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FLORA

OF

BRITISH INDIA.
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THE

FLORA OF BRITISH INDIA.

BY

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CORRESPONDING MEMBER OF THE INSTITUTE OF FRANCE, AND HON. MEMBER OF THE
ASIATIC SOCIETY OF BENGAL.

ASSISTED BY VARIOUS BOTANISTS.

VOL. II.

SABIACEAE TO CORNACEAE.

PUBLISHED UNDER THE AUTHORITY OF THE SECRETARY OF STATE FOR
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ADDENDA.

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

Seeds linear, testa membranous, albumen scanty or 0 . . . . . 7. SPIRA.
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 racemous or panicled, 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. —Distr. 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 panicled, 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.—Distr. Java.

A large shrub, with drooping slender leafy branches. Leaves 2 by 1½ in., ovate-cordate, 3-lobed; lobes shallow, acute, sharply irregularly toothed or serrate. Panicles 3–8 in. Flowers shortly pedicelled. Calyx-tube ½ 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 obovate. Fruit inclosed in the calyx, of 1 carpel.

2. N. rubiflora, Don Prodr. 229; racemes solitary or shortly panicled, stipules and bracteoles usually quite entire, calyx tomentose. DC. Prodr. ii. 547; Hook. f. & Thoms. in Journ. Linn. Soc. ii. 75; Wall. Cat. 697.

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 a'tissima is a scandent tree (J. D. H.)
, 413. Crassula indic a has the stem-leaves alternate.
, 415. Kalanchoe brasiliensis should include K. olivacea, Dalz. in Dalz. & Gilb. Bomb. Fl. 313.
, 417. I. 3. Stamens 5 in some flowers, 10 in others (W. B. Hemsley).
, 445. Terminalia belerii should include T. attenuata, Edgew. in Trans. Linn. Soc. xx. 46.
, 607. I. 38, under T. multiloba, 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, Celeb). 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).

Begonia fallax. The type specimen of this species, lately found in Wight's private Herbarium, is B. malabarica, Lamk.
, 705. I. 5. The Kumaon plant collected by Strachey and Winterbottom is Trachyspermum 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. 1002; leaves oblong acuminate puberulous base acute, petals elliptic nerved, filaments subulate much shorter than the petals. Hook. f. & T. Fl. Ind. i. 209; Brandis, For. Flor. 116.

Temperate Himalaya; from Simla, alt. 5000 ft., to Sikkim, alt. 9-10,000 ft.
A climbing shrub. Leaves 2-4 by 2-1\frac{1}{2} in., membranous, puberulous on both surfaces, nerves reticulate. Peduncles 1-2 in., subclavate. Flowers \frac{3}{8} in. diam.
FLORA OF BRITISH INDIA.

ORDER XLV. SABIACÉÆ. (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 polygamous, 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 2–8-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, tests 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.

Stamens 4–5, all perfect and equal 
Stamens 5, very unequal

1. SABIA, Coleb.

Climbing or sarmentose shrubs; branches with the bud-scales persistent at their bases. Leaves quite entire. Flowers axillary, solitary, cymose or panicled, usually hermaphrodite, 2-bracteate; bracts, calyx, corolla, stamens and carpels all opposite. Calyx 4–5-partite. Petals 4–5, with transparent lines, green, purplish or yellow. Disk annular, 4–5-lobed. Stamens 4–5, inserted at the base of the disk; anthers extrorse or introrse. Carpels 2, rarely 3, 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, dotted; embryo curved, cotyledons straight or incurved flat rugose or undulate, radicle cylin dric.—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. 1002; leaves oblong acuminate puberulous base acute, petals elliptic nerved, filaments subulate much shorter than the petals. Hook. f. & T. Fl. Ind. i. 209; Brandis, For. Flor. 116.

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

A climbing shrub. Leaves 2–4 by 3/4–1 1/2 in., membranous, puberulous on both surfaces, nerves reticulate. Peduncles 1–2 in., subclavate. Flowers 3/4 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. 209**; 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 1–1½ 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 \( \frac{3}{2} \) in. long, punctate. Filaments ligulate, anthers extrorse. Drupe as in **S. campanulata**.

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

3. **S. purpurea**, **Hook. f. & T. Fl. Ind. i. 209**; leaves oblong-acuminate base usually rounded young puberulous, cymes 3–5-flowered, petals acute, filaments broadly subulate. **S. parviflora**, **Wall. Cat. 1001, in part.**

**Khasia Mts.**; alt. 4–6000 ft. Wallich, etc.

Leaves 2–5 by \( \frac{1}{2}–1 \) in., often 6 by 2½ 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.**


**Western Peninsula**; Aramallay hills, alt. 3–4000 ft., **Beddome.**

A climbing shrub, quite glabrous. Leaves 3–5 by 1–1½ in., thinly coriaceous, pale, margin cartilaginous; nerves many, spreading, much reticulated beneath; petiole \( \frac{1}{2}–1 \) in. **Peduncle** \( \frac{1}{2}–1 \) 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 \( \frac{3}{2} \) in., reniform, reticulated.—Beddome figures the petals as connate at the base.

5. **S. parviflora**, **Wall. in Roxb. Fl. Ind. ed. Carey, ii. 310**; **Cat. 1001, in part.** leaves ovate or oblong acuminate margins waved, cymes dichotomous 7–11-flowered, stamens unequal. **Hook. f. & T. Fl. Ind. i. 210.**

**Subtropical and Temperate Himalaya**; from Kumaon to Sikkim, alt. 3–6000 ft.

A climbing shrub; branches very slender, tips puberulous. Leaves 2–4 by \( \frac{3}{2}–1 \)½ in., thinly coriaceous, glabrous, pale beneath, nerves almost horizontal. **Bracts** minute, ciliate. **Flowers** minute. Sepals ovate, ciliate. Petals narrow, oblong, 5-nerved. Filaments ligulate. Drupe \( \frac{1}{2}–1 \) in., obovoid, oblong or subglobose; stone compressed.

6. **S. lanceolata**, **Colebrooke in Trans. Linn. Soc. xii. 355 t. 14**; leaves oblong-lanceolate base acute or obtuse, cymes long-peduncled coriaceous many-flowered, petals ovate-lanceolate, stamens included. **Wall. in Roxb. Fl. Ind. ed. Carey, ii. 309**; **Cat. 999**; **Bhume Mus. Bot. 268**; **Hook. f. & T. Fl. Ind. i. 210.**

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

A climbing shrub. Leaves 4–7 by \( \frac{3}{2}–2 \)½ in., shining above, glaucous beneath, thinly coriaceous, nerves nearly horizontal, petiole \( \frac{1}{2}–1 \) in. **Peduncles** 1½–2 in., slender, sometimes supra-axillary. Flowers greenish, sweet-scented. **Sepals** ovate, acute. **Petals** \( \frac{1}{2} \) in., subacute. **Filaments** subulate. Anthers introrse. Drupe \( \frac{1}{3} \) in., pulpy, blue; stone rugose, compressed.
7. S. limoniaceae, Wall. Cat. 1000; leaves oblong or lanceolate acute or acuminate thickly coriaceous, panicles long glabrous, petals broadly oblong, stamens included. Hook. f. & T. Fl. Ind. i. 210. Celastrina, Wall. Cat. 9015; Griff. Notul. iv. 423; As. Pl. As. t. 568 f. 2.

TROPICAL SIKKIM, BHOTAN, 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 ½ in., shortly clawed, obovate, 5-nerved, fleshy. Filaments fleshy, incurved.—This approaches the Javanese S. menescorta, Bl.

8. S. paniculata, Edgw. 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 ¼ in. Petiole much branched, many-flowered, peduncle puberulous; branches and pedicels slender, glabrous. Flowers ¼ in. diam. Filaments ligulate, shorter than the petals. Fruit didymous, of two obovoid diverging roseate subcompressed carpels, each nearly ½ in. long.—The only specimen I have seen has but two leaves, and is remarkable for its very short petals 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 subrotundis. 16. 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 ½ in. long. Stigmas horse-shoe shaped. Fruit unknown.—I know nothing of this species beyond Kurz's description.

2. MELIOSMA, 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
XLV. SABIACEE. (J. D. Hooker.)

* Leaves simple.


1. **M. dilleniasifolia**, Wall. nes. (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.

**Temperate Himalaya**; from Simla, alt. 4,800 ft., to Sikkim, alt. 8–10,000 ft.


A small tree, 20 ft.; branches, petioles, and panicles covered with soft rusty pubescence. Leaves 6–12 by 3–6 in., membranous, cupulic-cuminate, narrowed into the petiole; nerves very many, parallel, ending in marginal teeth. **Panicl**e as long as the leaves or longer, spreading, lax-flowered; bracts broad, deciduous; pedicels very short; flowers white. **Drupes** 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 F, F (Millingtonia); leaves oblonglate ciliate-cuminate 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, **Roye Ill.** 139. M. integrofolia, **Wall. Cat.** 8114 G in part (Millingtonia). M. rigida and M. ferruginea, **Sieb. & Zucc. (in Herb. Hook.)**

**Subtropical and Temperate Himalaya**; alt. 3–8,000 ft., from Marri to Nipal.—Distrib. 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. **Panicl**e often much larger than the leaves, spreading, erect; flowers densely fascicled on the ultimate branches, larger than in **M. dilleniasifolia** or **simplicifolia**. **Drupes** ½ 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. integrofolia** Wall. Herb. under 8114 G consists of one specimen of this with nearly entire leaves, and one of **M. simplicifolia**, both from Nepal.

†† Leaves quite entire, or subserrate 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**,
Meliosma.]  

XLV. SABIACEAE.  (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 ciliate 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 oblanccolate or oblong-lanceolate quite entire or toothed when young glabrous or pubescent beneath, flowers sessile distinct, sepals and bracteoles about 6 ciliate outer narrow hairy on the back. Wall. Cat. 8114 B, C, D; W & A. Prodr. 115 (Millingtonia); M. integrifolia, Wall. Cat. 8114 G (Millingtonia); Thwaites Enum. 59; Griff. Notul. iv. 162; Fl. 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, Shylhet, Tenasserim at Mergui, Griffith; Western Peninsula, in subalpine forests, Beddome. Ceylon, common up to an elevation of 3000 ft. Distinct. 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; branches slender. Flowers much smaller than in M. Wightii, not glomerated, more hairy on the bracts and sepals, which are much more acute. Fruit about 1/4 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, panicule densely tomentose, flowers sessile distinct, sepals and bracteoles 3-6, orbicular very coriaceous subciliate, petals very coriaceous subvalvate. Sabia? floribunda, Mis. Fl. 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 oblanccolate, narrowed into the petiole; nerves arched, very prominent beneath; petiole ⅔-1 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 2-½, ciliate at the tip (Maingay)—Kurz (Jour. 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 oblanccolate acuminate membranous, flowers sessile, aggregated, 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 bo-
Leaves 12-18 by 3½-4 in., very long and narrow, very acuminate, but not ciliate, 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.
† Leaves serrate or toothed.

7. *M. pinnata*, Roxb. Fl. Ind. i. 104 (Millingtonia); nearly glabrous, leaves 6-12 pairs oblong or oblong-ovate 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 cylindrical; leaflets 3-6 by 1-1½ in. shortly petiolate, much acuminate, sometimes nearly entire. Panicle as long as the leaves, terminal; branches spreading; bracts minute, caduceous, 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 caduceous. 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 Moifong in the Khasia seem identical with a Corean plant collected by Wilford.

†† Leaves 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 ½-¾ in. Panicle axillary and terminal. Flowers very numerous, crowded on the branchlets of the panicle. Sepals and bracteoles 5, orbicular-ovate, obtuse, ciliolate, rather pubescent. Petals subvalvate. Drupe globose, the size of pea.

10. *M. sumatranâna*, Jack in Mal. Misc. ii. 30 (Millingtonia); glabrous, leaflets 3-6 pairs elliptic-ovate or obovate-lanceolate acuminate base acute panicle contracted pubescent, flowers large crowded. M. nitida, Blume Cat.
MALACCA, Griffith, Maingay.—Distr. Sumatra.

A moderate-sized tree; branchlets glabrous. Leaves 1-1½ ft.; petiole nearly terete; leaflets 6-10 in., opposite, very variable in shape, coriaceous, shining on both surfaces; nerves arched, much reticulate; petiolules ½-⅓ in. Panicle stout, erect, rusty-pubescent, with rather spreading short pubescence; bracts acuminate, ciliate. Sepals and bracteoles 6, 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 ½ 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. mitida. 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. 108 (B. excepted), var. pubescens; pubescent, leaflets 6–8 pairs, very coriaceous linear-oblong caduate-acuminate pubescent beneath margins recurved, panicle tomentose with very long branches.

MALACCA, Mt. Ophir, Griffith, Maingay (M. Sumatrana, Kew distr. not of Jack).—Distr. Sumatra, Borneo.

A tree; branchlets stout, rusty-pubescent. Leaves 1-2 ft.; petiole stout, terete; leaflets 5–7 by ½–1½ in., often recurved and subfalcate, base rounded, rigidly coriaceous, shining above, opaque and pubescent beneath with much raised nerves; petiolules stout, ½ 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. ANACARDIACEÆ. (By J. D. Hooker.)

Trees or shrubs; juice often milky and acrid. Leaves alternate, opposite in Bouea, exstipulate, 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 3; 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 funicule. Fruit usually a 1–5-celled 1–5-seeded drupe; stone sometimes dehiscing. Seed exalbuminous; embryo straight or curved, cotyledons plano-convex, radicle short.—Distr. Chiefly tropical; genera about 45; species about 450.

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

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

A. Ovules pendulous from a basal funicule.
XLVI. ANACARDIACEAE. (J. D. Hooker.)

* Sepals and petals not accrescent.

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.

** Sepals or petals accrescent. Leaves simple.

Calyx spathaceous. Stamens 5 or numerous. 7. MELANORRHIGA.
Calyx 5-partite. Stamens 5. 8. SWINTONTIA.

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

* Leaves 3-foliolate or pinnate.

Calyx not accrescent. Petals valvate. Stamens 10. 9. SOLENCARFUS.
Style 1. 10. TAPIRIA.
Style 1. 11. PENTASPADOJON.
Styles 3–4. 12. ODINA.

** Leaves simple.

Petals imbricate. Stamens 5. Style 1. Drupe superior. 15. DRIMYCARFUS.
Petals valvate. Stamens 5. Style 1. Drupe superior. 17. MELANOCHYLA.
Petals imbricate. Stamens 4. Style 1, short. Drupe superior. 18. NOTHOSPIA.

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

Flowers polygamous. Stamens 8–10. Styles 4–5, free above. 20. SONDIAS.
Flowers bisexual. Stamens 10. Styles 5, thick, connate at the lips. 21. DRACOCTOMELUM.

** DOUTFUL GENUS.

Calyx 3-fid. Stamens 3. Ovary 3-celled. Leaves entire. 22. RUMPHIA.
Trees or shrubs, with often an acrid 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 ♀ 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 coriaceous, crustaceous or bony. Seed pendulous from the funicle, testa membranous, cotyledons flattish, radicle hooked short superior.—A large genus of about 120 species, natives chiefly of warm temperate regions.

**Sect. 1. Cotinus.** Leaves simple. **Panicle** with many flowerless finally elongate capillary hairy pedicels. **Flowers** bisexual. **Drupe** obovate, compressed, stone triangular.

1. **R. Cotinus**, Linn.; **Bois. Fl. Orient.** ii. 4; leaves long-petioled elliptic or obovate glabrous or tomentose. **Brandis For. Flor.** 118. R. velutina, **Wall. Cat.** 998 (excl. C. in Herb. Linn. Soc.); R. levis, **Wall. mes. in G. Don Gen. Syst.** ii. 65.

**Western Subtropical Himalaya**; alt. 3-5000 ft., from Marr to Kumai.—**Distrib.** from Syria westward to France.

A shrub or small tree. **Leaves** 3-4 in. obtuse; nerves spreading, parallel; petiole very slender, 1-2 in. **Panicles** axillary and terminal, very large, slender, and many-flowered. **Flowers** ¼ 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 dicoeous 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; **Dalc. & 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 unarmed shrub; branchlets, leaves beneath, petioles and panicle densely clothed with soft rusty tomentum. **Leaves** palmate, 3-foliolate; petiole 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** ½ in. diam.; pedicels very short; bracts linear. **Sepals** ovate, the outer hairy. **Petals** twice as long, oblong. **Disk** 5-lobed. **Drupe** ½ in. diam., ovoid, compressed, red-brown, shining.—The Ceylon specimens alluded to in Brandis are of doubt cultivated ones.


**North Western India**; Seind, Stocks; Rohilkund, near Delhi. **Western Panjbas**, Sulima range, alt. 2500-5000 ft. **Western Peninsula**; Malsor and the Dakkan.

A small shrub; branchies woody, flexuose, often spinous; branchlets, petioles,
leaves beneath, and panicle clothed with a rather furfuraceous pubescence. **Leaves** palmately 3-foliolate; petiole 1-2 in.; leaflets 1-1 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** 1/4 in. diam.; pedicels short; bracts minute. **Sepals** ovate, 2 smaller. **Petals** oblong, much larger than the sepals. **Stamens** short. **Disk** obscurely 5-lobed. **Drupe** 1/4 in. diam., subglobose, 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.* 993; 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-foliolate; petiole 1-1 1/2 in.; leaflets 3-5 by 1-2 in., rarely oblanceolate, 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** 1/4 in.; shortly pedicelled. **Sepals** orbicular. **Petals** not much larger, ovate-oblong, obtuse. **Disk** cup-shaped. **Drupe** 1/4 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. **Panicles** large, broad, with a stout peduncle. **Flowers** 1/4 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; stamens large. **Disk** cup-shaped, 10-lobed. **Styles** rather long. **Drupe** 1/4 in. diam., orbicular, compressed, red, shining, acid.—I have specimens from the Bombay Presidency collected by Dr. Gibson (perhaps cultivated), and from Ritchie (Griffith’s Herbarium) collected at Baraghur (probably east of the Indus) with the name “Semal-Shoorookee.” 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 indeshecent.

**North Western Himalaya:** Kunswur, alt. 6000 ft., *Thomson*. Rajasori 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** 1/4 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-acuminate hairy chiefly on the nerves beneath, pericarp dehiscent.

Khastia Mts.; at the Borpanee, and at Chittagong. H. f. & T.

A large tree. Leaves 1-1 ½ ft.; petiole terete, soft, pubescent towards the tip; leaflets 3-4 by 2-3 in.; base cuneate, oblique, glaucous beneath; nerves very slender, about 15 pairs, arched, clothed with soft white spreading hairs. Flowers not seen. Drupes ½ 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. 176; Brandis For. Flor. 120. R. juglandifolia, Wall. Cat. 906 (not of Willd).n

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, ½ 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, ½ 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 globose above tomentose beneath, panicles shorter than the leaves, drupe pedicelled, pericarp dehiscent.

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

A small beautiful tree. Leaves 12-18 in.; petiole terete; leaflets 6-9 by 3-4 ½ 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 ½ 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, petiolule leaflets that are often cordate at the base, large lax glabrous panicles, and smaller very different fruit. The panicles and petals are crusted with lenticels in some Sikkim specimens.

10. R.? Dhuna, Hamilton in Wall. Cat. 8502 (Terebinthraceae?); 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 ½ 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.—**Distrib. 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. **Panicles** axillary, half the length of the leaves, slender, lax, with a very few scattered hairs, or glabrous. **Flowers** ⅓th in. diam., yellow-green; pedicel slender. **Sepals** broadly ovate, obtuse. **Petals** much larger, oblong or obtuse. **Disk** 5-lobed. **Drupes** ¼ 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. himalacea;** 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, panicule pubescent in flower, fruiting glabrous very lax, drupes pedicelled 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 Sikim 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-obovate or -oblong often abruptly caudiate-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. sphærocarpa;** leaves of var. 3, drupes depressed spheres.—**Khasia, Griffith.**


**Khasia Mts.** alt. 4–6000 ft., *Simens*, 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 ½ in., very stout; nerves strong. **Panicles** 5–6 in. long, axillary; peduncle and branches stout, pubescent. **Flowers** ⅓ 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 ½–¾ 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 staminate, 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 capitate, recurved; ovule pendulous from a basal funicle. Drupe dry; stone bony. Seed with a membranous testa; cotyledons thick, oily, curved. Distrib. 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 Pistachio-nut, are imported into N. Western India.


**North-Western Frontier; Peshvar 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, pelticulate, coriaceous, quite entire, base oblique; nerves many, arcaded. Panicles lateral; 3 compact, pubescent; 2 lax, 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 exsurgences. 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, tests papery; cotyledons plano-convex, often unequal and lobed. Distrib. 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.

† Panicle 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 5 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;
Mangifera.


Tropical Himalaya: alt. 1-3000 ft, from Kumaon to Bhutan Hills and valleys of Behar, the Khasia Mts., Birma, Oudh, and Western Peninsula from Kandesh southward.—Distrib. 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, acuminate 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, odoruous, subsessile, rarely pedicelled, 3 and 5 on the same panicle. Sepals ovate, oblong, concave. Petals twice as long, ovate, ridges 3-5, orange. Disk fleshy, 5-lobed. Stamen 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 enumerated 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 Sorindeia, a Madagascar plant accidentally intermixed; 8487 G. is Buchanania? acuminata (Wall. Cat. 981), and 8487 I. is, I suspect, M. sylvestra.

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.

Martaaran, Kurz.

A moderate sized tree. Leaves 4-6 by 1½-1¾ in., equally reticulated on both surfaces between the 16-20 pairs of arching nerves; petiole ½-1 in., much thickened at the base. Panicle tomentose throughout. Flowers much as in M. indica, the reflexed 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 reticulation 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 acuminate reticulated on both surfaces, panicle spreading tomentose, flowers crowded subsessile, petals 5 with 3 ridges, stamens 5 perfect, ovary smooth, style subterminal.

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.

4. M. Griffithii, Hook. f. in Trans. Linn. Soc. xxii. 163, in note; leaves small oblong or oblong-ovate obtuse reticulate between the nerves, inflorescence of many suberect compound pubescent racemes, petals 4 orbicular-oblong not much exceeding the sepals, stamen 1.

Malacca, Griffith.

Branches stout. Leaves 3-5 by 1½-2 in.; nerves about 10 pairs; base narrowed; petiole stout, ½ in. Racemes (branches of a reduced panicle), not much if at all longer.
than the leaves, stout, finely pubescent. Flowers very small, \( \frac{1}{2} \) in. diam., sub sessile. 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 narrow tips most thickly coriaceous base acute or rounded nerves obscure, petals much thickened at the base, panicle pubescent of many erect stout spiciform branches, petals not much exceeding the sepals, stamen 1.

MALACCA, Maingay.
Branches very thick, woody, glabrous, angled, and channelled. Leaves 4–5 by 2–2½ 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, \( \frac{1}{4} \) 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.

TROPICAL NIPAL AND SIKKIM HIMALAYA, J. D. H.; SIKHET, ROXB.; KHASIA MTS., H. F. & T.; ANDAMAN ISLA., KURZ.
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 Sihlet, 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 back. 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 2½–3½ in., membranous, the much reticulated, elliptic-lanceolate, acuminate, petiole very slender \( \frac{3}{2} \)–2 in.; nerves 16–20 pairs, slender, arched. I have gathered similar specimens in Sikkim and Sihlet, with petals 4 in. long, and Wallich’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 accuminated 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, Maingay.
A tree. Leaves 6–10 by 1½–3 in., with 14–10 pairs of nerves, reticulation obscure above, more distinct beneath; petiole \( \frac{3}{2} \)–1½ in. Panicles usually longer than the leaves, branches widely spreading, pedicles \( \frac{1}{2} \) in. Flowers \( \frac{1}{4} \)–\( \frac{1}{2} \) in. diam. Sepals ovate, subacute. Petals white, with yellow veins, very narrow, recurved. Disk broadly conical, papillose, 5-lobed. Stamens far exerted, filament elongated. Ovary smooth; style lateral, long, slender; ovule obliquely ascending.—This, as
Griffith remarks, is very near *M. sylvestica*, 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-obovate 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; Buchanan? *zeylanica*, Blume Mus. Bot. i. 185.

**Ceylon**; abundant up to an elevation of 3000 ft.


9. **M. gracilipes**, Hook. f.; leaves small elliptic-lanceolate acuminate obscurely reticulated, 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, Mainay.**

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, ½-1 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 ½ 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, Mainay (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, ¼-½ in. *Sepals* veined. *Petals* rather short, yellow, ridges tipped with red. *Fruit* 4 in. long, ovoid, dull green.—Mainay, from whom this description of the fruit is taken, says that this is cultivated at Malacca as the Queene 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.* 8489.

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

A lofty tree, perfectly glabrous throughout; branchlets very stout. Leaves 4—8 by 1½—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—6 flowered. Flowers small, ½ in. diam.; pedicel 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* tumid, 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 superficial fifth petal is sometimes placed within the rest. This is allied in flower and inflorescence to *M. Griffiihi*.

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 1½—3½ in., coriaceous, nerves 15—20 pairs, not strong, arched; petiole 1—2 in. *Panicle* equalling or exceeding the leaves, branches pale green (when dry), rather slender. Flowers ½ 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 Sapooong or Sampong), with larger leaves not narrowed into the petiole, opaque above, with sunk nerves, tumid 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 2¼—3 in.

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

**Malacca, Griffith; in orchards.**

A small tree (*Griffith*). Leaves 1¼—4 by 2½—1½ in., shining above; nerves 8—10-pairs; petiole slender, ½—1 in. *Panicle* short, stout, rather irregular, sometimes reduced to erect compound racemes, by the abbreviation of the peduncle and the branches being erect. Flowers about ½ in. diam., on short stout pedicela. *Sepals* pubescent. *Petals* about twice as long, the ridges distinct. *Filament* slender. *Style* lateral. *Fruit* oviform, green, very turpentiny, *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 6-fl.

*Petals free from the disk.*


**Malacca, Griffith.—Disth. Java (Zollinger, 480).**

*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, 1\frac{1}{4}-1\frac{5}{8} in., much thickened from below the middle to the base. Panicle with stout green branches that turn black when dry. Flowers \frac{1}{2} in. diam., odoriferous, 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, capitulate. 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 "Koeene" or "Kobini," 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 branches and very long pedicels.

15. M. lagenifera, Griff. Notul. iv. 414, t. 587, f. 3; leaves small obovate-oblong or spatulate 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 1\frac{1}{4}-1\frac{5}{8} in., very thickly coriaceous, gradually narrowed into a very stout petiole \frac{4}{3}-\frac{1}{8} 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 \frac{3}{4} in. diam.; pedicels very short. Sepals many, orbicular, tomentose. Petals three times as long, concave, purple, erect till a late period. Disk a slender stripes. Filaments very slender (purple, alternating with short horns, Maingay). Ovary glabrous; style capillary, lateral. (Drupe pyriform, \frac{4}{3} by 2\frac{1}{3} 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, glanscent, fleshy, fetid, exuding a black varnish, traversed by innumerable fibres; stone ovate-lanceolate, fibro-coriaceous. Seed erect, adhering to the black segment 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 1\frac{1}{4}-1\frac{5}{8} in., coriaceous, reticulated on both surfaces, margins waved, base acute abruptly contracted into a very slender petiole \frac{1}{4}-\frac{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 \frac{1}{4} 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. Disk 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 disk, stamens 5 one perfectly the rest shorter imperfect. **Roxb. Fl. Ind. ed. Carey, ii. 440; Wall. Cat. 8488; Griff. Notul. iv. 419. M. Horsfieldii & M. fistida, Mig. Fl. Ind. But. 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, 1–2½ in. **Panicle** large, stout, with very spreading branches, and these again with short tertiary cymose branchlets (deep blood-red, **Maingay**), 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. (**Drupe** variable in form, not compressed, oblique, green, smooth, very fleshy yellow, thick; stone almost 2-edged, chartaceous, fibrous; cotyledons equal, auricled at the base; radicle short. **Griffith**.)—Maingay describes the fruit as coarse-flavoured, and not unlike Lanjot (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. cæsia**, 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. fistida, **Blume** (according to **Miguel in Herb.**).

MALACCA, MAINGAY (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 ¼–1 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, ¼ 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. (**Drupe** oblong-ovate, 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 Binjase.

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

MALACCA, MAINGAY.

A gigantic tree (Maingay); 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** ¼ 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 antheriferous. **Ovary** oblique; style slender, subterminal; ovule laterally attached, horizontal.—This is a grand species, allied to **M. cæsia**, but far larger in all its parts than any other of the genus. It is curious that no one but Maingay should have met with so conspicuous a tree. Large sheathing stipule-like scales occur amongst the leaves, whose nature I cannot ascertain.
20. **M. polycarpa**, Griff. *Notul.* iv. 416 (polycarpa), t. 167, f. 2 (cassia); leaves large sessile oblanceolate obtusely acuminate faintly reticulated undulate.

**Malaca, Griffith.**
A large tree, like *M. fatida*; branches stout. *Leaves* nearly 1 ft. long, very coriaceous, nerves 20–30 pairs, arched; petiole ¼ in., winged, flattened. *Flowers* unknown. *Drupe* oblong, base rather broader, brown, dusty all over, of a strong Dorian 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 ? polycarpa* (misprinted *polycarpa*, at p. 416 of the *Notule*), in allusion to the russet-coloured fruit, which is unique in the genus. Judging from the foliage, this is probably allied to *M. cassia*.

**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, Roth.**


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 ¼–½ 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.*

4. **BOUEA, Meissn.**

Trees. *Leaves* opposite, petioled, 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.—Distr. Species 5, natives of Tropical Asia and the Malay Archipelago.


Pattu, Tenasserim and the Andaman Islands.—Distr. 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.—‘Mamam’ 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 densely-flowered obscurely puberulous, flowers 4-merous. B. diversifolia, Miqu. Fl. Ind. Bat. Suppl. i. 522. ? B. myrinoides, Blume Mus. Bat. t. i. 204; Miquel i. c. i. pt. 2, 635.

Malacca, Griffith, Mainqay.—Distr. Sumatra.

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


Malacca, Griffith, Mainqay.—Distr. 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. Panicle 2–3 in. long; branches stout, spreading horizontally and bearing densely crowded cymes of flowers about ½ in. diam. Sepals 3 in the 9 (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 filament. 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.—Distr. About 8 species, all Malayan.
1. **G. elegans**, Wall. in Roxb. Fl. Ind. ed. Carey, ii. 315; Cat. 1003 (Syndesium); leaves elliptic-lanceolate acuminate not reticulate above, petiole and nerves slender, panicles lax and flowers perfectly glabrous. Indeterminate, Wall. Cat. 9049.

**Pendunc., 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 1⁄4–1⁄2 in. **Panicles** much shorter than the leaves, slender. **Flowers** 1⁄2 in. long, subcoriaceous. **Calyx** tubular, membranous, scarlet, split, mouth 2-toothed. **Petals** linear-lanceolate. **Disk** elongate. **Stamens** 4–5, as long as the petals. **Drupe** 3⁄4 in. long, when dry, gibbous-oblong, smooth, style-scar nearer the base than top. —A most beautiful and fragrant tree.

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

2. **G. tavoyana**, Wall. Cat. 1004 (Syndesium); leaves oblong-lanceolate obtuse acute or acuminate reticulate on both surfaces, petiole short, panicles long-peduncled puberulous. Syndesium sp., Griff. Notul. iv. 410.

**Tenasserim, at Tavoy, Gomez;** Mergui, Griffith.
A small tree with white branches. **Leaves** 4–12 by 11⁄2–3 in., very coriaceous, brown, rather waved; nerves 15–20 pairs, arched; petiole usually 1⁄2 in., stout. **Panicles** slender; peduncle 1–3 in.; flowers loosely corymbose, like those of _G. elegans_, but smaller, about 1⁄3 in. long; pedical stout; calyx (scarlet) shorter, puberulous, not toothed. **Petals** linear-spathulate, white.

3. **G. coarctata**, Griff. Notul. iv. 400, t. 567, f. 1 (Syndesium); leaves recurved conduplicate short-petioled linear- or obvate-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 1⁄4–3⁄8 in. **Panicles** much branched, 3–5 in.; flowers crowded at the tops of the branches, 1⁄2 in. diam. **Calyx** short, almost campanulate, split and lobed, very pubescent. **Petals** 5, obvate-lanceolate tipped with red. **Stamens** 5. **Drupe** 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 sub-hemispherical unequal fleshy, opposite faces pink, radicle short.—The description of the fruit is taken from Griffith's Notulæ and figure. The recurved subsessile leaves and large flowers at once distinguish the species.

4. **G. travancorica**, Bedd. Flor. Sylv. i. t. 60; leaves subsessile small obvate-oblong rounded at the tip, panicles spreading tomentose, calyx cupular.

**Western Peninsula;** Ghats of Tinnevelly and Travancor, Beddome.
A very tall timber tree. **Leaves** 4–6 by 11⁄2–13⁄4 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. **Drupe** 1 in. diam., depressed-globose, stipitate.


Trees. **Leaves** alternate, petioled, simple, quite entire. **Panicles** terminal and axillary, crowded. **Flowers** small, white, hermaphrodite. **Calyx** short,
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. Drupes small, flesh scanty; stone crustaceous or bony, 2-valved. Seed gibbous, acute at one end; cotyledons thick; radicle superior.—DISTRB. 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**, **Birma** 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 1/2-1 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. Drupes 1/2 in., subglobose, 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 1/2-1 1/4 in. diam., quite glabrous, nearly sessile. Drupes 1/2 in. diam., obliquely spherical.—The Malay 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**, **Wallieh**.

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, finely reticulate, lower strongly reticulate shining; nerves 12-15 pairs; petiole always short, 3/4 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.—Wallieh'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
broadly ovate or ovate-oblong, tip rounded or obtuse reticulate on both surfaces narrowed into the petiole, panicles lax spreading, branches slender, flowers

**Eastern Peninsula;** from Tenasserim to Malacca, and Penang.—*Distrib. 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. *Drupes* 
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 petiolata* and
*bancana.* I should refer hither also the glabrous paniced Australian plant placed
under *angustifolia,* Roxb., in the *Flora Australiensis.*

**Var. intermedia,** leaves ovate-spathulate membranous. *B. intermedia,* *Wight
Ic.* t. 81.—*Naggerie* hills, Madras.

5. **B. acuminata,** *Turcz. in Bull. Mosc.* 1858, i. 472; glabrous throughout, leaves long—
or short-petioled ovate or oblanceolate abruptly 
acuminate, panicles spreading exceeding the leaves long-peduncled very slender

**Tenasserim;** at Moulmein, *Lobb; Penang, Porter; Malacca, *Griffith, Maingay.*

**Distrib. 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 divar-
compressed. *Drupes* as in *B. lucida.—*I think there is no doubt of *Blume's B. sessil-
ifolia* 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.

