short, lobes ovate. Petals broad, shorter than the sepals, attached to the throat of the calyx. Ovary subglobose, surmounted by three cuneate, fringed, reflexed stigmas. Fruit glabrous, the size of a small plum, subglobose or ovoid, 3-valved. Seeds flattened, heart-shaped, rugulose, with parallel ridges around the margins.—Wight and Arnott refer Wallich’s *M. diversifolia* to *Vitis lanceolaria*, but the type specimen in Wallich’s herbarium clearly belongs to the present species.


**Malacca.** Singapore, Wallich.—**Distrib.** Borneo.

Glabrous. Leaves 3–4 by 2 in., coriaceous, oblong-obovate, obtuse, tapering to the base, midrib prominent, secondary nerves remote; petiole \(\frac{1}{4}\) in., with a large sessile gland on either side at the top. Tendrils as long as the petiole. Male flowers \(\frac{1}{4}\) in., elongate-fusiform. Calyx leathery, shortly 5-lobed, lobes ovate, connivent (? always). Petals thick, leathery, oblong acute, springing from the calyx-tube just
beneath the throat. *Corona* none (?). Glands of the disc 5, small, oblong, at the base of the calyx-tube, opposite to its lobes. *Stamens* 5; anthers subsessile, erect, linear; connective long, thread-like. *Rudimentary ovary* fusiform. *Fruit* 2 in., long, glabrous, fusiform.—Maingay's specimens, like Wallich's, are very imperfect, but the two are sufficiently alike to leave no doubt of their specific identity.


**Sikkim, Khasia Mts., and Assam.**

Glabrous. *Branches* terete. Leaves remote, 6–8 by 4–5 in., entire, rarely palmately lobed, basal lobes rounded divaricate; petiole 2–3 in., with a sessile gland on either side at the apex. *Gynoecium* many-flowered, on a cylindrical peduncle as long as the pediole, one branch cirrose. *Male flowers* ½ in., bell-shaped. *Calyx* leathery, spotted, 5-lobed to the middle; lobes oblong, obtuse. *Petals* membranous, white, ovate, obtuse, springing from about the middle of the tube. *Androecium* membranous and tubular below, above divided into five filaments; anthers linear-ovate, acute. *Glands of the disc* 5, small, opposite to the sepals. *Female flower*: *Calyx* ¼ in., funnel-shaped, slightly dilated above the base, leathery, spotted; lobes oblong, 3-nerved. *Petals* membranous, springing from the middle of the calyx-tube, oblong, 1-nerved, entire or minutely serrulate. *Glands of the disc* opposite the sepals, small, oblong, curved. *Barren stamens* forming a shallow membranous tube, divided above into filiform segments. *Ovary* raised on a short gynophore, ovoid, surmounted by a large peltate stigma with 3 reflexed wedge-shaped laminar lobes.—In foliage very like the entire-leaved form of *M. palmata*, but the anthers and stigmas are quite different.


**Andaman Islands, Kurz.**—**Distrib. Java.**

Leaves 2–3 by 2 in., shortly petiolate, slightly glaucous beneath. *Calyx* elongate, constricted at the neck. *Petals* small. *Anthers* oblong muticus. *Fruit* 3 by 1 in. —I have seen no authentic specimen of this either from the Andamans or from Java. The specimen labelled by Kurz *heterophylla* in the herbarium has much larger and markedly acuminate leaves. It is probably an entire-leaved form of *M. palmata* or *M. trilobata*.

**Sect.** II. **Blepharanthes**, W. & A. *Petals* springing from the base of the calyx-tube. *Style* trilid or styles 3; stigmas capitate.


**Sikkim, Assam, Khasia Mts., Cachar, Chittagong.**

into a membranous cup. *Gynophore* short. *Ovary* elongate, ovoid; style short, stigma large capitate 3-lobed. *Fruit* scarlet, oblong, 2½ by 1½ in.


**Western Peninsula and Ceylon.**

Glabrous. *Branches* sulcate. *Leaves* remote, broader than long, 4–5 by 6–7 in., roundish, cordate, usually 3–5-lobed nearly to the base with a single circular flat gland beneath the sinus, sometimes entire, cordate, ovate, acuminate; lobes oblong-lanceolate, acuminate, tapering to the base; petiole 2 in., with a gland on either side at the apex. *Male flower*: *Calyx* about ½ in., campanulate, 5-lobed, dilated at the base, lobes ovate-acute. *Petals* linear-oblong, 3-nerved, ciliate, springing from the base of the calyx-tube. *Corona* a ring of threads from the tube of the calyx, just above the dilated portion. *Filaments* subulate, united at the base; anthers linear-oblong. *Female flower*: *Calyx* ¼ in., campanulate; lobes ovate acute. *Petals* linear, acute, ciliated, springing from the base of the tube. *Corona* a membranous fold fringed with white hairs, arising from near the base of the flower tube. *Glands of disc oblong*, opposite the sepals. *Staminodes* 5, forming a membranous cup surrounding the base of the ovary and above divided into flat strap-shaped filaments nearly as long as the glabrous subglobose ovary. *Style* nearly as long as the ovary, dividing into 3 branches; stigma large capitate. *Fruit* the size of a small apple, subglobose. *Seeds* large, pitted, ribbed at the edges.—Root said to be poisonous, used as medicine by the Cingalese (*Thwaites l. c.*). *M. integrifolia*, *Wall. Cat.* 6765, is a garden specimen of uncertain identity not referable to the present species.

**Imperfectly Known Species.**

*M. aliena*, *Wall. Cat.* 6766, from Silhet, is an Asclepiad, the flowers of which are too imperfect for determination.—There is no specimen in Wallich’s herbarium.

*M. apiculata*, *Mast.*; leaves membranous cordate roundish deeply 5-sect., segments lanceolate narrow at the base with a gland beneath the sinus on the undersurface, anthers apiculate, fruit ovoid.—Burma, Pegu, McClelland.

Glabrous. *Branches* sulcate. *Petiole* 2 in. *Tendrils* very long. *Anthers* linear with a long slender apiculus. *Fruit* 1½ in., ovoid, acute. *Seeds* subglobose slightly flattened.—Imperfect specimens only exist in the Kew herbarium, Sir Joseph Hooker who analysed the flower states in a note that it differs from *M. trilobata* by the apiculate anther. Possibly it may be the *M. furfuracea* of Wallich (see below).

*M. furfuracea*, *Wall. Cat.* 1235. *Prome, Wallich.*—There is no specimen of this in Wallich’s herbarium.


Glabrous. *Stems* very slender, sulcate. *Leaves* 4 by 1–2 in., oblong or oblong-lanceolate, 1-nerved, secondary nerves remote, arched; petiole eglandular, ½ in. attached to the blade just within the base. *Tendrils* about 2 in. branched, thickened at the ends. *Fruit* 1½–2 in. long. *Glabrous*, *oblong*, acute, 3-valved. *Seeds* discoid.—The specimens of Wallich and of Maingay are imperfect, but evidently belong to the same species.

*M. populifolia*, *Blume Rumphia*, i. t. 50.—To this I refer with doubt *Maingay* n. 668 with cordate ovate-acute leaves, petioles with two large apical glands, fruits about 3 in. long tapering to both ends.
ORDER LXV. CUCURBITACEÆ. (By C. B. Clarke, F.L.S.)

Climbing herbs or shrubs; tendrils solitary, lateral, spiral, simple or divided. Leaves alternate, petioled, frequently cordate, simple lobed or pedately divided. Flowers monoecious or dioecious, yellow or white, racem and solitary, less commonly panicled. Calyx-tube wholly adnate to the ovary (except in Actinostemma); limbs rotate campanulate or tubular; lobes 5 (rarely 3), imbricate. Petals 5, inserted on the calyx-limb, united in a tube or nearly or quite free, sometimes fimbriated at the margin, valvate or involute in the bud. Stamens inserted at the mouth or about the middle or at the base of the calyx-tube, usually 3 (sometimes 5 or 2); anthers free or united into a tube, one usually 1-celled and the other two 2-celled, cells straight or flexuose or conduplicate, the connective sometimes crested or produced. Ovary inferior (in Actinostemma half-superior), usually 3-carpellary; style 1 with 3 stigmas, more rarely styles 2–3–4; placentas usually 3, vertical, in double lines, the edges of the carpellary leaves being often turned in so far that the ovary (in flower time even) is spuriously 3-celled; ovules usually many, horizontal, rarely pendulous, sometimes few and pendulous from near the top of the ovary (in Dicelospermum erect from the base of the ovary?). Fruit generally berried or fleshy, indehiscent or dehiscing by valves or by a stopple, often 1-celled, the seeds being often packed in pulp or fibre. Seeds usually many, often compressed, horizontal, pendulous (or in Dicelospermum erect), frequently corrugated or subspinose on the margins, albumen 0.—Distr. Species 400, in the warmer parts of the whole globe especially in the tropics.

Tribe I. Cucumineæ. Ovules horizontal (or pendulous). Female flowers usually solitary, never panicled. Leaves not divided into distinct leaflets (except rarely in Thladiantha).

A. Anther-cells conduplicate or sigmoid.

* Corolla divided nearly or quite to the base into 5 petals.

† Petals fimbriate at their margin.

Seeds many. Calyx-tube less than 3 in. . . . . . . . . 2. Trichosanthes.

†† Petals entire.

a. Calyx-tube of the male flower elongate; anthers usually included in the tube or nearly so.

Seeds many, horizontal. Tendrils rarely divided . 3. Gymnophetalum.
Seeds 12–18, pendulous . . . . . . . . . . . . . . 5. Herpetospermum.
Tendrils divided. Fruit very large. Petiole with 2 glands at apex . . . . . . . . . . . . . . . . . . . . . . . . 6. Lagenaria.

b. Calyx-tube of the male flower short; anthers usually exserted from the tube or nearly so.

a. Stamens inserted near the mouth of the calyx-tube; anthers hardly or not at all cohering.
Male flowers (partly) in racemes. Fruit opening by a stopple.

Flowers all solitary. Fruit very fleshy, indehiscent.

\[ \text{β. Stamens inserted below the mouth of the calyx-tube; anthers more or less cohering.} \]

Male flowers (partly) racemed. Tendrils simple.

Male flowers clustered or solitary. Tendrils simple.

Flowers all solitary. Tendrils 2-3-fid.

** Corolla campanulate, divided half way down or thereabout.

Tendrils simple. Flowers white.

Tendrils divided. Flowers yellow.

B. Anther-cells straight (or in Bryonia somewhat curved).

* Flowers not large, yellow, male racemes or pedicels not stout.

† Male and female pedicels 1-flowered, clustered.

Tendrils 2-fid.

Tendrils simple.

†† Male flowers corymbose or subumbellate or racemed.

Fruit shortly peduncled. Connective not produced.

Fruit on a capillary peduncle. Connective produced.

Fruit sessile, beaked.

Fruit circumsciss near the base.

Fruit subsessile, indehiscent, without a beak.

Ciliature bracts resembling stipules at base of the petioles.

** Flowers large deep yellow, male raceme stout.

Calyx-tube short. Seeds very many.


Tribe II. Orthospermeae. Ovules and seeds erect.

Seeds 3, each with two empty cells.

Tribe III. Zanoniae. Ovules pendulous. Flowers small, the female in panicles or many-flowered racemes. Stamens 5, free, each with a single small straight anther.

A. Leaves not divided into separate leaflets.

Fruit small circumsciss. Leaves serrate.

Fruit long clavate. Leaves subentire.


B. Leaves pedately divided into 3-5 leaflets.

Fruit trigonous obovoid. Leaflets serrate. Tendrils bifid.

Fruit pea-like. Leaflets serrate. Tendrils simple.

Fruit elongate clavate. Leaflets entire.

25. Gomphogyne.

27. Gynostemma.

29. Alsomitra.
1. **HODGSONIA, H. f. & T.**

A large climber. *Leaves* coriaceous, 3-5-lobed, long-petioled; tendrils 2-3-fid. *Flowers* large, dioecious; males in long racemes; bracts oblong, entire, deciduous; females solitary. **Male**: calyx long-tubular, mouth shortly campanulate, teeth 5, short; petals 5, connate at the base, very long-fimbriate; stamens 3, filaments very short; anthers exerted, connate, linear, one 1-celled, two 2-celled, cells conduplicate. **Female**: calyx and corolla as in the male; ovary globose, 1-celled; style long, stigmas 3 oblong bifid exerted; placentas 3, parietal, near the base of the ovary, 2-ovulate on each side. **Fruit** large, depressed gloular, 12-grooved, flesh hard; perfect seeds usually six, each having a smaller commonly barren one attached to its side, flat-ellipsoid, with sunk veins.


**Sikkim**; alt. 0-4000 ft. **Assam**. **Khasia Mts.** alt. 0-3000 ft. **East Bengal** and **Chittagong**; **Pegu** and **Martaban**; **Kurz**. **Pinang** and **Malacca**.

**Stem** extending sometimes 100 ft. **Leaves** 6-8 in. long and broad, glabrous, deeply lobed; lobes entire or very sparingly denticulate, acute. Male **racemes** 8 in.; bracts ½ in. **Calyx** often rusty-pubescent without, tube 3-4 by ½ in. **Corolla-lobes** 2 in., brown-villos, 3-nerved without, white, tinged yellow within, ending in a fringe 4 in. **Fruit** 4-10 in. wide, red-brown, closely tomentose. **Seeds** 2-3 by 1-½ in.

2. **TRICHOSANTHES, Linn.**

Scandent herbs. *Leaves* entire or 3-9-lobed, denticulate; tendrils usually 2-5-fid. *Flowers* dioecious less often monoecious, white; male peduncles usually in axillary pairs, one 1-flowered caducous, the other racemose; bracts large or small or female flower solitary. **Male**: calyx long-tubular; teeth 5, lanceolate, entire serrate or laciniate. **Corolla-5-fid** nearly to the base, lobes long-fimbriate; stamens 3; anthers almost included, connate (free in **T. dioica**), long-linear, one 1-celled, two 2-celled, cells conduplicate. **Female**: calyx and corolla as in the male. **Ovary** inferior, at the base of the calyx-tube, 1-celled; style filiform, 3 or 6-fid at apex; placentas 3, parietal; ovules very many, horizontal, half-pendulous. **Fruit** lanceolate or globose, smooth, acute or obtuse at the apex. **Seeds** many, horizontal, packed in pulp, compressed, ellipsoid, sometimes angular on the margin. — **District**. Species 20, in South-East Asia, extending through Malaya to North Australia in one direction, through China to Japan in another.

*Bracts of the male raceme large, sheathing the flowers from a broad base.*

1. **T. palmata**, Roxb. Fl. Ind. iii. 704; leaves palmate half-way down in 5 or 3-7 broad lobes (but vary from angular nearly entire to deeply palmate with linear-oblong lobes), bracts ovate or obovate lacerate or strongly serrate, fruit globose the size of a small orange, seeds ½ in. scarcely angular on the margins. Wall. Cat. 6684 excl. C, F; W. & A. Prodr. 350 as to a and β; Wight III. t. 104, 105; Dalz. & Gibbs. Bomb. Fl. 103. T. laciniosa, Wall. Cat. 6689 A, B. T. aspera, Heyne in Herb. Rottler. T. tricuspis, Miq. Fl. Ind.
Leaves 2–6 in. diam., not at all hairy beneath, usually glabrous or less commonly scabrous on the nerves, often with several large glands near the apex of the petiole, cordate at the base; segments dentate, serrate, divaricate, sometimes subpinnatifid (var. *incisa* Heyne), usually acute (but obtuse in var. *sinuata*, Heyne); petiole 1–3 in. Tendrils commonly 3-fld. Male *peduncles* usually paired, the racemed one 6 in., naked below; bracts ovate or obovate, glabrous or viscid with scattered glands or pubescent. *Calyx-tube* 1½ in., closely tomentose or glabrous; sometimes much larger in the Sikkim examples; teeth long-lanceolate, sometimes dentate serrate or subpinnatifid. *Fruit* 1½–2 in. diam., not acute, bright red with 10 orange streaks. *Seeds* very many, immersed in green pulp.—The extreme forms of the leaves are var. *laciniosa*, Wight, which has the leaves palmate nearly to the base, the segments scarcely ½ in. wide and sometimes subpinnatifid; and var. *Thomsonii* from Moradabad with the leaves entire and slightly 5-angular: in both the leaves are coriaceous and with their petioles more or less covered with scattered round white minute flat scales. The Himalayan specimens recede further by their large subsessile succulent accipitate leaves and very large flowers.

Var. *Scotanthus*, C. B. Clarke; calyx-teeth broad-lanceolate entire, petals nearly destitute of fimbriations especially in the female.

Var. *tomentosa*, Heyne in Herb. Rottler; leaves tomentose beneath divided not more than half-way down.—Deccan Peninsula Mts.; Wight No. 1134, 1136 partly; G. Thomson. Ceylon, alt. 2600 ft.; Gardner.—This looks like a good species but the fruit and seeds are as in var. 1. This closely resembles the Australian T. subvelutina Muell. in Herb. referred to *T. palmata* by Bentham. The distribution of *T. palmata* is extended to Japan on the faith of two examples collected by Max mowicz. They belong to the commonest Bengal type of *T. palmata*, but bear the name *T. japonica*, Regel, which in *Regel Ind. Scin.* 1868, p. 20, is said to have solitary male flowers, and has been referred by authors to the neighbourhood of *T. cucumerina*. A *Trichosanthes* collected in Mergui by Griffith No. 759 (No. 2532 Kew Distrib.) has the leaves with short hairs beneath; otherwise resembles the var. *tomentosa*.

2. *T. multiloba*, Miq. *Ann. Mus. Lugd. Bat.* ii. 82; leaves deeply (only half-way down) palmate in 5 or 3–9 lobes narrowed near their base, bracts ovate or obovate deeply serrate, fruit 2–4 in. ovoid or oblong acute, seeds ½–2 in. more or less angular on the margins. *T. grandibracteata*, Kurz in *Journ. As. Soc.* 1877, pt. ii. 99 ex descr.


Rumbling extensively. *Dioecious.* Leaves 3–6 in. diam., usually glabrous beneath or less commonly scabrous with scattered bristles, subcordate at the base; segments serrate (sometimes lobed), ascending, less divaricate than in *T. palmata*, acute; petiole 1–3 in., often with several large glands near the apex; tendrils commonly 3-fld. Male *peduncles* usually paired, the racemed one 6 in., naked below. *Calyx-tube* 1–2 in.; teeth lanceolate-subulate, entire. *Fruit* bright red with orange streaks. *Seeds* very many in green pulp.—This is perhaps a variety of *T. palmata*, the Himalayan large form of which it so closely resembles, that in the absence of the fruit it cannot always be distinguished from it.—The locality "China" is added on the faith of Hance's No. 13,745 marked *T. palmata Roxb.* which it may be, as it does not exhibit fruit nor does Maingay's *Malacca* example.
Var. majuscula (Trichosanthes sp. 7 Herb. Ind. Or. Hk. f. & T.); male raceme stout more than 1 ft., bracts long little serrate, leaves very large. Khasia Mts.; alt. 4000 ft.; Hk. f. & T.—Perhaps a new species, but the examples consist of male racemes and leaves only. No. 12,298 C. B. Clarke (Darjeeling alt. 3000 ft.) seems the same.

3. T. cordata, Roxb. Fl Ind. iii. 703; leaves cordate-ovate acute entire or obscurely angular-lobed hairy beneath, bracts elongate obovate entire or scarcely serrate, fruit globose size of a small orange, seeds ¼ in. scarcely angular on the margins. Wall. Cat. 6686 A.; Kurz in Journ. As. Soc. 1877, pt. ii. 99. T. tuberosa, Roxb. l.c. ined. T. palmata, Wall. Cat. 6688 F partly, & C.

From the base of the eastern Himalaya in Sikkim and Assam to Pegu. Frequent in the Khasia Terai and Cachar.

An extensive climber. Dioecious. Leaves often 6–8 in., dentate-serrate; tendrils usually 3-fld. Male peduncles usually paired, the racemed one often 8 in., stout; bracts pubescent. Calyx-tube ½ in., densely hairy without, segments finely acuminate. Fruit almost exactly as in T. palmata, bright red, orange-streaked, apex not acute.

Var. subedata; leaves pedately lobed almost to the base.—Cachar; C. B. Clarke.

—The bracts and indumentum are exactly as in the type. Judging by the description, T. macrostipho, Kurz in Journ. As. Soc. 1872, pt. ii. 308, differs less from T. cordata, Roxb. than does this var. subedata.

** Bracts of the male raceme large, subpersistent, narrowed to the base, not sheathing.

4. T. truncata, C. B. Clarke; leaves ovate from a truncate hastate or obtuse (not cordate) base sometimes subpetalate entire or irregularly tricuspid glabrous denticulate or not, bracts ovate slightly serrate nearly glabrous, female plant unknown.


Stem twining; tendrils 2–3-fld. Leaves glabrous coriaceous or membranous, polymorphous, sometimes exactly ovate with a rounded subentire margin sometimes deeply 3-cuspidate. Male peduncle 6 in. Calyx-tube ¼–1½ in., somewhat tomentose without; corolla (ex Hook. f.) greenish-white.

5. T. himalensis, C. B. Clarke; leaves palmately 3-lobed deeply cordate villous or pubescent beneath, bracts lanceolate incise-serrate, fruit 3–4 in. long-cylindric tapering at both ends. T. cordata, Wall. Cat. 6686 B. Cucurbita ficifolia, Wall. Cat. 6721.

Sikkim, alt. 2000–5000 ft. from Yoksun to the plains; J. D. H., C. B. Clarke.

Stems extensively climbing, with the petioles and leaves pubescent and hairy. Dioecious. Leaves 5 in., usually deeply palmate, irregularly serrate; tendrils 3-fld. Male peduncles 3–4 in., bracts ¼–½ in. Calyx-tube 1¼–2 in., very narrow, little hairy without. Fruit 3–4 by 1–1½ in., nearly circular in section. Seeds ¼–¾ in. diam., polymorphous, sometimes obvoid the broader part subtrimerous, sometimes drum-shaped.—Certain seeds were sent by Dr. Anderson to Naudin, who grew them and has placed the resulting leaves in the Kew Herbarium accompanied by a drawing of the seed, and has attached the name Platygonia himalensis thereto. These leaves may belong to the present species.

Var. glabrrior; leaves glabrous above pubescent or scabrous on the nerves beneath.—Khasia; alt. 4000 ft. Trichosanthes sp. 9 Herb. Ind. Or., H. f. & T.—The examples are of leaves and male racemes only.

*** Bracts of the male raceme 0 or minute.


Stems long, twining, innovations at least pubescent. *Dioecious*. Leaves 4 by 3½ in., not at all lobed; petiole 1½ in.; tendrils 2-fld. Male *peduncules* paired, one early 1-flowered, the other 2–3 in., racemed, ebracteate. Calyx-tube 1¼ in., narrow, pubescent. Fruit pubescent, with 10 paler vertical bands. Seeds in orange pulp.—This is perhaps Kurz’s *reniformis* obtained in Sikkim, but it can hardly be *T. reniformis*, *Mig. Fl. Ind. Bat.* i. pt. i. 675, which has obtuse lobes to the leaves and the male spikes leafy-bracteate.


Throughout the plain of north India from the Punjab to Assam and East Bengal.—common.

Stems twining extensively, more or less woolly and scabrous. *Dioecious*. Leaves 3 by 2 in., harsh, sinuate-dentate, not lobed; petiole ½ in.; tendrils 2-fld. Male *peduncles* paired, the second-flowering often 2 in. but not racemmed in any example at Kew. Calyx-tube 13 in., narrow. Fruit 2–3½ in., oblong or nearly spherical, acute, orange-red. Seeds ¾–½ in., half-ellipsoid, compressed, corrugate on the margin.—United with the next species by Bentham in *Fl. Austral.* iii. 315. Roxburgh says “Stamens three distinct” which has been repeatedly verified in the living plant.


Deccan Peninsula; Quilon, Wight. Kurz (tropical region); G. Thomson. Ceylon; not uncommon up to 5000 ft.; Thwaites.

Stems twining, glabrous. *Dioecious*. Leaves 3 by 1¼–2 in., membranous, sinuate-dentate, not lobed; petiole ¾ in.; tendrils 2-fld. Male *peduncles* usually paired, the second-flowering carrying a raceme (finally elongate and zigzag) of about 12 flowers. Calyx-tube 1¼ in. Fruit (and seeds from Rheede’s drawing) 2–3 in., circular in section, about twice as long as broad, acute. Seeds ¾–½ in., half-ellipsoid, compressed, corrugate on the margin.


Throughout India and Ceylon.—Distrib. Malaya, North Australia.

Stems twining, more or less pubescent. *Dioecious* or less often (? when cultivated) monocious. Leaves 2–4 in. diam., usually 5-lobed about half-way down, lobes obtuse or if acute not acuminate; petiole 3½ in.; tendrils 2-fld. Male *peduncles* in pairs, the earlier 1-flowered, the later racemmed; occasionally in place of the earlier is found a female. Calyx-tube 1 in. Seeds ¾–1½ in., half-ellipsoid, compressed, in red pulp.—In *Bth. & Hk. f.* Gen. Pl. i. 833, under Ceratosanthes, *T. cucumerina* is a misprint for *T. corniculata.*

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**India**, cultivated.—**Distrib. China, Malaya.**

Except in the fruit this agrees altogether with *T. cucumerina*, of which it is probably a cultivated form. The fruit, used as a vegetable, is eminently polymorphic. Miquel places this species at the head of his *Involucracia* which he states to have great leafy sheathing bracts to the male flowers, but in the Indian *T. anguina* these bracts are minute.


**Deccan Peninsula; Wight; Rottler, G. Thomson, &c.**

**Stem** and petioles with flaccid hairs. *Leaves* pubescent beneath, and with flaccid hairs; tendrils 3-5-fid. *Fruit* 2-4 by 1-2 in., acute at both ends. *Seeds* half-ellipsoid, compressed, margins entire.—Probably a variety of *T. cucumerina* as suggested by *W. & A. Prodr.* 350. *T. lobata*, *Kurz in Journ. As. Soc.* 1877, pt. ii. 98, having the seeds tubercled (from Chittagong) is perhaps nearer *T. cucumerina* or *T. anguina* as here understood: but the three species are difficult to separate.

12. **T. integrifolia**, *Thwaites Enum.* 127, not of *Kurz*; dioecious, leaves glabrous nervved elliptic or ovate acuminate less often lanceolate 3-nerved entire coriaceous base rounded or cordate, tendrils simple, flowers somewhat large solitary, fruit spherical shortly apiculate, seeds numerous crowded.

**Ceylon**, alt. 2000-4000 ft.; *Thwaites.*

*Leaves* 2½-6 by 1½-2 in.; petiole $\frac{3}{4}$ in. *Fruit* 2 in. diam., red. *Seeds* $\frac{1}{2}$ in., smooth, oblong, oblique, compressed, truncate at the hilum, with two indentations at the vertex, testa blackish green.—Not seen. The above description is translated from Mr. Thwaites, who has been careful in communicating examples to Kew of all his types; but his No. 1629 is not to be found in its place. Mr. Thwaites describes no bracts to the male inflorescence, and if the male flowers are all solitary the species must be near *T. dioica*, *Roxb.*

**Doubtful Species.**

**T. macrophion**, *Kurz in Journ. As. Soc.* 1172, pt. ii. 308, from Tenasserim, in the absence of both the male inflorescence and the fruit cannot be identified from the description. It might be *T. cordata*, *Roxb.*

**Trichosanthes sp.» Griffith** (No. 2543 Kew Distrib.); nearly glabrous, tendrils 2-fid, leaves 3-foliolate very coriaceous, leaflets lanceolate nearly entire the central one somewhat obovate the lateral ones unequally auricled on the outer base, petiole nearly 2 in., petiolules $\frac{1}{2}$ in., fruit oblong-ovate but nearly spherical red with yellowish streaks, seeds very many in green pulp brown compressed, margin somewhat angular at the hilum end.—Malacca, *Griffith.*—This imperfect description is drawn up from a fragment with leaves and from Griffith's note of the fruit attached thereto. The characters appear nearly those of *Telfairia*, but the habit and texture are those of *Hodgsonia*; while from Griffith's description of the fruit it appears he did best by placing it provisionally in *Trichosanthes.*

Twining herbs, tendrils usually simple or 2-fid. Leaves petioled, 5-angular, nearly entire or deeply lobed. Flowers white (or yellow?), somewhat large; monoeccious at least, sometimes: male peduncles in fully developed plants 2 from each axil, the earlier 1-flowered, the later longer racemose, either often suppressed; bracts in the racemes persistent, large lanceolate incised or small; females 1-flowered usually in separate axils. Male: calyx-tube long, contracted near the mouth, limb of 5 lanceolate segments; petals 5, not fimbriate on margin; stamens 3; anthers included, connate, elongate, 1-celled, 2-celled, cells conduplicate; rudiments of the ovary 1, or 3, small, linear. Female: calyx and corolla as in the male; ovary oblong; style long, stigmas 3 short linear; ovules horizontal, many; placenta 3, long, vertical. Fruit ovate-oblong, acute at both ends. Seeds many or few, ellipsoid, compressed, margined, nearly smooth.—Distrib. Species 5; in India, China and Malaya.


Stems slender, 5-angular, more or less scabrous-hairy. Leaves 2–3 in. diam., scabrous on both surfaces; tendrils simple or 2-fid. Male racemed peduncle sometimes 6–8 in., usually shorter; bracts ¾ in., incise-serrate, lobes often again incised. Calyx-tube ¾ in., villous, closed by deflexed hairs within above the stamens. Rudiments of the ovary in the male flower 3. Petals ½ in., ovate, entire or somewhat crenate. Fruit 2 by ¾ in., orange-red, somewhat scabrous, with 10 longitudinal ribs, pulp greenish, not very succulent. Seeds ½ by ⅓ and ⅛ in. thick.


Rangoon; McClelland. Pinang; Porter. Malay Peninsula; Griffith. Singapore; G. Thomson.—Distrib. Malaya to Borneo.

Agrees very closely with the last species: the segments of the leaves are here narrow, subpinnate, 3-fid or pinnatifid, but graduate towards the half-lobed form of G. cochinchinesis.—Kurz's G. heterophyllum agrees as described with the present species; it is perhaps a specimen with poorly developed male racemes. Kurz says the flower is white, and quotes Bryonia heterophylla, Wall. Cat. 6711, which obscures the whole matter, for that plant is Bryonia palmata, Wall. (now Cephalandra) while B. heterophylla, Wall. No. 6704 (and of which there is a solitary sheet) differs altogether from Mr. Kurz' description and is a Cerasioccarmum.

South Deccan Peninsula; Wight; Canara, Hohenacker No. 662. Ceylon, ascending to 5000 ft., Walker, Gardner, Thwaites.

Leaves 2 in. diam., more or less pubescent on both surfaces, denticulate, lobes acute or obtuse or 0; petiole 1 in. Male racemose peduncle 2 in.; flowers crowded, subumbellate; bracts ½ in., linear, pedicels often ½ in.; peduncle of the female flowers ½ in. Calyx-tube ½ in., slender, with scattered hairs or very pilose, lobes small. Petals ½ in. (yellow according to Arnott and Hook. f., white according to Thwaites). Rudiment of the ovary in the male flower simple. Fruit 1½—2 in., red, more or less hairy, not ribbed. Seeds ½ by ⅛ in., without corrugations or angles.—Bryonia tubiflora, Wight No. 1118 has the calyx-tube pubescent and is nowise distinguishable from the Ceylon plant as Mr. Thwaites surmised in Enum. p. 127.


Bengal; Roxburgh. Ponlong (Irawaddy estuary); Wallich.

Stem scabrid; tendrils undivided in Wallich's specimen (2-fid in Roxburgh's drawing. Leaves 3 in. diam., very harshly scabrous above, densely villous beneath, margin undulate scarcely denticulate; petiole 1 in. Flowers monoecious, all solitary, white; male peduncle 1½ in., female peduncle ¼ in. Male: calyx-tube elongate, densely brown-villous, teeth 5, lanceolate; corolla divided nearly to the base, lobes obovate, entire, yellow-veined, pubescent. Female: calyx and corolla as in the male; stigmas 3, oblong. Fruit from Roxburgh's figure ⅔—⅔ in. diam., orange-red, globular, smooth.—Wall. Cat. 6694 consists of three leaves with one male peduncle and calyx, and a detached fruit; the leaves resemble those of *Trichosanthes dioica*, Roxb.


Extensively scendent, tendrils 2—3-fid. Leaves long-petioled, ovate or deeply 5-lobed. Flowers large, yellow, dioecious; males frequently two peduncles from one axil, one early deciduous 1-flowered, the other bearing a raceme without bracts; females solitary on long peduncles. Male: calyx-tube cylindrical, narrow, then suddenly widened campanulate subhemispheric, teeth 5, linear; petals 5, ovate, nearly separate, entire; stamens 3; anthers connate, included, one 1-celled, two 2-celled, cells conduplicate. Female: calyx and corolla as in the male; ovary oblong; style long, with 3 wide stigmatic lobes; ovules horizontal, many, placenta 3, vertical. Fruit oblong, attenuate at both ends, 3-angular, 6-ribbed, 3-valved nearly to the base. Seeds in each cell about 16, in two rows, horizontal, compressed, ellipsoid, smooth.

Different from *Gymnopetalum* by the large campanulate mouth to the calyx, by the divided tendrils, and the anthers exserted from the tubular portion of the calyx. Named after J. Ware Edgar, C.S.I.


Sikkim, alt. 6000—10,000 ft., very common; H. f. J. D. H.; Tonglo N., C. B. Clarke.

Stem and peduncles nearly glabrous. Leaves 6—9 by 4—5 in., polymorphous, cor- date, denticulate, nearly glabrous, ovate acute or 6-lobed or cut nearly to the base into narrow segments; petiole 4 in. Male peduncle 8 in., pedicels ¼—⅛ in. Calyx-tube 1½ in., pubescent, cylindrical portion more than ⅛ in. Petals ⅔ in. Fruit 4 by 1½ in. Seeds ¼ in., packed in a fibrous almost juiceless pulp.—This is one of the three species included in *Herpetospermum* by J. Hooker in Gen. Pl. i. 834.

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**LXV. CUCURBITACEAE.** (C. B. Clarke.) **[Gymnopetalum]**.
HERPETOSPERMUM, Wall.

Extensively scandent, tendrils 2-3-fid. Leaves long-petioled, cordate, ovate, little lobed. Flowers large, yellow, dioecious; males frequently two peduncles from one axil, one early deciduous 1-flowered the other racemose without bracts; females solitary on very short peduncles. Male: calyx-tube elongate, cylindrical at the base, above narrow, funnel-shaped; teeth 5, long, linear; petals 5, elliptic, nearly separate, entire; stamens 3; anthers connate, included, one 1-celled, two 2-celled, cells conduplicate. Female: calyx and corolla as in the male; ovary oblong, 3-celled, style long, with three oblong bifid stigmatic lobes; ovules pendulous, 4-6 in each cell. Fruit broad-oblong, narrowed at both ends, 3-angular, irregularly sinuate-costate, valves 3 separating from the axis nearly to the base. Seeds in two rows in each cell, flat, oblong, pendulous, the lower end corrugate or almost 3-lobed.


Temperate Himalaya, from Simla and Kumaon to Bhotan, alt. 5000-8000 ft.; very common in Sikkim. Khasia Mrs.; Wallich.

Stem and peduncles more or less pubescent. Leaves 4-6 in. long and broad, usually pubescent on both surfaces, serrate, acuminate; petiole 2-4 in. Male peduncle 8 in., pedicels 1 in., hairy. Calyx-tube 1 in., pubescent without. Petals often 1 in. Rudiment of the ovary in the male linear, simple. Fruit 3 by ⅓ in., more or less pubescent. Seeds usually 12 sometimes 18, ⅓ by ⅛ and ⅛ in., thick, often exhibiting (when dried) wavy marks on the surface, packed in a fibrous almost juiceless pulp. Wallich's Khasia specimen exhibits ripe seeds which are very narrow, incised at the lower end so that the middle lobe appears as a spinous tooth. Lady Dalhousie's examples collected at Simla are nearly glabrous with smaller flowers. Herpetospermum of Bth. & Hk. f. Gen. Pl. i. 834. described from imperfect materials, includes H. caudigerum, Warea tongensis and Edgaria darjeelingensis. The generic character did not fit Warea or Edgaria and required emendation as to the ovules and seeds of Wallich's Herpetospermum.

6. LAGENARIA, Seringe.

Large climbers, pubescent, tendrils 2-fid. Leaves ovate or orbicular, cordate, dentate; petiole long, with two glands at its apex. Flowers large, white, solitary, monoeccious or dioecious, the males long- the females short-peduncled. Male: calyx-tube funnel-shaped subcampanulate, teeth 5 narrow; petals 5, free, obovate; stamens 3; anthers connate, included, one 1-celled, two 2-celled, cells conduplicate; rudiment of ovary 0. Female: calyx and corolla as in the male; ovary oblong, style short with 3 bifid stigmatic lobes; ovules many, horizontal; placentas 3, vertical. Fruit large, ultimately thick membranous or almost woody, indehiscent, polymorphous, usually broader upwards. Seeds very many, horizontal, compressed, with a marginal groove, smooth.

1. L. vulgaris, Seringe in DC. Prodr. iii. 299; W. & A. Prodr. 341; Wight Ill. t. 105*; Kurz in Journ. As. Soc. 1877, pt. ii. 100. L. vittata, hispida and idolatrica, Seringe t. c. 299. Cucurbita Lagenaria, Linn.; Lamk. Ill. t. 795; Roxb. Fl. Ind. iii. 718; Wall. Cat. 6719.—Rheedee Hort. Mal. viii. t. 5.
Cultivated throughout India.—Distrib. Cultivated in the tropics and warm temperate zones of the whole world.

Leaves often 6 in. diam., softly pubescent on both surfaces, more or less 5-angular or 5-lobed. Male peduncle often 6 in., female 1 in. Calyx-tube ⅓ in., pubescent. Petals 1-2 in. Fruit often 1½ ft., in India usually bottle- or urn-shaped. Seeds ⅔ by ⅓ and ⅛ in. thick, with an impressed groove parallel to and near the margin.

Climbers, large or small, pubescent or nearly glabrous; tendrils 2–5-fid. Leaves cordate, usually 5-angular or 5-lobed; petiole without glands at its apex. Flowers yellow or white, monoeocious; males and females often from the same axil; females solitary or panicked, males on long or short racemes or clustered. Male: calyx-tube top-shaped, 5 lobes, triangular or lanceolate; petals 5, obovate; stamens 3, rarely 5, filaments 3 free or connate; anthers exserted free, one 1-celled, the others 2-celled, cells sigmoid often on the margin of the broad connective. Female: calyx-tube shortly produced above the ovary; lobes and corolla as in the male; ovary oblong, style cylindric, stigma 3-lobed; ovules very many, horizontal. Fruit large or small, oblong (not spherical), smooth or angular or spinous, ultimately fibrous, not succulent, 3-celled, usually circumsciss near the top. Seeds many, oblong, compressed.—Distrib. Species 10, in the warmer regions of the Old World several widely cultivated, one indigenous in America.

* Stamens 5.

1. L. graveolens, Roxb. Fl. Ind. iii. 716; male pedicels clustered in the axils without bracts, females often in the same axils 1–3 on the peduncle each 1-bracteate, fruit with numerous soft bristles. Wall. Cat. 6752; Naud. in Ann. Sc. Nat. ser. 4, xii. 124; Kurz in Journ. As. Soc. 1877, pt. ii. 101.


Stems long, little villous; tendrils 3–5-fid. Leaves 3 in. diam., reniform-orbicular, 5-angled, dentilicate, punctulate, scabrous above, pubescent on the nerves beneath; petiole 2–3 in. Male pedicels few, much shorter than the petiole; petals 5, ⅓ in., yellow, entire; stamens 5. Female peduncle short, sometimes divided with 2–3 flowers, each pedicel carrying a small ovate entire thick bract ⅓ in. Fruit 2 by 1 in., covered with papille, scarcely spinous, obscurely 10-striate, dehiscent horizontally near the top, stopple without papilla. Seeds scarcely ⅓ in., very many, packed in fibres, smooth, not marginated.


Thoughout India very common, often cultivated.—Distrib. Cultivated throughout the tropics, native country uncertain (Naudin).
Extensively climbing hairy; tendrils 2-3-fid. Leaves 4 in. diam., reniform-orbicular, 5-angled or somewhat 5-lobed, dentate, usually scabrous, punctate on both surfaces, pubescent on the nerves beneath; petiole 2 in. Male peduncle 6 in., flowers often approximate near the summit; pedicels short, each carrying a small ovate viscid entire bract sometimes obsolete. Petals 5, 1-1 in., yellow, often with elevated hairy green veins. Stamens 5. Female flower solitary, peduncle 1-3 in. Fruit 5-12 in. Seeds 2 by nearly 1 in., usually black, very narrowly winged, smooth or very sparingly tubercled.—The pedicels are rarely elongated (L. Satpatia, Wall.); one example of Falconer's has the racemes compound. The fruit being the part eaten and attended to in cultivation is hence very variable: and no good character founded on it can be drawn between this species and L. acutangula.

**Stamens 3.**


North-West India; Royle. Sikkim; J. D. H. Assam; Masters. Plain of East Bengal; C. B. Clarke. Ceylon; Thwaites.—Distrib. Malaya.

Very near L. pentandra from which it differs by having 3 stamens as noted by Roxburgh and verified by Thwaites. The fruit is usually smaller, often only 3-4 in.—The figure of L. fatida in Cav. Ic. i. t. 9, shows clearly 5 stamens and is not Roxburgh's plant. Rheed. Hort. Mal. viii. t. 7, is much more probably L. egyptiaca than this species. L. acutangula No. 1106 in Herb. Wight is pentandrous and is L. egyptiaca exactly. All these, and all descriptions founded on them, are not here included in L. acutangula, Roxb.

Var. amara, Roxb. Fl. Ind. iii. 715 (sp.); fruit oblong 10-angled without spines or papillae. Wall. Cat. 6754 A; W. A. Prodr. 343; Dalz. & Gbs. Bomb. Fl. 102; Naud. in Ann. Sc. Nat. ser. 4, xii. 123. L. Plukenetiana, DC. Prodr. iii. 302. Momordica tubiflora, Wall. Cat. 6749.—From nearly all India especially the Western side. Naudin, who retains L. amara as a species, says it is “exceedingly near L. acutangula but distinguished by the leaves a little smaller and sometimes whitish.” The typical L. amara has the leaves softly pubescent at least while young, for they become in age scabrous.


Gujerat; Dalzell. Sicnde; Stocks. Purneah (Bengal); Kurz. Dacca; C. B. Clarke.—Distrib. Tropical Africa.

Climbing not extensively, sparingly scabrous-pilose; tendrils 2-fid. Leaves 1-2 in. diam., cordate, reniform-orbicular, entire or obscurely 5-angular or 5-lobed, or cut almost to the base into 5 narrow sinuate-pinnatifid segments, dentate; petiole 1-2 in. Male peduncles normally paired, one 1-flowered the other racemed very long 6 in. or more, pedicels 1 in.; flowers small, white, without bracts. Filaments 3, two with 2-celled anthers. Peduncle of the solitary female very short. Fruit 1½ by ¾ in., ribs not visible; spines ¾ in., ciliate; stopple without spines, calyx-teeth persistent. Seeds ½ in., many, slightly scabrous.

Var. longistyliis, Edgw. in Journ. As. Soc. 1852, p. 270 (sp.); male raceme shorter than the leaves, spines of the fruit fewer themselves glabrous.—Banda, Edgeworth.—The leaves are not more dissected than in some Bengal typical L. echinata, nor are the styles longer. The whole male raceme is much shorter than the accompanying 1-flowered male peduncle.

**Travancore**, *Klein*. **Coromandel** (? Wight).

Agrees closely with *L. echinata* and may be a variety of it, but the stamens differ; the filaments being three, of which two are bifid below the anthers.

8. **BENINCASA**, *Savi.*

A large climber, softly hairy, tendrils 2-fid. *Leaves* cordate, reniform-orbicular, more or less 5-lobed; petiole without glands. *Flowers* large, yellow, monoecious, all solitary, without bracts. **Male**: calyx-tube campanulate, lobes 5, leaf-like, serrate; petals 5, nearly separate, obovate; stamens 3, inserted near the mouth of the tube; anthers exerted, free, one 1-celled, two 2-celled, cells sigmoid. **Female**: calyx and corolla as in the male; ovary oblong, densely hairy; style thick, with 3 flexuose stigmas; ovules numerous, horizontal; placentas 3. **Fruit** large, fleshy, oblong, pubescent, indehiscent. *Seeds* many, oblong, compressed, margined.


Throughout **India** cultivated.—**Distrib.** Cultivated in Malay, China, Japan, Tropical Africa; where wild uncertain.


Climbing, with simple tendrils. *Leaves* cordate, petiolated, undivided in the Indian species. *Flowers* yellow or white, monoecious or dioecious, females solitary peduncled, males solitary or racemed, bracteate or not. **Male**: calyx-tube short, campanulate (with 2–3 basal oblong incurved scales ex *Hook. f.*) lobes 5; corolla 5-partite nearly to the base; stamens 3 (2 in *M. Cymbalaria*); filaments short; anthers at length free, one 1-celled, one or two 2-celled, cells conduplicate, or in *M. Cymbalaria* horse-shoe-shaped. **Female**: calyx and corolla as in the male; ovary oblong; style long, stigmas 3; ovules very many, horizontal placentas 3. **Fruit** oblong or spherical, rough or smooth, indehiscent or 3-valved, many- or few-seeded. *Seeds* obovate or complanate, smooth corugate or sculptured.—**Distrib.** Species 26, chiefly in the warmer parts of Africa, several in Tropical Asia, few in Tropical America.—The genus is here artificially separated from *Luffa* by its simple tendrils.

* Male peduncles 1-flowered.

1. **M. Charantia**, *Linn.*; *DC. Prodr.* iii. 311; monoecious, bract about the middle of the male peduncle orbicular entire, fruit ovoid narrowed to both ends many-ribbed covered with triangular tubercles. *Roxb. Fl. Ind.* iii. 707;
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Throughout India, cultivated.—Distr. Malaya, China, Tropical Africa.

Leaves 1-3 in. diam., orbicular, glabrous or slightly pubescent, cut nearly to the base into 5-7 narrow sinuate or subpinnatifid lobes. Male peduncle 2-4 in., slender, bracteate. Calyx-lobes ovate, acute. Petals 3-4 in., yellow. Female peduncle 2-4 in., slender, bracteate near the base; ovary fusiform, mucicrate. Fruit 1-3 in., rostrate. Seeds ½ in., compressed, corrugated on the margin, somewhat sculptured.


PUNJAB; T. Thomson, Edgeworth. NORTH-WEST INDIA; Royce. SCINDE; Stocks.—Distr. Malay, Australia, Western Asia, Africa to the Cape.

Glabrous or nearly so. Leaves 1½-3 in. diam., orbicular, palmately 3-5-lobed to about the middle, lobes acutely lobulate, punctulate on both surfaces; petiole ¾-1½ in. Male peduncle 1-3 in.; calyx-lobes ovate or oblong, acute; petals ½ in., yellowish, black at the base. Female peduncle short, less than ½ in., bracteate. Fruit 1-3 in., rostrate, red, usually quite smooth, in the example of Edgeworth's obscurely ribbed and slightly mucicrate. Seeds ½ in., compressed, nearly smooth.


Throughout India, from the HIMALAYA to CEYLON and SINGAPORE, ascending to 5000 ft. alt. on the hills.—Distr. Malaya.

Leaves 2-4 in. long and broad, cordate, ovate, acute, entire, denticate or more or less 3-5-lobed, glabrous, often punctate beneath; petiole 1-2 in. Male peduncle 2-6 in.; bract large, cow-like, embracing the expanded flower, glabrous, thin or (in M. Missionis) thick soft pubescent; calyx-lobes oblong with a narrow termination; petals 1 in., full-yellow, the two 2-anthered filaments 2-fid half way down. Female peduncles as long as the male, bract small usually near the base. Fruit 1-3 in., ellipsoid, acute, without ribs. Seeds nearly ½ in., many, compressed, broad-oblong, with a few well-marked corrugations on the margins, nearly smooth on the surface.—The large succulent Lower Bengal form cannot well be confounded with any other; but both from the Deccan Peninsula and Punjab there is a much slenderer form, the males of which have been referred to M. Balsamina (the intense spinosity of the young ovary prevents the female plants being mistaken): they usually have the leaves much less dissected, and M. Balsamina almost invariably exhibits both male and female flowers on the same branch. M. Missionis, Wall., is the slender form
with a glabrous small bract to male flower: *M. renigera*, Wall. has a large woolly bract: *M. Heyneana*, Wall. has the leaves deeply 3-lobate: *M. Hamiltoniana*, Wall. has the bract foliaceous crumpled serrate. *M. Balsamina*, Wall. is the typical *M. dioica*, Roxb. Thwaites' *M. dioica* 3. denudata is altogether remote from *M. dioica* (see No. 5).


**BENGAL to TENASSERIM, common. DECCAN PENINSULA; WIGHT. CANARA; LAW.—DISTRICTS. FORMOSA, PHILIPPINES.**

Leaves 4–5 in. diam., cordate, ovate, usually 3-lobed, glabrous or a little pubescent, often punctate beneath, little dentate; petiole 2–3 in., almost invariably glandular on its middle as well as apex. Male peduncle 2–6 in., bract often pubescent, embracing the expanded flower; petals 1–2 in., white tinged with yellow, 3 with black spots at the base 2 with yellow glands; the two 2-answered filaments not 2-fid. Female peduncle 1–2 in., bract small about the middle. Fruit 4–5 in., ovate, pointed, bright red, very fleshy, without ribs, covered with conical points nearly ½ in. high. Seeds ½ by ⅓ and ⅓ in. thick, many, horizontal, irregular, ovate, compressed, black, corrugated on the margins, sculptured on the faces.

**Male peduncles several-flowered.**

5. *M. denudata*, Thwaites Enum. 126; dioecious, leaves ovate-lanceolate, flowers small, many males on one raceme with inconspicuous bracts, filaments 3, anthers conduplicate, fruit ovoid rostrate muricata with triangular papillae.

**CEYLON; alt. 3000–4000 ft.; GARDNER, THWAITES, WALKER.**

Slender, climbing, nearly glabrous; tendrils simple. Leaves 2–4 by 1–2 in., deeply cordate, often 3–5-angled or sparingly 3–5-lobed, central lobe always long acute; petiole 1 in. Male peduncle 2 in., often somewhat panicked nearly from the base and 10–20 mostly pedicelled flowered; bracts at the base of the pedicels minute; sepals ovate, acuminate; petals ½–1 in.; filaments inserted near the top of the calyx-tube, anthers much exsert. Female peduncle 1-flowered, about as long as the male, bract minute near the middle. Fruit ¾ in. long and broad, suddenly rostrate.

This species is evidently closely allied to the next which Sir J. Hooker removed from *Luffa* (where Roxburgh placed it) because of its simple tendrils. But the exsert anthers, the shape of the flowers and their being pedicelled, all ally *M. denudata* and *M. Cymbalaria* with *Luffa* rather than *Momordica*.


**DECCAN PENINSULA; WIGHT. MYSORE; HEYNE. CONECA; STOCKS.—DISTRIB. TROPICAL AFRICA.**

Root a large woody tuber as in many others of the genus. Leaves 1–2 in. broad, 5-angular or slightly 5-lobed, middle lobe not elongated, glabrous or slightly pubescent, often punctulate on both surfaces, dentate; petiole ½–1½ in. Male raceme 1–2 in., with usually only 2–4 flowers; calyx-lobes lanceolate; petals ⅜ in., yellow; filaments 2,
one 2-fid one 3-fid so each with one anther-cell; filaments inserted near the top of the calyx-tube, anthers completely exsert. Female peduncle ½-2 in., 1-flowered, ebracteate. Fruit ½ by scarcely ¾ in. Seeds ½-½ in., few, shortly ovoid, smooth, shining.

10. CUCUMIS, Linn.

Climbing herbs, hispid or scabrous; tendrils simple. Leaves petioled, palmately 3-7-lobed or 5-angled or entire, dentate or serrate. Flowers yellow, monoeccious, males clustered in the axils, females solitary, all shortly peduncled. Male: calyx-tube top-shaped or campanulate, lobes 5. Stamens 3; anthers free, one 1-celled, two 2-celled, cells conduplicate or much flexuose, connective produced in a crest. Female: calyx and corolla as in the male; ovary ovoid, style short, with three obtuse stigmas; ovules very many, horizontal; placentas 3. Fruit fleshy, indehiscent, large or small, spherical or elongate, smooth or tuberculate. Seeds very many, oblong, compressed, mostly smooth.—Distrib. Species 25, of which half are African, a few in the tropical regions of Asia, Australia and America, and several widely cultivated of doubtful origin.

1. C. trigonus, Roxb. Fl. Ind. ii. 722; leaves and petioles scabrid not softly hairy, petioles ½-½ in., flowers small, ovary hairy sometimes densely white woolly or silky, fruit about 1½ in. ultimately glabrous ellipsoid or ob-ovoid round or obscurely trigonous. W. & A. Prodr. 342; Wight Ic. t. 497; Wight Ill. t. 105; Boiss. Fl. Orient. ii. 753; Dalz. & Gibbs. Bomb. Fl. 103; Naud. in Ann. Sc. Nat. ser. 4, xi. 30. C. turbinatus, Roxb. Fl. Ind. iii. 723; W. & A. Prodr. iii. 342; Mig. Fl. Ind. Bat. i. pt. i. 671. C. maderaspatanus, Roxb. l. c. 723; Wall. Cat. 6734. C. Melo var. agrestis, Naud. l. c. 73. C. pubescens, Wall. Cat. 6729; W. & A. Prodr. 342; Royle Ill. t. 47; Wight Ic. t. 496; Dalz. & Gibbs. Bomb. Fl. 103, perhaps not of Willd. and others. C. pseudo-colocynthis, Royle Ill. t. 47. C. eriocarpus, Boiss. Diagn. ii. 59. Bryonia callosa, Herb. Kottler; Wall. Cat. 6710.

Throughout India.—Distrib. Malaya, North Australia, Afghanistan, Persia.

Root perennial, by which character alone it can be distinguished from C. Melo according to Naudin, but the examples seen and collected in India are almost invariably less than one year old. Stem in the typical examples scabrid; tendrils short. Leaves 1-2 in. diam., orbicular subpentangular, in the typical plant deeply palmate-lobed, lobes very scabrid and often narrow; in the more flaccid C. pubescens the hairs more scattered, the leaves entire, 5-angled 5-lobed; petiole ½-1½ in. Peduncles of males and females ½-1 in. Fruit sometimes with a few scattered hairs, often with 10 stripes.—The plants marked by Indian botanists as C. pubescens are reduced to C. trigonus by Naudin in the Kew Herbarium. Kurs (in Journ. As. Soc. 1877, pt. ii. 103) separates C. trigonus with solitary peduncles from C. pubescens with clustered peduncles and makes the latter a variety of C. Melo, Linn. C. pubescens of Thwaites Enum. (C. P. 3334) has remarkably acute lobes to the leaves and resembles C. Hardwickii, but there is no note of the fruit.

2. C. prophetarum, Linn.; DC. Prodr. iii. 301; leaves and petioles scabrid not softly downy, flowers small, petals ½ in., ovary very tuberculate, fruit about 1 in. more or less tuberculate ellipsoid. Wall. Cat. 6733; W. & A. Prodr. iii. 342; Boiss. Fl. Orient. ii. 753; Naud. in Ann. Sc. Nat. ser. 4, xi. 14.

Scinde; Stocks.—Distrib. Beloochistan, Arabia, Tropical Africa to Guinea.

Stem scabrid; tendrils short. Leaves 1-1½ in., reniform, subtriangular, much lobed; petiole ½-1 in. Female peduncle less than ½ in., stout. Fruit green, with paler vertical stripes.

Throughout **India**, cultivated.—**Distr.** Cultivated in most hot countries, and perhaps the cultivated form of C. trigonus.

**Stems** scabrous. Leaves 3 in. diam.; petiole 2 in. Female peduncle sometimes 2 in. Fruit spherical ovoid elongate or contorted.—The Melon.

4. **C. sativus**, Linn.; DC. Prodr. iii. 300; leaves ovate 5-angular or slightly lobed, lobes acute hispidulous on both surfaces and also often with soft hairs, petals $\frac{1}{2}$ in., fruit glabrous sometimes tuberculat commonly elongate. Linn. Ill. t. 795; Roxb. Fl. Ind. iii. 720; Wall. Cat. 6737; W. & A. Prodr. 342; Miqu. Fl. Ind. Bot. i. pt. i. 671; Naud. in Ann. Sc. Nat. ser. 4, xi. 27; Kurz in Journ. As. Soc. 1877, pt. ii. 103. C. muricatus, Wall. Cat. 6735 A. C. Hardwickii, Royle Ill. t. 47.—Rheed Hort. Mal. t. 6.

Throughout **India**, cultivated.—**Distr.** In all warm and warm temperate countries, cultivated; where wild unknown.

**Stems** scabrous. Leaves 3–5 in. diam.; petiole 2–3 in. Female peduncle sometimes 2 in. Young ovary muricate with rigid prickles. Fruit commonly cylindrical, 12 by $\frac{1}{4}$ in.—The **Cucumber**.


Climbing herbs, hispid or scabrous; tendrils 2–3-fid. Leaves petioled, palmately 3–7-lobed, usually deeply with narrow sinuate-pinnatifid segments, but sometimes little lobed. Flowers monoeccious, all solitary, tolerably large. Male: calyx-tube campanulate, lobes 5; stamens 3, short; anthers scarcely cohering, one 1-celled, two 2-celled, cells conuplicate, connective not produced. Female: calyx and corolla as in the male; ovary ovoid; style short, stigmas 3, reniform; ovules very many, horizontal; placentas 3. Fruit globose or ellipsoid, smooth, fleshy, indehiscent. Seeds very many, oblong, compressed, smooth.—**Distr.** Species 2, widely cultivated.


Throughout **India**, cultivated and also very apparently wild.—**Distr.** Western Asia, Arabia, all Africa except the Cape, Spain.

Whole plant scabrid. Leaves $2\frac{1}{2}$ by scarcely 2 in. in the typical wild very scabrous form, larger in the cultivated forms approaching C. vulgaris, ovate, middle segment compound-pinnatifid; petiole 1 in. Petals $\frac{1}{2}$ in., obovate, light yellow. Ovary villous. Fruit smooth, variegated green and white. Seeds $\frac{1}{4}$ in., not margined.

Throughout India, cultivated.—Distr: In all warm countries of the world, cultivated.

Said to be annual while C. Colocynthis is perennial; but the distinction between the cultivated form of C. Colocynthis and the divided-leaved forms of the water-melon is very small. The water-melon has either sweet or bitter fruit: when the latter, it is Cucurbita amara of authors.—C. fistulosus, Stocks, has thick stems, leaves sparingly lobed, and is plentifully supplied with long somewhat hispid hairs.—The Water-Melon.