6. **B. lanceolata,** *Wt.* Ic. t. 237; *Ill.* i. 185; leaves elliptic-lanceolate 
obtusely acuminate, petiole stout, panicles short pubescent, flowers 

**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—⅔ in. stout. *Panicles* shorter than the leaves, numerous, stout, 
axillary and terminal. *Flowers* ⅓ in. diam., crowded on the short stout lateral
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. *lanceifolia,* *Roxb. Fl. Ind.* ii. 386; *a large tree, leaves lanceolate obtuse
pointed lucid entire, panicles terminal.*—*Chittagong.*

fruit only.

ovate-oblong coriaceous finely tomentose glabrescent above, petiole ¼ in. stout, panicle
terminal lax diffuse much branched hoary or yellowish pubescent, flowers minute,
pedicels short and slender, bracts minute subulate, calyx hoary, lobes \( \frac{1}{3} \) 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, hermaphrodite. 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. 597; leaves obovate or elliptic obtuse softly tomentose on both surfaces.

**Munnifore**, 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, \( \frac{1}{2} \) in. Panicles 1 ft. long, peduncled, tomentose. Flowers lax \( \frac{1}{2} \) in. diam.; pedicels slender. Calyx calyptriform, 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; pedical \( \frac{1}{2} \) 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, \( \frac{1}{2} \) in. diam. Calyx membranous, calyptraform, acute pubescent. Petals linear-oblong, acute, puberulous, eventually 2-2\( \frac{1}{2} \) in. long, linear-oblong or -spatulate, coriaceous, veined. Drupe \( \frac{3}{4} \) in. diam., depressed or globose, quite smooth; pedicel very slender, 1-1\( \frac{1}{2} \) in.

** Stamens 5. Fruit subsessile.**


Maacca, Maingay.

A gigantic tree (Maingay); branchlets rather slender. Leaves 4-6 by 2-3 in., very coriaceous, deeply reticulate on both surfaces; nerves 18-20-pairs, strongly 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 calyptraform, 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 \( \frac{3}{4} \) in. oblong, obtuse, smooth.

Swintonia, Wallich; Malacca, Maingay.
A large tree. Leaves 6–8 by 3–4 in., coriaceous, obscurely reticulate above, more distinctly beneath; nerves strong, nearly straight; petiole 1–1 1/2 in. Panicles terminal and in the uppermost axile, branched from the base, curved, a foot long and more, together forming a drooping mass of long arched finely pubescent angled (when dry) peduncles, that branch towards their ends into slender tomentose branchlets with innumerable softly downy flowers; bracts large, obovate, concave, very membranous. Flowers very shortly pedicelled, 1/4 in. long. Calyx narrow-ovoid, very membranous, almost 2-valved. Petals linear-oblong, inserted towards the base of the disk, villous on both surfaces. Stamens 5. Disk short.—Wallich, who assumed this to be Jack’s Stagnaria verniciflua (Glata Benghas, L.), found a tree of it in the forest of Sincapore, close to Botany Hall, which, I assume, was his temporary residence.

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 incurvate. Petals 5, adnate to the middle of the disk, linear-oblong, incurvate, 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 funiculus. Drupes ovoid, smooth, sessile, coriaceous, subtended by the 5 reflexed enlarged petals. Seed erect, tests thin; cotyledons amygdaloid.—Distributed. The following are the only species known.

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

Tynasserrim, at Mergui, Griffith; Helder.
A lofty tree, glabrous throughout; branchlets very slender. Leaves 4–7 by 1–1 1/2 in., sometimes subopposite or 3-nate; tip obuse; margin waved, obscurely reticulate above and beneath; nerves 10-20-pairs, very slender; petiole 1 1/2 in. Panicle copiously branched from near the base. Flowers long-pedicelled, 1/4 in. diam. Petals linear-oblong, quite glabrous, rapidly enlarging. Fruit unknown.—I do not find the irregular pebollah 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.

Tynasserrim of Andaman Islands, Helder.
Very nearly allied to S. Griffithii, but branchlets stouter. Leaves much longer, 6–10 by 1–1 1/2 in., drawn out into longer points, with more numerous (25–30) pairs of nerves, rather stout petioles, and more waved margins; they are also of a dark brown colour when dry, whereas those of S. Griffithii are pale greyish-brown. Drupes (ripe) ovobvoid, 1/4 in. The reflexed petals 2 in. long, linear, obtuse, veined, glabrous.

Swintonia.]

XLVI. ANACARDIACEÆ. (J. D. Hooker.)

Beng. 1870, ii. 75. Anauxanopetalum Schwenkii, Teysm. & Binnend. in Miquel Journ. i. 308. Astropetalum 2, Griffith, Notul. iv. 415.

MALACCA, Griffith; Maingay.—Distrih. 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. Pedicels numerous from the upper axils, branched, peduncles and branches and pedicels excessively slender and spreading. Flowers the smallest of the genus, when first expanded, ½ in. diam., shortly pedicelled. Calyx-lobes orbicular, glabrous. Petals oblong on expansion, very rapidly enlarging, finally 2½ in. long, linear, obtuse coriaceous, veined. Drupe ¼ in long, oblong, smooth. Cotyledons oblong, amygdaloid; radicle lateral, minute.—Kurz refers to this Astropetalum 1 of Griffith's Notulæ, 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. Griffithi. The reference to "Cat. Hort. Begor." 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-ovovate 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 ½–1 in. Panicles subcorymbose, sometimes leafy, repeatedly trichotomously forked; branches angular, strict, suberect, glabrous, articulate, ultimate divisions ½ in. stout, clothed with imbricating small bracts and flowers; rachis with close-set deep scars; bracts orbicular, concave, pubescent. Flowers ½ in. diam. when first expanded, apparently polygamous, most of them males and caducous; pedicel 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 ¾ in. long, obliquely ovoid, smooth; pericarp thin. Cotyledons amygdalo.id.—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. Syv. 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-petiolute, 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.

- 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 inferior position, immersed in the disk, 4-5-angled, with 4-5 styles; in the ovary, 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 Nepal and Sikkim, ascending to 4000 ft.; to Bhutan, Griffith. Assam, Sleater, 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* 1½ in. diam., pale, sweet-scented. *Drupe* the size of a currant, black; flesh next the stone cellular and full of viscid brown balsam.


**Trees.** *Leaves* odd-pinnate; leaflets opposite subsessile, quite entire. *Panicles* axillary, peduncled, branched, branchlets very slender. *Flowers* pedicelled, minute, hermaphroditic. *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 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 scars of fallen leaves, tips velvety. *Leaves* crowded at the ends of the branch; petiole 6-10 in. stout, cylindrical, velvety, bearing no leaflets on the lower third or fourth; leaflets 2-3½ 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* ½ in. diam. on short glabrous pedicels; bracts minute. *Calyx* lobes ovate. *Petals* spreading, minutely puberulous. *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.—Maingay notes that this tree is polygamie-dioecious, but all the flowers I have examined seem to be hermaphrodite. Owing to the minuteness 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 Miqel (Fl. Ind. Bat. Suppl. 527), who referred it to *Bumareaea*. Miqel's description is most imperfect, and I added to it in the Genera Plantarum the character of having two styles, taken from flowers sent to me by Miqel as belonging to his plant, but which prove to belong to a totally different one. Marchand (Rev. Anacard. 90, 188) was the first to identify *Nothoprotium* with *Pentaspadon*, and his identification I have confirmed by specimens subsequently received from Miqel. The fruit of the original species being unknown, it is possible that that here described may not be congeneric.

### 12. ODINA, Roxb.

Trees with a few stout soft branches. **Leaves** few at the ends of the branches, alternate, odd-pinnate, deciduous; leaflets opposite, quite entire. **Racemes** simple and panicled, terminal, fascicled. **Flowers** small, monoeious 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 4-5, 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, cotyledons 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. Pl. 42; Wt. Fl. t. 60; Bedd. Fl. Sylva. t. 123; Wall. Cat. 8475; Royle Ill. t. 31; Datz. & Gibs. Bomb. Fl. 51; Brandis For. Flor. 123.—Rhede's 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 CRYLON. 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, peltate, 3-6 in., oblong-ovate, ciliate, acuminate, quite entire. **Racemes** slender, 3 compound, 9 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 3. **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** dioecious. **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.


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 sepals 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 sepals 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 Herbarium specimens, the leaves of **P. Maingayi** are fastened down with the fruit of a species with puberulous pericarp and acute fruiting sepals 4⅜ by 1½ in.

3. **P. pubescens**, Hook, f.; leaflets 5 pair thickly coriaceous oblong acute or acuminate pubescent beneath, fruiting sepals 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 lirid thickly pubescent much reticulate; nerves 10–12 pairs, very strong, arched. **Panicle** divided to the base into numerous fascicled branches, densely softly tomentose. **Flowers** ¾ in. diam., pedicelled. **Ovary** conical, pilose; **styles** 3. **Drupe** ½ in. long, between conical and spherical, densely tomentose. **Pericarp** cartilaginous; fruiting sepals ¼ 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 ♀ 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.—**DISTRI.** 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.
Tropical Outer Himalaya, from Sirmore to Sikkim, ascending to 3600 ft.; and throughout the hotter parts of India, as far east as Assam (absent in the Eastern Peninsula and Ceylon).—Disturn. 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* squalling or shorter than the leaves, stout; branches spreading; bracts lanceolate. *Flowers* ¾–½ in. diam., subsessile, fascicled. 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.

**Var. cuneifolia;** DC. Prodr. ii. 62; leaves cuneate at the base often tomentose beneath. Tropical Himalaya, Khasia Mts., Behar, and the Concan.—*S. cuneifolia,* Roxb. Fl. Ind. ii. 86; *Grah.* Cat. Bomb. Pl. 41.

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 subescabrid pubescence beneath, drupe ½ in.

Birma; on the Irrawaddy, Wallich.

Very similar in habit and foliage to *S. Anacardium,* but the drupes are less than half the size.—Kurz's *S. abescens* (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 ¾ in.

Ceylon, at Ratnapoors, Walker, Thwaites.

A small tree (Thwaites). *Leaves* 6–12 by 2–2½ 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 ½–1 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 glabrate 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. Sylvi. 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 Ghat, 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 equaling the leaves. *Flowers* dioecious, 5–6-merous. Calyx pubes-
cent, and ciliate, & with a large turbinate rudiment of an ovary. Drupes 1 in., obliquely oblong, rounded at the tip; cup broad, short. Beddome.

6. S. auriculata, Beddome Fl. Sylva under t. 233; J. C. Plant. Ind. Or., t. 187; leaves sessile, oblongate, tip obtusely reticulate on both surfaces, nerves strong beneath.

WESTERN PENINSULA; Travancor and Tinnevelly Mountains, Hayne, Beddome.

A good-sized deciduous tree. Leaves 7 by 1½ in., oblongate, obtusely acuminate, very gradually narrowed at the base and thickly furnished with 2 rounded lobes just above the petiole, dull green, glabrous, midrib slightly rusty, margin membranous, reticulations prominent beneath; petiole ½ in. Flowers 3–5-merous. Drupes 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-obovate or obovate-acuminate, abruptly 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 ⅛ in. broad, reticulate beneath; nerves about 12 pairs, slender, arching; midrib grooved beneath; petiole ¾ in., remarkably thick. Panicles 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. subsessile 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 Cultura and Ratnapura.

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 pairs; petiole ¾ 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 12–20 pairs, very spreading, shining beneath, with the midrib grooved; petiole ¾ in., very thick. Panicles 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 1½–3½ 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 ½–1 in. long, and broad. Panicles fascicled,

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, branchlets spreading. *Flowers* ¾ in. diam. *Nut* 1½ in. broad, much shorter; cup large, kidney-shaped, fleshy.—A very handsome plant.

12. **S. Gardleri**, *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 ¾ 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 Amboyna 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. Gardleri*, 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.


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

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 ½ in. *Nut* ¾ in., half sunk in the cup.


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Ceylon; forests in the Galle, Ratnapura 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. acuminate); leaves 3–6 in. obovate-cuneate or oblong-obovate narrowed into the petiole, tip rounded or abruptly obtusely acuminate, pale and reticulate beneath, midrib above slender, panicles terminal short, not 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* 1 1/2–2 in. broad, very variable in breadth, but almost always cuneate-obovate and decurrent on the petiole, which is 1/4–1 in., very dark green; nerves 6–10 pairs, much arched, reticulate as *S. obscura* and *S. Walkeri*. *Panicles* short, reduced to racemes. *Flowers* large, 3/4 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 1257, mentioned under *S. Gardneri*.

17. **S. parvifolia**, Thwaites Enum. 77; leaves 1 1/4–3 1/2 in. obovate or elliptic decurrent on the slender petiole tip rounded or obtusely abruptly acuminate, margin cartilaginous, strongly closely reticulate beneath with thick nerves, 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, 1 3/4–2 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 1/4 in., much more slender than usual in the genus. *Racemes* shorter than the leaves. *Nut* unripe, 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 opique and reticulate beneath with many spreading nerves, midrib above broad, panicles terminal black when dry shorter than the leaves, flowers minute pedicelled.

Malacca, Malacca.

A tree, quite glabrous throughout. *Leaves* 1 1/2–2 in. broad, almost shining above, very opaque and lurid (as if glaucous 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 1/2–1 in. stout. *Panicles* terminal and axillary, much branched, the lateral branches 3/4–1 in. long, bearing loose cyms of 5 flowers not 3/4 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, Wall.** (cult. in Calcutta Bot. Gardens).

Branchlets stout. Leaves 1 ft. and upwards by 3/4 - 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 1/2 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.

20. *S. heterophylla*, Blume Mius. Bot. i. 187; leaves 6-14 in. oblong or obovate-oblong thickly coriaceous tip abruptly obtusely acuminate shining above pale and reticulated beneath, petiole 3-1 in., panicle pubescent very large with slender erecto-patent branches, flowers minute. **Mig. Fl. Ind. Bot.** i. pt. 2, 625.

**Tenasserim or Andaman Islands, Helfer.** - **Distrim.** 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. subracemosa*, 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 1-1 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.—Pog. Kurz. Probably a *Holigarna*.

*S. acuminata*, Kurz in Jour. As. Soc. Beng. 1870, ii. 75; perfectly glabrous, leaves 6-12 in. cuneate-obovate 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. levigata*, Thouctes in Herb. (Coll. 3948); a small species in a very imperfect state, with glabrous elliptic-obovate obtuse but acuminate leaves 2-4 in. long shining above transversely strongly reticulated beneath.—South parts of Ceylon. *S. oblongigiboba* var. 5. Marchand Rev. Annocar. 109.

*S. albescens*, Kurz in Beng. As. Soc. Jour. 1871, ii. 51; 'a large tree, young parts velvety-tomentose, leaves 7-12 in. elongate-obovate or cuneate-lanceolate shortly 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 d 2
XLVI. ANACARDIACEÆ.  (J. D. Hooker.)  [Semecarpus.

lax, petiole \( \frac{3}{4} \)–1 in. thick tomentose, panicle densely yellow tomentose usually shorter than the leaves, flowers small racemulose, pedicels \( \frac{3}{2} \)–1 in., calyx minute pubescent, petals valvate or subvalvate \( \frac{1}{4} \) in. shortly pubescent, ovary densely appressed hirsute, stigmas 3 thick glabrous, disk glabrous, stamens 5, filaments short rather broad 1 or 2 longer and abortive.'—Kurz.

Prov; 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.—Distr. 2 or 3 Indian species.


Sikkim and Bhutan 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.

16. HOLIGARNA, Ham.

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 hairy. 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.—Distr. 7 species, all India.

* Leaves quite glabrous beneath.

1. H. Arnottiana, Hook. f.; leaves cuneate-obovate obtuse or acute quite glabrous decurrent on the petiole, petiole with two tubercles at the top, panicles slender tomentose, drupe glabrous. H. longifolia, Wt. & Arn. Prodr. i. 169; Grab. Cat. Bomb. Pl. 41; Dalz. & Gibbs, Bombay Fl. 51; Beedlove Fl. Sylv. t. 167 (not of Roxburgh). Terebinthacea, Wall. Cat. 8504.

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 1/4–1 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, 1/8 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, Marchant Rev. Anacard. 171; leaves cuneate-oblatae rounded at the tip quite glabrous decurrent on the petiolo, petiolo with two tubercles at the top, racemose robust clothed with dark rusty tomentum. Terebinthacea, Wall. Cat. 8503.

Western Peninsula: Coorg, Herb. Stocks; Travancor, Herb. Wall.; Mangalore, 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 1/2–2 in. diam. Stamens longer than the petals. Styles 3–4 in., elongate.—The terminal bud of this species seems more glabrous than in the H. Arnottiana.

3. H. longifolia, Roxb. Cor. Pl. iii. 79, t. 282; Fl. Ind. ii. 80; leaves 1–2 ft. very narrowly cuneate-oblanceolate acuminate membranous glabrous and glaucous beneath, petiolo 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 petiolo; nerves 20–25 pairs, erecto-patent, slender, reticulations large; petiolo 1/4–1/3 in. Panicle very large and spreading, ¥ tomentose. Flowers 1/10 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-oblanceolate acute or acuminate glaucous beneath rather coriaceous, decurrent on the very short petiolo, spurs two on each side slender persistent, ¥ panicle much branched softly densely tomentose, ¥ simple racemose.

Tenasserim; at Margoi, 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 25 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 1/10 in. diam., in small glomerules; ¥ in stout simple racemes, pedicelled, very much larger than the ¥. Drupes subcylindric, truncate, 1/2 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. ob lanceolate-cuneate triangular above the middle and acuminate finely pubescent beneath, petiolo very short and thick, petiolar spurs 2 or 4 persistent. Semecarpus Grahamii, Wt. &c. t. 235; iii. 185; Dals. &c. figs. Bomb. Fl. 52.

Western Peninsula; Concan, 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 petiolo, very rigidly
coriaceous, shining above, pale and reticulated beneath; nerves 20-30 pairs, very prominent beneath; petiole ¼ in., spurs 1 or 2 on each side ½-1 in. Panicles terminal, ½ a foot long, much branched, clothed with ferruginous tomentum, 2 shorter. Flowers clustered, 2 about ½ in. diam. Styles 3: Drupe ovoid, glabrous, ½ in. long, upper ⅓ or ⅔ 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-ob lanceolate sometimes much produced below acute or acuminate densely velvety beneath young membranous and ciliate.

Western Peninsula; Anamalay 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. ob lanceolate-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, flowers shortly pedicelled ½ 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 decurrent on the petiole, obtuse; midrib stout faintly grooved; nerves 14-18 pairs all raised, arched; petiole ¼-⅔ in. Panicle of 3 peduncled, rachis curved, branches very slender, spreading; of 2 also much branched and spreading. Flowers 3 only seen. Sepals small. Petals obtuse, pubescent. Filaments very slender. Disk pubescent. Drupe pedicelled, ½ 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 (Semecarpus, Wight.) I find no trace of spurs on the petiole, but have seem no very young leaves. Kurz describes this as beard-like.

17. **MELANOCHYLA**, 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 6, erect. Petals 6, 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.—Distrib. 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, 1/4-1 in. Panicle exceeding the leaves, rachis almost villous, branches spreading pubescent. Flowers 6 minute, 1/2 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. Drupes elliptic, globose, 1-1 1/2 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 1 1/4-1 3/4 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 1-1 1/4 in. very slender, greatly thickened from 1/4 in. above the base. Panicles chiefly axillary, very slender, longer or shorter than the leaves. Flowers in lateral cymes, 6-8 in. diam.; like those of M. tomentosa, but much less tomentose. Drupes unripe 1 1/2 in. diam., globose, apiculate, puberulous.—Maingay describes the corolla as imbricate, but I find it to be quite valvate.

3. M. MAINGAY, 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 2 1/2-3 1/2 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 1 1/2-2 in. Panicle terminal, stout, ferruginous. Flowers pubescent, 6 1/2 in. diam. subsessile; 9 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 3 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 1 1/2-2 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 1 1/2 in. long and as broad, which is adnate to the branch. Panicles terminal, smaller than the leaves, rusty-pubescent, rachis very stout. Flowers 6 clustered about 1/2 in. diam. Drupes oblong-globose, 1 1/4-1 1/2 in. diam., puberulous, ribbed when dry; stone very thick.

18. NOTHOPEGIA, Blume.

Small tree. Leaves alternate or opposite, petiolate, 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. Drupes depressed-turbinate, striate, tipped with the style, flesh cellular. Seed pendulous; cotyledons thick, plano-convex, radicle short sublateral.—Disturb. The following are the only species.


Western Peninsula; on the Ghats from the Southern Canara 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 1–2 in. Racemes much shorter than the leaves, solitary and fascicled, strict; ﬂowers minute; ovate or nearly so, 1/5 in. diam. Petals suberect with recurved tips, hairy on the back. Sepals almost orbicular. Filaments almost glabrous. Drupes 1/5 in. diam., red, top depressed.

Var. 1. Heyneana; leaves smaller 2–3 in. more shortly petiolated obtuse, drupe blue.—Terebinthacea? W. Cat. 8500.

Var. 2. macrocarpa; leaves 3–4 in. obovate-oblong shortly obtusely acuminate very coriaceous, drupe ½–3 in. diam., top not depressed.—Shevaghery 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 1½–12 in., almost membranous, margin thickened, green below, ciliate towards the base which is acute and not decurrent on the petiole; nerves 30–35 pairs, slightly arched; petiole ½ in. Flowers 1½ 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 1/2 in.—I have seen only an imperfect specimen of this very curious species.

19. CAMPNOSPERMA, Thwaites.

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. Drupes 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;** Saffrangan and Ambamagowa districts, generally on river banks. *Thwaites.*

A ramous tree, 30–40 ft.; branchlets stout, terete, youngest parts minutely scaly. *Leaves* 3–7 by 2–2½ in., elliptic-ovate or oblanceolate 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 ½–2 in. *Raceme* usually shorter than the leaves, rachis stout. *Flowers* ½ in. diam. *Drupe* nearly globose, 3½ in. diam. purple.


**Malacca, Griffith.** *Singapore;* Schomburgk, &c.—*Distr.* 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, ⅓ in. diam., tetramerous. *Sepals* rounded, pubescent. *Petals* orbicular-ovate, obtuse, erect. *Filaments* shortly subulate. *Drupe* ¼–½ in., subacute, compressed, nearly orbicular; stone crustaceous, 3–4-celled.


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

A tall shrubby tree, *Wallach.* 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.


**Singapore, Mainay, T. Anderson.—Distr.* 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 ½–1 in., the auricles quite small, beautifully reticulate on both surfaces, as in *C. zeylanica,* nerves arched, very slender. *Paniele* as in *P. grandifolia,* but less pubescent. *Flowers* similar, 4-merous.
20. **Spondias**, Linn.

Deciduous glabrous trees. *Leaves* usually crowded at the tips of the branches, alternate, odd-pinnate; leaflets sub-opposite, usually caudate-acuminate. *Panicles* terminal, spreading. *Flowers* small, polygamous. *Calyx* small, 4-5-fid, deciduous, lobes slightly imbricate. *Petals* 4-5, spreading, subvalvate. *Disk* cupular, broad, crenate. *Stamens* 8-10, inserted beneath the disk. *Ovary* sessile, free, 4-5-celled; styles 4-5, conniving; ovules solitary, pendulous in the cells. *Drupe* fleshy; stone hard, thick, 1-5-celled, the cells erect or diverging and opening by canals through the top of the stone. *Seeds* pendulous, testa membranous; embryo straight, cotyledons elongate plano-convex, radicle short superior.—*Distr.* About 8 species all tropical.

*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. butea*, 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.—*Distr.* Tropical Asia.

A small tree, everywhere glabrous. *Leaves* 1-1½ ft.; petiole slender; leaflets 2-9 by 1-4 in., shortly petiolulate, shining, more or less oblique; nerves 10-30 on each side, horizontal, joined by a strong intra-marginal one. *Panicules* large, spreading, sparingly branched. *Flowers* ½ in. dийm., scattered, uni- or bisexual. *Calyx* 5-toothed. *Petals* oblong, greenish-white. *Disk* broad, 10-toothed. *Filaments* short, subulate. *Drupe* 1½-2 in. long, yellow, smooth; flesh very austere; stone cavernous, usually with 1 (1-3) perfect seed.—The 'Amra' of the Hindoos, and the Hog-plum of many Europeans.


**Western Peninsula**; Malabar, *Heyne, Roxburgh*; in the Concan hills, near Kenney caves, *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.


*Nipa*, *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, $\frac{1}{2}$ 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 'gaub-serrate' but figures as obtusely serrate), and the subsolitary flowers on the branches with peduncles $\frac{3}{4}$ in. long, are quite unlike any *Spondias* I know.


BIRMA, 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*.


**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* 1½–2½ ft.; petiole cylindric, glabrous or pubescent; leaflets petiolulate, 5–7 by 1½–2½ in., usually rather falcate and oblique at the rounded or coriaceous base, gradually narrowed to the subacute apex, glabrous above, beneath glabrous puberulous or with tufts of hair in the nerve axils; nerves 10–12 pair, arching, reticulations close small; petiolule $\frac{1}{2}$ in. *Panicle* equaling or exceeding the leaves, pubescent or tomentose; pedicels slender, ebracteate. *Flowers* campanulate, $\frac{3}{4}$–1 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. syzygostrum*, 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.

Malabar; a very large tree; bark red within, aromatic. Leaves 4-5 by 2¾-3½ 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, obvoid, ob-tusely 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 pentenata 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 saramentose branches, the lower opposite; buds scaly. Leaves opposite, rarely 3-nate, y whorled, quite entire, sessile, exstipulate. Racemes axillary. Flowers small, green, hermaphrodite or polygamous. 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, papillose 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, tests 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 Phytolaccaceae, which should in this work have been placed in Thalamiflores.

Coriaria, Linn.

Character of the order.

1. C. nepalensis, Wall. Pl. As. Rar. iii. t. 289; Cat. 6317; leaves ovate or elliptic 3-7 nerved, stamens 10, carpels 5. Brandis For. Flor. 128.

Temperate and Subtropical Himalaya, from Marri alt. 3-600 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-
minate, 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 \( \frac{1}{3} \) in. diam. *Fruit* \( \frac{1}{2} - \frac{1}{3} \) 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. *Panicules* 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 parietal placentas. *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—**DISTRIBUTION** 3 species, natives of Western Asia and N. Africa.

A natural order of very doubtful affinity, which has been referred to near Resedaceae, Capparideae, Meliantheae, Violaricae, Polygalaceae, Leguminoseae, Bignoniaceae, and others.

**MORINGA**, Lamk.

Character of the order.


Forests of Western Himalaya and Oudh, and cultivated elsewhere throughout India.—**DISTRIBUTION**. 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, \( \frac{1}{4} - \frac{1}{3} \) in., opposite, pale beneath; petioles slender; glands linear, hairy. **Panicules** spreading, bracts linear. *Flowers* pedicelled, 1 in. diam., honey-scented. **Sepals** linear-lanceolate, reflexed. **Petals** narrowly spatulate. **Fertile filaments** villous at the base. *Ovary* hairy. **Pod** 9–13 in., pendulous, 9-ribbed. **Seeds** 3-gonous, winged at the angles.—The Horse-radish tree.

2. **M. concanensis**, Nimmo in Grah. Cat. Bomb. Pl. 43; leaflets 1–1\( \frac{1}{2} \) in. broadly elliptic or orbicular, nerves 4–6 pair distinct. Dalz. & Gits. 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 reteuse at the tip; the petals are yellowish streaked with pink. **Seeds** \( \frac{1}{3} \) 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* racemed 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 dehiscing, 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, hisrate, 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. *Seeds* 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.—**DISTRIBUTION.** 12 genera, all tropical.

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

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

**Connaracea ?** Wall. Cat. 8534, is *Dialium platysepalum*, Baker.

**Connaracea ?** Wall. Cat. 8550, is *Cupania glabra*, Kurz.

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

**Tribe I. Connaraceæ.** *Calyx* imbricate. *Seeds* exalbuminous.

*Calyx* not clasping the base of the capsule. *Seeds* exarillate . 1. *Aegelea."

*Calyx* accrescent, clasping the base of the sessile capsule.

*Seeds* arillate . . . . . . 2. *Rourea."

*Calyx* slightly accrescent, not clasping the base of the sessile capsule. *Seeds* exarillate . . . . . . 3. *Roureopsis."

*Calyx* not accrescent, clasping the pedicel of the stipitate capsule. *Seeds* arillate . . . . . . 4. *Connarus."

**Tribe II. Cnestideæ.** *Calyx* valvate. *Seeds* albuminous or exalbuminous.


1. **Aegelea**, Soland.

Erect or scandent shrubs. *Leaves* 3-foliolate. *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* 0-annular or 0. *Carpels* 1-5. *Capsules* 1-2; sessile or shortly stalked, coriaceous, rugose or lamellate. *Seeds* erect, exalbuminous; testa arilliform below the middle.—**DISTRIBUTION.** 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.—Distrib. Borneo.

Densely clothed with fulvous hairs. Leaves 3–6 by 1½–2½ in., lateral, sub sessile, terminal petiolulate; nerves beneath very stout, strongly reticulate. Racemes 1 in., slender, hirsute. Flowers ⅓ in. diam. Capsule ⅔ in. long, ovoid with a curved beak, strongly tuberculate or sublamellate, densely tomentose. Seed obovoid; testa thin, arilliform towards the base.

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. Connaraceae, Wall. Cat. 8544.

**Eastern Peninsula;** Singapore, Wall; Malacca, Griffith, Maingay.


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 5,4 usually imperfect; style slender. Capsule sessile, curved. Seed erect, arillate, exalbuminous.—Distrib. Tropics; species about 50.

* Leaflets few, 1–3-pairs, petiolulate, glabrous.


**Western Peninsula;** from the Concan to Travancor, Ceylon.

Leaves 2½–3 by 1½–2½ 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, ⅛ in.; bracts small. Flowers ⅓–½ in. diam. Petals twice as long as the linear-oblong sepals. Capsule falcate, ⅔ in., 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 very distinctly beneath, lower pair long ascending, base usually acute, sepals orbicular not ciliate, ovaries glabrous. Onestis monadelpha, Roxb. Fl. Ind. ii. 454. Connaraceae? Wall. Cat. 8549 (no fl. or fruit.). Connaraceae, Wall. Cat. 8547, 8548.

Assam, Sylhet, Chittagong, Birma and southwards to Tenasserim.—Distrib. 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** Mrs., 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 membranous leaflets 2–2½ in., of which the points are ½–¾ as long as the blade, finely reticulate, not shining. *Racemes* or panicles 1–2 in. *Flowers* ½ in. diam. *Capsule* ½–1 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 ½ in. long; they are uniformly reticulate on both surfaces without obvious principal nerves. *Panicles* very slender, often exceeding the leaves; pedicels ¼ 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.

5. **R. acuminata**, Hook. f.; quite glabrous, leaflets 3–4 pair elliptic or elliptic-oblong abruptly caudate-acuminate finely reticulate on both surfaces shining above subglabrous beneath, petiole very slender. *Cnestis* acuminata, Wall. Cat. 8533 (Connaraceae).

**Singapore**, Wallich.

Branches slender. *Leaves* 2½–6 in.; petiole quite glabrous, petiolules very short; leaflets 1½–3 by ½–1½ in., thinly coriaceous, brown when dry; base rounded. *Capsule* ½ in.—The specimens are very imperfect.

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

† *Leaflets* very pubescent beneath.


7. **R. villosa**, Planch. in *Linnaea*, xxiii. 422; branches petioles and inflorescence softly pubescent, leaflets 12–20 pairs ½ in. oblong rounded at the tip pilose beneath, panicles slender, pedicels equalling the calyx.

**Tenasserim**, at Mergui, Griffith, Hefner.—**Distrun**, Sumatra.

8. **R. fulgens**, Planch. in Linnaea, xxiii. 423; branches petioles leaves beneath and panicles densely shortly pubescent, leaflets 12–20 pairs in linear-oblong rounded at the tip base oblique, racemes strict contracted. Connaraceae, (Connaraceae?) Wall. Cat. 8524.

**Singapore, Wallich, Malacca.**

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, 2$\frac{1}{2}$ 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 $\frac{2}{3}$–3 in. linear-oblong rounded at the tip glabrous on both surfaces, racemes slender, pedicels equalling or exceeding the calyx, flowers $\frac{3}{4}$ in. diam. Connaraceae, Wall. Cat. 8525. *Connaraceae*, Vahl? Wall. Cat. 8526 D.

**Tenasserim** and **Martaban**; Amherst, Wallich; Tavoy, Gomez; Moulemein, 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* $\frac{3}{4}$ in. long, linear, glabrous. *Capsule* $\frac{1}{2}$–$\frac{3}{4}$ in. long, curved.—A specimen of this is mixed with Wallich's 8526 B.


**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* $\frac{1}{2}$–$\frac{3}{4}$ in. pointed.—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
pubescent or glabrare beneath, racemes slender, pedicels equalling the calyx. R. sororia and R. parallela, Planch. in Linnaea, xxiii. 421; Connnarus mimosoides Wall. ? Wall. Cat. 8526 C.

EASTERN PENINSULA, Penang, Porter; MALACCA, Maingay.—DISTRIB. Sumatra, Borneo.

Branchlets pubescent. Leaves 3-6 in.; petiole slender; leaflets cordate at the base, usually shining above with raised nerves, or with the nerves obsolete, subglabrous beneath. Racemes shorter than the leaves. Flowers ½ in. diam. Sepals broadly oblong, very pubescent. Petals twice as long. Capsule ½ in., much curved.

3. BOUREOPSIS, Planch.

Trees or shrubs. Leaves odd-pinnate, leaflets few. Flowers in axillary panicles, pedicels slender. Sepals oblong, slightly imbricate, somewhat enlarged and spreading, but not clasping the base of the capsule. Petals linear-oblong. Stamens 10, the alternate longer. Ovaries 5; styles slender. Capsule linear-oblong, recurved. Seed ovoid, tests thin black arilliform at the base; cotyledons amygdaloid.—DISTRIB. Species 2, a Javanese and Indian.

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

1. B. 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.

Leaves 4-8 in.; petioles slender; leaflets, 2-4 in., alternate, petiolulate, base acut; nerves distinct, arched. Panicles or racemes axillary, shorter than the leaves, nearly glabrous; pedicels ½ in. Flowers ½ in. diam. Sepals nerved, glabrous, very obtuse. Petals strap-shaped, three times as long. Ovaries pubescent. Capsule 1 in., nearly straight.

4. CONNARUS, Linn.

Trees or shrubs. Leaves odd-pinnate; leaflets 5, rarely 3 or more, quite entire. Panicles 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, tests shining, albumen 0; cotyledons amygdaloid.—DISTRIB. 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\(\frac{1}{4}\)-1\(\frac{1}{2}\) in., glossy, above, reticulations faint, quite glabrous, Panicles densely pubescent. Flowers \(\frac{1}{2}\) 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 Lamarck'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 Rheedc'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.

2. **C. Wightii**, Hook. f.; leaves elliptic-ovate obtusely pointed, nerves 5-6 on each side arched slender, capsule 1\(\frac{1}{2}\) by \(\frac{3}{4}\) in. compressed, base narrowed into the stalk shining hardly pointed. Rourea? sclerocarpa, W. & A. in Wight Cat. 934. (See note under Pongamia, W. & A. Prodr. 262.)

Western Peninsula, Wight; the Concan, Stocks.

Leaflets 3-3\(\frac{1}{2}\) by 1\(\frac{1}{4}\)-1\(\frac{3}{4}\) 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 \(\frac{3}{4}\) by \(\frac{3}{4}\) in. turgidly oblong rounded at the top, base cordate.

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

Leaflets 3-4 by 1\(\frac{1}{4}\)-1\(\frac{3}{4}\) in., finely reticulated, quite glabrous. Panicles rusty-pubescent. Flowers crowded, \(\frac{3}{4}\) in. long. Sepals ovate-oblong. Petals about twice as 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 capsule more or less pubescent or velvety within (unknown in C. Griffithtii 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\(\frac{1}{4}\) by 1\(\frac{3}{4}\) 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 3-5 by 1\(\frac{1}{4}\)-2\(\frac{1}{2}\) 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 \(\frac{1}{2}\) 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- or elliptic-lanceolate acuminate, nerves very indistinct.

**Tenasserim**, at Mergui, Griffith.

Branches slender. Leaflets 3–5 by ⅓–⅓ in., thinly coriaceous, finely pubescent with rusty hairs beneath, midrib distinct; nerves very faint, oblique. **Panicles** rusty-pubescent. **Flowers** ¼ 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** ½ in. long, white (Wallich). **Sepals** linear-oblong. **Petals** more than twice as long, narrow, linear-spatulate, 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** ⅓ in. long. **Sepals** linear-oblong, pubescent. **Petals** more than twice as long, nearly glabrous. **Panicles** twice 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.


Leaflets 3–5 by 1¼–2¼ in., quite glabrous; transverse venules distinct beneath. **Panicles** branched, rather slender. **Flowers** ½ in. **Sepals** ovate-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. Championi*, 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 1¼–2¼ in., thinly coriaceous, polished on both surfaces, reticulate beneath; petiole and petiolum slender. **Panicles** axillary and terminal, 4–6 in., minutely rusty-pubescent. **Flowers** ⅓ in. long. **Sepals** oblong, hairy. **Petals** twice as long, linear-ovate, 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 $\frac{1}{2}$ by $\frac{1}{4}$ in. shortly subcylindric very turgid abruptly contracted into the stalk, top rounded scarcely apiculate. Connaraceae ? 8546.

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

Leaflets 4—7 by $\frac{1}{2}$—3 in., coriaceous, quite glabrous; nerves 5 pairs, slender, arching, reticulations indistinct. **Panicles** widely spreading. **Flowers** $\frac{1}{2}$ 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 of Andaman Islands**, Hefner.

Branches and petiolules 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** $\frac{1}{2}$ 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 elliptic-ovate obtusely acuminate very coriaceous pale, nerves very faint, capsules 1—1$\frac{1}{2}$ by $\frac{1}{4}$ in. elliptic or subcylindric, stalk obscure.

**Eastern Peninsula**; Malacca, Maingay.

Branches rather stout, glabrous. Leaflets 5, 3—5 by $\frac{1}{2}$—2$\frac{1}{2}$ in., closely finely reticulated, opaque and pale grey on both surfaces. **Panicles** hoary-pubescent. **Flowers** $\frac{1}{2}$ in. long. **Sepals** small, ovate-lanceolate. **Petals** three times as long, linear, with black dot, hoary on both surfaces. **Capsules**, young, 1$\frac{1}{2}$ by $\frac{1}{3}$ in., terete, grooved at both sutures, top rounded and mucronate, striæ 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 subcylindric and $\frac{1}{4}$ in. diam.; the shorter are ellipsoid and $\frac{1}{2}$ in. diam.; a few are 2$\frac{1}{2}$ in. long, curved and more distinctly stalked, as in Blume's *falcatus*.

13. **C. oligophyllus**, Planch. in Linnean, xxiii. 427; leaflets elliptic-lanceolate obtusely acuminate lower 2—3 pairs of nerves prominent beneath, panicle hoary-pubescent, capsule $\frac{1}{2}$—1$\frac{1}{2}$ by $\frac{1}{3}$ in. fusiform-clavate symmetrical apiculate obscurely stalked grooved on one face. Connaraceae, Wall. Cat. 8542 (in part) and 8539, D (in part).

**Penang**, Porter.

Branches and leaves quite glabrous. Leaflets 5, 4—7 by $\frac{1}{2}$—2$\frac{1}{2}$ 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** $\frac{1}{2}$ 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 8539 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, panicle slender hoary, sepals ovate-lanceolate, petals glabrous.—Singapore or Penang, Walker.

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

Connarus?  velutinus, Wall. Cat. 8538, consists of foliage and diseased fruit of a Spatholobus, with one capsule of Elliptanthus tomentosus, H. f.

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

Connarus?  Mimosoides, Vahl Symb. iii. 87; D.C. 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 racemose, tomentose, rarely panicked, 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; styles short, stigmas capitellate.  Capsules 1–3, kidney-shaped, cylindrical curved or waved, pubescent, often villous or clothed with rigid hairs within.  Seed exarillate, albumen fleshy; cotyledons thin.—Disturb.  Tropical Asia and Africa; species about 10.


A climbing shrub.  Branches stout, woody.  Leaves 1 ft.; petiole slender, pubescent; leaflets subobovate, 1 1/2–3 in., sometimes contracted below the middle, glabrous and shining above; nerves 6–10 pairs, slender, arching.  Panicles axillary, fascicled, slender, much shorter than the leaves, densely clothed with pale soft tomentum.  Flowers 2–3 in. diam., rosy, 2 smaller.  Sepals linear-oblong, obtuse.  Petals shorter in the 2, longer in the 3, linear-oblong, obtuse or emarginate, glabrous.  Filaments slender, glabrous.  Ovaries 5–7 (usually 6, Griffith), hispate; styles short.  Capsules 1–3 in. long, sessile, falcate, enlarged and tumid above the middle, obtuse, woody, rugose; 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, subrect, 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, stigmate; style short. Capsule stalked, oblique, velvety; valves glabrous within. Seed arillate; albumen 0; cotyledons plano-convex.—DISTRIB. 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. Connamus 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 OF ANDAMAN ISLANDS; Helfer.—DISTRIB. 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 ½-½ in., pubescent; Flower-buds; ½ 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 ½ in., densely pubescent, linear-oblong. Capsules 2-1 in., obvoid 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** monophyllus, Wall. Cat. 8651 (Connaraceae).

**Pegu, Martaban, and Tenasserim, Wallach, &c.—Distrib. Siam.**

Branches densely tomentose with fulvous hair. Leaflets 4-6 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 ½ to ¾ in. **Racemes** ½ 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 stalk stalk, obtuse, apiculate, densely velvety, sutures rounded, valves woody, glabrous within.

5. **E. Griffithii**, Hook. f.; leaves ovate-lanceolate candate-acuminate rusty-pubescent beneath, nerves 8-10 pairs strong beneath.

**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 ½ to ¾ in. **Racemes** ½ in., few-flowered. **Capsule** 2 in. long, curved, semicircular, beaked, densely clothed with rustyle velvety tomentum, stalk very short, valves woody, glabrous within.

**Order I. 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 panicked; 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 deccimate; 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. Podaleticæ.** **Stamens** free. **Pod** dehiscent. **Leaves** digitate.

Shrub with connate stipules...

Herbs with free stipules...

1. **Piptanthus**.

2. **Thermopsis**.

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

** Anthers dimorphous. Keel petals firmly cohering:

| Leaflets entire, subsessile. | 3. Rothia. |
| Keel obtuse. | 4. Argyrolobium. |
| Calyx 2-lipped | 5. Lotozonis. |
| Calyx subequally 5-toothed | 6. Helyndia. |
| Keel beaked. | 7. Priotropis. |
| Pod flattened. | 8. Crotalaria. |
| Flowers in terminal racemes | 10. Trifolium. |
| Pod turgid | 11. Parochetus. |
| Leaflets toothed, stalked | 12. Trigonella. |
| ** Leaves pinnately 3-foliolate. |
| Petals persistent, adnate to the staminal tube | 13. Melilotus. |
| Petals caducous, free from the staminal tube | 14. Medicago. |
| ** Leaves pinnately 5-foliolate. |
| Pod elongated, straight or recurved | 15. Lotus. |
| Pod short, round, or oblong | 16. Caryopsis. |
| Pod falcate or spiral | 17. Indigofera. |
| ** Leaves basifixed. |

Tribe III. Trifoliae. 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 | 10. Trifolium. |
| Petals caducous, free from the staminal tube | 11. Parochetus. |
| ** Leaves pinnately 3-foliolate. |
| Pod elongated, straight or recurved | 12. Trigonella. |
| Pod short, round, or oblong | 13. Melilotus. |
| Pod falcate or spiral | 14. Medicago. |

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

| ** Leaves basifixed. |

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

* Anthers apiculate. Hairs fixed by the centre.

| Stamens diadelphous | 17. Indigofera. |
| ** Anthers obtuse. Hairs basifixed. |

| Pod few- or many-seeded, subindehiscent or late in dehiscing. Filaments filiform. | 19. Collutea. |
| Pod membranous, inflated | 20. Millettia. |
| Pod woody or very firm | 21. Mundulea. |
| Filaments dilated | 22. Tephrosia. |
| Pod linear or oblong, not septate. Calyx very oblique | 25. Trigoniella. |
| Keel long, obtuse | 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 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, muricately
decurrent.
- 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.

**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.
- *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 panicked 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.

- Shrub 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 spurred. Flowers dimorphic
- Standard not spurred. Flowers uniform
- Style flattened upwards. Calyx truncate

** Stamens monadelphous. Stipules and bracts minute caducous.

Anthers uniform, all fertile
- Alternate anthers abortive


Keel exceeding the wings and standard.
- Anthers dimorphous
- Anthers uniform
- Standard exceeding the keel and wings
- Standard and keel equal; wings short


* Stamens diadelphous.

Herbs.
- Two upper calyx-teeth not fused
- Two upper calyx-teeth fused into one.
  - Keel nearly straight
  - Keel semicircular

Shrubs.
- Pod 1-seeded, not winged
  - Flowers small, panicked
  - Flowers large, racemose
  - Pod many-seeded, winged

** Stamens monadelphous.

Upper lip of calyx projecting.
- Upper teeth of calyx not projecting.
  - Pod oblong, turgid, 1-2-seeded
  - Pod linear, flat, many-seeded

Subtribe IV. _Euphaseolæae_. Leaves not gland-dotted. Stamens diadelphous. Style bearded below the stigma.

* Stigma oblique.

Keel spiral
- Keel not spiral. Style filiform
- Keel not spiral. Style flat upwards

** Stigma terminal.

Petals very unequal in length
- Petals equal in length. Pod flattish
- Petals equal in length. Pod square, 4-winged
Subtribe V. Cajaneae. Leaves gland-dotted below; stipelle 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.
Aril absent.
Pod without depressed lines between the seeds.

** Ovules 1-2.

Calyx-teeth accrescent.
Calyx-teeth not accrescent.
Funiculus at the end of the hilum.
Funiculus centric on the hilum.
Leaves pinate. Pod compressed.
Leaves digitate. Pod turgid.

Tribe IX. Dalbergieae. Stamens monadelphous or diadelphous. Pod continuous, indehiscent. Leaves odd-pinnae.

* Leaflets distinctly alternate.

Flowers small, white or reddish.
Flowers large, yellow.

** Leaflets opposite:

Pod flat, almost woody, wingless.
Pod flat, thin, firm, winged down one or both sutures.
Pod round, subdrupaceous.


Leaves simple. Bract and bracteoles large, opposite, persistent.
Leaves odd-pinnae. Bracts and bracteoles small, caducous.
Stigma terminal.
Pod moniliform.
Pod equal, flat, membranous.
Stigma oblique.
Pod indehiscent, flattish, narrowly winged.
Pod turgid, dehiscent, fleshy or coriaceous.

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

Tribe XI. Eucalypinarieae. Leaves ample, abruptly bipinnate.

* Calyx-disk sub-basal; sepals imbricated.

Sutures of pod not winged.
Both sutures of pod winged.
Upper suture of pod winged.
Pod samaroid.

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

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

See also MEZONEUENON, § Tubicalyx.

102. WAGATEA.

Tribe XII. Cassieæ. Leaves simply pinnate. Calyx-tube short; disk subbasal.

Petals 5. Anthers mostly dehiscing by a terminal pore . . . . . 103. Cassia.
Petal 1. Stamens diadelphous (9 and 1) . . . . . 105. Sindora.
Petals none.
Stamens 2. Leaves equally pinnate . . . . . 106. Dialium.
Stamens 10. Leaves equally pinnate.
Sepals usually 5 . . . . . . . . 107. Hardwickia.
Sepals 4 . . . . . . . . . . 108. Crudia.


Petals none . . . . . . . . . . 109. Saraca.
Petals 3–5.
Stamens diadelphous (9 and 1) . . . . . 110. Amherstia.
Stamens monadelphous, only 3 developed . . . . . 111. Tamardinus.
Stamens 5, free, equal . . . . . . . . 112. Humboldtia.
Stamens 5–8, free . . . . . . . . . . 113. Afzelia.

Tribe XIV. Bauhinieæ. Leaves simple, mostly deeply 2-lobed.

114. Bauhinia.

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

Tribe XV. Mimoseæ. Stamens definite, usually ten.

* Anthers at first gland-crested.

Herbs with flowers in round heads . . . . . 115. Neptunia.
Tree with flowers in round heads . . . . . 116. Xylica.
Shrubs or trees with flowers in spikes.
Climber with tendrils . . . . . . . . . . 117. Entada.
Erect without prickles . . . . . . . . . . 118. Adenanthera.
Erect prickly.
Pod turgid with a thick mesocarp . . . . . 119. Prosopis.
Pod thin, coriaceous, finally twisted . . . . . 120. Dichrostachys.
Pod long, thin, flat . . . . . . . . . . . . 121. Piptadenia.

** Anthers not gland-crested.

Stamens 10.
Calyx-teeth imbricate. Stamens monadelphous . . . . . . . 122. Parkia.
Calyx-teeth valvate. Stamens free.
Pod ligulate, coriaceous, continuous.
Underneath with clavate stigma . . . . . . . 123. Desmanthus.
Tree with capitate stigma . . . . . . . . . . 124. Leucena.
Pod jointed . . . . . . . . . . . . . . . . . 125. Mimosa.
Stamens 5 . . . . . . . . . . . . . . . . . 126. Acrocarpus.

Tribe XVI. Acacieæ. Stamens indefinite.

Stamens free . . . . . . . . . . . . . . . . . 127. Acacia.
Stamens monadelphous.
Leaves bipinnate.
   Pod thin, ligulate, the sutures not thickened.
   Pod large, turgid, oblong, indehiscent, the sutures not thickened.
   Pod rather falcate, the sutures much thickened.
   Pod circinate.
Leaves simply pinnate.

1. PIPTANTHUS, D. Don.
A shrub. Leaves digitately 3-foliolate. Flowers racemted, 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, 8–10-ovulate; style filiform, incurved; stigma minute terminal. Pod linear, flattened, continuous within.—Distr. A single endemic species.


Temperate Himalaya, from Simla to Bhotan, alt. 7–9000 ft.
A shrub 6–10 ft 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, racemced. 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, oo-ovulate; style filiform, incurved; stigma minute terminal. Pod turgid, linear or oblong, straight or falcate, continuous within.—Distr. Species 12, China, Japan, N. America.


Temperate and Subalpine Himalaya, from Kashmir and Kunawar 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, ½–5 in. broad, 1–6-seeded.
Thermopsis.]

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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, oo-ovulate; style short, straight, filiform, stigma capitate minute. Pod linear, slender, nearly straight, compressed, continuous within.—Distrib. Two species, the other Trop. African.


Tropical plains from BUNDUKUND 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 oblanceolate-oblong, obtuse, minutely mucronate, rather fleshy, silky, \( \frac{1}{2}–\frac{3}{4} \) 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 1½–2 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, slit 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, oo-ovulate; 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, ½-3 in. long. **Flowers** 1-6 in leaf-opposed racemes on peduncles that exceed the leaves. **Calyx** ½-1 in.; teeth shorter than the limb. **Pod** densely silky, 6-8-seeded, ½ in. broad.—**Cytisus tanguineus**, 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. flaccidum*, but nearly or quite glabrous. **Stipules** the same; petioles as long as or shorter than the leaves; leaflets ½-3 in. long, often nearly as broad, point truncate or emarginate. **Peduncles** 1-4-flowered, exceeding the leaves. **Calyx** ½ in., glabrous; teeth of upper lip exceeding limb. **Corolla** yellow tinged with red; standard longer than upper lip of calyx. **Pod** glabrous, 10-18-seeded, ½ 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, 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, ½ ft. or less high. **Stipules** minute lanceolate, deciduous; petiole as long as leaf; leaflets oblanceolate, rather fleshy, obtuse, minutely mucronate, ½-⅜ in. **Flowers** 1-5, subsessile in axils of most of the leaves. **Calyx** silky, ⅝-⅞ 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
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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 Gangatic plain and Scinde to Ceylon. A prostrate more or less silky much-branched herb. Leaves close-set, alternate, simple, subsessile, cordate-ovate, 1/2–1 in. long, more produced in the lower half. Flowers in the axils of most of its leaves, subsessile, solitary. Corolla yellow, 4–6 in. Pod silky, 3–4 in. long.

7. PRIOTROPIS, W. & A.

Calyx-tube campanulate; teeth subequal. Corolla much exserted; standard roundish; wings obovate-oblong; keel broad, with a long distinct ascending beak. Stamens monadelphous; anthers dimorphous. Ovary distinctly stalked, oö-ovulate; 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 1 in., finely silky; teeth lanceolate, as long as the tube. Corolla pale yellow, glabrous, 2–3 times the calyx. Pod 1 in. by 1 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 3folicate, very rarely odd-pinnate. 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.

Sect. I. ARENARICE, 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. Cambay, in the desert region, Dalzell.—Distrib. Afghanistan and Belocharistan.

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

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


Plains of the Peninsula and Ceylon.—Distrib. Java.

A silky trailing annual, with stems 1-1 1/2 ft. long. Leaves close, subsessile, densely silky, ovate or roundish, 1/4-1 in. long, obtuse, mucronate; stipules minute, usually 0. Pedicels 2-4 times leaves, 1 or closely 2-flowered. Calyx 1/2 in., densely silky; teeth long, upper lanceolate, lower linear. Corolla yellow, scarcely exserted. Pod compressible, 1/4-3 1/2 in. long, short-stalked.


Carnatic, Dindygul hills and Courtallum, *Wight, G. Thomson.*

Habit, vestiture, leaves, in florescence, 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. Peduncles copious, rigid, 3-5 times the leaves, glabrous; flowers distant if more than one; bracts persistent, reflexed. Calyx 1/3 in. long, finely silky; teeth long, all lanceolate. Corolla yellow, exserted; standard erect, veined, round, 1/3 in. broad. Pod short-stalked, 1/3 in. long.


Ava; Mount Prumo, Wallisch.

Stems slender, copiously branched, thinly silky when young. Leaves short-stalked, membranous, pale, subacute, 1-2 in. long, glaucous below; stipules small, spreading,
foliosaceous. *Peduncles* very slender, sometimes pseudo-terminal by the development of leaves from their nodes; flowers if two distant. *Calyx* ⅓ in. long; teeth deep, lanceolate. *Corolla* yellow, not distinctly exserted. *Pod* short-stalked, ⅓-⅔ 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, ¼–1 in. long, obtuse or subacute, pale, membranous, more broadly rounded on the lower side. Peduncles thread-like, rigid, clothed with long hairs, rarely two-flowered, often leafy downwards, longer than the leaves. Calyx ¼ in., densely silky; teeth long, linear. *Corolla* yellowish, scarcely exserted. *Pod* short-stalked, ⅓ in. long.

7. **C. Stockiil**, 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 Helfer's Tenasserim and Andaman collection.

*Stems* slender, very copiously branched, 1–1½ ft. *Leaves* short-stalked, obtuse, ¼–1½ in. long, membranous, equally narrowed on both sides at the base. *Peduncles* filiform, 2–3 times the leaves; bracts subulate. Calyx ¼ in.; teeth long, linear. *Corolla* yellow, slightly exserted. *Pod* sessile, ⅓ in. long, finally black.


*Herb. Stocks*, probably from **Concan**.


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 Wildl. 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, ⅔–1 ft., clothed with short adpressed or spreading silky yellow-brown hairs. *Leaves* nearly sessile, ⅓–1½ in. long, obtuse, pale, glaucous below, produced (cordate) on the lower side at the base. *Peduncles* finely silky, usually twice the leaves. Calyx ¼ in., densely silky; teeth linear, long. *Corolla* yellow, not exserted. *Pod* nearly sessile, ⅓–⅔ 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, 1–2 in. long. Peduncles arcuate, densely silky, usually 2–3 times the leaves, sometimes leafy below; pedicels cernuous, lower as long as the calyx. Corolla yellowish, not exerted. Pod short-stalked, ½ in. long.


**NIPAL** to **ASSAM**, ascending to 5–6000 ft.; **AVA, MARTABAN, Ceylon.**—Distr. 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. Corolla 2–3 in., nearly equal; teeth long, upper lanceolate, lower linear. Corolla not distinctly exerted. Pod short-stalked, 1–1½ in. long.

Var. **B. pilosissima**, Benth. MSS.: leaves and flowers larger, calyx and bracts densely clothed with longer bright yellow-brown silky hairs.—**Khasia**; 3–5000 ft., **Hook. fil. & Thomson**.


**BENGAL** to **AVA** and **TENASSERIM.**—Distr. Java, Philippines.

Stems slender, a foot long or more, thinly clothed with spreading silky hairs. Leaves nearly sessile, obtuse, glaucous-green, membranous, thinly silky, ½–1 in. long, rounded on the upper, cordate on the lower side at the base; stipules persistent, reflexed. Peduncles equaling or exceeding leaves; bracts small, persistent, reflexed. Corolla 2–3 in., densely silky, teeth linear, very long. Corolla not exerted. Pod sessile, 1½–2 in. long.


Tropical region, **NILOHIBIS** 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 equaling or much exceeding the leaves; pedicels cernuous, exceeding the bracts, shorter than the calyx. Corolla yellow, slightly exerted. Pod short-stalked ½–1 in. long.—The plant figured under this name in Wight’s *Icones* t. 31 from Courtallam has much larger flowers and is probably a distinct undescribed species.

Crotalaria.\] L. \textit{Leguminosae}. (J. G. Baker.) 69


Tropical region, CENTRAL HIMALAYA, \textit{Royte, Edgeworth, Thomson; BUNDELKUND, Edgeworth; WESTERN PENINSULA, Heyne, Wight.}

Very near the last. Leaves more membranous, always acute, 1–2 in. Peduncles shorter, more slender, often leafy, densely clothed with short spreading silky hairs. \textit{Calyx} \(\frac{3}{4}\) in., densely pubescent. \textit{Corolla} yellow, distinctly exserted. Pod just the same in shape and size.


Tropical regions of the \textbf{WESTERN PENINSULA} and \textbf{CEYLON}.

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


\textbf{CEYLON}, alt. 3–5000 ft., \textit{Gardiner, Thwaites, \&c.}

The most robust and showy species of the section. Leaves distinctly stalked, subcoriaceous, dark green, glandular, punctate, usually 1–2 in., but reaching in a narrow-leaved form 4–5 in. Peduncles \(\frac{3}{4}\) foot, stout, arcuate, densely clothed like the stem with short spreading brown hairs; pedicels cernuous, \(\frac{1}{2}\) in.; bracts reflexed, persistent. \textit{Calyx} \(\frac{1}{2}–1\) in., inconspicuously downy; teeth lanceolate, very long. \textit{Corolla} yellowish, equaling the calyx; standard nearly 1 in. broad, veined with dark purple. Pod short-stalked, \(\frac{1}{2}–2\) in. long, densely clothed with dark brown silky hairs.

\textbf{SECT. III. \textit{Alata}}, \textit{Benth.} Diffuse or suberect pubescent perennials. Leaves simple. Stipules recurrent as a persistent wing to the branches. Racemes all lateral, leaf-opposed 1–3-flowered. Pod stipitate linear-oblong glabrous.


\textbf{KUMAO\ N to ASSAM} and the \textbf{KHASIA} \textit{Mts.} ascending to 5500 ft.; \textit{AV\A, Wallich, Misem, Griffith; Pegu, McLelland.}—\textbf{DISTRIB. JAVA.}

A suberect under-shrub 1–2 ft. high. Stem and leaves below clothed with short silky pubescence. Leaves subsessile, much thinner than in \textit{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. \textit{Calyx} \(\frac{3}{4}\) in., densely silky; tube campanulate; bracteoles inserted above the base. \textit{Corolla} pale, not exserted. Pod linear-oblong, glabrous, \(\frac{1}{2}–1\frac{3}{4}\) in. long, 30–40-seeded.

18. \textbf{C. rubiginosa}, \textit{Wild. Sp. Pl.} iii. 978; diffuse, stipular wing narrow, leaves small round-ovate obtuse coriaceous, peduncle short not leafy, pod short-
Nilghiris up to 4000 ft.

A spreading shrub with stems 1-1 foot long, densely shorty 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 3-3 in., densely silky. Corolla yellow, not exserted. Pod oblong, 1-1 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—Nilghiris and Ceylon.

Var. 2. Wightiana; stems suberect much more robust than in the type, leaves thinner more silky larger reaching 2-3 in. long 1-2 in. broad, corolla and calyx 3-4 in. long, pod 1-2 in. long, 30-40-seeded. C. Wightiana, Grab. in Wall. Cat. 5358; A.; W. & A. Prodr. 181—Nilghiris 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. 5366; W. & A. Prodr. 189.

Western Peninsula; Bombay to Courtallum.

Stems under half a foot high, with copious ascending branches clothed with adpressed brown silky hairs. Leaves subsessile, firm, obtuse, 4-3 in. long, densely silky. Racemes very copious, short-stalked, 1-2 in long. Calyx campanulate, silky 3 in deep; teeth deep, all linear. Corolla yellow, scarce exserted, Pod 3 in long, thinly silky, 4-3-seeded.—The smallest of all the species.


Dekkan, near Hyderabad.

A diffuse annual with slender branches, thinly clothed with short spreading hairs. Leaves short-stalked 3-4 in, moderately close, rounded at the base. Flowers crowded at the end of leafy branches; pedicels very short. Calyx 3 in., densely silky; teeth long, all linear, acuminate. Corolla scarce exserted. Pod oblong, 15-20-seeded.

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

21. C. mysorensis, Roth; DC. Prodr. ii. 126; annual, densely silky, stipules linear persistent, leaves linear-oblong obtuse, racemes terminal and lateral laxly 6-9-flowered, bracts lanceolate foliaceous, pod subsessile glabrous twice the calyx. Wall. Cat. 5361; W. & A. Prodr. 182. O. stipulacea, Roxb. Fl. Ind. iii. 204. C. hirsuta, Roxb. in E. I. C. Mus., t. 1596.

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 $\frac{1}{2}$–$\frac{3}{4}$ in. deep, densely clothed with long silky hairs; teeth all long, acuminate, upper lanceolate, lower linear. Corolla yellow, not exserted. Pod oblong, 1–1 $\frac{1}{4}$ 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 $\frac{1}{2}$–$\frac{3}{4}$ in. deep, thinly silky; teeth long all linear, acuminate. Corolla pale yellow, $\frac{1}{2}$ in. long; standard ovate, pointed. Pod oblong-cylindrical, $\frac{1}{2}$ 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 in the West Himalayas. Birma, Wallich, Pegu, McClelland. Tenasserim, Hefler.—Distrib. 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, $\frac{1}{4}$ in., finally $\frac{3}{8}$ in. long, thinly silky; teeth long, 3 lower linear acuminate, upper broader often subobtuse. Corolla pale yellow, glabrous, scarcely exserted. Pod oblong-cylindrical, $\frac{1}{2}$–$\frac{1}{2}$ in. long, 6–12-seeded.


** Pod included or very slightly exserted.**


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 $\frac{1}{4}$–1 in., moderately firm, thinly silky above, densely so below, base subcuneate, stipules 0. Bracts and bracteoles minute, subulate; upper flowers often quasi-umbellate. Calyx $\frac{1}{2}$–$\frac{3}{4}$ 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, Graham. in Wall. Cat. 5371—Birma, Wallich, Griffith.

**Tropical region:** Sikkim, alt. 1–4000 ft. **Western Peninsula**, Ceylon, Brina, 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 4–1 ft. long; bracts and bracteoles subulate, very minute. *Calyx* ½–1 in. long, densely bilabiate, 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, ½–1½ in., cuneate in lower half, retuse or emarginate at apex, glabrescent above, thinly silky below; stipules 0. *Racemes* 6–12-flowered, ½–1 ft. long, usually distinctly stalked; bracts and bracteoles linear, very minute. *Calyx* ½–1 in. long, shortly velvety, lower teeth linear. *Corolla* pale yellow, glabrous, equaling the pod. Pod sessile, glabrous, 9–12-seeded.


**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, glancous and obscurely silky beneath; stipules setaceous very minute. Terminal *racemes* 6–20-flowered, ½–1 ft. long; bracts linear, minute. *Corolla* ½–¾ in. deep, densely clothed with short brown silky hairs; upper teeth oblong-spathulate, ½–¾ in. broad. *Corolla* glabrous, deep violet-blue, as long as the calyx. Pod glabrous, sessile, 10–15-seeded.


**Tropical region,** from the Himalayas to Ceylon, ascending to 5,500 ft. in Kumaon.—**Distrib.** Tropical Africa, Malay Isles, China, N. Australia.
L. LEGUMINOSÆ. (J. G. Baker.)

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 ¾-1 in. long, persistently densely clothed with long brown silky hairs; lower teeth lanceolate-acuminate, upper ob lanceolate, ½-¾ in. broad. Corolla glabrous, pale yellow, shorter than the calyx. Pod sessile, glabrous, ½-¾ in. long, 20-30-seeded.


Upper Punjab and along the base of the Himalayas to Assam, ascending to 5,500 ft. in Kumaon; Binna, Walkieh; Peso, McLeodand.—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, 2-20 to a raceme, close; racemes reaching 6-9 in. long; bracts and bracteoles long, setaceous, persistent. Calyx ¾-1 in. long, brown silky hairs long and dense, but not as much so as in calyxina; 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. 180; annual, laxly silky, leaves linear or ob lanceolate obtuse or subacute, flowers 3-6 densely capitdate all terminal, calyx middle-sized, teeth long upper lanceolate, pod oblong as long as calyx. Benth. in Hook. Lond. Journ. ii. 566 (not of Roxb.)

Upper Gangetic Plain, Concana, Malabar, Peso, 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 ¾-1 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.

32. C. dubia, Grah. in Wall. Cat. 5404; annual, shortly silky, leaves obovate cuneate subacute, flowers 12-30 in dense terminal heads, calyx small densely silky, teeth all long acuminate, pod oblong as long as calyx. Benth. in Hook. Lond. Journ. ii. 568.
I. \textit{herbaceous}, \textit{Calyx C. foot teeth bracts Anamaiats, bracts stipules upper 178 stipules Bacie'}


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

\item **36. C. neriifolia,** \textit{Wall. Cat. 5362;} shrubby, bracts linear very minute, calyx-teeth lanceolate. \textit{Benth. in Hook. Lond. Journ.} ii. 560.

**AVA:** mount Taong Dong, Wallich.

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

Crotalaria.]

L. Leguminose. (J. G. Baker.)

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

General habit of C. peduncularis. Leaves narrow-linear, short-stalked, reaching 5–6 in. Racemes laxly 12–20-flowered, finally a foot long; lower pedicels 2–3 in. long; bracts reflexed, shorter than the pedicels. Calyx $\frac{1}{3}$ in.; teeth one-third the tube. Corolla smaller than in the last; standard the same shape and colour. Pod $\frac{1}{2}$–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. Disturb. China, Malayia, 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, oblong-oblong, moderately firm, cuneate at the base, 1$\frac{1}{2}$–3 in. Racemes laxly 12–20-flowered; pedicels shorter than calyx. Calyx $\frac{1}{2}$–$\frac{1}{3}$ 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 oblong-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 $\frac{1}{4}$ in.; teeth lanceolate, twice campanulate tube. Corolla half as long again as calyx, generally purplish. Pod 1–2 in. long, distinctly stalked, $\frac{3}{2}$–$\frac{1}{2}$ 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. Burmanni, DC. Prodr. ii. 126? C. sericea, Burm. Fl. Ind. t. 48, fig. 1 ?

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

General habit just that of the two preceding, to which it is allied closely. Leaves oblong-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 $\frac{3}{4}$ in.; teeth lanceolate, twice campanulate tube. Corolla $\frac{4}{5}$ in. deep, golden-yellow. Pod $\frac{1}{2}$–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 Concan.

General habit of the three preceding, to which it is closely allied. Leaves oblong-lanceolate-oblong, subcoriaceous, 3–4 in., cuneate at the base, clothed beneath with thick white silky pubescence. Racemes rather densely 20–30-flowered, reaching ½ ft. long; bracts like those of *C. sericea* but smaller; lower pedicels as long as the calyx. Calyx ⅔ in.; teeth lanceolate, twice campanulate tube. Corolla yellow, ⅓ 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.

43. **C. formosa**, Gr. in Wall. Cat. 5393; branches and calyx densely silky, stipules lanceolate minute, leaves obtuse glabrous above densely silky beneath, bracts linear silky persistent, corolla not exserted. W. & A. Prodr. 186; Wt. Io. t. 981; Benth. in Hook. Lond. Journ. ii. 481.

Nilghiris.

Dwarfer and more branched than the four preceding, with woody stems densely clothed with grey or yellow-brown silky hairs. Leaves oblong-lanceolate-oblong, 2–3 in. moderately firm, short-stalked, cuneate at the base. Racemes very dense, 1–2 in., long; pedicels ⅔–⅗ in., densely silky. Calyx shaggy, ⅓–⅔ in.; teeth deep, lanceolate-deltoïd. Pod oblong, 1½–1½ in. long, distinctly stalked.

44. **C. barbata**, Gr. in Wall. Cat. 5394; shrubby, stipules 0, leaves oblong-lanceolate-oblong subacute thinly silky above densely silky beneath, racemes simple 6–12-flowered, bracts minute lanceolate, pedicels as long as calyx, pod stalked. W. & A. Prodr. 181; Wt. Io. t. 980; Benth. in Hook. Lond. Journ. ii. 483.

Nilghiris; Travencor, 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 ⅔–⅗ in., densely silky, not bracteolate at the middle. Calyx ⅔ in., deeply bilabiate, densely shaggy with dark brown silky hairs; teeth of lower lip linear, equaling limb. Corolla scarce exserted. Pod 1½ in. long by half as broad, 15–20-seeded.