12. CEPHALANDRA, Schrader.

Climbing herbs, scarcely hairy; tendrils simple. Leaves petioled, 5-angular or 5-lobed, toothed. Flowers dioecious, moderately large, all solitary and white in the Indian species, ebracteate. Male: calyx-tube campanulate, short, limb 5-lobed; corolla campanulate, 5-lobed about half-way down; stamens 3; anthers exerted, connate, one 1-celled, two 2-celled, cells conduplicate. Female: calyx and corolla as in the male; ovary oblong, style long with 3 bifid stigmas; ovules many, horizontal; placentas 3, vertical. Fruit fleshy, indehiscent, cylindric, smooth. Seeds many, ovoid, compressed, margined.—Distr:. Species 12; all African, one extending to India and Malaya.


Throughout India, common.—Distr:. Malaya, Africa.

Leaves 2-4 in. diam., 5-angular, papillosse, scabrid; petiole 1 in. Male: peduncle 1 in., jointed below the flower; calyx-lobes linear-oblong; corolla nearly 1 in., lobes long-triangularr. Female peduncle about 1 in. Ovary smooth. Fruit bright scarlet.

Var. palmata, W. & A. Prodr. 348; leaves deeply lobed segments sometimes narrow and sinate. B. alceefolia, Herb. Rothler.—Principally in the Deccan Peninsula. Hook. f. in Oliv. Fl. Trop. Afr. ii. 551 keeps C. quinqueloba (Schrard. in Eekl. & Zeyk. Enum. 280) distinct from this var., but it is not easy to do so.—Whether this plant is Bryonia grandis, DC. Prodr. iii. 305 with aculeate fruit, or B. Mormoi of the same work, also said to have aculeate fruit, is perhaps now not material.

13. CUCURBITA, Linn.

Large climbing herbs, hispid or hairy; tendrils 2-4-fid. Leaves petioled, cordate, ovate, 5-angular or lobed. Flowers monoeccious, all solitary, yellow, very large. Male: calyx-tube campanulate, lobes 5, linear or foliaceous; corolla
campanulate, 5-lobed hardly half-way down; stamens 3, inserted low in the calyx-tube, anthers connate, one 1-celled, two 2-celled, cells conduplicate. **FEMALE**: calyx and corolla as in the male; ovary oblong, style short, stigmas 3, bifid; ovules very many, horizontal; placentas 3. **Fruit** fleshy, indehiscent, often large. **Seeds** ovoid or oblong, compressed, margined or not.—**Distr.** Species 5, whereof 4 are cultivated, 1 is said to be wild in Africa.

1. **C. maxima**, Duchesne in Lamk. Dict. ii. 151; leaves with 5 shallow lobes or suberetine sinus between the lobes narrow, hairs of the petiole equal not pungent, calyx-segments lanceolate-linear, fruiting peduncle stout corky striated not grooved. **D. C. Prodr.** iii. 316; **Wall. Cat.** 6720; **Naud. in Ann. Sc. Nat. ser. 4**, vi. 17.

Throughout **India**, cultivated.—**Distr.** Cultivated in all warm and temperate parts of the globe.

Annual. **Leaves** 4–6 in. diam., hispidulous and also with much soft hair, denticulate; petiole often nearly as long as the blade. Male **peduncle** 4 in., female 1½ in. **Corolla** 3–4 in.—The **Common Gourd**.


Throughout **India**, cultivated.—**Distr.** Widely cultivated in tropical and sub-tropical regions.—The **Musk-Melon**.

3. **C. Pepo**, **D. C. Prodr.** iii. 317; leaves 5-lobed sinus between the lobes broad, hairs on the petiole beneath rigid almost prickly, fruiting peduncle woody strongly grooved. **Roxb. fl. Ind.** iii. 718; **W. & A. Prodr.** 351; **Naud. in Ann. Sc. Nat. ser. 4**, vi. 29; **Wall. Cat.** 6722.

Throughout **India**, cultivated.—**Distr.** Cultivated in all warm and temperate parts of the globe.

Annual. **Leaves** 4–6 in. diam., with much soft hair, hispidulous on the nerves beneath, denticulate, lobes acute often slightly lobed; petiole often nearly as long as the blade. Male **peduncle** 4 in. or more, female 1½ in. **Corolla** 3–4 in.—The **Pumpkin**.

14. **Bryonia**, Linn.

Climbing herbs, scabrid or glabrous; tendrils 3-fid in the Indian species. **Leaves** petioled, palmately 5-lobed or 3–5-angular. **Flowers** small, yellowish, males and females clustered in the same axils (in the Indian species shortly pedicelled). **Male**: calyx-tube widely campanulate, 5-toothed; corolla 5-partite; stamens 3, inserted low down the calyx-tube, anthers free, two 2-celled one 1-celled; cells curved or somewhat sigmoid, never quite conduplicate, connective not produced; rudiment of ovary 0. **Female**: calyx and corolla as in the male; ovary ovoid; style slender, 3-fid at the top, no disc at the base in the Indian species; ovules many, horizontal, placentas 3. **Berry** spherical, indehiscent. **Seeds** not very many, oblong or ovoid, compressed.—**Distr.** Species 12, in the warm and temperate regions of the old world.

1. **B. laciniosa**, Linn.; **D. C. Prodr.** iii. 308; scabrous or nearly glabrous, leaves generally deeply palmately 5-lobed sinus sometimes shallow, fruit nearly

From the Himalaya to Ceylon. *Pegu; Kurz.—Distr. Trop. Africa, Mauritius, Malaya, Australia.*

Stems angular, slender, usually glabrous or nearly so. *Leaves* often scabrous, punctate above, lobes 2–3 in., with a broad or narrow sinus; petiole often longer than the blade, sometimes muricate near the apex. Male *pedicels* less than 1 in., usually glabrous, female still shorter. *Calyx-teeth* subulate. *Fruit* ⅜ in. diam., green with white vertical stripes. *Seeds* ⅜ in.

15. **MUKIA, Arn.**

Scabrous climbing herbs; tendrils simple. *Leaves* 3–7-angular, not deeply lobed, cordate, petioled and subsessile on the same plant. *Flowers* small, yellow, males and females clustered in the same axils; males very short-peduncled, females subsessile. **Male**: calyx campanulate, teeth 5, subulate; corolla 5-partite; stamens 8, inserted low in the calyx-tube, anthers free, two 2-celled one 1-celled; cells straight, connective not produced. **Female**: calyx and corolla as in the male; disk annular; ovary ovoid, hispid; style thick, apex 3–2-lobed; ovules not very many, horizontal; placentas 3–2. *Berry* globose, small, indehiscent. *Seeds* not very many, ovoid, compressed, strongly margined, faces rough or smooth.—**Distr.** Species 2; one South Indian; the other African, Asiatic, and Australian.


Throughout India, common; ascending the hills as far as subtropical warmth extends.—**Distr.** Africa, Malaya, Australia.

Stem angular, slender, hispid or sebrid. *Leaves* 1–3 in., serrate; petiole often very short, sometimes 1 in. or more. *Flowers* ⅓–⅜ in. diam. *Ovary* very hispid. *Fruit* ⅓–⅜ in. diam., bright red.

**Var. gracilis**: leaves ⅓ by 2⅓ in. hastate elongate very acute wide at the base long-petioled nearly entire. Bryonia gracilis, *Wall. Cat.* 6714.—Pagamew (Burma); *Wallich.* Possibly a distinct species.


Nearly allied to *M. scabrella*. *Leaves* densely softly villose beneath when young and often when old, elongated acute at the apex.—Mr. Thwaites says the rudimentary pistil in the male flowers is more developed than in *M. scabrella* and is surrounded at the base with an annulus.

16. **ZEHNERIA, Endl.**

Climbing herbs; tendrils simple. *Leaves* long- or short-petioled, dentate, angular or deeply lobed, polymorphous. *Flowers* small, yellowish, monoecious or dioecious, males in a peduncled corymb, females solitary on short peduncles or sometimes subcorymbose on a longer peduncle; bracts 0 or very small. **Male**: calyx tubular-campanulate, teeth 5 small; corolla divided nearly to the base into 5 triangular segments; stamens 3, inserted low in the calyx-tube, filaments glabrous or hairy (in the same species), anthers free, all 2-celled or (in the same species) one 1-celled; anther-cells curved or (in the same species) flexuose or sigmoid; connective often papillose at the top, scarcely produced. **Female**: calyx and corolla as in the male; ovary globose or oblong, glabrous or very hairy; style cylindric, 3-lobed, surrounded at the base by an annular disc; ovaries many, horizontal; placentas 3. *Fruit* succulent, indehiscent, globose ellipsoid or cylindric. *Seeds* many or few, obvoid rounded or compressed, with or without a margin, faces smooth or somewhat tubercular or pitted.—Distrib. Species 15 (according to Bth. & Hk. f.) or 5 only; in tropical Asia, Australia, and Africa, with one species in South America.


Deccan Peninsula; Wight; Heyne; Nilghiris, G. Thomson; Canara, Stocks; Belgaum, Ritchie.—Distrib. Malaya, Japan, Norfolk Island, Fijis; but the area cannot be separated from that of the next species.

Weak, nearly glabrous. *Leaves* 2 in. diam., generally sharply denticulate; petiole ¾ in. or short. *Flowers* frequently monoecious in the same axils, sometimes apparently dioecious; male peduncle usually 1–2 in., female less than ¾ in., undivided in all the Indian examples, but occasionally the female peduncle is elongate umbellate according to Wight.—Roxburgh's *Bryonia filiformis* perhaps belongs here, but the ripe fruit is said to be near 1 in. It has been referred to *Melothria indica*, but the inflorescence is quite unlike that, as are the yellow flowers and stamens of Roxburgh's picture.


North Bengal; common in Sikkim, Assam, Khasia, and Cachar, ascending to 5000 ft. alt. Deccan Peninsula and Ceylon, common; apparently always in the lower hills.—Distrib. Ava, Malaya, Africa.
Very near Z. Baueriana and possibly not distinct: but the ovary is globose even before the expansion of the flower. The leaves are also generally asperous above and sometimes much more hairy beneath than in any undoubted examples of Z. Baueriana. The African distribution of this cannot be defined, as Z. scrobiculata and even Piloxyne lucida, Naud. can hardly be distinguished from it.


Throughout India and Ceylon, very common.—Distrib. Malaya, China, North Australia.

Stem and leaves usually nearly glabrous, or leaves scabrous above; petiole short, often hispid. Leaves polymorphous; sometimes 6 by scarcely 1 in., narrow triangular— lanceolate, sometimes cordate-oblung much rounded, often palmate nearly to the base with 3–5 narrow divericate segments; basal lobes usually produced strongly backwards, rounded subacute or most acute. Inflorescence usually dichious, male corymbose on a peduncle 2–4 in. or sessile; pedicels glabrous or hairy, subbracteate; females solitary, very short peduncled. Young ovary narrow-oblong, glabrous or somewhat pubescent. Fruit bright-red, usually much larger than that of the two preceding species. Seeds about 12; sometimes only 4–6 in the typical Z. umbellata, as said always in Z. amplexicaulis by W. & A.—Wight says that Z. umbellata may be distinguished from Z. amplexicaulis by having small oblong bracts on the middle of the pedicels, but these cannot be made out even in Wight's own specimens.

Var. nepalensis, leaves deeply 5-palmate with narrow lobes, scattered glands, young ovary densely velvety, seeds oblong slightly compressed quite smooth and rounded with no trace of a margin. Bryonia nepalensis, Seringe in DC. Prodr. iii. 307.—Temperate Western Himalaya, alt. 4000–7000 ft.; Royle; Thomson; Jacquemont; Strachey & Winterbottom, &c.—A variety many times collected but only within a very limited area in Gurwhal, Kumaon and Kunawur.

17. MELOTHRIA, Linn.

Climbing herbs; tendrils simple or 2-fid. Leaves peltioed, deltoid, truncate or haste, entire or deeply 3-lobed, little hairy, often punctate. Flowers small, white, usually monoeccious, males and females often from the same axil; male pedicels long, clustered (rarely subsolitary) in the axils, or clustered on long racemes resembling branches without leaves; female long-pedicelled. Male: calyx-tube short, teeth 5, small; corolla 5-partite; stamens 3, inserted in the middle of the calyx-tube; anthers free, one 1-celled, two 2-celled; cells free, straight, simple, more or less lateral, connective prolonged, undivided, glabrous. Female: calyx and corolla as in the male; ovary oblong, style long; stigmas 3 subglobose; ovules many, horizontal; placenta 3, vertical. Fruit indehiscent, globose, acute, or fusiform substrate. Seeds many, small, oblong; much compressed, obscurely margined, smooth or very nearly so.—Distrib. Species 25, all tropical.

* Fruit fusiform, subtrigonous.

Ceylon; common up to 5000 ft., *Walker*; *Gardner*.

Nearly glabrous, stems thin. *Leaves* 2 by 1½ in., acute, often punctate on both surfaces; petiole 1 in. *Pedicels* of males and females about as long as the pedioles. *Corolla* hairy round the throat; rudimentary ovary of the male depressed-globose. *Ovary* fusiform; stigma large, 3-lobed. *Fruit* ½ in. broad, obtusely trigonous, almost rostrate. *Seeds* ½ in., packed in three columns.—The name *M. deltoidea* is pre-occupied by *Benth. in Flora Nigrit.* 368 for a different plant.


Prome (Burmah); *Wallich*.

Stem glabrous. *Leaves* 2-3 by 2½-3½ in., very broadly deltoid, sharply triangular, sinuous scarcely denticulate, scabrous above with flat round glands, slightly hispid beneath. Male raceme nearly as in *M. odorata*. Fruit *pedicel* ¾ in. Fruit rostrate, attenuate at the base, resembling closely that of *M. zeylanica* but rather larger. *Seeds* nearly ¼ in., larger than those of *M. zeylanica*, many, oblong, very compliant, hardly margined, smooth on the faces.

**Fruit globose, subquadrate, obtuse.**


Nearly glabrous, stem slender. *Leaves* 1½ by 1½ in., acuminate or scarcely acute, often punctate on both surfaces; petiole 1 in. *Pedicels* of males and females about as long as the petioles. Point of the connective short. *Fruit* white, seeds strongly margined (*ex Naudin*).—This appears exceedingly rare in India: but it may be doubted whether the next is other than a form of it: see *Benth. Fl. Hongk.* 125.

4. *M. odorata*, *Hk. f. & T. in Herb.*; tendrils simple, leaves more or less cordate entire or somewhat 3-lobed, male pedicels in distant clusters on long racemes, fruit ¾-1 in. globose quadrate very obtuse. Bryonia odorata, *Ham. in Wall. Cat.* 6706 A. B. C.

North-West Himalaya; *Ryle*. Throughout the plain of East Bengal, common, and ascending the hills to 7000 ft. alt.

Nearly glabrous, stem more stouter than in *M. indica*. *Leaves* 2-3 by 1¾-2½ in., acute, often punctate on both surfaces; petiole 1-1½ in. Male peduncle long, somewhat zigzag, with a cluster of pedicels (each ½-¾ in.) at each angle; female pedicel as long as the petiole. *Corolla* white, with much hair round the throat. *Connective* not much produced; rudiment of ovary in the male flower globose depressed. *Seeds* ¾-1 in., not or very obscurely margined.—This species has been separated from *M. indica* by the long raceme of the male flowers, which, however, does not essentially differ. The fruit appears very obtuse, the degree of margination of the seeds can hardly be relied on.

*Var. trifolia*; lobes of leaf disarticulating sometimes very narrow and long, petiole often shorter than in the type. Bryonia triflora, *Wall. Cat.* 6707.—East Bengal;
Soorma Bank, Griffith (Kew Distrib. No. 2530).—The male inflorescence and the fruit are altogether those of M. odorata; the leaves unlike.

5. M. bicirrhosa, C. B. Clarke; tendrils 2-fid, leaves deeply cordate ovate caudate-acuminate, male inflorescence elongate racemed.

BIRMA; Griffith (Kew Distrib. No. 2522).

Nearly glabrous; stem like that of M. odorata; tendrils stout all 2-fid. Leaves 4 by 3 in.; petiole 2–3 in. Inflorescence exactly as in M. odorata. Male flower altogether of the genus, anthers lateral on the connective which is long produced above them; rudiment of the ovary depressed globose. Fruit not seen.—This appears as an excessively developed M. odorata.

18. RHYNCHOCARPA, Schrader.

Climbing herbs; tendrils simple. Leaves peltioed, orbicular and undivided in the Indian species. Flowers monocious or dicous, very small; males subcorymbose on a short peduncle; females solitary (rarely aggregated), subsessile, sometimes in the same axil with the male. Male: calyx-tube campanulate, teeth 5, small; corolla 5-partite; stamens 3 (rarely 5); anthers free or united one 1-celled, the others 2-celled; cells straight; connective crested 2-lobed or long-produced in two points. Female: calyx and corolla as in the male; ovary ovoid, beaked; style ending in 2 rarely in 3 long stigmas; ovules not many, horizontal; placentas 2 rarely 3, vertical. Fruit ovoid, rostrate, indehiscent. Seeds ovoid, compressed, not very many.—DISTRIB. Species 5; in warmer Africa, one also in Western India.


GUZERAT; Dalzell. Deccan Peninsula; Rottler; Wight. Malabar Hills? Stocks; Dr. Ritchie. AYA, Wallich.—DISTRIB. Tropical Africa and Natal.

Stem somewhat stout, pubescent. Leaves 2 in. diam., orbicular or ovate, cordate, dentate; petiole ½–1 in. Male racemes small, scarcely 1 in. Calyx hairy with subulate teeth. Connective of each anther produced into a long curved pointed horn. Fruit bright red, 2-celled. Seeds 4 in., distinctly margined.

SPECIES IMPERFEKTLY KNOWN.


Upper Tenasserim, Attaran, Brandis; Pegu and Prome, Kurz.

Not seen; from the description it may be a variety of R. foetida.

19. CORALLOCARPUS, Welw.

Climbing or prostrate herbs, scabrid or subtomentose; tendrils simple. Leaves peltioed, roundish-cordate, somewhat thick, entire lobed or palmate. Flowers
very small, monocious; males in a small corymb at the apex of a long peduncle; females short-pedicelled or subsessile, solitary or clustered. **Male**: calyx-tube campanulate, lobes 5, short; corolla 5-partite; stamens 3, nearly sessile at the mouth of the calyx-tube, anthers free, all 2-celled or one 1-celled; cells straight, oblong, lateral on the thin connective which is not produced; ovary rudimentary. **Female**: calyx and corolla as in the male; ovary ovoid; disc 0; stigmas 3 or 2; ovules not very many, horizontal; placentas 3–2, vertical. **Berry** ovoid, circumsciss near the base, usually rostrate. **Seeds** not very many, ellipsoid or nearly globose, somewhat compressed, smooth or nearly so, little margined.—**Distrib.** Species 6, in Tropical Africa, the Persian Gulf, and Western India.


**Punjab**, Rawul Pindi; **J. E. T. Aitcheson. Scinde** and **Gujarat**; **Dalzell. Deccan Peninsula; Rottler; Wight. Belgaum; Ritchie. Ceylon; Thwaites.**

**Leaves** 2 in. diam., nearly entire 3–5-angular or 3–5-lobed; lobes usually broad sometimes narrow, commonly roundish or sinuous on the margin; petiole 1 in. **Male peduncle** 1½–2 in., female 1½–1¾ in. or sometimes 1 in. **Fruit** ¾ in., beak ¼ in. more. **Seeds** about six, much longer than broad.


**Gujarat**, near Malpor and Gundar; **Dalzell.** Also in Stocks' collection probably from Scinde.—**Distrib.** Central Africa.

Hardly differs from *C. epigaea* but in the points specified in the diagnosis. The leaves are 5-lobed, the lobes lanceolate, acute, narrow at each end.


**Scinde; Dalzell.—Distrib.** Persian Gulf and Tropical Africa?

Whole plant villous. **Leaves** 2 in. diam., subentire or more or less 3–5-lobed, lobes rounded; petiole ½ in. **Male peduncle** 3 in. with 12 flowers at the top. **Male** and **female flowers** as in *C. epigaea*. **Fruit** ¾ in. the beak ½ in. **Seeds** about 12, ½ in. **diam.**

20. **CERASIOCARPUM**, Hook. **f.**

Climbing glabrous herbs; tendrils simple. **Leaves** long-petioled, oblong, cor–date, nearly entire. **Flowers** very small, monocious; male peduncle carrying a few clustered flowers at the top; female flower sessile, solitary, often in the same axil with the male. **Male**: calyx-tube short campanulate with 5 minute teeth; corolla 5-partite; stamens 3; anthers subsessile, distinct, one 1-celled, two 2-celled; cells oblong, lateral on the connective which is not produced;
rudiment of the ovary 0. **Female**: calyx and corolla as in the male; ovary ovoid; disc 0, stigmas 3; ovules few, horizontal; placentas vertical. **Fruit** ellipsoid, subsessile, indehiscent, without a beak. Seeds 2–6, ovoid, smooth, slightly compressed.


**Ceylon**: alt. 3000–5000 ft.; **Thwaites**.

Leaves 3–6 in., obtuse or acute, cordate or hastate, almost 3-lobed, entire or undulate-denticulate; petiole $\frac{3}{4}$–1½ in. **Flowers** $\frac{1}{4}$–$\frac{1}{2}$ in. diam., yellow; petals broad, acuminate. Berry at most $\frac{1}{2}$ in. diam. **Seeds** $\frac{1}{4}$–$\frac{1}{2}$ in. diam., little compressed, incompletely margined, 2–6 to each fruit.

**DOUBTFUL SPECIES.**


**Pinang**: Wallich.

Stems rather strong, minutely pilose; tendrils simple. **Leaves** cordate-oblong, acute, entire slightly denticulate, scabrous above minutely hispid beneath. **Flowers** monoecious, all peduncled, solitary female and racemed males from the same axil; male peduncle 1½ in. with 8 small pedicels at the summit. **Fruit** $\frac{3}{4}$–1½ in. diam., smooth, nearly globose. **Seeds** 4 to 6, $\frac{1}{2}$ in., somewhat margined, oblong.—Closely resembles **C. zeylanicum** except as to the peduncled female: but there are no flowers on Wallich's example.

3. **C. maingayi**, C. B. Clarke; leaves 3-lobed and entire, female peduncle $\frac{3}{4}$–1½ in., seeds margined not much compressed very rugose pitted on the faces.

**Malacca**: Maingay No. 1268.

Stems nearly glabrous; tendrils simple. **Leaves** 2 by 1½ in., with three divaricate lanceolate lobes or entire, not much cordate, scabrous on both surfaces; petiole $\frac{3}{4}$ in. Male **peduncle** 1¼ in. with 8 minute pedicels at the summit; female from the same axil. **Stamens** of the genus. **Fruit** $\frac{3}{4}$ by less than $\frac{3}{4}$ in., oblong, subacute. **Seeds** 10–12, less than $\frac{3}{4}$ in.—This may be a **Melothria**, but the long male peduncle with short pedicels and the unproduced connective do not suit. The capsule and seeds do not suit **Cerasiocarpum**.


Climbing or prostrate scabrous herbs, turning black in drying; tendrils simple. **Leaves** cordate, orbicular, 5–7-lobed; stipuliform bracts at the axils of the leaves large round or elliptic, ciliate or dentate. **Flowers** minute, monoecious; males in small racemes on inconspicuous axile peduncles; female solitary, short-peduncled, in the same axil with the male. **Male**: calyx-tube short, campanulate, lobes 5, subulate; corolla 5-partite; stamens 3, filaments very short; anthers free, one 1-celled, two 2-celled; cells straight, connective not produced; rudiment of ovary 0. **Female**: calyx and corolla as in the male; ovary ovoid; 1-celled; disc 0; style columnar, stigmas 2 or 3; ovules 2 or 3, horizontal; placentas parietal. **Fruit** small, globose or subquadrate, oblique, indehiscent. **Seeds** 2 or 3, ellipsoid, much compressed, acutely margined, somewhat boat-shaped.—**Distrib.** Species 3; in India, Tropical Western Asia and Tropical Africa. The remarkable stipuliform bracts are characteristic of this genus.

1. **C. Garcini**, Naud. in Ann. Sc. Nat. ser. 5, vi. 13; middle lobe of the
leaf not very acute nor much longer than the others, male peduncle less than \( \frac{1}{4} \) in., fruit not longer than broad. Bryonia Garcini, DC. Prodr. iii. 308; Roxb. Fl. Ind. iii. 727; Wall. Cat. 6712; W. & A. Prodr. 344. Zehneria Garcini, Stocks in Hook. Kew Journ. Bot. iv. 149; Dalz. & Gibbs. Bomb. Fl. 99.

Bundelkund; Edgeworth. Deccan Peninsula; Rottler, &c. Ceylon; Thwaites. Annual; stem not elongate, more or less scabrous and punctate, scarcely at all hairy. Leaves 1-1\( \frac{1}{2} \) in. diam., lobes often sinuate and lobed; petiole \( \frac{1}{3} - \frac{4}{3} \) in.; stipuliform bracts \( \frac{1}{4} \) in. and more, elliptic, with long cilia. Fruit \( \frac{1}{2} \) by \( \frac{1}{2} \) in.

2. **C. cerasiformis**, Naud. in Ann. Soc. Nat. ser. 5, vi. 13; middle lobe of the leaf acute longer than the others, male peduncle \( \frac{1}{4} - 1 \) in., fruit ellipsoid not in the least narrowed into the peduncle. Zehneria cerasiformis, Stocks in Hook. Kew Journ. Bot. iv. 149.

Scinde; Stocks. Gujerat; Dalzell.—Distrib. Tropical and Southern Africa.

Hardly distinguishable from C. Garcini. Leaves usually larger, sometimes 3 in. diam.

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**22. DICÉLOSPERMUM, C. B. Clarke.**

A climbing scabrous herb; tendrils simple. Leaves petioled, cordate or hastate, ovate, acute, little lobed. Flowers minute; males and females clustered in the same axils, short-pedicelled. Male: calyx-tube short, campanulate, teeth 5, minute; corolla 5-partite; stamens 3, filaments very short, anthers free, one 1-celled, two 2-celled; cells oblong, straight; connective not produced. Fruit small, membranous, obovoid, subtrigonom, 1-celled, with 3 basal erect seeds. Seeds with three parallel equal cells, the two lateral empty.

1. **D. Ritchiei, C. B. Clarke.**

Belgaum; Ritchie. Also in Herb. Stocks doubtless from Western India.

Exceedingly like Mukia scabra.—except as to the seeds, and the flowers are smaller. Leaves 2\( \frac{1}{2} \) by 1\( \frac{1}{4} \) in., scabrid and somewhat hispid on both surfaces; petiole \( \frac{3}{4} \) in. Fruit \( \frac{1}{4} \) in. diam. Seeds \( \frac{3}{4} \) by \( \frac{1}{2} \) and \( \frac{1}{3} \) in. thick, attached to the very bottom of the fruit, erect.—Female flowers not seen.

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**23. THLADIANTHA, Bunge.**

Climbing herbes; tendrils simple, rarely 2-fid. Leaves petioled, entire or tri-partite, deeply cordate, denticate, softly pubescent or nearly glabrous. Flowers dioecious, yellow, large or small. Male pedunces in the fully developed plant paired, one 1-flowered ebracteate caducous, the other racemous the flowers with or without bracts; female peduncle elongate, 1-flowered, ebracteate. Male: calyx-tube shortly campanulate, the bottom shut by a horizontal scale; segments 5, lanceolate; corolla campanulate, 5-partite, segments revolute about half-way down; filaments 5, inserted near the mouth of the calyx-tube; anther 1-celled, narrow-oblong, straight. Female: calyx and corolla as in the male; ovary oblong, style deeply 3-fid with 3 reniform stigmas; ovules many, horizontal; placentas 3, vertical. Fruit ellipsoid, obtuse, indehiscent, green, cylindric with vertical ribs. Seeds many, horizontal, small, obovoid, compressed, smooth.—Distrib. Species 2, Bengal, Malaya, China.

The generic character is here widened to include the Khasia species. As in most Cucurbits with paired male peduncle, either the simple or the racemmed one is often wanting, and the two do not flower together; the simple peduncle generally falls off
by the time the racemcd one is in blossom. The corolla is slightly oblique; in T. dubia besides the normal large male flowers much smaller imperfect ones are often found.


Plain of East Bengal common, ascending to 8000 ft. in the hills. The female plant is rare and has never been collected in the plains. Pogp; Kurz.—Distrib. Malaya, China.

A large climber. Leaves 4 by 2$\frac{1}{4}$ in., denticulate, not at all angular, usually villos beneath sometimes nearly glabrous; petiole 1$\frac{1}{2}$ in. Tendrils simple in all the wild examples, but in Naudin's strong cultivated plants bifid. Male racemes 2-3 in., flowers approximated, bracts serrate or incise-serrate; calyx-teeth very narrow; filaments minutely hairy. Female peduncle 2-3 in., more or less hairy; young ovary densely woolly. Fruit 1$\frac{1}{2}$ by $\frac{3}{4}$ in., glabrous, oblong, obtuse at both ends. Seeds scarcely $\frac{1}{4}$ in.—There is an admirable picture of this plant amongst Roxburgh's drawings.

2. T. Hookeri, C. B. Clarke; leaves deeply cordate-ovate acute entire and tripartite with lanceolate segments, male racemes without bracts, petals less than $\frac{1}{4}$ in.

Assam; Griffith (Kew Distrib. No. 769, 2553). Khasia Mts., alt. 4000-6000 ft.; Myrung and Nunklow; H. f. & T.

A large climber; tendrils simple. Leaves polymorphous, acute, resembling altogether those of T. dubia, but generally less hairy and thinner, or tripartite, with segments 4 by 1$\frac{1}{4}$ in., the two lateral lobes very cordate and auricled on the outer base; petiolules hardly $\frac{1}{4}$ in.; petiole 2 in. The female flower in Griffith's example resembles that of T. dubia but is smaller though the petals are slightly more than $\frac{1}{4}$ in.; peduncle about 1 in. Male racemes 1$\frac{1}{2}$ in., slender; flowers pedicelled, scattered, yellow; petals scarcely $\frac{1}{4}$ in.; these small flowers probably correspond to the small imperfect males often found in T. dubia; if so the large perfect males of T. Hookeri are as yet unknown. Fruit (and seeds) altogether like those of T. dubia, but rather smaller, 1$\frac{1}{4}$ in.—The ebracteate male raceme of this with pedicels $\frac{1}{4}$ in. is exceedingly unlike that of T. dubia: but in all other points they appear congenic, and the habit is the same.

24. EDGARIA, C. B. Clarke.

A large scandent herb; tendrils 2-fid. Leaves petioloed, entire, ovate, acute, deeply cordate, more or less pubescent. Flowers large, dioecious, yellow. Male peduncles paired, one 1-flowered caducous, the other racemed; bracts 0 or inconspicuous; female peduncle elongate, 1-flowered. Male: calyx-tube elongate, funnel-shaped, teeth 5, subulate; corolla deeply 5-partite, with obovate acute segments; stamens 3, included in the calyx-tube; filaments exceedingly short; anthers connate into a cylindric tube, one 1-celled, two 2-celled; cells straight, linear-oblong, connective not appended. Female: calyx and corolla as in the male; ovary narrow-obovoid, 3-celled; style long, stigmas 3, oblong, 2-fid; ovules 1-3 superimposed in each cell, horizontal or subpendulous. Capsule large, broadly fusiform, trigonous, 3-celled, fibrous, dry, 3 valved, valves dehiscing downwards and leaving the trigonous central axis. Seeds 1-3 in each cell, pendulous, compressed, subquadrate, large, corrugate or somewhat 3-lobed at the lower end and faces when dry.
GUNWHAH; Falconer. Sikkim, alt., 5000–8000 ft., very common; J. D. H.; C. B. Clarke.

Leaves 4 by 3½ in., serrate and denticulate; petiole 3 in. Male raceme 6 in., female 3–4 in. Calyx-tube ½ in. Petals ¾ in., widely patent. Fruit 3 by 1½ in., somewhat pilose, with 2 wavy vertical ribs on each face. Seed ½ by ⅛ and ¼ in. thick.

25. GOMPHOGYNE, Griff.

Climbing, weak, succulent herbs, tendrils 2-fid or simple. Leaves petioled, pedate, with 5–7 lanceolate serrate leaflets. Flowers small, monoecious (sometimes at least), males racemate; females panicled or clustered. Male: calyx rotate, 5-partite, with oblong segments; corolla 5-partite, with elongate erose segments; stamens 5, filaments united at the base; anthers globose, 1-celled, straight. Female: calyx produced above the ovary and corolla as in the male; corolla-segments caudate; ovary top-shaped, 1-celled; styles 3, 2-fid at the apex; ovules 3, pendulous. Capsule top-shaped, 3-valved at the wide truncate summit, crowned by the persistent styles. Seeds 3 (2–1), ellipsoid, little compressed, black, obscurely margined.—Distrib. Species 2, one in the Himalaya one in Burma.

1. G. cissiformis, Griff. Pl. Cantor. p. 26; capsule somewhat succulent ⅛ in. wide at the summit, seeds ¼ in. oblong with scaly tubercles on the rounded faces.


Leaves 2½ in. diam., glabrous or slightly pubescent; petiole 1–1¼ in. Male racemes 1–6 in., often compound (or appearing so), towards the end of leafless branchlets. Females clustered near the axils or on panicles 2–4 in. Capsule ⅖ in.


Burma; at Taong-dong; Wallich.
The leaves and inflorescence closely resemble G. cissiformis. The capsule is ¼ in., but narrow linear-oblong.

26. ACTINOSTEMMA, Griff.

A climbing weak herb; tendrils simple and 2-fid. Leaves petioled, deeply cordate or hastate, elongate, much toothed, nearly glabrous. Flowers small, monoecious, in lax axillary panicles, pedicels jointed about their middle; panicles frequently male with a few females near the base. Male: calyx rotate, 5-partite, with lanceolate-linear segments; corolla 5-partite, segments lanceolate-caudate; stamens 5, free; connective dilated-papillose on one side with a narrow straight oblong anther-cell on the other. Female: calyx and corolla as in the male; ovary subglobose, verrucose, 1-celled; style short, with 2 reniform stigmas; ovules 2–4, pendulous, subparietal. Capsule ovoid-conical, half-superior, covered with rough points, circumsciss above the middle. Seeds 2–4, compressed, ovate, corrugated and denticulate on the margin.

Plain of East Bengal, frequent. Assam. Silhet.—Distrib. Amurland, Japan.

Leaves 4 by $\frac{1}{2}$ in., acute, scarcely lobed in the Bengal specimens, palmately lobed in Maximowicz'; petiole often 2 in. **Panicles** 3–6 in. **Fruit** $\frac{3}{4}$ by $\frac{3}{4}$ in., not at all trigonous, upper part muricated as well as the lower. **Seeds** $\frac{1}{2}$ by $\frac{1}{8}$ in.

27. **GYNOSTEMMA**, Blume.

A climbing herb; tendrils simple. **Leaves** pedate; leaflets 3–5, ovate-lanceolate, serrate, membranous. **Flowers** small, dioecious, in axillary diffuse panicles, greenish. **Male**: calyx short, with 5 small lobes; corolla rotate, 5-partite, with lanceolate segments; stamens 5, filaments connate below; anthers 2-celled; cells long, straight. **Female**: calyx and corolla as in the male; ovary spherical, 3–2-celled; styles 3–2, united at the base, at the apex 2-fid; ovules in each cell 2, pendulous. **Fruit** globose, size of a pea, umbonate, indehiscent, 1–3-seeded. **Seed** not winged, verrucose, submuricate.


**Kumaon**; *Strachey & Winterbottom*. Nepal; *Wallich*. Sikkim, Assam, Khasia, common up to 5000 ft. alt. Ceylon; Thwaites.—Distrib. Malaya, Japan.

Glabrous or pubescent. **Leaflets** 5 or 3 by $\frac{1}{2}$–2 in., lanceolate or obovate-lanceolate; petiolules $\frac{1}{2}$–$\frac{3}{4}$ in.; petiole 1–$\frac{1}{4}$ in., often pubescent with a line of crisped hairs. **Panicles** usually 3–6 in., sometimes 15 in. by nearly a foot broad, leafless. **Styles** 3 and 2 on the same plant. **Fruit** $\frac{1}{4}$ in. diam., glabrous or puberulous. **Seed** $\frac{1}{8}$ in., ellipsoid, subtrapezoid.

28. **ZANONIA**, Linn.

Climbing herbs; tendrils simple. **Leaves** long-petioled, simple, ovate or oblong. **Flowers** dioecious, in large compound pendulous racemes, males pedicelled, females subsessile. **Male**: sepals 3, obovate or orbicular, concave; corolla rotate, 5-partite, segments subacute; stamens 5, free, inserted on a fleshy disc, filaments very short; anthers 1-celled, transversely oblong. **Female**: calyx and corolla as in the male; ovary subclavate, at first 3-celled, styles 3, spreading, 2-fid at the apex; ovules in each cell 2 or many, pendulous, attached in 2 series to a fleshy parietal placenta. **Capsule** large, elongate-cylindric, clavate, 3-valved at the truncate apex. **Seeds** large, oblong, pendulous, compressed, surrounded by a large membranous wing.—Distrib. Species 2–3, extending from India to Borneo.

1. **Z. indica**, Linn.; DC. Prodr. iii. 296; leaves ovate rounded or cordate at the base glabrous or nearly so, fruit 4 in., seeds few pendulous from the summit of the fruit (Dalzell) wing 2–3 in. Lamk. Ill. t. 816; Blume Bijd. 937;
ASSAM and EAST BENGAL; Griffith, DECCAN PENINSULA; Wight, MALABAR Mts.; Stocks, Law, Dalzell, CEYLON; not uncommon up to 2000 ft., Thwaites.—DISTRIB. Malaya.

Leaves 6–8 by 3–4 in., usually acute; petiole 1 in. Male flowers very small, pedicels ¼–½ in.; female flowers including the ovary ½ in. Ovary early becoming 1-celled by the separation of the 3 fleshy placentas which only at first meet in its centre. Seeds much compressed, hardly ¼ in. thick.

DOUBTFUL SPECIES.

? ZANONIA; leaves 5 by 2 in. narrow-oblong rounded at the base, tendrils lateral.

CHITTAGONG; H. f. & T.—The example contains neither flowers nor fruit, but has all the appearance of Zanonia to which genus the collectors referred it in the field.—The only other species of the genus (collected by Beccari in Borneo) has the seed (including the wings) 6 in. broad curved lunate.

29. ALSOMITRA, Bth. & HK. f.

Large climbers; tendrils simple or 2-fid. Leaves with 3 oblong entire leaflets. Flowers small, dioecious, white, in compound panicles, with filiform branches. Male: calyx rotate, 5-partite, segments oblong, acute; corolla rotate, 6-partite, segments obtuse; stamens 5, filaments short, near together at the base; anthers small, oblong, straight, 1-celled. Female: calyx and corolla as in the male; ovary elongate-clavate, 1-celled; styles 3–4, conical, with semi-lunate stigmas; ovules very many, pendulous; placentas 3, thick, vertical, parietal. Capsule large, elongate-clavate, truncate and 3-valved at the apex. Seeds very many, compressed, vertical, in six rows, much corrugated, incised or horned on the margin with a terminal membranous wing longer than the seed or 0.—DISTRIB. Species 3–5, extending from Nipal through Malaya to North Australia.

1. A. sarcophylla, Hook. f. in Gen. Pl. i. 840; leaves very fleshy, fruit 1¾ by ½ in. at the top, seeds including the wing ½ in. very verrucose on the rounded faces. Kurz in Journ. As. Soc. 1878, pt. ii. 106. Zanonia sarcophylla, Wall. Pl. As. Rar. t. 133; Cat. 3724.

BIRMA; from MANDALAY to PROME, Wallich, Kurz.—DISTRIB. Siam.

Leaflets 2½ by 1½ in., obtuse; petiolule scarcely ½ in. Seeds black, not much compressed, narrowed nearly to a point at the base with 2 flat thin (not 2-fid) curved horns at the apex, between which rises the wing.

2. A. clavigera, Hook. f. in Gen. Pl. i. 840; leaves herbaceous, fruit 3 by ½ in. at the top, seeds including the wing 1 in. slightly muricate on the flat faces. Zanonia clavigera, Wall. Pl. As. Rar. ii. p. 28, partly?; Cat. 3725.


Leaflets 3 by 1¼ in., acute; petiolule often exceeding ½ in. Seeds yellowish-white, much flattened, with several deep triangular spinose teeth at the apex, teeth of 2 lamella, between which the wing is inserted, split in the plane of complanation of the fruit, and the wing springing from these narrow splits.—Wallich's description of the seed of Z. clavigera is incorrect and appears to be taken from that of Z. indica, which grows in the same locality.
Begonia.]  

**Order LXVI. BEGONIACEAE. (By C. B. Clarke.)**

Succulent herbs or undershrubs; stem often reduced to a rhizome or tuber. *Leaves* alternate (sometimes falsely whorled in *B. verticillata*), more or less unequal-sided, entire toothed or lobed; stipules 2, free, frequently deciduous. *Peduncles* axillary, divided into dichotomous cymes, the branches and bracts at their divisions generally opposite. *Flowers* white rose or yellow, showy, sometimes small, monocious. **Male:** perianth (of the only Indian genus) of 2 outer valvate opposite sepaloid segments, and 2–0 inner smaller segments; stamens indefinite often very many, free or monadelphous, anthers narrowly obovoid. **Female:** perianth (of the only Indian genus) of 5–2 segments, *Ovary* inferior (in *Hildebrandia* half-superior), 2–3–4-celled; placentas vertical, axile (at the time of aestivation), divided or simple; *styles* 2–4, free or combined at the base, stigmas branched or tortuous; ovules very many. *Fruit* capsular, more rarely succulent, often winged, variously dehiscing or irregularly breaking up. *Seeds* very many, minute, globose or narrow cylindric, testa reticulated: albumen very scanty or 0.—**DISTRIBUTION.** Species 400 (of which 308 belong to the genus *Begonia*), in all tropical moist countries; not yet met with in Australia.

1. *Begonia, Linn.*

Character of the Order.

**Sect. I. Casparya.** Stamens numerous, shortly monadelphous; anthers narrowly oblong, connate, collectively slightly produced, obtuse. *Ovary* 4-celled (in *B. Candollei* 3-celled), placentas 2-fid or 2-partite. *Fruit* more or less fleshy, not dehiscing on the faces; carpels not much compressed, nor having their backs produced into a thin wing. (None small: leaves in all very unequal at the base.)


From Nepal to Burma; not uncommon in North and East Bengal with Assam, ascending to 4000 ft. *Root* fibrous, not tuberous. *Stem* usually 1–3 ft., erect, succulent, glabrous or minutely pubescent when young. *Leaves* 6–9 in., acuminate, glabrous or minutely pubescent on the nerves of both surfaces; petiole 2–5 in.; stipules lanceolate, glabrous, deciduous. *Cymes* short, axillary, dichotomous, with narrow lanceolate linear bracts, often few-flowered, producing but one or two fruits from each axil. **Male Fl.:** sepals 2, large, glabrous, nearly white; petals usually 2, smaller than the sepals, white or nearly so; stamens about 50. **Female:** ovary cells 4; placentas very
thick, succulent, equally 2-partite; styles 4, 2-fid nearly from the base, stigmas winding spirally with 3 turns. Fruit \( \frac{1}{2} - \frac{3}{4} \) in. diam pendant; walls very thick, succulent, indescent or finally dehiscent at the angles. Seeds shortly ellipsoid, somewhat obovoid.—Catheart \textit{Fl. Ined.} represents the cells of the ovary as occasionally 3 which is not improbable, or his artist may have confounded \textit{B. Candollei} (No. 4) with the present species.


\textbf{Khasia Miss.; Wallich. East Bengal; Griffith (Kew Distrib. No. 2569). Cachar; Keenan.}

Rootstock short, thick, fibrous on all sides, scarcely tuberous. Leaves 6 in., broadly ovate, not acuminate, shaggy on both surfaces in Griffith’s examples, only slightly hairy in Wallich’s. Petiole 6-18 in., hirsute in Griffith’s examples, less hairy in Wallich’s. Scapes 2-4 in., 1-7-flowered. Male: sepals 2, hairy without, \( \frac{3}{4} \) in. in Griffith’s examples, smaller nearly glabrous in Wallich’s; petals 2, smaller than the sepals, glabrous; stamens numerous, shortly monadelphous, anthers narrowly oblong. Female: styles bident, with tortuose stigmas. Fruit \( \frac{1}{2} \) in. and upwards in diam., globose or ovoid, without angles or protuberances. Seeds many, shining brown, shortly ellipsoid.—Griffith’s No. 2569 (with which Wallich’s No. 3677 B agrees), differs considerably in hairiness and in size of the flower from Wallich’s No. 9107 on which A. DC. founded his \textit{Casparya} \textit{? silhetensis}: two species are possibly here mixed, but the material is not sufficient to justify a new species.

3. \textit{B. tessaricarpa}, C. B. Clarke; nearly stemless, inflorescence much shorter than the petioles, leaves ovate nearly glabrous sinuate-denticate hardly serrate, fruit subpyramidal 4-celled laxly hairy, carpels acutely keeled and ending upwards in a short linear patent horn.

\textbf{Assam; Griffith (Kew Distrib. No. 2586).}

Creeping stem 0-2 in. Leaves 2-4 in., broadly ovate, glabrous or minutely pubescent on the nerves beneath; petiole 6-12 in., pubescent upwards. Inflorescence 2-4 in. Flowers much smaller and fruit less succulent than in \textit{B. Roxburghii}. Fruit about \( 1\frac{1}{2} \) in. diam., slightly pubescent.—This solitary example may be possibly a stunted example of \textit{B. Roxburghii}, from which it does not differ in any essential particular though it is very unlike it in general aspect; the seeds are alike.

4. \textit{B. inflata}, C. B. Clarke; stem lengthened, inflorescence axillary, leaves oblong-lanceolate glabrous or nearly so sinuate-dentate scarcely serrate, fruit 3-celled.

\textbf{Darjeeling, alt. 3000 ft.; C. B. Clarke. Bhutan? Griffith (Kew Distrib. No. 2587).}

Erect, 3-4 ft., branched. Leaves 4 by 1\( \frac{1}{2} \) in., acuminate, very unequally cordate; petiole \( 1\frac{1}{2} - \frac{3}{4} \) in.; stipules lanceolate-subulate, glabrous. Flowers in short axillary dichotomous cymes from several axils on each branch; bracts lanceolate-subulate. Male: sepals 2, white, obovate, glabrous; petals 2, linear-ovovate; stamens about 50, scarcely monadelphous; anthers narrow-oblong; connective produced, obtuse. Female: perianth of 4 segments; ovary 3-celled, placentas 2-fid. Fruit \( \frac{3}{4} \) in. diam., trigonous or almost triquetrous; carpels round, as if it were inflated, with a narrow line down the back, glabrous or nearly so, indescent or probably at length dehiscent down the ridges as in \textit{B. Roxburghii}. Seeds short, ellipsoid somewhat obovoid.—Griffith’s examples are in good fruit but the locality is doubtful: his ticket is marked “Umb. ascent. 4 day.”
5. **B. Dux**, C. B. Clarke; stem lengthened, inflorescence axillary, not diffuse, leaves ovate with scattered hairs above denticulate somewhat ciliate.

**Moullenis**; Moolee alt. 6000 ft.; Parish.

*Stem* exceeding a foot, succulent, tubercular. *Leaves* 8 in., acuminate, much auricled on one side at the base, somewhat angular, pubescent on the nerves beneath; petiole 4 in., pubescent upwards; stipules 3 in., ovate-lanceolate, glabrous, persistent. *Flowers* (all male in the solitary example) large, glabrous, in short few-flowered cymes with bracts resembling the stipules. *Sepals* 2, round; petals 2, narrower. *Stamens* very many, shortly monadelphous; anthers narrow-obleng; connec- tive hardly produced.—The section is doubtful, the female flowers being unknown: it may be a *Platycentrum*: Parish remarks that it looks like *B. Rex*; but the thick erect tall stem differs.

**Sect. II. Alaeida.** Fruit triquetrous, faces with a medial line; carpels dehiscing dorsally, angles with short subequal wings below the middle; placetas divided.—Small small-flowered plants; filaments monadelphous; styles connate.


**Moullenis**; Parish.

*Rootstock* small, fibrous. *Stem* 3 in., nearly glabrous. *Leaves* 1½-4½ in. diam., cordate, round, minutely denticulate, puberulous-punctate above, nearly glabrous beneath; petiole 1-2½ in.; stipules ovate, acute, minute. *Cymes* 3-6 in., weak, somewhat panicled; bracts small, ovate, persistent, with lax hairs. **Male**: sepals 2, round; petals 2, narrow-obleng; stamens not very many; anthers very short, obovoid; connec- tive not produced. **Female**: styles united a long way, stigmas lunate; ovary with glandular hairs. *Capsule* scarcely ¼ in. broad including the wings, ripe green, with 6 lines equally diverging from the base of the styles. *Seeds* short, ellipsoid.

7. **B. tricuspidata**, C. B. Clarke; stem short or 0, leaves ovate crenate puberulous on the nerves beneath, scape pubescent, capsule stellately tricuspidate glabrous.

**Moullenis**; Parish.

*Rootstock* small, fibrous. *Stem* sometimes 1-2 in., pubescent. *Leaves* round or ovate, somewhat cordate, crenate or nearly entire, with scattered minute hairs above; petiole ½-1 in., pubescent; stipules minute. *Cymes* 2-3 in., minutely pubescent; bracts ovate, minute. **Male**: sepals 2, obovate; petals 2, narrowly obovate; stamens not many; anthers very short, ovoid; connec- tive not produced. **Female**: perianth of 4 segments, much as in the male: styles combined below, each with two curved branches. *Capsule* less than ¼ in. broad including the wings, with six lines equally diverging from the base of the styles, wings acute. *Seeds* very small, shortly ellipsoid.

8. **B. triradiata**, C. B. Clarke; stem short or 0, leaves ovate serrate or doubly crenate glabrous and white beneath, scape glabrous, capsule stellately 3-rayed glabrous.

**Moullenis**; Parish.

*Rootstock* a small cluster of tubers. *Stem* 0-½ in., glabrous. *Leaves* ½-1½ in., somewhat cordate, incise-crenate, minutely pilose above; petiole ½-2 in., glabrous; stipules small, lanceolate. *Cymes* 2-3 in., glabrous; bracts small, lanceolate, gla- brous, persistent; flowers pink. *Flowers* fruit and seeds closely resembling those of *B. tricuspidata*.

**Sect. III. Knesebeckia.** *Capsule* 3-celled, triquetrous, the angles pro-duced into three often unequal papery wings; faces flat with a rib or line down
the middle; dehiscing by the falling away of 2 or 3 of the faces; placentas 2-rolled. Staminodia very shortly monadelphous, anthers obovoid, connective not produced.

- Ovary and young capsule very pubescent. (See also 12. B. Josephi.)


Rootstock of one or few tubers; plant 6–15 in., the inflorescence scarcely exceeding the leaves, stem glabrous or obscurely pubescent. Leaves 3–5 by 2–3 in., nearly equally cordate, doubly finely serrate, pilose above, villous on the nerves beneath; petiole of the cauleine leaf usually 1 in. at least; stipules lanceolate, hairy, scarcely exceeding the leaves. Peduncle more or less pubescent upwards; bracts oblong-lanceolate, persistent, pubescent. Male: outer segments 2, pubescent; petals 2, smaller; stamens shortly monadelphous, about 30; anthers obovoid; connective not produced. Female: perianth of 5 segments, outer larger, pubescent. Styles 3, nearly separate, divided half way up into two tortuose branches. Capsule large, 1 in., usually pubescent, sometimes nearly glabrous when quite ripe; one wing ½ in. broad, another ½ in., the third ⅓ in. in a large example; styles persistent; wings slightly ascending, dehiscing by the three faces falling off. Seeds light brown, shortly ellipsoid.—Flowers pale rose, medium large; leaves often variegated.

10. B. Satrapis, C. B. Clarke; leaves reniform or shortly ovate-cordate not acute, capsule with 3 wings no one of them greatly elongate.

SIKKIM; above the Rungait, alt. 2000 ft.; Herb. Griffith, C. B. Clarke, Dr. Treuter.

Rootstock of a few tubers. Stem erect, usually elongate above the leaves, pubescent, whole plant 12–18 in. Leaves 2–3 by 3–4 in., nearly equally cordate, minutely denticulate-ciliate, closely pubescent above, rufous-villous on the nerves beneath; petiole of the cauleine leaf usually short often less than 1 in.; stipules lanceolate, pubescent. Peduncle elongate, very pubescent, bright rose-red, often rising 6 in. above the highest leaf; bracts oblong-lanceolate, persistent, very hairy, laciniate, sometimes divided to the base. Male: sepals 2, pubescent; petals 2, smaller; stamens shortly monadelphous, about 50; anthers obovoid; connective not produced. Female: perianth of 5 (or 6) segments, outer larger, pubescent; styles 3, nearly separate, each divided half-way up into two tortuose branches. Capsule large, very pubescent, length ⅜ in., wings not very unequal about ½ in. broad (but the capsule not well ripe). Seeds (not well ripe) like those of B. picta but narrower.—A very beautiful plant with bright rose flowers.

** Ovary and capsule glabrous (except sometimes in 12, B. Josephi).
12. **B. Josephi**, A. DC. *Prodr.* xv. pt. i. 313; little hairy, leaves ovate little unequal at the base peltate (at least when young), capsule 3-winged, one wing much the longer. B. scutata, *Wall. Cat.* 3686 A, *not of A. DC.*

**Sikkim**, alt. 3000–8000 ft., the commonest species. **Khasia Mts.**, alt. 4000–6000 ft.; *H. f. & T.*

Very variable in size and habit, stemless or stem leafy, always easily recognised by the peltate leaves. **Rootstock** of one or few tubers. **Stem** generally 0. Radical **leaves** (on petioles 4–10 in.) often 6 in., sometimes nearly regularly ovate acuminate, acutely 3-lobed or orbicular with numerous acute lobes, serrate or doubly serrate or less often almost entire, usually nearly glabrous but often slightly pubescent on the nerves beneath sometimes weakly pilose above; stipules ovate, deciduous, glabrous or nearly so. **Scape** 1 ft., usually repeatedly dichotomous with long lower branches, soon entirely naked; bracts caducous, caulescent and leafy; flowers rather small, rose. **Male**: sepals 2, caducous; petals 2, smaller; stamens shortly monadelphous, sometimes 8–30; anthers obovoid; connective not produced. **Female**: perianth-segments 5, glabrous, inner smaller; styles 3, nearly distinct, divided about half-way into two tortuous branches. **Capsule** ½ by ½ in. including the wings, the faces ribbed down the middle; styles persistent; wings slightly ascending; capsule dehiscing by two valves on each face, one valve on either side of the central rib.—There is no example from Pinang in the Kew Herbarium.


**Khasia Mts.**, alt. 3000–6000 ft., frequent. **Bhotan**; *Griffith.*

**Rootstock** tuberous, or elongate woody. **Stem** erect, 4–8 in., usually with some brown hairs and zigzag, not unfrequently bearing bulblets in the upper axils. **Leaves** 2–3 in., sharply doubly-serrate, pubescent on the nerves beneath; petiole usually short (less than 1 in.) but sometimes elongate; stipules ½–⅓ in., ovate, acute, ciliate. **Cyme** repeatedly dichotomous; bracts ovate, acute, ciliate; flowers small, rose-red.
Male: sepals 2, glabrous or nearly so; petals 2, smaller; stamens shortly monadelphous, about 30, anthers obvoid, connective not produced. Female: perianth, lobes 4–5, persistent, somewhat enlarged on the fruit; ovary glabrous; styles 3 nearly separate, divided near the top into two curved branches. Capsule scarcely \( \frac{1}{4} \) by \( \frac{3}{4} \) in. including the wing, upper margin of the longest wing horizontal; capsule dehiscing by its three faces falling off. Seeds short-ellipsoid.

14. B. surculigera, Kurz in Flora 1871, 296; weak, caulescent with terminal inflorescence, leaves cordate-ovate crenate and denticulate, bracts minute ovate persistent, capsule with 3 subequal wings.

British Burma; Akyab and Arracan, on low sandstone hills, Kurz.

Weak, succulent, 3–10 in., glabrous or slightly glandular-pubescent, frequently proliferous, or the peduncle going off into a runner. Leaves 1–1\( \frac{1}{4} \) by 1–1\( \frac{1}{4} \) in., nearly glabrous, obscurely acuminate, obtuse at the apex, base equal or unequal; petiole 1 in.; stipules small, ovate, glabrous. Peduncle weak, terminal, dichotomous, lax, slightly glandular-pubescent. Flowers small (white ex Kurz). Male: sepals 2, obovate, glabrous or with few paleaceous hairs; petals 2, much smaller; stamens monadelphous, about 8, anthers obvoid, connective apiculate, but not produced. Female: perianth-segments 5; ovary 3-celled, glabrous, placentas bipartite (Kurz); styles 3, nearly distinct, divided only near the top, stigmas lunate. Capsule less than \( \frac{1}{2} \) by \( \frac{3}{4} \) in. including the wings, styles deciduous in the few examples seen, upper margin of the wings convex, dehiscing by its three faces. Seeds short-ellipsoid.

15. B. modestiflora, Kurz in Flora 1871, 296; caulescent, inflorescence terminal elongate and panicked in fruit, leaves ovate-acute from a very oblique base denticulate-serrate nearly glabrous, capsule unequally 3-winged. B. parviflora, Wall. Cat. 3674.

Morung Hills, Nipal; Hamilton. British Burma; Akyab on sandstone rocks, Kurz. Moulmein on limestone rocks, Parish.—Distrib. Yunnan.

Glabrous or nearly so. Rootstock tuberous. Stem erect, sometimes a foot. Leaves 3–4 by 2 in., not lobed, cuneate-acute, base very unequaly cordate or very obliquely subtruncate; petiole 1\( \frac{1}{4} \)–2\( \frac{1}{2} \) in.; stipules small, lanceolate. Cymes elongate, narrow, slightly panicked; bracts small, lanceolate, ciliate, caducous; flowers numerous, small, white. Male: sepals 2, petals 2, smaller; stamens (about 12), free ex Kurz (distinctly monadelphous ex Parish), anthers obvoid, connective slightly produced in a triangular point. Female: perianth-segments 5, much enlarged in fruit; ovary glabrous, 3-celled, placentas 2-partite; styles 3, nearly distinct, broader upwards, stigma lunate. Capsule rather more than \( \frac{1}{4} \) by 1 in. including the wings; styles deciduous; 3 wings prominent, their upper margins horizontal, one often very greatly produced; capsule dehiscing by the three faces. Seeds short-ellipsoid.—Kurz placed this species next B. scutata, but the 5 female perianth segments refer it to Knesebeckia proper, and not to Trilobaria, A. DC. Possibly two species are mixed here. Wallich's very immature specimen has exceedingly small flowers and weak inflorescence and is referred by Meissner in ms. to B. hydrophila.

16. B. parvuliflora, A. DC. Prodr. xv. pt. i. 355; stem with 1 or no leaf, leaves round or ovate-cordate subequal at the base, capsule 3-winged one of the wings very long produced. B. Lobhiana, A. DC. ms. not B. Lobbia, Hassk. B. velutina, Parish ms.; Kurz in Journ. As. Soc. 1873, pt. ii. 81.