45. **C. longipes**, W. & A. Prodr. i. 183; shrubby, stipules 0, leaves obovate-oblong rather obtuse both sides minutely silky, racemes copiously panicked, bracts foliaceous ovate, pedicels as long as calyx, pod stalked. Benth. in Hook. Lond. Journ. ii. 483.

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 ⅔ in., densely clothed with brown silky hairs, deeply bilabiate; lower teeth reaching half way down. Corolla ⅔–⅔ 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. pegovana**, 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.

**Pod**; near Rangoon, McClelland.

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 ⅔ in.; teeth long, linear-lanceolate. Corolla scarcely exerted. Pod cylindrical, ⅔ 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 oblong-lanceolate-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 ⅔ in. deep, densely coated with bright brown velvety hairs; teeth linear, all very long. Corolla bright yellow, not exerted. Pod 1⅓-2 in. long, half as broad.

48. **C. lanata**, Bedd. in Madr. Journ. iii. 178; *Pl. Ind. Or. t. 105*; shrubby, stipules foliaceous ⅓-lunate, leaves large oblong, racemes not panicked, bracts minute lanceolate, pedicels short, pod stalked.

**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 ⅔-⅔ in. long, densely silky; teeth linear-lanceolate, twice the tube. Corolla yellow, much exerted. Pod 'glabrous' (Beddome) oblong, 1⅓-1⅔ in. long.

**Sect. VII. Eriocarpace**, 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 racemose.*


Copiously branched, scarcely shrubby, 2-3 feet high. Branches at first puberulent, soon glabrescent. Leaves thin, obscurely downy beneath, reaching 4-6 in., usually acute. Racemes moderately close, 12-20-flowered, ⅓ foot or more long; bracts linear, very minute; pedicels equaling or shorter than calyx. Calyx ⅔ in., obscurely
downy; teeth lanceolate, twice tube. *Corolla* twice calyx, yellow, white and blue. Pod finely pubescent, 1–1¼ in. long, 10–12-seeded.


Tropical Region; Nilghiris.—Distr. Java.

More shrubby than *C. verrucosa*. Branches subsalute 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. Inflorescence like that of *C. verrucosa*; bracts minute, subulate; pedicels ¼–½ in., finely downy. Calyx ¾–1 in., more or less densely puberulent; teeth linear, twice the campanulate tube. *Corolla* ¾–1 in., bright yellow. Pod 1½–2 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 petiolate, 3–4 in., narrowed at both ends, hardly at all puberulent; stipules smaller. Inflorescence and bracts identical; pedicels ¼–½ in., slender, faintly puberulent. Calyx ¼ in.; teeth lanceolate, very deep. *Corolla* slightly exserted. Pod 1½–1½ in. long, clothed with deciduous fine pubescence, 10–12-seeded.

52. **C. leptostachya**, *Benth. in Hook. Lond. Journ.* ii. 562; branches angular, stipules 0 or minute subulate, leaves lanceolate acuminate, racemes lateral and terminal not panicled, pod oblong sessile densely velvety 2–3 times the calyx.

Western Peninsula; Concan, Jacquemont, Stocks, Law.

A stiff erect shrub with the habit and slender subulate thinly silky branches of *C. juncea* and *tetragona*. 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 ¾ ft. long; bracts lanceolate very minute. Calyx ¼ in., densely silky; teeth linear, very deep. *Corolla* yellow, not exserted. Pod 5–6-seeded, ¾–3 in. long.


Kumaon (up to 3500 ft.), and along the Himalayas to Sikkim and Assam. Prov. McClelland.—Distr. Java.

A stiff shrub, reaching 6 ft. high, with subulate thinly silky slender erecto-patent branches. Leaves short-stalked, distant, membranous, both sides thinly silky or glabrescent, reaching ¾–1 ft. Racemes laxly 6–10-flowered, half a foot or more long;
bracts minute, linear. Calyx ½-1 in. long, densely brown-velvety; teeth very long, linear or lanceolate, acuminate. Corolla lemon-yellow, glabrous, little exserted. Pod 1½-2 in. long, densely persistently dark-brown and velvety, 12-20-seeded.


Plains from the Himalayas to Ceylon, but often planted for its fibre. *Birma*, *Wallis.*; *Psev*, McClelland.—Distr. Malay isles, Australia.

A stiff shrub several feet high, with slender vignet rigid thinly silky branches. Leaves rather distant, firm, linear or oblong, usually 1½-3 in., shining on both sides with thin short brown silky hairs. Racemes loosely 12-20-flowered, reaching a foot long; bracts minute, linear. Calyx ½-3 in. long, densely clothed with ferruginous velvety hairs; teeth linear-lanceolate, very deep. Corolla bright yellow, glabrous, slightly exserted. Pod 1-1½ in. long, clothed with short-spreading persistent silky hairs, 10-15-seeded. Yields Sun fibre.

55. **C. obtecta**, Gram. 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.* 186; *Jas.* 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 ½-1 in., densely velvety, deeply bilabiate; teeth linear. Corolla slightly exserted; standard silky on the back. Pod 1½-2 in. long, 10-12-seeded, densely coated with dark brown velvety pubescence.


**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 panicked Eriocarpe. Calyx ½ in. deep, densely silky, deeply bilabiate; teeth narrow, acuminate, two upper lanceolate. Corolla ½ 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 panicked, bracts round spreading persistent,
Carnatic; Dindygul hills alt. 2000 ft., Wight.

General habit and indorseness just as in C. madurensis, to which it is closely allied. Leaves thinner, narrowed to a point, less rounded at the base, 2–4 in. long. Branches densely clothed with short spreading silky hairs; bracts sometimes opposite, ½ in. long, densely silky on the back. *Calyx* ½–1 in. deep, finely silky; teeth lanceolate, acuminate, with reflexed borders. *Corolla* 2–3 in.; standard rather pointed, silky on the back. Pod oblong, stalked, twice the calyx, with 12 or more seeds.


Maisor, the Concan, Nilghiris, and Ceylon.—Distrib. Java, Sumatra, and naturalised in the Seychelles and Mauritius.

A stiff erect shrub 3–5 feet, copiously paniculately branched. Branches densely clothed with short brown silky hairs. Leaves nearly sessile, subcoriaceous, 3–4 in. long, obtuse or subacute, cuneate at the base, shining on both sides, with a silky lustre from minute hairs. Branches elongated with several bracts flowerless. *Calyx* ½–1 in. deep, densely silky, with a pair of conspicuous bracteoles; upper teeth oblong, lower lanceolate. *Corolla* 3–1 in.; standard rather pointed, densely silky on the back. Pod thinly silky, sessile, about as long as the calyx.


Nilghiris.

A stiff erect shrub 3–4 ft. high, copiously paniculately 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; pedicels short, densely silky. *Calyx* ½–1 in. long; upper segments oblong, lower lanceolate; standard silky on the back. Pod oblong, bright brown, sessile, as long as the calyx.

60. **C. lunulata**, Heyne in *Wall. Cat.* 5378; leaves oblanceolate acutely loosely silky, stipules small obtuse, racemes panicled, bracts copious persistent like the stipules, calyx-teeth narrow, corolla twice the calyx, pod oblong 1-seeded scarcely exerted. *W. & A. Prodr.* 183; *Wight Lc.* t. 480; *Benth. in Hook. Lond. Journ.* ii. 564.

Tanjore, in the Carnatic; Ceylon.

A stiff erect undershrub, copiously paniculately branched, clothed with dense spreading brown silky hairs. Leaves short-petioled, moderately firm, densely silky, cuneate at the base, usually 1–2 in. Branches elongated, with numerous amplexicaul reflexed small bracts below the flowers. *Calyx* densely silky, 3–½ in. long; teeth long, all linear, the edges slightly recurved. *Corolla* 2–7½ in.; standard rather pointed, thinly silky on the back. Pod sessile, finely silky, as long as the calyx.

61. **C. ramosissima**, Roxb. Fl. Ind. iii. 268; leaves small oblanceolate densely silky, stipules 0, racemes panicked, bracts lanceolate persistent, calyx-teeth narrow, corolla little exerted, pod 1-seeded scarcely exerted. *W. & A.*

WESTERN PENINSULA, Rottler, Heyne; interior of BENGAL, Roxburgh.

Shrubby, erect, much branched. *Stems* a foot or less high, densely coated, like the leaves, with thick silky brown hairs. *Leaves* crowded, subsessile, subobtuse, 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 viscid on the face. *Calyx* 3⁄4 in. long; teeth long, linear, with reflexed edges. *Corolla* 3⁄8 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 ft high, with very numerous stiff ascending branches, clothed with loose brown silky hairs. *Leaves* 1–11⁄2 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 viscid edges like the bracts and bracteoles. *Corolla* 3⁄8–3⁄4 in.; standard very silky on the back. *Pod* oblong, sessile, finely silky.


Tropical region, from the WEST HIMALAYAS to CEYLON and BURMA, ascending to 6000 ft. in Kashmir.—Distr. Malay isles, Afghanistan, China and Australia.

A diffuse *perennial*, with slender much-branched stems, 1–11⁄4 ft. long, thinly silky upwards. *Stipules* setaceous, very minute, deciduous; *leaflets* 3⁄4–1 in. long, retuse emarginate, glabrous above, obscurely silky below. *Racemes* copious, terminal and leaf-opposed; peduncles exceeding the leaves; bracts minute, linear. *Calyx* thinly silky, campanulate, 3⁄4 in. deep; *teeth* linear, exceeding the tube. *Corolla* yellow. *Pod* 1 in. long, glabrescent.

**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. Willetoviana**, DC. Prodr. ii. 134; herbaceous or suffruticos, *vol. ii.*
branches often stiff clothed with short fine down, petiole shorter than the small ob lanceolate leaflets, racemes 3-6-flowered, corolla thrice the calyx. _W. & A. Prodr. 191_; _Benth. in Hook. Lond. Journ. ii. 579._ _C. spartioides_, _Spreng.; Wall. Cat. 5435. _C. genistoides_, _Willd. Sp. Pl. iii. 987, non Lamk._

**Western Peninsula.**

Perennial, reaching 2-3 ft. high, with very numerous ascending elongated branches. _Stipules_ small, setaceous, persistent; leaflets 3-4 in. long, firm, obtuse, emarginate, silky on both sides. _Racemes_ copious, terminal and lateral; bracts minute, linear, setaceous, persistent. _Calyx_ 3 in. long, finely downy; teeth linear, exceeding the tube. _Corolla_ yellow; keel with a narrower and longer beak than in the last. _Pod_ pubescent, \( \frac{3}{4} \) 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, \( \frac{1}{2} \)-1 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_ 3 in. long, finely silky; teeth linear, twice the length of the tube. _Corolla_ yellow, glabrous. _Pod_ subquadrangular, sessile, thinly silky, \( \frac{3}{4} \) in. long.


**Nilgiris and Pulney Mountains.**

Branches firm, ascending, terete, clothed with minute grey silky hairs. _Stipules_ setaceous, \( \frac{1}{2} \) in.; petioles shorter than the leaflets; leaflets cuneate in the lower half, reaching 1-1\( \frac{1}{4} \) 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, \( \frac{3}{4} \) in. long; teeth lanceolate, equalling the tube. _Corolla_ yellow; keel with a very long beak. _Pod_ \( \frac{1}{4} \) in. long, subquadrangular, 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 \( \frac{3}{4} \) in. long. _Racemes_ copious, close, all terminal; bracts linear, very minute. _Calyx_ \( \frac{3}{4} \) in. long, thinly silky; teeth lanceolate, equalling the tube. _Corolla_ yellow, glabrous; beak of keel long and narrow. _Pod_ \( \frac{1}{4} \) in. long, thinly silky.

**Group 9. Trifoliolatae Polyspermae.** Leaves 3-foliate. _Pod_ oblong or cylindrical, stalked or sessile, glabrous or pubescent, many-seeded. Herbs or shrubs.
Crotalaria.]     L. LEGUMINOSAE. (J. G. Baker.)  


Plains throughout the Western Peninsula.—Distr. Abyssinia. Perennial, with spreading slender copiously-branched stems, 1-1½ ft. long, clothed with short spreading brown hairs, which are bulbous at the base. Stipules linear, persistent; petiole ¼-1 in.; leaflets 1-1½ in. long, moderately firm, glabrous above, thinly clothed with long hairs below. Lateral racemes numerous, 3-12-flowered; bracts large, ovate-acuminate, reflexed; pedicels filiform, 3-4 times the calyx. Calyx ½ in. long; teeth linear, long. Pod ½-2 in. long, 8-10-seeded, with a stalk as long as the calyx.—The only representative of the Diffusae in the trifoliolate series.


Plains of the Western Peninsula.

A small shrub, with long slender terete erecto-patent branches, finely downy or glabrescent. Stipules minute, setaceous, deciduous; petiole as long as leaves; leaflets ½-1½ in. long, green and glabrous above, pale and obscurely silky below. Racemes subcorymbose at the end of copious branchlets; pedicels cernuous, bracteolate, thinly silky. Calyx ¾ in. deep, thinly silky; teeth lanceolate, as long as the tube. Corolla yellow, ¾-1 in.; keel with a very long beak. Pod ½-2 in. long, 8-10-seeded, with a stalk as long as the calyx.


KUMAO; 5000 ft., Strachey and Winterbottom, Edgeworth; CEYLON, Gardiner, &c. Perhaps naturalised only.—Distr. Malay isles, Trop. Africa and America, common.

An undershrub, 2-4 ft. high, with robust terete branches, the whole plant, including calyx and pod, clothed with fine spreading brown silky hairs. Stipules setaceous, minute; leaflets 1½-2 in. long, very obtuse, cuneate in the lower half, membrane. Racemes closely 12-20-flowered, reaching 6-10 in. long. Calyx ¾ in. long; teeth long, lanceolate. Pods deflexed, rather recurved, 1½ in. long, 20-30-seeded.


CARNATIC; Dindygul hills, Wight. A low shrub with acutate ascending terete glabrescent branches. Stipules setaceous, very minute; petiole shorter than the leaflets; leaflets thick, rather fleshy, obtuse, cuneate in the lower half, pale, subglabrous. Racemes 20-30-flowered, shortpeduncled, reaching ½ ft. long. Calyx campanulate, thinly silky, ⅗ in. long; teeth lanceolate, as long as the tube. Corolla yellow, glabrous, ¾ in. long. Pod deflexed, rather recurved, 10-12-seeded.

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

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BHOTAN, CHITTAGONG, BIRMA, PEGU, TENASSERIM.—Distrib. Malay isles, Philippines.

A low shrub with elongated flexuose slender finely downy or glabrescent branches. Stipules setaceous, very minute; pediole 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 ½ in. long, finely silky; teeth lanceolate, as long as tube. Corolla pale yellow, 3-4 in. long. Pods deflexed, rather recurved, hard, 8-10-seeded, densely clothed with spreading pale brown hairs.


HIMALAYAS to Ceylon and Malacca.—Distrib. 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; pediole 2-3 in.; leaflets membranous, 3-4 in. long, usually subobtuse, green and glabrous above, pale and obscurely silky below. Racemes 20-50-flowered, reaching ½ ft. long. Calyx ½ in. long, thinly silky; teeth lanceolate, as long as the tube. Corolla glabrous, yellow striped with red. Pods deflexed, rather recurved, ½-2 in. long, 20-30-seeded.


WESTERN PENINSULA, CEYLON, MALACCA.—Distrib. Philippines and Malay isles.

A low shrub with slender elongated terete branches. Stipules 0; pediole 2-3 in.; leaflets membranous, glabrous, 1-2 in. long, cuneate at the base. Racemes terminal and lateral, ½-1 ft. long; pedicels exceeding the calyx. Calyx glabrous, turbinate, ½-¾ 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 1½-2 in. long, 20-30-seeded; gynophore filiform, ½-1 in. long, much exceeding that of any other species.

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

75. *C. quinquefolia*, Linn.; DC. Prodr. ii. 135; herbaceous, branches and leaves below thinly silky, leaflets linear, bracts linear thinly silky, lower pedicels at last as long as the calyx. Roxb. Fl. Ind. iii. 279; Dals. & Gibs. Bomb. Fl. 57; Wall. Cat. 5429; W. & A. Prodr. 194; Ill. t. 16—Rheeve Hort. Mal. ix. t. 28.

WESTERN PENINSULA, CEYLON, BIRMA, TENASSERIM.—Distrib. Malay isles, Philippines.

An erect annual 2-4 ft. high, with robust straight sulcate branches. Stipules linear, subpersistent; pediole 1-3 in.; leaflets usually 5, rarely 3, linear, rarely narrow oblanceolate, 2-4 in. long, obtuse, glabrous above. Racemes usually terminal,
laxly 10–20-flowered, reaching ½ ft. long; bracts persistent, as long as the pedicels. Calyx campanulate, subglabrous, ⅓ in. long; teeth lanceolate, as long as the tube. Corolla glabrous, twice the calyx. Pod oblong, glabrous, distinctly stalked, ¼–2 in. by ½–1 in., 30–40-seeded.—C. heterophylla, L. DC. Prodr. ii. 131, is a trifoliate form.

76. **C. Grahamiana**, W. & A. Prodr. 194; shrubby, branches and leaves below densely clothed with adpressed silky hairs, leaflets obovate-lanceolate, bracts linear, thin, silky, 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 8–4 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, ½–4 ft.; bracts ¼–2 in., acuminate, reflexed, persistent. Calyx just like that of C. quinquefolia. Corolla yellow, glabrous, half as long again as the calyx. Pod linear-oblong, 1¼–2 in. long, distinctly stalked.

77. **C. digitata**, Hook. Bot. Misc. ii. 354, suppl. t. 16 (C. quinquefolia); shrubby, branches and leaves on both sides clothed with loose soft tomentum, leaflets obovate-cuneate, bracts lanceolate tomentose, pedicels twice the calyx. W. & A. Prodr. 194, non Wight in Wall. Cat. 5430.

**Carnatic**; Madura hills, Wight.

A low shrub; the whole plant, except calyx and corolla, clothed with loose soft pale brown velvety tomentum. Stipules ½ in. long, linear-setaceous, reflexed, persistent; petiole 2–3 in.; leaflets 3–5, thick and soft, cuneate in the lower half, very obtuse, the end one reaching 2¾–3 in. long, ⅓ in. broad, the outermost sometimes unequal-sided. Racemes terminal and lateral, short-peduncled, closely 12–20-flowered; bracts lanceolate acuminate, densely velvety, patent, persistent. Calyx glabrous, ⅓–⅔ in. long; teeth lanceolate, as long as the tube. Corolla yellow, glabrous, 1 in. long. Pod linear-oblong, 2–2½ in. long.

**C. Elliptica**, Roxb. in Wall. Cat. 5433 (C. Vachellii, H. & A.), and C. Vasculosa, Gral. 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.

Undershubs 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, turbid, 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 ⅓ 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. *Stamens* 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 *Garrwath*, 4–6000 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 subcominate. *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. *Stamens* diadelphous; filaments not dilated; anthers uniform. *Ovary* sessile, linear, ax-ovulate; style elongated, glabrous, suddenly incurved above the base, stigma terminal. *Pod* linear, turgid, continuous within. A single species.

**Trigonella.**] L. *LEGUMINOSAE.* (J. G. Baker.)


Alpine, Temperate and Subtropical Himalaya from Simla and Garwhal to Assam, alt. 4-18,000 ft. Nilghiris, Ceylon, Birma, Wallich; Tenasserim, Parish.—Distribs. Java, Zambesi-land.

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

12. **Trigonella**, Linn.

Annual herbs. Leaves pinnately 3-foliolate, 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-oblong, compressed or subterete, not spiral, usually exserted, many-seeded, continuous within.—Distribs. 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.—Distribs. 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-setaceous. Corolla slightly exserted. Pod elliptical, scarcely exserted, glabrous, usually 2-seeded.

** Pod long, turgid.**


Kashmir, Punjab, Upper Gangetic Plain, &c.—Distribs. South Europe and Orient, widely cultivated.

Annual, robust, erect, subglabrous. Stipules not laciniated; leaflets toothed, $\frac{1}{3}$-$\frac{1}{4}$ in. long, obovate-oblong. Flowers 1-2, sessile in the axils of the leaves. Calyx $\frac{1}{3}$-$\frac{3}{4}$ 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.—Distribs. West Siberia, Orient, South Europe to Spain.

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


Included amongst Wallich's plants, with the habitat of Tikari (Hamilton), but a doubtful native of India proper.—*Distrib.* Afghanistan, Egypt, Nubia, Cape.

Annual, glabrous. *Stems* cespitose, diffuse, 1 ft. or more long. *Stipules* broad, deeply cut; *leaflets* obovate-cuneate, shallowly toothed, ⅓–⅕ in. long; base deltoid, entire. *Racemes* close, equalling or falling short of the leaves, terminated by a spine. *Calyx* short-pedicellate, under ⅒ in. deep; *teeth* lanceolate, shorter than the tube. *Corolla* three times the calyx. *Pod* ⅓–⅙ in. long, much curved, 4–6-seeded.

***Pod linear or linear-oblong flat.***

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

*Kashmir*, *Kumaon*, Guriwal, &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, ⅓–⅔ in. long, finely inciso-dentate, veins raised. *Peduncles* filiform, exceeding leaves, ending in a conspicuous awn. *Calyx* ⅔ in.; *teeth* setaceous, as long as the tube. *Pod* ⅓–⅜ in. by ⅔ in., marked with distinct rather close transverse veins.


*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, ⅓–⅔ in. long. *Peduncle* as long as the leaves, not ending in an awn. *Calyx* ⅔ in.; finely downy; *teeth* linear-setaceous, exceeding the tube. *Pod* downy at first, ⅓–⅘ in. by ⅕–⅔ in.; *veins* transverse, distinct, very close.


*Kashmir* to *Nical*, alt. 4–10,000 ft.—*Distrib.* Afghanistan, Persia, Orient.

Habit and inchorescence 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. *Corolla* glabrous, ⅓–⅔ in.; *teeth* linear, as long as the tube. *Pod* ⅓–⅔ in. by ⅝–⅞ in., glabrous, with close distinct raised veins.

Bengal, Kashmir and Ladak to Kumaon, alt. 5–12,000 ft.—Distr. 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-cuneate, faintly inciso-dentate, $\frac{1}{3}$–$\frac{1}{2}$ in. long. Peduncles exceeding the leaves, awned at the tip. Calyx $\frac{3}{4}$ in.; teeth shorter than the tube. Pod $\frac{3}{4}$–$\frac{1}{2}$ in. by $\frac{1}{2}$ 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 exserted, indesigmate.—Distr. Species about a dozen; spread through the temperate regions of the Old World.


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

Stems slender, 1–1 1/2 ft. high. Stipules linear acuminate; leaflets obovate or oblanceolate, retuse or emarginate. Flowering-racemes close; fruiting-racemes 1–2 in. long. Calyx $\frac{3}{4}$ in.; teeth deltoid. Corolla not more than $\frac{1}{2}$ in. long. Pod $\frac{3}{4}$–$\frac{1}{2}$ in., obscurely reticulate-lacunose, usually 1-seeded.—M. parviflora, Wall. 5943 D, is M. italica, 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.—Distr. Europe, Orient, Siberia, &c.

Much taller and more robust than the last. Stipules and leaflets similar. Racemes in flower 1 1/2–2 in., in fruit 3–4 in. long. Calyx under $\frac{1}{2}$ 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.—Distr. Europe, Orient, &c.

Very like M. alba in general habit and identical in stipules and leaflets. Racemes denser, and not quite so long. Calyx $\frac{3}{4}$ 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 exserted, free
from the staminal tube; standard and wings oblong; keel straight, obutse. Stamens diadelphous; filaments filiform; anthers uniform. Ovary sessile, usually many-ovuled; style short, little incurved; stigma oblique. Pod usually spirally twisted, many-seeded, indehiscent, rarely sickle-shaped, in *M. lupulina* one-seeded.—*Distrib. Species about 40; spread principally round the Mediterranean.*

*Subrect, perennial.*


*Kashmir, Ladak, Kunawar, &c.; alt. 5–13,000 ft.—*Distrib. Afghanistan, Orient, and all through Europe.


**Diffuse trailing annuals or biennials.**


Tropical and temperate tracts of the north-west, ascending from the Indus valley and Ganges 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 obvate, 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.


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

Stems glabrous, very slender, reaching a foot long. *Leaflets* ½–3 in. long, ovate-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 muricated 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 laciniosa. Leaflets 1-3 in. long, obovate-cuneate, finely toothed. Peduncles short, closely 2-6-flowered, not awned. Calyx 1/12 in.; teeth lanceolate, as long as the tube. Pod with 2-4 spirals, the veined face 3-1/3 in. broad without the spines, which are 1/3-1 in. long in the type, but reduced down to mere tubercles in the var. M. apiculata, Willd.


Kashmir, alt. 5,000 ft., D. Thomson.—Distr. Afghanistan, Orient, Medieter-ranean, Abyssinia, Europe.

Finely downy, the stems under 1/3 ft. long. Petioles as long as the leaflets, which are obovate-cuneate, 1/3-1 in. long, distinctly toothed. Peduncles as long as the leaves, closely 2-5-flowered, not muriciculata. Calyx 1/12 in., finely downy; teeth linear-setaceous, as long as the tube. Corolla distinctly exserted. Pod 3/8 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 incurved shortly beaked keel. Stamens disdelphous, filaments dilated at the apex; anthers uniform. Ovary sessile, many-ovuled; style long, abruptly inflexed, stigma terminal. Pod linear, turbid, seate between the seeds.—Distr. Species 50 or more, spread through North and South temperate regions.

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


Wesl 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 trifoliolate leaf, at the end of a long peduncle. Calyx 1/4 in.; teeth lanceolate-cuspidate. Corolla showy, 2-3 times as long as the calyx. Pod cylindrical, straight, 3/4-1 in. long.

Var. minor: a dwarf form, from the plains of Scinde with solitary flowers and flimsy leaflets 3/4 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 Oononis, to which genus it also approaches by its slightly dimorphic anthers. Stems 4-1 ft., copiously stiffly branched, covered like the leaves with short grey tomentum. Leaflets pale, flimsy, 3/4-1 in. long, obovate-cuneate. Flowers copious, inconspicuous. Calyx 1/4 in., densely downy; teeth linear, twice the tube. Corolla not exserted. Pod linear, straight, 5-6-seeded, 3/4 in. long.
16. CYAMOPSIS, DC.

Erect annuals, with 3-foliate 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; anthers uniform, apiculate. Ovary sessile, linear, 6–8-ovuled; style short, filiform, much incurved, stigma capitate. Pod linear, straight, subtetragonal, 2-valved, septate between the seeds.—

DISTR. Species 2, the other Arabian and trop. African.


Plains from the Himalaya to the Western Peninsula, but often, perhaps always, cultivated.—DISTR. 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-foliate; leaflets ovate, acute, inciso-dentate, 2–3 in. long. Flowers 6–30 in copious close short-peduncled axillary racemes; bracts setaceous, protruded. Calyx ½–1 in. Corolla scarcely exerted. 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-canescence. 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; anthers uniform, apiculate. Ovary sessile, usually many-ovuled; style short incurved, stigma capitate usually penicillate. Pod usually linear-cylindrical, rarely oblong or globose, turgid, rarely flatish, in one section crescent-shaped, densely muricate.—DISTR. Species 250–300, spread through all tropical regions and also abundant at the Cape.

SUBGEN. 1. Acanthonotus, Benth. Pod recurved, sickle-shaped, 1-seeded, muricate along the ventral suture.


Plains of Ceylon and the Western Peninsula.—DISTR. Guinea.


2. I. linifolia, Retz.; DC. Prodr. ii. 222; Roxb. Fl. Ind. iii. 370; Cor. Pl. t. 196; Wall. Cat. 5489; W. & A. Prodr. 198; Wight Ic. t. 313; Dalz. & Gös. Bomb. Fl. 58; Boiss. Fl. Orient. ii. 188. Sphaeridiophora linifolia, Desv. Journ. Bot. iii. 125, 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-hairy. Stems slender, copiously branched both at the base and upwards, \( \frac{1}{4} \) to 1 ft. Leaves simple, subsessile, \( \frac{1}{2} \) to 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 subsessile racemes. Calyx \( \frac{1}{2} \) in., silvery; teeth long, linear-setaceous. Corolla bright red, 2–3 times the calyx. Pod hard, mucronate, silvery, under \( \frac{1}{4} \) in. thick.

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

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


Plains throughout India proper, ascending to 4000 ft. in the Chenab valley.—Distr. Afghanistan, Belochistan, Nubia, Malay Isles, N. Australia.

A copiously branched diffuse annual with stems \( \frac{1}{4} \) to 1 ft. long. Leaves subobtuse with a mucro, flexuous, \( \frac{1}{2} \) to 1 in. long, obscurely downy above, densely below; stipules setaceous, minute. Heads copious, 4–8-flowered. Calyx \( \frac{1}{2} \) in. densely downy; teeth long, setaceous. Corolla bright red, not exserted. Pod under \( \frac{1}{2} \) in. long, pubescent, casually 1-seeded.


Plains of Concan, Dalseil, Stocks.

Perennial, greenish in shade, obscurely silvery in exposure. Stems very flexuous, trailing, 1 ft. or less long, slender, acutely triquetrose. Leaves firm, \( \frac{1}{2} \) to 1 in. long, narrowly or slightly rounded at both ends; stipules setaceous, persistent. Racemes short-peduncled, finally an inch long. Calyx \( \frac{1}{4} \) in., canescence; teeth long, setaceous. Corolla \( \frac{3}{4} \) in., bright red. Pod \( \frac{1}{2} \) to \( \frac{3}{4} \) in. long, turbid, glabrous, the flattened sutures margined by acute keels.

5. I. caloneura, Kurz in _Journ._ _Asiat._ Soc. Beng. 42, 2, 229; shrubby, fulvo-puberulous, leaves small petioled elliptical with veins beneath much raised, racemes short close, pods unknown.

_Prev._ Kurz.

An erect branched shrub. Leaves \( \frac{1}{2} \) to 1 in., rounded to both ends, mucronulate, chartaceous, glabrous above, glaucous beneath and softly pubescent below; petiole as long as blade; stipules minute, linear-subulate. Racemes usually shorter than leaves; peduncle \( \frac{3}{4} \) in.; bracts subulate, moderately long. Calyx broad, short. Corolla \( \frac{3}{4} \) in., probably rose. Ovary densely silky.

6. I. Brunoniana, _Grah._ in _Wall._ Cat. 5491; shrubby, argenteo-canescence, leaves large petioled oblong, racemes close elongated, pods cylindrical, many-seeded. _Wall._ Fl. _As._ Rar. t. 279. _Birma._ Mount Prome, Wallis.

Branches long, virgate, terete, slender. Leaves oblong, casually 3-foliolate, firm, conspicuously veined below, 3–5 in. long, obtuse or subacute; stipules deciduous; petioles \( \frac{1}{4} \) to 1 in. Racemes short-peduncled, copious, reaching 4–5 in. long. Calyx oblique, argenteo-canescence, \( \frac{3}{4} \) in. long; teeth short, deltoid. Corolla \( \frac{3}{4} \) in., bright red; standard thinly canescence. Pod turbid, 2 in. long, thinly canescence, recurved at the tip.

7. **I. glandulosa**, Willd.; DC. Prodr. ii. 223; thinly pubescent, not at all argenteo-canescent, leaves distinctly petioled always 3-foliolate, corolla 3-4 times the calyx, pod 1-2-seeded. Roxb. Fl. Ind. iii. 372; Wall. Cat. 5461; W. & A. Prodr. 199; Wright Ic. t. 330; Dalz. & Gibbs. Bomb. Fl. 58. I. frumentacea, Roxb. MSS.

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 oblanccolate, membranous, 1-1 in. long, green above, hairs adpressed obscure, pale glaucous with conspicuous black dots below. **Heads** 1/4-1 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. Sykeii, Herb. Griff., globose, 1-seeded.


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

Annual; stems cespitose, trailing, much branched, 1-1 in. long. Leaves 1/3-1 in. long; leaflets firm, alternate, oblanccolate; stipules linear; petiole 1/2 in. long. **Heads** 1-2-foliolate, always sessile, round or oblong, 12-20-flowered. **Calyx** 1/4 in.; teeth long, setaceous. **Corolla** red. **Pod** 1/4 in. long, cylindrical, silvery-hoary, torulose.


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

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

Group 3. Digitalae. Leaves digitate or nearly so, rarely 1-foliolate, sessile. Flowers solitary, pedicellate.

10. **I. uniflora**, Hamilt. MSS.; herbaceous, branches very slender, pedicels exceeding the leaves as long as the pod. Roxb. Fl. Ind. iii. 374; Wall. Cat. 5446; W. & A. Prodr. 199; Wright Ic. t. 333; Dalz. & Gibbs. Bomb. Fl. 58.

Plains of the Western Peninsula and Carnicart.

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


Plains of Carnicart and Ceylon.
Indigofera.] L. LEGUMINOSE. (J. G. Baker.)

A low undershrub, with copiously spreading rigid terete branches and argentoe-eanescenct branchlets. Leaflets 1-5, pale green, with a few obscure adpressed hairs, ob lanceolate, \( \frac{1}{4} \) in. long, often complicate. Pedicels erecto-patent, \( \frac{1}{4} \) in. Calyx and corolla like that of I. uniflora. Pod straight, glabrous, turgid, \( \frac{1}{4} \) 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 & cit. 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.—Distr. Trop. Africa.

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

13. I. tenuifolia, Rottl.; W. & A. Prodr. 200; branches and pod with only a few adpressed hairs, leaflets 7-9 ob lanceolate, racemes 3-6-flowered. Dals. & Gils. Bomb. Fl. 58.

Plains of the Western Peninsula and Ceylon.

General habit of I. pentaphylla, which it approaches closely. Leaves \( \frac{3}{4} \) 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, \( \frac{1}{4} \) in. long, 8-10-seeded, distinctly torulose.


Branches densely cespitose, 1-3 ft. high, more robust and woody than in the two last, persistently densely viscous throughout. Leaves \( \frac{3}{4} \) \( \frac{1}{4} \) in. long; leaflets membranous, opposite, pale green above, very glaucous below, with persistent adpressed bristly hairs; stipules setaceous, minute; pediole \( \frac{1}{4} \) 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, \( \frac{1}{4} \) \( \frac{1}{4} \) in. long, 10-12-seeded, faintly torulose.

15. I. pedicellata, W. & A. Prodr. 200; branches and pod glabrescent, leaflets 3 ob lanceolate-oblong, racemes 6-12-flowered. Wight & cit. 983.

Nilghiris and Pulney hills.

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

* Leaflets 3-5.


**Himalayas** (ascending to 4000 ft. in Kumaon) to **Ceylon**, **Tennessee**, **Helfer**.—**Distrob.** Java, China, Philippines, North Australia.

**Perennial.** Stems copiously branched, trailing or suberect, 1-2 ft. long, soon glabrescent. **Stipules** minute, setaceous; petiolo shorter than the leaflets, which are always 3, digitate, oblong-spatulate, ¼-1 in. long, grey-green above, glaucous below with black dots. **Racemes** 6-12-flowered, usually shorter than the petiole. **Calyx** ¼-½ in.; teeth long, setaceous. **Corolla** red, 3-4 times the calyx. **Pod** deflexed, ¼-½ 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 petiolo, and leaves with short spreading soft brownish hairs. **Petiolo** ¼-½ in.; leaflets crowded, obovate, soft, thick, obtuse, ¼-½ 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**; **Birma**.—**Distrob.** Trop. Africa, Malay isles, North Australia.

An undershrub, 2-3 ft. high, with firm slender branches, soon glabrescent. **Stipules** minute, setaceous; petiolo ¼-½ in.; leaflets always 3, the end one 1-1½ in. long, the side ones opposite. **Racemes** 6-12-flowered, usually sessile, seldom over an inch long. **Calyx** ¼-½ in., white-setaceous; teeth long, setaceous. **Corolla** purplish-red, twice the calyx. **Pod** deflexed, ¼-1½ in. long, the firm glabrescent valves obtusely keeled.

19. **I. subulata**, Vahl; DC. Prodr. ii. 232; suffruticose, branches and membraneous leaves thinly clothed with adpressed grey hairs, leaflets 5 obvolute 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, ½-1 in. long. Peduncles 1-2 in. long; racemes 20-40-flowered, reaching 4-6 in. long. Calyx ½ in.; teeth setaceous. Corolla lilac, 2-3 times the calyx. Pod 1-2 in. long, subtetragonal from the raised keel of the valves.


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, ⅓-1 in. long, clothed with minute adpressed deciduous grey hairs, the valves broadly rounded.


Bundelkund, Edgeworth.

General habit, leaves and flowers of the two preceding. Leaflets 1-1½ in. long, pale grey-green. Racemes peduncled, 30-50-flowered, reaching 4-6 in. long, much exceeding the leaves. Pod ½-3 in. long, deeply constricted between the seeds, with a beak which is gradually narrowed into the style.


Plains from Scinde and the Upper Ganges to Ceylon.—Distrib. Java, Belochistan, Arabia, Trop. Africa.

A shrub reaching 4-6 ft. high, with copious woody branches. Leaflets firm, ob lanceolate-oblong, ½-1 in. long, sometimes solitary on the branches; petiole short, but distinct. Racemes short-peduncled, 20-50-flowered, reaching 3-4 in. long. Calyx silvery, ⅜ in.; teeth lanceolate-cuspidate, as long as the tube. Corolla red, 3-4 times the calyx, thinly silvery externally. Pod ½-3 in. long, glaucous, distinctly turulose.

**Leaflets many, opposite (except *I. endocaphylla*); flowers small.


VOL. II.

A suberect copiously-branched annual, 1–2 ft. high, with slender finely canescent stems. Leaves short-petiolated, 1½–2 in. long; leaflets membranous, ½–1 in. long, obtuse or subacute, thinly argentecanescens; 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, 1–2½ 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.


Annual or biennial, suberect, reaching 2–4 ft. high, the pubescence grey or brown. Leaves short-petiolate, 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 exserted. Pod ½–1 in. long, densely clothed like the branches.

26. I. semitrijuga, Forsk.; DC. Prodr. ii. 230; suffruthicose, densely argentecanescens, 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, ½–1 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, Stockes.—Distrit. Arabia, Egypt, Abyssinia.
A shrub several feet high, with succulent woody branches. Leaves 1–2 in. long; leaflets opposite, subcoriaceous, persistently argentous, $\frac{1}{2}$–1 in. long; petiole $\frac{1}{4}$ in.; stipules minute, setaceous. Racemes subfasciculate, 12–20-flowered, shorter than the leaves, $\frac{1}{2}$–1 in. long, and recurved. Calyx $\frac{3}{4}$ in., campanulate, argentous; teeth deltoid, cuspitate, as long as tube. Corolla $\frac{1}{4}$ in., reddish-yellow, externally canescent. Pod $\frac{3}{4}$–$\frac{1}{2}$ in. by $\frac{3}{4}$ in., at first argentous, finely glabrescent, distinctly torulose.

Var. carules; leaves 2–3 in. long, leaflets 7–9 less argentous than in the type, racemes more elongated 1–2 in. long, pod less decidedly torulose. I. carules, Roxb. Fl. Ind. iii. 377; W. & A. Prodr. 203; Wl. Ind. t. 386; Dals. & Gbbs. Bomb. Fl. 59. I. trichocarpa, Graham. in Wall. Cat. 5476. I. brachyacarpa, Graham. 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, membraneous, turning blackish when dried; petiole $\frac{1}{4}$ in. Racemes lax, nearly sessile, 2–4 in. long. Calyx $\frac{3}{4}$ in., silvery; teeth as long as the tube. Corolla $\frac{3}{4}$ in., reddish-yellow. Pod $\frac{1}{2}$–1 in. long, $\frac{3}{4}$ 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. fuscida 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 tetraquetrosubtorulose 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, $\frac{1}{2}$–$\frac{1}{2}$ in. long. Racemes sessile, dense, 1–1 1/2 in. long. Calyx $\frac{3}{4}$ in., silvery; teeth linear, as long as the tube. Corolla yellowish-red, $\frac{1}{4}$ in. long, externally canescent. Pod tumid, straight, finely canescent, 1 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.

NipaL Wallich.

An erect shrubby perennial, with slender woody erecto-patent branches. Leaves short-petioled, 1 1/2–2 in. long; leaflets membraneous, opposite, obtuse, green above, pale below; $\frac{8}{9}$–$\frac{1}{2}$ in. long, both sides with a few short appressed hairs. Racemes very lax,
short-peduncled, finally 3-4 in. long; pedicels 1/4 in. Calyx oblique, 3/4 in.; teeth short. Corolla 3/4 in. long, pale red. Pod straight, glabrescent, turgid, 1 1/2-1 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, 1/4-1 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 1/8 in., finely brown-silky; teeth short, deltoid. Corolla 1/8 in., pale red, canescent externally. Pod glabrous, straight, 1-1 1/2 in. long, 6-8-seeded, turgid, with narrow sutures. — The Cendolol synonym may not unlikely belong to a form of I. pulchella.

32. I. Gerardiana, Wall. Cat. 5486; shrubby, branchlets argenteo-canescent, leaflets small oblanceolate-oblong 9-17, stipellae and bracts minute.

Temperate and subtropical western Himalaya; common, from the Salt range to Kumaon, alt. 2-10,000 ft.—Distr. Afghanistan.

A low copiously-branched shrub, the branchlets distinctly argenteo-canescent. Leaves short-petioled, 1-2 in. long; leaflets subcoriaceous, 3/4-1 1/2 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, 3/16 in. long; teeth deltoid-cuspidate. Corolla 1/8 in., pale red, canescent externally. Pod 1 1/2-2 in. long, subcylindrical, glabrous, 6-10-seeded; sutures narrow.


33. I. galegoides, DC. Prodr. ii. 225; shrubby, branches glabrescent, leaflets large oblong 11-25, stipellae and bracts minute. I. uncinata, Roxb. Fl. Ind. iii. 382; Wall. Cat. 5472. I. Finlaysoniana, Wall. Cat. 5488. I. Zollingeriana, Miq. Flor. Ind. Bat. i. 310?

Tropical zone; Khasia and Mergui to CEYLON, MALACCA AND SIAM.—Distr. Malay isles, Philippines, S. China.

A tall shrub, with twiggy woody branches, thinly coated with adpressed hairs at first. Leaves distinctly petioled, 3/4-1 ft. long; leaflets opposite, membranous, usually obtuse, 1-1 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 1/4 in., canescent; teeth short, deltoid. Corolla pale red, 3/16 in., finely canescent externally. Pod glabrous, the longest of the genus, 2 1/4-3 in. long, subcylindrical, straight, 10-18-seeded, beaked.

34. I. bracteata, Graham in Wall. Cat. 5477; suffrutiocose, branches glabrescent, leaves middle-sized oblanceolate-oblong 7-17, stipellae and bracts large.

Khasia, 5-6000 ft., Hook. fl. & Thomson; NepaL, Wallich; and an exstipellate form from KASHMIR, 5-6000 ft., Thomson.
Indigofera. ] L. LEGUMINOSÆ. (J. G. Baker.) 101

A low shrub, with copious slender trailing branches with a few adpressed hairs at first. Leaves distinctly petioloed, 3-4 in., long.; leaflets opposite, membranous, ¼ -1 in. long, obtuse, pale green above, glaucous beneath, nearly glabrous; stipellæ setaceous, ⅔ in. long. Peduncles reaching 2-3 in., bearing a close short raceme, bracts herbaceous, boat-shaped, with a cusp, enfolding the buds. Calyx ¼ in., campanulate, obscurely hairy; teeth deltoid. Corolla ⅔ in. long, pale red. Pod linear, glabrous, not seen mature.

35. I. atropurpurea, Hamilt.; DC. Prodr. ii. 225; shrubby, branches glabrescent, leaflets large oblong 11-17, stipitate minute, bracts lanceolate acuminate exceeding the buds. Don Prodr. 244; Roxb. Fl. Ind. iii. 381; Wall. Cat. 5463; Wight Lac. t. 369; Brand. For. Fl. 136; Bot. Mag. t. 3065; Bot. Reg. t. 1744. I. Hamiltonii, Grah. in Wall. Cat. 5465.

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 1-1½ 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 ½ in., subpersistent, narrowly gradually into a long point; pedicels very short. Calyx 1½ in., obliquely campanulate; teeth short, deltoid. Corolla 1½ in., a much darker deeper red than in any of the others. Pod linear, turgid, 1-1½ in. long, glabrous, 6-10-seeded; not at all reflexed or narrowed into a beak.

36. I. hebepetala, Benth. Mss.; shrubby, branches glabrescent, leaflets large oblong 13-17 membranous, stipellæ distinct, bracts boat-shaped cuspitate 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 1-1½ in. long, much smaller in a subalpine form, dull green above, pale but scarcely glaucous below, 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 ½ in. deep, a much lighter and more crimson red than in I. atropurpurea, glabrous externally, the keel ½ in. deep. Pod glabrous, turgid, straight, 1½-2 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-petioloed, 3-6 in. long.; leaflets opposite, firmer in texture than its allies, obtuse, often smarginate, usually 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 1/2 in. long, argenteo-canescent; teeth short deltoid. Corolla bright red, glabrous externally, the largest of all the species, generally 3-5 in., reaching 2-3 in. long, the standard 3 in. broad, reflexed in the expanded flower. Pod straight, turgid, glabrous, 1-4-1 1/2 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 woolly branches, clothed with short spreading grey or brownish pubescence. Leaves subsessile, 1-3 in. long; leaflets usually opposite, membranous, obtuse, 3-1/2 in. long, dull green above, glaucous below, more or less densely pubescent. Racemes distinctly peduncled, moderately close, 1-3 in. long; bracts 3/4 in. long, lanceolate-cuspidate, silky; pedicels very short. Calyx 3/4 in., densely silky; teeth deltoid-cuspidate. Corolla bright red, glabrous, 3-5 in. Pod straight, glabrescent, 1-1 1/4 in. long, 8-12-seeded, with very broad sutures.

Var. tomentosa; branches clothed with dense brown silky pubescence, leaves 6-9 in. long, leaflets 41-51 often subacute and 1 in. long, racemes longer, bracts densely brown-velvety, with a very long; cusp. I. tomentosa, Gräb. in Wall. Cat. 5487. I. stachyodes, Lindl. Bot. Reg. 1843, t. 14.—Khasia, Sikkim, Silhet, Bhotan, 1-5000 ft.


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, 3-1/2 in. long, thinly clothed on both sides with adpressed grey hairs; stipellas setaceous, 3 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-foliate leaves. Calyx 3/4 in.; teeth lanceolate, very long. Corolla red, glabrous, twice the calyx. Pod linear-cylindrical, straight, 1-3/2 in. long, 4-6-seeded, finely pubescent.

Subgen. 4. Amecarpus, Benth. Ovary with at least two ovules. Pod linear, unarmed, 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, oblongolate 3-1 in. long. Racemes short-peduncled, closely 12-20-flowered, under an inch long. Calyx 3/4 in., argenteo-canescent; teeth setaceous. Corolla scarcely exserted. Pod linear, reflexed, 3-1/2 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.—Distrib. 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.

A low copiously-branched shrub, the stems obscurely argenteo-canescent, verrucose, the denuded branchlets subsinuose. Leaves short-petioled; leaflets subcoriaceous, dull green, oblanceolate, 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 ½ 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, ovo-volute; style filiform, much incurved, bearded along the inner side, stigma large oblique. Pod large, membranous, inflated, continuous within, nearly or quite indehiscent.—Distrib. Species 3, or 4, spread through South Europe and Temperate Asia.


Temperate West Himalaya, Kunwar, Tibet, NepaL, &c., alt. 8–11,000 ft.—Distrib. Orient, S. Europe.
A subglaucous shrub, 6–10 ft. high. Leaflets 9–13, obovate, pale green, ½–3 in. long, often emarginate, obscurely silky in the young state. Racemes as long as the leaves, laxly 3–4-flowered. Calyx ½–1 in. Corolla bright yellow, ½ in. long; standard furnished at the base with two nipple-shaped papillae. Pod ½–2 in. long, faintly downy when young, splitting at the tip before ripening.
20. MILLETTIA, Wt. & Arn.

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 turgid, late in dehiscing or hardly dehiscing.—Distr. Species 40-50, spread through the tropics of the Old World.

Subgen. 1. Bumillletia. Standard not auricled at the base. Stamens monadelphous or diadelphous.

* Leaves lustrous beneath, with thin silky pubescence.


Forests of BIRMA, MALACCA, PENANG, and SINGAPORE. — Distr. 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 ¾ 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 ½ in., silky, scarcely toothed. Corolla ¾-½ 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, cuspitate stipellate sericeous beneath, standard densely silky on the back, stamens diadelphous, pod oblong glabrescent. Wight i.c. 207.

Hills in the CARMATI near Courtailain, 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; stipellae obscure; petiolules ½-¾ 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, ½ in., short-pedicellate. Corolla reddish, ¾ in., densely silky. Pod 2-3 in. long, subignose, 2-3-seeded, when young densely velvety.


Tropical forests of the Nlghkirs and ANAMALAY hills.

Habit and inflorescence 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; stipellae setaceous; petiolules ¼-½ in. Racemes shorter than the leaves, the nearly sessile flowers densely fascicled at the end of short branchlets. Calyx ½ in., densely silky, with a pair of small ovate bracteoles. Corolla reddish, ½ 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.—Distr. Philippines, Cuming, 1208?

An erect tree, with the branches and leaves below thinly clothed with opaque greyish-silky pubescence. Leaves and leaflets the smallest of all the species, the former not more than 2-5 in. long, green and pubescent above; petiolules very short and stipellate minute. Racemes copious, shorter than the leaves, the flowers fascicled, shortly peduncled from the main rachis. Calyx 3/4 in., scarcely toothed. Corolla reddish, 3-1/2 in. Pod 2-4 in long, 1/2 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; petiolules short, with large setaceous stipella. Racemes copiously panicked, the flowers not fascicled on short branches, but close shortly pedicellate on the main rachis; bracts exceeding the buds, setaceous, deciduous. Calyx 1/2 in., densely silky. Corolla 3/4-1/2 in., whitish. Pod linear, narrow, 1/2 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, Wollich; Birma, forests of Pegu, McLelland, Kurz.

An erect tree, with thinly silky branchlets, and leaves 1/2 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; petiolules under 1/2 in. Flowers in short dense racemes in the axils of the leaves; pedicels densely fascicled, 1/2-1/3 in. Calyx 3/4-1/2 in., shortly grey-silky; teeth deltoid, shorter than the tube. Corolla shorter than the calyx. Pod oblong, 3-5 in. long, 1/4 in. broad, tubercled, 1-3-seeded.


Ava; banks of the Irrawaddy at Yenanghuen, Wollich.

Climber, with grey pubescent branches and leaf-rachis, the latter 1/4 ft. long. Side leaflets oblong, 21/2-3 in. long, the end one obovate; upper surface glabrous, rather shining; petiolules 1/2 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 dehiscing early for the genus, 2-3 by 1/2-1/3 in.

**Birma**; forests of Pegu, &c. Wallach, 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 1/2 in. Flowers in short close nearly sessile racemes in the axils of the leaves; pedicels fascicled, 1/4–1 in. Calyx 1/8 in., thinly clothed with adpressed hairs; teeth deltoid. Corolla pale blue. Pod subligneous, quadrangular, straight, linear 3–4 in. long, nearly an inch thick, the wings 1/3–2 in. broad in the middle, narrowed to each end.


**Martaban**, Kurz.

An erect tree 20–25 ft. high, the young parts puberulous. Leaf 1/2 ft. with a puberulent rachis; leaflets (number not stated) 2–3 in. long, thinly chartaceous. Racemes leaf-opposed, slender, simple, 2 1/2–3 in. long; pedicels capillary, pubescent, solitary or fascicled. Calyx 1/8 in., reddish, broader than deep, 1/4–1/3 in. long; slightly pubescent, obscurely toothed. Corolla yellowish-white; standard above 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 racemes 4–7 in. long, arising above the scab of the fallen leaves. Calyx 1/8 in., longer than broad; teeth obscure, anterior one largest. Standard 1/3 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 subcandate, the pubescence below short, loose, deciduous; petiolules 1/4–1/2 in. Racemes copious, 6–9 in. long, most of the nodes with short branchlets. Calyx 1/4–1/3 in., distinctly pedicelled, densely downy; teeth very short. Corolla 3 1/2–1 in. long. Pod 1–3-seeded, rugose, 1–1 1/2 in. broad, reaching 4–5 in. long.

*** Mature leaflets glabrescent beneath.

Forests of Sikkim, Khasia, Silhet, Assam, Chittagong, and Birma, ascending to 4000 ft.—Distrib. China?

A woody climber, with young branchlets and leaves below with a little opaque grey deciduous pubescence. Leaflets large, reaching 1–1 1/2 ft. long, thin and flexible; both sides green; petiolules and setaceous stipelle 1/4–3/4 in. Racemes most or all in a panicle above the leaves; flowers distinctly pedicellate, not fascicled, subtended by a pair of setaceous bracteoles. Calyx 1/3 in., densely silky, distinctly toothed. Corolla 3/8 in., densely coated with grey silk. Pod very turgid, 4–5 in. long, 1 in. broad, 3–5-seeded, subligneous.


Birma, at Prome, Kurz.

An erect glabrous middle-sized tree. Leaves 1/2–1 1/2 ft.; leaflets 3/4–1 in. long, glaucous and finely reticulated beneath; petiolules slender, 3/6 to 5/6 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, 1/3 in., long, nearly truncate. Corolla blue; standard 1/3 in. long. Pod 2–3 in. long, 2–3-seeded at middle, subligneous, pale, incurved, narrowed to base, sparsely verrucose.—Kurz loc. cit.

14. M. caerulea, Baker; leaflets 7 obovate-oblong cuspitate subcoriaceous stipitate glabrous, standard densely silky, stamens monadelphous, pod large flat rather woody finely brown-vellute. Pongamia caerulea, Grab. in Wall. Cat. 5904.

Ava, at Panoa, Wall.; Malacca, Mainagay.

A woody climber, with glabrous branches. Leaflets 4–6 in. long, glabrous on both sides from an early stage; petiolules 1/2–5/6 in. Flowers in close short-peduncled racemes in the axils of the leaves; pedicels very short, densely fascicled. Calyx campanulate, 1/3 long, faintly silky, nearly truncate. Corolla three times the calyx, the standard densely white-canescant on the back. Pod linear-oblong, 7–8 in. long, 1 1/4–1 1/2 in. broad, recurved, late in dehiscing, clothed with dense short persistent brown velvety pubescence.

15. M. glaucescens, Kurz in Journ. Asiat. Soc. Beng. xlii. 2, 67; leaflets obovate-oblong cuspitate 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 branches. Leaflets thin, flexible, green above, dull below, reaching 1 ft.; petiolules 3/4 in. Racemes close, simple, 1 1/2 ft. long, axillary on short peduncles; pedicels in pairs, exceeding the calyx. Calyx 3/4 in., with a few minute hairs; teeth deltoid. Corolla 3/5 in., steel-blue. Pod 3–4-seeded, tubercled, 1 1/4 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 \( \frac{1}{2} \) in., often geminate, neither bracteate nor bracteolate. Calyx \( \frac{1}{4} \) in., thinly silky; teeth short, obtuse. Corolla snow-white, \( \frac{1}{4} \) in. Pod 3–4 in. by 1–1\( \frac{1}{2} \) in., narrowed to a point; valves quite smooth, dehiscent earlier than in the other species.


**Birma**, near Yomah, Kurz.
An erect tree, with slender terete glabrous branches. Leaflets \( 1-1\frac{1}{2} \) 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 \( \frac{1}{2} \) in. glabrous, broadly campanulate; teeth deltoid. Corolla lilac, \( \frac{2}{3} \) in. Pod 3–4 in. long, under an inch broad, 2–4-seeded, the valves quite smooth and flat, twisting when dried.


**Forest of Malacca**, Griffith, Maingay.
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 \( \frac{1}{4} \) in. Racemes copious, short, subsessile, dense, subspicate; bracts large, roundish, densely silky, clasping and hiding the buds. Calyx subsessile, \( \frac{1}{4} \) in., clothed with bright yellowish-brown silky pubescence, like the bracts and standard; teeth as long as the tube, broad, imbricated. Corolla \( \frac{2}{3} \)–1 in., densely silky. Pod beaked, turgescent, 3 in. long, 1-seeded, subindehiscent.


**Forests of Martaban, Tenasserim, Malacca, and Penang.—District, 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 \( \frac{1}{4} \) in. Inflorences a dense terminal panicle above the leaves; racemes not branched; bracts minute, ovate; pedicels \( \frac{1}{2} \) in. Calyx \( \frac{1}{4} \) 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.


**Rohilkund and Kumaon to Sikkim** reaching 3500 ft.; also on Parasnath in Behar.
Millettia.]  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 subsericeous. 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 1/2 in., densely silky; teeth very short. Corolla white; 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, 1-2 ft. long; leaflets 4-6 in. long, 1/2-2 in. broad, obscurely stipellate, glabrous above, thinly sericeous beneath. Flowers in dense short axillary racemes and also in terminal panicles. Calyx 1/4 in., densely sericeous, subtended by minute ovate bracts and bracteoles. Corolla 3/4 in. red, the standard densely silky. Pod hard and woody, silky when young, 6-7 in. by 1-1 1/4 in.


Martaban, Wallich.

A little-known climbing species, closely allied to the two preceding. Leaflets long-petioled, distantly 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 1/2 in., campanulate, scarcely toothed, with a pair of very minute bracteoles at the base. Corolla 3/8 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 1/2-1 in., nodding, velvety. Calyx broader than deep, under 1/2 in. long, fulvous-velvety, obscurely toothed, upper tooth largest. Corolla glabrous, violet; standard 1/2 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, 6-9 in. long, firm, bright green above, glaucous below, narrowed out at the tip into a long distinct tail. Racemes axillary, short-pedicelled, not so dense as in the others, 4-6 in. long. Calyx campanulate, 1/2 in., scarcely toothed, densely silky. Bracts very minute. Corolla 1-1 1/2 in., densely silky. Pod linear, straight, rigidly-coriaceous, subequally turgid, 8-4 in. long, 1/2 in. broad.
Doubtful Species.

The following are probable species of *Milletia*, 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. — *M. macacca*, *Griffith*, 1833.

Leaflets 7, subcoriaceous, obovate, very obtuse, opaque, 3–4 in. long, obscurely grey-canescant below. *Pod* linear, 4–5 in. long, flat, ¼ in. broad, several-seeded, with similar vesture. *Feg*, *Moellendorf*. May be *Paderburnia dasystylia*, *Miq. Flor. Ind. Bat.* i. 150.

*M. Maingayi*, *Baker*. Leaflets 15 or more, oblong, coriaceous, 1½–2 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-oblong, acuminate, 2–3 in. long. Inflorescence and separate flowers just as in *M. glaucescens*. *Nipa*, *Hamilton*.

21. **Mundulea**, DC.

Shrubs. *Leaves* odd-pinnate. *Flowers* in dense terminal racemes. *Calyx* campanulate; teeth short, deltoid. *Corolla* much exserted; standard obovate, with a long claw; wings oblancoate, 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 capitiate. *Pod* large, linear, subindehiscent. *Distr.* Species 3, the two others plants of Madagascar.


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 penicillate. *Pod* linear, flattened, many-seeded, 2-valved, continuous or obscurely septate between the seeds. *Distr.* Species about 100, spread through the Tropics of both hemispheres.
Tephrosia.]  L. LEGUMINOSE.  (J. G. Baker.)  111


Plains of Scinde, the Punjab and Concan.

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, ½–2 in. Calyx ½ 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 Kumaon eastward to Khasia and Assam, ascending to 5000 ft. in Sikkim. Silhet, Chittagong, Martaban, and Tenasserim. —DISTRIBUTION. 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 cespitose, terminal and lateral, elongated, 6–9 in. long; lower several to a fascicle; pedicels silky, ½–2 in. Calyx ½–4 in., densely silky; teeth much shorter than the tube. Corolla ½–1 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, Budd. Ic. Plant. Ind. Or. t. 166; 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 cordate, 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 ½ in.; teeth lanceolate, cuspidate, as long as the tube. Corolla ½–1 in.; standard downy on the back. Pod 2½–3 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. Grahamii, Wall. Cat. 5652), oblong, obtuse, subcoriaceous, the end one much larger than the others, 2-3 in. long. 3/4-1 in. broad, green, glabrous above, clothed with persistent white silky pubescence beneath, the nerves prominent; stipules lanceolate, ascending. Peduncles often extending 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 in., pale red, silky. Pod slightly recurved, 2-2 1/2 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 argentano-canescent, bracts linear minute, racemes elongated. T. coccinea, Wall. Cat. 5653; Pl. As. Rar. t. 60. Birma, Walllich.

Var. 3. intermedia, W. & A.; branches velvety, leaflets much smaller 9-13 3-5/4 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. 5652. 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, 3/4-1 1/2 in. Leaves short-petioled, 1 1/2 in. long; leaflets 5-7, narrow-ob lanceolate, rigidly subcoriaceous, truncate, often emarginate, glabrous above, glaucous, nearly glabrous below. Flowers all axillary; 1-2 rarely 3 from the nodes; pedicels 1-4 1/2 in. Calyx 1/2 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, Walllich.

A low shrub, with copious crenate-patent terete slender branches; petiole very short; stipules minute, ascending, setaceous; leaflets usually 5, rarely 3, narrow-ob lanceolate, 1-1 1/4 in. long, truncate or emarginate, green, glabrous above, thinly silky beneath, cuneately narrowed in the lower half. Flowers usually geminate; pedicels 3/8 in., argenteous. Calyx 1/4 in.; teeth linear, as long as the tube. Corolla more than twice the calyx, argenteous. Pod 1 1/2-2 in. long, 6-8-seeded, much recurved, persistently thinly canescent.

Tephrosia.]  
L. LEGUMINOSAE. (J. G. Baker.) 113


Tropical zone, spread universally from the HIMALAYAS to Ceylon, Malacca and Sum, ascending to 4000 ft. in the north-west.—*Distrib.* Every where in the Tropics.

A copiously-branched suberect perennial, 1-2 ft. high, with slender firm tetrate stems. *Leaves* short-petioled, 3-6 in. long; stipules linear-subulate, ascending or reflexed; leaflets 13-21, narrow oblancoate, obtuse, green, glabrescent above, glaucous, obscurely silky below. *Racemes* copious, all leaf-opposed, 3-6 in. long, lax; lower flowers fascicled; pedicels ⅛-⅔ in.; bracts minute. *Calyx* ⅛-⅔ in., closely silky; teeth linear-subulate, as long as the tube. *Corolla* ⅛ in., red, thinly silky. *Pod* ⅜-2 in. by ⅛ 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 oblancoate, ⅜-1 in. long, truncate or emarginate, glabrescent above, thinly persistently silky below. *Racemes* all lateral, reaching 6-9 in. long; pedicels ⅛-⅔ in. *Calyx* densely silky, ⅛-⅔ in.; teeth setaceous, exceeding the tube. *Corolla* ⅛-⅔ in. *Pod* ⅛-2 in. by ⅛ in.; style flattened, subglabrous, penicillate at the tip.


Plains from the Himalayas to Ceylon.—*Distrib.* Mauritius, Trop. Africa.

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 oblancoate, 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* ⅛-⅔ in. deep, densely silky; teeth setaceous, lower exceeding the tube. *Corolla* pale red, not much exceeding the calyx. *Pod* 1-⅛ in. long, ⅛-⅔ 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.*

Plains of Schinde, Stocks, Dalezell; Punjabs, Stewart; Birmá, Wallich.

Stems densely cespitose, under a foot high. Stipules ascending, setaceous; leaflets 5-9, narrow oblanceolate, finely silky beneath, 1-1½ 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 ½ in., finely silky. Corolla red, twice the calyx. Pod 1-2 in. by ½ 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 Dindygul 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 eberroa*, but the leaflets are shorter and more obtuse, and the pod dehisces readily, like that of a *Tephronea*, and the sutures are not thickened so as to form a prominent border. The calyx is that of *§ Brissonia*.


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 exserted; petals all with long claws; standard broad; keel obtuse, straight, or in *§ Agati* recurved and subulate. Stamens diadelphous; anthers uniform. Corolla linear, stipitate, many-ovuled; style filiform, incurved, glabrous, stigma capitate. Pod very long and narrow, dehiscent, with distinct septa between the very numerous seeds.—DISTRIBUTION. Species about 20, spread everywhere through the tropics.

**SUBGEN. I. EUSESBAUNIA.** Flowers small; bud straight.


Plains from the Himalayas to Ceylon and Siam, ascending to 4000 ft. in the north-west.—Distribution. Cosmopolitan in tropics of old world.

A soft-wooded shrub of short duration, 6-10 ft. high, with terete twiggy branches. Leaves 3-6 in. long; leaflets 21-41, glabrous, linear-oblong, pale green. Flowers 6-10, in copious lax axillary racemes; pedicels filiform, ½-1 in. Calyx ½ in., glabrous, membranous; teeth short, deltoid. Corolla ½-2 in., glabrous, pale yellow or (in *S. picta*, Pers.; *Bot. Reg.* t. 873), more or less tinged with deep red. Pod 6-9 in. long, weak, torulose; sutures little thickened.


Plains from the West Himalayas to Ceylon and Siam.—Distrib. Cosmopolitan in tropics of old world.

Suffrutescent, reaching several feet high, the branches and leaf-rachises armed with small weak prickles. Leaves reaching ½-1 ft. long; leaflets glabrous, 41-81, smaller and narrower than in S. agyiopicosa. Racemes laxly 3-6-flowered, distinctly peduncled. Calyx ½ in., glabrous. Corolla ¾-½ in., pale yellow; standard dotted with red. Pod 6-9 in. by ½ 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. sericea; branches robust unarmad, leaflets more or less silky even when mature, racemes subsessile. S. sericea. DC. Prodr. ii. 266—Plains of Ceylon, Fergusson, CP., 3850.


Plains of the Western Peninsula.

Branches lower and more slender than in the last. Leaves 2-3 in. long; leaflets 3½-4, linear-oblong, glabrous, glaucous. Flowers solitary or geminate, without a common pedicle. Calyx ½ in. long. Corolla 3 times the calyx. Pod straight, 2-3 in. long, ½ in. thick, 15-20-seeded, distinctly torulose.

Subgen. 2. Agati, Desv. Flowers large; bud falcately recurved.


Plains of the Western Peninsula, a doubtful native.—Distrib. Mauritius to N. Australia, but often cultivated.

A short-lived soft-wooded tree, 20-30 ft. high, with virgate terete branches. Leaves ½-1 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 8-4 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 pedice, produced on the upper side; teeth 5, deltoid or lanceolate. Corolla much exserted; standard broad, with reflexed edges; keel not at all beaked, usually as long as the wings and standard. Stamens diadephous; 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.—Distrib. Species about 16, spread widely through Central Asia.
* Leaf-rachis suppressed.


West Himalayas, temperate and alpine regions; Tibet, Kunawar, &c., alt. 8-17,000 ft.—Dist. Afghanistan, Altau to Dascalia. 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 axils, with rarely a perceptible pedicel; leaflets 1/4-1 in. long, firm, pale green. Pedicels jointed, shorter than the calyx. Calyx glabrous, 1/4 in. long; teeth short, deltoid. Corolla bright reddish-yellow, 1/4 in.; standard glabrous. Pod linear, turgid, glabrous, naked within, 1/4-1 in. long.

** Leaf-rachis produced, with a spine at the end.

2. **C. conferta**, Benth. *MSS.*; leaflets 4-6 ob lanceolate 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, scarious, downy, with a spiny tip; leaflets 1/4-1 in. long, obtuse, with a mucro, at first faintly silky beneath, subcoriaceous. Pedicels downy, shorter than the calyx. Calyx 1/4 in., finely silky; teeth deltoid, ciliate, 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.; Gurwhal, Kunawar, Kumaon, Kunawar.

A shrub reaching 3-4 ft. high, with very close nodes and downy young branches. Old spines erecto-patent, pungent, 1-1 1/2 in. long, often downy. Leaflets 1/4-1 in. long, obtuse, mucronate, firm, densely silky; stipules deltoid, scarious, not spine-tipped and consequently the old spines simple, not trifid. Calyx shortly pedicelled, 1/4 in. long, densely pubescent; teeth deltoid-cuspidate, half the tube. Corolla twice the calyx. Pod 1/4 in. in 1 by 1 in., woolly within and persistently clothed with grey pubescence on the outside.


Central Himalaya, alpine or temperate region; Kumaon, Blinkworth; Gurwhal, Strachey 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 1/4-1/2 in. long, pale green, rigidly coriaceous, truncate, mucronate. Common peduncle short and not always developed. Calyx 1/4 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. 5-9,000 ft.; Kashmir, Kunawar, Gurwal, Simla, &c.—Distribs. 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. Leaves 2-3 in. long, subcoriaceous, glabrescent on both sides or thinly pubescent below. Peduncle 1-2 in.; bracts and bracteoles linear, sericeous; pedicels downy. Calyx ½ 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.; Gurwal and Kumaon to Sikkim.

Stems thick, tufted, woody, creeping for a few inches below the surface, clothed verydensely with the long tough but not pungent or spinous leaf-rachises. Leaves in a lax rosette at the surface, short-petioled, 1-½ in. long; leaflets green, not coriaceous, ½-¾ in. long, truncate or emarginate. Peduncle downy, as long as the calyx. Calyx ½ in. long, very oblique, densely pubescent; teeth 1-½ tube. Corolla reddish-yellow, twice the calyx; standard pubescent on the outside; wings and keel shorter. Pod linear-oblong, ½-¾ in. long, finely pubescent, stuffed inside with cottony down.