Moulmein and Martaban; T. Lob; on limestone rocks, Parish. Tenasserim; Dr. Stoliczka (ex Kurz).

Rootstock of 1 or 2 tubers. Stem 0–2 in., glabrous or nearly so, whole plant 6–12 in. Leaves 1–3 in. diam., softly pubescent above and on the nerves beneath, sometimes nearly glabrous, doubly serrate-ciliate or simply crenate; petiole of the cauline leaf 1–1 in., of the radical leaves often much longer, slightly pubescent; stipules very
small, lanceolate. **Peduncles** 4–10 in., nearly glabrous, laxly dichotomous; bracts ½–⅓ in., lanceolate, sometimes fiabriate; flowers not many, small, white tinged with rose. **Male**: sepals 2, broad-elliptic, glabrous or with a few scattered hairs; petals 2, narrowly oblong; stamens about 25, monadelphous, anthers obovoid, connective not produced. **Female**: perianth-segments 5 or 4 segments; styles 3, somewhat combined, each divided into two curved branches. **Capsule** ½ by ½ in. including the wings, one wing very long, margins of all extended horizontally from the summit of the capsule, dehiscing on all three faces. **Seeds** short-ellipsoid.—Kurz (in *Journ. As. Soc.* 1877, pt. ii. 107) keeps *B. parvuliflora* "a caulescent wholly glabrous herb" distinct from *B. velutina* "a seapigeros herb with leaves pilose above:" but A. DC.'s type of *B. parvuliflora* (marked by him *B. Lobbia*) has the leaves decidedly pilose above and the stems not more caulescent than some of Parish's *B. velutina*. The only difference between the two is that in *B. velutina* the leaves are often beautifully variegated and doubly serrated; but not always Parish's specimens.


**Sikkim**, alt. 6000–11,000 ft.; plentiful round Darjeeling.

**Rootstock** tuberous. **Stem** 6–16 in., succulent, glabrous. **Leaves** ovate-cordate, acuminated, often with acute or lanceolate lobes, glabrous beneath, often pilose above; petiole 1–3 in.; stipules ovate. **Peduncles** short, axillary, little divided, pedicels longer; flowers pendulous, medium-sized, white or with rose stripes, usually monoeious. **Male**: sepals 2; petals 2, narrower; stamens numerous, shortly monadelphous, anthers obovoid, connective not produced. **Female**: perianth-segments 5, nearly equal, persistent; styles 3, nearly distinct, broader upwards, stigmas lunate. **Capsule** ½ by ½ in. including the wings, somewhat inflated, with a medial line on each face; wings nearly equal, upper margins horizontal.—In some of the axils the peduncle instead of producing flowers is very shortly once or twice divided, each branch terminating in 4 quadrangular cups, each packed closely with oblong viviparous bulbils. Alph. DC. gives dichocious as a character of his section *Putzeysia*, but this, the only species of that section so far as the Indian Begonias, monoeious or occasionally dichocious.


**South Deccan Peninsula**; Courtallum; *Wight. Ceylon; Thwaites.**

**Rootstock** tuberous. **Leaves** 1½–3 in. diam., rarely subsacate, nearly equal at the base, pilose above, laxly pubescent on the nerves beneath; petiole 2–5 in., laxly pubescent; stipules ⅓ in., ovate-lanceolate, glabrous. **Scape** 6 in., repeatedly dichotomous; flowers medium-sized, numerous; bracts ½ in., lanceolate. **Male**: sepals 2, round; petals 2, smaller, narrow; stamens numerous, shortly monadelphous, anthers obovoid, connective not produced. **Female**: perianth-segments 5–4–3 in. (Wight's Icon 3-lobed); styles 3, nearly separate, divided halfway up into two curved branches. **Capsule** ⅔ by ⅔ in. including the wings, perianth deciduous, styles persistent; wings narrow, upper margin rounded or shortly horizontal, dehiscing on all three faces. **Seeds** shortly ellipsoid.—Wight finally united his *D. Arnottianum* with his *D. cordifolium*. Alph. DC. separated them again on the sole ground that *D. Arnottianum* had 4 segments to the female perianth, *D. cordifolium* only 3. But in Wight's specimens of *B. cordifolium* all the female flowers examined have 5. The var. *insularis* of A. DC. founded on Mr. Thwaites' No. 3584 has the leaves acute with the nerves beneath more shaggy than in the type.
B. Segments of female flower 3, with sometimes a small fourth; two outer large, third small lateral. (Trilobaria, A. DC.)


Temperate Central and Western Himalaya; alt. 5000-7000 ft. from Dalhousie to Sikkim; among the commonest species at Simla.

***Rhizome tuberous. Stem*** usually 0 or very short, in Wallich’s specimen nearly 1 ft. *Leaves* 3 by 2 in., glabrous, crenate-serrate; petiole 2-3 in.; stipules ovate, glabrous. *Scape* 3-5 in., glabrous, loosely dichotomous, few-flowered; bracts ovate-oblong, caduceous; flowers medium-sized. **Male**: sepals 2, ovate; petals 2, elliptic, smaller; stamens numerous, shortly monadelphous; anthers obvoid, connective not produced. **Female**: perianth-segments 2, large, ovate, opposite, and one smaller lateral, all enlarged and persistent on the fruit; styles 3, nearly separate, divided near the top into two curved branches. *Capsule* ½ by nearly 1 in. including the wings, styles persistent, upper margins of wings horizontal, dehiscing on all the faces. *Seeds* smooth, reticulated; far more elongate than those of any other Indian species.


**Nipal; Wallich.** East Nipal, alt. 4000 ft.; **J. D. H. Sikkim**, alt. 4000 ft.; **C. B. Clarke.** ? **Burma, Kurz.**

Nearly glabrous. **Rootstock tuberous. Stem** in fruit often leafless, scape-like. *Leaves* 2-6 in., sinuate-toothed or slightly angular not serrate, glabrous or minutely pubescent on the nerves beneath; petiole very long, of the radical leaves often 6 in.; stipules ovate-lanceolate, deciduous. *Scape* or stem reaching 9 in., laxly dichotomous upwards; bracts oblong, acute, caduceous; flowers medium-sized, many or few. **Male**: sepals 2, round; petals 2, narrower; stamens numerous, shortly monadelphous; anthers obvoid, connective not produced. **Female**: perianth-segments 3, 2 larger round opposite, the third smaller lateral, all deciduous; styles 3, nearly distinct, divided about half-way up into two curved branches. *Capsule* nearly ½ by 1 in. including the wings; styles persistent; upper margin of the wings concave, dehiscing by all three faces. *Seeds* short-ellipsoid.

21. **B. ovatifolia**, *A. DC. Prodr. xv. pt. i. 328*; stem short or 0, leaves ovate sometimes acute more or less serrate equal or scarcely unequal at the base, capsule-wings unequal the larger slightly ascending. B. subovata, *Wall. Cat. 3683*.

**Sikkim**, alt. 4000 ft.; **J. D. H.**; alt. 1000 ft.; **C. B. Clarke, Dr. Treuttler. Khasia Mrs., alt. 4000 ft.; **H. f. & T.**

**Rootstock** of several tubers; whole plant rarely exceeding 6 in. **Cauline leaf** 1 or 0. *Leaves* 1-2½ in. diam., roundish or ovate, cordate or scarcely rounded at the base, pubescent on the nerves beneath; petiole 1-4 in., pilose above, usually pubescent towards its summit; stipules very small, lanceolate. **Peduncles** lax, succulent, glabrous or slightly pubescent, 4-8-flowered; bracts oblong or lanceolate; flowers smaller, white or rose. **Male**: sepals 2, ovobate; petals 2, narrow-ovobate; stamens about 20, shortly monadelphous, anthers obvoid, connective not produced. **Female**: perianth-segments 3, 2 ovobate subequal, 1 lateral much smaller, deciduous; styles 3, nearly distinct, divided half-way up into two curved branches. *Capsule* ½ by 1 in. including the wings, styles persistent, upper margin of longer wing straight or convex upwards, capsule dehiscing on all three faces. *Seeds* short-ellipsoid.
VAR. CRETACEA; LEAVES STOUTER SHAGGY ON THE NERVES BENEATH, PEDUNCLES FIRMER, FEMALE PERNIANT OF 4 SEGMENTS (ALMOST EXACTLY LIKE THE MALE).—BHOTAN; GRIFFITH. (Kew Distrib. No. 2583.) LIMESTONE ROCKS NEAR CHERRA IN KHASIA, ALT. 4000 FT.; C. B. CLARKE.

22. **B. SUBPERFOLIATA**, Parish ms.; Kurz in Journ. As. Soc. 1877, pt. ii. 100; stemless, glabrous, leaves ovate crenate–dentate subpeltate prominently reticulated on both surfaces, bracts laciniate acutely.

MOULMEIN, ON LIMESTONE ROCKS; PARISH.

ROOT TUBEROUS. LEAF SOLITARY, RADICAL, 3½ BY 2 IN., ACUTE NOT ACUMINATE, HARDLY SERRATE, EQUAL AT THE BASE, PELTATE OR THE AURICLES ONLY OVERLAPPING; PETIOLE 2–4 IN. PEDUNCLE 3 IN. WITH ABOUT 10 SMALL FLOWERS; BRAC'TS ½ IN., PERSISTENT, DIVIDED TO NEAR THE BASE OR SHARPLY SERRATE. MALE: SEPALS 2, ELLIPTIC; PETALS 2, NARROW–OBLONG; STAMENS ABOUT 25, MUCH MONADELPHOUS, ANTHERS OBOVATE, CONNECTIVE NOT PRODUCED. FEMALE: PERNIANT VERY NEARLY AS IN THE MALE; STYLES 3, COMBINED HALF-WAY UP, STIGMAS LUNATE, **CAPSULE** 3-CELLED, ½ BY ½ IN. INCLUDING THE WINGS, STYLES Persistent, WINGS 2 SHORT 1 LONGER, UPPER MARGIN OF EACH HORIZONTAL, DEHISCING BY ALL THREE FACES. **SEEDS** SHORT-ELLIPS OID,

23. **B. MOULMEINENSIS**, C. B. Clarke; stemless, very pubescent throughout, leaves ovate serratte, bracts incise-serrate or laciniate.

MOULMEIN; T. Lobb No. 380.

Closely resembling **B. subperfoliata**. The specimens which are in bud differ in pubescence and in the leaf being slightly cordate (not at all peltate), serratte, almost lobed, and not prominently reticulate on either surface.

24. **B. FALLAX**, A. DC. Prodr. xv. pt. i. 329; glabrous or nearly so, leaves elliptic acuminate angular toothed very unequal at the base, capsule equally 3-winged wings narrow their upper margins shortly horizontal. Diplocodium Lindleyanum, Wight Ic. t. 1817.

SOUTH DECCAN PENINSULA; COURTALLUM AND MALABAR; WIGHT.

The branch figured by Wight is 8 IN. LONG WITH A PEDUNCLE FROM A LOWER AXIL AND A. DC. CONJECTURES THE PLANT MAY BE SUFFRESCENT. LEAVES 4 BY 2 IN.; PETIOLE 1 IN.; STIPULES OBLONG, DECIDUOUS. PEDUNCLE MANY TIMES DICHOTOMOUS, MANY-FLOWERED, SHORTER THAN THE LEAF; BRAC'TS NUMEROUS, MINUTE; FLOWERS MEDIUM-SIZED. **MALE**: SEPALS 2, ROUNDED; PETALS 2, NARROW–ELLIPTIC; STAMENS NUMEROUS, SHORTLY MONADELPHOUS, ANTHERS OBOVATE, CONNECTIVE NOT PRODUCED. **FEMALE**: PERNIANT-SEGMENTS 3, 2 LARGE ROUND, 1 SMALL NARROW LATERAL; STYLES 3, NEARLY SEPARATE, DIVIDED HALF-WAY UP IN TWO CURVED BRANCHES. **CAPSULE** ½–½ IN. LONG AND BROAD INCLUDING THE WINGS. **SEEDS** SHORTLY-ELLIPS OID, SOMEWHAT OBOVATE.—NOT SEEN: THE ABOVE IS DRAWN UP FROM WIGHT'S FIGURE: THE PLANT IS OF THE SECTION **TRILOBARIA** IF ALL WIGHT'S DETAILS ARE WITHOUT ERROR.

SECT. IV. **PLATYCENTRUM**. **CAPSULE** 2-CELLED COMPRESSED, TRIQUETROUS, HAVING ONE BROAD AND TWO NARROW PAPERY WINGS; DEHISCING BY THE FALLING AWAY OF THE FACES BETWEEN THE WINGS; PLACENTAS 2-FID.

A. Female perianth-segments 4–3.—Genus **MEZIEREA**, A. DC.


Rootstock thick, woolly, not tuberous. STEM 2–3 FT., RARELY BRANCHED. LEAVES 9–12 BY 3 IN, CAUDATE-ACUMINATE (SOMETIMES LARGER AND OVATE), UNDULATE, TOOTHED,
pubescent on the nerves beneath otherwise glabrous, base very unequal deeply auricled on one side; petiole ¼-¾ in.; stipules narrow-lanceolate, glabrous, deciduous. **Peduncles** short, dichotomous, with many rather small white or pale pink flowers; bracts ovate, acute, deciduous. **Male**: sepals 2, ovate, subacute, glabrous; petals 0; stamens about 40, shortly monadelphous, anthers obovoid, connective not produced. **Female**: perianth-segments 3, 2 outer ovate subacute resembling but smaller than the male sepals, inner small lateral; ovary (at the time of expanding of the flower) completely 2-celled with 2-fld placents (exactly as in *Platycentrum*); styles 2–3 (sometimes 4, A. DC.) nearly free, or one free the other two combined, sometimes simply branched upwards, often 3–4-fld and more or less contorted. **Capsule** ½ by 1 in. including the wing, styles persistent, oblong, concave upon its narrow face (between the two very narrow wings), broad wing extending the whole length of the capsule, its upper margin horizontal convex, narrow face first falling away. **Seeds** ellipsoid.—This is the largest Indian *Begonia*: the description and remarks of Alph. DC. must have been founded upon very imperfect materials.


Leaves 6 by 1 in., narrow-lanceolate, cordate, toothed, membranous, with scattered pubescence above, very pubescent or almost glabrous on the nerves beneath, base very unequal deeply auricled on one side; petiole ¼-½ in.; stipules ½ in., very persistent, lanceolate, subulate, glabrous. **Inflorescence** often from the middle and lower axils in short dichotomous peduncles, usually pubescent; bracts oblong-lanceolate, glabrous, persistent; flowers somewhat numerous, rather small. **Male**: sepals 2, ovate; petals 0; stamens about 40, shortly monadelphous, anthers obovoid, connective not produced. **Female**: perianth-segments 4, 2 outer ovate, 2 inner narrow-oblong; styles 3 or 2, nearly free at the base, divided into long curved branches. **Capsule** as in *B. gigantea* but the upper margin of the larger wing is concave and somewhat descending. **Seeds** short-ellipsoid.—In *Griffith's* Bhotan examples, the stems upwards peduncles and leaves on both surfaces are very pubescent, and the petioles are ½-¾ in.; Clarke's examples (from Bishop's Falls, Shillong) are very nearly glabrous with the petioles 1½ in. The Khasia examples of H. f. & T. are intermediate.

B. Female perianth-segments 4–6.—Sect. *Platycentrum*, A. DC.

* Connective produced above the anther-cells.


**East Sikkim**, alt. 4000–5000 ft.; J. D. H. Dumsong, Bhotan, alt. 6000 ft.; C. B. Clarke.

**Rhizome** thick. Stem (in the wild examples) 0. Leaves 6–8 in., acute, unequally cordate at the base, pubescent on the nerves beneath, otherwise nearly glabrous; petiole 3–4 in.; stipules ovate, acute, glabrous or pubescent. **Scape** 1 ft. with spreading hairs below, nearly glabrous upwards; bracts at its first division ¾ in., oblong-lanceolate, glabrous; flowers medium large, full yellow (in the wild examples). **Male**: sepals 2, round; petals 2, elliptic; stamens about 100, shortly monadelphous; connective produced, triangular. **Female**: perianth-segments 5, outer round, inner gradually smaller; styles 2, shortly combined below, each dividing half-way up into two tortuous branches; ovary (in the wild specimens) glabrous. **Capsule** with the unequal wing very much elongated, descending, its upper margin concave.—In some cultivated specimens, the stem is elongated and leafy.

**Sikkim**, Bhutan and Khasia Mts., alt. 3000-6000 ft., frequent.

**Rootstock** thick. Plant 8–16 in., stem puberulous or minutely pubescent. *Leaves* 3–6 in., usually narrow, sometimes elliptic, shortly pubescent on the nerves beneath otherwise glabrous, base unequal rounded scarcely cordate; petiole 1–2 in.; stipules persistent, lanceolate, cadate, glabrous. *Peduncles* axillary, 3–6 in., usually divided only near the top and few-flowered; bracts like the stipules and persistent; flowers medium-sized. **Male**: sepals 2, rounded; petals 2, narrower, white; stamens numerous, very shortly monadelphous; connective produced, obtuse. **Female**: perianth-segments 5, 3 inner gradually smaller, white; ovary glabrous; styles 2, combined at the base, very tortuous. *Capsule* 1/4–1/3 by 1–1 1/2 in. including the wings, often recurved in fruit, the broad wing much descending its upper edge concave; broader faces first falling away. *Seeds* ellipsoid.

**Var. Meissneri**, Wall. Cat. 6294; shortly caulescent, leaves linear-lanceolate very tomentose on the nerves beneath.—Khasia Mts., Wallich; alt. 3500 ft., C. B. Clarke.

—*Leaves* 2–4 by 1/4 in.; petiole 1–1 1/2 in., pubescent, tomentose. *Flowers* and *capsules* like those of *B. rubro-venia* but smaller. Wallich’s type examples look like a distinct species, but the examples of C. B. Clarke connect the two.


**Nipal** to **Burma**; ascending in **Sikkim** to 7000 ft. Very common in Khasia and Chittagong.—**Distrib.** South China.

**Rootstock** long, creeping, neither woody nor tuberous. *Stem* 6–24 in., more or less brown-tomentose. *Leaves* 4–6 in. diam., always more or less lobed, lobes usually many, cadate- acuminate, often 2 in. long, ciliate, usually but slightly serrate, rounded or cordate more or less unequally at the base, pilose above, pubescent on the nerves beneath more or less villous or tomentose; petiole 1/4–4 in.; stipules 1/4 in., persistent, lanceolate, mucronate, pubescent. *Peduncles* 3–6 in., usually from one or two uppermost axils, tomentose; bracts large, oblong, tomentose; flowers medium, not very many, always more or less glandular-pubescent on the back, from nearly white to deep rose. **Male**: sepals 2, long-elliptic; petals 2, narrowly obovate; filaments nearly free, about 50, anthers obvoid; connective little produced, obtuse. **Female**: perianth-segments 5–4, inner gradually smaller; ovary with pubescent, not mere glandular, roughness; styles 2, divided from near the base into 2 much contorted branches. *Capsule* 1/4 by 1 in. including the wings, often recurved in fruit, with a descending wing; dehiscing by 4 lines adjacent to, and one on each side of, the two narrow wings. *Seeds* ellipsoid, somewhat obvoid.

**Var. ? flava**; flowers full, yellow, leaves green finely serrate, ovary and sepals pubescent or nearly glabrous.—Sikkim, alt. 5000 ft.; J. D. H., Treutler; Darjeeling, 7000 ft. alt.; C. B. Clarke; Herb. Griffith (Kew Distrib. No. 2577).—Perhaps a species: the plant has not the brown-red tint of *B. laciniata*, the leaves are thinner and less softly hairy. Alph. DC. doubts the correctness of the colour of the flowers; it is a full deep yellow as noted on the specimens of J. D. H. and C. B. Clarke, and as shown in the excellent figure of Cathcart preserved at Kew.

**Var. tuberculosa**; ovary with glandular tubercles not pubescent, flowers pale pink glabrous.—Sikkim, alt. 6000 ft.; J. D. H., Treutler.

From Sylhet and Cachar to Burma, alt. 0–2000 ft. Chittagong, abundant in the hills.

Rootstock creeping, not thick, nor tuberous. Stem decumbent, usually short, with much spreading brown hair. Leaves 2–5 in., unequal cordate at the base, hispid on both surfaces, margin very entire; petiole 1–4 in., with spreading hairs; stipules persistent, lanceolate-subulate, ciliate. Peduncles from the upper axils, not more than 3 in., pubescent to the summit except in ripe fruit, few-flowered; flowers medium, white to pink. Male: sepals 2, ovate, pubescent; petals 2, narrowly obovate; stamens 50 or more, scarcely monadelphous, anthers obovoid; connective much produced, ovate-oblong. Female: perianth-segments 5, outer pubescent, inner gradually smaller; ovary shaggy. Capsule ½ by 1 in. including the wings, hairy at least until the seeds are scattered, recurved in fruit with a descending wing, dehiscing by four lines one on either side of the two narrow wings. Seeds ellipsoid, brown.


Rootstock thick, woody. Stem erect, 12–18 in. when well developed. Leaves 4–6 in., unequal at the base, nerves beneath and petiole unusually glabrous; petiole 1–4 in.; stipules lanceolate-subulate, glabrous, persistent. Peduncles elongate, from the upper axils, often 8 in.; bracts large, oblong, glabrous, caducous; flowers large, not very many, pink. Male: sepals 2, ovate; petals 2, ovate, little smaller; stamens 50 or more, monadelphous, anthers obovoid; connective produced, obtuse. Female: perianth-segments 5, nearly equal; styles 2, long, combined at the base, with long tortuous branches. Capsule and seeds as in *B. rubro-venia*.

32. **B. sikkimensis**, *A. DC. Prodr.* xv. pt. i. 349; caulescent, glabrous or nearly so, leaves round lobed often nearly to the base lobes often again incised or lobed.

Sikkim, alt. 3000–7000 ft.; *J. D. H.*; *C. B. Clarke*.

Rootstock thickened, woody. Stem erect, 12–18 in. when well developed. Leaves 4–6 in. diam., not very unequal nor very cordate at the base, denticulate-ciliate; petiole 1–4 in., glabrous; stipules nearly 1 in., lanceolate-linear. Peduncles from the upper axils, elongate, often 6–9 in.; bracts elliptic, deciduous, bright-red, as are the pedicels and flowers; flowers medium, not very many. Male: sepals 2, ovate; petals 2, elliptic, smaller; stamens 50 or more, monadelphous; anthers obovoid; connective produced, triangular, obtuse. Female: perianth-segments 5, inner bright-red gradually smaller; styles 2, combined at the base, branches very tortuous. Capsule and seeds as in *B. rubro-venia*.


Sikkim, alt. 3000–8000 ft.; *J. D. H.*; *C. B. Clarke*. BIRMA; Griffith (Kew Distrib. No. 2582); *Kurz*. Moulmein; Parish, Thos. Lobb.

Near *B. barbata* and best distinguished by the hairs on its stems petioles and peduncles, which are numerous but scattered, long from a lanceolate paleaceous base.
and deflexed, by the leaves much less hairy beneath, often quite glabrous; stipules nearly or quite glabrous. *Flowers* fruit and seeds as in *B. barbata*.

34. **B. Thomsonii**, *A. DC. Prodr.* xv. pt. i. 349; caulescent, leaves ovate acuminate hispid beneath denticulate-ciliate not lobed, petioles densely shaggy, bracts cyme and ovary shaggy.

**Khasia** Mts., alt. 3000–4000 ft.; *Griffith* (Kew Distrib. No. 2570); *Hk. f.* & *T.*; C. B. Clarke.

This only differs from *B. barbata* by being everywhere more hairy, the petioles are densely shaggy as is the stem.—One example referred here of *Griffith’s* has the stem and petioles covered with a close brown tomentum without any spreading hairs, and appears much more different from *B. Thomsonii* than is *B. Thomsonii* from *B. barbata*.


**Bhotan**; *Griffith* No. 2505 (Kew Distrib. No. 2571).

Appears to be a variety of *B. barbata* or *B. Thomsonii* with an abbreviated stem. The *capsules* are not ripe but are very like unripe capsules of *B. barbata*. The leaves are much less ciliate barbate on the margin than in *B. barbata*. But for the great authority of Alph. *DC.*, the three *B. barbata*, *B. Thomsonii* and *B. Griffithii* might be united.


**Assam** and **Mishmee**; *Griffith* (Kew Distrib. No. 2588, 2589, 2591, 2592); *Masters*.

**Leaves** 4–6 in., unequal at the base, undulate, ciliate-denticulate, with a few scattered hairs above; petiole 1–4 in. with spreading hairs. *Scapes* 4–9 in., glabrous except a few hairs near the base; flowers medium, rose, not very many. **Male**: sepals 2, ovate; petals 2, elliptic; stamens numerous, monadelphous, anthers oblong; connective produced, acutely triangular. **Female**: perianth-segments 5, inner gradually smaller; styles 2, combined below, branches very tortuous. *Capsule* ½–4 by 1–1½ in., including the wings: much as that of *B. rubro-venia*.—The whole plant is much less hairy than *B. barbata* and the allied species: the capsule is glabrous and its body is less than half the diameter of the pubescent capsules of *B. Griffithii*.

37. **B. brevicaulis**, *A. DC. Prodr.* xv. pt. i. 350; stemless, leaves cordate broad-ovate obtuse or scarcely acute, petioles scape flowers and ovary glabrous or very nearly so.

**Khasia**; Terai, alt. 1000 ft.; *Hk. f.* & *T.*.

Flowers and fruit much smaller than in any of the preceding species of this section. *Rootstock* tuberous. **Leaves** 1–3½ in., nearly orbicular, not very unequal at the base, crenate-denticulate, hardly ciliate, glabrous or with a few scattered hairs above, rarely with minute pubescence on the nerves beneath; petiole 1–3 in., succulent; stipules oblong, acute, glabrous. *Scapes* 3–6 in., sometimes with a small leaf above the base, weak, succulent, with few small flowers; bracts ovate, acute, very small. **Male**: sepals 2, round; petals 2, narrower; stamens about 25, shortly monadelphous, anthers oblong; connective much produced, obtuse. **Female**: not seen. *Capsule* ½ by ½ in., recurved, styles deciduous; two smaller wings very narrow, broader wing descending its upper margin concave very thin; dehiscing by 4 lines one on either side of each of the two narrower wings. *Seeds* short-ellipsoid.—This species resembles in habit many of the sections *Parabegonia* and *Knesebeckia*, and is very unlike any *Platycentrum* with a produced connective.
**Connective not produced above the anther-cells.**


Western Ghauts from Bombay to Mysore; Law, Dalzell, &c. Mouleins; Parish.

Rootstock tuberous. Stem 6-12 in., succulent. Leaves 3-6 in., hardly acute, pilose above, laxly pubescent on the nerves beneath, finely ciliate; petiole 1-5 in.; stipules lanceolate, upper ones glabrous lower with lax hairs. Peduncle as though terminal; flowers white, medium-sized, not very many; bracts broad, ovate, lower with some lax hairs, upper glabrous. Male: sepals 2, round; petals 2, narrow-oblong; stamens about 60, monadelphous, anthers obovoid. Female: perianth-segments 5, inner gradually smaller; styles 2, combined below, branched and much twisted upwards. Capsule ½ by ¾ in. including the wings, recurved, smaller wings very narrow, broad wing descending, dehiscing primarily by the narrow face. Seeds short-ellipsoid.—Alph. DC. gives Ceylon as a locality, quoting Thwaites No. 2597, which is Thwaites's B. subpellata.


Pinang; Wallich. Malaya; Maingay No. 675 partly.

Differs from B. integrifolia only in having the leaves nearly without cilia: the flowers appear somewhat smaller, but the two species are probably one. Wallich's specimen is very large with a thick woody rootstock, the petioles 10 in.

40. B. procridifolia, Wall. Cat. 6292; nearly glabrous, stem erect simple, leaves subsessile oblong acuminate entire or denticulate. A. DC. Prodr. xv. pt. i. 352; Kurz in Journ. As. Soc. 1877, pt. ii. 108.

Martaban; near Tavoy, Wallich.

Rootstock fibrous. Stem 6-9 in., weak. Leaves 3-5 by ⅓-1½ in., very unequal at the base, glabrous beneath, sometimes with a few scattered hairs above; petiole ⅔-1½ in.; stipules ⅓ in., oblong, acuminate. Peduncles from the upper axils, hardly so long as the leaves; bracts ovate, deciduous. Male: sepals 2, ⅓ in., round, rose-coloured; petals 2, smaller, narrow-obovate; stamens many, monadelphous, anthers obovoid, connective not produced. Female: not known. Capsule more than ½ by ¾ in. exclusive of the wings, recurved; styles deciduous; the two narrow wings ovate the broad wing much descending.—This may, in the absence of female flowers, belong to the section Mezierea, but the ovate narrow wings of the capsule suggest the present section where it has been placed by Alph. DC.

41. B. goniotis, C. B. Clarke; nearly glabrous, stem elongate branching, leaves narrow-oblong caudate excessively unequal at base.

Burma, alt 3700-4000 ft.; Griffith (Kew Distrib. No. 2579).

Stem 2 ft. Leaves 5-6 by ¾-1 in., nearly entire or serrate near the apex, one auricle excessively produced backwards often in an angular or quadriform form; petiole ¼-1½ in.; stipules persistent, ovate, acute, mucronate not acuminate, cordate. Peduncles axillary, few-flowered, glabrous; bracts deciduous. Flowers not seen. Capsule ½ by 1½ in. including the wings, glabrous, recurved; styles deciduous; the two narrower wings more than ½ in. broad towards the top of the capsule, the larger descending, dehiscing by 4 lines, one on either side of the narrower wings. Seeds short-ellipsoid.—The breadth of the narrower wings of the capsule renders it unlikely that this is a Mezierea; but the habit is that of B. episcopatis, No. 26.
42. **B. sandalifolia**, C. B. Clarke; nearly glabrous, stem elongate, leaves oblong acute very unequal at the cordate base.

**Burma**; **Griffith** (Kew Distrib. No. 2585).

*Rootstock* not much thickened, nor tuberous. *Stem* 15 in., glabrous except the extremities of the branches. *Leaves* 5–6 by 1½–2 in., nearly entire or serrate, pubescent on the nerves beneath, otherwise glabrous; petiole 1½–1 in., pubescent; stipules oblong, acute, persistent, glabrous. *Peduncles* near the end of the branches, few-flowered, not elongated; bracts large, elliptic, glabrous; pedicels slightly pubescent. **Male**: sepals 2, round, nearly ¾ in. diam., with some pubescence; petals 2, oblong; stamens 50 or more; anthers obvoid, emarginate. **Female**: not seen. *Capsule* ⅔ by 1 in. including the wings, glabrous, recurved; styles deciduous; the two narrower wings ⅓ in. broad and nearly an equal breadth for the whole length of the capsule, the broad wing descending, dehiscing by 4 lines on either side of the two narrower wings.

**Sect. V. Papyraceae.** *Capsule* 2-celled (3-celled in *B. delicatula*), papyraceous dehiscing by the very thin faces breaking up irregularly, placentas 2-hid.—Small plants with small flowers.

A. **Ovary** 2-celled. *Capsule* winged, the wings not much produced above or below the cells. Sects. *Parvibegonia*, *Lauchea* and *Monophyllum*, Alph. DC.


**Moulmein**; **Lobb No. 382**; Parish.

Glabrous, or the leaves slightly pilose above. *Rootstock* small, tuberous. *Stem* erect, 2–6 in., whole plant sometimes 1 ft. *Leaves* 1–2 in., 3–8 in a whorl at the summit of the stem, or alternate, oblong-lanceolate, rounded and nearly equal at the base, coarsely crenate-serrate; petiole 1½–1¾ in.; stipules minute, lanceolate. *Peduncles* 1–4 axillary, slender, with numerous small white flowers; bracts persistent. **Male**: sepals 2, round; petals 2, linear-oblong; stamens about 8, long-monadelphous, anthers oblong, connective not produced. **Female**: perianth-segments usually 4, inner 2 considerably smaller; styles 2, combined at the base, clavate upwards, branches two short simple curved. *Capsule* less than ⅔ by 1½–2 in. including the wings, the two smaller wings exceedingly narrow-linear the larger triangular, its upper margin slightly descending. **Seeds** shortly-ellipsoid, minutely papillose on the margins of the reticulations of its surface.


**Moulmein**; **Lobb No. 381**; on limestone rocks, Parish. ? **Pinang**, *Finlayson*.

*Rootstock* a tuber. *Stem* 3–4 in. *Leaf* 3–8 in. diam., round-ovate, acute, nearly equally deeply cordate. *Peduncles* 2–10 in., repeatedly dichotomous; bracts hardly ½ in., ovate. **Male**: sepals 2, broad-elliptic, rose-coloured, sometimes slightly hairy; petals 2, oblong; stamens about 12, much monadelphous, anthers oblong, connective not produced. **Female**: perianth of 5 much imbricated segments; styles 2, branches two incurved. *Capsule* ⅔ by 1½ in. including the wings, recurved; styles deciduous; two smaller wings very narrow above, enlarged and produced below, the upper margin of the larger nearly horizontal from the top of the capsule. **Seeds** globose.—*A. DC.* describes this plant as stemless, on theoretic grounds, considering that the apparent stem is formed by a complete adhesion of the petiole to the scape, and supporting this view by the statement that there are no stipules at the point whence the peduncles spring. If there were none at that point it would not establish the
above view, but there are two small ovate acute bracts placed at that point.—B. Finlaysoniana possibly belongs here: but the example is very imperfect and the leaves are 2-3, some of them peltioed.

45. B. paleacea, Kurz in Flora 1871, 297; caulescent leaf 1 obliquely cordate-ovate or orbicular, peltioed and inflorescence with short palesaceous hairs, capsule winged below.

Martaban; Attaran Valley; Brandis.

An erect low herb, simple or nearly so, succulent; rootstock tuborous. Leaf 3-6 in., sometimes proliferous, obtuse or obtusely acuminate, entire or deeply crenate, often finely ciliate, membranous, glabrous or sometimes papillose and hairy on the nerves beneath; petiole ½-1 in. or 0; stipules lanceolate, acuminate, pilose. Cymes long-peduncled, slender, few-flowered, springing from the base of the ribs of the leaves; pedicels capillary, glandular-pubescent; flowers small, white; bracts of the male flowers ½ in., broad-ovate, obtuse, glabrous, deciduous, the female smaller, lanceolate, acuminate, pilose, more persistent. Male: sepals ½ in., broadly round, slightly hairy without; petals a little smaller; stamens many, monadelphous, anthers obovoid, emarginate. Female: styles 2, connate, shortly 2-lobed. Capsule nearly ½ in., glabrous or slightly hairy, oblong, 2-celled, 3-winged; wings ½ in. broad, truncate at the apex, or the medial wing twice as broad; placenta 2-fid.—The above copied from Kurz, who has placed the species between B. prolifera and B. sinuata; the very imperfect specimen communicated seems B. integrifolia, No. 38.


Pinang; Wallich, &c. Tenasserim, Parish, &c. Malaya; Maingay No. 674.

Rootstock small with small tubers. Whole plant 10 in. but more often quite small, covered (except the upper part of the cymes) with much minute stellate pubescence. Stem 1-6 in. Leaves 1-5 in. diam., nearly equal at the base, denticulate-sinate; petiole ½-3 in. or 0; stipules less than ½ in., lanceolate, acuminate, stellately pubescent. Cymes weak; lower bracts lanceolate, stellately hairy; upper often quite glabrous, sometimes lobed; flowers not very numerous, small, pink, glabrous. Male: sepals 2, roundish; petals 2, narrower, obovate; stamens about 20, much monadelphous, anthers obovoid, connective not produced. Female: perianth-segments 5, inner gradually smaller; styles 2, combined half-way up, stigmas lunate. Capsule ½ by ½ in. including the wings; wings from the lower part of the capsule, two smaller triangular acute. Seeds short-ellipsoid, somewhat obovoid.

47. B. andamensis, Parish ms.; caulescent, nearly glabrous, leaves cordate-ornicular shortly peltioed or the upper sessile; capsule winged below.

Andamans and Moulmein; Parish.

Rootstock tuborous. Stem erect, whole plant 6-10 in. Leaves 1-4 in. diam., entire or minutely closely denticulate, equal at the base, with few lax hairs on the nerves beneath, sometimes minutely pilose above; petiole of the radical leaves elongate, of the caudine usually 0-½ in.; stipules small, ovate, acute, glabrous. Peduncles very glabrous upwards; bracts very small, ovate, acute; flowers not very many, rose-coloured, rather larger than in the allied species. Flowers capsule and seeds almost identical with those of B. sinuata but the styles are less combined.—The capsule is quite membranous but shows a tendency to dehisce along either side of the narrow wings, exactly as in Platycentrum: and the present species (with B. sinuata) seems closely allied to the small species of that section. This species is reduced to B. sinuata by Kurz, but it does not exhibit the stellate hairs on the upper surface of the leaf and the flowers are much larger.

Moullin; Lobb No. 393; Helfer (Kew Distrib. No. 2575).
This differs from B. sinuata by the absence of the stellate pubescence: and from B. andamanensis in the leaves being longer-petioled, none sessile, more acute with a serrate ciliate margin; and in the generally greater pubescence; the stipules being pubescent and the lower bracts often ciliate or fimbriate.

49. B. Parishii, C. B. Clarke; cauline leaves 1–3 all sessile cordate orbicular with lax scattered pubescence above and on the nerves beneath, capsule winged above.

Moullin; on limestone rocks; Parish.
Tuber rather large. Erect, nearly 1 ft., stem and lower part of the peduncle with some lax pubescence. Leaves 1½–3½ in. diam., subequal at the base, crenate-serrate; petiole of the cauleine 0, of the radical 2–8 in.; stipules of the cauleine ½ in., ovate, acute, ciliate. Pedicels and flowers glabrous; lower bracts ½ in., ciliate or fimbriate, ovate, acute. Flowers few, medium, rose-coloured. Male: sepals 2, ½ in., round; petals 2, obovate, narrower, rather shorter; stamens about 40, long-monadelphous, anthers elongate-obovoid, connective not at all produced. Female: perianth of 4 (perhaps of 5) segments; styles 2, long combined, stigmas curved complex. Capsule (only half ripe) more than ½ in.—The ripe capsule not being seen, this species may be a Platycentrum, as the size of the flowers indicates, but the styles are combined nearly to the base of the stigmas.

50. B. flaccidissima, Kurz in Journ. As. Soc. 1872, pt. ii. 308; caulescent, minutely sparsely pubescent, leaves petioled cordate orbicular obtuse, petals in the male 0.

Tenasserim; Kurz.
A tender very flaccid herb, 4–5 in. high. Leaves 2 in. diam., deeply crenate-dentate, almost lobed; petiole 2–3 in.; stipules hyaline, obtuse, about ½ in. Cymes dichotomous, minutely sparsely pubescent; bracts linear, minute; flowers small, white, on capillary pedicels. Male: sepals 2, ½ in., rotund-ovate; petals 0; stamens many, very monadelphous, anthers subovoid. Female: perianth-segments 4; styles 2, free from the base, each dilated into a concave semilunate stigma; ovary sparsely and crisply pilose, 2-celled. Capsule unknown.—Plant not seen. The above copied from Mr. Kurz. The general description is like that of B. delicatula, No. 54.

B. Ovary 2-celled. Capsule winged, wings irregular and much produced below the cells. Perianth accrescent on the fruit. Sect. Dysmorphism, A. DC.

51. B. crenata, Dryand. in Trans. Linn. Soc. i. 162, t. 14, fig. 3; pedicels and young ovary often with minute scattered glandular pubescence, sepals of the male 1½–2 in. A. DC. Prodr. xv. pt. i. 356; Dalz. & Gibs. Bomb. Fl. 104. B. minima, Bedd. In. Pl. t. 110.

Malabar coast, alt. 0–3000 ft., from Bombay to Wynad. ?Tenasserim, Helfer, No. 2584.
Nearly glabrous. Rootstock slender, tuberous. Stem slender, 4–10 in., 1–4-leaved. Leaves 1½–2 in. (sometimes much smaller), ovate, slightly cordate at the base, crenate or serrate, glabrous or with slight pubescence on the nerves beneath; petiole 2–2 in.; stipules small, ovate, acute, glabrous. Peduncles weak; bracts less than ½ in., ovate, acute, glabrous; flowers not numerous, white or pinkish. Male: sepals 2, elliptic; petals 2, narrower; stamens 8–16, very monadelphous, anthers oblong, connective not produced. Female: perianth-segments 5, outer elliptic, inner oblong, soon becoming larger than the male flower; styles 2, combined at base,
stigmas lunate. Capsule scarcely ½ by ½ in., membranous, crowned by the accrescent perianth. Seeds short-ellipsoid.—Col. Beddome's B. minima is reduced by inspection of his figure merely. Halfar's No. 2584 is in fruit and is either this or some very closely allied species.


*Mangalore*, in Canara; *Hohenacker.*

Closely resembling the preceding species: but the leaves flower and fruit are rather smaller. The styles in *B. canarana* are combined higher up (ex *A. DC*).

C. Ovary 3-celled. Capsule membranous, globose, wingless.

53. **B. deliciatula**, *Parish* ms; styles long combined.

*Motjlmein*; *Parish*.

Rootstock small, fibrous. Stem 5–12 in., slightly dividing, with several leaves and peduncles from all the axils, glabrous, weak. Leaves 2–3 in. diam., broad-ornicular, cordate, subequal at the base, doubly serrate, very delicate, with weak scattered pubescence above and on the nerves beneath; petiole of the calyce leaves long, attaining 3–4 in.; stipules less than ½ in., lanceolate, glabrous. Peduncles repeatedly dichotomous, with very many flowers; bracts numerous, small, hyaline, subpersistent, oblong, ciliate or fimbriate, pedicels and young ovary with minute sparse lax pubescence. Male: sepals 2, ¼ in., round; petals 0; stamens 20, much monadelphous, anthers narrow-obovoid, connective not produced. Female: perianth of 4 segments, inner two obovate, not very narrow; styles 3, stigmas lunate. Capsule ⅛ in. diam., almost exactly globose, very membranous, breaking up irregularly, wingless. Seeds shortly ellipsoid.

**Secr. VI. Uniplacentales.** Placenta undivided. Capsule 3-celled with 3 thin not very unequal wings, dehiscing by lines within the margins of its three faces.

* Stemless, or stemmed having the peduncles long and from the upper axils only.

54. **B. fibrosa**, *C. B. Clarke*; cauline leaves 2 orbicular sessile with many peduncles from the axils of each.

*Motjlmein*; on limestone rocks; *Parish*.

Rootstock fibrous, no root-leaves in the dried examples; plant 6–10 in., glabrous or nearly so. Leaves orbicular, larger 6–8 in. diam., nearly entire. Peduncles rather stout, as many as 7 from one axil, minutely sparsely puberulo-pubescent; bracts foliaceous; lower ⅛ in., elliptic, glabrous, often petioled; upper smaller. Male: sepals 2, ⅛ in., ovate; petals 2, oblong, smaller; stamens about 10, nearly free, anthers short-obovoid, connective not produced. Female: perianth of 3 segments; styles 3, combined less than half their length, each dividing into two curved branches. Capsule ⅛ by ⅛ in. including the wings, upper margin of the broader wing horizontal or somewhat descending. Seeds small, ellipsoid.


*Ceylon*, *Walker*. Pas-dom Corle; *Thwaites*.

Rootstock somewhat thick, tuberous. Leaves 2–4 in. diam., obtuse or subacute,
subsequaly cordate at the base, minutely denticulate not serrate, with scattered weak pubescence on both surfaces, the young leaves very shaggy; petiole 2–5 in.; stipules nearly \( \frac{1}{4} \) in., ovate, acute, glabrous. Peduncles 3–6 in., not exceeding the leaves, with a few flowers towards their summits; bracts ovate, acute, ciliate, pubescent or the lower ones glabrous. Male: sepals 2, 1–2 in., round, pubescent on the back; petals 2, obovate; stamens about 40, anthers obvoid, connective not produced. Female: perianth of 5 segments, inner narrower; styles 3, nearly free, 2-lobed near their summit. Capsule \( \frac{3}{4} \) by \( \frac{1}{4} \) in. including the wings, wings not very unequal, their upper margins straight from the top of the capsule slightly descending. Seeds short-ellipsoid.—The example of Walker marked B. tenera, Dryand. in the writing of M. Alph. DC. is identical with Thwaites' No. 2808.

56. B. subpeltata, Wight. In. t. 1812; stemless, leaves ovate, petioles pubescent, pedicels and young ovary glabrous. A. DC. Prodr. xv. pt. i. 386.

South Deccan Peninsula; probably Malabar or Travancore, Wight. Ceylon, Trichocarpus, Thwaites.

This differs from B. tenera, Dryand. in the glabrous pedicels and ovaries, in the larger flowers, in the somewhat angular leaves which are slightly more serrate. (See Thwaites Enum. p. 128.) It is hardly distinct from B. tenera.


Concan, tropical region, Stocks. Bombay, above the Ghat, Law.

Rootstock a tuber. Stem elongated, whole plant sometime 1 ft. Leaves 3–5 in., acute not acuminate, cordate, subequal at the base, young leaves with a little lax pubescence beneath, the older leaves with a few scattered hairs or quite glabrous; petiole of the cauline leaves 1–2½ in., of the radical often very long; stipules \( \frac{1}{4} \) in., ovate, acute. Peduncles elongate, dichotomous; bracts lanceolate; flowers rose-coloured, not very many. Male: sepals 2, nearly \( \frac{1}{4} \) in., elliptic; petals 2, smaller, narrower; stamens about 40, nearly free, anthers obvoid, connective not produced. Female: perianth of 5 segments, 3 inner much narrower; styles 3, nearly free, bifid near the apex. Capsule \( \frac{3}{4} \) by \( \frac{1}{4} \) in. including the wings, wings from the upper part of the capsule, their upper margins slightly descending. Seeds ellipsoid.—This slightly differs from subpeltata by having a distinct (often elongate) stem and the petioles without patent hairs. As to the placentas which are taken as bipartite by Alph. DC., but are at least sometimes undivided, it is curious that the example of B. concanensis at Kew authenticated in A. DC.'s handwriting is typical B. trichocarpus.


Malabar Ghats; Canan, Canara, Mysore, Malabar, frequently collected.

Rootstock large, tuberous. Stem elongate, often exceeding 1 ft., glabrous or nearly so. Leaves 3–5 in., acute scarcely acuminate, cordate, subequal at the base, with scattered pubescence on both surfaces; petiole of the cauline leaves often 3–4 in., little pubescent; stipules \( \frac{1}{4} \) in., ovate, lanceolate. Peduncles scarcely elongate, repeatedly dichotomous; bracts \( \frac{5}{6} \) in., lanceolate, ciliate, pubescent; pedicels and ovary with lax long hairs; flowers white. Male: sepals 2, elliptic, sometimes exceeding \( \frac{3}{4} \) in., more or less pubescent without, usually entire, sometimes fimbriate or ciliate; petals 2, narrower, shorter; stamens 40 or more, nearly free, anthers oblong-obovoid, connective not produced. Female: perianth of 5 segments, inner narrower; styles 3, nearly free, each divided into two branches. Capsule \( \frac{3}{4} \) by nearly 1 in. including the wings, ultimately glabrous, wings not much unequal, their upper margins from the summit of the capsule slightly ascending; placentas undivided.
59. **B. nivea**, Parish ms.; Kurz in Journ. As. Soc. 1873, pt. ii. 81; radical leaf solitary elliptic-oblong doubly serrate, petiole 0–1 in., scape leafless or with two very small leaves near its base.

MOULMEIN; Parish.

**Rootstock** tuberous. Radical leaf 2–3½ in., obtuse, subequally cordate at the base, glabrous, white beneath, with scattered very coarse bristles above. **Scape** 6–8 in., glabrous, leafless, or with a pair of opposite leaves near its base which resemble the radical leaf but are less than 1 in., divided near the summit; bracts ovate or oblong, very obtuse, entire, glabrous; flowers medium-large, white. **Male**: sepals 2, 3–½ in., round; petals 2, not much shorter but narrow; stamens about 10, much monadelphous, anthers oblong, connective not produced. **Female**: perianth of 5 (or 6) segments; styles 3, much combined, each ending in two curved branches. **Capsule** ½ by ½ in. including the wings, wings not very unequal, their upper margins horizontal.


COURTALLAM; Wight. MYSORE and CARNATIC, alt. 1000 ft.; G. Thomson.

**Rootstock** elongate, thick. **Leaves** 8–4½ in., usually broader than long, nearly glabrous when mature but often ciliate on the margin; petiole 3–6 in., pubescent, often tomentose; stipules large, sometimes exceeding 1½ in., lanceolate, glabrous. **Scapes** 4–9 in., usually glabrous below, above with the bracts and pedicels pubescent; bracts ¼ in., lanceolate; flowers many, bright rose-coloured. **Male**: sepals 2, 3–½ in., round; petals 2, elliptic; stamens 40, very shortly monadelphous, anthers shortly obvoid, connective not produced. **Female**: young ovary almost tomentose; styles 3, little combined below, 2-lobed and much contorted above. **Capsule** ½ by ½ in. including the wings; wings equal, continued at nearly equal breadth entirely round the capsule which is thus exactly elliptic in outline. **Seeds** ellipsoid.

61. **B. floccifera**, Bedd. Ic. Pl. Ind. Or. 111; scape elongate far above the leaves many-flowered, leaves broadly rounded with whitish tomentum beneath.

TRAVANCORE and SOUTH TINNEVELLY HILLS, alt. 3000 ft.; Beddome.

**Leaves** 1½–3 in., broader than long, subequally cordate at the base, denticulate or nearly entire, thickly coriaceous, with close whitish or yellowish tomentum on both surfaces, becoming at length nearly glabrous above; petiole 1–3 in., with similar tomentum; stipules ¼ in., broad-elliptic, acute, scarious. **Scape** 18 in., very firm, branching at 15 in. high into a very compound cyme; bracts many, small, lanceolate, glabrous, persistent; pedicels and flowers glabrous. **Male**: sepals 2, scarcely ½ in., round; petals 0; stamens 40, very shortly monadelphous, anthers obvoid, connective not produced. **Female**: perianth of 4 nearly equal segments, persistent on the fruit; styles 3, nearly free, 2-lobed near the apex. **Capsule** ½ by ½ in. including the wings; wings subequal, rounded, broadest at the height of half the capsule. **Seeds** ellipsoid.

62. **B. Brandisiana**, Kurz in Flora 1871, 295; radical leaves long-petioled deeply 5–7-lobed, cauline small, perianth both of male and female of 2 segments.

MARTABAN; ATTARAN VALLEY; Dr. Brandis.

**Rootstock** tuberous; stem succulent, nearly glabrous and simple. Radical leaves 5–7 in., rather broader than long, membranous, base subcordate, lobes acuminate and obtusely repand-toothed; petiole 6–8 in., glabrous; cauline leaves much smaller and shorter-petioled, usually 5-lobed. **Podunecle** very long, subradical, many times dichotomous; pedicels capillary; bracts lanceolate, minute; flowers very many, white,
minute. *Sepals* of either sex 2, \( \frac{1}{2} \) in., round, emarginate, a little broader than long; petals of either sex 0; *stamens* many, free, anthers oblong. *Styles* 3, bifid at the apex. *Capsule* \( \frac{1}{2} \)–\( \frac{1}{2} \) in., ovate, acute, glabrous, 3–winged; wings retrorsely produced below the cells, 2 broad-oblong obtuse, the other linear-oblong; placentas undivided. *Seeds* small, short, ellipsoid.

** Stem elongate with lateral inflorescence.

† *Perianth of the male flower of 4 segments.*


*Morung Mountains; Hamilton* ex Wall. Cat.

Branch more than 10 in. long, dividing repeatedly, with many leaves, and flowers from the lowermost as well as the upper axils. *Leaves* 2–3 in., cordate, ovate, very unequal at the base, dentate-serrate, with very short viscid pubescence on both surfaces; petiole \( \frac{1}{2} \)–1 in., viscidly pubescent; stipules \( \frac{1}{2} \) in., ovate, acute, ciliate. *Peduncles* 2 in., few-flowered; bracts \( \frac{1}{2} \) in., ovate, acute, scarious, pubescent, persistent. **Male**: sepal 2, \( \frac{1}{2} \) in., round-elliptic; petals 2, narrower; *stamens* (ex A. DC.) monadelphous, anthers ovoid, connective not produced. **Female**: styles 3, free, each ending in two long curved and twisted branches. *Capsule* \( \frac{3}{2} \) by \( \frac{3}{4} \) in. including the wings, at length glabrous, wings subequal, broadest near the base of the capsule, their margin everywhere rounded. *Seeds* ellipsoid.—The locality of this plant is very doubtful. By *Morung* Hamilton understood the Terai from the river Teesta to the Kooshee (see Hamilton's *Nepal* p. 151): this tract has been explored by very good collectors (J. Scott, Gamble, &c.) since, and no plant at all corresponding to the present large species has been obtained: indeed Alph. DC. doubts (and with reason) whether any such plant has ever been found in Asia.

†† *Perianth of the male flower of 2 segments only.*


*Malabar Mts.*; common, ascending to 6000 ft.; and in *Ceylon.*

*Stem* often 2 ft., repeatedly dividing, with many leaves. *Leaves* 2–4 in., cordate, acute, very unequal at the base, crenate or serrate, pilose above and sometimes pubescent beneath, or altogether glabrous; petiole 1–5 in.; stipules \( \frac{3}{2} \) in., persistent, ovate, acute, glabrous. *Peduncles* axillary, rarely exceeding 2–3 in., glabrous or nearly so; bracts \( \frac{3}{4} \) in., lanceolate, acute; flowers rose-coloured, not very many on one peduncle. **Male**: sepal 2, \( \frac{3}{4} \)–1 \( \frac{1}{2} \) in., round, glabrous; petals 0; *stamens* 40, short, monadelphous, anthers ovoid, connective not produced. **Female**: perianth nearly as in the male; *styles* 3, little combined at the base, each dividing into two curved and twisted branches. *Capsule* \( \frac{3}{4} \) by \( \frac{3}{2} \) in. including the wings; wings little unequal, continued all round the capsule, rounded altogether or having an obtuse angle at the outer upper margin. *Seeds* ellipsoid, slightly obovoid.—The following are distinguished as species by Alph. DC.

**Var. 1. *dipetala*:** leaves pilose above and sometimes pubescent beneath, capsule without any angle on the wings.—This is the old *B. tuberosa* of the Madras Herbarium and *B. dipetala vera* of *Thwaites*. But there are examples at Kew in ripe fruit which have most of the capsules round-winged, others on the same stem angularly winged; and in the large series of examples the pubescence is often evanescent or all but so.

**Var. 2. *hydrophila*:** leaves pilose above, capsule shorter than in var. 1, the wings broader and more unequal.

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*Note:* The text provided is a transcription of botanical information, likely from a historical botanical text, discussing the characteristics of various species of *Begonia*.
VAR. 3. *malabarica*; leaves glabrous, capsules large slightly subquadrate rather than elliptic.—As to *Rheede Hort.* Mal. ix. t. 86 referred here, it may be the present plant as it is difficult to guess what other species Rheede could have got in Malabar; though it differs not merely in the points mentioned by Alph. DC.; but in the male flowers with two sepals and two petals.

**DOUBTFUL AND EXCLUDED SPECIES.**

65.*B. khasiana*, C. B. Clarke; flowers minute, capsule less than $\frac{1}{4}$ in. *B. pendunculosa* Wall. Cat. 3672 B.

Stylhet Mts. (which means Khasia); *Wallich*.

Branches weak, succulent, scarioso winged, repeatedly divided with many leaves. *Leaves* $\frac{1}{4}$-2 in., cordate, acute, very unequal at the base, serrate, pilose above, laxly sparingly villose on the nerves beneath; petiole $\frac{1}{4}$ to $\frac{3}{8}$ in.; stipules $\frac{1}{4}$ in., persistent, obovate, acute, glabrous. *Peduncles* from the lower as well as from the upper axils, 1-1$\frac{1}{4}$ in., few-flowered; bracts minute, elliptic, acute, ciliate, fimbriate. *Male*: sepals 2, scarcely $\frac{1}{4}$ in., round, glabrous; petals 0; stamens about 8, anthers oblong, connective not produced. *Female*: perianth of 5 segments; styles 3, divided upwards. *Capsule* $\frac{1}{4}$ by $\frac{1}{4}$ in. including the wings; wings 3, one about twice as broad as the others, its margin from the top of the capsule first horizontal then rounding away without angles; capsule dehiscing by marginal lines within the margins of its faces; placentas not seen.

*B. tentipolia*, Dryand, in *Trans. Linn. Soc.* i. 162, from Pulo Pontægh, is not a Pulo Pinang plant as A. DC. suspects from the similarity of the names (see *Prodr.* xv. pt. i. 351).

**ORDER LXVII. DATISCACEÆ.** (By C. B. Clarke.)

Trees or herbs. *Leaves* petioloed, simple or pinnate; stipules 0. *Flowers* small, dioecious in the Indian species, clustered racemosed or panicked. *Male*: calyx-tube short, teeth 3-9; petals 0; stamens 4-25. *Female*: calyx-tube adnate to the ovary, lobes 3-8 short; petals 0; ovary 1-celled, open or closed at the vertex; styles lateral, alternating with as many parietal placentæ, simple or 2-partite; ovules very many, ascending or horizontal. *Capsule* coriaceous or membranous, opening at the vertex between the styles. *Seeds* very many, small, albuminous; embryo straight, radicle next the hilum.—*Distrib.* Species 4; natives of the Mediterranean, Central Asia, Java, and North-West America.


1. *DATISCA*, Linn.

Tall glabrous erect herbs. *Leaves* 3-partite or unequally pinnate, the uppermost undivided; leaflets lanceolate, strongly serrate. *Flowers* dioecious, axillary, clustered, short-pedicelled. *Male*: Calyx-tube very short, lobes 4-9, unequal; stamens 9-25; no rudiment of the ovary. *Female*: Calyx-tube ovoid, trigonous upwards; styles 3, divided nearly to the base into two linear stigmas. *Capsule* narrow-oblong, trigonous, coriaceous, opening at the vertex between the styles. *Seeds* many, ellipsoid, coarsely reticulated.—*Distrib.* Species 2, one in Western Asia, the other in California.

1. *D. cannabina*, Linn.; Boiss. *Fl. Orient.* ii. 763; leaves from the flowering branches long-petioled very narrowly linear-lanceolate attenuated at...

Temperate and Subtropical Western Himalaya from Kashmir to Nipal, alt. 1000-6000 ft.; Wallich, Thomson, &c., not very common.—Distrib. Westward to the Levant.

Stem 2-6 ft., stout, branching. Lower leaves 1 ft., pinnate; leaflets 7-11, 6 by 1½ in., petiolulated; upper much smaller and less divided; floral simple, 3 by 1½ in. Pedicels often carrying linear bracts. Anthers oblong, rather large; filaments very short. Styles ½ in. Capsule ¾ by less than ½ in.