Temperate and Alpine West Himalayas, alt. 8-13,000 ft.; Tibet and Kunawar.—Distribs. 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, ½-¾ in. long, truncate, emarginate, not coriaceous, densely pubescent. Peduncle equaling or overlapping the leaves; pedicels very short. Calyx ½-¾ 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, 2-2¾ in. long, 10-12-seeded, slightly stuffed within. This and the last have the oblique calyx of Calophaea, but in habit and corolla range better under Guldenstædtia.—Dr. Atchison sends from Ladak a plant with deep purple flowers, more hoary leaves and narrower pod, which may be distinct.

25. GULDENSTÆDTIA, 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 exerted; standard round; keel not more than half as long as the other petals, straight, obtuse. Stamens diadelphiou; anthers uniform. Ovary sessile, many-ovuled; style incurved very short, stigma capitulate. Pod linear, turgid, not torulose, continuous within.—Distribs. Species 7-8, all Central Asian.

1. G. himalaica, Baker; shortly caulescent, 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.; Kumaon and Gurwal to Sikkim.

Stems 1-2 in. long, cespitose from a perennial rootstock, densely silky. Leaves ½-1½ 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 \(\frac{1}{2}\) 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 Mirpore, Jacquemont. Hazara, 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. Peduncles as long as the leaves; pedicels scarcely any. Calyx \(\frac{1}{2}\) in. finely silky; teeth lanceolate-acuminate. Corolla twice the calyx. Pod twice the calyx, linear, finely silky.


West Himalaya, Requx, the exact station not known. Distr. 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 \(\frac{1}{2}\) 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 exerted; 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 turgid, continuous within or more or less completely longitudinally 2-celled from the introversion of the inferior suture.—Distr. 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. Petersburg, 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. 16–16,000 ft., Strachey. By the Tso-kar sea, between Rupshu and Korosge, 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 \(\frac{1}{2}\) in. Flowers 2–4 in a close umbelate 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.
Astragalus.] L. LEGUMINOSE. (J. G. Baker.) 119

*Annuals with slender trailing stems and sessile pods (habit of Subgen. Trimeniaeus).

2. A. amherstianus, Benth. in Royce Ill. 199; corolla scarcely exceeding the calyx, pod 10–12-seeded with the valves but little indexed. Bunge Mon. i. 5, ii. 3.

West Himalayas, temperate region, alt. 6–10,000 ft.; Kistwar, Kunawar, Chamba, Simla.—Distribs. Afghanistan.

Stems densely caspioidose, diffuse, ½–1 ft., clothed with dense adpressed whitish hairs. Leaves short-petioled, 1–1½ in.; leaflets 13–17, narrow, oblong, obtuse, ½–⅔ 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 ⅓–⅔ in., shaggy with hairs like those of the leaves; teeth setaceous, as long as the tube. Corolla primrose-yellow. Pod linear, turgid, ⅓–⅔ in. long, much recurved, rostrate, thinly pubescent.

3. A. subumbellatus, Klotzsch in Reise Pr. Wald. Bot. 159, t. 3; corolla more than twice as long as the calyx, pod 20–24-seeded with the sutures much indexed. A. hippocrepidis, Benth. MSS.; Bunge Mon. i. 5, ii. 3; Boiss. Fl. Orient. ii. 231. A. Scorpiurus, Bunge Mon. loc. cit. A. humifusus, Jacqum. MSS.


Stems ½–1 ft., diffuse, branched, clothed with short deciduous ascending white hairs. Leaves 1–2 in.; leaflets 13–21, distant, oblong, glaucous, ⅓–⅔ in. long, thinly or densely pilose or nearly glabrescent; stipules minute, lanceolate, cuspidate. Racemes distinctly peduncled, 6–10-flowered, lax or close; pedicels very short; bracts setaceous, very minute. Calyx ⅔ 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 ⅓–⅔ in., cylindrical, much recurved, shortly pubescent, almost completely bilocular.

**Perennials with slender caspioidose trailing stems and stalked pods (habit of Subgen. Hypoglottis).**

4. A. pycnorhizus, Wall. Cat. 5927; glabrous, flowers 1–2, calyx-teeth lanceolate nearly as long as the tube, wings shorter than the keel. Benth. in Royce Ill. 199; Bunge Mon. i. 4, ii. 1. Sphaerophysa pycnorhiza, Benth. Gen. Plant. i. 504.

Nipal, Wallich. Sikkim, alt. 6–12,000 ft., Hook. fl.

Root woody, fusiform. Stems wiry, ½–1 ft. Leaves an inch or more long; leaflets close, 11–13, green, obovate-oblong, truncate-emarginate, ⅓ in. long, clothed with only a few very short obscure hairs; stipules free, minute, membranous, deltoid. Peduncles equaling 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 ⅓–⅔ in., purplish; limb of standard round, ⅓ in. broad; wings half as broad as the depth of the keel. Pod ⅓–⅔ in. long, glabrous, inflated, 12–16-seeded, the suture not indexed; 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, Wallich.

Plants 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 $\frac{1}{2}$ in. long. Corolla purple; standard $\frac{2}{3}$ 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. fll.

Subcaulescent, with a slender rhizome, creeping below the surface. Leaves distinctly petiolated, 2–3 in. long; leaflets 15–17, roundish-oblong, obtuse, not complicate, pale green, thinly coated with short white hairs; stipules $\frac{1}{2}$–$\frac{3}{4}$ in., ovate, obtuse, persistent, slightly silky. Flowers 5–6, ascending or cernuous, in a dense head; peduncles 1½–2 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, Hayde.

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, $\frac{1}{2}$–$\frac{3}{4}$ 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 $\frac{1}{2}$–1 in. long; leaflets 13–17, obvate-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. pycnorhizus*, 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 pubes- cence. Leaves 1–1½ in. long; leaflets close, glaucous, obtuse, ochlanceolate-oblong, $\frac{1}{2}$–1 in. long. Racemes few-flowered, long-pediculed; pedicels shorter than the calyx, downy. Calyx $\frac{1}{4}$ in., gibbous, nearly glabrous; teeth very short. Corolla filac, $\frac{1}{2}$ in.; wings lanceolate, acute, as long as the keel. Pod $\frac{1}{2}$–$\frac{3}{4}$ in. long, narrowed to both ends, 4–6-seeded; stalk twice the calyx; inflexed 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 ½-1 in. long, upper growing gradually smaller; stipules persistent, obliquely cordate-ovate. *Racemes* very lax, ½-1 ft.; pedicels very short; bracts minute, linear. *Calyx* 1 in., oblique, tubuloso-campanulate, glabrous; teeth minute, deltoid. *Corolla* lilac, ½ in., the petals subequal in length; limb of wing lanceolate, acute. *Pod* oblong, ½-1 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 turgid finely downy. *Bunge Mon.* i. 4; ii. 2. A. sesbanioideae, Benth. in *Royle Ill.* 199; *Bunge loc. cit.*

Central Himalayas, temperate region, alt. 5-8000 ft.; *Simla*, Gurwhal, Kumaon. Erect, suffruticose, reaching several feet high, the branches straight, virgate, much furrowed. Leaves subsessile, 2-4 in.; leaflets 31-41, oblong, ⅓-⅔ 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, ¼ in.; teeth deltoid. *Corolla* lilac, 4-5 times the calyx; limb of standard round; wings lanceolate, shorter than the keel. *Pod* ⅓-⅔ in. long, oblong, completely 2-celled, 4-8-seeded; stalk much exceeding the calyx.

**SUBGEN. 3. Trimeniaeus, Bunge.** Annual weeds with basifixed hairs, small yellow flowers in usually dense heads, and glabrous stigmas.


Plains of Scinde and Punjab.—**Distr.** Cape Verde islands; through Egypt to Arabia.

Stems very slender, ½-1 ft., densely clothed upwards with adpressed white hairs. Leaves distinctly petioled, ½-1½ in. long; leaflets distant, glaucescent, ¼-½ in., clothed with fine adpressed white hairs; stipules minute, lanceolate, free. *Heads* 6-12-flowered; peduncles rarely as long as the leaves. *Calyx* under ½ in., densely matted; teeth linear-setaceous, nearly as long as the tube. *Corolla* little exserted. *Pod* sessile, turgid, ½-⅔ 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 16-20-seeded.


Stems suberect, ½ ft., slender, thinly white-canescens. Leaves distinctly petioled, 1½-2½ in. long; leaflets distant, 17-25, alternate, ¼ in. long, grey-green, thinly coated with adpressed short white hairs; stipules minute, deltoid. *Racemes* 4-6-flowered; pedicels very short; bracts minute. *Calyx* ⅛ 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* 1½ in. long, under ½ in. thick, thinly white-canescens at first; dissepiment not at all incurved; seeds distant, very small.
14. *A. ophiocarpus*, Benth. MSS.; heads lax nearly sessile, leaflets oblong-elliptic, pod very long and slender sickle-shaped slightly turbulose 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, 1-1 ½ ft., densely finely white-downy. Leaves distinctly peltioid, ½-1 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 ½ in., densely matted; teeth lanceolate, shorter than the tube. Corolla nearly twice the calyx, its petals subequal in length. Pod 1-1 ½ in. long, thick, finely downy, the disposition not at all incurved, the oblong seeds with a space corresponding to the slight contractions of the pod between them.


Plains of Punjab.—DistriB. Canaries, through Egypt to Afghanistan.

Stems slender, densely cespitose, trailing, ½-1 ft., densely clothed upwards with ascending white hairs. Leaves distinctly peltioid, 1-2 ½ in. long; leaflets mostly close, densely clothed with long white hairs on both sides; stipules minute. Heads 6-10-flowered. Calyx tubular, ½-1 in., densely matted; teeth sessile, shorter than the tube. Corolla pale yellow, little exerted. Pods ¾ 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 peltioid, ¾-2 ft. long; leaflets distinctly stalked, pale green, ½-2 in. long, glabrescent above, or thinly matted with silvery hairs on both sides. Heads 6-20-flowered; peduncles much shorter than the leaves. Calyx ½ 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 ¾-1 in. long, cylindrical, firmer than in its neighbours, quite glabrous.

17. *A. gracilipes*, Benth. MSS.; heads dense peduncled few-flowered, leaflets 9-13 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.*

Aculescent, or stems short, suberect, densely clothed with ascending strong white hairs. Leaves long-peltioid, 1-3 inches long; leaflets distant, greenish, ½-5 in. long, densely clothed with hairs like those of the stem; stipules minute. Heads 3-6-flowered; peduncles pilose, 2-4 in. Calyx ½ 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 ¼-5 in. long by ½ in., sessile, clothed with short dense white bristly hairs.

Plains of Punjaub and Scinde.—Distrib. East Europe, Orient, West Siberia.

Stems suberect, 1-1 ½ ft, densely clothed with short soft spreading white hairs. *Leaves* distinctly peltioed, 3-4 inches long; leaflets 1½-2 in., distant, greenish, thin at first, densely plicate on both sides; stipules lanceolate, free, larger than in all the preceding. *Heads* very dense, many-flowered, on plicate peduncles much shorter than the leaves. *Calyx* ½ in., densely plicose; teeth setaceous, plumose, exceeding the tube. *Corolla* little exerted, the lanceolate acute wings shorter than the standard and keel. *Pod* ½ in. long, sausage-shaped, membranous, rugose, completely conduplicate.

**Subgen. 4. Podolotus, Royle.** A cauliflous perennial, with a few obscure basifixed hairs and naked stigmas, differing from all the other groups by the endocarp of the unilocular pod separating as a thin membrane and produced into sepa between the seeds.


*Kumaon* and *Gurwhal*, temperate region.

*Stems* slender, glabrous, zigzag, densely cespitose, 1½-1 ½ ft. *Leaves* short-peltioed, 1-1 ½ in.; leaflets 15-15, green, glabrous, oblong, obtuse, ½-½ in.; stipules minute, deltoid. *Peduncles* equalling or exceeding the leaves, 1-2-flowered. *Calyx* ½ in., glabrous; teeth short, deltoid. *Corolla* yellow, twice the calyx; petals equal in length, wings and keel abruptly incurved. *Pod* linear, turgid, straight, ½-½ 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 capitulate heads, and naked stigmas.

*Heads sessile or peduncled. Flowers lilac or purple.*

20. **A. conformus**, Benth. MSS.; stems very dwarf densely cespitose-thinly clothed with adpressed white hairs, leaflets 11-12, 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* ½-½ in. long; leaflets silvery, thick, close, complicate, oblong, densely canescent, 1½ in. or less long; stipules small, lanceolate. *Heads* 6-8-flowered; peduncle 1½ in., mostly subradical, clothed with adpressed black and white silky hairs; pedicels and bracts very small. *Calyx* ½ 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. rigidus**, 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. fl.*

*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 peltioed, 1½ in.; leaflets green, linear-oblong, obtuse, ½ in. long, thinly coated with adpressed white hairs; stipules ½ in. deltoid, membranous. *Heads* 6-10-flowered; peduncles and pedicels both very short. *Calyx* under ½ in. *Corolla* twice the calyx; limb of standard oblong, exceeding the wings and keel. *Pod* glabrous, oblong, membranous, ½ 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. Phacæ 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 1-1½ in., thinly silky. Heads 3-6-flowered; bracts linear, exceeding the short pedicels. Calyx ⅔ 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. kongreens.

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. 198?

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, ⅓-½ ft. Leaves 2-4 in. long, distinctly petioloed; 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 predominating upwards; bracts lanceolate, much exceeding the short black pedicels. Calyx ⅔ in., the teeth densely, the tube thinly black-silky. Corolla twice the calyx; wings shorter than the standard; keel still shorter. Pod ⅓-½ 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 1-1½ 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 1½-2 in. long, with a few black hairs mixed with the white ones upwards. Calyx ⅔-⅜ in. Corolla deep purple, ⅜ 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. fl.

Whole plant under a foot high. Leaves 1-2 in. long; leaflets green, oblong, obtuse, ⅓ in. long, with a few black hairs; stipules foliaceous, lanceolate, ⅓-⅔ in. long, ciliate at first with black hairs; petiole twice as long as the stipules. Heads 12-20-flowered. Pedicels very short; peduncles erect ⅜-⅞ ft., with a few adpressed black hairs in the upper half; bracts minute, shaggy with black hairs. Calyx ⅛-⅜ in., tube campanulate, nearly naked; teeth black-plumose. Corolla ⅛ in., petals sub-equal. Pod ⅛ 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
Astragalus.] L. LEGUMINOSÆ. (J. G. Baker.)
clothed with adpressed white silky hairs, leaflets 19-25, calyx clothed 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, Jacqem. MSS.

Through the Himalayas in the alpine region, alt. 11-16,000 ft., from Nubra and
Ladak to Sinkim and Silhet.

Stems densely cespitose, firm but slender, branched, ½-1 ft. long. Leaves short-
petioled, 1-1½ in. long; leaflets close, oblong, obtuse, ½-3 in. long, pale green, persistently
clothed 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 ½ in. Corolla twice the calyx; wings and keel shorter than the standard. Pod ½ in.
long, short-stalked, rather recurved, clothed like the calyx.

27. A. oxyodon, Baker; stems short slender ascending clothed with
adpressed white silky hairs, leaflets 15-17, calyx clothed with adpressed mixed-
black and white hairs, teeth setaceous twice as long as the tube, ovary stalked
5-6-ovulate.

West Tibet, Falcomer.

General habit of A. strictus. Stems densely cespitose, ½-1 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 ½-1 in., lancelolate, membranous. Calyx ½ in.; tube campyluate; teeth much longer
in proportion than in any of its allies. Corolla ½ in.; keel and standard equal;
wings much shorter. Mature pod not seen; ovary thinly silky.

28. A. densiflorus, Kar. & Kir. Enum. Pl. Song. No. 245; stems elongat-
ed firm glabrous, leaflets 11-13, calyx minute clothed with mixed black and
white hairs, teeth lanceolate short, pod globose sessile minute unilocular 1-2-
seeded. Bunge Mon. i. 21; ii. 22.

West Himalayas, alpine region, alt. 12-17,000 ft.; Lahul, Sassar, Zanskar,
Ladak, Kunwar.—Distribution. Afghanistan, Central Siberia.

Stems densely cespitose, rigid, erect, ½-1 ft. long. Leaves 1-2 in. long; leaflets
thick, oblong, glaucous, obtuse, ½-3 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. Calyx ½ in., campyluate; 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, ½ in. long, turgid, membranous.

29. A. melanostachys, Benth. MSS.; stems elongated firm glabrous,
leaflets 13-15, calyx clothed with black silky hairs, teeth as long as the tube,
pod oblong sessile half-bilocular 2-seeded. Bunge Mon. i. 21; ii. 22. A. brac-
teococcus, Klotzsch Reise Pr. Wald. Bot. 180, t. 5, non Boiss.

West Himalayas, alpine region, alt. 10-15,000 ft.; Kashmir, Lahul, Tibet.

Stems 1½-2 ft. high, moderately stout. Leaves distinctly petiolated, 1-3 in. long;
leaflets oblong, glaucous-green, obtuse or emarginate, ½-3 in. long, nearly naked;
stipules ½-1 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 ½-1 in., lancelolate, foliaceous, persistent. Calyx
½ in. nearly sessile. Corolla narrow, half as long again as the calyx; keel and
wings shorter than the standard. Pod included in the calyx, ½ 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-bilocular.

**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 oblongate-oblong, obtuse, 1/2 in. long, green and glabrescent above, clothed with a few obscure adpressed hairs below; stipules free, lanceolate, 1/2 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, 1/2 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, 1–2 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.

**Kumaon**; 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, 1/2 in. long, green, glabrescent when mature, thinly silky at first; stipules minute, lanceolate. **Flowers** 3–4 together, on a short peduncle clothed with ascending grey silky hairs; pedicels distinct, but shorter than the minute deltoid bracts. **Calyx** 1/8 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 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 Eruca.*

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** 1 1/2–2 in. long; leaflets oblong, obtuse or subacute, 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** 1/4 in. tubuloso-campanulate. **Corolla** twice the calyx; standard slightly exceeding the keel and wings. **Pod** 1/4–1/2 in. long, membranous, turgid, densely black-silky; stalk as long as the calyx-tube.

34. **A. himalayanus**, 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 **cachemerica**, Benth. MSS.
Astragalus.]

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WEST HIMALAYAS, temperate and alpine region, alt. 5–13,000 ft.; LAHUL, KULU, KUNAWAR, KASHMIR, GADHIL.

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 emarginate, 1/2–1 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 1/2–1 in., campanulate. Corolla 1/3 in., keel slightly exceeding the wings, falling short of the standard. Pod 1/4 in. long, membranous, finely black-silky; stalk exceeding the calyx.—A specimen gathered by Strachey and Winterbottom at the Molam 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.

KUMAO; temperate region, alt. 10–11,000 ft., Madden, Edgeworth.

General habit exactly as in A. himalayanus, but the young branches densely beaet with short spreading black and white bristly hairs. Leaves 1 1/2–2 in. long; leaflets oblongate-oblong, obtuse, densely clothed at first on both sides with adpressed silvery hairs; stipules minute, spreading. Heads few-flowered; peduncle 1/4 in., clothed like the branches; bracts linear, exceeding the short black pedicels. Calyx 1/3 in. Corolla 1/4 in.; wings much shorter than standard and keel. Pod 1/4 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 exerted, pod sessile finely pubescent bilocular 6–8-seeded.

KASHMIR, temperate region, alt. 9–10,000 ft., Jacquemont, Falconer.

Stems stout, erect or ascending, under a foot high. Leaves distinctly petioled, 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 1/4 in. long, free, lanceolate, membranous, striated. Heads dense, round; peduncle 1–3 in.; pedicle 1/2–1 in., shaggy; bracts linear, plumose, persistent, 1/3–3 in. long. Calyx 1/2–1 in.; teeth linear, shorter than the tube. Corolla 3 in.; standard exceeding the wings and keel. Pod 1/4 in. long, firm in texture, linear-oblong, straight, hollowed down the keel, narrowed into a long beak.

Var. 1. Falconeri, Baker; taller, much less shaggy, stipules narrower an 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; Tungu, alt. 13,000 ft., Hook. fil.

Stems moderately stout, erect, 1–1 ft. Leaves 1 1/2–3 in.; leaflets linear-oblong, glaucous, subacute, 3–1/2 in. thinly clothed with adpressed silvery bristles; stipules lanceolate or deltoid, free, 1/2–1 in. Heads round or oblong, 12–30-flowered, the lower flowers cernuous; peduncle 1–2 in., densely black-silky; pedicels black, 1/3 in.; bracts linear, minute. Calyx under 1/4 in.; teeth short, linear. Corolla bright yellow, twice the calyx; petals nearly equal. Pod linear-oblong, 1/3 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 exerted, pod minute oblong sessile unilocular 3-4-seeded. *Benth. in Royle Ill.* 198, t. 32, fig. 2; *Bunge Mon.* i. 48; ii. 76; *Boiss. Fl. Orient.* ii. 241.

West Himalayas, temperate and tropical zone, alt. 1-7,000 ft.; *Punjab, Kashmir, Simla, Gurwhal, Kumaoon.*—*Distrib.* Afghanistan.

Stems densely cespitose, ascending, ½-1 ft., densely persistently tomentose. Leaves 1-3 in. long; leaflets close, oblong, glaucous, densely argenteo-canescens, thick, obtuse or subacute, ⅔-1 in. long; stipules small, foliaceous, connate below the middle. Heads small, very dense, oblong; peduncles 2-6 in., densely white-tomentose; bracts lanceolate, exceeding the buds. Calyx ⅛ in. long, sessile, very shaggy; teeth setaceous, as long as the tube. Corolla pale yellow, ¼ in.; keel rather shorter than the standard and wings. Pod ⅛ 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; *Prit. Lahul, Ladak.*—*Distrib.* Kashgar, Beliel.

Rhizome stout, long, woody, fusiform. Stems cespitose, stout, erect, ½-1 ft., shaggy throughout with dense spreading white hairs. Leaves 1½-2 in. long; leaflets 19-21-ob lanceolate, obtuse, ⅔-1 in. long, thinly clothed with loose white hairs; stipules ½ in., free, linear, or lanceolate. Calyx short-pedicelled, ⅔-⅞ in., thinly pubescent; teeth linear-setaceous, nearly as long as the tube. Corolla 2½-3 in., pale yellow; petals subequal. Pod oblong, sessile, membranous, much inflated, an inch long, nearly bilocular, 10-12-seeded.

**Suugen. 6. Phaca.** Herbaceous perennials or undershrubs with flowers in elongated racemes, baxi-fixed hairs and naked stigmas.

* Stipules small.


Tibetan Himalayas, alpine region, alt. 9-12,000 ft.; *Ladak, Zanskar, &c., Thom son.*—*Distrib.* 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, ⅔-⅞ in. long; stipules minute, lanceolate, free, spreading, caduceous. Racemes very lax, ½-1 ft. long; peduncles stiff, ascending, ⅓-1 ft.; pedicels ⅛ in.; bracts very minute. Calyx campanulate, ⅛ in. long, with a few minute adpressed black hairs; teeth deltoid-cuspidate. Corolla ⅜ in.; keel much shorter than the wings and standard. Pod ⅛-⅞ in. long, glabrous, turgid, narrowed to a beak, nearly straight.


West Himalayas, alpine and temperate region, alt. 5-14,000 ft.; *Pangi, Lahul, Kashmir, Simla, Kumaoon, 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* 1-1/2 ft. long; leaflets thin, oblong, obtuse, 1/3-2 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 1/3 in. long; bracts lanceolate, scarcely exceeding the buds. *Calyx* tubular, under 1/2 in. long, finely downy, oblique at the mouth, the teeth denticulate. *Corolla* twice the calyx; petals subequal. Pod turgid, membranous, glabrous, 1/2 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.

**Kashmir**, temperate region, *Falconer*.

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* 1/8 in., linear-setaceous, spreading, cadaceous. *Branches* firm, many-ribbed, clothed with copious adpressed short white hairs. *Racemes* 1-2/3 ft., in the single specimen panicked near the base. *Calyx* 1/4 in. long, including the teeth, densely silky. *Pod* 1-3/4 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 1-2 in. long, finely white-silky, greenish above, glaucous beneath; stipules minute, free, lanceolate. *Bracts* as in the last. *Calyx* 1/8 in., with copious minute adpressed black hairs and deciduous longer white ones. *Pod* 1/8-3/8 in. long, glabrous, narrowed to both ends; its stalk 1-1/3 in. long.

44. **A. ciliolatus**, Bentham. **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 1-2 ft. long; leaflets thin, obtuse, green and glabrescent, 1/8-1 1/3 in. long, glaucous, thinly white-silky at first below; stipules 1/4 in., free, persistent, lanceolate or deltoid. *Racemes* long-peduncled close, subsecund; bracts linear, not exceeding the buds. *Calyx* 1/8 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**, Bentham. **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. f.*

*Stems* 2-3 ft. high, erect, hollow, obscurely pubescent upwards, glabrous below. *Leaves* 1-1/2 ft. long; leaflets thin, narrow, oblong, obtuse, 1-1/3 in. long, green, glabrescent above, glaucous, thinly silky below; stipules lanceolate, spreading, free, 1/8 in.
Racemes long-peduncled, at first close, finally 2-3 in. long; pedicels \( \frac{13}{16} \) in. black; bracts lanceolate, not protruded. Calyx \( \frac{3}{4} \) in. tubular, with a few black hairs; teeth more densely black-silky, less than half as long as the tube. Corolla bright yellow, \( \frac{3}{4} - \frac{3}{8} \) in.; petals subequal. Pod 1-1 2 in. by \( \frac{4}{8} - \frac{3}{4} \) 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 turgid subbilocular 12-16-seeded. Bunge Mon. i. 28; ii. 33. A. podocarpus, Gräb. in Wall. Cat. 5930, non C. A. Meyer.

KUMAOYes, alt. 10-11,000 ft., Blinkworth, Strackey and Winterbottom.

Stems tall, fistular, stout, erect, glabrous. Leaves 6-9 in. long; leaflets thin, obtuse, \( \frac{3}{4} - 1 \) in. long, glabrescent on both sides, green above, glaucous beneath; stipules lanceolate, acute, free, reflexed. Racemes long-peduncled, 2-3 in. long; pedicels ascending, \( \frac{1}{4} \) in. long, finely downy; bracts lanceolate, \( \frac{4}{1} - \frac{1}{3} \) in. Calyx \( \frac{1}{2} \) in. long, subglabrous, tubular. Corolla twice the calyx; petals equal. Pod oblong, turgid, membranous, glabrous, 1 1/4-1 1/2 in. long, narrowed gradually into a beak; stalk \( \frac{1}{8} - \frac{3}{4} \) in. long.

47. A. khasianus, Benth. MSS.; shrubby, leaflets oblong 21-25, calyx-teeth minute, corolla yellow, pod oblong turgid stalked bilocular 12-16-seeded. Bunge Mon. i. 27; ii. 32.

Khasia, temperate region, alt. 6-7000 ft., Hook. f. et. Thomson, Griffith.

Stems tall, erect, shrubby, much branched, subglabrous. Leaves 4 in. long; leaflets thin, narrow oblong, obtuse, \( \frac{3}{4} - \frac{1}{2} \) in. long, green and glabrescent above, glaucous with a few adpressed white hairs below; stipules lanceolate, free, \( \frac{1}{4} \) in. long. Racemes long-peduncled, moderately close, subsecund, finally 3-4 in. long; pedicels \( \frac{1}{4} \) in., finely downy; bracts lanceolate, caducous, \( \frac{1}{2} \) in. Calyx \( \frac{1}{2} \) in. tubular, scarcely at all pilose. Corolla twice the calyx; petals subequal. Pod oblique oblong, very turgid, 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, \( \frac{1}{2} - \frac{3}{4} \) in. long; stipules free, minute, deltoid. Racemes long-peduncled, at first close, finally 2-1/4 ft. long; pedicels short, pilose; bracts linear, not protruded. Calyx \( \frac{1}{2} \) in., tubular, thinly pilose; teeth setaceous, half as long as the tube. Corolla \( \frac{5}{4} \) in.; keel abruptly incurved, much shorter than the wings and standard. Pod glabrous, very turgid, 1-1 1/4 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, \( \frac{1}{2} - \frac{3}{4} \) in. long. Racemes long-peduncled, moderately close, subsecund, finally 2-3 in. long; pedicels black-
Astragalus.]  L. LEGUMINOSAE.  (J. G. Baker.)  131

silky, $\frac{1}{10}$ in. Calyx $\frac{3}{8}$ 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 $\frac{3}{4}$–1 ft.; leaflets 1–1½ in. long, thin, oblong, obtuse, green and glabrescent above, glaucous, with a few adpressed hairs below; stipules broadly membranous, connate, $\frac{1}{3}$–$\frac{1}{2}$ in. long. Racemes long-peduncled, close, 2–3 in. long; pedicels $\frac{1}{3}$–$\frac{1}{4}$ in., subglabrous; bracts lanceolate, $\frac{1}{4}$ 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, $\frac{3}{4}$–$\frac{3}{4}$ 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. A. rotundifolius, Royle Ill. 199; Bunge loc. cit. A. medullaris, Boiss. Diagn. ix. 66; Fl. Orient. ii. 268; Bunge loc. cit. A. Scottianus, Stocks MSS. A. stipulatus, Jaquem. MSS. non Don.

West Himalayas, temperate region, alt. 4–12,500 ft.; KASEMIR, KISTVAR, PTT, GUWAR, KUNAWAR, KUMON.—DIST. Afghanistan, Beloochistan.

A tall undershrub, with copious virgate terete glaucous branches. Leaves 4–6 in. long; leaflets opposite, firm, obtuse, glaucous, glabrous on both sides, subdistant, $\frac{3}{4}$–1 in. long; stipules free, foliaceous, cordate, ovate or lanceolate, 1–$\frac{1}{2}$ in. long. Racemes long-peduncled, $\frac{1}{2}$–1 ft. long; pedicels $\frac{1}{3}$–$\frac{1}{4}$ in.; bracts linear, glabrous. Calyx tubular, glabrous, $\frac{1}{3}$ in. long; mouth very oblique. Corolla yellow, twice the calyx; standard slightly exceeding the wings and keel. Pod 1–1½ in. long, $\frac{3}{4}$ 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 $\frac{1}{2}$–1 ft. long; leaflets thin, obtuse, 1–2 in. long, green, glabrescent above, glaucous with a few adpressed hairs below; stipules membranous, connate, leaf-opposed, amplexicaul, 1–3 in. long. Racemes long-peduncled, $\frac{1}{4}$–1 ft. long, at first dense; pedicels $\frac{1}{4}$ in.; bracts $\frac{1}{4}$ in., lanceolate, membranous. Calyx tubular, $\frac{1}{3}$–$\frac{1}{2}$ in., finely grey-downy. Corolla yellow, $\frac{5}{6}$ 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.; Zanskars, Lahul, Kashmir, Kunawar.

Tufts one or several together at the crown of a woody rootstock. Stipules ½-⅓ in., lanceolate; petiole and leaf-rachis densely silky, the latter 2-4 in. long, not persisting after the leaflets fall; leaflets 31-41, ⅜-⅜ 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, ½-⅓ in. long, densely silky. Calyx tubular, silky, ½-⅜ 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, ½-⅔ in. long, oblong, turgid, bilocular, splitting open the calyx, 15-20-seeded, narrowed suddenly into the beak.

54. A. acaulis, Baker MSS.; heads subsessile, leaflets lanceolate acute glabrous, leaf-rachis not indurated, calyx-teeth lanceolate, ovary stipitate.

Sikkim, alpine region, alt. 16-17,000 ft., Hook. fl.

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, ⅜-⅜ in. long; stipules ¼ in., membranous, lanceolate. Heads 2-3-flowered, sessile. Calyx under ⅜ 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 ½ in. broad. Ovary glabrous, distinctly stalked; ovules 12-16. Pod not seen.

55. A. Webbianus, Gras. in Wall. Cat. 5936; heads subsessile, leaflets oblong obtuse glabrous, leaf-rachis indurated, calyx-teeth linear-setaceous, pod subsessile. Benth. in Royle Ill. 199; Bunge Mon. i. 39; ii. 51.

Kunawar and West Tibet, alt. 12-16,000 ft., alpine region.

Tufts densely cespitose at the crown of a thick woody rootstock. Stipules linear or lanceolate, ½-⅔ 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, ⅜-⅜ in. long, glaucous with a few fine spreading hairs in the early stage. Heads many-flowered, sessile or short-peduncled; pedicels ⅛-⅛ in.; bracts linear, exceeding the pedicels. Calyx tubular, ⅛ 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, ½-⅔ in. long, bilocular, 15-20-seeded, narrowed suddenly at both ends.

56. A. bakuensis, Bunge Mon. i. 37; ii. 45; heads long-peduncled, leaflets linear finely downy, leaf-rachis not at all indurated, calyx-teeth setaceous, pod subsessile. Boiss. Fl. Orient. ii. 283.

Punjab, sub-tropical zone; Salt range, Fleming, Stewart. —Distria. Orient.

Leaves ¼-¾ ft. long; petioles 2-6 in. long, densely clothed with short spreading hairs; leaflets 31-41, distant, opposite or alternate, glaucous, distinctly stalked, ⅜-⅜ in. long; stipules lanceolate, ¼-⅛ in. long. Racemes many-flowered, laxer than in the other species; peduncle 2-12 in. long, finely downy; bracts linear-setaceous, ⅛ in. long. Calyx tubular, downy, ⅛ 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.
Astragalus.]

West Himalayas, temperate and alpine region, alt. 8-13,000 ft.; West Tibet, KUNAWAR, KASHMIR, GURWAL, KUMAO.

**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, 2/3 in. long, more or less silky; petioles 1-2 in. finely downy. *Heads* dense, many-flowered; pedicels 1/3 in., densely silky; bracts linear. *Corolla* 1 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* 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. *pindiceneis*, Benth.) with the general habit and copious persistent indurated petioles of this species, but with a shorter pod rounded at both ends like the next, will probably prove distinct from both when fully known.

Bunge cites from 'Royle Ill. p. 199,' *A. subeulecens*, which he keeps up as a species, but says he has not seen. Royle has no such plant.


**Stems** short, woody, densely clothed with long soft spreading fine pale brown hairs. *Stipules* 1/3 in. long, lanceolate, silky; leaf-rachis including petiole 3-4 ft. long, densely clothed with spreading hairs, much overtopping the heads; leaflets green, roundish or obovate-oblong, 1/3-1/2 in. long, obtuse, with a minute mucro. *Heads* close, 6-12-flowered; peduncle 1-4 in.; pedicels short; bracts linear-setaceous, plumose. *Corolla* densely silky, 2/3 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, 2/3 in. long; stipules lanceolate, 3-4 in. *Heads* close or rarely sublax; peduncles an inch or less; bracts linear-setaceous, exceeding the distinct pedicels. *Corolla* 1 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* 1/2 in. long, sessile, very turgid, firm, bilocular, silky, 8-10-seeded.

60. **A. anomalus**, *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, 3-4 in. long, the upper close, the lower distant, green, with a few short silky hairs; stipules lanceolate, 3-4 in. long. *Corolla* 3/4 in.; teeth setaceous, plumose, half as long as the tube. *Corolla* 2-3 in.; proportion of the petals as in *A. malacophyllus*. *Ovary* linear, silky, nearly sessile; ovules about 20. *Pod* not seen.

SUBGEN. 8. **EGACANTHA**, 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, glibbous calyces and naked stigmas. Included in Fischer's monograph in *Tragacantha*, from which they are separated by their pedicelled glibbous calyx.

* Leaflets glabrescent or obscurely silky.

61. **A. polyacanthus**, Royle III. 199, non Wall. Cat. 5934; spines short, stipules deltoid or lanceolate-deltoid, leaflets 9–13, flowers sessile in the axils of the leaves usually geminate, 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 III. 199, t. 36, fig. 2; Bunge Mon. i. 44; ii. 68. A. Jacque- montii, Bunge Mon. i. 44; ii. 68.

Common in the north-west, ascending from the plains of the Punia to 12,000 ft., reaching east to Kumaoon and Garwal.—District. 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, ¼–½ in. long. *Pedicels* silky, ½–1 in. *Calyx* tubular, ½ in. long, glabrescent or thinly silky; mouth oblique; teeth short, linear. *Corolla* 1–1½ 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. opites, Benth. MSS. A. tenuispinuus, Bunge Mon. i. 44; ii. 70. A. microphyllus, Jacquem. MSS.

West Himalayas, temperate and alpine region, alt. 10–17,000 ft.; Nubra, Ladak, Kashimer, Garwhal, Kunawar, &c.

An undershrub, densely armed with the erecto-patent rigid stramineous leaf-rachises, which are ½–1 ft. long. *Leaflets* finely silky at first, mostly glabrescent when mature, pale green, thick in texture, obtuse, sometimes emarginate, ascending, caducous, ¼–½ in. long, oblongulate or obovate-oblong. *Flowers* usually 3–4 together on short peduncles from the axils of the leaves; *pedicels* ¾–1 in.; bracts linear or setaceous, exceeding the pedicels. *Calyx* ¼–½ 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* ¾–1 in. long, oblong, turgid, bilocular, densely silky, narrowed to the point, 15–20-seeded.

** Leaflets persistently densely silky.

63. **A. multiceps**, Wall. Cat. 5037; 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.; Siimla, Kumaoon, Garwhal.

*Twigs* densely congested, armed with the very crowded ascending old leaf-rachises, which are 1¼–3 in. long. *Stipules* 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 in., thinly silky; teeth linear-setaceous, half as long as the tube. *Corolla* 1 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.; Zanskir, 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, ½ in. long; leaflets 21-31, close, oblong, obtuse, caducous, ¼-½ 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 ¼-½ in., tubular, densely silky; teeth setaceous, ¼ as long as the tube. Corolla ½ 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-axils not peduncled, corolla twice as long as the calyx. *A. leptocanthus*, *Benth. MSS. non Boiss. & Buhse*.

West Himalayas, alpine region. Pitri, 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, ¼-½ in. long, persistently matted on both sides with thick grey-brown silky pubescence. Pedicels ½ in., densely silky; bracts plumose, linear-setaceous. Calyx ½ 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, ¼-½ 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. leucocentrus,* Benth. MSS.

Hazara and West Tibet, temperate zone, Winterbottom, Jacquemont, Falconer.

General habit of *A. polyacanthus*. Branches clothed with dense spreading or deflexed pale brown silky hairs. Spines 1-2 in. long, stramineous, erecto-patent. Stipules 1-2 in., lanceolate-cuspidate; leaflets 15-17, oblong, ¼-½ in. long, obtuse, or subacute, shaggy with dense pubescence like the stem. Pedicels very short. Calyx ¼ in. long, shaggy with dense silky hairs like the stem. Corolla ½-2 in.; wings and keel much shorter than the standard. Pod shaggy, subsessile, oblong, bilocular, ½-⅓ in. long, 8-10-seeded.


West Himalayas, temperate and alpine region, alt. 8-13,000 ft.; Pitri, Kashmir, Kunawar—Disthrk, Afghanistan.

A copiously-branched undershrub, not more than a few inches high, densely armed with the ascending spine-tipped stramineous pedioles, which are 1-2 inches long. Stipules membranous, deltoid, adnate to the pediole, like those of a rose, except at the tip; leaflets 11-13, oblancoate, glaucoes, rigid, acute, ¼-½ in. long, strigillose. Flowers a few sessile in the axil of each pediole, scarcely protruding

beyond the stipules. Calyx \( \frac{3}{4} \) in. long, cleft down to the base, each lobe like a dense tuft of thick white pubescence. Corolla yellow, little exerted; petals equal, marcescent; standard panduriform. Pod sessile, silky, 3-4-seeded.

Bunge gives his A. glabrifolius, Mon. i. 98, ii. 167, gathered also by Griffith in Afghanistan, from the West Himalayas, on Falconer's authority. It has much longer pedicels, longer flat glabrous leaflets, flowers of many nodes at the top of a short stem aggregated into a thick very dense oblong head.

SIBERIA. 10. Cercidiothrix, Bunge (including Calycocystis). Herbacceous perennials, densely canescent with adpressed white bristly hairs fixed by the centre like those of Indigafera, 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-oblong, 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 subacut, \( \frac{3}{4} \) in. long, pale green, glabrescent above, persistently strigillose below; stipules deltoid, free, membranous. Racemes 2-4 in. long, dense upwards, Phala-like; peduncles finally \( \frac{3}{4} \) ft. or more; pedicels very short, cernuous; bracts lanceolate, \( \frac{1}{3} \) in., subpersistent. Calyx \( \frac{3}{4} \) 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, \( \frac{3}{4} \) in. long, depressed down the keel, but the suture not intruded; seeds 15-20.


WEST TIBET, alpine region, alt. 12,000 ft., Thomson, Henderson.—Distribr. Afghanistan, Bshoocostan, 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 \( \frac{3}{4} \) in. long; leaflets \( \frac{3}{4} \) in. acute, firm, pale green, persistently strigillose on both sides; stipules linear, very minute. Racemes 3-12-flowered, 1-2 in. long; peduncles rigid, exceeding the leaves, clothed with mixed black and white adpressed hairs; pedicels very short; bracts minute, lanceolate, persistent. Calyx cylindrical, \( \frac{3}{4} \) 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, 1-4 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. Pl. 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. 187, ii. 234. A. Thomasonianus, Benth. MSS.

WEST TIBET, alpine region, alt. 11-16,000 ft.; Zanskar, Ladak, and Sassar, Thomson, Stewart.—Distribr. Central Siberia.

Root thick, woody. Stems \( \frac{3}{4} \) ft., densely cespitose, slender, finely canescent. Leaf
1-1½ in.; leaflets ¼-3 in., obtuse, densely white-canescent on both sides; stipules small, lanceolate, cuneate, 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 ¼ 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 ¼-½ in., oblique oblong, silky, distinctly stalked, 2-4-seeded, with the introverted suture reaching half through.

**UNKNOWN SPECIES.**

Of *A. carules*, 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 exerted; standard longest; keel shortest, pointed with a distinct cusp. Stamens diadelphous; anthers uniform. Ovary sessile or stalked, many-ovuled; style abruptly incurved beardless, stigma capitate. Pod oblong or roundish, turgid, continuous longitudinally within, unilocular or rarely bilocular.—Disr. Species about 100, spread through the North temperate zone.

**SECT. I. HYPOGLOTTIDAE.** Flowers in dense peduncled heads. Leaflets not more than one from the same point.—Habit of *Astragalus*, section *Hypoglossis*.

* Flowers purple, rarely yellow.


**WESTERN HIMALAYAS**, frequent in the alpine and temperate regions, alt. 9-17,000 ft. Sikkim, *Hook. fil.*—Dist. Mts. of Europe and Siberia.

Stems often not developed, sometimes 1-½ ft. long. Leaves 1-3 in. long; leaflets ¼-1 in., green in the type, with a few adpressed white silky hairs or sometimes nearly glabrescent; stipules ¼-½ in., leaf-opposed, connate towards the base. Peduncles 1-½ ft.; with only a few adpressed hairs; flowers 6-20 in a dense rounded head; bracts minute, linear. Calyx ¼-½ in., coated with adpressed nearly black silky hairs; teeth linear, shorter than the tube. Corolla bright purple, ½-½ in. long; keel much shorter than the wings. Pod linear-oblong, ½-½ 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.

**VARI. 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 longer than in the type. A high alpine form.

**VARI. 2. kumifusa**, *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.

**VARI. 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. fil.*

2. **O. mollis**, *Royle Ill.* 198; stemless, tall, leaflets densely white-
Oxytropis.

Silky 13-25 oblong or lanceolate-oblong, heads finally sublax, corolla half as long again as the calyx, pods ascending. O. floribunda, Benth. in Royle Ill. 198. Astragulus vesiculosus, Jacqum. MSS.

West Himalayas, alpine region, alt. 10-12,000 ft.; Lahul, Zanskar, Kunawar, &c. 
Tetis 4-1 ft. high, crowned at the top of a woody rootstock. Leaves long-petioled, 2-3 in. long; leaflets ¼–½ 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 ¼–½ in long, densely clothed with mixed black and white silky hairs. Pod ½–8 in. long, oblong-cylindrical, unilocular, distinctly stalked, 6-8-seeded.

3. O. Thomsoni, Benth. MSS.; stemless, tall, leaflets lanceolate densely white-silky 13-61, 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 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 ½–3 in.; bracts linear, small. Calyx ½–3 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-silky, heads few-flowered short-peduncled, pod ovate-cylindrical bilocular.

West Tibet, alpine region, alt. 16-17,000 ft., Thomson, Strachey.
Tufts densely caespitose from a woody root, the whole plant not more than 1-1½ in. above the surface. Leaves under ½ in. long; leaflets ⅓ in. long, close, oblong, thickly matted with persistent grey-silky hairs; stipules deltoid, membranous, 1¼–2 in. connate downwards. Heads 3-5-flowered; peduncles densely silky, ¼–½ 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 & Winterbottom.
Whole plant not above a couple of inches above the surface. Stipules deltoid, membranous, minute; leaflets thick, complicate, oblong, ⅓–¼ in. long, densely matted with grey-brown silky hairs. Heads short-peduncled, 2-3-flowered; bracts minute; pedicels very short. Calyx ⅜ in. long, tubular, densely clothed with ascending grey silky hairs; teeth linear, ⅓–½ tube. Corolla half as long again as the calyx. Pod ⅜ in. long, sessile, 3-4-seeded, densely clothed with long persistent pale brown silky hairs.

6. O. tatarica, Jacqum. MSS.; stemless, leaflets small 13-21 densely matted with white silky hairs, heads dense long-peduncled, bracts minute, pod sessile inflated unilocular round-oblong.
Oxytropis.]  L. LEGUMINOSE. (J. G. Baker.)  139

West Tibet, alpine region, frequent, alt. 13-17,000 ft.; NUBRA, ZANSKAR, PTI, PARANG, LADAK, &c.

Densely tufted, the whole plant 3-4 in. high. Leaves 1/2-1 in. long; leaflets close, except the lowest, oblong or lanceolate-oblong, 1/2-2 in. 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 1/2-1 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-epathulate, exceeding the wings and keel. Pod much inflated, membranous, sessile, 1-3 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 1-1 1/2 ft. high. Stems ascending from a woody rootstock, finely pubescent. Leaves 1-2 in. long; leaflets 1/2-1 in. long, clothed on both sides with loose white silky hairs; stipules lanceolate or deltoid, coninate downwards. Flowers 12-30 in a dense head; pedicels very short. Calyx 1/2 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. Leh. 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 1-2 in. long, obtuse, thinly clothed with rather long whitish hairs on both sides; stipules 1-2 free, lanceolate or oblong. Flowers 12-20 in a dense head; pedicules erect, 4-6 in. long; pedicels 1/2-1 in.; bracts linear, 1-2 in. long, ciliated with black hairs. Calyx 1/2 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, 1-2 in. long, straight, 6-8-seeded, with a few dark silky hairs.

Dr. Hooker procured from Nepalese Tibet flower-heads of a fifth yellow-flowered species which, as far as the material goes, matches the Siberian O. argentata, 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. campstris.

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, PTI, SASSAR, NUBRA, KUNAWAR, &c.; SIKKIM, Hook. fl.

Stemless, erect, 1-2 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, 1 1/2-3 in. long; leaflets crowded, linear-oblong, 1/2-1 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 *Phaca*.


West Tiber, temperate region, alt. 7–8000 feet.—**Distr.** West Siberia. Caulescent, 1–2 ft. high. **Stems** copiously branched, firm, slender, zigzag, terete, glabrous. **Leaves** 2–3 in. long; leaflets 9–13, lanceolate, \(\frac{1}{4}\)–1 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-foliate. **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, capit ate. **Pod** of 1–4 flattened indehiscent densely muricate joints.—**Distr.** Species 3–4, reaching Egypt and Abyssinia.


Plains of Scinde and the Punjab.—**Distr.** Afghanistan, Orient. A copiously-branched undershrub, 1–2 ft. high, with slender finely canescent terete branches. **Leaves** shortly petioled, usually 3-foliate; leaflets very variable in size, \(\frac{1}{2}\)–1 in. long, obovate-oblong or nearly round, thick, pale green, thinly canescent beneath, the side ones not opposite; stipules free, minute, lanceolate, scarious. **Racemes** few- or many-flowered, usually exceeding the leaves. **Calyx** \(\frac{3}{4}\)–\(\frac{3}{2}\) in., thinly silky. **Corolla** red, glabrous, \(\frac{3}{4}\)–\(\frac{3}{2}\) in. **Joints** of pod 1–4, roundish.

29. **Ebenus**, Linn.

Villous herbs or undershrubs. **Leaves** odd-pinnate; leaflets entire, exstipulate; 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 capitated. **Pod** flat, oblong, included in the calyx-tube, membranous, indehiscent.—**Distr.** 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.—Distr. 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, ½-3½ in. long. Flowers sessile in dense staked heads, on peduncles at most as long as the spines, each head surrounded by a whorl of large lanceolate bracts. Calyx ½ in., densely clothed with long brown silky hairs.

30. GEISSAPSID, W. & A.


Plains of Western Peninsula, Ceylon, Aya, Martaban, Tenasserim, and Pegu.

A densely caespitose trailing annual, with slender naked branches ½-2 ft. long. Leaves petioled, with a very short rachis; leaflets obovate, oblique, glabrous, truncate, ½-1½ 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 ½ in. long. Calyx ½ in. long Corolla twice the calyx. Joints 1-2, ½ in. long.

2. G. tenella, Benth. in Hohen. 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, ½-1½ in. long, obliquely obovate, truncate, glabrous. Racemes copious, terminal, peduncled, 4-12-flowered; bracts obliquely oblong, less imbricated, ½-1½ in. broad, strongly veined, ciliato-denticulate. Calyx ⅙ in., deeply cleft. Corolla yellow, ⅙ 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 Pindes, Dr. Aitchison.

Stems slender, 1½-2 ft., glabrescent. Leaf-rachis 3-4 in. long, including distinct
petiole; leaflets 9-11, oblong-cuneate, subacute, distant \( \frac{1}{4} \text{ in.} \) long, obscurely canescent; stipules linear, minute. Racemes long-peduncled, 6-9 in. long, lax; buds crowded; pedicels very short; bracts linear, minute. Calyx campanulate, \( \frac{1}{2} \text{ in.} \) silty; teeth lanceolate. Corolla 3-4 times calyx; standard glabrous, veined. Pod reniform, turgid, \( \frac{1}{4}-\frac{1}{2} \text{ in.} \) 1-seeded; faces woody, deeply alate; edge muriated 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 \textit{O. heterophylla}, C. A. Meyer; \textit{Led. Fl. Ross}, i. 711, from Persia and the Caucasus.


Herbs or undershrubs. Leaves oxtipellate, trifoliolate. Flowers copious, in racemes, or crowded in the leaf-axils. Calyx-tube campanulate; 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, indescent. \textit{Distr.} Species 20-25, the others Siberian, Chinese, Japanese, and N. American, one Javan. Monographed lately by Maximowicz.

\textbf{Subgen. Bulespedeza.} Keel obtuse, not much incurved.


Along the Himalayas from Hazara and Kashmir to Assam, alt. 3-8000 ft. \textit{Distr.} China, Japan, N. Australia.

An erect undershrub, 2-3 ft. high, with tough long slender branches. Leaves ascending, crowded; leaflets \( \frac{1}{4}-\frac{1}{2} \text{ in.} \) 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 \( \frac{1}{2} \text{ in.} \). Flowers 2-4, on short pedicels in the axils all down the branch; bracteoles linear, minute. Calyx \( \frac{1}{3} \text{ in.} \) canescent; teeth linear-subulate, very long. Corolla twice the calyx, white, tinged with purple. Pod \( \frac{1}{2} \text{ in.} \) thinly silty; style twice its length.


\textit{Kashmir} and \textit{Kunawar}, temperate region, alt. 4-8000 ft. \textit{Distr.} Siberia, North China.

Stems slender, 1-2 ft. high, finely downy, erect or decumbent. Leaves not nearly so crowded as in the last; leaflets \( \frac{1}{4}-\frac{1}{2} \text{ in.} \) long, rigidly subcoriaceous, obtuse, narrowed gradually in the lower half; petioles \( \frac{1}{4}-\frac{1}{2} \text{ in.} \). Umbels usually sessile, produced far down the branches. Calyx \( \frac{1}{2} \text{ in.} \) canescent; teeth linear-setaceous, 3-4 times the tube. Corolla twice the calyx. Pod and style as in \textit{L. sericea}.

3. \textit{L. Gerardiana}, \textit{Grah. in Wall. Cat.} 5744; petiole short, leaflets ob-
Lespedeza.] L. LEGUMINOSÆ. (J. G. Baker.) 143

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 2-3 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 ½-2 in.; leaflets ½-3 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 ½-1 in., densely pubescent; teeth linear-subulate, very long. Corolla half as long again as the calyx. Pod ½ in. long, oblong, downy.


KASHMIR, temperate region, alt. 5-6000 ft., Griffith, Hook. fL. and Thomson.

Stems woody, reaching several feet high, finely pubescent. Leaves not crowded; leaflets subcoriaceous, 1-1½ 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 ½-1 in., densely canescence; teeth lanceolate, acute, twice as long as the tube. Corolla deep red, twice as long as the calyx. Pod oblong, ½ in. long, finely downy, distinctly stalked.—Very near the common East Asian L. bicolor, Turcz. Led. Fl. 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.—DISTRI. China, Japan, Korea.

Stems 2-3 ft., erect, densely pubescent. Leaves distantly; leaflets 1-2 in. long, obtuse, thick, subcoriaceous, at first thinly silky above, densely silky, and the veins raised beneath; petioles 1-½ in.; stipules subulate, persistent. Racemes distinctly peduncled, 2-4 in. long, moderately close, rarely congested, sessile (L. glomerata, Horn.) ; pedicels very short. Calyx ½-1 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.

SUGDEN. Oxyramphis, Wall. Keel acute and much incurved, like that of a Crotalaria. (Campylotropis, Bunge.)

7. L. macrostyla, Baker; petiole short, leaves small thinly clothed be-
neath with whitish silky hairs, calyx and large pod densely clothed with spreading hairs. *Oxyramphis sericea*, *Grah. in Wall. Cat. 5349. Lespedeza sericea, *Royce MSS. non Miquel. Crotalaria macrostyle, Don Prodr. 242. Oxy-


**HIMALAYAS,** tropical and temperate zones, alt. 2-7000 ft.; **SIMLA** and **GURWAHL** to **KHASIA**.

An undershrub, 3-4 ft. high, with woody densely pubescent branches. **Petiole** 1/2-1 in.; leaves obovate-cuneate, rigidly subcoriaceous, 1-3 in. long, grey, glabres-
cent, venose above, usually persistently silky, rarely (*O. macrostyle, Wall.*) subglabrescent below, broadly rounded, sometimes deeply emarginate at the point, the peti-
lule of the end one not more than 1/2 in. **Racemes** short, dense, many-flowered, catkin like when unexpanded, the silky ovate bracts hiding the buds; pedicels 1/2 in., densely silky. **Calyx** 1/2 in.; teeth lanceolate, twice the tube. **Corolla** deep red, three times the calyx. Pod short-stalked, 3-4 in. long, narrowed to both ends; style per-
sistent, 1/2 in. long, densely plumose in the lower half.


**HIMALAYAS,** 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 fur-
rowed branches. **Petiole** 11/2-1 1/2 in.; leaves obovate-cuneate, 3-1 in. long, rigidly subcoriaceous, green, glabrous, reticulate-venose above, broadly rounded at the apex, the end one on a petiolule 1/4 in. long; uppermost leaves reduced or suppressed. **Racemes** copious, peduncled, not dense, many-flowered, 2-4 in. long; bracts not exceeding buds; pedicels 1/2-1 in. **Calyx** 1/2 in.; teeth linear-subulate, twice the tube. **Corolla** deep purple-red, 3-6 in. **Pod** 1 in., long, minutely stalked, more coriaceous than in the last; style as long as the pod, slightly pubescent near the base.—L. paniculata, *Royce,* is a mere form, with lax racemes and longer pedicels.

9. **L. Thomsoni,** Benth. MSS.; petiole produced, leaflets large densely argenteo-canescent beneath, calyx and small pod finely grey-silky.

**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** 1/2 in., linear, subpersistent, canescent on the back; pedicels 1/2-1 in. **Calyx** 1/2 in.; teeth lanceolate, as long as the tube. **Corolla** 1/2 in., deep red. **Pod** 1/2-1 in. long, shortly stipitate, finally glabrescent, subcoriaceous; style 1/2 in., not at all plumose.

**SPECIES UNKNOWN TO ME.**

1. **L. decorum**, *Kurus in Journ. Asiat. Soc. Beng. 42, 2, 231.* An erect shrub, 3-5 ft. high, with angular stems clothed with adpressed fulvous down. **Stipules** linear-subulate 1/2 in.; petiole 1-1 1/2 in.; leaflets obovate-oblong, obtuse with a micro, chartaceous, 1-2 1/2 in. long, glabrous and dark green above, glaucous and faintly pubescent below. **Racemes** short, but slender, fulvo-pubescent; bracts ovate-lanceo-
late, cuspidate, 1/4 in. long, persistent, glanduloso-pilose. **Calyx** 1/2 in., fulvo-pubes-
cent; teeth ovate-acuminate. **Corolla** twice length of calyx, blue. Immature **pod** oblique ovoid, compressed, shortly sericeous. **MARTABAN,** *Kurus.*

leaves ovate-elliptic, 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, 1/2 in.; teeth subulate. Corolla scarcely twice as long as the calyx, probably blue. 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 exerted; standard broad; keel obtuse. Stamens diadelphous; anthers uniform. Ovary linear, sessile, 6-8-ovulate; style filiform, incurved; stigma minute, capitate. Pod linear, subcontinuous or moniliform; joints oblong, small, turgid, smooth.—Distrib. Species I, 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 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, 1/2-1/3 in. Corolla reddish, 3 times the calyx. Pod 1 in. long or less, falcate or straight.

34. **Hedysarum**, Linn.

Herbs. Leaves numerous, odd-pinnate, extispellate. Flowers usually red, in copious long-peduncled axillary racemes. Calyx-tube campanulate or tubular; teeth 5, distinct, long or short. Corolla much exerted; petals unequal in relative proportion in the different species; keel obtuse. Stamens diadelphous; anthers uniform. Ovary linear, stalked, few-ovulate; style very long, filiform, abruptly inflexed, stigma minute terminal. Pod of 1-3 flattened indehiscent joints, in our species not muricate, but ruditately 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 equaling or exceeding the tube.

1. **H. kumaonense**, Benth. MSS.; stemless, leaflets small subcoriaceous-ovate-oblong, bracts lanceolate, joints small firm turgid, sutures not bordered.

Kumaon, temperate region, alt. 1000 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, 1/3-1/2 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 1/3-1/2 in.; teeth setaceous, from a lanceolate base, exceeding tube. Corolla 5/8-3/8 in. Joints of pod solitary in the specimen seen, rather downy, oblong, under 1 in. long.

2. **H. sikkimense**, Benth. MSS.; 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, 1/4-1/2 in. long, obtuse, glabrous above, obscurely pubescent with raised veins below. Heads dense, 1-2 in. long in flower; bracts linear, minute. Calyx pubescent, 1/4 in.; teeth lanceolate, as long as the tube. Corolla bright red, 1/4-3/4 in. Joints of pod 1-3, roundish or oblong, 1/8 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 1/2-2 ft. high, slender, firm, sulcate, glabrous. Leaf-rachises 6-9 in. long; leaflets 13-19, distant, 2/4-1/2 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 1/4 in. long; teeth setaceous, as long as the tube. Corolla 1/2-3 in. Joints oblong, glabrous, 1/8 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.

Kishwar, alpine zone, alt. 11-12,000 ft., Thomson. Lahul, Joreskhe.

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 mucro, 3/4-1 in. long, glabrescent above, persistently grey-canescence below. Flower-racemes very dense, 2-3 in. long, the linear seariose bracts protruding beyond the buds; pedicels shorter than calyx. Calyx 1/8 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 1/3-1 ft. long; leaflets 21-27, thin, obtuse, 3/4-1/2 in. long; both sides green, glabrescent, concolorous. Racemes very dense, 2-3 in. long in flower, the linear seariose bracts protruding beyond the buds; pedicels very short. Calyx downy, 1/8 in.; teeth as long as the tube. Corolla 3/4-1 in. long. Joints 1-3, glabrous, oblong, 1/4-1/2 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, 1/4-1 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 1/4 in.; upper teeth deltoid, lower lanceolate. Corolla 3/4-3 in. Joints 3-4, oblong, firm, glabrous, rather turgid, not more than 1/8 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, 1–1½ in. long, flexible, glabrescent above, thinly white-silky beneath. Racemes dense, 2–3 in. long; the buds quite hidden by the imbricated scariosose ciliated bracts; pedicels very short. Calyx tubular, ½–1 in. long; teeth deltoid-cuspidate, not more than ⅓–⅔ tube. Corolla yellowish, under ½ 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; Gurwhal, 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, 1–1½ in. long; both sides green, glabrous. Flower-racemes 2–4 in. long, lax; pedicels ½–⅔ in. long, grey-pubescent. Calyx ½ in., campanulate, membranous, glabrous; teeth minute, deltoid-cuspidate. Corolla bright red, ¾–3 in. Joints 2–3, oblong, ⅓–⅔ in. long, thin, glabrous, the sutures both distinctly margined.

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 diadelphous; anthers uniform. Ovary linear, sessile, few-ovuled; style long, filiform, abruptly incurved, stigma minute capitate. Pod flat, not visibly jointed, muricately 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 Nipal, 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 11–15, 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 ½ in., densely pubescent. Corolla ¾–⅔ in., reddish, glabrous. Pod glabrous, membranous, 1 in. long.

36. **Zornia**, Gmel.

Annuals, with large geminate 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 dimorphous. Ovary sessile, many-ovuled; style filiform, incurved, stigma minute capitate. Pod of several small round flattened finely muriculated 1-seeded indehiscent joints.—Distrib. Species 10, all but two American.

Plains from the Himalayas to Ceylon and Birma, ascending to 4000 ft. in Kumaon.—Distrib. Everywhere in the Tropics.

Stems wiry, densely cespitose. Leaves petioloed; leaflets lanceolate, acute, glabrous, rigidly coriaceous, ¼-1 in. long, dotted with black glands; stipules lanceolate, with a long spur.

**Hedysarum** BeM. Wall. Salisb. Calyx anthers Walkeri Ajachis Cosmopolitan, 726 323 318; DO. leaflets stipules bracts Fl. Joints _Zomia._ Stems Thwaites Hedysarum style teeth, small world.

**L. Leguminose.** (J. G. Baker.) [Zornia.]

37. **STYLOSANTHES,** Sw.

Undershubs. 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 capitata. 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 scariosi, adnate downwards to the petiole; leaflets ¼-1 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 ⅓ 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 scariosi, with large auricles. Flowers racemose or axillary. Calyx deeply 2-lipped, the lips usually entire. Corolla exserted; standard orbicular; keel incurvate, obtuse. Stamens in two bundles of 5 each; anthers uniform. Ovary linear, many-ovuled; style incurved, filiform, stigma minute capitata. 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; Sallisb. Par. t. 92; Wall. Cat. 5688, et
HIMALAYAS TO TRAVANCORE AND RANGOON, ascending to 3000 ft. in KHASIA.—DISTR. Madagasar, Abyssinia, Java, China.

Annual, ½-3 ft. high. Stems very slender, much branched. Leaf-rachis bristly, ½-1 in. long; leaflets ½-⅓ in. long, with subparallel edges, bristly mainly on the midrib below. Flowers 1-6, in close short-peduncled racemes from the axils of the upper leaves; pedicels short, ascending. Calyx ½-⅔ in. long; lips acute, entire, with a few short deciduous scattered bristles. Joints 4-6, densely papillose on the faces.

2. S. gemniflora, 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 ⅓ in., with a few deciduous bristles; both lips entire, acute. Corolla about twice the calyx. Joints 4-6, very turbid and papillose.


Plains of CONCAN.

Annual. Stems very slender, ½-2 ft. high. Leaf-rachis 1-2 in. long; leaflets linear, ¼-⅔ 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 cernuous; bracteoles acute or obtuse, ½-⅔ calyx. Calyx ⅓-⅔ in. long; upper lip obtuse, recurved, lower subacute, both without bristles. Corolla little exserted. Joints of pod 10-12, reticulato-venose, not papillose.


Plains of CONCAN, Stocks, Dalzell.

A robust annual, 2-4 ft. high, the stems densely clothed throughout with deflexed bristles. Leaflets linear, ⅛-1½ 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 ⅛ 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 papillose.

** 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 echinulate. Dalz. & Gibs. Bomb. Flora, 64.

Plains of CONCAN, Stocks, Dalzell; DEKKAN, near Poonah, Jacquemont.

Annual, very diffuse, with very slender stems, 1 ft. or less high. Leaf-rachis ¼ in. long; leaflets membranous, ob lanceolate-oblong, obtuse, ⅝-⅞ in. long, minutely bristly
on the back and edge. Flowers 4-6, in copious short-peduncled racemes; bracteoles linear, \( \frac{1}{2} \) the calyx. Calyx \( \frac{1}{2} \) in., turbinate, densely bristle-ciliated; lips equal, upper truncate. Corolla yellow, twice the calyx.


Nilokhris, Schmidt, Wight.
A diffuse, very slender, perennial, with the general habit and inflorescence of S. bigemina. Leaflets obovate-oblong, \( \frac{1}{4}-\frac{3}{4} \) in., minutely bristly. Calyx \( \frac{1}{4} \) 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 echinulate as in S. bigemina.

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. pumila, Royle MSS.; W. & A. Prodr. 220.

Simla and Kumaon to Khasia and Sikkim, alt. 3-6000 ft. Paramnth in Behar.
Annual. Stems slender, \( \frac{1}{2}-2 \) ft. high. Leaf-rachis \( \frac{1}{2}-1 \) in.; leaflets linear, \( \frac{1}{2}-\frac{3}{4} \) in. long, obtuse, distinctively bristly on the edge and midrib below. Flowers up to a dozen in dense copious short-peduncled second racemes; bracteoles leafy, oblong, ciliated, nearly as long as calyx. Calyx \( \frac{1}{4} \) in., densely bristle-ciliated; upper lip truncate, finally \( \frac{1}{4} \) in. broad; lower lanceolate. Corolla yellow, little exserted.

8. S. capitata, Dals. in Kew Journ. iii. 208; stems not bristly, leaflets 20-30, flowers in globose terminal heads, bracteoles large, joints 5-6 smooth. Dals. & Gibbs. Bomb. Flora, 63, non Desv.; Bedd. ix. Pl. Ind. Or. t. 244.

Western Peninsula.
An annual, 1-2 ft. high, with firm shrubby terete branches. Leaf-rachis densely bristly, \( \frac{1}{1}-\frac{1}{2} \) in. long; leaflets linear, \( \frac{1}{4}-\frac{3}{8} \) 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 \( \frac{1}{6} \) in. long; both lips broad, truncated, ciliated with long bristles. Corolla purplish, much exserted. Joints neither venose, nor papillose.

9. S. pycnantha, Bentham. MSS.; stems minutely bristly, leaflets 6-8, flowers in globose terminal heads, bracteoles minute, joints 5-6 venose.

Concan, Stocks, Law.
An erect annual, \( \frac{1}{4}-2 \) ft. high, the stem clothed densely with small bristles dilated at the base. Leaves distinctly petioloed; leaf-rachis \( \frac{1}{4} \) in. or less long, densely bristly; leaflets linear, \( \frac{1}{8}-\frac{3}{8} \) 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, obnucate. Calyx \( \frac{1}{8} \) 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, Dakell 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. Exsicc. No. 146, non Wall.

Western Peninsula.
Stems annual, very slender, little branched, 1-1 \( \frac{1}{2} \) ft. high. Leaf-rachis \( \frac{1}{4} \) in. or less long; leaflets membranous, oblanceolate-oblong, obtuse, \( \frac{1}{8}-\frac{3}{8} \) in. long, not aristate, both sides without bristles. Lower racemes of the panicles 5-6-flowered, secund; pedicels ascending, \( \frac{1}{4}-\frac{1}{2} \) in.; bracteoles linear, \( \frac{1}{3}-\frac{1}{4} \) calyx. Calyx membranous, \( \frac{1}{3} \) 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 † calyx, joints 20–25 venose.

Base of the Himalayas in Sikkim, Herb. Griffith, Hook. fil.;
Stems stout, erect, 3–4 ft. high. Leaf-rachis 2½–3 in. long; leaflets linear, obtuse, without bristles, ½–3 in. long; lower stipules 1 in. long. Racemes subsessile, 6–12-flowered, forming a corymbose panicle † ft. broad; pedicels erect, ½–1 in. long, with a few deciduous bristles; bracteoles ¼ in., obtuse. Calyx ½ in. long; lips equal, truncate, obtuse, with only a few small bristles at first. Joints largest of all, † in. broad.

12. **S. blandia**, Wall. Cat. 5669; stems densely bristly, leaflets 6–10, racemes copiously panicked, bracteoles half as long as the calyx, joints ½–6 reticulated. *W. & A. Prodr. 221; Wight. Ic. t. 986; Dalz. & Gibbs. Bomb. Fl. 64.*

East Himalayas, tropical zone up to 4000 ft, 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, ½–3 in. long, with copious fine deciduous bristles on the rachis, edge and midrib. Racemes forming a dense terminal panicle, with corymbose branches; pedicels ½–1½ in., densely bristly. Calyx ½–½ in., densely clothed with fine bristles on back and edge; lips equal; upper broad, truncate. Corolla bright yellow, twice the calyx. Joints † in. broad.