2. TETRAMELES, R. Br.

A large tree. Leaves petiolated, ovate, pubescent beneath at least on the nerves. Flowers dioecious, appearing before the leaves; males panicked, females in elongate racemes, clustered near the ends of the branchlets. Male: Calyx-lobes short; teeth 4, ovate, one or two smaller teeth sometimes added; petals 0; stamens 4, opposite the calyx-teeth, inserted round a depressed disc; rudiment of the ovary 0 or quadrangular. Female: Calyx-tube ovoid; teeth 4, short; petals 0; styles 4, short, stigmas simple somewhat club-shaped. Capsule ovoid, with 4 lines or slight ridges, membranous, opening at the top between the styles. Seeds very many, minute, flattened, ellipsoid, testa very lax and extending much beyond the nucleus as a loose ragged large-reticulated membrane.


Attains 100-150 ft. Leaves 5-6 by 4-5 in. roundly ovate, shortly acuminate, serrate or nearly entire, pubescent on both surfaces when young, glabrescent when old, glabrous in Mr. Kurz's Andaman plant except the nerves beneath. Racemes and panicles pubescent; flowers sessile or nearly so, bracts minute or 0. Anthers small, roundish; filaments long. Capsule ½ by ½ in., glandular.

Order LXVIII. CACTEAE. (By C. B. Clarke.)

Herbs, shrubs, or trees; branches often thickened, striated, or angled. Leaves usually represented by tufts of spines, or by prickles or small tubercles. Flowers solitary, sessile, hermaphrodite, regular. Calyx-tube adnate to the ovary, lobes 3-∞, small, imbricate. Petals 0, free or shortly united at the base, imbricate. Stamens 0, free or adnate to the base of the petals; filaments filiform. Ovary 1-celled; style filiform or cylindrical, stigma 2-∞ rayed; ovules very many on parietal placentas, horizontal. Berry 1-celled, placentas pulpy. Seeds very many, oblong or reniform; albumen plentiful, or scanty, or almost 0; embryo straight or curved.—Distrib. Species 1000, confined to America, except Rhipsalis cassytha.

Opuntia Dilignii, Haw.; DC. Prodr. iii. 472; Cactus indicus, Roxb. Hort. Beng., 37, Pl. Ind. ii. 475; Wight Ill. 114; an American plant, is naturalised in India, and

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is nearly or quite the same species as that on which cochineal is tended in Teneriffe; see Lowe Fl. Madeira, 313-319; Brand, For. Fl. 245-247. Roxburgh states that the cochineal "insects" brought from America thrice and multiplied abundantly on his Cactus indicus.

1. RHIPSALIS, Gaertn.

Small fleshy shrubs; branches long, terete, or flattened and leaf-like. Leaves represented by small scales. Flowers lateral, small. Calyx-tube not produced above the ovary, lobes 3-∞. Petals 6-10, spreading, oblong: Ovary smooth; style filiform, stigma 3-∞-rayed. Berry globose; smooth; the placenta projecting inwards nearly to the axis. Seeds obovoid; albumen 0.—Distr. Species 30, confined to Tropical America, except the one species below.

1. R. Cassytha, Gaertn. Fruct. 137, t. 28. fig. 1; branches round pendulous whorled, petals 5-6. DC. Prodr. iii. 476; Lodg. Bot. Cab. t. 865; Hook. Exot. Fl. t. 2; Bot. Mag. t. 3080; Thwaites Enum. 129.

Ceylon; upon rocks and trees throughout the Central Province and certainly indigenous, Walker; Thwaites.—Distr. Mauritius, South and Central Africa, Tropical America.

Calyx-segments 4-5, acute, very unequal, tinged with red at the apex. Corolla white. Stamens about 20. Placentas 3-4; stigma 3-4-rayed. Berry size of a pea, transparent, white. Seeds oblong, shining, black, obscurely striate.

ORDER LXIX. FICOIDEE. (By C. B. Clarke.)

Herbs. Leaves simple, often fleshy, usually opposite or whorled; stipules 0 or scarious. Flowers usually in cymes or clusters, rarely solitary, regular, hermaphrodite rarely polygamous. Calyx of 4-5 segments, united into a tube or nearly distinct, free from the ovary in the Indian genera, often persistent. Petals usually wanting, when present small. Stamens perigynous or hypogynous, definite or indefinite; staminodes sometimes present. Ovary free (except in Mesembryanthemum), 2-5-celled, syncarpous (except in Gisekia); styles as many as the carpels; ovules many in each carpel and axile, or solitary basal. Fruit usually capsular, splitting dorsally or circumsciss, more rarely the carpels separate into cocci. Seeds many or 1 in each carpel, usually reniform, compressed; embryo curved or annular, surrounding the farinaceous albumen, radicle next the hilum.—Distr. Species 450, chiefly African, a few are scattered through most tropical and subtropical regions.


* Carpels dehiscing dorsally.

Hairy woody small herbs . . . . . . . . . . . . . . . . 1. AIZOON.

** Capsule circumsciss.

Ovary (and capsule) 3-5-celled . . . . . . . . . . . . . 2. SERRUVUM.
Ovary (and capsule) 1-2-celled . . . . . . . . . . . . . 3. TRIANTHEMA.
TRIBE II. Molluginace. Calyx deeply 5-partite. Stamens hypogynous.

† Carpels dehiscent dorsally.
Petals many, small, hypogynous ........................................ 4. ORYGIA.
Petals 0. Stipules scarious, fugacious .................................. 5. MOLLUGO.

** Capsule of separate cocci.
Carpels 3–5, separate in the flower ...................................... 6. GISEKIA.
Carpels 2, combined in the flower ...................................... 7. LIMEUM.

1. AIZOON, Linn.

Spreading procumbent herbs, or small shrubs. Leaves alternate or falsely opposite, entire; stipules 0. Flowers axillary, solitary or in spikes or cymes. Calyx-tube short; lobes 5–4, spreading, yellow within. Petals 0. Stamens many, inserted near the top of the calyx-tube. Ovary free, 5–4-celled, depressed, nearly included in the calyx-tube; styles 5–4, free, subulate; ovules several in each cell. Capsule almost woody, surrounded by the persistent calyx, 5-celled, cells splitting from the top downwards dorsally. Seeds 2 or several in each cell, reniform; embryo annular.—Distr. Species 8, from Europe to S. Africa, and from the Canaries to Scinde: one aberrant species in Australia.

1. A. canariense, Linn.; Boiss. Fl. Orient. ii. 765; leaves petioled hairy elliptic, capsules sessile numerous, the valves inflexed. DC. Prodr. iii. 453.

Scinde; Stocks, Vicary.—Distr. Afghanistan, Arabia, Africa.
Small, woody, closely procumbent, repeatedly dividing. Leaves 1–1½ in., papillose and simply hairy or tomentose, petiole 0–½ in. Flowers in nearly 5-partite axil. Calyx-lobes ½ in. ovate. Capsule ½ in. broad, the summit when looked down upon pentagonal. Seeds black, smooth, with a few continuous raised ridges concentric with regard to the unappended hilum.

2. SESUVIUM, Linn.

Succulent branching herbs. Leaves opposite, fleshy; stipules 0. Flowers axillary, sessile or peduncled, solitary, rarely in cymes. Calyx-tube short; lobes 5, triangular-lanceolate, persistent, often coloured. Petals 0. Stamens many or 5, inserted round the summit of the calyx-tube. Ovary free, 3–5-celled; styles 3–5; ovules many, axile. Capsule ovate-oblong, membranous, 3–5-celled, circumsciss. Seeds many in each cell, reniform; embryo annular.—Distr. Species 4, littoral in warm climates.


Seashores of India, from Bombay to Calcutta and Singapore.—Distr. Tropical and subtropical seashores.
Small, or extensively creeping and rooting in sand. Leaves ½–2 in., from ovate to linear spatulate or subcyllindric; petiole often dilated at base with scarious mar-
3. TRIANTHEMA, Linn.

Diffuse prostrate branched herbs, glabrous or papillose. Leaves petiolar, opposite, unequal, from linear to ovate or obovate, entire; petioles connected at base by their dilated membranous margins; stipules 0. Flowers small, axillary, sessile or peduncled, solitary or in cymes or clusters. Calyx-tube short or long, lobes 5, often cuspidate, coloured within. Petals 0. Stamens 5–10 or more, inserted near the top of the calyx-tube. Ovary free, 1–2-celled; styles 1 or 2, subulate; ovules 1 or many, basal. Capsule membranous or coriaceous, clavate, circumsciss, the upper portion often carrying away 1 or 2 seeds attached to or enclosed in it, the lower portion 2–∞-seeded. Seeds reniform; embryo annular.
—Distrib. Species 10, tropical and subtropical.

* Style 1.


Throughout India and Ceylon, common.—Distrib. Malaya, Western Asia, Africa, Tropical America.

Glabrous. Leaves $\frac{1}{2}$–1$\frac{1}{2}$ in., obovate; petiole $\frac{1}{2}$ in. Flowers solitary. Calyx-lobes obtuse, cuspidate. Stamens 10–20. Capsule $\frac{1}{2}$ in., scarious below, beak exserted coriaceous so much more mimiform adnate to the enclosed seed, lower part 3–5-seeded. Seeds black, scarcely shining, with concentric broken undulating raised lines.


From the Punjab to Ceylon: not in Bengal.—Distrib. Throughout Africa.

Minute papillose or glabrous. Leaves $\frac{1}{2}$–$\frac{3}{4}$ in., narrowly oblanceolate or elliptic; petiole very short or obscure. Flowers often very many, solitary densely clustered. Calyx-lobes triangular, cuspidate. Capsule $\frac{1}{12}$ in.; beak a circular corky flat disc depressed in the centre, deciduous often with one seed attached beneath or imperfectly included by a membrane. Seeds 2, super-imposed, discoid, black, scarcely shining, with concentric broken undulating raised lines.

** Styles 2.

3. T. pentandra, Linn. Mant. 79; stamens 5, beak of the fruit mimiform separating into two 1-seeded parts, lower portion of the fruit 2-seeded... DC. Prodr. iii. 352; Edgew. in Journ. Linn. Soc. vi. 203; Boiss. Fl. Orient. ii. 766. T. obcordata, Wall. Cat. 6837 F. T. Govindia, Wall. Cat. 6838.

The Punjab, Schinde and plains of North-West India.—Distrib. Western Asia and Tropical Africa.
Papillse or nearly glabrous. Leaves 1-1½ in., oblong or elliptic; petiole ½ in. Flowers in sessile clusters. Calyx-lobes ovate, often scarious on the margin, bracts scarious. Capsule ½ in.; beak consisting of two lanceolar portions acute upwards, coriaceous, closely adnate to the included seed. Seeds in the lower half of the capsule 2, dull black, roughly puberulous, the concentric lineation very obscure.

4. T. decandra, Linn. Mant. 70; stamens 10, beak of the fruit truncate consolidated with the two included seeds indesincent or only finally splitting. Roxb. Hort. Beng. 34, Fl. Ind. ii. 444; DC. Prodr. ill. 352; Wall. Cat. 6839; W. & A. Prodr. 355; Wight i. t. 296; Dalz. & Gibs. Bomb. Fl. 15; Kurz in Journ. As. Soc. 1877, pt. ii. 110. Zaleya decandra, Burm. Fl. Ind. t. 31, fig. 3.

Deccan Peninsula and Ceylon.—Distrib. Timor; Ava (ex Kurz).

Glabrous or minutely papillose. Leaves 1-1½ in., oblong or elliptic; petiole ½-1 in. Flowers in nearly sessile clusters. Calyx-lobes ovate, usually obtuse, often scarious on the margins; bracts scarious. Capsule ½ in., beak a truncate solid cylinder, not at all or very obscurely mitriform. Seeds 4-2 lower dull black puberulous, with numerous faint concentric raised lines.—Closely allied to the preceding species.


Mooltan; Edgeworth. Scinde; Stocks. Bombay; Law.—Distrib. East Tropical Africa.

Minutely papillose or glabrous. Leaves 1-1 in., oblong or elliptic, often with scarious margins; petiole ½-1 in. Flowers sessile, solitary and clustered. Calyx-tube 10-ribbed; lobes triangular-elongate, acute, dilated at base so that there appear to be 5 interjected auricles. Capsule ½ in.; beak elongate-conical, hollow. Seeds about 10-15, dull black, with puberulous raised undulating lines that radiate from the centre (and thus are in a direction right angles to the lines on the seeds of the four preceding species).—Flowers separated, or clustered. T. polysperma, Oliç, is undistinguishable from some of Stocks’ Scinde specimens. Diplochonium sesuvioiides, Fenzl. in Harv. & Sond. Fl. Cap. ii. 473 is separated by the very numerous stamens and shining seeds, as Edgeworth has noted.

4. ORYGIA, Forsk.

A rigid branched glabrous herb. Leaves opposite and alternate, fleshy, entire; stipules 0. Cymes terminal and leaf-opposite, lax, few-flowered. Sepals 5, nearly free, ovate. Petals 0. Staminodes many, small, subhypogynous. Stamens 12 or more, subhypogynous. Ovary free, globose, 5-ribbed, 5-celled; styles 5, filiform; ovules many, axile. Capsule globose, papery, wrapped in the persistent sepals; cells 5, dehiscing dorsally. Seeds many, reniform, strophiolate; embryo annular.


Dry and hot India from the Punjab and Scinde to Mysore and Coimbatore. Not in Bengal.—Distrib. Western Asia and the whole of Africa.
Stems 6-18 in., somewhat angular or trigonous. Leaves 3/4-1 in., obovate, cuspitate; petiole 1/4 in. Cymes with small lanceolate bracts at their divisions; flowers 1/4 in. diam., pedicelled. Sepals purplish-green, with scarious edges, acute. Capsule 3/2 in. diam. Seeds black, not shining, with numerous concentric elevated lines.

5. MOLLUGO, Linn.

Herbs, branched, often dichotomous. Leaves often falsely whorled, or alternate, or all radical, from linear to obovate, entire; stipules quickly disappearing. Flowers axillary, sessile or pedicelled, clustered or in cymes or racemes, small, greenish; bracts inconspicuous. Sepals 5, persistent. Petals 0; staminodes 0 or small in the same species. Stamens 5-3, rarely many. Ovary free, globose or ellipsoid, 3-5-celled; styles 3-5, linear or very small; ovules many, axile. Capsule membranous, sheathed by the sepals, 3-5-celled, dehiscing dorsally. Seeds several in each cell, rarely 1, reniform, appendaged or not at the hilum; embryo annular.—Distrib. Species 12, tropical and subtropical.

* Seeds with an appendage at the hilum, inflorescence in axillary clusters.


Throughout IndiA and Ceylon, common.—Distrib. All warm regions.

Stellately woolly, sometimes less hairy, rarely glabrous. Stem prostrate, much branching, leafy. Leaves 3/4-1 in., opposite or whorled, usually obovate but vary from round to round-lanceolate; petiole 0-3 in. Flowers usually sessile or nearly so; pedicels sometimes 3/4 in. Sepals 3/4-1 in., elliptic or oblong, acute. Staminodes linear or 0. Stamens usually 10 or more but vary to 5. Styles 3-5, linear, short. Capsule a little shorter than the sepals, oblong. Seeds many, covered with raised tubercular points; the appendage sometimes carrying more than one bristle.—A variable weed of which the following are the most notice-worthy varieties.

Var. 1. typica; flowers sessile, sepals 3/4 in. more or less stellately tomentose. Glinus dictamnoides, W. & A. Prodr. 362.

Var. 2. lotoides, W. & A. Prodr. 362 (sp.); pedicels of the flowers 3/4-3 in., sepals 3/4 in. stellately tomentose.—Hills of the Deccan Peninsula.

Var. 3. Keenanii: stem slightly pubescent, leaves glabrous petioled lanceolate, flowers sessile, sepals 3/4 in. glabrous with scarious margins, capsule oblong the seeds clearly seen through the walls, seeds exactly of Var. 1 but smaller than usual.—Cachar, R. L. Keenan; possibly a good species but it can be nearly matched out of the African bundles of Var. 1.

From the base of the Eastern Himalaya to Ceylon and Burma; common. (No example from North-West India, the Punjab or Scinde.)—Distrib. Tropical Africa and Australia.

Stems branching, diffuse, leafy. Leaves 1/2–1 in., usually whorled, spatulate lanceolate or elliptic; petiole 0–1/4 in. Pedicels 1/2–3/4 in., oblong, margins often membranous. Stamens 5–10. Stigmas 3, minute. Capsule ellipsoid, a little shorter than the sepals. Seeds many, covered with raised tubercular points, the appendage sometimes comprises a second, yet more minute, bristle.

**Seeds not appendaged, inflorescence in terminal cymes or racemes.**


Throughout India and Ceylon, very common.—Distrib. Eastward to Malacca, China, Japan, Fiji.

Often a foot high. Leaves 3/2–2 1/2 in., whorled or opposite, varying from lanceolate acute to obovate obtuse, much narrowed at the base; petiole hence obscure. Cymes compound, the branches sometimes racemosed so that the inflorescence becomes like that of M. disticha. Sepals 1/2 in., elliptic or round. Stamens 3–5, filaments dilated. Styles 3, short, linear. Capsule as long as the sepals, globose, many-seeded, the walls thin. Seeds dark chestnut-coloured; embryo curled into three-quarters of a complete circle.


From the Punjab to Ceylon, in the hotter drier parts of India; not in Bengal.—Distrib. Asia, Africa to the Cape, Australia.

Stems 3–6 in., erect, usually several. Leaves 1/2–2 in., radical tufted spatulate or obovate, cauline linear-oblong often 4–8 in a whorl, whence spring unambitately many branches. Peduncles trichotomous or umbellate-cymose. Sepals 1/2 in., elliptic or round. Stamens 5. Styles very small. Capsule as long as the sepals, globose, many-seeded. Seeds pink-chestnut or yellowish, covered with slightly elevated oblong reticulations, bluntly ridged on the back; embryo curled through less than a semicircle.

5. **M. disticha**, Seringe in DC. Prodr. i. 392; glabrous, branched, cauline leaves lanceolate, seeds smooth. Wall. Cat. 652; W. & A. Prodr. 44; Wight i.c. t. 3. Pharnaceum distichum, Linn. Mant. 221.

**South Deccan Peninsula and Ceylon.**

Stems often 12–18 in. Leaves 1/2–1 in., usually whorled, tapering almost to the base. Flowers in cymes, the branches often ultimately prolonged as racemes. Sepals 1/2 in., ovate. Stamens 5. Styles 3, short. Capsule as long as the sepals, globose or shortly ellipsoid, many-seeded. Seeds obscurely reticulated, shining chestnut, bluntly ridged on the back; embryo curved through three-quarters of a circle.—Wight's figure represents this plant as hairy: it is glabrous or sometimes microscopically puberulo-glandular.

From the Punjab to Ceylon in the hotter drier parts of India; not in Bengal.—Distr. New Caledonia, Tropical Africa, Cuba.

Leaves 1-2 in., elliptic, tapering to the base. Scapes 3-8 in., wiry, repeatedly dichotomous. Sepals \( \frac{1}{2} \) in., oblong. Stamens 5-3 (Oliver). Stigmas 3, very small. Capsule as long as the sepal, somewhat ellipsoid, many-seeded. Seeds black, a microscopic scale appended to the hilum, obscurely ridged on the back, shining, closely densely reticulated, very obscurely rough not tuberculated; embryo curved through half a semicircle—New Caledonian examples have the seeds rougher, and a very short linear spur added to the appendage. Cuban examples resemble generally the Indian, but one of them has the stem very woody thick branched densely packed with leaves.

6. GISEKIA, Linn.

Diffuse branched herbs. Leaves opposite or falsely whorled, fleshy, spatulate, abounding in raphides; stipules 0. Flowers sessile and pedicelled, hermaphrodite or polygamous, small, greenish or purplish, in axillary cymes. Sepals 5, nearly free, ovate, herbaceous with membranous margins. Petals 0. Stamens (in the Indian species) 5, hypogynous. Carpels 5-3, distinct; each ending in a short simple style and containing one basal ovule. Fruit of 5, free, membranous, papillose, indehiscent, carpels. Seeds vertical, subreniform; embryo curved.—Distr. Species 5, in India, Arabia, and Africa.


Glabrous. Stems 8-18 in. Leaves \( \frac{3}{2} \)-1½ in., oblong or elliptic, entire, narrowed at the base; petiole 0-½ in. Sepals \( \frac{1}{2} \) in. Filaments dilated below. Carpels usually 5, in fruit as long as the sepal. Seeds blackish, smooth, minutely glandular-punctate; embryo curved less than a semicircle.

7. LIMEUM, Linn.

Branched, mostly prostrate herbs; glandular or glabrous. Leaves alternate or subopposite; stipules 0. Flowers bracteate, cymed, hermaphrodite or unisexual, small, green. Sepals 5, nearly free, ovate, herbaceous with membranous margins. Petals (in the Indian species) 3-5, small. Stamens 5-10, hypogynous; filaments dilated downwards and somewhat connate at the base. Ovary globose, 2-celled; stigmas 2, short; ovule 1 in each cell, basal. Fruit separating vertically into two coriaceous hemispherical cocci, which at length dehise ventrally. Seeds vertical, reniform; embryo annular.—Distr. Species 10, African, one reaching the west of India.

PUNJAB; Edgeworth, Vicary, Aitchison. SCINDE; Stocks.—Distr. Aden, Nubia.
Subprostrate, glandular-puberulous or glabrate; branches 8–18 in., much divided. Leaves \(\frac{4}{3}\) in., opposite or nearly so. Petiole \(\frac{3}{5}\) in. Cymes sessile (or nearly so) at the nodes. Sepals \(\frac{5}{6}\) in., roundish. Petals much shorter than the sepals, obovate, clawed, the upper margin incised or nearly fimbriate. Stamens 6–7 (Oliver). Carpels in fruit as long as the sepals, hemispheric, dehiscing ventrally; margins of the valves inflexed so as to retain the seed until moistened. Seed reniform, longer than broad, compressed, concavo-convex, perfectly smooth, whitish.

ORDER LXX. UMBELLIFERÆ. (By C. B. Clarke.)

Herbs (rarely in non-Indian species shrubs or trees). Leaves alternate, usually divided or dissected, sometimes simple, petiole generally sheathing at the base; stipules 0. Flowers hermaphrodite or polygamous, in compound umbels (simple in Hydrocotyle and Bupleurum), exterior of the umbel sometimes radiant; umbels with involucriform bracts at the base of the general one and bracteoles at the base of the partial ones (umbellules). Calyx-tube adnate to the ovary, limb 0 or 5-toothed. Petals 5, epigynous, often unequal, and with a median fold on the face, plane or emarginate or 2-lobed with the apex inflexed; imbricated in bud, in Hydrocotyle sometimes valvate. Stamens 5, epigynous. Ovary inferior, 2-celled, disc 2-lobed; styles 2, stigmas capitellate; ovules 1 in each cell, pendulous. Fruit of 2 indehiscent dorsally or laterally compressed carpels, separated by a commissure; carpels each attached to and often pendulous from a slender often forked axis (carpophore), with 5 primary ridges (1 dorsal, 2 marginal and 2 intermediate) and often 4 secondary ones intercalated between these; pericarp often traversed by oil canals (vittæ). Seed 1 in each carpel, pendulous, albumen cartilaginous; embryo small, next the hilum, radicle superior.—Distr. Species 1,300, mainly in Europe, North Africa, West Central and North Asia; a few are North American, tropical, and natives of the Southern Hemisphere.

Tordylium is stated in Gen. Pl. i. 871 to be Himalayan. We have seen no specimens.

An umbellifer in flower, Edgw. No. 175 \(\frac{1}{2}\) from the North-west Himalaya, alt. 6000–7000 ft., may be Jojrenia alpina, Fenzl.

Clavis of the Genera (as to the Indian species only).

 SERIES I. Heterosciadæ. Umbels simple or irregularly compound. Vitte 0.
Leaves spinulose-serrate. Flowers capitate . . . . . . 2. Eryngium.
Leaves compound not spinulose. Umbels subcorymbose . . . 3. Sanicula.


TRIBE I. Ammineæ. Fruit laterally compressed, or at least constricted at the commissure, not or very obscurely winged.

* Carpels in outline ovate or oblong, not distinctly narrowed upwards, excavated or concave on the inner face; seed grooved or concave on the inner face.
Bracteoles simple, linear ........................................ 4. Vicatia.
Bracteoles lobed or pinnatifid .................................. 5. Trachydiun.
Bracteoles entire, lanceolate, white-margined ............... 6. Eleosticta.

** Carpels in outline ovate or oblong, not distinctly narrowed upwards, plane on the inner face; seed plane or concave on the inner face.

Leaves entire. Flowers yellow or lurid .......................... 7. Bupleurum.
Umbels short-peduncled, leaf-opposed, ebracteolate ............ 8. APIUM.
Ridges of the fruit thick, corky ............................... 9. CHICU.
Ridges of the fruit slender, valleys 1-vittate .................. 11. CARUM.
Ridges of the fruit obtuse, corky, valleys 2–3-vittate ........ 12. SITUM.
Ridges of the fruit slender, valleys 2–3-vittate ............... 13. Pimpinella.

*** Carpels in outline elongate oblong; seed in horizontal section nearly circular, grooved on the inner face.

Ultimate segments of the leaves large, fruit attenuate at base 14. Osmorrhiza.
Fruit oblong, narrowed upwards, distinctly ridged, glabrous 15. Chelrophyllum.
Fruit narrowed upwards into a long beak ........................ 16. Scandix.
Fruit oblong, narrowed upwards, obscurely ridged, hispid 17. Anthriscus.

Tribe II. Seselinae. Fruit widest at the commissure, in horizontal section circular or somewhat dorsally compressed.

* Primary ridges of the fruit more or less distinct, not alate.

Fruit globose or subcylindric, ridges distinct. Petals white 18. Sesel.
Central flower of the umbellule sessile perfect, lateral male pedicelled ......................................................... 19. Pycnocycla.
Leaves cut into filiform segments. Bracts 0. Petals yellow 20. Feniciulum.
Fruit ½ in., roughly corrugate between the ridges ............ 21. Frangos.
Fruit with all the ridges equal, broad, obtuse, cory. ......... 22. Ænanthe.
Bracts prominent. Fruit ovoid, vittæ = ......................... 23. Scultizia.
Bracts 0, or small. Fruit ovoid, vittæ = ....................... 24. Polyzygus.

** Primary ridges of the fruit (or the lateral only) more or less excurrent, winged.

† Valleys next the dorsal ridge 2–3-vittate.

Petals emarginate. Fruit less than ½ in. ....................... 25. Ligusticum.
Petals subentire. Fruit ½ in. .................................... 30. Archangelica.

†† Valleys next the dorsal ridge 1-vittate (very rarely 1 or 2 additional small superficial vittæ are present), in Pleurospermum Candollii 3–2-vittate.

Tall. Leaves very compound. Seed plane on the inner face 26. Selinum.
Stemless, or short. Carpels much compressed dorsally 27. Cortia.
Seed grooved or concave on the inner face ..................... 28. Pleurospermum.
Leaves compound pinnate with large segments. Fruit ½ in. 29. Angelica.

Tribe III. Peucedanæ. Fruit much dorsally compressed, dorsal ridges slightly excurrent lateral winged, wings of the opposite carpels closely applied face to face.

Flowers not radiant. Ovary glabrous ............................ 32. Peucedanum.
Ovary pubescent. Vittæ rarely reaching the base of the fruit 33. Heracleum.
Wings of carpels hyaline with a very thick border .......... 34. Zosimia.
Series III. Diplozygæ. Umbels compound. Secondary ridges of the fruit prominent, primary equally or less prominent or inconspicuous.

* Fruit glabrous.

Fruit globose. Bracts 0 .......................................................... 34.* Coriandrum.
Fruit narrowly oblong. Bracts slender, simple ......................... 34.** Cuminum.

** Fruit hirsute or setose.

Bracts pinnate. Seed plane on the inner face .......................... 35. Daucus.
Bracts linear, or 0. Seed grooved on the inner face .................. 36. Caucalis.
Bracts linear-lanceolate, membranous ................................. 37. Psammogeton.

I. HYDROCOTYLE, Linn.

Prostrate herbs, rooting at the nodes. Leaves (in the Indian species) cordate or hastate, not peltate, round or 5-9-gonal, subentire or palmately lobed, palmate-nerved, long-petioled; stipules small, scarious. Umbels (in the Indian species) simple, small; bracts small or 0; flowers white, sometimes unisexual. Calyx-teeth 0 or minute. Petals entire, valvate or imbricate. Fruit laterally compressed, commissure narrow; carpels laterally compressed or sub-pentagonal; lateral primary ridges concealed within the commissure, or distant therefrom and prominent; vitre 0, or most slender, obscure; carpophore 0. Seed laterally compressed.—Distr. Species 70; in wet places in tropical and temperate regions, more-numerous in the Southern Hemisphere.

Section I. Eu-Hydrocotyle. Petals acute, valvate. Secondary ridges 0. Pericarp not thickened.


Leaves 1–3 in. diam., pubescent or glabrous. Peduncles ¼–2 in., lower solitary, leaf-opposed. Umbels many-flowered; bracts minute lanceolate scales among the pedicels; pedicels 0–1 in. glabrous. Fruit ½ in., orbicular or subquadrate, reticulate-rugose or smooth (sometimes deformed, enlarged, obovoid, corky); lateral primary ridges commissural, intermediate faint or 0; pericarp hard, thin.—Fruits exceedingly uniform even in minute characters from the Himalaya to Ceylon. Thunberg describes H. javanica as glabrous, but all the specimens so named from Java have at least the petioles and peduncles pubescent and are identical with the Indian. H. hirsuta, Blume, is a form with fulvous pubescence abundant in the Eastern Himalaya.—H. polycephal, Wight Ill. t. 117, fig. 1, represents the carpels as subpentagonal and little compressed laterally, and perhaps was taken from H. rotundifolia.
VAR. 1. podantha, Molkenboer in Pl. Jungh. 89 (sp.); pedicels ¼ in. Miquel. Fl. Ind. Bat. i. pt. i. 732.—Sikkim, Bhotan, Khasia, frequent.—Peduncles sometimes 3 in. Fruits ovoid, intermediate primary ridges 0.—Referred to H. podantha from the description only; Molkenboer relies partly on the leaves being setulose, but so they are in typical H. javanica. H. laxiflora, DC. Prod. iv. 61 (= H. densiflora, DC. Prodr. iv. 61), does not differ unless by the fruits being slightly less compressed.

VAR. 2. Hookeri; leaves very pentagonal little lobed, peduncles 6 in., fruit little compressed yellowish shining with red glandular dots.—Khasia, alt. 5000—6000 ft.; H. f. & T.—Leaves 2½ in. diam., sparingly setulose. Fruit somewhat pentagonal, the immediate primary ridges more defined, nearly as in H. rotundifolia. This may be a distinct species.

2. H. burmanica, Kurz in Journ. As. Soc. 1871, pt. ii. 60, and 1877, pt. ii. 113; quite glabrous, leaves 5-lobed to the middle, lobes triangular acute crenate, peduncles long, pedicels ⅜ in., fruit moderately compressed somewhat pentagonal.

Upper Tenasserim; alt. 3000—5000 ft.; Brandis, Parish.
Leaves 1-2½ in. diam. Peduncles 1-2½ in., lower solitary leaf-opposed, upper 2-3-nate. Umbels many-flowered; bracts minute. Fruit ⅜ in., broadly orbicular, obscurely punctate not reticulate; lateral primary ridges commissural, intermediate appearing as slightly elevated angles; pericarp hard, thin.—Very near H. javanica, differing in its glabrousness, 5-gonous leaves, and less compressed fruits. It may be H. javanica (cf. Hiern in Oliv. Fl. Trop. Afr. iii. 4) when No. 1 must be called H. hirsuta, Blume.

3. H. conferta, Wight Ic. t. 1002; leaves cordate crenate subentire or lobed to the middle, petiole laxly pubescent, umbels subsessile, fruit somewhat compressed subpentagonal.

South Deccan; Pulney Mts., Wight; Nilgherry Mts., Gardner, Schmidt.
Leaves 1-2½ in. diam., setulose. Umbels 5–15-flowered; peduncle when visible glabrous, any bracts obscure. Fruit ⅜ in., orbicular, obscurely punctate, not reticulate; lateral primary ridges commissural, intermediate, appearing as slightly elevated angles; pericarp hard, thin.—From the size and hairiness of the leaves this has been supposed near H. javanica, differing by its sessile clusters of fruit in the axils; but in the structure of its fruit it is exceedingly like H. rotundifolia with which indeed it is mixed by Wight; and from some forms of which it hardly differs but by the larger more hairy leaves.


Leaves ¼–1 in. diam., glabrous and shining or pubescent or subvillous on both surfaces. Peduncles glabrous, 0–3 in., sometimes on the same specimen; bracts obscure; umbels 10–15-flowered. Fruit ⅜ in., broadly orbicular, smooth, sometimes punctate; lateral primary ridges commissural (more prominent than in the three preceding species), intermediate forming elevated angles; pericarp hard, thin.—Easily separated from the three preceding species by the much smaller leaves. The multiplication of names is chiefly due to the variability in the length of the peduncle, the specimens
being in other respects very uniform. Some of the hill examples have shining glabrous sub serrate leaves, the peduncles $\frac{2}{3}$ in.; other plains' examples closely procumbent on mud are villous with sessile umbels. \textit{H. hirta, R. Br.} differs (if at all) by its laxly hairy peduncles: see \textit{Benth. Fl. Austral.} iii. 340, as to \textit{Var. pusilla} only. \textit{H. sibiricopoides}, Lamk.; \textit{DC. Prodr.} l. c. 66, which extends throughout South-Eastern Asia and Japan, only differs (from the form \textit{nitidula}) by the rather larger leaves and longer peduncles.

**SECTION II. Centella.** Petals obtuse, imbricate. Secondary ridges as distinct as the primary. Pericarp much thickened.


Throughout India, alt. 0-2000 ft.; from the Himalaya to Ceylon and Malacca; frequent.—\textit{Distrib.} Tropical and sub tropical regions.

Leaves $\frac{1}{2}$-2$\frac{1}{2}$ in. diam., usually glabrous or nearly so; petiole pubescent or glabrous. Peduncles about $\frac{1}{2}$ in., often 2-3-nate, laxly pubescent or glabrous; bracts $\frac{1}{4}$-1 in., not scattered among the pedicels (as in \textit{Eu-Hydrocotyle} and in \textit{Araliaeaceae}). Fruit $\frac{1}{4}$-1 in. Carpels oblong, subcylindric, curved, slightly compressed, much longer than broad, reticulate-rugose, often crowned by the subpersistent petals, each with 9 curvilinear subsimilar ridges, and 2 within the commissure; pericarp thickened, woody, white. Seed compressed laterally.—In this species it seems to be the endocarp that is so greatly thickened, and that is adnate to the exocarp, thus invalidating one of the most uniform distinctions between \textit{Umbelliferae} and \textit{Araliaeacceae} (see \textit{Gen. Pl.} i. 861).

2. \textbf{ERYNGIUM, Linn.}

Spinescent, glabrous, erect, perennial herbs (the Indian species). Leaves spinous-toothed, entire lobed or dissected. Flowers in simple heads, each bracteolate; bracts stellate, spinulose (in Indian species). Calyx-tube covered with ascending hyaline scales; teeth rigid, acute. Petals white, narrow, erect, emarginate, scarcely imbricate. Fruit ellipsoid, nearly cylindric: carpels dorsally sub compressed, subconcave on the inner face; primary ridges obtuse not prominent, secondary 0; vitte in the primary ridges inconspicuous or 0, with some very slender scattered in the endocarp: carpophore 0. Seed semi-terete, dorsally subcompressed, subconcave on the inner face.—\textit{Distrib.} Species 100, temperate and tropical; plentiful in Western Asia.


Stems 2-3 ft., erect, undivided below, corymbose and often bluish above. Radical leaves 5 by 1$\frac{1}{2}$ in., petiole 2-6 in.; lower cauline often similar smaller with shorter petioles, but more often sub sessile, elliptic, acute, undivided, serrate or sub spinulose. Bracts 5-6, 1 in., linear, with a few spines on the margins, sometimes short exterior spines alternating with them; bracteoles linear, spinulose, simple, exceeding the flowers; a few (in the outermost row but one) sometimes spinous, subtrifid. Calyx-tube densely scaly, teeth lanceolate-subulate, spinescent. Fruit $\frac{1}{8}$ in.—This
has been referred to *E. dichotomum*, Desf. which has the radical leaves oblong entire not spinulose and altogether differs. It is certainly Boissé plant referred by him to Biebersteins.


Stem 6–18 in., erect or branching from the base, corymbose often bluish above. Radical leaves 2–4 in. diam., often hastate; petiole 2–4 in.; lower cauleine sometimes similar but short-petioled. Bracts 5–7, 1 in., linear, with few or 0 spines on the margins; short spines alternate with and somewhat exterior to the bracts; bracteoles linear, spinulose, simple, exceeding the flowers. Calyx-tube with lanceolate scales, teeth lanceolate-subulate spinescent. *Fruit* ⅛ in.—The Indian examples are all smaller with smaller heads than the type-specimens of *E. Billardieri* and are perhaps *Var. meiocephalum*, Boiss. l. c. The bracts are frequently without spines, but the radical leaves are not narrowly dissected enough for *E. Heldreichii*, *Boiss. l. c.* 826. The radical leaves early disappear, it is then much like *E. cœruleum* but can generally be distinguished by its much less strict stem and dissected lower cauleine leaves.

3. **SANICULA**, Linn.

Erect herbs. Leaves palmately 3–5-partite, segments toothed lobed or dissected. *Umbels* irregularly compound, rays few; bracts sessile, leaf-like; umbellules usually small with small bracteoles. *Flowers* mostly unisexual. *Calyx-tube* villous, subechinate; teeth herbaceous. *Petals* white, emarginate, slightly imbricate. *Fruit* echinate, ovoid or slightly compressed laterally, commissure broad, carpophore 0; carpels ⅓-terete or subterete, plane on the inner face, ridges all obscure, lateral primary commissural; vittae small, solitary in each primary ridge, with some very slender scattered in the endocarp. *Seed* nearly terete.—Distr. Species 10, 1 only in the Old World.


4. **VICATIA**, DC.

Perennial herbs, glabrous. *Leaves* pinnately compound, ultimate segments narrow. *Umbels* compound; bracts 1 linear, small, or 0; bracteoles several, linear. *Calyx-margin* obsolete. *Petals* obovate, emarginate, white pink or
purple-red. Fruit ovoid, narrowed at the apex, scarcely laterally compressed, distinctly constricted at the commissure. Carpels grooved on the inner face, subpentagonal or subterete, dorsally subcompressed; lateral primary ridges commissural, intermediate slender but distinct; vitte 2–3 in each furrow, not large; carpophore entire or bifid. Seed subterete, grooved on the inner face.—Distrib. Species 2–3, Himalayan.

Separable from Pimpinella only by the deeper groove on the inner face of the micarps as DC. states.


Himalaya, alt. 6000–12,000 ft., from Baltistan and Kashmir to Nipal, common.

Stem 1–2 ft., ascending, divided, striate, sparingly leafy. Leaves usually 3-pinnate, ultimate segments linear or narrowly oblong-linear, acute. Peduncle 2–6 in. Bract rarely exceeding 1 in., very rarely more than 1 or slightly divided; primary rays of the umbel 6–12, 1–2 in., rigid, angularly striate; bracteoles 3–6, often as long as the umbellule. Fruit 1/2–1 in., disc prominent, styles short.


Kashmir; Tragbol, alt. 11,400 ft., C. B. Clarke. ? Nipal; Hoffmeister. Sikkim; Jongri, alt. 12,000–13,000 ft., C. B. Clarke.

Stem 4–6 in., rarely 12 in. Cauline leaves 2–4 in., 2–3–4-pinnate, ultimate segments scarcely 1/2 in. Fruit 1/2–1 in., oblong or narrow-oblong; disc prominent; styles short.—United with V. conifolia by Bentham (in Gen. Pl. i. 883), but the fruit is very much smaller, less grooved on the inner face, and the leaves are much more finely cut.

3. V. ? Stewartii, C. B. Clarke; secondary pinnae of the cauline leaves deeply cut into small narrow-lanceolate teeth, carpels plane on the inner face, seed with a T-shaped groove on the inner face.

Gurwhal, alt. 6500 ft., Stewart.

Braacts small or 0. Bracteoles linear, unequal, some overtopping the flowering umbellules. Fruit (not quite ripe) 1/2 in., rather larger than that of V. conifolia, ridges obscure; vitæ in each furrow 3–4, small.

5. TRACHYDIUM, Lindl.

Perennial herbs, glabrous or minutely hisrute. Leaves 1-2- or 3-pinnate. Umbels compound, sometimes sessile, when the inflorescence appears to consist of simple umbels on clustered long peduncles; bracts several, foliaceous, lobed or pinnate; bracteoles 5–10, similar, often united at the base, sometimes white membranous on the margins, often equaling the rays. Calyx-margin obsolete or prominent, entire or nearly so. Petals white or pink, elliptic, subacute, or emarginate by the greater or less inflexion of the apex. Fruit ovoid or subquadrate, laterally subcompressed, slightly constricted at the commissure, smooth or tubercled; carpels terete; primary ridges distinct, sometimes thickened, spongy, rugose or tubercled, lateral at the commissure; secondary
ridges 0, or like the primary; vittae 1–2 between each primary ridge; carpophore entire 2-fid or 2-partite. Seed subpentagonal, lunate, dorsally subcompressed, concave on the inner face.—Distrib. Species 10, Himalayan or Central Asiatic, and 1 Abyssinian.

Subgen. Enneazygon. Fruit truncate; calyx-margin spongy, patent; ridges of the carpels 9, equal, hollow, obtuse.

1. T. novem-jugum, C. B. Clarke; radical leaves pinnate, pinnae orbicular crenate.—Trachydiwm sp. 5, Herb. Ind. Or. H. f. & T.

   Sikkim, alt. 12,000–15,000 ft.; Lama Kangra, Tungu, and Yeumtong; J. D. H.
   Stem 0–2 in., grooved, thick, hollow. Radical leaves 3 in.; pinnae 7, ½ in. diam., reticulate-nerved. Bracts like reduced leaves with narrower pinnae; bracteoles linear-obovate, toothed lobed or subpinnaatid. Umbels often subsessile; rays 2–3 in., thick, often hollow; rays of the umbellules often 15–20. Petals lurid green. Styles very small. Fruit 6–10 in., ovoid, subquadrate, somewhat cordate at the base, slightly narrowed close under the calyx-margin which is wider than the summit of the fruit; style bases depressed, inconspicuous. Carpels semi-terete; primary and secondary ridges cellular, hollow, almost covering the carpel, smooth; vittae about 8 (excluding those on the commissure); carpophore 2-partite. Seed ½-terete, dorsally subcompressed, slightly grooved on the inner face.

Subgen. Pentazygon. Fruit narrowed upwards or truncate; calyx-margin not prominent; ridges of the carpel 5, simple inflated rugose or tubercled, secondary wanting.


West Tibet; Falconer. North-west Himalaya; Lance; Lanjar, alt. 17,500 ft., Strachey & Winterbottom. Kashmir; alt. 11,000–14,000 ft.; in many places, C. B. Clarke.

Stem 0–2 in., thick, grooved, often hollow. Radical leaves 3 in. (including petiole), oblong-lanceolate. Umbel solitary, sessile, with some of the rays (peduncles of single umbels?) again umbellated; bracts leaf-like; bracteoles 6–10, 1–2-pinnate, with lanceolate acute ultimate segments, often white-membranous on the margin. Fruit 6–10 in., ellipsoid, narrowed upwards; primary ridges inflated, spongy, of cellular tissue, nearly covering the carpel, glistening when very young, then rugulose, lax, finally tubercled; vittae usually 2 between the primary ridges. Seed ½-terete, dorsally subcompressed, subpentagonal.

3. T. dissectum, C. B. Clarke; radical leaves 2-pinnate, secondary pinnae pinnaatid glabrous ultimate segments small linear acute, fruit small ovoid truncate, ridges narrow not rugose.—Cortia, sp. 3, Herb. Ind. Or. H. f. & T.

Sikkim; Tungu, alt. 13,000–14,000 ft. J. D. H.

Stem 0–7 in., not thickened. Peduncles 1–4 in.; bract linear-oblung, pinnaatid, segments lanceolate-linear acute; bracteoles pinnate with narrow acute segments; primary rays ½–1½ in. Style-bases prominent in the young fruit. Fruit 6–10 in., slightly narrowed upwards; pericarp thin, slightly inflated; ridges hollow, much narrower than in the preceding species, furrows nearly covering the fruit, vittae 1–2 in each furrow. Carpophore slender, 2-partite. Seed lunate, dorsally compressed.

4. T. hirsutulum, C. B. Clarke; radical leaves 2-pinnate, secondary pinnae pinnaatid hirsute ultimate segments small linear acute, fruit small ovoid truncate ridges narrow not rugose.
Sikkim; Tungu, alt. 13,000–14,000 ft., J. D. H.

Stem 0, crown greatly thickened. Leaves with ascending fine hairs on the midrib. Umbels solitary, sessile, with some of the rays again umbelled. Bracteoles 3–6, ½–1 in., 3-fid or pinnatifid. Carpophore stout, 2-fid. Fruit nearly as of T. dissectum, but the ridges less acute, the style-bases less prominent.


Nipal, Gossain Than; Wallich. Sikkim, alt. 11,000–13,000 ft.; Tungu, Lachen, Jongri; J. D. H.; C. B. Clarke.

Stem (including the terminal peduncle) often 1 foot, grooved, hollow. Radical leaves (including the petiole) 3–4 by 1 in., in Sikkim examples twice as large as Nipal ones; pinnae 7–11, segments oblong toothed or lobulate. Bracts of a dilated narrow oblong entire petiole and sub-bipinnate limb with narrow remote segments in Sikkim examples, ovate pinnatifid with approximate broad lanceolate segments in Nipal ones. Fruit ½ in.; style-bases conical, prominent; primary ridges lax; pericarp thin, somewhat inflated; vitre usually 2 between the primary ridges; carpophore 2-fid. Seed semiterete, dorsally subcompressed, hardly concave on the inner face.

Var. stricta; ultimate segments and bracts more acuminate, primary rays shorter, fruit more truncate less narrowed upwards. Trachyopygium, sp. 6. Herb. Ind. Or. H. f. & T.—Sikkim, Chola Pass, alt. 10,000–12,000 ft., J. D. H. This may be a distinct species. Stems very erect, rays of the umbel 1½ in., not much divaricate; but the only distinction of importance is in the fruit which, though not well ripened, is unlike that of **T. obtusiusculum** at the same stage.


Annual herbs, glabrous, erect, corymbose upwards or simple. Leaves 1–3-pinnate, ultimate segments linear. Umbels compound; bracts and bracteoles several, scarious. Calyx-teeth 0. Petals obovate, emarginate. Disc depressed, inconspicuous. Styles short. Fruit elliptic, truncate, laterally compressed, didymous; primary ridges very slender or 0, vitre in each furrow 3–1, minute; carpophore 2-partite or entire. Seed lunate, margins incurved, hence broadly grooved on the inner face.—Distr. Species 4, in Western and Central Asia.

This genus is placed by Bentham (*Gen. Pl. i. 896*) under Conopodium, but differs in the short truncate fruit, the deeply grooved seed, and scarious bracts.


Punjab Plain; Aitcheson.—Distr. Persia, Syria.

Root fusiform. Stem 1–3 ft., erect, panned upwards or (in the small Indian example) simple. Rays of the umbel 5–11, ½–1½ in. Pedicels 6–12, ½ in., Fruit ¾ by ½ in., depressed didymous; ridges obsolete; vitre minute, 2–1 in each furrow.

The Indian solitary example may be a new species, but is more probably only a small specimen; the fruit is even smaller than in **E. meifolia** type, the carpophore subentire.

**VOL. II.**
7. Bupleurum, Linn.

Glabrous herbs, or shrubs. **Leaves** entire. **Umbels** compound; bracts and bracteoles foliaceous, or setaceous, or 0. **Flowers** yellow or lurid, pedicelled or subsessile. **Calyx**-teeth 0. **Petals** obovate, emarginate. **Styles** short. **Fruit** laterally compressed, slightly constricted at the commissure; carpels terete or subpentagonal; primary ridges distinct, sometimes subalate, rarely obscure; secondary 0, or obscure; **vittae** 1–3 between the primary ridges, rarely 0 or many; carpophore entire 2-fid or 2-partite. **Disc** depressed, rarely prominent in fruit. **Seed** terete, sometimes slightly grooved on the inner face.—**Distrib.**

Species 60, European and temperate Asiatic: 1 South African, 1 Arctic American.

A genus at once recognised by its absolutely entire leaves.

1. B. plantaginifolium, Wight Ic. t. 281; upper cauline leaves broadly oblong obtuse mucronate, bracts 3–5 elliptic foliaceous, fruit ½ in. oblong subquadrate subulate, furrows 1-vittate.

Mts. of the Deccan Peninsula; Nilghiris, alt. 6000–8000 ft., Wight, &c. Stout, bushy, 2–7 ft. **Lower leaves** linear-oblong; upper cauline 2–4 by ¾–1¾ in., subsessile, shortly narrowed at the base; nerves 10–50, subpalmate; secondary numer-

2. B. lanceolatum, Wall. Cat. 551; middle cauline leaves petioled ovate or broadly lanceolate, bract 1 small lanceolate or 0, fruit ovoid-oblong, ridges obscure, furrows 3-vittate. **DC. Prodr.** iv. 132.

North-west Himalaya; from Kashmir to Nipal, alt. 4000–9000 ft., common. Perennial, 1–5 ft., erect, nearly simple, or sometimes subpanicled with spreading horizontal branches 1 foot long. **Lower leaves** long-petioled, lanceolate; middle cauline 3–5 by ½–3 in., ovate, acuminate, occasionally rounded at the base, nerves 5–7, subpalmate; secondary nerves numerous, distinct, reticulate. **Bracts** ½ in., acute; bracteoles less than ⅛ in., linear, usually obsolete in the fruit; rays 5–8, unequal; pedicels 6–12, ¼ in., subequal. **Fruit** ½–⅜ in. **Carpels** much incurved when ripe, yellowish-brown, subviscid; ridges distinct in imperfectly ripe fruit, small obsolete in the fully ripe; carpophore entire. **Seed** terete.

3. B. Candollii, Wall. Cat. 552; upper cauline leaves subsessile oblong or ovate hardly cordate lower linear-oblong, bracteoles 4–5 elliptic or oblong usually as long as the flowering umbellule, fruit ellipsoid-oblong, ridges prominent, furrows 3-vittate. **DC. Prodr.** iv. 131.

Himalaya, from Kashmir to Sikkim, alt. 8000–12,000 ft.; frequent. Perennial, 1–3 ft., erect: more or less corymbose upwards. **Lower cauline leaves** 2–5 by ¾–1½ in.; upper 1–4 by ¾–2 in., acute, rarely acuminate, narrowed shortly at the base, subsessile or sessile and amplexicaul; primary nerves 8–12, often subpin-nate, oblique; transverse nerves numerous, distinct, reticulating. **Bracts** 2–3 or 0, ¼–1¼ in., ovate or oblong, acute, foliaceous, angular; bracteoles ⅛–⅜ in., foliaceous, frequently longer than the fruiting umbellule; rays 5–8, rather short; pedicels about half as long as the carpels. **Carpels** ½ in., yellowish-brown, semi-terete or dorsally subcompressed; ridges distinct, but not thick nor winged; carpophore entire.
Seed nearly terete.—The Kashmir and Chumba examples are much more slender than the Sikkim.


**Kashmir**; Budravur, alt. 7000 ft., C. B. Clarke. **Lahul**; Jaeschke.—**Distrib. Amurland.**

Stems 1–2 ft., erect from a decumbent base, corymbose with long branches. Lower cauline leaves 1–1 \( \frac{1}{2} \) in., orbicular, petiole scarcely \( \frac{1}{3} \) in.; upper 1–2 in., orbicular or ovate-oblong, mucronate, not peltate; primary nerves 10–20, palmate; transverse nerves numerous, distinct, oblique, reticulating. **Bract** 1, \( \frac{1}{4}–\frac{3}{4} \) in., ovate, foliaceous, often amplexicaul or cordate, occasionally 0; bracteoles 4–5, usually \( \frac{1}{2} \) in., often 0; rays 5–8, somewhat stout, angular; pedicels about half as long as the carpels. Carpels nearly as in **B. Candollii**, but rather longer, \( \frac{1}{6} \) in.—**B. aureum**, Fisch., differs in the much larger bracteoles, and the often perfoliate upper leaves.

**Var. cachemirica**; lower cauline leaves linear-oblong or linear, upper ovate-lanceolate, ridges subulate.—**Kashmir**, alt. 7500–10,000 ft., C. B. Clarke; common. Lower cauline leaves 5 by \( \frac{1}{3} \) in. Bracts often 0; bracteoles of 1–4 oblong or linear frequently 0.—The extreme forms of this with tall simple stem corymbose near the summit, narrow leaves, and umbels nearly without bracts or bracteoles appear very distinct from **B. jucundum**, but there are numerous intermediate forms.

5. **B. Thomsoni**, C. B. Clarke; cauline leaves linear upper lanceolate or ovate cordate-amplexicaul, bracteoles 5–9 lanceolate acuminate or linear, carpels glaucous 5-winged, furrows 4–3-vittate.


Erect, 2–3 ft., corymbose. Upper cauline leaves 2–4 in., lanceolate, acuminate, uppermost sometimes ovate, transverse reticulating nerves obscure. **Bracts** usually 0, sometimes 1–2 lanceolate; rays of the umbel 6–10, 1–2 \( \frac{1}{2} \) in.; bracteoles usually as long as the flowering umbellules, caudate; rays of the umbellule often 20, about half as long as the mericarp. **Fruit** \( \frac{1}{5} \) in., oblong, subquadrarate; carpels terete, wings more than half as broad as the nucleus; carpophore very thin, 2-partite.—This has been supposed to be allied to **B. diversifolium**; but the foliage seems nearer that of **B. jucundum**, var. cachemirica; it should be compared with **B. polyphyllum**, Ledeb.; **Boiss. Fl. Orient.** ii. 551, of which no authentic example is at Kew.


**North-west Himalaya**, alt. 7000–9000 ft., Thomson. **Kashmir and Baltistan**, alt. 9000–12,000 ft., C. B. Clarke.—**Distrib. West Asia, South-East Europe.**

Lower cauline leaves linear, hardly broader upwards; middle cauline completely amplexicaul. **Bracts** 0, or 1, small, lanceolate; rays of the umbel 8–14; pedicels \( \frac{3}{4}–1 \) in. **Fruit** \( \frac{1}{3} \) in. glaucous, in outline oblong; disc brown, subprominent.—United with **B. falcatum**, Linn. both by Reichenbach l.c. and in **Boiss. Fl. Orient.** ii. 850: it differs in the completely amplexicaul, usually inflated, base of the cauline leaves, the lower leaves linear not at all obovate, the fruits glaucous much more strongly ribbed. Whether regarded as a species or variety, India produces the plant of Rochel in its most characteristic form.
7. **B. falcatum, Linn.**; **DC. Prodr.** iv. 132; radical leaves linear broader upwards middle cauline linear acute narrowed at the base more or less amplexicaul, bracts 1-5 lanceolate small or 0, bracteoles 4-5 distinctly shorter than the fruiting umbellule, carpels narrowly oblong, ridges not prominent, furrows 3-vittate. **Jacq. Fl. Austr.** t. 158; **Boiss. Fl. Orient.** i. 850. B. imai-colum, A. Kerner **Nov. Sp. Fl. dec.** ii. 19.

**Himalaya**; alt. 3000-12,000 ft., from Kashmir to Bhotan, frequent. **Khasia** Mts.; alt. 3000-6000 ft., frequent. —**Distrib.** Central and W. Asia, S. Europe.

Stem 1-4 ft., erect, corymbose upwards. Radical leaves spatulate-oblong in the typical European specimens, in the Indian (which belong to the form **B. graminium** Vill.) they are but slightly broader upwards. Cauleine leaves ½-amplexicaul or sessile, long acuminate, secondary nerves not prominent. Bracts usually 0 in the Indian forms, sometimes a few scarcely ¼ in.; bracteoles usually not longer than the flowering umbellule, narrowly lanceolate; rays 5-8, 1½ in.; pedicels 5-15, usually less than half the length of the fruit. **Fruit** ½-⅔ in., brown; carpels terec, ridges distinct; disc yellow or brownish, not prominent.

**Var. 1. marginata,** Wall. Cat. 566 (sp.); margins of the leaves prominently cartilaginous. **DC. Prodr.** iv. 132.—Himalaya and Khasia Mts.; the most frequent form.—Middle cauline leaves often completely amplexicaul, but narrowed not widened close to the base.

**Var. 2. Hoffmeisteri,** Klotzsch in Reis. Pr. Waldem. Bot. 146, t. 62 (sp.); cauleine leaves numerous less acuminate scarcely at all amplexicaul, carpels ½ in. glaucous, ridges very prominent.—Kashmir, alt. 8000 ft., C. B. Clarke; Falconer.—Leaves somewhat suddenly acute, mucronate, glaucous, primary nerves strong, secondary subprominent.

**Var. 3. nigrocarpa,** Jacquem. ms. (sp.); stems numerous from the crown, often procumbent, cauleine leaves ovate-lanceolate or linear widest very near the amplexicaul base, bracts 3-4, ⅓ in. lanceolate-linear, disc prominent on the half ripe fruit purple-black. **B. virgatum,** Wall. Cat. 555 not of **W. & A.** B. gracillimum, Klotzsch in Reis. Pr. Waldem. Bot. 148, t. 50 (sp.)—Baltistan, Kashmir, and N.W. Himalaya; alt. 10,000-14,000 ft. frequent. Sikkim; Yakla alt. 10,000 ft., C. B. Clarke.—This has all the appearance of an alpine variety of **B. falcatum.** The leaves vary a good deal in width; the lower always linear, the uppermost sometimes ovate. In habit it agrees with an authentic example of **B. baldense,** var. **enceum,** Boiss. Fl. Orient. ii. 849, but the leaves seem never oblong.

8. **B. mucronatum,** W. & A. **Prodr.** 370; cauleine leaves linear or linear-oblong mucronate often subobtuse narrowed at the base, bracts 4-5 lanceolate prominent, carpels elliptic, ridges prominent, furrows 2-1 (rarely 3-)vittate. **B. ramosissimum,** W. & A. **Prodr.** 370; **Wight. Ic.** t. 1007. **B. falcatus,** **Var. ramosissimum,** Dalz. & Gibs. Bomb. Fl. 108. **B. virgatum,** W. & A. **Prodr.** 370, not of **Wall.** B. **nervosum,** Moon Cat. 22.

**Mts. of the South Deccan and Ceylon**; alt. 5000-8000 ft.; plentiful.

Differs essentially from **B. falcatus,** **Linn.** in the fruit being elliptic instead of oblong, shorter, and narrowed at the apex. Also there are invariably present 4 or 5 bracts, often ¼-½ in., the bracteoles are more prominent usually exceeding the flowering umbellules, and the upper cauleine leaves are less acuminate. **W. & A.** have distinguished three forms as under:

**Var. 1. typica**; stem little branched, upper leaves linear-oblong obtuse mucronate, bracteoles sometimes exceeding the fruiting umbellules, carpels strongly ridged, furrows usually with solitary large vittae.—South Deccan.

**Var. 2. ramosissima,** W. & A. l.c. (sp.); stem corymbose upwards, leaves less obtuse, bracteoles about as long as the flowering umbellules, carpels distinctly ridged, furrows usually 2-vittate.—South Deccan.

**Var. 3. virgata,** W. & A. l.c. (sp.); habit nearly of **B. falcata** but the fruit very markedly ellipsoid, often only ¼ in. long and nearly as broad, ridges not very promi-
nent, furrows usually 3-vittate.—Ceylon.—Stem usually simple, erect, laxly corymbose above, cauleine leaves subacute.—It is the existence of this var. that has led to the referring the South Indian species to *B. falcatum*. This Ceylon plant differs from the Himalayan *B. falcatum* not only in the shortened fruit but in the invariable presence of 4–5 bracts.


**Nilghiri Mts., alt. 7000 ft.; Wight, &c.**

Stem 4–14 in., slender, erect; otherwise closely resembling *B. mucronatum* from which it differs chiefly in the very small fruits (1½ in.). The lower distichous leaves are in the typical examples very closely packed, 12–16 in the space of 1 in.; but when these are absent it is difficult to distinguish from small examples of *B. mucronatum*.


**Himalaya, alt. 8–13,000 ft.; from Kashmir to Sikkim; common.**

Stem 8–24 in., erect, corymbose upwards; sometimes branching from the root. Leaves very variable; in the Wallichian type narrow-linear acute, the uppermost (and the bracts) little wider, hardly broader at the base, transverse nerves not prominent; in other examples upper leaves (as the bracts) ovate, acute, with very prominent secondary nerves. Bracts 1–3; bracteoles 5–8, very prominent, with reticulating nerves, often longer than the fruiting umbellule; rays 3–8, 1–2½ in., somewhat stout, striate. Petals and disc usually black. Fruit ¾–1 in.

**Var. 1. himalensis**, Klotzsch in *Reis. Pr. Waldem. Bot.* 146, t. 51 (sp.); upper leaves ovate-lanceolate base amplexicaul ovate almost cordate, bracteoles 8–10 very bract imbricate.—Kashmir, alt. 12,000 ft., frequent.—Connected by imperceptible gradations with the Eastern plant.

**Var. 2. Dalkousieana**; upper leaves and bracts ovate-lanceolate narrowed at the base, petals yellow, disc brown, fruit strongly ridged hardly winged usually thrice as long as the pedicel.—Dalkousie and Dhurmala, alt. 8000–12,000 ft.; plentiful, *C. B. Clarke.*—Stems 4–8 in., sometimes erect 24 in., much divided or simple, corymbose at the top. Upper leaves and bracts with the transverse nerves obscure. Bracteoles smaller than in typical *B. longicaule*, less acuminate, and much less foliaceous, the transverse nerves far less prominent.—The true affinity of this form is very doubtful: it differs from *B. Candollii* in the cauleine leaves being narrower with obscure secondary nerves, and by having all the leaves more acute: from *B. tenue* in the acute leaves, stout rays of the umbel, and much stronger umbellules.

**Var. 3. stricta**; stems 12–15 in. usually simple terminated by a strict umbel, bracts and bracteoles elliptic-oblong hardly acute pendent in fruit.—Sikkim; Jongri, alt. 12,000–13,000 ft., *C. B. Clarke.* Stem very erect. Lower leaves linear, upper rather broader, all narrowed at the base. Bracts several, sometimes nearly 2 in.; bracteoles orbicular or oblong, sometimes ½ in., longer than the fruiting umbellule; rays of the umbel stout, ascending not divericate. Fruit longer than in any form of *B. longicaule*, sometimes ½ in. —This is almost surely allied to Var. Dalkousieana: but it may be doubted whether it should be attached to *B. longicaule*, Wall.

Himalaya; from Kashmir to Sikkim, alt. 1-9000 ft.; common in the West, and in the lower hills, extending in the plains to Jullundur.

Stem 1-3 ft., solitary, erect, much branched upwards, usually with numerous umbels. Lower leaves linear; oblong leaves usually with 5-9 somewhat distant primary nerves and numerous prominent reticulating secondary ones. Bracts 1-4, \(\frac{1}{8}-\frac{1}{4}\) in., lanceolate or ovate-lanceolate; bracteoles 4-5, \(\frac{1}{2}\) in., ovate-lanceolate, often as long as the fruiting umbellule or longer; rays 3-8, usually less than 1 in., never stout; pedicels rarely exceeding \(\frac{3}{4}\) in. Fruit broadly oblong, yellowish brown; carpels terete; vitæ in each furrow solitary, sometimes obscure.—Distinguished from *B. Candollii* Var. minor by the delicate primary rays of the umbel and the much smaller fruit.

Var. khasiana; upper leaves linear or lanceolate acute or acuminate, bracts and bracteoles narrow-lanceolate prominent, fruit rather longer.—Khasia Mts., alt. 4000-6000 ft.; common; Tenasserim; Martaban Hills, alt. 7000 ft., Kurz.—Stem very often bushy from the base, corymbosely dichotomous with ascending branches, whereas in *B. tenue* type there is a simple main stem with divaricate sub-horizontal branches. Bracts often \(\frac{1}{2}\) in.; bracteoles overtopping the fruits.—This variety has always been referred to *B. tenue*, Don, with which the fruit closely agrees; it resembles *B. mucronatum*, var. *ramosissima* in its leaves bracts and bracteoles, but differs in its smaller, shorter pedicelled fruit. We have not seen Martaban specimens, but as Kurz (Journ. As. Soc. 1877, pt. ii. 114) gives *tenue*, Don, as a native, we assume he alludes to this variety.

12. **B. Maddeni**, C. B. Clarke; cauline leaves small linear acuminate narrowed at the base, bracteoles few not prominent, pedicels less than \(\frac{1}{4}\) in., fruit \(\frac{1}{8}\) in. oblong strongly ridged, furrows 2-3-vittate.—*Bupleurum* No. 8, Herb. Ind. Or. H. f. & T.

North-West Himalaya; Mussoorie, Madden, Jameson; Simla, Lady Dalhousie; Kunawur, alt. 6000-8000 ft., Thomson.

Stems 1-2 ft., several from the root, erect, simple below, with numerous leafy branches upwards. Lower leaves linear, almost subulate; upper \(\frac{1}{2}-\frac{1}{4}\) in., scarcely amplexicaul. Bracts 1-3, \(\frac{1}{8}\) in., lanceolate, often 0; bracteoles 3, less often 4-5, \(\frac{1}{3}\) in., lanceolate or linear, rays 5-8, less than \(\frac{1}{3}\) in. Fruit broadly oblong, glaucous.

—Thomson regarded this as a new species near *B. tenue*, with which it agrees in having very small umbels with subsessile flowers, but it seems more closely allied to *B. falcatum*, var. *Hoffmeisteri*, of which it may possibly be a deajaperedated mountain form.

13. **B. setaceum**, Fenzl in Tchih. As. Min. i. 418; stem slender diffusely dichotomously branched, leaves setaceous, umbels simple few-flowered subracemcd with capillary peduncles, fruit \(\frac{1}{10}\) in. ellipsoid, ridges distinct, furrows 1-vittate. *Boiss. Fl. Orient.* ii. 847.

Kashmir, alt. 4500 ft.; Kishtwar, C. B. Clarke; Stewart.—Distrib. Bithynia.

Annual. Stem 18 in., erect, above divaricately branched. Caulline leaves 1-1\(\frac{1}{2}\) in., uppermost \(\frac{1}{2}\) in., setaceous, 3-nerved. Peduncles \(\frac{1}{2}-\frac{1}{4}\) in., usually springing as though from a bifurcation whereof one branch is arrested. Bracts 1-4, \(\frac{1}{2}-\frac{1}{3}\) in., narrowly linear-lanceolate, usually longer than the fruiting umbel; pedicels 1-4, less than \(\frac{1}{4}\) in. Fruit obscurely transversely rugose between the ridges; vitæ large, distinct, alternating with the ridges; carpels terete, slightly pentagonal.—Identified with *B. setaceum* from Fenzl’s description only. There are several closely allied species perhaps not really distinct: *B. trichopodium*, *Boiss. & Sprun.* (Boiss. Fl. Orient. ii. 864) is much less compound, and the fruits have the furrows 3-vittate.

8. **Apyum**, Linn.

Herbs, annual or perennial, glabrous. Leaves pinnate, 3-partite, or compound. Umbels compound, often leaf-opposed. Bracts and bracteoles 0 (in the Indian species). Flowers white. Calyx-teeth obsolete. Petals ovate, acute,
tip inflexed. Fruit orbicular or elliptic, slightly longer than broad, laterally subcompressed; carpels semi-terete, subpentagonal, plane on the inner face; primary ridges distinct, filiform; secondary 0; furrows 1-vittate; carpophore undivided, or shortly 2-fid. Seed semi-terete, dorsally subcompressed.—Distrib. Species 14, scattered throughout the world.

The genus is hardly separable from Carum; the one Indian species is easily recognized by its short-peduncled umbels opposite a leaf without bracts or bracteoles.


Base of the North-West Himalaya, and outlying hills in the Punjab; Falconer, Jacquinont, &c.—Distrib. Cabul, West Asia, Europe, North Africa.


9. **CICUTA**, Linn.

*Herbs*, perennial, tall, glabrous. Leaves usually compound-pinnate. Umbels compound, rays numerous. Bracts 0, or few; bracteoles many, small. Flowers white. Calyx-teeth acute, minute. Petals obovate, emarginate. Fruit ovoid, not longer than broad, subcompressed, distinctly narrowed at the commissure; carpels semi-terete, dorsally compressed, plane on the inner face; primary ridges broad, corky, obtuse; furrows very narrow, 1-vittate; carpophore 2-partite. Seed semi-terete, dorsally compressed.—Distrib. Species 3, in the North Temperate Zone.


Khaskmir; Falconer; Srinuggur, alt. 5200 ft., C. B. Clarke.—Distrib. Throughout Europe and Temperate Asia; in marshes and ditches.

Stem 2–5 ft., striate, hollow. Leaflets 1–2 by ½–⅔ in. Peduncles 2–3 in., terminal and leaf-opposed. Bracts 0; bracteoles 2–8, ⅓ in., linear or narrowly lanceolate-linear; rays often 15, 1½–2½ in.; pedicels often 30–40, ⅔–¾ in. Fruit ¾ in. in Indian examples (often ⅓ in. in European), lateral primary ridges commissural; commissure obscurely constricted in some Indian examples.—Water hemlock.


Perennial herbs, branched, somewhat rigid. Radical leaves 2–3-pinnate, cauline much reduced. Umbels compound; bracts and bracteoles lanceolate-linear, small, or 0. Calyx-teeth obsolete. Petals white, ovate, emarginate. Fruit ovoid or oblong, more or less laterally compressed, usually hairy; carpels terete, subpentagonal; primary ridges distinct (when the hair is removed), obtuse; furrows 1-vittate; carpophore 2-partite.—Distrib. Species 5 African, 2 Indian.
SUBGEN. **Eriocyla.** Lindley (Gen.). Stem and leaves pubescent. Disc conical, very prominent. Styles long, early divergent, recurved. Ovary and young fruit densely hairy. Fruit oblong, much longer than broad.

1. **P. nudula,** Benth. in Gen. Pl. i. 890; much branched upwards with virgate almost naked branches, umbels long-peduncled, rays 3-6, fruit scarcely laterally compressed. Eriocyla nudula, Lindl. in **Royce Ill.** 232, t. 51.

North-west Himalaya; Kunawur, alt. 10,000-11,000 ft., Royle, T. Thomson; Jacquemont.

Stem 2-3 ft., glabrescent upwards. Lower cauline leaves 2-pinnate, ultimate segments ¼ in., oblone, lobed and toothed; upper much reduced, often to oblong acute sheaths ½ in. Bracts 1-5, ½ in; bracteoles 5-10, ⅔-⅕ in., linear; rays 1-4 in.; pedicels 8-12, ⅔-⅕ in., obscurely pubescent. Fruit ½ in., at first densely hairy, ultimately much less so; carpels oblong, narrower upwards; lateral primary ridges marginal.

2. **P. Thomsonii,** C. B. Clarke; stem with many lateral branches and umbels, rays 4-8, fruit much laterally compressed.—Eriocyla sp. ? 2, Herb. Ind. Or. II. f. & T.

West Tibet; Piti, alt. 10,000-12,000 ft., Thomson. Himalaya; Jacquemont.

Stem 12-18 in., grey-pubescent. Lower cauline leaves 2-pinnate; ultimate segments ⅔ in., ovate, deeply pinnatifid, toothed; upper leaves greatly reduced. Umbels long- or short-peduncled, sometimes sessile; bracts 4-8, ⅔ in., linear; rays ½-⅕ in., pubescent, submentose; bracteoles and pedicels much as in P. nudula, but more hairy. Fruit ⅔ in.; carpels oblong, hardly narrowed upwards; lateral primary ridges within the distinctly constricted commissure.

11. **CARUM,** Linn.

*Herbs,* perennial or annual. Leaves pinnate, or decoupled. Umbels compound; bracts few or many, simple or rarely divided; bracteoles several or many, undivided. Flowers white (in Indian species), polygamous, sterile flowers often with enlarged or irregular petals. Calyx-teeth small, or 0. Petals retuse or emarginate. Fruit ovoid ellipsoid or oblone, laterally compressed and more or less constricted at the commissure; carpels terete, sub-pentagonal, plane on the inner face; primary ridges slender, conspicuous or obscure, lateral commissural; furrows 1-vittate; carpophore 2-fid or 2-partite. Seed terete, dorsally subcompressed, plane or obscurely channelled on the inner face.—Distrib. Species 50 in Europe, Temperate Asia, S. Africa and N. America.

This genus as modelled by Mr. Bentham differs from *Pimpinella* in its solitary vitre, from *Seseli* by the fruit being more or less constricted at the commissure. (See *Pimpinella cespitosa* which has solitary vitre.)

* Fruit glabrous or very nearly so.

1. **C. Caruli,** Linn.; DC. Prodr. iv. 115; ultimate segments of the lower leaves lanceolate, of the upper linear, bracteoles small linear or 0, fruit elliptic-oblong. *Boiss. Fl. Orient.* ii. 870.

Baltistan, Kashmir and Gurwhar, alt. 9000-12,000 ft., Royle, &c.—Distrib. W. and N. Asia, Europe (often cultivated).

Glabrous. Stem 1-3 ft., branched, erect or diffuse. Leaves 2-pinnate, finely dissected; ultimate segments of the lower leaves ¼-⅓ in., of the upper ¼-1 in. Bracts 1-3, small, linear, or 0, rarely divided; rays 3-8, 1-2 in., unequal; pedicels 3-8,

**Nipal**; *Wall.ich.*

Glabrous. Stem 3 ft. or more, much branched, sparingly leafy upwards. Leaves 2-3 in.; pinnae $\frac{3}{4}$ by $\frac{1}{8}$ in., acute, or in the upper leaves often linear. Bracts 1-3, $\frac{3}{4}$ in. linear or 0; bracteoles 0-5, $\frac{1}{4}$ in., linear; rays 8-14; pedicels numerous. Flowers minute, all fertile. Calyx-teeth 0. Petals obovate, slightly emarginate. Styles somewhat long on conical style-bases. Fruit immature, $\frac{3}{4}$ in., nearly terete, probably resembling that of *C. Carui*, but may become broad at the commissure when it may be referable to *Feniculum*.

3. **C. nothin**, C. B. Clarke; ultimate segments of all the leaves short linear, bracteoles 4-5 linear-oblong exceeding the pedicels, fruit nearly as in *C. Carui*.

**Ceylon**

Glabrous. Stem 4-5 in., erect, branched. Leaves 2-3-pinnate, finely dissected; ultimate segments $\frac{1}{2}$ in., somewhat distant and rigid. Bracts 4-5, $\frac{1}{4}$ in., very narrowly oblong, subobtuse; rays 3-7, 1-1$\frac{1}{8}$ in.; pedicels 3-8, rarely attaining $\frac{1}{4}$ in. Calyx-teeth minute. Fruit rather more strongly ribbed than that of *C. Carui*, less narrowed upwards; carpophore 2-partite.—There is little doubt regarding the genus of this plant, it having been originally referred to *Ptychotis* by Sir J. D. H. and having been again dissected by Bentham and marked *Carum*. The doubt is as to its birth-place; it is marked "Ceylon," but not on an original ticket, and there is no collector's name. Its aspect is Alpine Himalayan, not at all Cinghalese. There is another small specimen collected by T. Lobb in Mysore that seems the same thing.


**Kashmir**, alt. 6000-9000 ft.; *Jacquemont, &c.—Distrib.* Beloochistan, N. Asia, Europe, N. Africa.

Glabrous. Root tuberous. Stem 6-30 in., erect, branched. Leaves 2-3-pinnate, finely dissected, ultimate segments of the lower often 4-1 in., of the upper leaves very narrow. Bracts 0, or several, linear, sometimes divided; rays 6-16, 1$\frac{1}{8}$ in.; pedicels 10-15, $\frac{5}{6}$ in. Fruit $\frac{1}{2}$ $\frac{1}{2}$ in., yellowish-brown, almost viscid; carpels exactly oblong, hardly widened at the middle, semi-terete, dorsally subcompressed; ridges thin, distinct; vitta solitary, rather large.

5. **C. stictocarpum**, C. B. Clarke; ultimate segments of the lower cauleine leaves narrowly linear-lanceolate, bracteoles 4-8 linear-lanceolate with scarious ciliate margins, fruit shining minutely puberulo-punctate.—*Ptychotis* sp. 3, *Herb. Ind. Or. H. f. § T.*

**Concan**; Stocks, Law.

Glabrous or minutely hairy. Root fusiform. Stem 1-3 ft., erect, much branched. Leaves 2-pinnate, ultimate segments often 1 by $\frac{1}{12}$ in., upper often with linear segments. Bracts 3-6, $\frac{1}{2}$ $\frac{1}{3}$ in., nearly linear; bracteoles $\frac{1}{4}$ in.; rays 6-12, $\frac{1}{2}$-2 in., equal, slender; pedicels 8-20, $\frac{3}{8}$-1 in. Ovary minutely puberulo-pubescent. Fruit
**Fruit hispid or muricate (see also C. stictocarpum No. 4).**


Throughout India extensively cultivated from Hindoostan and Bengal to Singapore and Ceylon. Not known wild.

Probably a cultivated form of *C. stictocarpum* which it exactly resembles except as to the fruit which is \( \frac{1}{12} \frac{1}{10} \) in., the part used by man and therefore that which has varied under cultivation. This shows a wide difference in size, colour, and hairiness in the two forms, but there is a series of connecting links through the var. *hebecarpa.* In *C. Roxburghianum,* the fruit is more distinctly ridged, subpentagonal; the vitae are most minute, W. & A. say several in each furrow, but they appear generally 1 or 0. The petals are hairy.—*Wight* doubts whether his t. 567 (which is copied from Roxburgh) is the *Pimpinella? involucrata* of W. & A. Prodr. 369; but a reference to his Herbarium shows that it is; the fruit varying somewhat in size and a good deal in hairiness. The only scrap *Wight* got of *C. stictocarpum* he arranged (without name) in *Ptychotis.*


India, extensively cultivated from the Punjab and Bengal to the South Deccan.—Distrib. W. Asia, S. Europe, N.-E. Africa.

Minutely pubescent, or the stem and leaves glabrescent. *Root* fusiform. *Stem* 1–3 ft., erect, branched, leafy. *Leaves* 2–3-pinnate; ultimate segments linear, often \( \frac{1}{2} \)–1 in. *Bracts* several, linear, rarely 0, sometimes divided; rays 4–12, \( \frac{3}{4} \)–1\( \frac{1}{4} \) in.; pedicels 6–16, \( \frac{1}{2} \)–1 in., more or less pubescent. *Fruit* \( \frac{1}{2} \) in., ovoid; carpels subpentagonal, dorsally compressed, nearly plane on the inner face; ridges usually distinct; vitae dorsally, small.—The bracts are in the Indian Ajowan not rarely divided, when it is undistinguishable from the West Asian *C. copticum.* Boissier l. c. maintains that the genus should be *Ammi* because the petals are destitute of a transverse fold; but W. & A. are correct in saying (Prodr. 368) that they are just like those of other *Carums.*


Pubescent throughout, or the lower part glabrescent. *Root* fusiform. *Stem* 2–4 ft.,
erect, corymbose upwards. Ultimate segments of the radical leaves often 2 by ½ in., narrowed at the base, distinctly reticulate-nerved, of the upper narrower, sometimes filiform. Bracts 0–5, ½ in., linear; rays 4–8, ½–1½ in., hispid; pedicels 8–16, ½–1½ in., bracteoles shorter than the pedicels. Fruit ½ in., ovoid, muricate hispidulous, ridges prominent; carpels subpentagonous, dorsally subcompressed; vitre solitary, small.


NIPAL, Wallich. KUMAON; Almora alt. 5000 ft., Strachey & Winterbottom.


10. *C. falconeri*, C. B. Clarke; leaves 2–3-pinnate ultimate segments linear, bracts 4–5 narrowly oblong-linear subobtuse, rays 3–7 glabrous or nearly so.—Ptychotis sp. 8, Herb. Ind. Or. H. f. & T.

GUWHALI; Falconer; alt. 7000–9000 ft., Edgeworth; Chiringa, alt. 7000 ft., Strachey & Winterbottom; Mussoorie, Dr. Bacon.

Glabrous except the pedicels, flowers, and fruits. Root fusiform. Stem 2–4 ft., erect, corymbose upwards. Upper leaves reduced sometimes to the dilated sheaths; ultimate segments very long in all the leaves, sometimes 2–3 by ⅛ in.; rays ½–1¾ in.; bracteoles 4–6, ⅛ in., oblong, subobtuse; pedicels 8–16, 1–1½ in., with scattered hairs. Petals pubescent. Fruit ⅓ in., ovoid, narrowed upwards, densely hairy.—Appears closely allied to *C. anethifolium*; possibly De Candolle’s description of *P. anethifolia* (Prodr. iv. 108) was intended to include this.

—12. **SIUM**, Linn.

Glabrous herbs. Leaves pinnate, pinnae toothed. Umbels compound terminal and lateral; bracts and bracteoles several. Calyx-teeth acute, or obsolete. Petals white, emarginate. Fruit ovoid or oblong, laterally compressed, constricted at the commissure (but the constriction masked in the Indian species by the large corky lateral ridges); primary ridges prominent, obtuse, frequently thickened; furrows 3–2– (or 1–) vittate; carpophore (ex DC.) completely bipartite, each half adnate to the adjoining mericarp. Seed terete.—Distrib. Species 4, in the N. Temperate Zone: 1 in South Africa.

The generic character is here somewhat altered from Bentham’s (in Gen. Plant.), in order to retain the Indian species in *Siom* rather than in *Pimpinella*. *Siom* is here separated by the large simple pinnae of the leaves, and the thickened prominent ridges of the fruit.

1. *S. latijugum*, C. B. Clarke; pinnae of the lower leaves 1 in. ovate or ovate-lanceolate, calyx-teeth 0, fruit elliptic, ridges triangular obtuse corky much wider than the 1-vittate furrows.

KASHMIR and BALTISTHAN, in ditches, alt. 5000–9000 ft.; very common.

Root, stem, leaves, and flowers closely resembling *S. latifolium*, which differs in its smaller pinnae, acute calyx-teeth, less thick ridges of the fruit, and many vitre scattered nearly all round the carpels. *S. latijugum* is that plant which Bentham (in Gen. Pl. ii. 893) refers to as that variety of *S. lancifolium* in which the ridges are broader nearly completely covering the furrows: but it can hardly belong to the
same genus as the true *S. lancifolium* in which the fruits are much smaller the ridges slender with broad 3-vittate furrows. *S. nipponicum*, Maxim, in Bull. Acad. Petersb. Met. Biol. ix. 766, is very near *S. latijugum*, but its calyx-teeth are manifest, and there are vitæ scattered under the ridges besides the subsidiary vitæ in the furrows. In *S. multijugum* the lateral ridges are rather larger than the others, and form with the commissure a wide plane face, there are 2 vitæ only on the commissure close to its medial line. The 4 vitæ on the outer faces of the carpels are large, exactly occupying the furrows. The seed is very accurately terete.

13. **PIMPINELLA, Linn.**

*Herbs, biennial or perennial. Leaves 1-2-pinnate or 1-2-ternate or compound, rarely undivided, toothed. Umbels compound; bracts few or 0; bracteoles usually linear, sometimes 0. Flowers hermaphrodite or poligamo-monoeious. Calyx-teeth 0 or small, lanceolate. Petals usually emarginate, ovate acute or lanceolate caudate. Fruit laterally compressed, usually constricted at the commissure, ovate or ovate-oblong or narrow-oblong; carpels terete or subpentagonal, often dorsally compressed, plane on the inner face; ridges slender, obscure or prominent; furrows 2-3-vittate (in *P. caspita* 1-vittate); carpophore entire 2-fid or 2-partite. Seed terete, ½-terete or dorsally subcompressed, inner face plane or nearly so. — Distr. Species 70, in the northern hemisphere, with a few in S. Africa and S. America.*

*Fruit glabrous or very nearly so.* (See also No. 16, *P. diversifolia, var. alpina*).

1. **P. achilleifolia**, C. B. Clarke; glabrous, lower cauleine leaves 3-4-pinnate ultimate segments linear-lanceolate, bracts 1-5 $\frac{1}{2}$-$\frac{3}{4}$ in. linear, rays 6-10. Athamanta achilleifolia, *Wall. Cat.* 568. Ptychotis achilleifolia, *DC. Prodr.* iv. 109.

Temperate and subalpine Himalaya, Wallich, &c.; from Kumaon; Naini Tal, alt. 8500 ft., *Str. and Wint.*; to Sikkim; Jongri, 13,000 ft., C. B. Clarke.

Stem 3-4 ft., erect, corymbose upwards, with long peduncles. Quaternary pinnae $\frac{1}{2}$-$\frac{3}{4}$ in., often 3-furcate, somewhat rigid, upper leaves reduced, sometimes almost to the inflated sheaths. Bracteoles 4-6, $\frac{1}{8}$ in., linear; rays $\frac{1}{2}$-2$\frac{1}{4}$ in.; pedicels 8-20, $\frac{1}{2}$-$\frac{3}{4}$ in. Fruit $\frac{1}{10}$ in., elliptic, oblong, glabrous, laterally compressed, ridges distinct, furrows 2-3-vittate; disc conical, prominent.

2. **P. nervosa**, C. B. Clarke; cauleine leaves twice 3-partite secondary pinnae 1-2 in. broadly lanceolate serrate nerves beneath much elevated minutely scabrid.

Khasia Mts.; Nonkreem, alt. 5500 ft., *H. f. & T.*

Nearly glabrous. Stem 2-3 ft., stout. Peduncles 1-6 in. Bracts 0; rays 6-12, 1-2$\frac{1}{4}$ in.; bracteoles 3-8, linear, overtopping the umbellules. Flowers all hermaphrodite. Calyx-limb 0. Petals emarginate, white or purplish. Styles short. Fruit $\frac{1}{8}$ in., crowned by short conic style-bases, glabrous; carpels subpentagonal, dorsally subcompressed; ridges distinct, furrows 2-1-vittate.—This from its coarse habit and foliage may be an *Egopodium*, but there are small vitæ in the unripe fruit.

Ptychotis. [LXX. UMBELLIFERAE. (C. B. Clarke.)] 685

zeylanicum, Herb. Rottler & Klein. Anethum trifoliatum, Roxb. Fl. Ind. ii. 96?.

Circars, Roxburgh; Deccan Peninsula and Ceylon, frequent in the hills. Chittagong; at Burkul, C. B. Clarke. Pegu, Kurz.

Nearly glabrous, or the leaves pilose. Stem 2–4 ft., erect, branched. Ultimate segments of the lower leaves often 1–2 by 4–½ in., serrate, of the upper narrower sometimes linear. Bracts 0; rays 6–12, 1–2 in., glabrous or nearly so; bracteoles 1–2, ½ in., often 0; pedicels 6–10, ½–2 in. Fruit ½–1½ in.; carpels ellipsoid, almost globose, ridges slender, rarely white and conspicuous; disc obsolete; carpophore 2-fid, sometimes deeply. Seed nearly terete, not concave on the inner face.—Roxburgh’s description of Anethum trifoliatum, a native of the Circars, will apply to both P. Heyneana and diversifolia. Wallich identified it with his trifoliata (diversifolia, DC.) a Himalayan plant, but W. & A. with more probability refer it to P. Heyneana.

4. P. sikkimensis, C. B. Clarke; cauline leaves 2- sub-3-pinnate, ultimate segments oblong bristle-serrate, fruit ½ in. elliptic longer than broad.—Ptychotis sp., Herb. Ind. Or. H. f.

Sikkim; common in damp forests, alt. 4–7500 ft. J. D. H., C. B. Clarke.

Glabrous or sparsely setulose. Stem 2–4 ft., corymbose. Leaves large, ovate; pinnae and pinnules (½ in.) opposite. Bracts 0 or 1–2, scarcely ¼ in., linear; rays 6–14, 1–3 in., stout, angular, divaricate; bracteoles few, scarcely ½ in., linear; pedicels very many, but only 6–12 fruiting, ½–3 in. Calyx-teeth lanceolate. Petals emarginate, greenish-white; disc prominent; styles very short. Fruit slightly narrowed upwards; ridges not prominent; carpophore stout, undivided; carpels much dorsally compressed, inner face concave; vitæ usually solitary in the two dorsal furrows, and in pairs in the two lateral ones.

5. P. Wallichii, C. B. Clarke; cauline leaves 2-3-pinnate tertiary pinna pinnatifid ultimate segments narrowly lanceolate, fruit ellipsoid broader than long.

Nipal; Wallich in Herb. Hook. Sikkim; alt. 4000–6000 ft., frequent, C. B. Clarke.

Glabrous. Stem 2–4 ft., erect, branched. Leaves large, ovate, pinnae and pinnules opposite, all similarly cut, ultimate segments ½–1 in., often 3-fid, not setulose. Bracts 0; rays 6–12, ¾ in., rigid; bracteoles 1–2, less than ¼ in., linear, or 0; pedicels 8–12, hardly ½ in. Fruit ½ in., laterally subcompressed; disc inconspicuous; ridges prominent; carpophore slender, 2-partite; carpels dorsally compressed, subpentagonal, plane on the inner face; vitæ externally somewhat conspicuous, usually 3 in each furrow and 4 on the commissure.

6. P. Saxifraga, Linn.; DC. Prodr. iv. 120; radical leaves pinnate pinna round or elliptic toothed upper sub-2-pinnate, fruit ellipsoid rather longer than broad. Boiss. Fl. Orient. ii. 873.—Var. dissectifolia; pinna (even of the radical and lower cauline leaves) deeply lobed, lobes lanceolate.

Var. dissectifolia; Kashmir; Tilail, alt. 13,000 ft., and Western Tibet; Karkorum, alt. 14,000 ft.; C. B. Clarke.—Distrin. Europe, Northern and Western Asia.

Glabrous or very nearly so, branched from the root. Stem 8–16 in. curved, striate, little leafy upwards. Leaves oblong, pinna ½–3 in. diam. Bracts 0; rays 5–10, ½–1½ in., unequal, stout, ascending; bracteoles 3–5, ¼ in., linear; pedicels 5–10; ½–1½ in. Petals often pink or purplish. Fruit ½ in.; carpels ½-terete, subpentagonal, dorsally subcompressed; inner face plane; ridges thin, distinct; vitæ 2–3 in each furrow; carpophore stout, often 2-partite. Seed concave on the inner face.—This does not exactly agree in the cutting of the leaf with any described form of P. Saxifraga and the styles are very short; it may be P. rhodantha, Boiss. in Tchih. As. Min. i. 414, Fl. Orient. ii. 874.

From Kashmir to Kumaon, alt. 4-8000 ft., frequent.

Glabrous, or the leaves obscurely pubescent. *Stem* 3-4 ft., corymbose upwards. Secondary *pinnae* 1-2 in. *Bracts* 1-5, \( \frac{3}{4} - \frac{1}{4} \) in., linear; *rays* 5-10, 1-3 in.; *bracteoles* 3-5, \( \frac{1}{4} - \frac{1}{4} \) in., linear; *pedicels* \( \frac{1}{4} - \frac{1}{4} \) in. *Petals* yellowish-green or nearly white. Fruit nearly globose, laterally compressed, yellowish-brown, subsessile; carpels terete, ridges slender, furrows 2-3-vittate; disc small.—Easily recognised by the long slender pedicels.

8. **P. bella**, C. B. Clarke; leaves all similarly cut 2-pinnate secondary pinnae pinnatifid ultimate segments oblong entire mucronate, fruit narrowly oblong.

**Sikkim**; alt. 10,000-12,000 ft., *Thomson, C. B. Clarke, N. Gamble*; on the watershed between Sikkim and Nipal.

Glabrous. *Rootstock* long, fusiform. *Stem* 1-3 ft., corymbose upwards. *Leaves* large, ovate, pinnae and pinnules opposite, often white beneath. *Bracts* 0, or 1 linear, 1 in.; *rays* 10-15, 1-2 in., angular, stout; *bracteoles* 2-5, \( \frac{1}{4} \) in., linear; *pedicels* 8-16, \( \frac{3}{4} - \frac{1}{4} \) in. *Calyx-margin* obsolete. *Petals* obvate-lanceolate, plane. *Discal* large, conical. *Carpophore* 2-partite. *Fruit* \( \frac{1}{4} \) in.; carpels terete, subpentagonal, inner face hardly grooved; ridges slender, furrows 2-3-vittate.


**Sikkim**, Northern valleys, Samdong and Lachen, alt. 8-11,000 ft., *J. D. H.*

Glabrous. *Root* tuberous. *Stem* 1-2 ft., slender, sparingly leafy, remotely corymbose or subvaginate. *Lower leaves* cut and whitened beneath as in *P. bella*, segments 1-2 in.; upper much reduced with very narrow segments. *Umbels* subracemose upwards, rays few and slender; bracts and bracteoles 0, or inconspicuous; pedicels 4-6, \( \frac{1}{4} - \frac{1}{4} \) in., slender. *Petals* very small, often elongate with a whip-like tail much exceeding their own length (but this does not appear uniformly present, some petals on the same plants being emarginate with a short inflexed point). *Fruit* \( \frac{1}{16} - \frac{1}{12} \) in. globose, narrowed at the apex, laterally subcompressed, yellow-brown; ridges obscure; furrows 2-3-vittate; disc evanescent; carpophore slender, 2-partite.


**Himalaya**, alt. 8-15,000 ft.; from Gurwhal to Sikkim; *Wallich, Falconer, J. D. H., C. B. Clarke*.

*Root* tuberous (not annual as Bentham l. c.). *Stem* 6-8, rarely 12 in. *Petals* often excessively elongate as in *P. Hookeri*. *Furrows* 2-3-vittate.—Closely resembling *P. Hookeri* but smaller, the ultimate segments of the upper leaves not exceeding \( \frac{1}{4} \) in., the carpophore undivided thick; fruit \( \frac{1}{16} \) in., elongated, narrower upwards.

*Var. dissecta*; leaves 2-3-pinnate ultimate segments scarcely \( \frac{1}{2} \) in. ovate acutely 3-lobed or longer linear subobtuse.—With the type.

11. **P. acronemaefolia**, C. B. Clarke; leaves 2-3-pinnate ultimate segments ovate acutely 3-lobed or longer linear subobtuse, peduncles 1-2 on each stem 2-6 in. stout, bracts 1-5 \( \frac{1}{5} \) in. linear.
Pimpinella.] LXX. Umbellifere. (C. B. Clarke.) 687

Sikkim, alt. 11,000 ft., Chola, Lachoong, J. D. H.; Singaleleh, alt. 10,000 ft., C. B. Clarke.

Glabrous, 3–8 in.; root tuberous. Leaves exceedingly like those of *P. tenera var. dissection;* segments ½ in. Rays 6–12, 1–1½ in., stout; bracteoles small; pedicels 10–16, ½–1 in. Petals elliptic, obtuse, plane, white or pinkish. Fruit nearly as that of *P. tenera.*—This closely resembles *Vicia millefolia,* but the plane petals exclude it from that genus.

12. **P. hastata,** C. B. Clarke; lower cauleine leaves cordate or hastate triangular-lanceolate crenate serrate villous beneath, fruit ovate as broad as long.—Pimpinella, sp. 17, Herb. Ind. Or. H. f. & T. Umbellifera, No. 875, Griff. Itin. Notes 56.


Root fusiform. Stem 3 ft., erect, obscurely pubescent, sparingly leafy, laxly corymbose upwards. Leaves 2–4 by 1–1½ in., nearly glabrous above; upper cauleine sometimes 3-partite with cordate ovate leaflets, uppermost sometimes reduced with narrow segments. Bracts 0; rays 5–8, 1–1½ in., scabrid, subpubescent; bracteoles 0, or 1–2, ½ in. linear; pedicels 5–10, ½–1 in. Fruit ½–1½ in., brown, subdismous, acute upwards, dorsally subcompressed, inner face slightly concave; ridges obscure, furrows 2-vittate; disc prominent, conical; carpophore 2-fid or 2-partite. Seed ¼-terete, dorsally compressed, inner face slightly concave.

13. **P. Leschenaultii,** DC. Prodr. iv. 122; lower cauleine leaves cordate orbicular serrate slightly pubescent beneath, fruit ovate-oblong glabrous or when young with a few scattered hairs. *W. & A. Prodr.* 369; *Wight Ic.* t. 1005; Thwaites Enum. 131.

Nilgiris, alt. 6–8000 ft.; *Wight, &c.* Ceylon, alt. 6000 ft., Thwaites.

Root fusiform, perennial. Stem 1–2 ft., virgate, obscurely pubescent. Leaves 1–2 in. diam., glabrous above or nearly so; upper reduced to sheaths, or 0. Bracts 0, or 1 small linear; rays 6–12, 1–1½ in., scabrid-pubescent; bracteoles 1–3, ½ in. linear; pedicels 6–12, ½–1 in. Fruit ½–1½ in., narrowed upwards, strongly compressed, brown, finally glabrous; carpels ¼-terete, not dorsally compressed, inner face plane; ridges not prominent, furrows 2-vittate; disc prominent, conical.—Thwaites says his Ceylon examples are intermediate between *P. Leschenaultii* and *P. Candolleana*; but they are typical *P. Leschenaultii* with large laterally compressed fruits, &c.

**Fruit papillose-scarbrous or pubescent.** (See also No. 13, *P. Leschenaultii*).


Mts. of the South Deccan, alt. 5–8000 ft., frequent.

Resembles generally *P. Leschenaultii* but is more pubescent. Lower leaves usually subacute, often pubescent above, sometimes 3-partite with petiololed leaflets; upper often 1–2-pinnatifid, ultimate segments oblong acute. Fruit very scabrid, shortly acute at the apex, very slightly compressed laterally, always much smaller and shorter than that of *P. Leschenaultii*; carpels ¼-terete, dorsally subcompressed, inner face plane; ridges prominent, furrows 2–3-vittate; carpophore stout, entire.—*P. javana* DC. Prodr. iv. 122 is nearly allied to this but has the upper leaves reduced and not pinnatifid, and the fruits less strongly ribbed.

15. **P. monolca,** Dalz. in Hook. Kew Journ. iii. 212; lower cauleine leaves 3-partite leaflets long-petiololed cordate-ovate, fruit terete papilloose subscabrid.

Mts. of Malabar and the Southern Deccan; Wight, &c.

Minutely pubescent or nearly glabrous. Stem 7–8 ft. (Dalzell), much divided upwards. Leaflets 2–3 by 1–2 in., sharply serrate; petiolules ½–2 in.; upper leaves often much reduced, cut into setaceous linear segments. Bracts 0, rarely 1 linear; rays 6–12, ½–1 ½ in.; bracteoles 1–3, ½ in., linear, or more often 0; pedicels 8–20, outer ¼ in. male, inner ⅔ in. hermaphrodite. Fruit ⅔ in., subdiumous, scarcely acute; carpels ¼ terete, inner face plane; ridges obscure, furrows 2-vittate; disc not prominent; carphopore entire, or very shortly 2-fid.


Throughout the Himalaya, alt. 4–10,000 ft., very common. Khasia Mts. alt. 3–6000 ft., common.—Distrib. China.

Villous, subtomentose, or scarcely pubescent. Stem 2–5 ft., corymbose upwards. Radical and lower cauline leaves often round-ovate; cauline often with 3–5-leaflet, or twice 3-partite or sub-2-pinnate; segments of the uppermost narrower, occasionally almost linear; leaflets usually 1–3 by ½–1 in., serrate, sometimes laciniate or subpinnatifid. Bracts 0, or 1–2, ½–1 ½ in., linear; rays 6–16, ½–1¼ in., sometimes villous, never quite glabrous; bracteoles 8–3, ½ in., or 0; pedicels 8–16, ½–¾ in., all fruting. Petals emarginate, white greenish or lurid. Fruit ⅔ in., laterally compressed, ridges never prominent sometimes quite obscure, furrows 2–3-vittate; disc not prominent; carpels ¼ terete, scarcely subpentagonal, dorsally subcompressed, inner face plane.—A common and variable plant; the north-west examples frequently have the peduncles rays and fruits very villous and the leaves glabrous above. The Khasian have deeply cordate leaflets and papillio-pugose fruit: from these P. monoca Dalz. differs only by the minute fruits and the barren outer pedicels.

Var. 1. alpina; petals ovate acute plane, young ovary glabrous, fruit shining yellow-brown glabrous much attenuated upwards. P. trifoliata, Wall. Cat. 565 (type specimen).—Sikkim, alt. 9–10,000 ft.—Rays of the umbel pubescent.

Var. 2. divisa; lower cauline leaves pinnate and 2-pinnatifid, young fruit terete clavate upwards, disc yellow-brown. Pimpinella sp. 5 Herb. Ind. Or. H. f. & T.—Kashmir and Kistwar, alt. 7000–8000 ft., Thomson.—Probably a new species but there is no ripe fruit.

17. **P. Stracheyi**, C. B. Clarke; leaves simple and 3-partite leaflets ovate pubescent, fruit oblong; narrowed at both ends, style-bases cylindric apex conical.—Pimpinella sp. 3, Herb. Ind. Or. H. f. & T.

Kumaon; Dhauli River, Samangentha, alt. 7500 ft., Strachey & Winterbottom. Generally resembling P. diversifolia on a small scale; stems 6–16 in., grey-villous, as the Kumaon examples of P. diversifolia generally are. Fruit ⅓ in.; carpels terete, ridges slender, furrows 2-vittate. Young ovary villous. Fruit ultimately glabrescent shining yellow-brown.—Nearly allied to No. 22, P. caespitosa.

18. **P. Parishiana**, Kurz in Journ. As. Soc. 1872, pt. ii. 309, and 1877, pt. ii. 115; leaves pinnate or 2–3-partite leaflets ovate acute serrate or laciniate, bracts 2–5 almost sheathing the rays, ovary minutely pubescent.

Moulmein, and Martaban, Kurz; on the Zwebak; Parish.

Habit of P. diversifolia, much divided and very leafy upwards. Leaflets 1–2 by

BOMBAY (probably in the Ghats) Dalzell; Concan, Stocks.
Pubescent, somewhat villous upwards, hardly tomentose. *Stems* 2–4 ft., much branched upwards. *Lower leaves* large, ovate, ultimate leaflets 1 in., petioluled, serrated with very long teeth; upper often reduced to sheaths. *Bracts* 0; rays 4–8, 1 in.; bracteoles 0, or 1–2 very small linear; pedicels 3–10. 1/2–1 in. *Fruit* 1/4 in., almost rostrate, laterally very compressed, hardly constricted at the commissure; style-bases elongate, conical, yellow-brown; carpels terete, obscurely pentalogonal; ridges very obscure, furrows 2–3-vittate; carpophore slender, 2-fid.


BOMBAY, Dalzell; Nasik, Edgeworth; Belgaum, Dr. Ritchie; Concan, Stocks.
Minutely pubescent or glabrous. *Stems* many, 8–24 in. *Lower leaves* with 4–8 pair of pinnae, terminal leaflet often large, pinna 1/2–3 in. diam., acutely serrate; upper leaves reduced, often more divided. *Bracts* 4–7, 1/2–3 in. linear; rays 4–12, 1 in., glabrous; bracteoles 4–7, 1/4 in., linear, minutely ciliate-pubescent; pedicels 8–16, 8–1 in. *Fruit* 1/10 in., brown, hardly acute, laterally compressed, disc not prominent; carpels terete, hardly pentalogonal, not dorsally compressed; ridges obscure; furrows 2–3-vittate.

21. P. lateriflora, Dalz. & Gibbs. Bomb. Fl. 106; "leaves ternate leaflets twice ternate lobes of the lower leaves lanceolate of the upper linear all acute mucronate, fruit densely covered with small granular tubercles." Dalz. l.c.

Deccan; in ravines, common; Dalzell.
Puberulous, 1–1 1/2 ft., erect. *Peduncles* long, slender, leaf-opposed; umbels 3–10; bracts 3–7, subulate; bracteoles 7, subulate, as long as the pedicels. *Flowers* pink.—Not seen; the above copied from Dalzell.


Gerwhal; Niti, alt. 12,000 ft., Edgeworth, Strachey & Winterbottom. Kunawur; above Rogi, alt. 9–10,000 ft., Thomson.
large, subglobose on the young fruit; carpels \( \frac{1}{2} \) terete, dorsally compressed; ridges obscure; furrows 1-vittate on the few fruits available.—Strach. & Wint. suggest that this is the *Thaspium foliosum*, Royle.

14. **OSMORRHZIÀ, DC.**

Perennial herbs. *Leaves* twice 3-partite or sub-2-pinnate, ultimate segments large. *Umbels* compound, very lax; bracts few narrow, or 0; bracteoles much shorter than the pedicels. *Calyx-teeth* obsolete. *Petals* emarginate, white. *Fruit* linear-oblong, long-attenuate at base; laterally compressed, somewhat constricted at the commissure; carpels terete, subpentagonal, grooved on the inner face; primary ridges slender, distinct, secondary 0; furrows 2-3-vittate; carpophore slender, 2-fid. *Seed* \( \frac{1}{2} \) terete, dorsally subcompressed, inner face grooved.—Distr. Species 4, North Asia, Japan, North America, Andes.


North-West Himalaya, from Kashmir to Kumaon, alt. 5000-8000 ft., frequent.—Distr. N.E. Asia, Japan, temperate N. America.

Rootstock not tuberous. *Stem* 2-5 ft. *Leaves* large, ovate; ultimate segments 1-2 in. coarsely toothed, sometimes larger and pinnatifid. *Bracts* \( \frac{1}{2} \) in., linear; rays 3-6, 1-4 in.; bracteoles 4-6, \( \frac{1}{2} \) in., lanceolate; fruiting pedicels 3-6, \( \frac{1}{2} \) in.; several other short abortive pedicels indicate male flowers. *Fruit* \( \frac{1}{2} \) by \( \frac{1}{16} \) in., rather suddenly narrowed into conical style-bases; styles in fruit variable in length.

—The Japanese examples have the pinnae generally 3-partite: the length of styles cannot be invariably connected with any other character, geographical or morphological.

15. **CHÆROPHYLLUM, Linn.**

Herbs, glabrous or hairy. *Leaves* pinnately decompound, or 2-pinnate with pinnatifid pinnules. *Umbels* compound; bracts 1-2, linear, or 0; bracteoles 3-6, lanceolate, or linear, or 0. *Flowers* white, usually polygamous; the central subsessile fertile, others pedicelled male or hermaphrodite. *Calyx-teeth* obsolete (Indian species). *Petals* emarginate. *Fruit* oblong, narrowed upwards, glabrous (in the Indian species), laterally compressed, narrowed at the commissure; primary ridges broad, obtuse, prominent (in *C. cachemiricum* obscure); furrows 1-vittate (or vittæ 0 in *C. capmoïdes*); carpels terete, inner face with a deep T-shaped groove; carpophore stout, undivided or shortly 2-fid; disc not prominent on the fruit. *Seed* terete, inner face with a deep narrow groove, widened into a hollow in the centre of the seed.—Distr. Species 30; in temperate regions.

Technically separated from *Anthriscus* by the more prominent ridges of the fruit. As regards the Indian species, the only one referred to *Anthriscus* is easily distinguished by the very scabrid fruit.

1. **C. villosum**, Wall. Cat. 558 chiefly; stem with many long deflexed white hairs especially below, upper leaves 2-3-pinnate more finely divided than
the lower ultimate segments small, fruit oblong scarcely beaked. *DC. Prodr.* iv. 225.

**HIMALAYA, from Kashmir to Sikkim; alt. 5000-12,000 ft., frequent. Khasia Mts., alt. 4000-6000 ft., frequent.**

*Root fusiform. Stem 1-4 feet, erect, branched, always hispid below, often hairy upward. Leaves large, secondary pinnae of the upper pinnate or pinnatifid, ultimate segments scarce \( \frac{1}{2} \) in., with 2-4 lanceolate teeth, often with scattered hairs; segments of the lowest often 1-3 by 1 in. pinnatifid scarcely half-way down; upper sheaths usually inflated, hairy, with prominent white margins. Bracts 0; rays 3-6, 1-3 in., stout; bracteoles 2-5, \( \frac{1}{2}-\frac{3}{4} \) in., linear, often white margined, soon reflexed; pedicels 10-15, often 3-8 fruiting. Fruit \( \frac{1}{2} \) in., equally broad its whole length, narrowed somewhat suddenly at the tip.*

2. **C. reflexum, Lindl. in Royle Ill.** 232: glabrous or very sparsely pilose, upper leaves 2-pinnate more finely divided than the lower ultimate segments small, fruit oblong narrowed into a thick cylindric beak. *C. villosum, Wall. Cat. 558 in part.*

North-west Himalaya; from Dalhousie to Kumaon; alt. 5000-9000 ft., frequent.

Much less hairy than *C. villosum*, the fruit larger, and usually 1 (sometimes 2-3), ripen in each umbellule; pedicels of the other flowers being reflexed, as sometimes in a much less degree in *C. villosum*. Fruit \( \frac{1}{2}-\frac{3}{4} \) in., beak \( \frac{1}{4} \) in.; vittae of the commissure 2, in the narrow part of the groove.

3. **C. acuminatum, Lindl. in Royle Ill.** 232; more or less hairy, upper leaves 1-2-pinnate pinnae large oblong closely regularly falcate-serrate, fruit oblong narrowed close under the style-bases.

**HIMALAYA from Kashmir to Kumaon; alt. 5000-9000 ft., frequent.**

*Stem 2-4 ft., usually with some long white hairs. Lower leaves often with ultimate pinnae 2 by \( \frac{1}{2} \) in., oblong, acute, upper reduced with narrower segments. Umbels bracts bracteoles and fruit much resembling those of *C. villosum*; petals somewhat larger, often somewhat radiant; fruits smaller (\( \frac{1}{2} \) in.) fewer (often 2-3) to the umbellule.—Closely allied to *C. villosum*, though very different in the cutting of the leaves. Lindley puts it next *C. aromaticum*, Jacq., but it more resembles *C. aureum*, Linn.*


**Kashmir; Jacquemont. Kishwar and Banahal; alt. 6000-8000 ft., Thomson.**

Nearly glabrous. *Stem 12-24 in. Leaves 4-8 in., lax, ovate; ultimate segments \( \frac{3}{4}-\frac{1}{2} \) by \( \frac{1}{2}-\frac{3}{4} \) in., undulate, mucronate. Bracts 0; rays 4-8, 1-3\( \frac{1}{2} \) in., stout; bracteoles 4-7, \( \frac{1}{2} \) in., lanceolate; pedicels 6-12, \( \frac{1}{2}-\frac{1}{2} \) in., most of them fruiting. Fruit \( \frac{1}{2} \) in., black, minutely punctate, very much constricted at the commissure, narrowed upwards, scarcely beaked; style-bases narrow, conical; carpels subtrapezoid from the extreme narrowing of the inner face; furrows subconcaue, epicarp thin, no trace of vittæ.—The Algerian Balansea Fontanesii, Boiss. & Reut., said hardly to differ from this by Benth., t. c., apart from the crenate lobed leaflets, the large style-bases, and other prominent specific marks, has the fruits broadly grooved on the very wide commissure, and has large vittæ.*

5. **C. cachemericum, C. B. Clarke;** upper leaves sub-2-pinnate secondary pinnae oblong deeply toothed or subpinnatifid, fruit oblong-lanceolate, ridges obscure.
North-west Himalayas; Dalhousie, alt. 7000 ft.; C. B. Clarke.

Stem 2–3 ft., hispid with reflexed hairs. Bracts 0; rays 5–8, ½–1 in.; bracteoles 1–4, ⅛ in., linear, obscure; pedicels 12, the central alone fruiting. Fruit ½ in.; carpels terete; ridges so obscure that the species should perhaps be referred to Anthriscus; furrows 1-vittate, no vittae in the groove.

Var. dissecta; glabrous, leaves 3-pinnate finely cut, fruit nearly ½ in. sometimes 2 to the umbellule.—Kashmir, Sind Valley, alt. 12,000 ft., C. B. Clarke.—Rays longer and stouter than in the type. Perhaps a distinct species, but the fruit closely agrees with that of C. cochemiricum except that it is a little larger.

16. SCANDIX, Linn.

Annual herbs. Leaves pinnately decompound, ultimate segments small, narrow. Umbels compound or simple; bracts 1 or 0, bracteoles several. Flowers white, polygamous, often radiant. Calyx-teeth 0, or minute. Petals emarginate. Fruit oblong, laterally compressed, beak many times longer than the seed; carpels terete or dorsally subcompressed, with a T-shaped groove on the inner face; primary ridges distinct, broad or narrow, secondary 0; vittae solitary in each furrow, slender, or 0; carpophore undivided or 2-fid. Seed terete, dorsally subcompressed.—Distrib. Species 10; all northern, mostly Mediterranean.

1. S. Pecten-veneris, Linn.; DC. Prodr. iv. 221; bracteoles lanceolate often incised or lobed at the apex, beak of the fruit dorsally compressed hispidulous on the margins, fruit 1–2 in. Boiss. Fl. Orient. ii. 914.


Stem 6–12 in., glabrous or pilose as are the leaves. Umbels simple or compound, short-peduncled; bracteoles ¼ in., lanceolate, pubescent or ciliate; pedicels 3–8, hardly ⅛ in. in fruit. Beak of fruit twice as long as the seed; ridges broad, obtuse.

17. ANTHRISCUS, Hoffm.

Herbs. Leaves 2–3-pinnate, ultimate segments pinnatifid or toothed, often broad. Umbels compound; bracts 1–2 or 0; bracteoles several, undivided. Flowers white, often polygamous. Calyx-teeth 0, or minute. Petals emarginate. Fruit oblong or ovate-oblong, narrowed shortly at the apex, laterally compressed, constricted at the commissure; often scabrous; carpels terete or dorsally subcompressed, with a T-shaped groove on the inner face; primary ridges not prominent, vittae solitary in each furrow, minute, or 0; carpophore undivided or 2-fid. Seed terete, dorsally subcompressed.—Distrib. Species 10, the north temperate regions of the Old World, 1 extending to North-west America.


Kashmir, alt. 7000–11,000 ft.; plentiful.—Distrib. N. Asia to E. Europe.

Stem 5–8 ft., sparingly hairy. Leaves large with large pinnae and segments, glabrous, or pubescent beneath. Bracteoles ⅛ in. Flowers often radiant. Fruits ⅛ in., numerous in each umbellule, black, minutely puncticulate as well as prominently hispid, ridges acute at the apex.
18. **SESELI, Linn.**

Herbs, glabrous or pubescent. Leaves 2–3-pinnate or twice 3-partite. *Umbels* compound; bracts 0 few or many, undivided or pinnate; bracteoles several or many. *Calyx-teeth* minute, lanceolate or linear, or 0. *Petals* emarginate, white. *Fruit* oblong ovate or circular, not laterally compressed, broadest at the commissure; carpels ½–terete or (in *S. trilobum*) much dorsally compressed; inner face plane or (in *S. trilobum*) concave; ridges strong, obtuse or subacute, lateral hardly larger than the dorsal; vitte in each furrow solitary, usually prominent; carpophore 2-partite, 2-fid or entire; disc not prominent on the fruit. *Seed* ½-terete; in *S. trilobum* dorsally compressed, inner face excavated.—**Distrib.** Species 40; in the N. temperate zone of the Old World; with 2 doubtful Australian.

1. **S. sibiricum**, Benth. in Gen. Pl. i. 901; lower leaves 2-pinnate secondary pinnae large ovate toothed and pinnatifid sessile or decurrent, calyx-teeth triangular minute deciduous, fruit cylindric villous. *Boiss. Fl. Orient.* i. 967.

**West Tibet; Falconer. Kashmir; Jacquemont.** Kishwar, alt. 7000–8000 ft., Thomson.—**Distrib.** Asia, Russia.

Minutely pubescent or nearly glabrous, 2–4 ft. *Lower leaves* often 1 ft., upper often pinnate; pinnae somewhat firm in texture, subspinulose, secondary 1–2 in. *Bracts* usually 0 or 1; in the Siberian examples sometimes many; rays 15–40, 1–2½ in., pubescent; bracteoles 5–10, ½ in. lanceolate; pedicels 10–25, ½–1 in. *Young fruit* ½ in., densely villous, in age less so; carpels ½-terete, dorsally compressed, inner face plane; epicarp somewhat thickened, ridges strong, subequal, vitte large; carpophore slender, 2-partite. *Seed* plane on the inner face.


Plains of India; from the foot of the Siwaliks to Assam and Coromandel; frequent in Central Bengal.

Annual, erect or diffuse, 4–12 in., often much branched. *Leaves* all similarly cut, upper without linear segments. *Bracts* 4–5, ½ in., narrowly lanceolate, cndate, pubescent; rays 8–16, ½–1 in.; bracteoles like the bracts but rather smaller; pedicels 8–16, ⅛ in. *Flowers* white or pinkish. *Fruit* ½–1 in. (in Roxburgh’s drawing copied in *Wight* Jc. t. 569) glabrous; in *Wall. Cat.* 7215, and *W. & A. Prodr.* 371, very hirsute (and hardly half as large); hairs often clubbed or subellate at the apex; carpels ½-terete; vitte distinct; carpophore entire.—There are examples with fruit intermediate between the two extreme types above described.


**East Bengal; from Bhotan and Assam to Dacca and Chittagong; Wallich, &c.** —**Distrib.** China.

Annual, erect, 8–16 in., glabrous or nearly so, very leafy upwards. Margin of the leaves minutely serrulate. *Peduncles* often leaf-opposed, short, stout; bracts ½–¾ in., sometimes pinnate; rays 8–16, usually shorter than the bracts; bracteoles 6–12, ⅛ in., linear; pedicels 10–25, ⅛ in. *Calyx-teeth* 0. *Petals* white or pinkish.
Fruit much like *S. indicum* but smaller and quite glabrous; ridges subequal.—Mr. Bentham did not possess well-ripened fruit when he referred this species to *Discopleura*. Hance referred the Chinese examples doubtfully to *Cnidium Monnieri*, *Cass.*; *DC. Prodr.* iv. 152; to which *Seseli daucifolium* bears a general resemblance; but it is more leafy upwards with short peduncles, and the fruit is much smaller and not dorsally compressed.


North-West Himalaya; *Nitt.*, alt. 8000–10,000 ft., *Edgeworth*. GURWHAL, *Edgeworth*. KUMAON; *Millel*, alt. 11,000 ft., *Strachey & Winterbottom*.

Stem 8–24 in., villous and little leafy upwards. *Leaves* minutely pubescent above; secondary pinnae ¼–½ in., crenate-serrate or irregularly lobed. *Bracts* 3–5, ¼ in.; rays 5–10, 1–2 in.; bracteoles 5–8, ½–1 in., linear; pedicels 10–20, ½–1 in. *Fruit* ¼–½ in., but little longer than broad; carpels convexo-concave, much dorsally compressed; ridges strongly marked, subequal, vittae prominent; carpophore deeply 2-fid. *Seed* excavated on the inner face, differing thus from all other species of *Seseli*.—Perhaps a *Pycnocycla*.


Perennial herbs; branches rush-like, few-leaved. *Leaves* pinnately dissected, ultimate segments narrow. *Rays* of the *umbels* very short; bracts and bracteoles many, small; umbellules containing one central sessile fertile flower, and several pedicelled males. *Calyx-tube* hairy; teeth small, lanceolate, often unequal. *Petals* obovate, emarginate, hairy. *Fruit* oblong-lanceolate, hairy, terete (one carpel is frequently aborted), surrounded by the inflated pedicels of the barren flowers, receptacle not (or very obscurely) enlarged; carpophore 0; carpels ¼-terete, inner face deeply grooved; primary ridges filiform, minute, lateral at the margin of the broad commissure; vittae numerous, very slender, usually 1 under each primary ridge and several still more minute scattered in the endocarp. *Seed* lunate or with a T-shaped groove on the inner face.—**Distrib.** Species 7, in N.E. Africa and W. and Central Asia.

Whether one or more flowers in each umbellule perfect seed is hardly a character of generic importance in this order, as may be seen in *Charophyllum*, wherein *C. reflexum* is hardly separable specifically from *C. villosum*. If this point be withdrawn from the generic character of *Pycnocycla*, it will include *Seseli trilobum*, Benth.


**North-West India**, *Royle*; Sutledge banks, *Falconer*. JUBBULPORE; Beddome. SATPURA HILLS, G. Thomson.—**Distrib.** Abyssinia.

Branched from the base, 1–2 ft.; branches terete, striate, subglaucous. Radical leaves long-petioled, pinnately dissected; segments remote, glabrous or nearly so; cauline similar, but smaller more shortly petioled. *Umbels* in flower ½ in. diam., resembling those of a *Scabiosa*; bracts 5–6, ½ in., oblong-linear or linear, hairy; bracteoles similar but smaller; rays ½ in., hairy; pedicels hairy. *Flowers* in the umbellule about 9; petals white, with reddish midrib, hairy. *Fruit* ¼ by ½ in.; carpel with a T-shaped groove on the inner face.—Beddome’s examples have the two carpels producing perfect and similar seeds.

Glabrous herds, biennial or perennial, tall. Leaves 2–3–4-pinnate, ultimate segments linear. Bracts 0; bracteoles 0, or few small linear. Calyx-teeth 0. Petals yellow, emarginate. Fruit not laterally compressed, oblong or ellipsoid; carpels 4-terete, ridges prominent subequal, furrows 1-vittate; carpophore 2-partite. Seed somewhat dorsally compressed, inner face slightly concave.—Distr. Species 3–4, from the Canaries to Western Asia, 1 widely cultivated.


Commonly cultivated throughout India, alt. 0–6000 ft.; often appearing wild.—Distr. Widely cultivated.

The Indian examples have the ultimate segments of the leaves very long; the form *F. piperitum* DC.; Boiss. Fl. Orient. ii. 975; Reich. Ic. Fl. Germ. t. 1931 (with short linear ultimate segments) has not been communicated from India.


Tall, perennial herds. Leaves 3–4-pinnate. Umbels compound; bracts and bracteoles many. Calyx-teeth 0. Petals emarginate, yellow. Fruit oblong, commissure broad; carpels 4-terete, dorsally compressed, inner face nearly plane but the epicarp there thin, introflexed in a deep T-shaped groove; epicarp spongy; primary ridges large, subequal or the lateral larger; vitæ small, numerous; carpophore 2-partite. Seed dorsally compressed, inner face slightly concave, with a deep narrow T-shaped groove.—Distr. Species 25, in the Mediterranean and West Asian regions.


Kashmir and Baltistan, alt. 6000–11,000 ft., Falconer, &c.—Distr. Cabul, Kashgar.


22. *Gnanath*, Linn.

Herbs, growing in wet places; root fibrous creeping or stoloniferous (in Indian species). Leaves 1–3-pinnate, ultimate segments large or linear or minute, rarely reduced almost to sheaths. Umbels compound; bracts 0–1 (in Indian species); bracteoles several linear. Flowers white, often polygamous, males sometimes radiant. Calyx-teeth small, acute. Petals emarginate. Fruit
glabrous, ellipsoid, longer than broad, or globose, nearly terete, commissure broad; carpels 1/3-terete, dorsally compressed, inner face plane; lateral primary ridges large, triangular, corky; dorsal and intermediate primary ridges much smaller, sometimes obsolete, or all subequal; furrows 1-vittate; carpophore 0; disc usually not prominent. Seed terete or dorsally compressed, inner face plane.—**Distrib.** Species 25, in the northern hemisphere and S. Africa.


Northern India from Kashmir and the Punjab to Assam and Pegu; alt. 0-5000 ft., frequent; common in the plains of Bengal.—**Distrib.** Java, China, Japan.

Glabrous or nearly so, 2-4 ft., rooting freely from many of the lower nodes. Leaves from 3-partite to 2-pinnate; ultimate segments 1-2 by 1/3-1 in., those of the upper leaves never linear. Rays 6-30, 1/2-2 in., stout. Carpels 1/3 by 1/3 in., subquadrate-ellipsoid, sometimes shorter scarcely longer than broad; dorsal and intermediate ridges usually distinct, scarcely prominent. Seed, in horizontal section, nearly circular.—Dasyloma japonica, *Miq. in Ann. Mus. Lugd. Bat.* iii. 59, has the leaflets rather more lobed than any Indian examples, but is (ex-Maximowicz. ms.) only a variety of *E. stolonifera*. From this *E. lactinatum*, *Miq. Fl. Ind. Bat.* i. pt. 741, does not appear to differ.


**Bengal Plain and Assam, common.**—**Distrib.** Formosa, Bonin, Lou-choo.

Glabrous or nearly so; 8-16 in.; usually erect on muddy banks. Secondary pinnae 1/3-1 in., of the lower leaves often ovate, of the upper lanceolate. Umbel often sessile. Bracts 0; rays 4-6, rarely 1/3 in., stout. Calyx-teeth small. Carpels 1x-10 by 1x in., subquadrate ellipsoid; dorsal and intermediate ridges usually distinct scarcely prominent. Seed nearly terete. The Indian specimens of *E. stolonifera* are readily separated from *E. benghalensis*. *E. stolonifera* is usually much larger with thickened hollow stems; the leaves are less compound, the rays more numerous and longer, the fruits longer. It is more difficult to separate the Chinese and Japanese specimens.

3. **E. linearis**, *Wall. Cat.* 586; stem decumbent, nodes rooting freely, leaves 2-pinnate ultimate segments of the upper 1/3-1 in. linear, peduncles and umbels nearly as in *E. stolonifera*. **DC. Prodr.** iv. 138.
NIPAL; Wallich.

Closely allied to *E. stolonifera*, and only differing in the more narrowly cut leaves, ultimate segments of the uppermost often $\frac{3}{4}$ by $\frac{1}{2}$ in. Wallich's specimens have no fruit. Mr. Bentham (in *Gen. Pl.* i. 906) has admitted this plant to specific rank.

4. **E. Hookeri**, C. B. Clarke; stem decumbent, nodes rooting, leaves mostly reduced to a fistular rachis with a very few remote pinnae, pinnae $\frac{1}{2}$ in. linear, often 0.—Dasylosma sp. 1, *Herb. Ind. Or.* H. f. & T. Umbellifera, No. 985, *Griff. Itin. Notes* 57.

**Khasia** Mrs., alt. 5000–6000 ft.; *Griffith*, H. f. & T., C. B. Clarke.

Glabrous, or the rays sometimes pubescent. Stem 2 ft., erect, fistulous, scarcely divided. *Peduncles* elongate. *Bract* 1, $\frac{1}{4}$ in., linear, or 0; rays 4–8, $\frac{1}{2}$–$\frac{3}{4}$ in.; bracteoles often longer than the flowering umbellule. *Calyx-teeth* obsolete. *Carpels* $\frac{1}{2}$–$\frac{3}{4}$ by $\frac{1}{2}$ in., almost exactly as in *E. benghalensis*, much smaller than in *E. fistulosa*, which this plant resembles in habit.


**Sikkim** and **Bhotan**, alt. 5000–8000 ft., frequent. **Khasia** Mrs., alt. 4500–6000 ft., frequent.

Glabrous, 2–3 ft., weak, diffuse, branched. *Leaves* 6 in., ovate, sometimes 5-pinnae. Rays 4–8, $\frac{1}{2}$–$\frac{3}{4}$ in.; bracteoles not prominent. *Carpels* $\frac{1}{2}$ by $\frac{1}{2}$ in. dorsally compressed, otherwise much resembling *E. benghalensis* and *E. Hookeri*. *Seed* dorsally compressed.


Glabrous perennial herbs. *Leaves* 1–2-pinnae, ultimate pinnae toothed pinnafifid or multifid. *Bracts* several, entire or divided; bracteoles numerous. *Calyx-teeth* prominent (in Indian species). *Petals* obovate, emarginate, white. *Fruit* ovate-oblong, commissure broad; carpels dorsally compressed; primary ridges slender; furrows 2–4-vittate; carpophore 2-partite.—**Distrib**. Species 3 in Central Asia, 1 in India.


**Canara**; Hohenacker.

**Calyx-teeth** narrow-lanceolate, small. *Fruit* $\frac{1}{2}$–$\frac{3}{4}$ in. subquadrate, ellipsoid; ridges distinct, very slightly elevated, the two intermediate approximated to the dorsal. *Carpels* lunate, compressed, face somewhat excavate. *Seed* compressed, lunate, inner face concave.—The examples in ripe fruit have the aspect leaves and umbels of *P. involucrata*, *W. & A.*, but the fruit (several still attached) is altogether different, and the plant is referred by Benth. (*in Gen. Pl.* i. 909) to *Schultzia* though the fruit does not quite fit that.—If not a *Schultzia*, the three approximate ridges on the back of the carpels must still bring the plant to this position in the Umbelliferous series.


A glabrous herb; root tuberous. *Leaves* 2-pinnae or twice 3-partite, secondary pinnae ovate lobed or deeply pinnafifid. *Umbels* compound; bracts 0, or few small; bracteoles few, small, linear. *Calyx-teeth* small, or the outer
slightly larger. Petals oblong, emarginate, white. Fruit ovoid, terete; commissure broad; primary ridges slender; furrows wide, 1-3-vittate; carpophore 2-partite. Seed \( \frac{1}{2} \)-terete, dorsally compressed, inner face plane.


**Bombay** and **Malwa**, Dalzell; **Concan**, Stocks; **Canara** and **Mysore**; Law.

Stems 8-18 in., several, weak. Secondary pinne of the leaves \( \frac{1}{4}-1 \) in., ultimate segments lanceolate or ovate. Rays 3-8, \( \frac{1}{4}-1 \frac{1}{2} \) in.; pedicels 6-12, \( \frac{2}{3}-\frac{3}{4} \) in. Fruit \( \frac{1}{3} \) in.; style-bases depressed, inconspicuous.—This resembles a *Pimpinella*, but the habit is weak, struggling.

25. **LIGUSTICUM**, Linn.

Perennial herbs. Leaves 1-2-3-pinnae or twice 3-partite, ultimate pinnae large minutely pubescent in the Indian species. Umbels compound, usually of many rays; bracts many, few, or 0; bracteoles many, rarely divided. Calyx-teeth obsolete. Petals obovate, emarginate, white. Fruit ovoid or ellipsoid, terete or dorsally subcompressed, commissure broad; carpels dorsally compressed, inner face plane; primary ridges very conspicuous, often subulate, subequal or the lateral wider; dorsal furrows at least 2-vittate, lateral at least 3-vittate; carpophore 2-partite. Seed dorsally compressed, about twice as broad as thick, inner face plane or slightly concave.—Distrib. Species 20, in the northern hemispheres.

1. **L. Thomsoni**, C. B. Clarke; leaves 1-pinnae pinnae oblong lobed or pinnatifid, fruit ellipsoid terete, lateral ridges scarcely wider than the dorsal.—Oreocome sp. 2, Herb. Ind. Or. H. f. & T.

**West Tibet**, alt. 11,000-13,000 ft., Thomson.—Distrib. Afghanistan.

Nearly glabrous; top of the peduncle pubescent. Stem 2 ft. Lower leaves 6 by 2 in., oblong, primary pinna 1 by \( \frac{3}{4} \) in., lobed, or sometimes deeply pinnatifid; upper leaves reduced nearly to sheaths, or small more finely cut. Bracts 5-8, \( \frac{2}{3}-\frac{3}{4} \) in., white-margined, deciduous; rays 10-20; bracteoles like the bracts but smaller. Fruit \( \frac{1}{2} \) by \( \frac{10}{12} \) in.; ridges subulate; dorsal furrows 3-2-vittate, lateral 3-vittate, commissure 6-10-vittate.

Var. evolutionis; larger, leaves larger 2-pinnae nerves pubescent.—North Kashmir, alt. 6000-9000 ft., frequent. Stem usually 3-5 ft., often leafy upwards. Umbel very many-rayed, dense. Fruit exactly as in the type.

2. **L. marginatum**, C. B. Clarke; lower leaves pinnate pinnae large deeply pinnatifid, carpels orbicular with prominent lateral ridges much dorsally compressed.

North-west Himalaya; alt. 7000-10,000 ft.; Simla and Naini Tal; Thomson.

Glabrous or nearly so, 2-4 ft, corymbose, nearly naked upwards. Lower cauline leaves 8-10 by 3 in., pinna 1-1\( \frac{1}{2} \) in. deeply pinnatifid, lower sometimes subpinnate; segments oblong, serrate or lobed, often minutely pubescent. Peduncles long, pubescent upwards. Bracts 1-6, \( \frac{1}{2} \) in. linear; rays 12-20, \( \frac{1}{4}-1\frac{1}{2} \) in.; bracteoles 4-8, \( \frac{2}{3}-\frac{3}{4} \) in., linear. Fruit larger than in *L. Thomsoni*, the lateral ridges much wider than the dorsal; vittae 3 in each furrow, 8 on the commissure. Seed 4-6 times as broad as thick, inner face slightly convex.—Undistinguishable from *L. Thomsoni* in the absence of fruit.

3. **L. elatum**, C. B. Clarke; lower cauline leaves 2-pinnae secondary pinnae 1-3 in. ovate pinnatifid, fruit elliptic much dorsally compressed. Cortia
elata, Edgew. in Trans. Linn. Soc. xx. 55. *Levisticum argutum, Lindl. in Royle Ill. 232.

North-west Himalaya; Simla, alt. 7000-8000 ft., Edgeworth. Lahul; Jaeschke.

**Stem** 2-3 ft. Lower leaves 12 by 8 in., secondary pinnae distant; upper pinnate or reduced to sheaths. **Bracts** 1-4, ¼ in., linear, or 0; rays 12-40, 1-½ in.; bracteoles 6-12, ¼ in., linear; pedicels very many. **Fruit** ¾-½ in., nearly as in *L. marginatum*, but the carpels are longer than broad; dorsal furrows 2-3-vittate, lateral 3-vittate, commissure 6-8-vittate. **Seed** 4-6 times as broad as thick, inner face plane.—Edgeworth's description is most accurate; the word *biuittatis* in the specific character being a misprint for *triuittatis*. He suggests that it may be the imperfectly described *Levisticum argutum*, Lindl.

**26. SELINUM, Linn.**

Perennial, branched herbs. **Leaves** pinnately compound. **Umbels** compound; rays numerous; bracts many, linear or pinnatifid, or few, small, or 0; bracteoles numerous, linear, serrate or pinnatifid, sometimes few small. **Calyx-teeth** obsolete, or lanceolate or linear. **Petals** obovate, emarginate, white or yellowish-green. **Fruit** ovoid or subquadrate, commissure broad, more or less dorsally compressed or complanate; lateral primary ridges winged, corycic or papery, dorsal and intermediate ridges approximate, equal or unequal, as wide as the lateral or not, sometimes excurrent, not winged; dorsal furrows 1-vittate (or rarely 1 large deep-seated 2 small lateral superficial) or 0, lateral furrows 1-4 vittate; carpophore slender, 2-partite; style-bases not prominent in fruit. **Seed** subterete, or more or less dorsally compressed, inner face plane or slightly concave, not grooved.—**Distrib.** Species 35, chiefly north temperate, with a South African and Andean.

The Indian species are uniform in habit, having very compound leaves, large umbels with prominent involucres, three approximated ridges excurrent on the back of each carpel, and the seed not grooved on the inner face. *Ligusticum* differs by having the dorsal furrows 3-vittate. *S. tenuifolium* has the three dorsal ridges not excurrent, often subobsolete, and is therefore hardly different from *Angelica. Pimpinella sikkimensis* (p. 685) was referred to *Selinum* by Bentham.

**1. S. striatum**, Benth. in Gen. Pl. i. 914; ultimate segments of the leaves ⅜ in. narrowly oblong-lanceolate, fruit little dorsally compressed, ridges subequally winged, vitæ all solitary, seed about twice as broad as thick. Laserpitium striatum, Wall. Cat. 553 (not *Ligusticum striatum*, DC. Prodr. iv. 158).

**NIPAL; Wallich. Khasian Mts.; alt. 3500-6000 ft., abundant.**

Glabrous or nearly so; 1-4 ft., frequently with many withered fibres at the base. **Leaves** 4-8 in., ovate, 3-4-pinnate, uppermost sheath often extending the whole length of the petiole. **Bracts** 4-6, ¼-⅜ in., linear: rays glabrous or obscurely pubescent; bracteoles 4-8, ¼ in., linear, minutely white on the margin, hardly serrate, not divided. **Calyx-teeth** linear, oblong, twice as long as broad. **Fruit** ¾-½ in., lateral furrows 1-vittate, vitæ twice as wide as those in the dorsal; commissural vitæ 2, wide apart. **Seed** obscurely 2-grooved on the inner face.—Easily recognised by the little-compressed fruits and seeds. All the specimens are Khasian, except Wallich's, which have the ultimate segments of the leaves less narrowly cut, showing the secondary nerves impressed: the fruit is exactly as in the Khasian examples. In *Ligusticum striatum*, DC. Prodr. iv. 158, the furrows are multi-vittate, Bentham, l.c., assuming that DC. possessed the true *S. striatum*, points out that he was mistaken on this point. But DC. also says that his *Ligusticum striatum* had "leaves 2-pinnate the lobes acute entire seldom incised," so that his plant cannot be
referred to any Indian *Selinum*. Wallich must have distributed two plants mixed under one name in this as in so many other cases.


Himalaya; alt. 6000–13,000 ft., from KASHMIR to Bhotan, very common.

Stem 2–6 ft. Lower leaves often 1 ft., in outline ovate, usually 3-pinnate, tertiary pinnae 1–2-pinnatifid, glabrous or pubescent; upper leaves reduced, sheath often as long as the petiole. Bracts 4–8, ⅔–1½ in., linear, often toothed or slightly lobed, rarely pinnate; rays generally villous; bracteoles 5–12, often longer than the umbellule, white-margined, often lobed rarely pinnate or 2-pinnatifid. Calyx-teeth linear; carpels slightly elliptic, longer than broad; dorsally compressed, subcom- planate, 3 dorsal ridges approximate, often hardly elevated (whence DC. considered the plant a *Peucedanum*); commissural vittae 4–6, distant from the medial line. Seed compleanate, inner face plane or subconvex.

Var. 1. *filicifolia*; quaternary pinnae pinnatifid into more remote lobes. Oreocome ilicifolia, *Edgew. in Trans. Linn. Soc. xx. 55*. *Laserpitium conifolium*, Wall. Cat. 584.—Kashmir and N.W. Himalaya, alt. 6000–10,000 ft., frequent.—Wallich's *L. conifolium* is without fruit and the leaves appear to belong to two species. *Ligusticum conifolium*, DC. Prodr. iv. 158, from the description appears the same plant; DC. says that the furrows are multi-vittate; refering probably to the lateral ones, which have 2–4 vittae.

Var. 2. *elata*; quaternary pinnae ⅓–1 in. broad-elliptic, fruit ¼ in. much dorsally compressed, dorsal and intermediate ridges distinctly winged, but less so than the lateral, dorsal furrows 1-vittate, lateral 2–3-vittate, seed 4 times as broad as thick. Oreocome elata, *Edgew. in Trans. Linn. Soc. xx. 54*.—North-west Himalaya, alt. 6000–10,000 ft.; from Kashmir to Kumaon; frequent.—This seems to differ from *S. tenuifolium* in the winged 3 dorsal ridges: the fruit also is somewhat larger. As regards Edgeworth's main character of "primary pinna of the upper leaves sessile at the apex of the sheath," it is common to *S. tenuifolium* and most other Indian species.

3. *S. Candollii*, *DC. Prodr.* iv. 165; quaternary pinnae ⅔–3 in. broad-elliptic pinnatifid deeply into narrow-lanceolate acute segments, fruit ⅛ in. somewhat dorsally compressed, ridges all distinctly subequally winged, furrows all 1-vittate, seed 2½ times as broad as thick. Angelica Candollii, *Wall. Cat. 582*.

Kashmir; alt. 7000–8000 ft., Thomson. NIPAL and KUMAO; Wallich. SIKKIM; alt. 12,000 ft., C. B. Clarke. Stem, leaves, bracts and umbels generally like *S. tenuifolium*, but the fruit very distinct. Fruit subquadrate, longer than broad; 3 dorsal ridges approximate; vittae in the lateral furrows solitary, but twice as broad as the dorsal, commissural 2, thick, somewhat widely separated. Seed convexo-concave, margins obtuse.

4. *S. vaginatum*, C. B. Clarke; secondary pinnae mostly 1 in. lanceolate serrate scarcely lobed or pinnatifid, bracteoles 1–2-pinnate, fruit ⅛ in. dorsally compressed, ridges all winged the lateral more broadly, vittae obsolete, seed 3 times as broad as thick. Cortia vaginata, *Edgew. in Trans. Linn. Soc. xx. 55*.

From KASHMIR to KUMAO, alt. 6000–12,000 ft., frequent. Glabrous, or nearly so, 2–4 ft. Leaves 4–10 in., elliptic; lower like *Sium lati-
folium; upper reduced; primary pinnae sometimes sessile on the sheath. Bracts few, usually inconspicuous; bracteoles 8–12, 3/4–14 in., usually exceeding the umbellule. Calyx-teeth long linear lanceolate. Fruit subquadrate, longer than broad, 3 dorsal ridges approximate. Seed plane on the inner face, or slightly concave.—The Herbarium specimens are largely mixed with fruits of *S. elatum*; and Edgeworth's descriptions of the fruit and bracteoles seem taken from these: the true plant has very large compound bracteoles, and the above description of the fruit is of ripe ones attached to unmistakable leaves. Mr. Bentham has referred it to *Ligusticum*, from the leaves approaching the Indian *Ligusticums* and the obsolete vittec; but the compound bracteoles and long calyx-teeth refer it to *Selinum*.

5. *S. papyraceum*, C. B. Clarke; tertiary pinnae 3/4 in. ovate serrate or half-pinnatifid into lanceolate segments, fruit 3/4 in. much dorsally compressed, lateral wings papery wider than the 3 dorsal, dorsal furrows 1-vittate lateral usually 2-vittate, seed in horizontal section elliptic twice as broad as thick.

From BaltistanandKashmir to Sikkim, alt. 8000–12,000 ft.; frequent.

Resembling *S. tenuifolium* so closely that it is difficult to separate until the fruit is nearly ripe: the leaves are usually less compound, the rays less villous, the bracteoles not white-margined. Fruit often longer than the umbellule, subquadrate, rather longer than broad, very strongly compressed; lateral ridges, quite unlike the white coryx wings of the other Indian *Selinums*: 3 dorsal ridges very close together, usually very small, but in some examples the intermediate ridges are developed, nearly as wide as the lateral, the dorsal remaining minute. Seed very narrow compared with the breadth of the carpel, commissural vittec close to the carpophore.

**Doubtful species.**

?S. *dissectum*, Wall. Cat. 581; leaves pinnate segments twice pinnatifid, lobes linear-oblong acute, bracts 0, bracteoles few, flowers yellowish, fruit nearly orbicular narrowly margined, furrows 1-vittate, vittec very distinct, commissural pair close to the carpophore. *Peucedanum* dissectum, DC. Prodr. iv. 178.—Nil; Gossain Than, Wallich. Habit of *Ethusa.*—The sheet in the Wallichian Herbarium contains —1, a good specimen in flower having 4–8 bracts and prominent bracteoles; 2, a young flowering specimen, exinvolucrate; 3, a detached umbel in fruit. DC.'s description, copied above, appears made up from 2 and 3, excluding 1; 1 certainly does not belong to 2, and it is possible that the fruit 3 belongs to neither.

27. **CORTIA**, DC.

Perennial herbs, often nearly stem-less. Leaves 3–4-pinnate, mostly radical, ultimate segments linear. Umbels compound, central one often sessile on the rootstock with numerous unequal rays; bracts rays and bracteoles many, often pinnate or 2-pinnate. Calyx-teeth prominent, sub-linear. Petals obovate, emarginate, white or purplish. Fruit orbicular or elliptic, much dorsally compressed; lateral ridges winged, dorsal and intermediate approximately much narrower sometimes hardly winged; dorsal vitte solitary, lateral solitary or in pairs; carpophore 2-partite. Seed much dorsally compressed, inner face plane.—Distr. Species 2; Himalayan.

This genus only differs from the Indian species of *Selinum* in the elongate unequal rays of the umbel; *C. Lindleyi* differs from all the *Selinums* by its compound pinnate bracteoles, *C. Hookerii*, by being stemless.

From Kumaon to Bhutan, alt. 12,000-16,000 ft.; Wallich, &c.

Stem 0-8 in. Leaves glabrous or nearly so, ultimate segments rarely \( \frac{1}{10} \) in., setaceous. Umbel often sessile; bracts (in the peduncled umbels) many large 2-pinnate; rays often pubescent, very unequal, sometimes 8-12 in. Fruit \( \frac{3}{4} - \frac{4}{5} \) in.; carpels elliptic, slightly cordate at base; 3-dorsal ridges slightly equally winged, much narrower than the lateral: dorsal furrows 1-vittate, lateral usually 2-vittate. Seed 4-5 times as broad as thick.

2. **C. Hookeri**, C. B. Clarke; bracteoles long simple or slightly lobed, styles of the fertile flowers very long, fruit commissure 2-vittate.—Cortia sp. 1, Herb. Ind. Or. II. f. & T.

Sikkim; alt. 13,000-18,000 ft., Donkiah, Jongri, &c., J. D. H.; Yakla, alt. 16,000 ft., C. B. Clarke; Phaloot, S. Kurz.

Stemless, with the fruit packed in dense masses over the crown, and a few long umbel-rays often added. Leaves glabrous or minutely pubescent, ultimate segments \( \frac{1}{12} - \frac{1}{4} \) in., linear. Rays usually pubescent; bracteoles \( \frac{1}{2} - \frac{3}{4} \) in.; pedicels of the fruit \( \frac{1}{12} - \frac{1}{4} \) in., often ultimately thickened; umbellules generally unisexual, males with long stamens and obsolete styles. Fruit \( \frac{1}{2} \) by \( \frac{3}{8} \) in., depressed-circular, base cordate; 3 dorsal ridges slightly equally elevated, or the dorsal slightly winged, the intermediate nearly as broad as the lateral: furrows all 1-vittate, vittae rather large. Seed 4-5 times as broad as thick.—The variation in the wings of the fruit of this species may be seen in one umbellule. But the great difference in the ultimate segments of the leaves is only seen in different plants, and may indicate two species: in one they are about \( \frac{1}{12} \) in., in the other about \( \frac{1}{4} \) in., and much more remote.


Perennial or biennial herbs, glabrous or nearly so. Leaves 1-4-pinnate, ultimate pinnae ovate, pinnatifid or multifid, setaceous. Umbels compound, rays many; bracts many, or few, often pinnatifid or compound, frequently white-margined; bracteoles many, broad, more or less white-margined, entire toothed or pinnatifid. Calyx-teeth small, or 0. Petals obovate, emarginate, white or dark purple. Fruit elliptic or oblong, orerete or dorsally subcompressed; epicarp often lax; commissure broad; primary ridges winged, lateral narrower broader than the others; furrows 1-vittate, or the lateral 2-vittate, or vittae many; carpophore 2-partite. Seed dorsally compressed, 2-3 times as broad as thick, inner face grooved concave or nearly plane.—Distrib. Species 16; Asiatic and Russian.

1. **P. Govanianum**, Bent. in Gen. Pl. i. 915; leaves pinnate pinnae \( \frac{1}{2} - \frac{1}{4} \) in. toothed or pinnatifid, bracteoles obovate toothed or subpinnatifid at the apex, fruit \( \frac{1}{4} \) in. lateral ridges narrowest. Ligustricum Govanianum, Wall. Cat. 546. Hymenolepina Govaniana, D.C. Prodr. iv. 246; Royle Ill. 233, t. 52.

From Kashmir to Gurwhal, alt. 10,000-15,000 ft., Jacquemont, &c., Stem 1 foot or less, thick, hollow. Leaves 4-8 in., oblong, pinnae often distant never finely cut, rarely deeply pinnatifid. Bracts 1-3 in., of an oblong entire white-margined sheath and divided often 2-pinnatifid limb; rays 1-5 in.; pedicels very many, short; umbellule capitate embraced by the bracteoles. Fruit ellipsoid or subquadrate; epicarp very lax, glistening, reticulate, ridges hollow, furrows 1-vittate. Seed distinctly grooved on the inner face.

2. **P. sikkimense**, C. B. Clarke; leaves pinnate rarely 2-pinnate pinnae \( \frac{1}{2} - 2 \) in. toothed or pinnatifid, bracteoles obovate toothed or subpinnatifid at the apex, fruit \( \frac{1}{2} \) in. equally 5-ridged hardly winged, epicarp not loose.

From Kashmir to Kumaon, alt. 10,000–15,000 ft.; frequent.—Distrib. Tianschan Mts.

P. ? rotundatum, Benth. in Gen. Pl. i. 915; leaves pinnate or 3-partite, leaflets of the lower 1–3 in. diam. with 3 rounded lobes, bracts 0 or 1 small, bracteoles 5–8 ¼ in. narrow-lanceolate caudate entire white-margined. Ligusticum rotundatum, Wall. Cat. 549. Hymenolea rotundata, DC. Prodr. iv. 245.

Nipal; Gossain Than, Wallich.


Nipal; Gossain Than, Wallich.


Kashmir; Falcorner. Kumaon; Rutam River, alt. 11,500 ft., Strachey & Winterbottom. Nipal; Wallich.

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Nipal; Gossain Than, Wallich.


Nipal; Gossain Than, Wallich.
serrated somewhat closely and regularly. Bracts 5-8, 1-1½ in., narrowly-lanceolate, entire, white-margined; rays 10-20, 1-4 in.; pedicles in fruit ½-1 in., often exceeding the bracteoles. Ridges of the carpels thin, narrowly winged, lateral rather the broadest.—The fruit is dorsally compressed; Klotzsch's figure must have been taken from very immature fruit, and does not show correctly the shape of the carpel in horizontal section at any period.


From Kumaon to Sikkim, alt. 9000-13,000 ft., Wallich, &c.

Stem 2-4 ft. Segments of the pinna ½ in., oblong or ovate, serrate. Bracts 3-0, 1 in., lanceolate, white-margined; rays 5-15, 1-3 in.; bracteoles usually undulate on the margin, crenulate or denticulate, or quite entire; pedicels in fruit usually shorter than the bracteoles. Carpels elliptic, dorsally compressed; ridges thin, narrowly alate, lateral broadest; dorsal furrows 1-vittate, lateral 2-vittate; commissure plane, 4-vittate; calyx-teeth 0; style-bases not prominent. Seed very obscurely concave on the inner face, or plane.—*Oxidium cuneatum*, Ledeb. Fl. Alt. i. 331 (Aulacospermum, Jc. Fl. Ross. iv. 7, t. 312) appears the same, but the authentic example is in young flower only. It is said to differ by the upper branches and leaves being opposite and whorled: but this is occasionally seen in many species of *Pleurospermum*. *P. dentatum*, in the absence of fruit, is very difficult to distinguish from *P. angelicoides*; but the leaves and leaflets are generally smaller, the bracteoles lanceolate (rather than narrow-lanceolate) and slightly crenulate or serrulate. In defining the area of the species; all Sir J. D. Hooker's examples distributed as *P. angelicoides* have been referred to *P. dentatum*; though the leaflets are large, the fruit is small, and the bracteoles distinctly serrulate.

Var. erosum, DC. l. c.; bracts 4-5, leaflets more irregularly incise-serrate.—Mixed with the type as DC. states. There appear two states of the bracts, and two very differently cut leaves; the latter may indicate a different species as DC. suggests, but the typical *P. dentatum* has sometimes many bracts.

8. *P. pumilum*, Benth. in Gen. Pl. i. 915; leaves pinnate pinnae ½-1 in. ovate lobed or subpinnatifid, bracts 1-2 small linear or 0, bracteoles 3-7 ½ in. linear entire obscurely white-margined. *Ligusticum pumilum*, Wall. Cat. 550. *Hymenolaena pumila*, DC. Prodr. iv. 245.

NIPAL; Wallich. SIKKIM; Isluumbo, alt. 11,000 ft., C. B. Clarke.

The specimens are without fruit. The species is very near *P. dentatum*, and differs only in the subobsolete bracts and very narrow bracteoles. The Sikkim example must have been at least 3 feet high, so that the name *pumilum* is not well applied to the species.

9. *P. stylosum*, C. B. Clarke; leaves 2-pinnate pinnae 1-3 in. often pinnatifid, bracteoles 6-10 lanceolate entire or incise-serrate at the apex, fruit ½ in. subglobose transversely plicate-rugose.

KASHMIR; Falconer. LAHUL; alt. 11,000-12,000 ft., Rev. H. Jaeschke.

Stem 2-4 ft. Segments of the secondary pinna ½-1 in. pinnatifid or serrate. Bracts 4-6, 1-3 in., lobed or pinnatifid at the apex; rays 10-35, 1½-3 in.; bracteoles white-margined, entire, incised or lobed in the same umbel. Fruit slightly longer than broad; epicarp of very lax tissue (as in *P. Govanianum*) the transverse folds occupying the whole back except the ridges; style-bases prominent even on the ripe fruit; calyx-teeth obsolete; ridges subequal, hardly winged.

10. *P. stellatum*, Benth. in Gen. Pl. i. 915; leaves 1-2-pinnate pinnae ½ in. serrate or pinnatifid with small narrowly lanceolate lobes, bracteoles 5-8
oblong white-margined obtuse lobed or very shortly pinnatifid at the apex, fruit ⅛ in. ellipsoid somewhat longer than broad, epicarp of very lax tissue, seed grooved on the inner face. Selinium stellatum, Don Prodr. 185; DC. Prodr. iv. 105. Hymenolena stellata, Lindl. in Royle Ill. 253.

North-west Himalaya; Royle. Kumaon; Milam Glacier, alt. 13,000 ft., Strachey & Winterbottom.

Stem 1–6 in. Leaves 2–4 in., oblong; pinne ovate, acutely serrate, or subflabellately pinnatifid or nearly 2-pinnate with mucronate lobes. Bracts 1–4, ⅛–⅓ in., pinnatifid; rays 3–5, 1–6 in., glabrous; pedicels very short. Fruit dorsally compressed; style-bases globose, depressed; calyx-teeth obsolete; petals often persistent. Carpels plane on the inner face; lateral ridges hardly so wide as the intermediate and dorsal, all obtuse, hollow; epicarp rugose, but hardly plicate; furrows 1-vittate.

Var. Lindleyana; bracteoles entire or slightly lobed, leaves often 2-pinnate ultimate segments oblong or obovate obtuse. Hymenolena Lindleyana, Klotzsch in Reis. Pr. Waldem. Bot. 150, t. 49. H. nana, Osten-Sacken & Rapport Sort. Tianshan. 49. Hymenolena, sp. No. 9, Herb. Ind. Or. H. f. & T.? Aulacospermum simplex, Ost. & Rapport t. c.—West Himalaya, alt. 13,000–16,000 ft.; Kashmir, Thomson. Lahul; Rev. H. J. Jaeschke.—Distrib. Karakorum (Northern slope); Tianschan Mts.—Except as to the obtuse (not mucronate) ultimate segments of the leaflets, there seems no difference between this and P. stellatum type. Of Aulacospermum simplex, the authentic example has the fruit not half-ripe, the bracteoles are rather smaller.

11. P. apiolens, C. B. Clarke; leaves pinnate pinnae ⅓–1⅓ in. ovate often pinnatifid with 3–5–7 lobes, bracteoles 6–10 obovate caudate often toothed near the apex, calyx-teeth obsolete, fruit ⅞–⅔ in. ellipsoid subquadrate.—Hymenolena sp. 10, Herb. Ind. Or., H. f. & T.

Interior valleys of Sikkim, alt. 11,000–14,000 ft.; J. D. H.; Elwes; C. B. Clarke. Stem 3–18 in. Leaves 4–8 in., oblong, mucronate-serrate. Bracts 4–5, ⅓–⅔ in., obovate-lanceolate, toothed, sometimes slightly pinnatifid, rarely subentire; rays 8–16, 1–2 in.; pedicels many, scarcely ¼ in. in fruit, much shorter than the bracteoles. Carpels dorsally compressed; epicarp loose but not of open tissue; ridges narrowly winged, subequal; furrows 1-vittate. Seed twice as broad as thick, inner face exactly plane.—Smells of celery (J. D. H.).

12. P. Hookeri, C. B. Clarke; leaves 2–3-pinnate ultimate pinnae ⅓–½ in. ovate or oblong toothed or pinnatifid, bracteoles 6–10 obovate-lanceolate subentire white-margined, calyx-teeth ovate.—Hymenolena sp. 8, Herb. Ind. Or., H. f. & T. Orocome sp. 1, Herb. Ind. Or. H. f. & T.

Sikkim, alt. 10,000–16,000 ft.; J. D. H. Stem 8–20 in. Leaves 6–12 in., ovate, mucronate-serrate. Bracts 4–7, 1–1½ in. lanceolate, often toothed or pinnatifid at the apex; rays 4–8, 1–3 in.; pedicels very many, ¼–⅓ in., shorter than the bracteoles. Petals persistent. Fruit not ripe, but will be nearly as in the var. Thomsoni.

Var. Thomsoni; bracteoles narrowly lanceolate (not at all obovate) narrow and narrowly white-margined often not prominent. West Tinnen, alt. 14,000–16,000 ft., Thomson; Shelshed River, alt. 15,500 ft., Strachey & Winterbottom.—Fruit ½ in., ellipsoid; epicarp loose but not of open tissue; ridges thin, narrowly winged, lateral a little broadest. Seed plane on the inner face or nearly so.—United with P. Hookeri by H. f. & T. in Herb. and it agrees with it as to the ovate calyx-teeth, but differs in the much smaller bracteoles and the remote locality. It has been placed next Selinium tenuifolium by H. f. & T. (mss.) and its bracts and bracteoles are hardly more prominent than in that species: but P. Hookeri type must be placed in Pleurospermum, which here touches Selinium.
13. **P. densiflorum**, Benth. in Gen. Pl. i. 916; leaves 3-4-pinnate ultimate segments very narrowly lanceolate or linear, bracteoles 5-8 elliptic entire or somewhat pinnatifid at the apex, fruit \( \frac{5}{6} \) in. with 5 subequal somewhat broad ridges, seed distinctly grooved on the inner face. Hymenidium ? densiflorum, Lindl. in Royle Ill. 233. ? H. suaveolens, Klotzsch in Reis. Pr. Waldem. Bot. 148, t. 48.

North-west Himalaya; Royle. Kashmir, alt. 11,000-14,000 ft., Levinge, C. B. Clarke. Gujwhal, Falconer.

Stem 6-15 in. Leaves 3-4 in., ovate. Bracts 5-6, 1-2 in., oblong, tips usually pinnatifid or pinnate; rays 5-12, 1-2 in.; bracteoles prominently white-margined, exceeding the umbellule, often entire obtuse with the green midrib subexcurrent. Calyx-teeth obsolete. Fruit ellipsoid subquadrate, nearly terete; epicarp thin, loose, not of lax tissue; dorsal furrows 1-vittate, lateral 2-vittate, commissure 4-vittate. Carpels plane on the inner face. Seed about twice as wide as thick.—Hardly distinguishable from *P. Brunonis* but by the larger more winged fruit: it is doubtful to which of these species *H. suaveolens* belongs, the drawing being made from immature fruit: the leaves of *P. Brunonis* are usually more finely cut than as in Klotzsch's figure.

14. **P. Brunonis**, Benth. in Gen. Pl. i. 916; leaves 3-4-pinnate ultimate segments setaceous, bracteoles 5-8 elliptic or obovate often pinnatifid at the apex, fruit \( \frac{5}{6} \) in., dorsal and intermediate ridges narrowest, seed exactly plane on the inner face. Ligusticum Brunonis, Wall. Cat. 545. Hymenolae*a Brunonis, DC. Prodr. 245. Hymenidium Brunonis, Lindl. in Royle Ill. 233.

From Kashmir to Nipal, alt. 9000-14,000 ft., frequent. Closely resembling *P. densiflorum* except as to the smaller fruit. Fruit ellipsoid subquadrate, much dorsally compressed; epicarp thin, loose, not of open tissue; furrows all 1-vittate, commissure 2-vittate; carpels plane on the inner face. Seed 4-5 times as wide as thick.—Bentham not having seen ripe fruit doubted the seed being plane on the inner face as described by Lindley and upon which character he founded the genus Hymenidium.

20. **ANGELICA**, Linn.

Herbs, usually tall. Leaves 1-2-3-pinnate, pinnae toothed, usually large. Umbels compound, rays many; bracts few, narrow, or 0; bracteoles small. Calyx-teeth obsolete. Petals obovate, emarginate, white or purplish. Fruit ovoid or ellipsoid, dorsally compressed, commissure broad; lateral ridges broadly winged, dorsal and intermediate not prominent; carpels complanate, broadly margined; furrows 1-2-vittate; carpophore 2-partite. Seed much dorsally compressed, inner face plane concave or almost grooved.—Distr. Species 18 in the north-temperate and Arctic regions, and New Zealand.

1. **A. glauca**, Edgew. in Trans. Linn. Soc. xx. 53; leaves twice or thrice 3-partite or 2-pinnate, leaflets few 1-3 in. ovate serrate glaucous beneath.

From Kashmir to Simla, alt. 8000-10,000 ft., Falconer, &c. Glabrous, 4-12 ft. Bracts several, 1 in., linear; bracteoles many, \( \frac{1}{3} \) in. Rays often 20-30, 1-3 in., equal; pedicels hardly half as long as the fruit. Fruit \( \frac{1}{3} \) by \( \frac{1}{3} \) in., subquadrate; dorsal and intermediate ridges approximate, rounded, somewhat corky; furrows 1-2-vittate; commissure 2-4-vittate; carpels plane on the inner face. Seed less than \( \frac{1}{3} \) in. wide, but about twice as wide as thick; almost grooved on the inner face.
30. **ARCHANGELICA, Hoffm.**

Tall perennial herbs. *Leaves* 2–3-pinnate, ultimate pinnae toothed, usually large. *Umbels* compound, rays many; bracts few, small, or 0; bracteoles many, linear, or obsolete. *Calyx-teeth* obsolete (in India). *Petals* ovate, sub-entire, white. *Fruit* ellipsoid, subquadrate, or oblong; commissure broad; carpels dorsally compressed, lateral ridges winged or acute, dorsal and intermediate narrower, distinct; vittae many; carphophore 2-partite. *Seed* dorsally much compressed, inner face plane.—**Distrib.** Species 5, in North Temperate regions.


**Var. himalica**; flowers twice as large, fruit ½ by ½ in. *Kashmir*; 8–13,000 ft., C. B. Clarke; *Aitchieson.* *Jogi*; alt. 11,000 ft., Thomson. *Sikkim*; Lachen, alt. 10,000–11,000 ft., *J. D. H.*—**Distrib.** (of the type) North Europe, Asia, and America.

**Stem** 5–10 ft. *Leaves* 1–3 ft., ovate, ultimate pinnae sessile, rarely decurrent, terminal often 3-lobed. *Bracts* small; rays 10–30, 1½–4 in.; *pedicels* very numerous, ½–1½ in. Lateral ridges usually winged; pericarp somewhat coryck, easily separating from the seed; vittae numerous, small, on the inner surface of the pericarp.—The fruit of the Himalayan variety is much larger than that of any other *Archangelica* preserved at Kew. It closely resembles the flowering example of *A. decurrens*, but in Ledebour's figure of that species its fruit is no larger than in ordinary *A. officinalis*.

31. **FERULA, Linn.**

Perennial herbs. *Leaves* 2–4-pinnatifid or 2–4-pinnate. *Umbels* compound. *Flowers* yellow, often polygamous. *Calyx-teeth* obsolete. *Petals* ovate, obtuse, or marginate. *Fruit* orbicular or ellipsoid, much compressed dorsally; lateral ridges winged, dorsal and intermediate filiform or obscure; vittae many or few; carphophore 2-partite. *Seed* much dorsally compressed, inner face plane.—**Distrib.** Species 60, in Europe, N. Africa, Central Asia.

*Ferula* is difficult to separate from *Peucedanum*. The Indian species all belong to the section *Narthex*.

**Sect. Narthex, Falconer** (Gen.) Segments of the *leaves* 1–4 in., oblong, often pubescent. *Bracts* 0, or small, deciduous; bracteoles 0, or very small. Dorsal furrows 1-vittate (rarely a small vitta added); lateral 1–2-vittate; commissure 2–14-vittate.


**Baltistan; Astor, Falconer.**

**Stem** 5–8 ft. *Leaves* pubescent, at least when young; lower leaves 1–2 ft., ovate, caulein sheaths large, from which spring simple or scarcely compound umbels. Terminal *umbel* large, compound, leafless. *Vitte* broad, usually occupying the whole furrow, and as long as the carpel; commissural usually 4, 2 slender sometimes added.
—This is certainly not *F. Asafoetida, Boiss. l. c.*, which is *Scorodosma fetidum*, Bunge in Borez. *Ferul. tt. 1, 2*, with hairy ovary and many very minute (or 0) vittae. Whether it is the *F. Asa-fetida* founded by Linnaeus on the figure in *Kämpf. Amanu. p. 536*, is a disputed point. That figure does not represent the numerous lateral subsimple umbels arising from the sheaths of the cauline leaves which characterise this, but this character varies so in *F. Jaeschkeana* (No. 3) that it is impossible to rely upon it. The fragments of Kämpf’s plant preserved in the British Museum do not suffice to determine the point. *T. Thomsonii* (No. 2) has the subsimple umbels of Falconer’s plant (in cultivation), and has also a divaricate coryb very like that figured by Kämpfer.

2. **F. Thomsonii**, C. B. Clarke: glabrous, tertiary pinnae 2 by \( \frac{1}{2} \) in. sub-entire mostly peltiulosed, inflorescence as in *F. Narthex*.—*Dorema No. 5, Herb. Ind. Or. H.f. & T.*

Kashmir; Banahal, alt. 5000–6000 ft., Thomson.

Resembling *F. Narthex*, but with leaves cut into remote lanceolate subacute leaflets.—Thomson’s examples are in flower, but a fruiting coryb of this, or an allied *Ferula*, from Kashmir at Nowgunge (alt. 8000 ft., C. B. Clarke), has umbels and flowers as in the terminal umbel of *F. Narthex*; pedicels \( \frac{1}{2} - \frac{3}{4} \) in., clavate at the apex; carpels \( \frac{1}{2} \) by \( \frac{1}{4} \) in., much compressed, elliptic narroed at both ends, plane or almost convex on the inner face: dorsal and intermediate ridges filiform, lateral narrowly winged; vittae: 3–2 in the dorsal furrows, minute, as long as the carpel, and seeds very much compressed.

3. **F. Jaeschkeana**, Vatke Append. in Sem. Hort. Berol. 1876, 2; secondary and tertiary pinnae decurrent regularly closely crenate, carpel \( \frac{3}{4} \) by \( \frac{3}{4} \) in., vittae very large solitary in each furrow. *F. fotidissima, Regel & Schmalt. in Gartenfl. 1878, 195–198, t. 944.—Dorema sp. 3 and 4, Herb. Ind. Or. H.f. & T.*

Kashmir; alt. 6000–12,000 ft., plentiful; Falconer, Thomson, &c.—*Distrib. Turkestan.*

Stem, leaves, and inflorescence as in *F. Narthex*, except that the leaves are closely crenate or doubly crenate or almost serrate. As in *F. Narthex*, the fruiting coryb often appears elongate subpaniculate, sometimes divaricate and corybose; peduncles bearing nearly simple umbels also proceed from the large sheaths of the cauline leaves. *Fruit* much larger and thicker than in *F. Narthex*, vittae much the largest of any Indian umbellifer; the commissural often 2 only near the medial line, sometimes 4 or 6.—Regel and Schmalz. think that this plant probably produces the Asafoetida of commerce; this may be so, as it is an abundant species in Kashmir, and very largely supplied with oil: but it is not the Asafoetida of Linnaeus, because Kämpfer’s figure has entire not crenate leaflets.

32. **PEUCEDANUM, Linn.**

Perennial glabrous or pubescent herbs (the Indian species). *Leaves* 1–3-pinnate or twice or thrice 3-partite, ultimate leaflets lanceolate or ovate, rarely linear, toothed or entire. *Umbels* compound, rays usually numerous; bracts various, bracteoles many few or 0. *Flowers* often polygamous, white or yellow, rarely pink. *Calyx-teeth* obsolete or small. *Petals* obovate, emarginate or 2-fid. *Ovary* glabrous. *Fruit* much dorsally compressed, ellipsoid, oblong, or orbicular, carpels scarcely convex on the back, more or less acutely winged on the margin, dorsal and marginal ridges little elevated or obsolete, lateral winged; dorsal furrows 1–vittate, lateral 1–rarely 2-vittate. *Seed* much dorsally compressed, inner face plane.—*Distrib.* Species 100, throughout nearly the whole world, few tropical.
The species (formerly referred to Pastinaca) having the ovary and young fruit hairy have been transferred by Mr. Bentham to Heracleum, whether the vitæ are abbreviated or not.

* Ultimate segments of the leaves $\frac{1}{4}$–1 in., linear.

1. **P. graveolens**, Benth. in Gen. Pl. i. 919; bracts and bracteoles 0, petals yellow, fruit $\frac{4}{9}$ by $\frac{2}{13}$ in. narrowly winged plano-convex 2–3 times as broad as thick. P. Sowa, Kurs in Journ. As. Soc. 1877, pt. ii. 116. Anethum graveolens, Linn.; DC. Prodr. iv. 186; Wall. Cat. 7210; Boiss. Fl. Orient. ii. 1026. A. Sowa, Roxb. Hort. Beng. 22, Fl. Ind. ii. 94; Fleming Cat. Ind. Med. Pl. 5; Wall. Cat. 595; DC. Prodr. iv. 186; W. & A. Prodr. 372; Wight ic. t. 572.

Throughout tropical and subtropical India; often cultivated.—Distrib. Cultivated in S. Europe and W. Asia.

Glabrous, 1–3 ft. Leaves 2–3-pinnate. Petals many, $\frac{1}{3}$ in. Styles small. Dorsal and intermediate ridges distinct, slender; vitæ large, solitary in each furrow, 2 on the commissure.—The fruits are as broad and as much winged in the Indian P. Sowa as in the ordinary P. graveolens: never subobsolete, as shown in Wight ic. t. 572. In the European P. graveolens the carpels are plano-convex, and not so subpentagonal as depicted by Reichenbach, as Bentham has observed l. c.

** Ultimate segments of the leaves $\frac{1}{4}$–2 in., linear-oblong or ovate, entire or remotely sparingly toothed; bracts 0 or very small.

2. **P. Dhana**, Ham. in Wall. Cat. 7216; leaves twice or thrice 3-partite or sub-2-pinnate leaflets 2 by $\frac{1}{4}$ in. sessile usually entire, carpels $\frac{1}{4}$ by $\frac{1}{4}$ in.

North-west India; Sub-sewaliks up to 4500 ft.; Edgeworth. Kumaon, in the subtropical region; Strachey & Winterbottom. North Bengal; Goruckpore, Hamilton; Dinajpur, C. B. Clarke.

Glabrous, 6–24 in., subnude upwards. Bracts 3–5, $\frac{1}{4}$ in., linear or linear-lanceolate; rays 5–10, 1–2$\frac{1}{4}$ in.; bracteoles 4–8, $\frac{1}{4}$ in. linear; pedicels numerous $\frac{1}{4}$ in. Flowers small, yellow. Calyx-teeth obsolete. Styles somewhat long. Carpels greatly compressed, subquadrat, tip obtuse, often truncate or emarginate; dorsal and intermediate ridges filiform, subobsolete, lateral with a wing as thick as the seed; dorsal furrows 1-vittate lateral 2-vittate; vitæ nearly as long as the carpel, commissural 6–4.

Var. Dalzellii; leaflets shortly oblong or suborbicular. Pastinaca glauca, Dalz. in Hook. Kew Journ. iv. 203; Dalz. & Gibbs. Bombay Fl. 107.—Belgium, Dalzell, Richie. Jubulpore, McLeod. Chota Nagpore, C. B. Clarke.—Leaflets usually 1 by $\frac{1}{2}$–$\frac{1}{2}$ in., very unlike those of P. Dhana, but the plants in every other point agree. There has been considerable confusion between Pastinaca glauca, Dalz. (Peucedanum, sp. Benth.) and Peucedanum glaucum, Wall.: two widely different plants.

*** Ultimate segments of the leaves linear- or ovate-lanceolate serrate; bracts 0 or very small.

3. **P. ramosissimum**, Wall. Cat. 578; segments of the lower leaves ovate-lanceolate of the upper narrow-lanceolate, pedicels in fruit $\frac{1}{4}$–$\frac{1}{4}$ in., fruit $\frac{1}{4}$ by $\frac{1}{4}$–$\frac{1}{4}$ in. winged commissure evittate. Palimbia ramosissima, DC. Prodr. iv. 176.

Khasia Mts., alt. 4000–6000 ft., common.

Glabrous, 2–5 ft. Leaves 2–4-pinnate, much and acutely serrate. Bracts 0, or 1–3, $\frac{1}{2}$ in.; rays 4–8, $\frac{1}{2}$–$\frac{1}{2}$ in., divaricate; bracteoles 0–5, $\frac{1}{4}$ in., linear; pedicels 5–10. Calyx-teeth minute. Styles very short. Carpels elliptic, narrowed at both ends, entire or subemarginate at the apex: dorsal and intermediate ridges obscure,
wings of lateral as thick as the seed; furrows 1-vittate; vittæ nearly or quite as long as the carpel.

4. **P. sikkimense**, C. B. Clarke; segments of the lower leaves ovate-lanceolate of the upper narrow-lanceolate, pedicels in fruit \( \frac{1}{4} - \frac{1}{3} \) in., fruit \( \frac{1}{4} - \frac{1}{3} \) by \( \frac{1}{4} - \frac{1}{3} \) in. broadly winged deeply emarginate at both ends, commissure evittate.

**Sikkim**; alt. 3000-7000 ft., frequent; *J. D. H., C. B. Clarke.*

Resembling *P. ramossissimum* closely except as to the fruit, which has a broader wing; the seed is not larger than in that plant, but the pedicels are usually longer and more slender, and there are often no bracteoles.

5. **P. anamallayense**, C. B. Clarke; segments of the leaves very narrowly lanceolate, pedicels in fruit \( \frac{1}{4} - \frac{1}{3} \) in., fruit \( \frac{1}{4} \) in. orbicular commissure 6–4-vittate.

**Anamallay Mts.; Wight, Beddome.**

Resembling *P. ramossissimum*, but the segments of the leaves narrower, the fruit different. **Umbel as in *P. ramossissimum*; bracts 0, or 1–4, \( \frac{1}{4} - \frac{1}{3} \) in., linear, sometimes narrowly oblong, sub-serrate. Calyx-teeth small, lanceolate. Styles long. Dorsal and intermediate ridges scarcely serrate, lateral with a prominent wing as thick as the seed; dorsal furrows 1-vittate, lateral 2–1-vittate; vittæ large usually as long as the carpel, commissural prominent.

6. **P. ceylanicum**, Gardn. MS.; pedicels in fruit \( \frac{1}{4} - \frac{1}{3} \) in., fruit \( \frac{1}{4} \) by \( \frac{1}{4} \) in., commissure 6–4-vittate. Palimbia ramossissima, *Thwaites Enum. 131*, not of DC.

**Ceylon; Gardner; Galagama, Thwaites.**

Resembling *P. anamallayense*, and perhaps a variety of it, but the (unripe) fruits are elliptic and less winged, the pedicels very much longer, and the calyx-teeth much smaller. Styles long.

7. **P. glaucum**, DC. Prodr. iv. 179; segments of the middle cauline leaves narrow-lanceolate serrate of the upper linear entire, fruit \( \frac{1}{2} \) by \( \frac{1}{4} \) in. truncate commissure 2-vittate. *Selinum glaucum*, *Wall. Cat. 580.*

**Nipal; Wallich.**

Glabrous 2–4 ft. Segments of the cauline leaves 2 by \( \frac{1}{4} \) in., entire in most of Wallich’s examples, serrate in the only fruiting one. **Bracts 0; rays 12–16, \( \frac{1}{4} - \frac{1}{3} \) in.; bracteoles 0, or minute; pedicels 8–16, \( \frac{1}{4} - \frac{1}{3} \) in. Calyx-teeth obsolete. Styles subprominent. Fruit subquadrate, somewhat emarginate at both ends; dorsal and intermediate ridges obscure, lateral subprominently winged, the wing as thick as the seed; vittæ solitary, nearly as long as the carpel.**

**Var. ? nagpurensis:** bracteoles 4–7 \( \frac{1}{4} \) in. linear, fruit narrowed at the base, margin thicker than the seed, commissure evittate.—*Chota Nagpore, alt. 1500–2000 ft.; Ramghur and Bagoda, C. B. Clarke; Behar, at Monghyr, G. Lockwood.—Lower leaves twice 3-partite, leaflets 3 by \( \frac{1}{2} \) in., strongly serrate: upper with linear segments. Fruit truncate emarginate at the narrowed base.—This may be a distinct species.**

**** Ultimate segments of the leaves 1–2 in., serrate; bracts prominent.

8. **P. grande**, C. B. Clarke; leaves 2-pinnate leaflets with 3 large rounded lobes, fruit \( \frac{1}{2} \) in. obovate obtuse. *Pastinaca grandis, Dalz. & Gibs. Bombay Fl. 107.*

**Bombay Ghauts; Dalzell.**

Glabrous, 3 ft. *Leaves mostly radical, long-petioled, ovate, shining on both surfaces, leaflets 1–3 in. Bracts oblong or obovate, obtuse; rays 20, 2–3 in., stout;*
bracteoles oblong, obtuse; pedicels 10-16, \( \frac{3}{2} \) in. Petals yellow. Ovary glabrous. Fruit narrowed to the base and not there emarginate, nearly as broad as long; dorsal and intermediate ridges triangular, small, obtuse, lateral narrowly winged; dorsal furrows 1-vittate, lateral 2-1-vittate; vittae nearly as long as the fruit or the lateral abbreviated, commissural 4 abbreviated. Seed much broader than thick.—Perhaps a *Heraclenum*, but the ovary is glabrous.

**** Leaves 3-4-pinnate, ultimate segments \( \frac{1}{2} \) in. ovate or lanceolate.

9. **F. Thomson**, C. B. Clarke; quaternary pinnae \( \frac{1}{2} \) in. ovate deeply pinnatifid, bracts hardly any, styles long.—Peucedanum sp. 5, *Herb. Ind. Or. H. f. & T."

**Kashmir**; alt. 5000-9000 ft.; **Kishtwar** and **Banahal**, Thomson.

Glabrous, or the leaves sometimes minutely hispidulous, 3-4 ft., stem subnude upwards. Lower leaves 6-8 in., broadly ovate, ultimate segments scarcely \( \frac{1}{2} \) in. linear-oblong, subobtuse. *Umbels* large, irregular, and often twice or thrice divided; rays unequal; bracteoles hardly any; pedicels 8-12, \( \frac{1}{2} \) in. Calyx-teeth 0. Ovary glabrous. Fruit only half-ripe; will be at least \( \frac{1}{2} \) in.—The very compound leaves and irregular umbels easily distinguish this species. The genus is doubtful in the absence of ripe fruit, but Dr. Thomson marked it *Peucedanum*, and it has all the appearance of being so.

**Doubtful Species.**

**P.? skardicum**, C. B. Clarke; glabrous, leaves twice 3-partite secondary pinnae ovate or elliptic denticulate, bracts 0, bracteoles 4-7 \( \frac{1}{2} \) in. lanceolate-linear scarious, petals yellow.—Balistan, near Skardo, alt. 12,000 ft., C. B. Clarke.—Stem 3-4 ft., corymbose. *Pinnae* \( \frac{1}{2} \) to 1 in. diam., shining, yellowish green; nerves prominent, flabellate and pinnate, hardly reticulate. *Peduncles* 5-8 in.; rays 10-12, \( \frac{1}{2} \) 2 in., subequal; pedicels 12-20, \( \frac{1}{2} \) in. Calyx-teeth 0. Petals obovate, emarginate. Disc large; styles short. Fruit very immature, but about to be winged.

33. **HERACLEUM**, Linn.

*Herbs*, biennial or perennial, never quite glabrous. Leaves 1-2-3-pinnate, segments never minute nor filiform. *Umbels* compound; rays usually many; bracts few simple, or 0, rarely many foliaceous; bracteoles many, rarely divided. *Flowers* polygamous, often radiant, white or yellowish. *Calyx-teeth* obsolete, rarely small linear-lanceolate. *Petals* obovate, emarginate or 2-fid. Ovary hairy or pubescent. Fruit orbicular obovate or elliptic, much dorsally compressed; dorsal and intermediate ridges small or 0, lateral usually winged or rarely acute; vittae usually solitary in each valley, as long as the carpel or abbreviated and dilated below; carpophore 2-partite. Seed much dorsally compressed, plano-convex.—**Distrib.** Species 50; in Temperate Europe and Asia; 1 in N. America, 1 in Abyssinia.

* Species of Northern and North-Eastern India.

† Not large, drying green, pubescence grey or whitish; fruit when ripe greenish or whitish. (Approaching *Pastinaca* in habit.)

1. **H. Thomson**, C. B. Clarke; lower leaves 2-pinnate, bracts small, fruit elliptic \( \frac{3}{4} \) by \( \frac{1}{2} \) in. winged minutely pubescent.—*Pastinaca* sp. i., *Herb. Ind. Or. H. f. & T.*

**Ladak** and **Prr**; alt. 11,000-15,000 ft., T. Thomson. **Lahul**; alt. 10,000 ft., Jaeschke. **Kashmir**; **Tilail**, alt. 9000 ft., C. B. Clarke.
Stems 12–20 in., grey puberulo-pubescent, naked upwards. Leaves 6-10 in., ovate-lanceolate, ultimate segments $\frac{1}{4}$–1 in. pinnatifid. Bracts 4–5, $\frac{3}{4}$–1 in.; rays 4–10, 1–2 in.; bracteoles 5–8, $\frac{1}{2}$ in., ovate-lanceolate, white-margined. Ovary hairy. Petals white. Fruit distinctly but not broadly winged, greenish-pubescent when ripe, dorsal ridges hardly excurrent; dorsal vittae extending nearly to the base; commissural 2, near the median line, half as long.—H. tragoides, Benth. in Gen. Pl. i. 924 (Zozimia tragoides, Boiss.), is very near this, but in it the lower leaves are pinnate and lobed.


2. **H. pinnatum**, C. B. Clarke; leaves pinnate pinnae ovate toothed or pinnatifid, bracts small or 0, fruit $\frac{3}{4}$–1 in. obovate winged.—Heracleum sp. 14, Herb. Ind. Or. H. f. & T.

Kashmir northwards to the Karakorum, alt. 10,000–16,000 ft.; Thomson, C. B. Clarke.

White-pubescent, 1–3 ft., sparsingly coriaceous, little leafy upwards. Leaves 6–10 in., oblong; pinnae usually $\frac{1}{4}$–1 in. sometimes 2–3 in., sessile, serrate. Bracts 0–4, $\frac{3}{4}$–1 in., linear or oblong; rays 8–20, 1–3 in.; bracteoles 5–8, $\frac{3}{4}$–1 in., linear or oblong; pedicels 10–30, $\frac{1}{3}$ in. Petals white. Ovary hairy. Fruit rather broadly winged, minutely pubescent, whitish; dorsal and intermediate ridges excurrent; vittae broad extending $\frac{3}{5}$ the length of the carpel, a minute vitta added in the centre of the wing; commissural 2, near the median line, often more than half as long as the mericarp.

3. **H. Jacquemontii**, C. B. Clarke; leaves pinnate or 3-partite, segments ovate, bracts 0, fruit orbicular $\frac{1}{4}$ in. winged.

North-west Himalaya?, Jacquemont.

Villos with lax white hairs, 1 ft., nude upwards. Leaves ovate, segments $\frac{3}{4}$–1 in., serrate. Rays 7, 1–2 in.; bracteoles 4–8, $\frac{1}{2}$–1 in., linear; pedicels 10–12, $\frac{1}{3}$ in. Fruit minutely pubescent, dorsal and intermediate ridges not excurrent, lateral excurrent in a continuous circular narrow wing; vittae nearly as long as the carpel, commissural 4.—Very distinct by the small fruits.

4. **H. cachemiricum**, C. B. Clarke; lower leaves 2–pinnate pinnae narrowly oblong entire or remotely obtusely toothed, bracts small, fruit $\frac{1}{4}$ by $\frac{1}{4}$ in. elliptic winged.—Peucedanum glaucum, Herb. Ind. Or. H. f. & T., not of Wall.

Murree, Falconer; Jamu, alt. 5000–6000 ft., Thomson; Kashmir; Nowgunge, alt. 8000 ft., C. B. Clarke.

Minutely pubescent, 2–3 ft., naked, sparingly coriaceous upwards. Leaves 6–12 in., ovate, secondary pinna 1–3 by $\frac{1}{2}$–$\frac{3}{4}$ in., sessile, subobtuse. Bracts 2–4, $\frac{1}{2}$–1 in., lanceolate; rays 6–10, 1–2 in.; bracteoles 5–8, $\frac{1}{2}$ in., lanceolate; pedicels 8–20, $\frac{1}{2}$–$\frac{3}{4}$ in. Fruit pubescent; dorsal and intermediate ridges hardly excurrent, lateral forming a continuous narrow wing; vittae broad nearly as long as the carpel, commissural 2, near the median line.

†† Large, drying brown; fruit when ripe brown, often with a very thin wing.

5. **H. Wallichii**, DC. Prodr. iv. 195; glabrescent upwards, upper leaves 3-partite or pinnate, bracts 1–2 small deciduous or 0, calyx-teeth linear prominent, fruit $\frac{3}{4}$ by $\frac{1}{4}$ in. obovate, commissure evittate. H. diversifolium, Wall. Cat. 574.

Nipal; Wallich. Sikkim: on Singaleleh, alt. 10,000 ft., C. B. Clarke.

Stem 3–4 ft., white-hirsute beneath the nodes. Leaves serrate, pilose above and
on the nerves beneath. Bracts 1, ¼ in., linear; rays 6–8, 1–2½ in., glabrous; bracteoles 0–5, ¼ in., linear; pedicels 8–16, ½–¾ in. Fruit glabrous, brown, dorsal and intermediate ridges not prominent, wing broad having a narrow median vitta; vitta about half as long as the fruit subelavate below.

**Var. elatior;** more hairy upwards, bracts 4–6, rays 20–30 hairy.—Nipal.—This may be a different species but contains only very immature fruit. The upper leaves are lobed, not divided, more hairy than in the type, and the bracteoles are much more prominent. Bentham (Gen. Pl. i. 922) referred *H. diversifolium* to *Puecedanum*; but is not now certain to which of the many plants mixed under the name *H. diversifolium* he referred. *H. Wallachii* is a typical *Heracleum*, with the vitta hardly half as long as the mericarp.

6. **H. nubigenum**, C. B. Clarke; upper leaves 3-partite or pinnate glabrescent, bracts several deciduous, calyx obsolete, fruit ¼ in. orbicular emarginate at both ends, commissure subellavate.

**Sikkim**, alt. 10,000–14,000 ft.; Chola Pass, J. D. H.; Yakla Pass, C. B. Clarke.

Stem 3–5 ft., pubescent. Tertiary pinnae 1–3 in., ovate, serrate, often lobed, slightly pubescent. Bracts 4–12, ½ in., linear; rays 30–60, 2–6 in., pubescent; bracteoles 4–10, ¼ in., linear; pedicels 15–30, ¼–½ in. Fruit glabrous, brown; dorsal and intermediate ridges obtuse, little excurrent, much broader than the vitta; wing broad interrupted at the apex and base; vitta nearly as long as the fruit, commissural usually 0, or 1–2 very short near the apex, sometimes fragments of an interrupted vitta are seen.—The fruit of this plant is much like that of *Cortis Hooperi*.


From Kumaon; Wallich; to Sikkim; alt. 10,000–13,500 ft.

Stem 1–3 ft., pubescent. cauline leaves 6–8 by 2–3 in.; pinnae subessisile, ovate, lobed or pinnatifid, serrate, sparingly pubescent. Rays 4–8, 1–1½ in.; bracteoles 5–6, ½ in., lanceolate; pedicels 8–16, much shorter than the bracteoles. Flowers greenish-white or purple (J. D. H.), outer often radiant, large. Calyx-teeth minute. Styles long. Fruit glabrous, brown; dorsal and intermediate ridges filiform, hardly excurrent; wing prominent with a minute marginal vitta; vitta ¾ or ¼ the length of the fruit, commissural 0, or 2 and short.

8. **H. sublineare**, C. B. Clarke; pinnae of the upper leaves linear or nearly linear, bracts small or 0, calyx-teeth linear, fruit ½ by ½ in. elliptic, commissure 2-vittate.—Pastinaca sp. 4, Herb. Ind. Or. H. f. & T.

Sikkim, alt. 10,000–13,000 ft., J. D. H., &c.

Stem 2–4 ft., pubescent. Lower leaves 6 in., ovate, 2-pinnate; pinnae lanceolate, serrate, little pubescent, upper pinnae, pinnae often 4 by ½ in., or 2 by ½ in. Bracts 1–3, ½ in., linear, often 0; rays 4–8, 1–1½ in., hairy; bracteoles 2–5, ¼–¾ in., linear; pedicels 6–16, ¼ in. Flowers white, outer often radiant, large. Fruit glabrous, brown, dorsal and intermediate ridges filiform hardly excurrent; wing broad, continuous, with a minute marginal vitta; dorsal vitta more than half as long as the fruit, commissural 2, usually slender, close to the medial line, nearly as long as the mericarp, rarely shorter or interrupted.

9. **H. canescens**, Lindl. in Royce Ill. 232; stem and leaves softly hairy, upper leaves mostly pinnate, bracts small or 0, fruit ¼ by ¼ in. obovate, commissure 2-vittate. *H. hirsutum*, Edgew. in Trans. Linn. Soc. xx. 57. ? H. cinereum, Lindl. in Royce Ill. 232.
North-west Himalaya, alt. 6000-8000 ft.; Kishtwar and Banahal, Royle, Thomson; Simla, Lady Dalhousie, &c.

Stem 1-4 ft., subnude upwards, hirsute with white lax hairs at the apex of the peduncles. Leaves 3-12 in., 1-2-pinnate, oblong or ovate; pinna ½-3 in., ovate or oblong, acute or obtuse, crenate-serrate or lobed, rhachis with lax white hair. Bracts 1-4, ½ in., linear or lanceolate, or 0; rays 6-16, 1-3 in.; bracteoles 4-8, ½ in., linear or linear-lanceolate; pedicels 8-16, 0-3 in. Calyx-teeth linear, small. Young ovary very hairy, rarely slightly pubescent. Dorsal and intermediate ridges filiform, distinctly elevated; wing broad; dorsal vitta ½ the length of the fruit, not clavate below, commissural distinct, near the medial line, more than half as long as the carpel.—Easily separated from H. candicans by the indumentum. The leaves are most variable. No example exists at Kew of H. cinereum, but there appears no reason why it should not belong here.

10. H. candicans, Wall. Cat. 573; leaves pinnatifid or pinnate, pinnae obtusely lobed or pinnatifid tomentose or white-villos beneath, bracts small or 0, fruit ½ by ¼ in. obovate, commissure 2-vittate. DC. Prodr. iv. 192.

From Kashmir to Kumaon, alt. 6000-12,000 ft., common.

Stem 2-6 ft., pubescent or closely villous. Pinnae often 8 by 6 in., crenate-serrate, thickly white-tomentose, or only slightly grey-pubescent. Bracts 1-3, 1½ in., linear, or 0; rays 10-10, 1-4 in.; bracteoles 4-8, 1½ in., linear; pedicels 8-16, 1½ in. Calyx-teeth linear. Dorsal and intermediate ridges filiform slightly excurrent, wing broad with a small distinct median vitta; vitta in Wallich's example ½ the length of the fruit, in others (with less elongate-obovate fruits) ⅔ the length; commissural in the type more than ⅓ the length, or minute near the apex, or 0.

11. H. obtusifolium. Wall. Cat. 577; upper leaves 3-6d or 3-partite lower 3-5-partite, pinnae round crenate white-tomentose beneath, bracts 2-5 ½-1 in. deciduous. DC. Prodr. iv. 192.

NIPAL; Wallich, Sikkim; Lachen, alt. 12,000 ft. J. D. H. Bhutan, Griffith.

Stem 1-3 ft., pubescent or villous. Pinnae 1-4 in. diam., sometimes 2-3-lobed, always rounded, scarcely serrate. Rays 10-16, 1-3½ in.; bracteoles 4-8, 1½ in.; pedicels 10-20 ½ in. Calyx-teeth linear, small. Outer flowers of the umbel moderately or not at all radiant. Fruit (ex DC.) obovate, commissure 4-vittate, dorsal vitta linear, extending ⅔ its length in the unripened fruit.

12. H. nepalense, Don Prodr. 185; upper leaves acutely 3-lobed rarely divided sparingly pubescent, lower pinnate, bracts 0 or inconspicuous, fruit ½ by ¼ in. obovate, commissure 4-vittate. Wall. Cat. 576; DC. Prodr. iv. 192.

From Nipal to Bhutan, alt. 5000-12,000 ft.; frequent.

Stem 2-5 ft., sparingly pubescent. Pinnae often 6 by 4 in., deeply lobed or pinnatifid, serrate. Bracts 3-5, ½ in., linear, sometimes 0; rays 8-20, 1½-3 in.; bracteoles 0-6, ⅓ in., linear; pedicels 8-20, 1½ in. Calyx-teeth linear, small. Outer flowers of the umbel radiant or not. Dorsal and intermediate ridges hardly excurrent; wing broad, with a prominent small marginal vitta; dorsal vitta ⅔ the length of the fruit, commissural 4, ⅔ the length in Wallich's examples, shorter in others.

Var. bivittata; fruit ⅔ in. elliptic or subobovate, commissure 2-vittate.—Sikkim and Bhutan, common.—Uppermost leaves sometimes 3-partite, and middle cauline leaves sub-2-pinnate. A very doubtful plant, some specimens of which have been referred to a variety of H. diversifolium with 2-vittate commissure, but the cutting of the leaves is that of H. nepalense.

13. H. barmanicum, Kurz in Journ. As. Soc. 1872, pt. ii. 309, and 1877, pt. ii. 116; lower leaves 1-2-pinnate hairy, bracts 5-8 ⅔ in. lanceolate,
fruit \( \frac{1}{2} \) by \( \frac{1}{4} \) in. obovate, furrows between the lateral and intermediate ridges 2-vittate, commissure 2-vittate.—Heracleum sp. 5, *Herb. Ind. Or. H. f. & T.*

**Khasia Mts.**, alt. 4000-6000 ft., common. Provb. alt. 2500-3000 ft., frequent, Kurz.

Stem 2-4 ft., villous. Upper leaves 3-fid or 3-partite, pinnae 1-3 in., cordate or ovate-lanceolate, serrate. Rays 6-12, \( \frac{1}{2} \) in.; bracteoles 5-10, \( \frac{3}{4} \) in. Calyx-teeth linear, small. Petals white, of the outer flowers radiant or not. Dorsal and intermediate ridges elevated hardly excurrent, vitae between them 1 rarely 2; wing broad with a narrow marginal vitta; vitae in the furrows between the intermediate and lateral ridges usually 1-3, more than half the length of the mericarp, commissural 2, usually more than half as long, 2 fragmentary often added.

**Species of Southern India and Ceylon.**

14. *H. Hookerianum*, *W. & A. Prodr.* 373; lower leaves undivided roundly 3-lobed villous often woolly beneath, upper much reduced often to mere sheaths, bracts not prominent, fruit \( \frac{1}{2} \) by \( \frac{1}{4} \) in. broadly elliptic scarcely obovate obtuse at both ends. Pastinaca Hookeriana, *Wight Ic.* t. 1010.

**Nilghiri Mts.;** Wight, Gardner, G. Thomson.

Stem 12-18 in. villous or pubescent, subnude upwards. Leaves 2.4 in. diam., sometimes peltate, often 3-lobed, lobes 2-3-fid, lobes rounded, crenate, not serrate. Bracts 1-5, \( \frac{1}{2} \) in., lanceolate or 0; rays 4-10, 1-3 in., hairy, unequal, sometimes compound; bracteoles 0-8, 0-\( \frac{1}{4} \) in., lanceolate or linear, very variable; pedicels 4-10, \( \frac{1}{4} \) in. Calyx-teeth small, lanceolate. Outer flowers of the umbel radiant or not. Fruit obtuse, dorsal and intermediate ridges slender, hardly elevated; wing broad, with a narrow marginal vitta; vitae solitary in the furrows, large, nearly as long as the carpel, commissural 4-2, the 2 longer extending nearly to its base.—Distinguished from *H. rigens*, of which it may be a form, by the undivided leaves: it appears uniformly smaller, more naked upwards, the fruits shining scarcely narrowed at the base.

15. *H. rigens*, *Wall. Cat.* 575; lower leaves pinnate, pinnae 3-5 rarely 7 orbicular villous beneath upper much reduced, bracts not prominent; fruit \( \frac{1}{2} \) by \( \frac{1}{4} \) in. obovate-elliptic. *DC. Prodr.* iv. 191; *W. & A. Prodr.* 373. *? H. sprengelianum*, *Dalz. & Gibs. Bomb. Fl.* 108. Pastinaca rigens, *Wight Ic.* t. 1009.

**Mts. of the Deccan Peninsula;** Heyne; Rottler; Nilghiris and near Cortal- lum, Wight. CEYLON, Walker, Thwaites (No. 145 partly).

Near *H. Hookerianum*, but usually larger (2-3 ft.) with larger umbels. Lower leaves 3-12 in.; pinna 1-3 in. diam., obtuse, crenate not serrate. Fruit nearly as in *H. Hookerianum* but dull reddish-brown, often more elongate at the base, in which case the vitae extend only \( \frac{1}{3} \) the length of the carpel; commissural vitae 2-6, usually 4.


16. *H. aquilegifolium*, C. B. Clarke; glabrous, lower leaves 3-partite or pinnate, pinnae large ovate 3-lobed, fruit \( \frac{1}{2} \) by \( \frac{1}{4} \) in. orbicular or suborbicular, vitæ in the lateral furrows usually 2-3. Heracleum sp. 11, *Herb. Ind. Or. H. f. & T.*

**Concan**; tropical region, Law, Stocks.

Stem 2-3 ft. Pinnae of the lower leaves 2-4 in. diam., dentilulate; upper leaves often undivided, uppermost reduced to sheaths. Umbels often in a nearly naked raceme. Bracts 3-5, \( \frac{1}{2} \) in., lanceolate; rays 6-10, \( 1 \frac{1}{2} \) in.; bracteoles
3–5, ¼ in., lanceolate or linear, sometimes obtuse. Dorsal *ridges* distinct, shortly excurrent, wing broad with a minute marginal *vitta*; dorsal *vitta* produced nearly to the base; commissural 6–8.—Very near *H. rigens* var. *lignisticfolium* which has the leaves sometimes nearly glabrous, but the leaves are less serrate, and the *vittae* are usually 2–3 in the lateral furrows.

17. **H. ceylanicum**, Gardn. ms.; lower leaves pinnate pinnae deeply pinnatifid, lobes oblong hairy above villous beneath, fruit as in *H. rigens*. **H. Sprengelianum**, Thwaites Enum. 131, not of *W. & A.*

**Ceylon**; Walker, Gardner, Wight, Thwaites (No. 145 partly).

*Pinnae* of the lower leaves 1–2 by ¾–1 in., sharply closely serrate or crenate. *Outer flowers* of the umbel somewhat radiate, with lanceolate acute calyx-teeth. *Fruit* ¾–1 by ½ in., obovate, totally unlike that of *H. Sprengelianum* *W. & A.*, but altogether that of *H. rigens* from which this differs only in the cutting of the leaves, which is uniform in the numerous examples.


**Nilgiri Hills**, *Wight, Gardner*.

*Stem* 2–4 ft. Lower leaves 8–16 in., ovate; secondary pinnae often 4 by 3 in., lobed, crenate-serrate. *Bracts* usually 0; rays 6–16, 1–2½ in., nearly glabrous; bracteoles 3–5, ¼ in., lanceolate, cadaceous; pedicels 8–16, in fruit ½ in. *Calyx-teeth* obscure, in the radiant flowers small, ovate, obtuse. Dorsal and intermediate *ridges* obsolete; wing less than ¼ in. wide; *vittae* often ½ the length of the carpel, or more; commissural 2–4.—Easily distinguished from the foregoing species by the small fruit.


**Concan Hills**; Dalzell, &c.

*Stem* 2–4 ft., more or less hispid. Tertiary *pinnae* of the lower leaves often 1–2 in., ovate, deeply 3-lobed. serrate; upper leaves much reduced, uppermost often to sheaths. *Bracts* 3–5, ⅓–¼ in., oblanceolate, obtuse, or 0; rays 5–10, 1–2 in.; bracteoles very variable, 5–7, lanceolate and longer than the umbellule, or small, linear. *Calyx-teeth* obscure, or small, oblanceolate. *Outer flowers* usually radiant, large. *Fruit* exceedingly hard, much less dorsally compressed than in other species, ridges prominent; *vittae* as long as the carpel, those of the lateral furrows usually 2, commissural 2–4.

**Var.? Stocksii**; dorsal and intermediate *ridges* (in the unripe fruit) slender lateral *ridges* excurrent into a narrow very thin ring. *Heracleum* sp. 10, Herb. Ind. Or. H. f. & T.—Concan; Stocks. *Fruit* the same size as in *H. concanense* type, and *vittae* the same. This may be a new species; for the wing of the unripe fruit will almost certainly dilate and will then be unlike that of *H. concanense*.


**Deccan**; Shevagherry Hills, *Wight*. **Belgaum**; **Law**.

*Stem* 12 in., or more, remotely hirsute. *Petiolic* 2–6 in.; leaflets 1–2 by ⅓–⅓ in. *Bracts* usually 1, ⅓ in., linear-lanceolate; rays 5–6, 1–1½ in.; bracteoles 0–5, ⅓–⅔ in., lanceolate; pedicels 8–12, ⅔ in., in young fruit. *Outer flowers* of the *umbel* radiate; calyx-teeth linear, pronounced; style-bases large conical. *Fruit* very immature in our specimen and in *Wight’s* drawing.—The large style-bases and pedate leaves are not like *Heracleum*; the fruit promises to be like that of *Schultzia*.

**Bombay**: On Hursur and Hurry-chunder hill forts, Dalzell.

Stem 1-1½ ft., erect, branched. *Leaves* mostly radical, long-petioled. *Bracts* 1-3, broad-ovate, acute, foliaceous; rays 6-8, unequal; bracteoles 3, like the bracts. *Flowers* white, exterior radiant.—Not seen: the foregoing copied from Dalzell, l.c.

34. **ZOSIMIA**, Hoffm.

A perennial herb, pubescent or hirsute. *Leaves* 2-4-pinnate, segments small. *Umbels* compound, rays numerous; bracts and bracteoles usually many, small. *Calyx-teeth* linear, somewhat prominent. *Petals* obovate, emarginate, white or yellowish, often unequal sometimes radiant. *Fruit* elliptic or orbicular, dorsally compressed, complanate; dorsal and intermediate ridges filiform or obscure, lateral hyaline, with a thick corky obtuse wing; furrows with solitary large vitæ; carpophore 2-partite. *Seed* 4-6 times broader than thick.


**Scinde**: Stocks. [**Punjab**]; base of Suleiman Mts., Edgeworth.—Distrib. Beloochistan and Cabul to S.E. Europe.

Stem 1-3 ft., pubescent or hirsute. *Leaves* 4-8 in., oblong-lanceolate, pubescent, ultimate segments ½-1 in. narrowly lanceolate or linear. *Bracts* and bracteoles variable, usually 5, ⅔-⅜ in., lanceolate; rays 6-16, 1-3 in., often stout; pedicels 8-20, ½-1 in. *Fruit* ½ by ⅔ in., elliptic or somewhat obovate, variable in size and shape, pubescent till fully ripe.

34.* **CORIANDRUM**, Linn.

A herb, annual, branched, glabrous. *Leaves* decompound. *Umbels* compound, rays few; bracts 0, or small linear; bracteoles few, filiform. *Calyx-teeth* small, acute, often unequal. *Petals* obovate, emarginate, white or purplish, of the outer flowers unequal, often radiant. *Fruit* subglobose; ridges not prominent, dorsal primary and adjacent secondary strongest, lateral primary and secondary obscure; vitæ obscure, solitary, under the secondary ridges; carpels slightly concave on the inner face, commissure distinctly 2-vittate; carpophore 2-partite. *Seed* convexo-concave, about thrice as broad as thick.


Throughout India; cultivated.—Distrib. Widely cultivated.

34.** **CUMINUM**, Linn.

A slender, annual herb, glabrous except the fruit. *Leaves* twice or thrice 3-partite, ultimate segments filiform. *Umbels* compound, rays few; bracts and bracteoles several, linear, rigid. *Calyx-teeth* small, subulate, unequal.
Petals oblong or obovate, emarginate, white, often unequal. Fruit cylindric, tip narrowed; primary ridges filiform, distinct; secondary usually hispidulous; vittae large, solitary under each secondary ridge; carpophore 2-partite or 2-fid. Seed somewhat dorsally compressed, convexo-concave.

1. **Cuminum, Linn.**; DC. Prodr. iv. 201; Roxb. Hort. Beng. 21, Fl. Ind. ii. 92; Wall. Cat. 7213; Wight Ill. t. 117, fig. 6; W. & A. Prodr. 372; Boiss. Fl. Orient. ii. 1080.

PUNJAB PLAIN, DECCAN, &c., cultivated.—Distrib. Widely cultivated.

35. **DAUCUS, Linn.**

Annual or biennial herbs, usually hispid. Leaves 2-4-pinnate, ultimate segments narrow or small. Umbels compound, rays usually many; bracts generally very many, pinnate; bracteoles many, 3-fid entire or 0. Calyx-teeth small, or obsolete. Petals obovate, emarginate, white, outer often radiant. Fruit elliptic, terete or somewhat dorsally compressed; ridges all prominent, all or secondary only bristly, lateral primary little developed, lateral secondary usually the widest almost in the plane of the commissure; vittae solitary, under the secondary ridges; carpophore undivided or 2-fid. Seed 1/4-terete, dorsally subcompressed, inner face plane.—Distrib. Species 20, mostly Mediterranean and temperate Asiatic; 2 N. American, 1 Australian.

1. **D. Carota, Linn.**; DC. Prodr. iv. 211; hispid, leaves 2-3-pinnate, pinnæ pinnatifid segments narrow-lanceolate, outer rays connivent in fruit, bristles of the secondary ridges as broad as the fruit, of primary shorter or 0. Roxb. Hort. Beng. 21, Fl. Ind. ii. 90; Wall. Cat. 7214; W. & A. Prodr. 374; Wight Ill. t. 117, fig. 7; Boiss. Fl. Orient. ii. 1076.

Kashmir and the Western Himalaya, alt. 5000-9000 ft.; cultivated elsewhere in India.—Distrib. Of the genus.

Stem 1-4 (in the Himalaya often 6) ft. Bracteoles many, 3-fid and simple. Fruit 1/10 in.; bristles on the secondary ridges glistening white, connate at the base only, of the primary ridges small or sessile, subglochidiate; carpophore undivided.—The carrot.

36. **CAUCALIS, Linn.**

Annual herbs, scabrid or hispid. Leaves 2-4-pinnate. Umbels compound, rays few (in Indian species); bracts 0, or linear, inconspicuous; bracteoles usually several, linear or oblong, membranous. Calyx-teeth small, acute, or obsolete. Petals obovate, emarginate, white or purplish, outer often radiant. Fruit elliptic or oblong, terete, subcompressed laterally, constricted at the commissure; primary and secondary ridges prominent or not, with 1 or 3 rows of bristles or tubercles; vittae solitary, under the secondary ridges; carpophore undivided or 2-fid. Seed 1/4-terete, deeply grooved on the inner face.—Distrib. Species 18, principally in the temperate Old World.

Himalaya, alt. 3000-9000 ft.; from Kashmir to Sikkim, frequent.—Distrib. N. Asia, Europe, N. Africa.

Adpressedly hispid; 1-2 (in the Himalaya) ft. Secondary pinnae 1 in., pinnatifid half-way down into lanceolate acute lobes. Umbels long-peduncled, rays 5-12; bracteoles linear, not white-margined. Petals purplish or white, not radiant. Bristles scattered over the whole surface of the fruit, rough, curved or almost hooked, not glochidiate.


Resembling C. Anthriscus, but the leaves rather more finely cut, ultimate segments narrower, sometimes almost linear; fruit larger, bristles longer, shining, scarcely scabrous, subglochidiate. Umbels often lateral, peduncle 1-2 in., stout; rays usually 2-5.


Kashmir; Falconer; alt. 5000-8000 ft., frequent, C. B. Clarke.

Hispid, almost prickly, 4-24 in., rigid, erect or divaricate. Leaves 1-2-pinnate, pinna often 1-2 in., oblong, serrate or pinnatifid half-way to the midrib. Rays 3-4, 1-3 in.; pedicels hardly ½ as long as the fruit. Carpels with 7 subequally aculeate ridges, the two lateral primary ridges within the commissure less prominent; bristles stout, rough, curved or nearly straight at the apex, hardly glochidiate.

37. PSAMMOGETON, Edgw.

A small annual, pubescent or glabrous. Leaves 1-2-pinnate, pinnae laminate. Umbels compound; bracts and bracteoles many, small, lanceolate or linear, scarious. Calyx-teeth obsolete. Petals obovate, emarginate, white or purplish, not or but slightly radiant in the outer flowers. Fruit small, ovoid or lanceolate commissure slightly constricted; primary and secondary ridges hairy, elevated, scarcely winged, secondary rather the more prominent; vitreous, solitary, under the secondary ridges; carpophore 2-fid. Seed somewhat dorsally compressed, inner face plane or scarcely concave.


Punjab Plain, ascending the Himalaya to 3000 ft.; frequent. Scinde.—Distrib. Beloochistan, Cabul, Persia.

Stem 2-8 in., divaricately branched, pubescent or grey subtomentose, not villous. Peduncles 1-3 in., stout, lateral and terminal. Bracts 3-8, ½-⅓ in., narrowly lanceolate or linear; rays 5-10, ½-1 in.; bracteoles 4-8, ½ in., lanceolate, sheathing the young umbellule; pedicels 6-16, ½ in. Fruit scarcely ⅓ in., lanceolate, thinly hairy in the Indian plants; styles very long.

Var.villosa; much taller with patent soft hairs, ridges of the fruit with several dense rows of often brown hairs.—Scinde, Stocks: a frequent form in Beloochistan.
and Cabul.—Very unlike the type, but there are intermediate forms. Probably
P. brevisetum and setifolium, Boiss. Fl. Orient. ii. 1079, are other varieties.

DOUBTFUL UMBELLIFERÆ.

Sison trinerve, Ham. in Don Prodr. 184; DC. Prodr. iv. 111.
Athamantha gigantea, Don Prodr. 184; DC. Prodr. iv. 156.
Athamantha teres, Don Prodr. 185; DC. Prodr. iv. 156.
Ligusticum ? nepalense, Don Prodr. 125; DC. Prodr. iv. 159.

(An Hymenolæa? DC. I.e.)

Order LXXI. **ARALIACEÆ.** (By C. B. Clarke.)

Trees or shrubs, very rarely herbs, sometimes scendent or scendent when
young and finally self-supporting, not rarely prickly. Leaves alternate, the
uppermost rarely sub-opposite, long-petioled, large, simple or compound;
stipules adnate to the petiole, sometimes inconspicuous or 0. Flowers regular,
small, sometimes polygamous, in umbels racemes or panicked heads; bracts
and bracteoles small or conspicuous; pedicels continuous with the base of
the calyx or there jointed. Calyx-tube adnate to the ovary; limb truncate,
obsolete or with small teeth. Petals 5 rarely 6-7 or many, valvate or sub-
imbri cate, expanding or deciduous in a cap. Stamens as many as and alternate
with the petals (very many in Tupidanthus), inserted round an epigynous disc.
Ovary inferior, 2-celled, or cells as many as the stamens (in Arthrophyllum
1-celled); styles as many as the cells, distinct or united; ovules solitary and
pendulous in each cell. Fruit coriaceous or drupaceous usually small, one or
more cells sometimes suppressed. Seed pendulous, albumen uniform or rumi-
nated; embryo minute, radicle next the hilum.—DISTRIB. Species 540, chiefly
tropical and subtropical, a few in the cool temperate zones.

Sect. I. **Araliaæ.** Petals imbricated (but only lightly). Pedicels jointed.

<table>
<thead>
<tr>
<th>Styles</th>
<th>Leaves</th>
<th>Species</th>
</tr>
</thead>
<tbody>
<tr>
<td>2-5, free</td>
<td>compound</td>
<td>1. Aralia</td>
</tr>
<tr>
<td>5, combined</td>
<td></td>
<td>2. Pentapanax</td>
</tr>
<tr>
<td>4-3, free</td>
<td>pinnatifid</td>
<td>3. Araldium</td>
</tr>
</tbody>
</table>

Sect. II. **Panaceæ.** Petals valvate. Albumen uniform.

* Ovary 2-celled.

<table>
<thead>
<tr>
<th>Pedicels</th>
<th>Leaves</th>
<th>Species</th>
</tr>
</thead>
<tbody>
<tr>
<td>jointed</td>
<td>compound</td>
<td>3. *Panax</td>
</tr>
<tr>
<td>continuous</td>
<td>digitate</td>
<td>4. Acanthopanax</td>
</tr>
</tbody>
</table>

** Ovary 4-10-celled.

† Umbels sessile on the back of the leaf.

<table>
<thead>
<tr>
<th>Leaves</th>
<th>Species</th>
</tr>
</thead>
<tbody>
<tr>
<td>simple</td>
<td>5. Helwingia</td>
</tr>
</tbody>
</table>

†† Pedicels jointed.

<table>
<thead>
<tr>
<th>Leaves</th>
<th>Species</th>
</tr>
</thead>
<tbody>
<tr>
<td>once pinnate</td>
<td>6. Polystias</td>
</tr>
</tbody>
</table>

††† Pedicels continuous. Leaves not pinnate.

<table>
<thead>
<tr>
<th>Fruit</th>
<th>Species</th>
</tr>
</thead>
<tbody>
<tr>
<td>angular the size of a pea</td>
<td>7. Heptapleurum</td>
</tr>
<tr>
<td>more than ½ in. long</td>
<td>8. Trevesia</td>
</tr>
<tr>
<td>flower sessile embraced by 4 bracteoles</td>
<td>9. Brassaiia</td>
</tr>
<tr>
<td>leaves simple (except the lowermost)</td>
<td>10. Dendropanax</td>
</tr>
</tbody>
</table>

* Ovary 1-celled.
Leaves pinnate or undivided

** Ovary 2-celled.
Pedicels continuous. Styles distinct
Pedicels continuous. Styles combined
Pedicels jointed. Styles combined

*** Ovary 5-4-celled; styles combined.
† Leaves simple lobed or pinnate.
Pedicels continuous
Pedicels jointed

†† Leaves digitate.
Tree. Leaflets ciliate

Petals united, falling off in a cap

1. ARAVIA, Linn.

Herbs shrubs or small trees, glabrous hairy or prickly. Leaves alternate or whorled, digitate pinnate or compound-pinnate; leaflets serrate or nearly entire; stipules not prominent. Umbels solitary or in racemes or panicles rarely in compound umbels; pedicels jointed close under the flower or not. Flowers often polygamo-monococious. Calyx margin truncate or 5-toothed. Petals 5, ovate, imbricate in bud. Stamens 5. Ovary 2-5-celled; styles 2-5, free or shortly connate at base (at least in the seed-producing flowers). Fruit 4-5-celled 4-5-angular, or subglobose 2-3-celled. Albumen uniform.—Distrib. Species 30; extending from India and Malaya to Japan and North America.


NIPAL, SIKKIM, and BROTAN, alt. 6000-12,000 ft., frequent. KHASIA MTS., alt. 5000 ft.; H. f. & T.

Rootstock horizontal, tuberous or tuberiferous. Stem 6-15 in., erect, smooth, terminated by a whorl of leaves; the scale at its base deciduous or persistent. Leaflets rarely 3, 2-6 by ³⁄₄-1 ½ in., acuminate often caudate, rounded or tapering at the base, closely serrate or deeply doubly serrate, glabrous except the scattered bristles; petiole 1-6 in., glabrous; petiolules 0-1 in. Peduncles shorter or longer than the leaves, glabrous or nearly so, solitary or 2-4, simple or with 2-5 umbellate heads; pedicels ½-1 in., pubescent or puberulous; bracteoles ½ in., narrow lanceolate-linear. Flowers polygamo-monococious; styles in the male flowers sometimes united nearly to their summit. Fruit red, or half-black half-red.

Doubtfully separable from the true Ginseng of Japan, Panax Ginseng, C. A. Mey. t. c. 524, which differs by having broader, more obovate, less bristly leaves, and not by the characters relied on by C. A. Meyer. The Indian examples show every VOL. II.
form of rootstock and tuber attributed specially to *P. Ginseng* and to *P. quinquefolius*, *Linn.*: the scale at the base of the stem is persistent even in some of Wallich's specimens.


**Sikkim Himalaya**, alt. 8500-11,500 ft.; *J. D. H.; C. B. Clarke.*
Generally resembles *A. Pseudo-ginseng*, and perhaps not distinct. Leaflets petiolueld or sessile, lanceolate acuminate or caudate. Rootstock horizontal, quite like that of some examples of *A. Pseudo-ginseng*, and doubtless, like it, produces tubers not rarely.

**SECT. II. Shrubs, erect or scandent, or small trees. Leaves digitate. Styles 5 (or 4). Fruit carpels 5-4, ridged on the back.**

3. **A. cissifolia**, *Griff.; Seem. Rev. Heder. 91*; leaflets 5 rarely 3 lanceolate narrowed at each end, a tuft of fulvous hairs or spines often at the apex of the petiole, umbels simple.—*Araliad* sp. 4, *Herb. Ind. Or.*, *H. f.* & *T.*

**Temperate Himalaya**; Kumaon, Sikkim, and Bhotan.
A shrub 10 ft. or erect small tree, branches with short strong deflexed prickles which are sometimes clustered at the nodes. *Petioles 5 in.*, glabrous or pubescent, often with scattered prickles; stipules large, ovate, often deciduous; leaflets 2-3 in., lanceolate, acuminate, pilose above; petiolo 0-½ in. *Peduncles 2-5 in.*, solitary, pubescent upwards, carrying each one many-flowered umbel; bracteoles among the pedicels few, linear, small. *Fruit* glabrous.

**Var. 1. normalis**; a small tree, branchlets and leaves prickly, leaflets fulvous-pubescent beneath doubly serrate, pedicels pubescent. Sikkim; alt. 9000-12,000 ft., Lachen, *J. D. H.* Bhotan; *Griffith* (Kew Distrib. No. 2669).


**SECT. III. Eu-Aralia.** Erect lax shrubs, *Leaves 1-3-pinnate. Styles 5 (or 4). Fruit carpels 5-4, ridged on the back.**


**Temperate Himalaya**; from Sikkim, alt. 7000-8000 ft., to Kashmir, alt. 9000-12,000 ft.; frequent.
A lax shrub, 5-10 ft. *Leaves 1-3-pinnate*, ultimate pinna with 5-9 leaflets, petiolules 0-½ in.; leaflets 3½ by 1½ in., often cordate at base, usually simply regularly serrate, pilose above, glabrous or hispid on the nerves beneath. *Umbels* in elongate panicles a foot long; but many smaller panicles occur; bracts ½ in., few, lanceolate, or sometimes leaf-like 1½ in.; pediole-branches and pedicels pubescent.

5. **A. malabarica**, *Bedd Fl. Syde. ii. 121,* and *Anal. Gen. t. 15*; aculate, panicle-branches and pedicels glabrous or sparingly bristly, bracts less than ½ in. narrow lanceolate acute ciliate.

**Western Ghats, from Malabar to Travancore**; common on the Carcoor Ghat in Wynaad; *Beddome.*
A large shrub, nearly glabrous, with scattered weak prickles and bristles. *Leaves
2. 3 ft., 2-pinnate with a pair of leaflets at each division of the rachis; petiolules 0-\(\frac{1}{2}\) in.; leaflets 3-5\(\frac{1}{2}\) by 1-1\(\frac{3}{4}\) in., 5-9 to each pinn, simply or doubly serrate, ciliate, acuminete, narrowed ovate or cordate (Beddome) at the base, when young weakly aculate, when older nearly glabrous on both surfaces. Umbels in a compound spreading panicle, at least 8 in. Fruit slightly 10-ribbed (Beddome).

6. A. Thomomsonii, Seem. Rev. Heder. 91; prickles short strong, stem upwards fulvous villous and woolly, pedicels \(\frac{1}{2}-\frac{3}{4}\) in.—Araliad sp. 42, Herb. Ind. Or., H. f. & T.


A large prickly shrub, all parts softly villous. Leaves large, 2-3-pinnate, with a pair of leaflets at each division of the rachis; petiolules 0-\(\frac{1}{2}\) in.; leaflets 3-4 by 1\(\frac{3}{4}\) in., 5-9 to each ultimate pinnule, elliptic, acuminete, base broad, sparingly often very obscurely serrate. Panicles 1\(\frac{1}{2}\) ft., compound; bracts \(\frac{1}{4}\) in., narrow-lanceolate.—Resembles A. chinensis, Linn., and A. montana, Blume, but differs from both in its long-pedicelled flowers. It is much more hairy than the other Indian Araliias.

7. A. foliolosa, Seem. Rev. Heder. 91; very prickly, leaflets glabrous beneath or sparingly bristly on the nerves, bracts narrow-oblong somewhat obtuse persistent, pedicels glabrous or nearly so. Panax (?) foliolosum, Wall. Cat. 4928.—Araliad sp. 44, Herb. Ind. Or., H. f. & T.

Sikkim, alt. 5000 ft., J. D. H.; BHOTAN, Griffith. KHASIA Mts., Griffith (Kew Distrib. No. 2659); alt. 3000-4000 ft.; H. f. & T.

A large lax shrub, glabrous or nearly so; prickles short strong spreading. Leaves large, 2-3-pinnate, with a pair of leaflets at each division of the rachis; petiolules 0-\(\frac{1}{2}\) in.; leaflets 2-3 by 1-1\(\frac{3}{4}\) in., 5-9 to each ultimate pinnule, elliptic, acuminete, usually rounded at the base, sparingly serrate, glabrous or minutely pilose above, pilose on the nerves beneath. Panicle 1 ft., compound; pedicels \(\frac{1}{2}-\frac{3}{4}\) in.

Var. sikkimensis; leaflets more slender more serrate, at their base are often needle-like spines \(\frac{1}{2}-\frac{3}{4}\) in., panicle very large.—Sikkim, alt. 2000-5000 ft.; J. D. H., N. Gamble, C. B. Clarke.

8. A. armata, Seem. Rev. Heder. 91; prickly, upper part of stem and petioles glabrous, leaflets pilose on both surfaces, upper part of panicle and pedicels pubescent, bracts 0 or caducous. Kurz For. Fl. i. 536. Panax armatum; Wall. Cat. 4933; G. Don Gen. Syst. iii. 356.—Araliad sp. 45, Herb. Ind. Or., H. f. & T.


A shrub. Leaves very large, usually 3-pinnate, with a pair of leaflets at each division of the leaf-rachis; petiolules \(\frac{1}{2}\) in.; leaflets 4\(\frac{1}{4}\) by 2 in., 5-9 to each ultimate pinnule, acuminete, round or cordate at the base, distinctly serrate. Panicle often 1\(\frac{1}{4}\) ft., the lower part of the rachis glabrous; pedicels \(\frac{1}{2}-\frac{3}{4}\) in.—Panax Finlaysonianum, Wall. Cat. 4933, from Turong Bay, Cochín China, hardly differs from this except that the leaflets have soft brownish-red hairs on the lower surface instead of bristly hairs.

2. PENTAPANAX, Seem.

Trees or large scandent shrubs. Leaves simply pinnate with 5-9 leaflets, or digitate with 3-5 leaflets glabrous; leaflets entire crenate or serrate. Flowers hermaphrodite or polygamous, in compound racemes or umbel, pedicels jointed close under the flowers. Calyx-teeth 5. Petals 5, imbricated in bud.
Stamens 5. Ovary 5- (or 4-) celled; styles 5-4, combined to the summit or free for more than half their length. Fruit 5-4-celled and angled. Albumen uniform.—Distrib. Species 5, confined to continental India.

* Flowers in panicked racemes.

1. **P. racemosum**, Seem. Rev. Heder. 21; panicles unisexual elongate oblong with racemes diverging from the rachis divaricately to its summit, styles in the perfect flowers half- or more- free recurved.—Araliad sp. 41, Herb. Ind. Or., H. f. & T.

Sikkim; alt. 6000—8000 ft.; H. f. & T.; Gamble; C. B. Clarke.

A tree 60 ft. (ex H. f. & T.), or a large climber (ex Gamble). Leaflets 4-9 by 2½—5½ in., usually 5-7, elliptic, acuminate, often rounded or cordate at the base, sinuate-denticulate; petiolules often ½ in. Pedicels glabrous or villous, often 1 ft. by 4-6 in., 3-9 clustered at the ends of the branchlets; branches 2-3½ in., racemed, flowering from their base; pedicels 0-¾ in., with a minute linear bract at their bases. Styles in the male flowers combined nearly to their summit, in the perfect flowers 3-5, recurved free sometimes almost to the base. Fruit (not ripe) small, subglobose; probably less angular and elongate than that of *P. Leschenaultii*; disc not elongate-conical.


Khasia Mts., alt. 4000—6000 ft.; Wallich, Griffith, &c., not rare.

A small tree. Leaflets ¾—4½ in. by 1 in., usually 3-5, elliptic, acuminate, often rounded or cordate at the base, sinuate-crenate; petiolules often ½ in. Pedicels 8 in., with 3-8 racemed branches ascending from its lower half; panicle-branches 2-4 in., glabrous racemed flowering from their base; pedicels often ½ in. (rarely 0-¼ in.), with a minute linear bract at their bases. Flowers appear all perfect. Fruit (nearly ripe) small, subglobose, obscurely 5-angled, disc not elongate-conical.

** Flowers umbelléd, umbels simply panicked.


Scandent, glabrous. Leaflets 2½ in. by 1½ in. (or smaller), scarcely acuminate, base rounded or subacute; petiolules 0-¼ in. Pedicels 3-4 in., simple with 2-8 umbels; pedicels ½ in. in. glabrous. Styles long, combined to near the top. Fruit (not ripe) small, subglobose, obscurely 5-angled; disc not elongate-conical.

Var. 1. *khasia*: pedicels and rachis of panicle pubescent.—Khasia Mts.; Myrung, alt. 5000 ft., Griffith (Kew Distrib. No. 2680), Simons.


Sikkim, alt. 6000—1000 ft.; J. D. H. South Deccan and Ceylon in the mountains. Burma, Taong-dong; Wallich.
A tree 30–50 ft., or scendent shrub. *Leaves* 3½ by 2½ in., 3 (or 5 in Wight's No. 1204), base rounded or cordate; petiolules often ¼ in. *Panicles* 3–6 in., with 3–6 heads; pedicles ¼ in., glabrous or puberulo-pubescent. Styles combined nearly to their summits. *Fruit* ½ in. long and broad subcampanulate; ribs not prominent.

The typical form of the fruit in the Nigheberries, accurately described and figured by Wight and Beddome, differs from the Himalayan, but the large series of examples bridges over the gap completely.

*Var. umbellatum*, Seem. Rev. Heder. 22 (sp.); fruit oblong strongly-ribbed, disc often elongate-conical, pedicels glabrous or pubescent. *P. Leschenaultii*, Seem. Rev. Heder. 22, partly; *Brand. For. Fl.* 248. *Hedera fragrans*, Don Prodr. 187, not of Roxb. *Panax bijugum*, Wall. Cat. 4937; *C. Don Gen. Syst.* iii. 386, &c.—Temperate Himalaya from Kumaon to Bhotan, alt. 4000–10,000 ft.; common. Khasia Mts., alt. 3000–5000 ft.—Resembles the type except in the fruit: the pedicels are either glabrous, or more or less pubescent. Seemann has marked as *P. Leschenaultii* examples with pubescent pedicels.


**Malacca**: *Griffith* (Kew Distrib. No. 2702); *Maingay* No. 676.

Lobes of the leaves 4–6 by 1–2 in., oblong-lanceolate. *Male panicles* 15 by 12 in., compound, with innumerable minute pubescent flowers. *Petals* pubescent. *Young ovary* with 1 pendulous ovule in each cell. *Fruit* (unripe) ¼ in. long.—Maingay notes "*Drupes* 1-seeded, cotyledons crumpled leafy." The albumen in the imperfectly ripe seeds seems much ruminated. The seeds of the closely allied *A. dentatum* are 1 in. long.

3* **PANAX**, Linn.

Shrubs or trees. *Leaves* pinnate or digitate rarely undivided; leaflets entire or serrate. *Umbels* panicled (in Indian species), pedicels jointed close under the flowers. *Flowers* often polygamous. *Calyx*-limb 5-toothed or nearly entire. *Petals* 5, valvate. *Stamens* 5. *Ovary* 2–(rarely 3) celled; styles 2 (rarely 3), distinct. *Fruit* subcompressed or globose, 2–(rarely 3-) seeded, carpels rounded on the back.—**Distr.** Species 25, Polynesian, Australian, and Malayan, extending to Mantchuria and Tropical Africa.


Throughout the warmer parts of India, cultivated.—**Distr.** Malaya and Polynesia, cultivated; wild state unknown.

A shrub, 3–6 ft. *Leaves* 2–3 by ¼ in., but varying greatly in size and often irregular in shape, usually much setose-serrate or incised, sometimes nearly entire. *Panicles* 3–6 in.; bracts minute, deciduous; pedicels ¼ in. *Fruit* ½ in. long and broad and ¼ in. thick; styles persistent recurved.

**Shrubs** or small trees, glabrous (or in non-Indian species tomentose). **Leaves** palmate or digitate (in Indian species). **Umbels** panicled or subsolitary; pedicels not jointed under the flower. **Flowers** polygamous or hermaphrodite. **Calyx-teeth** 5, small. **Petal** 5–4, valvate. **Stamens** 5–4. **Ovary** 2- (rarely 3–4-) celled; **styles** 2 at the apex of a conical disc, distinct or combined at the base. **Fruit** laterally subcompressed or subglobose. **Albumen** uniform.—**Distrib.** Species 6; Japan to Malaya, and E. Bengal.


**Misher; Griffith (Kew Distrib. No. 2665).** Khasia Mts., alt. 4000 ft., frequent.—**Distrib.** China, Japan.

A shrub or small tree; branches angular; spines short, broad-based, stout, often deflexed. **Leaves** of 3–5 leaflets; petiole 1–2 in., often bearing one or more prickles; leaflets 2 by 3/4–1 in., subacute, denticulate or serrate, sometimes with a few stiff bristles on the nerves beneath; petiolules usually distinct, 1 to 1/2 in. **Umbels** often solitary; pedicels numerous, 1/2–1 in. **Fruit** 1/2 in. long and broad; styles persistent, recurved, united for half their length.—Seemann has marked some of the Kew examples *A. sepium*, others *A. aculeatum*, between which no difference can be discovered, and his diagnosis of *A. sepium* applies to the examples he has marked *A. aculeatum*. It is very doubtful whether *Panax spinosum*, Linn. f. (*Acanthopanax*, Miq.), specifically differs: the leaflets in this seen quite sessile and the prickles are less deflexed.

5. **HELWINGIA**, Wild.

Glabrous under-shrubs. **Leaves** petaled, simple, lanceolate or ovate-lanceolate, bristle-serrate; stipules a tuft of linear bristles seen only at the base of the young petioles. **Umbels** unisexual, simple, very small, sessile about the middle of the back of the leaf, or on phyllodes; females 1–4-flowered; males with more flowers; bracts 0, pedicels not jointed under the flower. **Calyx-margin** obsolete. **Petal** 3–5, valvate. **Stamens** 3–5. **Ovary** 3–4-celled; styles 3–4, combined at base, rising from a conical disc. **Fruit** ovoid or ellipsoidal, usually 2–3-celled; carpels rounded on the back. **Seed** compressed; albumen uniform.—**Distrib.** Species 2, an Indian and a Japanese.


Sikkim, alt. 7000–9000 ft., frequent. **East Himalaya; Griffith.** Khasia Mts., alt. 5000–6500 ft., *H. f.* & *T*.

Stem woody, branched. **Leaves** 3 by 1 in., tapering at both ends; petiole 1 1/2 in. **Phyllodes** when present spathulate-oblong, sessile, 1 1/2 in., entire below bristle-serrate near the apex, midrib strong, the wing membranous imperfectly herbaceous. **Flowers** 3/4 in. diam., greenish. **Fruit** 1–3 on the leaf; pedicels hardly 1/2 in. **Seeds** narrowly-oblong, compressed, more than twice as long as broad.—This hardly differs from *H. rusciflora*, Wild., which has elliptic (rather than lanceolate) leaves, the fruit shorter subglobose, the seeds less than twice the length of their breadth.
Helwingia populifolia, Spreng. Pugillus ii. 89, said to be from Bengal, does not belong to the genus.


Glabrous trees or large shrubs. *Leaves* pinnate, leaflets coriaceous entire. *Umbels* paniced (in Indian species); bracts $\frac{3}{4}$ in., lanceolate or 0; pedicels jointed under the flower. *Calyx*—*margin* truncate or toothed. *Petals* 5–4 (in Indian species), valvate. *Ovary* 5–4-celled (in Indian species), summit flat; styles 5–4, distinct. *Fruit* ellipsoid or globose, prominently ribbed. *Seed* compressed; albumen uniform.—**DISTR.** Species 8; E. African Islands, S. India, and Malaya.


Decan Mts., alt. 5000 ft.; Nilghiris; Wight. Anamallays and Tinnevelly Ghats; Ceylon, Adams Peak, alt. 4000–5000 ft.; Thwaites.

A tree. *Leaflets* 5 by $\frac{1}{2}$ in., attenuated at both ends, margin thickened, petiole $\frac{1}{4}$ in. *Panicle* 8–10 by 1–3 in., branches stout, umbel at the end of each subcapitate the pedicels not rising from the same point and being sometimes again divided so that the panicle may be called compound, but the umbels altogether are not above 1 in. diam.; bracts caducous. *Ovary* truncate, ellipsoid, soon becoming distinctly ribbed. *Ripe fruit* not seen. [The Andaman leaves distributed by Mr. Kurz as Eupeteron sp. nov. Andaman Rep. Suppl. B. 9 appear to be Arthrophyllum diversifolium, Blume.]


India? Wight No. 1213.—**DISTR.** Malaya, Polynesia.

This plant is noticed here because taken up in W. & A. Prodr. and because Dr. Seeman supposed it might be a new genus. Wight's Herbarium specimen is without locality, there is therefore small probability that the plant is Indian.

7. **HEPTAPLEURUM**, Gaertn.

Large shrubs or trees, glabrous or tomentose, without prickles. *Leaves* digitate rarely compound-digitate or 1-foliolate; leaflets coriaceous, entire or remotely toothed or lobed, never closely serrate nor ciliate, those near the panicle usually entire; stipules often connate within the petiole and prominent. *Umbels* (rarely capitate) paniced or in compound racemes; bracts woolly, deciduous or persistent; pedicels not jointed under the flower; bracteoles few or 0, or rarely densely tufted. *Calyx*—*margin* toothed or truncate. *Petals* 5–6 or many, valvate. *Stamens* as many as the petals. *Ovary* cells as many as the petals, disc small or large; styles small, separate or combined in a short conical narrow cylindric column. *Fruit* subglobose, 5–6-angled. *Seeds* compressed; albumen uniform.—**DISTR.** Species 50, in the tropics of the old world.
SUBGEN. I. **Agalma.** *Stigmas* connate into a narrow cylindric style.

† Umbels perfect, pedicels not racemied.


Temperate Himalaya, alt. 6000–11,000 ft.; from Kumaon to Bhotan, frequent.

A tree, 60 ft. Leaflets often 10 by 2½ in., rugose above from the impressed nerves, lanceolate or oblanceolate, acuminate; petiOles rarely more than 1 in.; leaflets from young trees often distantly lobed or serrate. *Panicle* 12–15 in., stellate-tomentose; bracts very shortly ovate, somewhat persistent; pedicels ½–3 in.—Seeman has applied the name *H. tomentosum* to a different Malayan plant; hence the new name *H. impressum*.

2. **H. hypoleuicum**, Kurz *For. Fl.* i. 530; leaflets with scattered lax stellate wool or glaucous beneath glabrous and not rugose above, petals covered with dense stellate wool.—Araliad sp. 15, *Herb. Ind. Or. H. f.* & *T.*

**Khasia** Mts., alt. 4000–6000 ft. frequent; *Griffith, H. f.* & *T., C. B. Clarke.*

**Marta-ban**, alt. 6000 ft.; *Kurz.*

A small branched tree. Leaflets 4–8 by 1½–3 in., those even from leaves next the panicle polymorphous, oblong or ovate, acute, quite entire or serrulate or lobed or irregularly pinnatifid, the stellate wool beneath deciduous, leaving a glaucous surface; petiOles ½–3 in. *Panicle* often 12–15 in., lower branches often elongate with several umbels, stellately woolly; bracts shortly ovate, somewhat persistent; pedicels ½–3 in.—Closely allied to the preceding. From Mr. Kurz's description it would seem that the rarer Khasian form with perfectly glabrous glaucous leaves, is the only Burman one.


**Kumaon** to **Bhotan**, alt. 5000–7000 ft., not uncommon; *Wallich,* &c.

A tree 30–40 ft. Leaflets 4–7 by 1–2½ in., broadest below the middle, in young trees but sparingly toothed or lobed; petiOles often 1–2 in. *Panicle* 12–18 in., lower branches usually compound; bracts very short, ovate, auriculate; pedicels ½–3 in., glabrous pubescent or stellately woolly; buds usually glabrous.


A small tree. Leaflets 6 by 2 in., broadest above the middle, the tertiary nerves impressed above but less deeply than in *H. impressum*, leaflets of young plants with
remote serratures or shallow lobes; petiolules 1 in. *Panicle* much as in *H. clatum*, nearly glabrous or more or less pubescent or stellately woolly.


**Nilghiris; Wight; Gardner**, alt. 7000 ft.; C. B. Clarke. (The Sikkim locality given by Seeman is an error.)

A small branched tree. *Leaflets* 4 1/4 by 1 1/2-2 in., entire or denticulate; petiolules 3/4-1 in. *Panicle* 8 in., branches often bearing one umbel each only; bracts shortly ovate, persistent; pedicels 1/2-3 in., glabrous or stellately pubescent, springing from a dense tuft of permanent bracteoles.

*Var. micrantha*; flowers and fruit smaller, pedicels and bracteoles glabrous.—Sisparah, Nilghiri Mts., *Wight*.

†† Pedicels usually racemose.


A large tree. *Leaflets* 6 by 2 1/4 in., elliptic or lanceolate, subobtuse or cuspidate, coriaceous, tertiary nerves above obscure; petiolules often 1-1 1/4 in. *Panicle* 6-12 in., the ends of the branches bracts and pedicels rusty pubescent while young; bracts shortly ovate, persistent; pedicels 1/2 in. *Flowers* at first often umbellated, the fruits usually distinctly racemose.—Closely allied to the preceding species: some of *Thwaites*’ specimens are not racemose at all, even in fruit.

**Subgen. II. Eu-Heptapleum.** *Styles* short, not connate into a narrow cylindric column.

* Leaves 1- (rarely 1-3-) foliolate.


**Ceylon**, up to 4000 ft.; *Walker, Thwaites*.

A climbing glabrous shrub. *Leaflets* 2-1 1/4 by 3-2 1/4 in., narrowed at the base, sub sessile, broadest at the very summit and there distinctly emarginate or 2-lobed, nerves on both surfaces raised. *Pedicels* 3/4 in., spreading; bracts 0 or early fugacious. *Flowers* very small, white tinged red (*Thwaites*).

** Leaves simply digitate; leaflets usually 5-7.

† Reticulating nerves prominent on the upper surface of the leaflets.

Throughout tropical and subtropical India, from the North-West Himalaya to the South Deccan and Singapore.—Distr. Malaya and Tropical Australia.

A small glabrous tree or climbing shrub. Leaflets 4 by 2 in., glabrous, entire, acuminate, base subacute or rounded; petiolules 1 in. or larger. Panicle small or large; lateral branches sometimes 10 in. compound; bracts caducous, large, ovate, hairy in the young panicle; branchlets and pedicels glabrous or pubescent; pedicels 6-14 in. Buds varying in size, and the disc after flowering is very prominent or not. —The panicle branches become more delicate and the buds smaller in Burma, where the plant is exactly Paratropia elliptica, Miq.; while at Malacca the form collected by Dr. Maingay (No. 680) is P. micrantha, Miq.

Var. macrophylla, Wall. Cat. 4918 (sp.); leaflets 6-8 in.—Amherst; Wallich.


Altogether resembles *H. venulosum* except as to the obtuse obvate leaflets, and may be merely a South Indian and Ceylon form of it.


Pinsang and Malacca; Griffith (Kew Distrib. No. 2690); Maingay, No. 681.—Distr. Sumatra.

Branchlets glabrous. Leaflets 5½ by 2½ in., narrowed at both ends, glabrous or rarely with scattered stellate woolly hairs beneath, entire or with a few teeth. Panicle in flower 10 by 1 in., in fruit nearly 3 in. broad, when young with scattered white stellate wool; bracts ½ in., lanceolate, stellately white woolly, soon deciduous; branches usually very short, sometimes 1 in.; pedicels ½ in., always stellately tomentose when young. Fruit pentagonal, disc large, prominent.—May this be a state of *H. heterophyllum*?

†† Leaves coriaceous, tertiary nerves not prominent above.


A large glabrous tree. Leaflets 5-10 by 2½-4 in., oblong or elliptic, acute, rounded at the base, very leathery. Panicle oblong, about 12 by 3 in.; buds glabrous, unusually large. Fruit crowned by the much enlarged pentagonal disc.


Leaflets attain 11 by 3 in., usually much smaller, narrow-oblong or lanceolate, acuminate, glabrous, the base sometimes almost rounded, very coriaceous, entire; petiolules often 1½ in. Panicle with white stellate tomentum on the branches pedicels and backs of the petals, often a foot long in fruit; lower branches elongate, ascend-
Hedera mollis; Wall. Cat. 4924; the example consists of leaves only; it may be Heptapleurum Cephalotes above.

8. TREVESIA, Vis.

Shrubs or small trees, prickly or unarmed, glabrous or stellate-hairy. Leaves palmate or digitate; petioles often united by a wing at their base; stipules united within the petiole or obsolete. Flowers polygamous, large for the Order; umbels panicked; pedicels not jointed under the flower; bracts small or 0. Calyx-margin entire or toothed. Petals 8–12, valvate, somewhat thick, often cohering as a cap in the fertile flowers. Stamens as many as the petals. Ovary with as many cells as the petals; styles united into a small boss or short column. Fruit ovoid, large for the Order. Seeds compressed; albumen uniform.—Distrib. Species 8; inhabiting Eastern India, Malaya and Polynesia.
Hardly separable from *Heptapleurum* by the larger flower and fruit, and the usually more numerous carpels.


From *NIPAL* and *SIKKIM* to *PSEU*, alt. 1000–5000 ft., frequent. A small tree 10–15 ft., the shoots with reddish hair and many prickles. *Leaves* 1–2 ft., adult glabrous or with scattered stellate hairs on both surfaces deeply palmate, in young plants often digitate; petiole often prickly. *Panicles* 18 in., straggling, young with red-brown tomentum; bracts 1 in., oblong, usually deciduous; pedicels 1–1½ in. *Buds* exceeding ½ in. diam. *Fruit* ½ by ½ in., ovoid, glabrate, ribs not prominent, crowned by the stout style.


Var. 2. *cheirantha*; leaves palmate nearly glabrous, lobes serrate, petiolules when present with entire wing. *Hedera? Aralia*, Jack *in Wall. Cat.* 4925. *Chittagong*, alt. 0–1000 ft.; *H. f. § T.* *Pinang* and *Malay Peninsula*, *Porter, Sir W. Norris; Wall. Cat.* 4910 partly. *Malacca*, *Griffith* (No. 2661 Kew Distrib.).—*Distrib. Philippines*.—These are the examples (leaves only) referred in *Gen. Pl.* i. 948 to *T. sundaeica*, Regel (*Gartenfl. 1864, t. 438*, not of Miquel). In *T. palmata* the young plants only, and only occasionally, produce digitate leaves; and such are often only imperfectly digitate, the central leaflets being frequently petioluled the lateral leaflets continuous. There may be more than one species of *Trevesia* here included, but no species can be founded on imperfectly digitate leaves. One sheet of *Wall. Cat.* 4910, marked *Hedera confluens*, consists of the fruit of *Brassaiopsis* (probably *B. Hainla*) mixed with leaves of *Trevesia* and constitutes the *Brassaiopsis confluens*, *Seem. Rev. Heder. 18*.


Unarmed glabrous trees. *Leaves* digitate; leaflets large, leathery, entire; stipules united within the petiole. *Panicle* stout, long, branches mostly undivided; umbels contracted into heads; each flower surrounded by 4 ovate bracteoles, as long as the ovary and united below into a tube. *Calyx-margin* entire or nearly so. *Petals* 6–18, valvate, thick. *Stamens* as many as the petals. *Ovary* cells as many as the petals; styles very short, scarcely united as a short cone. *Fruit* obconic and ribbed below, hemispheric above. *Seed* compressed; albumen uniform.—*Distrib.* Species 2, extending from the Deccan Peninsula to Northern Australia.

Separated from *Heptapleurum Cephalotes* by the floral bracteoles.


NILGHERRY MTS., Kotagerry and Vellyengry Hill; *Wight.*

*Leaflets* 6–8, 6 by 2½ in., elliptic-oblong subacute, somewhat rounded at the base, very coriaceous, entire; petiolules 2 in., very stout. *Panicle* 16 by 3–4 in., branches very stout.—Doubtfully separable from *B. actinophylla*, Endl. (see *Benth. Pl. Austral.* iii. 385) by its persistent bracts, less numerous flower-parts. Wight's examples are very good, but the species seems rare, as Col. Beddome has never met with it.

Trees or shrubs, glabrous, unarmed. *Leaves* simple, entire, on young shoots polymorphous, palmately 3-5-lobed; stipules small, scarcely united within the petiole. *Umbels* solitary or in small panicles; bracts small or 0; pedicels not jointed under the flower. *Calyx-margin* entire or 5-toothed. *Petal* 5, valvate, somewhat thick. *Stamens* 5. *Ovary* 5-celled; styles united into a column at the base, their summits (in the Indian species) spreading. *Fruit* globose or ellipsoid, distinctly or obscurely 5-ribbed. *Seeds* compressed; albumen uniform.

—**Distrib.** Species 20, mostly tropical American; four species in China, Japan, and E. India.


Khasia Mts., alt. 4000-5000 ft.; *H. f. & T*.; *Griffith* (Kew Distrib. No. 2681, 2679).—**Distrib.** Japan.

Appears to be an erect shrub or very small tree. *Leaves* (those near the umbels) 4 by 2-3 in., oblong or elliptic, acute, entire, 1-3-5-nerved from the base; petiole ¾-2 in.; polymorphous leaves on young shoots sometimes 8 in. diam., deeply 3-5-palmated; segments narrowly lanceolate, often remotely and minutely toothed; petiole 6-8 in. *Umbels* solitary or 2-3, panicked; pedicels ½ in. *Fruit* ²/₅ by ½ in., somewhat pentagonal.


Mount Ophir, Malacca; *Griffith* (Kew Distrib. No. 2685); *Maingay*, No. 682.—**Distrib.** Hongkong.

Apparently an erect shrub. *Leaves* 3½ by 2½ in., entire or very obscurely toothed, glands not visible on the young leaves even; petiole ¾-1½ in. *Umbels* mostly solitary; pedicels ½ in. *Fruit* ¼ in. diam.—The branchlets from Mount Ophir have all entire leaves as they carry umbels; the Hongkong young shoots have polymorphous palmate leaves. *D. proteum*, Benth. Fl. Hongk. 136, has the upper leaves very narrowly lanceolar, mostly 1-nerved from the base, but is perhaps only a variety of the present species.

11. **Arthrophyllum**, Blume.

Shrubs or small trees, unarmed. *Leaves* glabrous or nearly so, lower usually alternate and compoundly pinnate, uppermost opposite and simple, intermediate 3-foliolate; leaflets easily separable from the rachis; stipules united within the petiole. *Peduncles* mostly forming a terminal umbel, each ending in a simple (or slightly compound) umbel of flowers; bracts very small; pedicels not jointed under the flower. *Calyx-teeth* 5, small. *Petal* 5, valvate. *Stamens* 5. *Ovary* 1-celled 1-ovulate; style short, simple. *Fruit* (in the Indian species) ovoid, not angular. *Seed* subglobose; albumen ruminated.—**Distrib.** Species 3, Malayan.

1. **A. diversifolium**, Blume Bijd. 879; leaves near the umbels usually all simple, leaflets subobtuse or shortly acuminate. *DC. Prodr. iv. 266*;
12. HETEROPANAX, Seem.

A small unarmed tree. Leaves glabrous or nearly so, very large, pinnately decompound; stipules not prominent. Panicles large; umbels racemcd, more or less stellate-hairy; bracts small, ovate, obtuse, persistent; pedicels not jointed under the flower. Flowers polygamous, the terminal umbel of each panicle-branch usually alone fruiting. Calyx-margin nearly entire. Petals 5, valvate. Stamens 5. Ovary 2-celled; styles 2, distinct from the base, spreading. Fruit much laterally compressed, 2-seeded. Seeds compressed; albumen ruminated. —DISTRIB. Species 1 or 2; Western Himalaya, Java, China.


From the Sewalik Hills to Burma, alt. 0-4000 ft.; common in Bengal. —DISTRIB. Java, China.
Leaves 3½ by 1¾ in., elliptic, shortly acuminated, little narrowed at the base, glabrous, entire, nerves not very prominent; petioles 0-1 in. Panicle often 12-16 in., branches 4-8 in.; umbels dense subcapitate in flower; pedicels in fruit elongating to ½ in. and more. Fruit ¼ by ⅛ in. and ⅝ in. thick, ultimately glabrous and often glaucous.

Var. 1. *typica*; leaves elliptic shortly acuminate, base slightly narrowed.

Var. 2. *subcordata*; leaves ovate shortly acuminate, base rounded or even cordate.

Var. 3. *attenuata*; leaves 4½ by 1¼ in., attenuate acuminate, much narrowed at base.—Bengal Plain. China.—This may be a distinct species.


Large shrubs or trees, glabrous or tomentose, armed or not. Leaves digitate or palmate or angled; stipules connate within the petiole, not prominent. Umbels in large compound panicles, young parts at least stellately tomentose; bracts not large, often persistent; pedicels rising from a dense cluster of persistent bracteoles, not jointed under the flower; flowers often polygamous. Calyx 5-toothed. Petals 5, valvate. Stamens 5. Ovary 2-celled; styles 2, united, long or short. Fruit broadly globose or turbinate, 2- or by abortion 1-seeded. Seed not compressed; albumen ruminated.—Distrib. Species 10, from Nipal to Java.

* Leaves undivided.

1. **B. simplicifolia**, C. B. Clarke; upper leaves simple lanceolate serrate, adult glabrous.

Mishmi; Griffith (Kew Distrib. No. 2699).

Branchlets prickly, glabrous or with a little hard close tomentum. Leaves near the panicle alone seen (the lower may be divided) 9 by 3½ in., acute, subacute at the base, sharply serrate, membranous, nerves much elevated; petiole 1½ in.; stipules not prominent. Young panicle 5 in., nearly glabrous, branches slightly compound; bracts ½ in., lanceolate; pedicels ½ in. with scattered stellate hairs, rising from a dense tuft of bracteoles.—Marked by Seemann as new genus, with a note that the petals are imbricate. They are, however, valvate, and it is clearly a Brassaiopsis.


Temperate Himalaya, alt. 3000-6000 ft., from Nipal to Bhotan; Griffith (Kew Distrib. No. 2668); J. D. H.; C. B. Clarke.

A small tree, the ends of the branches prickly, young parts stellately tomentose. Leaves 4-9 in. diam., truncate or cordate at the base, subspinose-toothed, finally glabrous above and nearly so beneath the hispidulous or stellate hairs distinctly scattered. Bracts to the panicle-branches ovate, short, densely stellate-tomentose, persistent. Buds densely stellate-tomentose. Pedicels ¼-⅘ in., rising from a dense cluster of bracteoles ½ in. oblong and very tomentose. Fruit ¼ by ⅛ in., globose, subdidymous. Style ⅝ in. on the fruit.

NIPAL; Wallich. Sikkim Terai; J. D. H. Subtropical zone of East Bengal and Burma. Chittagong; Roxburgh, J. D. H. Burma; Griffith (Kew Distrib. No. 2663). South Andaman; Kurz.

Closely resembles B. Hainla; sparingly prickly. Pedicels springing from a dense cluster of bracteoles 1/3 in. oblong and very tomentose. Fruit often 1-seeded, when 2-seeded it is 1/2 by 3/4 in. turbinate-ellipsoid. Style on the fruit 1/2 in. or rather more. —Wallich’s plate belongs to this plant, as he mentions the fruit as turbinate (as also does Roxburgh). Arabia palmata, Lour. Fl. Cochinch. 187, doubtfully referred here by Seeman, is an Acanthopanax.

4. B. alpina, C. B. Clarke; leaves cordate-ovate acute or slightly 3-5-cuspidate densely stellate-tomentose, bracts to the panicle-branches lanceolate. —Araliad sp. 27, Herb. Ind. Or. H. f. & T.

Alpine Sikkim, alt. 10,000—11,000 ft.; Tonglo and Lachen, J. D. H.

An unarmed tree, 30 ft.; young branches densely villous and tomentose with yellow or brown stellate hair. Leaves 4—5 in. and nearly as wide, softly serrate, membranous, thickly tomentose on both surfaces when young, when older the scattered stellate hairs wear off, but much remains on both surfaces. Panicle (very young) densely tomentose; buds completely enclosed in thick stellate wool; bracts at the base of the panicle-branches 1/4 in., very narrow.—Can this be a woolly alpine form of B. Hainla?

5. B. hispida, Seem. Rev. Hedr. 18; stem panicle and petioles prickly, leaves deeply palmate spinosely serrate, reticulating nerves beneath much raised and ultimately nearly glabrous.—Araliad sp. 30, Herb. Ind. Or. H. f. & T. partly.

Sikkim, alt. 6000—7000 ft.; J. D. H. Mishmi; Griffith (Kew Distrib. No. 2696).

Yellowish when dried; prickles numerous and often whorled, lanceolate, compressed, deflexed. Leaves 1 ft. diam. and more, segments oblong-lanceolate narrower towards the base, coriaceous, lower surface glabrous or sparingly hispidulous; stipules united within the petiole with two free linear points. Panicle very large; bracts to the branches 2/4 in., lanceolate, tomentose, persistent; pedicels very many, rising amid numerous bracteoles 3/4—1 in. lanceolate closely tomentose. Young calyx-tube closely densely stellate-tomentose. Petals glabrous, appear yellow. Style after the petals have fallen scarcely 1/16 in. Fruit not seen.

6. B. mitis, C. B. Clarke; branches prickly, leaves deeply palmate softly serrate, the reticulating nerves scarcely raised beneath ultimately pubescent or hispidulous.—Araliad sp. 29, Herb. Ind. Or. H. f. & T.

Sikkim, alt. 4000—8000 ft., not rare; J. D. H., C. B. Clarke, N. Gamble.

An erect small tree, 20 ft., the panicle and petioles usually without prickles. Leaves 1 ft. diam. and more; segments oblong-lanceolate, narrowed towards the base, membranous, adult beneath softly hairy and not shining; stipules large, lanceolate-subulate, nearly distinct. Panicle very large, often with dense bundles of bristles on the rachis and at the top of the petiole; bracts on the branches 2/4 in., lanceolate, coriaceous; pedicels very many, arising amid numerous lanceolate closely-tomentose bracteoles 3/4—1 in. Young calyx-tube more or less stellate-tomentose. Petals glabrous. Style after the petals have fallen 2/3 in.; the disc large, subhemispheric. Ripe fruit not seen.

7. B. Griffithii, C. B. Clarke; leaves very large palmate divided halfway down or more serrate-denticulate, adult glabrous or the nerves beneath minutely hispidulous.

East Bengal; Namroo (? Upper Assam), Griffith (Kew Distrib. No. 2697).

No prickles seen on the end of the branchlets nor elsewhere. Leaves 16 in. diam.; lobes oblong or elliptic, acuminate, tertiary nerves prominent on both surfaces.
Panicle very large and compound, much more glabrous than in the allied species; bracts to the branches short, ovate, persistent; pedicels 3/ in., very numerous, bracteoles at their base minute. Young calyx-tube sparingly stellate-tomentose, limb distinctly toothed. Disc of the young fruit much elevated; style scarcely 1/ in. Fruit ½ in. diam., globose.

**Leaves digitate.**


From NIPAL and ASSAM to CHITTAGONG; alt. 0–5000 ft., frequent.—Distrib. Java.

A small tree; upper part of the branches (and sometimes the panicle also) prickly; innovations stellately tomentose often rusty reddish brown. Leaflets 4–8 by 1–3 in., when young often with scattered stellate hairs above and some clustered stellate wool beneath, acuminate, herbaceous, reticulations moderately conspicuous; petiolules usually more than 1 in. summit of the petiole without dense clustered bristles. Panicle large, usually a foot long or more; bracts at the base of the branches oblong or lanceolate, persistent; pedicels ½ in. rising from a dense cluster of rusty stellately hairy persistent bracteoles ½ in. Fruit ½ by ½ in., didymo-globose, or 1-seeded and subglobose.—There are many forms of this plant, but these being large, it is not easy to establish species upon them. In the young fruit the disc is sometimes very elevated, and the style is long or short, as mentioned by Dene & Planchon: the calyx-tube of the young fruit is shortly hemispheric, or more often long and obconic. These differences appear to depend on the stage of ripening at which the fruit is gathered.

Var. 1. typica; leaflets 6½ by 2 in. oblong acuminate entire, base not rounded under surface of the adult glabrous. Wall. Cat. 4912.

Var. 2. subovata; leaflets 7 by 4½ in. ovate or elliptic shortly suddenly acuminate entire or very nearly so base rounded adult glabrous beneath.—Sikkim, J. D. II.

Var. 3. birta; leaflets 5 by 1½ in. lanceolate narrowed to both ends entire midrib beneath when young with needle-like spreading hairs (unlike those of any other plant in the order).—The leaflets are detached from the panicle, but except as to the hairs they appear to belong to the species. Cachar, R. L. Keenan.

Var. 4. rufo-stellata; leaflets oblong-lanceolate from a rounded base somewhat closely denticulate-serrate in nearly their whole extent with scattered rusty-stellate hairs above, when young rusty villose pubescent beneath, panicle densely rufous-stellate tomentose.—Chiefly from low levels in Cachar, Khasia, and Chittagong.

Var. 5. serrata; leaflets 7 by 2½ in. elliptic-lanceolate dentate-serrate base subacute, panicle very sparingly stellate-woolly. Darjeeling, Griffith (Kew Distrib. No. 2639).

9. B. Hookeri, C. B. Clarke; petiolules distinct or long, leaflets very large oblong narrowed at each end serrate, mature more or less stellate-woolly beneath.—Araliâd sp. 12, Herb. Ind. Or. H. f. & T.


A small prickly tree. Leaflets attaining 18 by 8 in., somewhat leathery, nerves above subimpressed; petiolules ½–2 in. Panicle 2 ft., the branches more than a foot with broad oblong persistent bracts at their base, the young parts densely white.
stellate-woolly; pedicels \( \frac{1}{2} - \frac{3}{4} \) in., stout, rising from numerous persistent bracteoles \( \frac{1}{2} \) in., less hairy than those of \( B. \ floribunda \); calyx-tube campanulate or obconic; disc prominently rayed, not greatly elevated; style \( \frac{1}{2} \) in.—Possibly a large form of \( B. \ floribunda \).


A small prickly tree. **Leaflets** 9 by 2\( \frac{3}{8} \) in., narrowly lanceolate-ovobate, acuminate, herbaceous, soft in texture, rusty stellate-tomentose, apex of the petiole very hispid; in one example of Dr. Thomson's the digitate leaf is sometimes replaced by a single entire leaf cordate at base. ** Panicle** large, compound, greatly resembling that of \( B. \ floribunda \), young parts stellate-rusty-woolly; bracts at the base of the branches ovate, short, persistent; pedicels \( \frac{1}{2} - \frac{3}{4} \) in., springing from a dense cluster of lanceolate hairy persistent bracteoles \( \frac{1}{2} \) in. **Fruit** \( \frac{1}{4} \) in. long and broad, globose, subdibymous; disc on the ripe fruit flat; style \( \frac{1}{4} - \frac{3}{4} \) in.—Wallich's Hedera asculifolia, in the Linnaean Society's herbarium, and those marked Agalma asculifolium in the British Museum by Seemann, are all 2-ovuled, and identical with Brassaiopsis aculeata.


Unarmed small trees. **Leaves** digitate, 3-5-foliolate, leaflets entire or serrate, in the Indian species glabrous; stipules shortly connate within the petiole or 0. **Panicles** large, branched; bracts small, deciduous; pedicels jointed under the flowers; flowers umbelled, polygamous. **Calyx-teeth** 5. **Petals** 5, valvate. **Stamens** 5. **Ovary** 2-celled; styles united. **Fruit** ovoid or subglobose or somewhat elongated upwards, striated or ribbed but hardly angular. **Seeds** dorsally compressed; albumen ruminated or very rugose.—**Distr.** Species 2, Nipal to Java.


From NIPAL and ASSAM to TENASSERIM, alt. 500-7000 ft., frequent.—**Distr.** Malaya.

Attains 30 ft. **Leaflets** 5 by \( 1\frac{1}{2} \) in., lanceolate, acuminate, sometimes longer and very narrow, sometimes almost elliptic, base narrowed or rounded; petiolules 1-3 in. **Panicle** 1 ft., compound; bracts usually deciduous, inconspicuous; pedicels \( \frac{1}{2} \) in., stout, more or less stellate-hairy, the bracteoles few or deciduous. **Fruit** \( \frac{1}{4} \) in., ovoid, sometimes elongated upwards; disc large, conical, often wider than the top of the fruit, crowned with the permanent style \( \frac{3}{4} - \frac{1}{2} \) in.

2. **M. undulatum**, Seem. Rev. Heder. 20; leaflets entire or very nearly so, panicle-branches ascending glabrous. Hedera undulata, Wall. Cat. 4916; G. Don Gen. Syst. iii. 394.—Araliad sp. 5, Herb. Ind. Or. H. f. & T.

Sikkim, Bhotan, ASSAM and KHASIA, alt. 500-5000 ft., common. Silhet station. A small tree. **Leaflets** 3-4 by \( 1\frac{1}{4} \) in., lanceolate, acuminate, rarely elliptic.
lanceolate, entire rarely minutely denticulate, base narrowed often very acute; petiolules \( \frac{1}{2} \)–2 in. **Panicle** 1 ft., compound; bracts \( \frac{1}{2} \) in., triangular, caducous; pedicels \( \frac{1}{4} \) in., angular, perfectly glabrous; bracteoles 0 or caducous. **Fruit** as in *M. oreophilum*.

15. **HEDERA**, Linn.

Shrubs, climbing extensively, or small trees. **Leaves** simple, lobed or pinnate, glabrous; stipules 0. **Flowers** polygamous; umbels panicked; bracts very small, pedicels not or very obscurely jointed under the flowers. **Calyx-margin** 5-toothed or sub-entire. **Petals** 5, valvate. **Stamens** 5. **Ovary** 5-celled; styles connate into a column. **Fruit** globose, almost berried. *Seeds* ovoid; albumen ruminated.—Species 2; one in all temperate regions of the Old World; the other Australian.


Throughout the Himalaya alt. 6000–10,000 ft.; Khasia Mts., alt. 4000–6000 ft.; not rare.—Distrib. From W. Europe to Japan.

Stem glabrous climbing adhesively by means of numerous extra-axillary rootlets. **Leaves** 3–4 in., varying from linear-lanceolate to cordate-ovate, entire or variously lobed palmate or subpinnatifid; petiole \( \frac{1}{2} \)–2 in. **Panicle** often depressed, subcorymbose, or shortly ovate, never large compound; bracts scarcely \( \frac{1}{4} \) in., triangular; pedicels \( \frac{1}{2} \)–\( \frac{3}{4} \) in., stellately hairy; bracteoles minute or 0. **Fruit** black, more rarely yellow or red.—There is no note of red fruit from India; yellow fruit is not uncommon there.


A glabrous unarmed tree. **Leaves** 1–3-foliolate; leaflets lanceolate, denticulate or nearly entire; base of petiole much dilated; stipules inconspicuous. **Umbels** panicked; bracts and bracteoles deciduous; pedicels jointed close under the flowers. **Calyx** margined, 5-toothed somewhat prominently. **Petals** 5, valvate. **Stamens** 5. **Ovary** 5-celled; styles connate. **Fruit** berried, large, subglobose, crowned by the stout persistent style. **Seeds** 5–4; albumen ruminated.

Differs technically from *Hedera* in the jointed pedicels: the serrate leaflets and large fruit give to it a widely different aspect.

1 H. **Maingayi**, C. B. Clarke.

MALACCA; Maingay, No. 683.

Leaflets of the compound leaves 3\( \frac{1}{2} \) by 1\( \frac{1}{4} \) in., simple leaves attain 8\( \frac{1}{2} \) by 4 in., membranous, base subacute, secondary nerves raised tertiary obscure; petiole 1–2 in. **Panicle** glabrous or obscurely pubescent; pedicels \( \frac{1}{2} \)–\( \frac{3}{4} \) in. **Young flowers** small, petals expanding, reflexed. **Fruit** (not quite ripe) more than \( \frac{1}{4} \) in. exclusive of the conical disc and stout style.—Dr. Maingay's examples are in fragments; the size of the panicle is doubtful, and it is not improbable that some at least of the leaves may have more than 3 leaflets or may be pinnate.

17. **GAMBLEA**, C. B. Clarke.

A tree. **Leaves** digitate, 5–3–1-foliolate; stipules within the petiole. **Umbels** panicked, bracts 0, pedicels continuous. **Flowers** polygamous. **Calyx-margin** minute. **Petals** 5, valvate. **Stamens** 5. **Ovary** 3–5-celled; styles 3–5, 3 \( \times \) 2.
combined nearly half their length. Fruit globose, 3-5-celled. Seed not compressed; albumen lightly ruminated, nearly as in Hedera.

1. G. ciliata, C. B. Clarke; leaflets oblanceolate or if solitary cordate harshly pilose above margin bristle-ciliate.—Araliad sp. 3, Herb. Ind. Or. H. f. & T.

Sikkim; Tonglo, alt. 10,000 ft.; J. D. H., Gamble; Jongri, C. B. Clarke.

Unarmed, 30 ft. Leaflets 6\(\frac{1}{2}\) by 2\(\frac{1}{4}\) in., acuminate, hairs on both surfaces harsh in age, or nearly glabrous beneath; petiolules 0-\(\frac{1}{4}\) in., densely rusty villose. Umbels in small panicles; pedicels 3-\(\frac{1}{4}\) in., puberulo-pubescent. Fruit 1\(\frac{1}{4}\) in. diam., ultimately glabrous.

18. TUPIDANTHUS, H. f. & T.

A glabrous small tree at first erect, afterwards a lofty climber. Leaves digitate; leaflets glabrous, leathery, entire; stipules connate within the petiole. Umbels in a compound umbel or small panicle; pedicels thick, not jointed under the flowers. Calyx-margin obsolete. Petals closely connate, falling off in a cap. Stamens very many, in two or several series. Ovary cells very numerous; stigmas very many (90), sessile, radiating, contiguous but not connate. Fruit globose, depressed (not seen ripe).


Leaflets 7-9, 7 by 2\(\frac{1}{4}\) in., narrowly oblong, shortly acuminate, narrowed at the base; petiolule 2 in. Main umbel about 3-rayed, branches 3 in., very stout with large ovate sheathing leathery persistent bracts at their base; partial umbels 5-7-fid; pedicels 1-1\(\frac{1}{4}\) in., glabrous, stout. Buds 3 in. diam., nearly globose; calyx-tube leathery, smooth. Stamens about 50-70, densely packed; filaments and anthers as in most of the order but larger. Unripe fruit more than 3 in. diam., long, will be berried. Seeds numerous, 20-30 at least.

Order LXXII. CORNACEAE. (C. B. Clarke.)

Shrubs or trees. Leaves opposite or alternate, generally petioled, entire or occasionally angular lobed or serrate, frequently unequal at the base; stipules 0. Flowers usually small, regular, hermaphrodite or unisexual, in axillary or terminal cymes panicles or heads. Calyx-tube adnate to the ovary; limb truncate or 4-5-toothed, persistent. Petals 0 or 4-5 (occasionally indefinite), epigynous, imbricate or valvate. Stamens inserted with the petals and equal to them in number, rarely twice or thrice as many. Ovary inferior, 1-4-celled, crowned by a usually fleshy sometimes inconspicuous disc; style single, short or long, stigma capitate or branched; ovule solitary (very seldom 2-3), pendulous from the apex of the cell. Fruit generally succulent, 1-4-celled, less often with 2 pyrenes. Seed oblong, pendulous, albumen copious, fleshy; embryo minute or cotyledons flat leafy nearly as wide as the seed.—Dist rib. Species 75, chiefly in the northern hemisphere.

* Flowers hermaphrodite.

† Petals narrow much elongate.
1. **ALANGIUM**, Lamk.

Shrubs or small trees, armed or not. Leaves alternate, petiolod, oblong, entire, 3-nerved at the base, persistent. Flowers in axillary fascicles or condensed cymes, hermaphrodite, silky, white, jointed on the pedicel; bracts 0. Calyx-tube adnate to the ovary, limb 5–10-toothed or truncate. Petals 5–10, linear-oblong, valvate, then reflexed. Stamens twice as many as the petals or more, filaments hairy; anthers very long. Ovary inferior, 1-celled, surmounted by a disc; style very long, stigma large, capitate; ovule pendulous. Fruit a berry, crowned by the somewhat enlarged calyx-limb. Seed oblong, albumen ruminated; cotyledons leafy, crumpled; radicle elongate.—Distrib. Species 2; tropical and subtropical Asia and Africa.

The species with stamens equal in number to the petals in which the structure of the embryo is unknown are here for convenience placed under Marlea; Sir J. Hooker (Gen. Pl. i. 949) has placed them in Alangium, but till the embryo is known their position must be uncertain.


Throughout India from the N.W. Himalaya to Ceylon and Tenasserim; very common.—Distrib. Malaya and South China to the Philippines. East Africa.

A small tree or rambling shrub, armed or not. Leaves 3–6 by 1–2 in., oblong (A. decapetalum), or elliptic (A. hexapetalum), acute or subobtuse, the base unequal somewhat rounded, above nearly glabrous with pubescent nerves, beneath with more or less scattered hair and often with tufts of hairs or hollow glands in the axils of the primary nerves; petiole ¼ in., hairy, often villous or woolly. Flowers in small close fascicles; peduncles pedicels and calyx-tube usually woolly. Calyx-limb minutely toothed. Petals 5–10 usually 6–7, ¾–1½ in. woolly without. Stamens about 20–30. Style glabrous, uniformly cylindric, stigma large subglobose. Fruit ½ by ¾ in., black, closely pubescent or finally glabrous; endocarp bony.—The examples of A. sundanum...
communicated by Miquel to the British Museum agree with Mr. Kurz's, which have the calyx-tube not furrowed, and do not materially differ from *A. Lamarckii*, but the examples of *A. sundanum* at Kew have the calyx-tube (even in the bud) deeply grooved and appear a distinct species.

**Var. glandulosum**, Thwaites Enum. 133 (sp.); young parts ruddy-furfuraceous, leaves ovate or oblong rostrate-acuminate, beneath with most minute shining glands and with glandular pores at the axils of the primary nerves, flowers glandular sparingly hairy, pedicels and calyces furfuraceous with red glands.—Ceylon, Central Province, alt. 2000-4000 ft.; Thwaites.—According to Mr. Thwaites a closely allied but distinct species. The peduncles, calyx-tube, and petals are much less woolly than in *A. Lamarckii*; these and the tender surfaces of the leaves are not (in Thwaites' No. 381) glandular, but covered with most minute glistening hairs, giving under a common lens a glandular appearance. *A. glandulosum* thus has much shorter hairs than the ordinary forms of *A. Lamarckii*, while some examples of *A. Lamarckii* have the under surface of the leaves glabrous or very nearly so.

2. **MARLEA**, Roxb.

Trees or shrubs. *Leaves* alternate, petioled, orbicular or oblong from an oblique base. *Flowers* in axillary contracted cymes, white, jointed on the pedicel, hermaphrodite. *Calyx-tube* adnate to the ovary, limb toothed or truncate. *Petals* 4-8, linear, free or slightly cohering at the base, valvate. *Stamens* 4-8, filaments attached to the petals slightly at the base and there usually hairy; anthers linear. *Ovary* 1-3-celled or 1-celled at the apex 2-3-celled at the base, crowned by a disc; style long, often thicker upwards and pubescent, stigma simple or lobes 4 linear or sub-clavate; ovule solitary in each complete or incomplete cell. *Berry* 1-2-celled, 1-2-seeded. *Seed* (in *M. begonie-folia* and *ebenacea*) oblong, compressed; cotyledons orbicular, thin, leafy; radicle short.—**Distrib.** Species 8; India, to Japan, Malaya, Australia, and Polynesia.


1. **M. Griffithii**, C. B. Clarke; leaves oblong acuminate, cymes repeatedly divided, flowers numerous and close, style glabrous, stigma simple sub-globose.

**Malacca**; **Griffith** (No. 3387 Kew Distrib.); **Maingay** No. 708. A tree (Maingay); branchlets minutely rusty-pubescent. *Leaves* 5½ by 1½ in., very unequal auricled at the base, nearly glabrous or minutely pubescent on the nerves above, beneath with spreading fulvous hairs on the main nerves and the surface minutely dotted and with more or less scattered villous hairs; petiole ½ in., fulvous, villous. *Cyme* with minute close fulvous pubescence rather longer and softer on the calyx-tube; bracteoles most minute, linear, deciduous. *Calyx-tube* not furrowed, limb almost truncate. *Petals* 5, ¼ in., nearly glabrous. *Stamens* 5, filaments short with much wool at their summit. *Ovule* 1.

2. **M. ebenacea**, C. B. Clarke; leaves oblong acuminate, cymes few-flowered, style hairy, stigma lanceolate grooved. *Alangium ebenaceum*, Griff. in Herb.

**Malacca**; **Griffith** (No. 3383 Kew Distrib.); **Maingay** No. 706. *Branches* stout, glabrous or nearly so. *Leaves* 10 by 3½ in., glabrous, entire, thick and somewhat coriaceous, base subacute slightly unequal; petiole 3½-½ in. thick. *Cyme* short, 4-8-flowered, minutely fulvous-pubescent. *Calyx-tube* more softly pubescent, not grooved, limb much dilated, truncate. *Petals* 5½-1 in., 6 (sometimes 5),
with minute close tomentum. **Stamens** 6 or 5, filaments short, woolly. **Style** shortly hairy, stigma an elongate quadrangular pyramid; ovule 1. **Fruit** \( \frac{3}{8} \) by \( \frac{1}{3} \) in., nearly glabrous and without ribs, crowned by the short cylindrical truncate little-enlarged limb of the calyx. **Seed** much compressed, albumen fleshy; cotyledons orbicular, thin, flat.

3. **M. nobilis**, C. B. Clarke; leaves elliptic or orbicular, cymes few-flowered, calyx-tube in the bud deeply grooved.

**Malacca**; **Griffith** (Kew Distrib. Nos. 3384, 3385); **Maingay** No. 707. **Singapore**, **Maingay** No. 705.

Branchlets petioles cymes and leaves beneath densely fulvous-villous. **Leaves** often 8 by \( 5 \frac{3}{4} \) in. (sometimes only half these dimensions), not acuminate, from cordate to subacute at the base, firm, at length glabrous above; petiole often \( \frac{3}{4} \) in. **Cyme** short, 4–8-flowered. **Calyx-tube** deeply grooved, teeth prominent rising from the angles. **Petals** 6–5, \( \frac{3}{2} \) in., much dilated at the base, very villous. **Stamens** 6–5; filaments short woolly. **Style** cylindrical densely villous, the very apex narrowed, stigma as in **M. ebenaceae**; ovule 1. **Fruit** 1 by \( \frac{3}{4} \) in., ellipsoid, compressed, very woolly, with 10 or 12 light vertical ridges, crowned by the incurved calyx-teeth.

4. **M. barbata**, R. Br. in Wall. Cat. 7129; shaggy with much soft spreading hair, leaves elliptic or ovate acuminate, cymes many-flowered, style glabrous apex almost divided into two subclavate stigmas.

**Bhotan and Assam**; **Griffith** (Kew Distrib. No. 3388). **Khasia Mts.**; **Wallich**.

Leaves 4 by \( 2 \frac{1}{2} \) in., entire, rounded or subcordate at the base, with scattered golden or brownish hairs on both surfaces especially beneath; petiole \( \frac{1}{2} \)–\( \frac{3}{4} \) in., densely hairy. **Cyme** 12–30-flowered with spreading golden hairs. **Calyx-tube** shaggy, not grooved, teeth lanceolate. **Petals** 6–5, \( \frac{3}{4} \)–\( \frac{1}{2} \) in., hairy on the back. **Filaments** short, hairy. **Ovule** 1. **Fruit** \( \frac{3}{4} \) by \( \frac{1}{2} \) in., ovoid, finally glabrous, slightly striated longitudinally, crowned by the erect calyx-teeth.

**Sect. II. Eu-Marlea.** **Ovules** 2, rarely 1 or 3. **Fruit** normally 2-seeded.

5. **M. begoniæfolia**, Roxb. **Cor. Pl.** t. 283, **Hort. Beng.** 28, **Fl. Ind.** ii. 261; young leaves and innovations villous, mature leaves more glabrous broad angular lobed or entire, connective hairy or nearly glabrous, style glabrous or with scattered hairs. **DC. Prodr.** iv. 267; **Bot. Reg.** 1838, t. 61; **Wall. Cat.** 3719; **Miq. Fl. Ind. Bat.** i. pt. i. 744; **Brand. For. Fl.** 251; **Kurz For. Fl.** i. 544. **M. affinis**, Dene. in Jacq. **Voy.** Bot. t. 83. **M. tomentosa**, Endl. **ex Hassk. in Flora** 1844, p. 605; **Miq. l. c.** 775; **Kurz l. c.** 545. **Diacarpium** tomentosum, **Blume Bijd.** 657; **Hassk. in Bonpland.** vii. 173. D. rotundifolium, **Hassk. l. c.** 172. **Stylium** chinense, **Lour. Fl. Cochinch.** 221. **Styrax** javanicum, **Blume Bijd.** 671 (ex Kurz).

Throughout Northern India, alt. 1000–6000 ft., common from the Punjab to Bengal and Burma.—**Distrib. China, Japan.**

A tree, often small, but attains 60 ft.; branches horizontal. **Leaves** \( \frac{3}{4} \) by \( \frac{3}{2} \) in., sometimes very large, from orbicular to broad oblong, acuminate, base rounded or subcordate unequal, not serrate nor denticulate, above glabrous when mature or villous on the nerves rarely with scattered fulvous hairs on the surface also, mature usually glabrous beneath with or without tufts of hairs in the axis of the main nerves, which are puberulous, or closely hairy on the nerves; petiole 1–1\( \frac{1}{2} \) in., fulvous-hairy or glabrous. **Cymes** 1–3 in., dichotomous, 8–12-flowered, more or less fulvous-hairy; bracts inconspicuous. **Calyx-tube** not grooved; limb shortly toothed. **Petals** usually 6–8, slightly hairy. **Filaments** short, hairy. **Style** usually glabrous, stigma capitate, sub-2–4-lobed. **Fruit** \( \frac{3}{8} \) by \( \frac{1}{4} \) in., ovoid, glabrous, obscurely ribbed, crowned with the very
narrow calyx-limb.—The Japan M. macrophylla and M. heterophylla hardly differ from this.

Var. alpina; leaves not angular, hairy all over beneath and no tufts in the nerve-axils.—Sikkim, alt. 6000–9000 ft.; H. f. & T. Marlea sp. 2.

3. CORNUS, Linn.

Trees and shrubs, glabrous or hairy, hairs often centrally attached. Leaves opposite or alternate, petioled, entire. Flowers small, hermaphrodite, white or yellow, in branched cymes or in involucrate heads. Calyx-tube campanulate or urn-shaped; limb with 4 short or long teeth. Petals 4, oblong, valvate. Stamens 4, anthers oblong. Ovary 2- (very rarely 3-) celled; style filiform or cylindric, stigma capitulate sub-2-lobed; ovule solitary pendulous in each cell. Drupe ovoid, 2-celled, 2-seeded; endocarp bony. Seeds oblong, compressed, albumen fleshy; cotyledons leafy.—Distrib. Species 15, in N. temperate regions, and 2 in Burma and Hongkong.


1. C. sanguinea, Linn.; Boiss. Fl. Orient. ii. 1092; a shrub, leaves opposite rarely exceeding 3 in. shortly or not at all acuminate not very glaucous beneath. DC. Prodr. iv. 272; Brand. For. Fl. 253. C. australis, C. A. Mey.; Boiss. l.c.

Kashmir; alt. 7000 ft.; Gulmurg, Stewart.—Distrib. W. and N. Asia, Europe.

An erect shrub, branchlets leaves beneath and cymes with minute white hairs. Leaves (in Kashmir examples) 1/2 by 1 1/4 in., ovate from a rounded base, obtuse, beneath paler and with appressed hairs, nerves 4 on each side with spreading crisped hairs beneath; petiole nearly 1/4 in. Fruit 3/3 in. diam., subglobose, minutely hairy.

2. C. macrophylla, Wall. in Roxb. Fl. Ind. ed. Carey & Wall. i. 433; a tree, leaves opposite or alternate usually exceeding 3 in. distinctly acuminate glaucous beneath. Don Prodr. 141; Wall. Cat. 469; DC. Prodr. iv. 272; Brand. For. Fl. 252, t. 32. C. brachypoda, C. A. Mey.; Walp. Ann. ii. 725.

Throughout the Himalaya, alt. 4000–8000 ft., frequent.—Distrib. China, Japan. An erect tree 40 ft., branches horizontal. Leaves 6 by 3 3/4 in. (often much larger), ovate; base rounded or subacute; secondary nerves 6 on each side, ultimately glabrous above, beneath with scattered minute appressed hairs; petiole 1 in. Panicles terminal, erect, often 4–5 in. diam., branches opposite or alternate. Calyx-tube urn-shaped, whitish from the numerous appressed hairs. Fruit 3 1/4–3 1/2 in. diam., globose. 

—C. alternifolia, Linn. f., a N. American species differs very little, if at all, from this.

Var. Stracheyi; panicle densely clothed with spreading fulvous hairs, young leaves silky hairy.—Kumaon, alt. 7000 ft., Kathi; Strachey & Winterbottom.

3. C. oblonga, Wall. in Roxb. Fl. Ind. ed. Carey & Wall. i. 432; leaves narrowly oblong narrowed at both ends glabrous or minutely hairy be neat. Don Prodr. 140; Wall. Cat. 468; DC. Prodr. v. 272; Brand. For Fl. 253; Kurz For. Fl. i. 545.


A tree 20–30 ft. Leaves 5 by 1 1/4 in., somewhat coriaceous, nerves much elevate beneath; petiole 1 1/4 in. Pedicels and cyme-branches minutely pubescent; bracteoles small. Calyx-tube campanulate, hardly urn-shaped. Petals almost glabrous. Fruit 3/8 by 3/8 in., ellipsoid, glabrous or nearly so.
Sect. II. Benthamia, Lindl. (gen.) Flowers connate in dense heads subtended by 4 large white bracts.

4. C. capitata, Wall. in Roxb. Fl. Ind. ed. Carey & Wall. i. 434; leaves oblong or elliptic adult closely covered above with minute hairs, calyx-teeth distinct reflexed. Don Prodr. 141; Wall. Cat. 467, Pl. As. Rav. t. 214; Brand. For. Fl. 253. Benthamia fragifera, Lindl. in Bot. Reg. t. 1579; Wight Ill. t. 122.

From Kulu and Kumaon to Bhotan, alt. 4000-7000 ft., not rare. A small tree, the tender parts densely clothed with minute bicuspidate hairs. Leaves 3½ by 1½ in., narrowed at both ends, hardly acuminate. Heads hemispherical, 3–4 in. wide; bracts 1 by ½ in. Fruiting heads depressed, globose, 1 in. wide, succulent, of numerous coalesced pericarps; endocarp about ¼ in., bony, ellipsoid or obovoid, compressed; calyces spreading on all sides from the young fruit heads, ultimately deciduous.

Var. khasiana; adult leaves glabrous or very nearly so.—Khasia, alt. 5000–6000 ft., Kalapani; H. f. & T. This variety approaches C. japonica, Thunb. which is closely allied but has the calyx-limb subtruncated.

4. Mastixia, Blume.

Trees, young parts more or less pubescent. Leaves alternate or opposite, petiolate, entire. Flowers hermaphrodite, 2-bracteolate, small, in terminal many-flowered panicles; bracts small or lengthened, pedicels short or 0, jointed under the flower. Calyx-tube campanulate, pubescent or silky; limb 5–4-toothed. Petals 5–4, ovate, leathery, valvate, silky. Stamens 5–4; anthers cordate-oblong. Ovary 1-celled; disc fleshy; style cylindric, simple; ovule 1, pendulous from one side of the cell very near its summit. Drupe ellipsoid or ovoid, crowned by the calyx-teeth or a scar; putamen grooved down one face; endocarp protruded inwards down one side. Seed ellipsoid; albumen fleshy; embryo small, radicle elongate, cotyledons thin, elliptic.—Distrib. Species 8; S. India and Malaya.

* Leaves all alternate.
† Bracts about ½ in., acute.


Ceylon; Thwaites.

A large tree, foliage heavy green. Leaves 3½ by 1½ in., elliptic or obovate-oblong, suddenly obtusely acuminate, narrowed at the base, glabrous, drying green; petiole ½–3 in., minutely pubescent when young. Panicle 2–3 in. diam., branches and calyx-tube with close fulvous pubescence. Calyx-teeth rarely 5. Style ¼ in. Fruit 1 by ½ in., almost cylindric, or ¾ by ½ in. ellipsoid.

Var. Thwaitesii; leaves 1½ by ½–2 in. obtuse turning black in drying, panicle and petals glabrous.—Ceylon; Thwaites. Very different in general appearance from M. tetrandra, but Mr. Thwaites regards it as a variety.

2. M. arboorea, C. B. Clarke; bracts acute persistent till after the petals drop, calyx-teeth in the bud triangular-lanceolate, stamens 5. Bursino-
petalum arboreum, *Wight* l.c. t. 950; *Thwaites* Enum. 42; *Bedd.* Fl. Sylv. t. 216.


A large tree, foliage dark green. Leaves 3 by 2 in., elliptic or obovate-oblung, suddenly shortly acuminate, narrowed at the base, glabrous, drying black; petiole ¼–1 in., minutely pubescent when young. Panicle 2-3 in. diam., branches and calyx-tube with close fulvous pubescence. *Style* less than ⅓ in. *Fruit* 1½ by ⅛–⅜ in., ellipsoid.—Closely allied to the preceding. Possibly not distinct from *M. pentandra,* Blume *Mus.* Bot. i. 256, of which there is no authentic example at Kew; the description agrees except that the leaves are much larger, 4–8 in.

†† Some of the bracts ¼–⅛ in., linear-oblung, obtuse.


MALABAR: Canara, Dharwar and Bellary; Law; Concean; Stocks.

A tree. Leaves 4–7 by 1½–2½ in., oblong or elliptic, narrowed to each end, puberulous on both surfaces at least when young, drying green, whiter beneath; petiole ¼–1½ in., pubescent when young. Panicle 3–6 in. diam., very pubescent towards the extremities. Some of the lower bracts ½ in., leaflike though narrow, many of the upper exceeding ½ in. *Buds* silky. *Style* less than ⅓ in. *Fruit* 1½ by ⅜ in., elongate-ellipsoid.—Identified from description only: Blume does not mention the large bracts, so that this is possibly a new species.

4. **M. bracteata**, C. B. Clarke; leaves 2 in., bracteoles and calyx-tube minutely silky or almost silky, calyx-teeth 5 short triangular.

MALACCA; Maingay, No. 710.


** Leaves subopposite and opposite.

5. **M. Junghuhniana**, *Miq. Fl. Ind.* Bat. i pt. i. 772; leaves glabrous beneath or shortly hairy on the main nerves, calyx-teeth 4 roundish minutely pubescent.

MALACCA; Maingay No. 709.

A tree of moderate size; tips of branchlets pubescent. Leaves 4½ by 2 in., oblong, narrowed to both ends, drying a shining green above, much whiter beneath; petiole ¼ in., pubescent when young. Panicle 2–3 in. diam., trichotomous; bracteoles ⅛–¼ in., pubescent. Young petals most minutely silky. *Fruit* not seen.—Identified with *M. Junghuhniana* by the description, which closely agrees. It has been named *M. trichotoma,* Blume, in the Kew Herbarium, of which species it is very possibly a variety.

6. **M. Maingayi**, C. B. Clarke; under surface of the leaves and panicle densely softly woolly.

SINGAPORE; Maingay No. 711.

Branchlets densely woolly. Leaves 5 by 2½ in., elliptic, acute not acuminate, narrowed at the base, shining green above, with much spreading soft hair and rugose beneath; petiole 1 in. Panicle 4 in. diam.; branches thick; bracts ½ in., ovate, obtuse, thick. Young flowers densely woolly. *Fruit* 1½ by ⅜ in., ovoid, much narrower upwards.—A very fine and distinct species.
5. **Aucuba, Thunb.**

Glabrous branching shrubs. Leaves opposite, petioled, ovate or lanceolate, obtusely serrate, leathery, shining, turning black in drying. Flowers small, dienceous, in pseudo-axillary panicles, lurid purple; bracts inconspicuous; pedicels jointed and 2-bracteolate. Male: calyx small, 4-toothed; petals ovate or lanceolate, valvate; stamens 4; disc quadrangular, fleshy; no rudiment of an ovary. Female: calyx-tube ovoid, limb 4-toothed; petals as in the male; no rudiments of stamens; ovary 1-celled, disc fleshy; style short, thick, stigma capitate; ovule solitary, pendulous. Berry ellipsoid, crowned by the calyx-teeth and style. Seed oblong, albumen copious; embryo minute, radicle superior near the summit of the seed.—**Distrib.** Species 3 or 1, Sikkim, Hongkong, Japan.

1. **A. himalaica, Hook. f. Ill. Him. Pl.** t. 12; leaves lanceolate or narrowly lanceolate acuminate, branches of the panicle very pilose.

Sikkim and Bhotan, alt. 6000-9000 ft., Griffith, &c.—**Distrib.** Japan.

A stout shrub, 6-12 ft., branching dichotomously. Leaves 8 by 1-2 in., narrowed at the base, denticulate or serrate; petiole 1/2-1 in. Panicles 3/4 in. diam., terminal on very short lateral branches. Fruit 1/4 by 1/2 in., smooth, shining, variable in colour, orange yellow or scarlet.—Yokohama specimens, named *A. longifolia* in Herb. Hook., are identical with the Indian. *A. japonica* differs by having rather broader less acuminate leaves and less hairy panicles. The increase of material renders more probable the suggestion made by Sir J. Hooker *l. c.* that there is but one and that a very variable species of *Aucuba*.

6. **Nyssa, Linn.**

Trees (or shrubs), innovations silky. Leaves alternate, petioled, entire. Flowers capitate, on axillary peduncles, polygamo-diceious, 1 or few females and many males in a head, each 3-4-bracteolate, or the males irregularly coalescing. Male: calyx short, cup-shaped, 5-7-toothed; petals 5-7, imbricate, hairy; stamens usually 10 (in the Indian species) around a large circular disc; rudiment of the ovary 0 or small. Female: calyx-tube campanulate; limb 5-toothed; petals 0 or minute; no rudiments of stamens; ovary 1-celled; style cylindric, simple or shortly 2-fid; ovule solitary, pendulous. Berry oblong or ovoid. Albumen copious; cotyledons flat, leafy, nearly as broad as the seed.—**Distrib.** Species 5-6, in N. America, and from Sikkim to Java.


A tree, 60 ft. Leaves 6 by 2 in., acute at the base, punctate on both surfaces, adult glabrous beneath, rarely pubescent and chiefly on the nerves; petiole 1 in. Peduncles 1-1/2 in., more or less pubescent. Calyx-teeth rounded, pubescent and ciliate. Ripe fruit 3/4 by 1/2 in., ovoid, narrowed upwards to a point, glabrous.
7. **Toricellia**, DC.

A small tree, branches thick. *Leaves* alternate, long-petioled, deciduous, broadly cordate, acute, sharply serrate; petiole sheathing at base. *Flowers* small, white, dioecious, numerous in pendulous panicles; pedicels short, bracteolate, in the female jointed under the flower, in the male not. **Male**: calyx-tube short, lobes generally 5; petals 5, oblong, acuminate, induplicate-valvate; stamens usually 5; disc flat; rudiment of ovary 0 or of 1-3 small bristles. **Female**: calyx-tube ovoid; limb minute, 3-5-toothed; petals and stamens 0; ovary 3-5-celled, disc inconspicuous; style very short, stigmas 3-5, cylindric; ovule solitary pendulous in each cell. *Drupe* small, purple, obliquely ovoid, crowned by the stigmas, 4-celled, 1-seeded. *Seed* linear, curved; albumen fleshy; embryo minute.


**Nipal**; *Wallioah*. **Sikkim**, alt. 6000 ft., *J. D. H. Bhotan*; *Griffith*.

*Leaves* 6 in. diam., adult glabrous or slightly pubescent on the nerves beneath, membranous, palmately nerved from the base; petiole often 3-4 in. **Male** panicle 1 ft., very compound, minutely pubescent or glabrous, with a few scattered linear bracts ½ in.: fem. sometimes nearly as long as the male, but much less dense and with far fewer more scattered flowers. *Fruit* ½ in., ovoid, glabrous.
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