Var. 2. *racemosa*; annual, more slender and fugacious, leaflets more membranous, calyx ½–2 in. long, coryms formed of a few close subsessile racemes 1½–4 in. long. *S. racemosa, Heyne in Wall. Cat. 5670; W. & A. Prodr. 221; Dalz. & Gibbs. Bomb. Fl. 63.* *S. hisutus, Dalz. in Kew Journ. iii. 135; Dalz. & Gibbs. Bomb. Fl. 63.—Plains of Western Peninsula and Ceylon.*

39. **ÆCHYNOMENE**, 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.—Distr. Species about 30, spread everywhere in the tropics.


Himalayas to Ceylon and Siam, ascending to 6000 ft. in Kashmir and 4000 ft. in Kumaon.—Distr. Japan and everywhere in tropics of old world.

A suffruticose 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-ciliated. Calyx under ½ in. long. Corolla fugacious, twice the calyx. Pod 1–1½ in. long, straight or rather curved; upper suture straight, lower more or less distinctly indented; joints 6–10, ½–1 in. broad, smooth or finally papillose on the face.


Tropical Zone; Bengal and Silhet to Malacca and Ceylon.—Distrib. 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 ⅛ in., with a pair of round bracteoles. Corolla twice the calyx. Pod 2–2½ in. by ½ in.; joints 3–6; smooth or echinate on the faces over the seeds.

*Æ. subrattensis*, *W. & A. Prodr.* 219, is altogether doubtful, the description being probably taken in part from *Sesbania acetabula*.

40. **ORMOCARPUM**, Beauv.

Shrubs. Leaves with odd-pinnate extipellate 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. Stamens in two bundles of 5 each; anthers uniform. Corolla linear, few-ovuled; style filiform, in- flexed, stigma minute terminal. Pod of a few indehiscent turdoid linear or oblong joints, the lower seedless, the faces rugose, naked or pubescent with weak gland-tipped prickles.—Distrib. Species 6, spread all round the world in the tropics.


Plains of the Western Peninsula and Ceylon.—Distrib. 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 ⅛ in. Corolla yellow, much exserted. Pod with 2–4 joints, linear or oblong, ½–1 in. long, horizontally plicate, smooth or pubescent.

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. Stamens diadelphous; anthers uniform. Corolla sessile, 1-ovuled; style long, filiform, incurved, stigma capitulate. Pod small, oblong, membranous, flattened, 1-seeded, opening widely along the ventral suture.—Distrib. Two species, the other a plant of Madagascar.

Tropical Zone; Nilghiris, Gardner, Schmidt, Wright.

A perennial, with slender firm trailing cespitose stems 1–2 ft. long. Leaves short-petiolated, membranous, 1 or 3-foliolate, the end leaflet the largest, orbicular or oblong, obtuse, \( \frac{1}{2}-\frac{3}{4} \) in. long, a little hairy below. Flowers in copious oblong terminal racemes under 1 in. long; bracts ovate, scarioso, finely pubescent; pedicels short. Calyx ¼ 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 subsessile, 1-ovuled; style short, uncinate or nearly straight, thickened at the base, stigma capitate. Pod of a single dimidiate membranous veined joint, with a flattened straight 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, \( \frac{1}{2}-1 \) 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, scarioso, deciduous. Pod ¼ in. long.

43. **PYCNOSPORA**, R. Br.

A low shrub. Leaves pinnately 3-foliolate. Flowers minute, racemed, Calyx deeply cleft, the upper teeth subconnate. Corolla much exserted; standard roundish; keel obtuse, cohering to the wings. Stamens diadelphous; anthers uniform. Ovary sessile, many-ovuled; style inflexed, 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.—Distr. China, Philippines, N. Australia.

A perennial herb, with slender densely cespitose trailing stems \( \frac{1}{2}-2 \) ft. long. Leaves pinnately 3-foliolate; leaflets obovate, obtuse, \( \frac{1}{2}-1\frac{1}{2} \) in. long, stipellate, subcoriaceous, glabrous above, finely downy and reticulato-venose below. Flowers in lax terminal racemes; bracts deciduous, scarioso, ovate-cuspidate; pedicels downy, 2–3 times the calyx. Calyx \( \frac{1}{2} \) in. long or less. Pod \( \frac{3}{4}-\frac{1}{2} \) 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 subconnate. Corolla 2–3 times the calyx; standard broad; keel obtuse. Stamens diadelphous; anthers uniform. Ovary subsessile, many-ovuled; style filiform, stigma capitate. Pod linear-oblong, compressed, mem-
branous, indehiscent, continuous within, the sutures not at all indented.—Distrib. Species 5, the others African.


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* petiolate, pinnately 3-foliolate; *leaflets* stipulate, membranous or subcoriaceous, green, obscurely bristly above, grey, densely pubescent, rarely subglabrescent below; and *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* 3–4 in. long, 4–6-seeded, finally downy.

45. **LOUREA**, Neck.

*Herbs.* *Leaves* membranous, stipulate, 1–3-foliolate. *Flowers* in terminal simple or panicked racemes. *Calyx* membranous, accrescent, the lanceolate teeth as long as the panicleate tube. *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; *Taung-dong* mountains, *Wallach.*

*Stems* erect, slender, finely downy. *Leaves* 2½–3 in. broad, rigidly coriaceous, glabrous; *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 geminate, shorter than the calyx. *Calyx* slightly downy, finally ½ in. *Joints* downy.


Common in waste places throughout India.—Distrib. Tropics of both hemispheres, often planted.

*Stems* erect, slender, finely downy upwards. *Petiole* ½ in. long; *leaflets* rigidly subcoriaceous, green, clouded usually with white, the end one 2–3 in. broad, ½ in. long, with two linear or lanceolate spreading or slightly ascendent 2–3-nerved half; *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 geminate. *Calyx* finally ½ in. long. *Corolla* not exerted. *Joints* 4–5.

BIRMA, Wallach.—Distrib. Malay isles, China, Philippines, N. Australia.

Stems cespitose, very slender, wide-trailing, pubescent. Petiole \(\frac{1}{2}-\frac{3}{4}\) in.; leaflets membranous, pale green, as broad as long, truncate or rounded at the apex, pale green, not clouded, glabrous above, \(\frac{3}{4}\) 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.


AVA; Taong-dong mountains, Wallach.

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 \(\frac{1}{3}\) in., curved. Calyx \(\frac{3}{4}-\frac{1}{2}\) in., densely pubescent. Corolla twice flower-calyx. Joints 2-3, pubescent.

40. **URARIA**, Desv.

Suffruticose perennials. 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 adhering to the obtuse keel. Stamens 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 suffruticose perennial, 3-6 ft. high. Stems robust, finely downy. Petioles 1-2 in.; leaflets 4-6, rarely 9, rigidly subcoriaceous, glabrous above, reticulato-venulose, minutely pubescent below, 4-8 in. long, \(\frac{1}{2}-1\) in. broad; lowest simple, round or oblong. Flowers in dense cylindrical racemes, \(\frac{1}{2}\) ft. long, \(\frac{3}{4}-\frac{1}{2}\) in. broad; bracts brown, scarious, deciduous, not distinctly ciliated; upper lanceolate, lower ovate acuminate; pedicels \(\frac{1}{3}-\frac{1}{2}\) in., abruptly recurved at the tip after flowering. Corolla purple, slightly exserted. 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 5-7-foliolate; leaflets subcoriaceous, green, smooth above, paler, reticulato-venose beneath, 4-6 in. long, 1\(\frac{1}{4}\)-2 in. broad, much rounded at the base. Racemes dense, reaching above a foot long, 1\(\frac{1}{4}\) in. thick;
lower pedicels ½-⅓ in. long with spreading bristles 3-4 times their thickness; bracts distinctly ciliolate. **Calyx-segments densely plumose. Corolla purplish, ½ in. long. Joints 4-6, opaque.

** Leaves 1- and 3-foliolate intermixed.


Tropical zone. **Nipal** and **Bengal** to **Avaj**.—**Distr.** Malaya isles, China, Polynesia, N. Australia.

*Stems* densely capnose, woody, slender, pubescent. *Petiole* ¼-1 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 persistent, distinctly ciliolate; pedicels densely ciliate, not longer than calyx. **Calyx** ½-⅔ in.; lower teeth scabose, densely plumose. **Corolla** scarcely exserted. **Joints** 1-2, brown, polished, finely pubescent. *U. cercisifolia*, *Desv.*; *DC. Prodr.* ii. 325, is probably a form of this with a single leaflet.


**Punjab**, along the Himalayas to Assam and Avaj, 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, reticulote-nioso, finely downy below; end leaflet 2-4 in. long, ½-2 in. broad. **Racemes** copious, both terminal and axillary, resembling those of *U. crinita*, reaching 6-9 in. by 1-1⅓ in.; bracts deciduous; pedicels 2-3 times the calyx, densely ciliate. **Calyx** ½-⅔ in. **Corolla** purple, little exserted. **Joints** 2-6, dark or pale, dull or polished.


**Burma**, *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 ⅓-⅔ in.; bracts ovate, acuminate, distinctly ciliolate, not deciduous; pedicels densely ciliate, shorter than the calyx. **Calyx** ⅓ in.; lower teeth long, scabose, plumose. **Joints** 2, polished, glabrous, brownish-drab.


**Himalayas** to **Ceylon**, **Birman** and **Burma**, ascending in **Sikkim** to 4000 ft.—**Distr.** Malaya 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 panicled, reaching ½-1 ft. long; bracts ovate, cuspidate, pubescent, deciduous; pedicels ½-1 in., often fascicled. Calyx ½ in., all the teeth deltoid-cuspidate. Corolla 2-3 times the calyx. Joints 4-6, opaque, drab or brown.

*** Leaves usually all 1-foliate.

7. U. prunellaefolia, Grah. in Wall. Cat. 5686; 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. Leaflet oblong or lanceolate, obtuse or acute, rounded at the base, 3-4 in. by 1-1½ in.; petiole ½-3 in. Racemes terminal, simple, 1-2 in. by ½-1 in.; bracts small, lanceolate, deciduous; pedicels 2-3 times the calyx, shortly bristly. Calyx ½-1 in., lower teeth twice as long as the upper. Corolla under twice the calyx. Joints 3-4, placed end to end, opaque or polished.


47. Alysicarpus, Neck.

Diffuse annuals or biennials. Leaves simple, rarely 3-foliate, stipulate, subcoriaceous. Flowers in cipions 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 terra or turgid, composed of several indehiscent 1-seeded joints.

—Derrin. Species about 15; weeds everywhere in the tropics of the old world.

* Microcalycinae. Calyx not longer than the first joint of the pod.


Stems densely tufted, ½-1 ft. long. Leaves all simple, oblong, obtuse, glabrous, ½-3 in. long, often cordate; petiole ½-1 in. long, finely downy. Racemes close, 4-8-flowered; pedicels very short. Calyx ½-1 in., obscurely hairy; teeth linear, erecto-patent. Pod ½ in. thick, 4-8-jointed, ½-1½ 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 BUNDIELKUND 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, 3/8-14 in. long and broad; petiole 1/8 in., hairy like the branches. Racemes short-peduncled, moderately close, 4-6-flowered; pedicels as long as the calyx. Calyx 1/4 in. long, the linear teeth erecto-patent. Pod 1/2-5 in. long, by 1/6 in., distinctly pubescent, 3-5-jointed.


HIMALAYAS 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, 1-2 in. long, cordate at the base, usually oblong, obtuse, about twice as long as broad, rarely lanceolate, 3-6 times as long as broad; petiole 1/2-5 in. Racemes elongated, 6-12-flowered, 2-3 in. long; pedicels shorter than the calyx. Calyx 1/4 in., nearly glabrous; teeth linear-setaceous, exceeding the tube. Pod 1/2-3 in. by 1/4 in., the joints half as long again as broad, faintly pubescent, rugose, usually a little thickened at the end, sometimes indistinctly moniliform.


Var. 2. heterophyllus; leaflets lanceolate, simple and trifoliolate intermixed, racemes elongated. A. heterophyllus, Benth. MSS. A. trifoliatus, Stocks MSS.—Plains of Scinde, Dr. Stocks.

Var. 3. Stocksii; stems clothed with fine spreading hairs, leaflets thinner than in the type obovate oblong hairy beneath, racemes elongated.—Plains of Concan, Stocks & Law. Intermediate between the type and A. rotundifolius.

**Macrocalycineae.** Calyx much longer than the first joint of the pod, its teeth imbricated in the fruiting stage.


HIMALAYAS to CEYLON and BIRMA, ascending to 4000 ft. in KUMAON.—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 1/4 in., adpressed to the pod, hairy at the edge only; teeth twice as long as the furrowed funnel-shaped tube. Pod stalked, 3/4-5 in. long, 1/12 in. thick; joints 4-6, glabrous, as long as smooth, slightly moniliform.

Var. 1. gracilis; leaves oblong-lanceolate obtuse 1-2 in. long, calyx not more than 1/4 in. long, pod 1-2-jointed; included or little exerted. A. gracilis, Edgew. in Journ. Linn. Soc. ix. 312; Cat. Pl. Band. 46.—Bundelkund, Edgeworth. Western Peninsula, Wight.

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 in.; teeth lanceolate, 4–5 times the length of the funnel-shaped plicate tube. *Pod* 4–6-jointed, usually exserted, ¼ in. broad, turgid, moniliform, marked only with a few faint raised veins.


Himalayas (up to 4–5000 ft.) to Ceylon and Birma.—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 ½–¾ in.; flowers adpressed to subglabrous rachis. *Calyx* ½–¾ in., glabrous on the back; teeth lanceolate, much imbricated, reaching down nearly to the base, minutely ciliated. *Pod* 3–5-jointed, included, glabrous, ¼ in. broad; joints rather broader than long, marked with close prominent transverse ribs.


Plains of Bundelkund, Deccan and Concan.

Resembling closely the small forms of *A. rugosus*. *Stems* slender, ¾–1 ft., finely hairy. *Leaves* simple, oblong or lanceolate, 1–1¾ in. ciliated on the nerves beneath. *Racemes lax, 2–3 in. long, the lower flowers in distant pairs; pedicels ¼ in. *Calyx* ¼–½ in.; teeth lanceolate, acuminate, reaching down nearly to the base. *Pod* ¼–½ in. by

Plains of Concan and Deccan.

Stems ascending, 1–1 ½ 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** ⅓ in. long; teeth lanceolate-sessaceous, densely plumose, reaching down to the base. **Pod** 3–4-jointed, included in the calyx, moniliform, glabrous; joints globose, under ¼ in. thick, the veins honeycombed.


Plains of Concan, Dalzell, Ritchie.

Stems 1–2 ft., clothed with dense short pubescence. **Leaves** casually 3-foliate, 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, 1½–1 ½ in. broad; pedicels curved, ascending, downy ⅔ in. **Calyx** ⅔ in.; teeth 5, lanceolate, reaching down to the base. **Pod** 3–4-jointed, subcompressed, scarcely moniliform, ⅓ in. broad, marked on the face with fine raised honeycomb veins.


48. **MEGOPUS**, Bennett.

An annual herb. **Leaves** 1-foliate. **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 inflexed, stigma minute capitate. **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 Burma, Martaban and Tenasserim.—DISTRIB. 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 stipitate at the top. **Flowers** in dense oblong peduncled terminal heads 1 in. or less long; pedicels fascicled, ½ in. long, finely downy, exceeding the sessaceous bracts. **Calyx** and corolla very small. **Pod** with a stalk 3–4 times as long as itself.

49. **OUGEINIA**, Bentham.

Tree. **Leaves** pinnately 3-foliate. **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 capitate. **Pod** linear, flat, smooth, formed of 2–5 large more or less distinct joints. —DISTRIB. A single endemic species.
Ougeinia. ]

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


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; and 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 ½–3 in., filiform, downy or glabrous. Calyx ½–3 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 subomnate. 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 muricated, 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.

Ornthopus perpusillus is in Schmidt's Nilgiriy collection, no doubt accidentally introduced.

Arachis hypogea is frequently cultivated, but has no claim to be regarded as a native.

**Subgen. 1. Dendrolobium, W. & A.** Shrubs with woody branches, 3-foliolate leaves, flowers in dense short-peduncled or sessile axillary umbels, minute deciduous bracts.


Tropical Zone; A VA, Tenasserim, Penang, Malacca, Ceylon.—**Distrib.** Mascaren isles, Malaya, Philippines, Polynesia.

A shrub, 5–8 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-oblong, 2–3 in. long. Umbels 6–12-flowered; pedicels short, unequal. Calyx ½ in. densely silky; teeth shorter than or as long as the tube. Corolla ⅝–⅜ in. Pod 1½–2 in. long; joints 4–5, thick, glabrescent or silky, ½–⅘ 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.
Phyllodium, Desv. Shrubs with woody branches, 3-foliate 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, Burma, and Pegu.—Distrib. China, Philippines, Malay isles.

A shrub, 3–6 ft. high, with slender terete finely grey-downy branches. Petiole ½–1 in.; leaflets rigidly coriaceous, green, glabrous above; and one much the largest, oblong, 3–6 in. long, obtuse or subacute, rounded at the base, sometimes slightly repand. Racemes ½–1 ft. long, composed of 12–50 umbels; bracts the same texture as the leaves, orbicular, rather oblique, ⅓–½ in. long, with a short petiole ending in a long bristle; umbels 2–6-flowered; pedicels ⅓–½ in., downy. Calyx ⅓ in.; teeth lanceolate, shorter than the tube. Corolla 3 times the calyx. Joints of pod rarely 1 or 3, glabrous or downy, ½ 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 1–1½ 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, ⅓–1 in. long, more cordate at the base; pedicels ⅓–⅔ in. long. Calyx ⅔ in., finely downy; upper teeth deltoid; lowest lanceolate. Joints of pod ⅔ 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 1–1½ 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* ⅔ in.; teeth deltoid, two upper connate, lowest lanceolate. *Corolla* ⅔ in. Joints of pod 2–3, downy, ½ in. long.

Sægen. 3. **Dicerca, DC.** A trailing undershrub with small 3-foliolate exstipellate leaves, minute bracts and flowers in long racemes.


Plains of WESTERN PENINSULA, Ceylon and BIRMA.—Distrib. Malay isles, N. Australia.

*Stems* slender, densely cespitose, ½–2 ft., glabrous or downy. *Stipules* scariosae, connate, 2–3 cleft; petiole ½–1 in.; leaflets rigidly coriaceous, pale green, subequal, ob lanceolate-oblong, obtuse, subglabrous, ⅔–⅔ in. long, nearly digitate. *Racemes* peduncled, subial, ⅔–⅔ ft., the lower flowers 2–4 together. *Calyx* scariosae, sub glabrous, under ⅔ in.; teeth exceeding the tube, the two upper connate. *Corolla* 2–3 times the calyx. *Joints* usually 2, rarely 1, round-oblong, pubescent, ⅔ in. long, both sutures deeply indented.

Sægen. 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; KIMAOI 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, se taceous; petiole 1–1⅔ in., thickened, grooved down the face; leaflets oblong-lanceolate, acute, 2–4 in. long, rigidly subcoriaceous, shining above, hairy on ribs below. *Racemes* ⅔–⅔ ft.; pedicels ½ in., finally spreading. *Calyx* ⅔ in.; hairs adpressed; teeth lanceolate, as long as the tube, lowest linear. *Corolla* white, ⅔–⅔ in. *Pod* 2–3 in. long; joints 6–8, twice as long as broad, beset with minute hooked spreading hairs.

Sægen. 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 KIMAOI, Sikkim and KHASIA. CHITTAGONG, TAVOY, PEHU.—Distrib. Seychelles, China, Philippines.

Branches triquetrous, soon glabrescent. *Leaflet ovate or lanceolate, reaching 6–8 in. long, acute, rigidly subcoriaceous, glabrous above, hairy on the ribs below; petiole 1–1⅔ in., with a wing on each side, like the leaflet in texture, ⅔–⅔ in. broad. *Racemes* ⅔–⅔ ft. long, axillary and terminal; pedicle ascending, ⅔–⅔ in. *Calyx* ⅔ in., cyma nulate; upper teeth deltoid, lowest linear. *Pod* 1–2 in. long, 6–8-jointed, glabrous or pubescent; joints nearly square, lower suture faintly indented.

Sægen. 6. **Desmodium proper.** Erect herbs or undershrubs.
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 \( \frac{1}{2} \) in. Racemes terminal only, 6–9 in. long; fascicles of flower few and distant; bracts minute, setaceous; pedicels \( \frac{1}{2} \) in. finally subpatent. **Calyx** \( \frac{3}{10} \) in., pubescent; teeth short, deltoid. Pod pendulous, 3–4 in. long under \( \frac{1}{4} \) in. broad; joints ribbed horizontally, clothed with minute hooked hairs, distinctly constricted at both sutures.

10. **D. teres**, **Wall. Cat.** 5994; petiole very short, leaves 1-foliolate, joints 10–12 very narrow turgid 4–5 times as long as broad, **Benth. Pl. Jungh.** 225.

**Ava**; **Taong-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 \( \frac{1}{2} \) in. Racemes terminal and axillary, lax, 6–9 in. long, sparsely panicked; bracts minute, subulate; pedicels downy, \( \frac{1}{2} \) in., finally spreading. **Calyx** \( \frac{1}{5} \) in., densely hairy; teeth as long as the tube. Pod \( \frac{1}{2} \) in. by \( \frac{1}{5} \) in. br., clothed with minute hooked hairs, subsessile, 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**, **Beng., Tenasserim**.—**Distr.** Java, Borneo, Philippines. An erect undershrub, 3–5 ft. high, with obtusely angled branches, clothed with dense short hairs. **Pettiole 1–2 in.**; leaflets membranous or subcoriaceous, glabrous above, clothed with appressed minute hairs beneath; end one usually ovate or broad oblong, acute, sometimes obovate, subobtuse, 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 \( \frac{1}{2} \) in., finally spreading; bracts minute, linear-subulate. **Calyx** under \( \frac{1}{10} \) in., densely hairy; teeth lanceolate, longer than the tube. Pod 1–\( \frac{1}{3} \) in., rarely 2 in., by \( \frac{1}{5} \) 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 (Ochalaria, DC.)**

A campsis erect annual, 1/2-2 feet high, with very slender glabrous stems. Leaves distinctly petiolated, 3-foliolate, green, membranous, subglabrous; end one ovate or lanceolate, 1/2-1 1/2 in. long. Racemes copious, axillary and terminal, the latter much panicked; bracts minute, setaceous; pedicels filiform, patent, glabrous, 1/2-1 in. Calyx 1/2 in.; teeth as long as the tube. Pod 1/2-1 in. long, 3-1/2 broad, 4-6-jointed, glabrous.

Joints of pod indehiscent, longer than broad, the lowest one distinctly stalked, the contractions reaching from the lower nearly to the upper suture.

(Dodocarpus, Benth.)


Temperate and tropical Himalayas, alt. 2-7000 ft.; from Simla and Gurwhal to Khasia and Sikkim.—Distrib. China, Japan.

Stems 2-3 ft., herbaceous, angular, erect, finely pubescent. Stipules small, setaceous; petiole 1-3 in.; leaflets 3, membranous, both surfaces subglabrescent, the lower one pale; end one roundish, subsacate, 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; pedicels under 1/4 in. Calyx turbinate, 1/4 in., slightly bristly; teeth deltoid, very short. Corolla 1/4 in. Joints 1-2, 1/2 in. long by half as broad, half-rhomboidal, pubescent, the upper suture flattened.

Var. lacum; leaflets larger, the end one 2-3 times as long as broad narrowed gradually to a point. D. laxum, DC. loc. cit. Hedysarum laxum, Spreng. Syst. App. 292. D. trinerve, Grai. in Wall. Cat. 3720.—Kumaon, Nipal and Sikkim.


West Peninsula, Shevagerry hills, Dr. Wight. Ceylon, Gardner.—Distrib. Japan.

General habit of the last, of which it is perhaps a mere southern variety. Stipules linear, 1/2-1 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 1/2-1 in.; bracts, calyx and corolla of D. podocarpum. Joints 2-3, 1/2-1 1/2 in. long, 1/2 in. broad, cut away in an oblique line from opposite the point to the base; stalk of pod 1/2-3/4 in. long.

D. dolabiforme, 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 Peninsula, Carnatic, near Courtallum, Wight; Tinnevelly, Beddome. 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, and one ovate, narrowed gradually to an obtuse point, twice as long as broad, 1 1/2-2 in. long, base deltoid. Racemes simple, lax, long-peduncled, terminal, 2-3 in. long; pedicels 1/4-3/4 in., finally patent. Calyx 1/4 in., turbinate; lower tooth lanceolate, as long as the tube, upper deltoid. Joint solitary, half-rhomboidal, 1/4 in. long, three times as long as broad, narrowly narrowed from above the middle to the tip and stalk.

D. Scalpe, DC. Prodr. ii. 334; corolla large, bracts large ovate, pedicels very long, stalk of pod twice as long as the calyx. D. strangulatum, W. & A. Prodr. 228; Wight loc. t. 985. D. trichocaulon, Hassk. Pl. Jav. Rav. 367,

Stems 3–4 ft. high, erect, woody in the lower part, densely downy. **Stipules** ¼–½ in., lanceolate, persistent; **petiole** 2–3 in.; **leaflet** 3, membranous, finely downy on both surfaces, often slightly repand; end one 2–4 in. long, roundish- or obovate-rhomboidal, 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 1–1½ in. long. **Calyx** ¼ in., downy; lower tooth lanceolate, as long as the tube; upper deltoid. **Corolla** ¼–½ in., bright red. **Joints** 1–3, half-rhomboidal, ¼–½ in. long by half as broad; apex oblique; upper suture rather recurved.


**Temanesem**, Kurz.

A twining perennial, 3–4 ft. high, with puberulous stems. **Stipules** lanceolate, ¼ in.; **petiole** ¼–½ in.; **leaflet** chartaceous, pale, thinly downy and prominently veined beneath, end one obcordate-lunate, ½–2 in. broad, emarginate with a macro, lateral ones smaller, deltoid. **Racemes** slender, pubescent, axillary and forming a terminal panicle; **bracts** very caducous. **Calyx** ¼ in., pubescent; **teeth** lanceolate, acuminate. **Corolla** purple, under ¼ in. **Joints** of pod 1–3, round-hastate, ½ in. long and broad, flat, puberulous.

**** **Joints** of pod indehiscent, once or twice as long as broad; upper suture straight or slightly indented; calyx-teeth deltoid, never exceeding the tube (Dolliner, Endl.) All shrubby.

† Leaves 1-foliolate.


**Ava**; Taung-dong mountains, Wallisch.

**Stems** slender, woody, finely downy. **Leaflet** oblong, 3–5 in. long, obtuse, rounded at the base, subcoriaceous, green, glabrous above; **petiole** ¼–½ in. **Racemes** very lax, axillary and terminal, copiously panicked, 4–6 in. long, most of the flowers in distant pairs; **pedicels** ¼–½ in.; **bracts** ¼ in., ovate-cuspidate. **Calyx** ¼ in., lowest tooth lanceolate, as long as the tube. **Corolla** ¼ in. **Pod** ¼–1 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, woody, glabrous. **Leaflet** membranous, 2–1 in. long, 1½ in. broad, green above, grey-green beneath; **petiole** ¼–½ in. **Racemes** very lax, axillary and terminal, the end one panicked; **pedicels** erecto-patent, ¼–½ in. **Calyx** ¼ in., thinly silky; **teeth** as long as the tube, lowest lanceolate, the others deltoid. **Corolla** 3–4 times the calyx. **Pod** ¼–½ in. long, ½ in. broad, 3–4-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-foliolate.

20. **D. sinuatun**, Blume MSS.; **petiole** repand, **pedicels** short, **bracts** small, **bracts** setaceous, joints many small clothed with minute hooked hairs. *D. strangulatum* var. *sinuaturn*, Miq. Flor. Ind. Bat. i. 265.
Khasia, tropical zone, alt. 3–5000 ft., Hook. fil. & Thomson. Mishmi, Griffith.—
Distirb. Malay isles.

Branches terete, woody, minutely downy. Petiole 1–1½ in.; leaflets subcoriaceous, pale, minutely downy or nearly glabrescent beneath; and one roundish-rhomboidal, obtuse, 2–3 in. long, conspicuously repand in the upper half. Racemes copious, terminal and axillary, moderately close, not more than 2–4 in. long; pedicels ½–1½ in., finely downy. Calyx ½–1½ in.; teeth as long as the tube. Corolla ½ in. Pod 1½–2½ in. long, under ½ 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 pressed grey silky hairs and finely reticulato-venose beneath; and 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, ciliate, ½ in. long; pedicels ½–1 in., erecto-patent, finely hairy. Calyx ½ in.; teeth as long as the tube. Corolla ½–1½ in. Pod 2–3 in. long, under ½ in. broad; 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, Litm.)

Central and East Himalayas, alt. 2–4000 ft.; Nepal, Sikkim and Khasia.

Branches terete, finely downy when young. Petiole 1–1½ in.; leaflets subcoriaceous, glabrous above, distinctly reticulato-venose, pale, minutely hairy below; endone obovate or oblong, obtuse or acute, 3–6 in. long. Racemes copious, short, dense, axillary and terminal, the latter panicked, often subsecund; bracts ½–1 in. long, lanceolate, scarious; pedicels ½–1½ in., ascending. Calyx ½ in., turinate, subglabrous; lower teeth lanceolate, as long as the tube; upper deltoid. Corolla 3–4 times the calyx. Pod 1–1½ in. long, under ½ in. broad; joints 3–4, twice as long as broad, the constriction from below reaching more than half way through.

23. D. oxyphyllum, DC. Prodr. ii. 336; leaflets acute thinly silky beneath, pedicels long, bracts lanceolate acuminate, corolla large, joints many large glabrescent. D. serriferum, Wall. Cat. 5708 B.

Central and East Himalayas, tropical and temperate zones. Kumao 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; and 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, acuminate, ciliate, ½ in. long; pedicels ascending, subglabrous ½–1½ in. Calyx ½ in., subglabrous; teeth very short. Corolla 2½ in. Pod 2–3 in. long, ½ in. broad, shortly stalked; joints 6–10, rather longer than broad.

Var. serriferum; leaflets obtuse repand densely silky beneath, pedicels spreading or deflexed ½–2 in. long clothed with spreading silky hairs like the calyx. D. serriferum, Wall. Cat. 5708 A. D. polycarpum, Wall. Cat. 5710, non DC.—Nepal, Wallich.

All along the Himalayas from the Upper Punjab to Tavoy, temperate and tropical zones, ascending to 9000 ft.

Branches slender, terete, finely downy. *Petiole* 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 panicked, with lower branches again compound; pedicels ½ in., ascending, finely downy. *Calyx* ½ in., downy; teeth deltoid, shorter than the tube. *Corolla* ½ in.* Pod* 2-3 in. long, ½ 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, Wallich.

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; petiole 1-1½ in. *Racemes* terminal and lateral, distinctly peduncled, 2-3 in. long, moderately close; pedicels ½ in., slender, ascending; bracts setaceous, minute. *Calyx* ½ in., bristly, teeth lanceolate. *Corolla* ½ in.* Pod* glabrescent, 5-6-jointed, only seen immature.


Himalayas (ascending to 5000 ft. on the Chenab) to Pesh and Ceylon.—Distribr. 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 ½-⅔ as broad, rounded at the base, narrowed gradually to an acute point, thinly clothed beneath with adpressed grey hairs, not reticulato-venose; petiole ½-1 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 ½-⅔ in., ascending; bracts minute, setaceous. *Calyx* under ⅔ in., finely downy; teeth lanceolate. *Corolla* ⅔-⅗ in.* Pod* falicate, ⅔-⅗ in. long, ⅔-⅗ in. broad, 6-8-jointed, glabrescent or clothed with minute hooked hairs.


Desmodium.] L. LEGUMINOSAE. (J. G. Baker.)


HIMALAYAS (ascending to 4000 ft. in Simikot) to BIRMA, SIAM and CEYLON.—Dis-trib. 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, 1 1/2 - 2 as long, as broad, usually cordate or truncate, rarely deltoid at the base, reticulato-venose, densely clothed with short soft brown hairs beneath; petiole 1/2 - 1 in. Racemes copious, ascending, 2-6 in. long, sessile or short-peduncled, spike-like, usually dense, axillary and terminal, the latter compound; pedicels 1/2 in. or less, densely downy; bracts minute, setaceous. Calyx 1/4 in.; teeth linear-lanceolate, as long as the tube. Corolla 3-4 times calyx. Pod 1/4 in. long, 1/6 in. broad, 4-6-jointed, densely clothed with minute hooked hairs, the upper suture slightly indented.

†† Leaves 3-foliolate.


CEYLON, Thwaites C.P. 3327.

Stems a foot or more long, clothed upwards with dense spreading grey hairs. Petiole 1/2 - 3/4 in.; leaflets membranous, green, glabrous above, clothed below with short adpressed grey hairs; end one 1-1 1/2 in. long. Racemes few, long-peduncled, lateral and terminal, lax, few-flowered; pedicels 1/4 - 1/2 in. spreading or ascending. Calyx under 1/4 in.; teeth lanceolate. Corolla 1/2 in. Pod 1 1/4 in. by 1/4 in.; joints about 4, minutely pubescent, scarcely constricted at the upper suture.—Habit of D. polycarpum var. tri-chocaulon, from which it differs by its pod, long pedicels, and lax racemes.


NILGIRI Hills and CEYLON.

Stems erect, clothed when young with fine short spreading grey hairs. Stipules large, lanceolate, acuminate, not amplexicaul; petiole 1-1 1/2 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 1/4 - 3/4 in., ascending or spreading. Calyx 1/2 in.; teeth lanceolate, longer than the tube. Corolla 3 times calyx. Pod 1 1/4 in. long, under 1/4 in. broad, glabrescent, 4-6-jointed; upper suture distinctly indented.


Plains of the Western Peninsula, Bunderkund, Bengal and Prome, ascending to 4000 ft. in the Vindhia chain (Bigheworth).

Stems 1-2 ft. long, diffuse, caespitose, prominently angled, clothed with spreading grey hairs. Stipules large, leafy, amplexicaul, auricled; petiole 1-1 1/2 in.; leaflets
subcoriaceous, rather sebaceous above, with obscure adpressed hairs,reticulato-vendose, finely grey-downy below; and one obtuse, obovate, rarely roundish or oblong, 2-3 in. long. Racemes copious, lateral and terminal, lax or moderately close, reaching a foot long, the end one panicked; pedicels ¾-1 in., pedunculate, erecto-patent. Calyx ¾ in.; teeth deep, sebaceous. Corolla twice the calyx, the smallest of all the species. Pod 1/3-1/2 in. long, 5-8 in. broad; joints 4-6, densely clothed with minute spreading hooked grey hairs; upper suture distinctly indented.

31. D. sequax, Wall. Pl. As. Ror. t. 157; shrubby, branches terete, leaflets ovate-oblong acute repand, bracts very minute, upper suture slightly indented. Wall. Cat. 5712.

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. Petioles 1-2 in.; leaflets subcoriaceous, subsebaceous, with short obscure adpressed hairs above, grey and more densely hairy beneath; and one 3-5 in. long, narrowed gradually to a point. Racemes copious, moderately lax, lateral and terminal, 2-4 in. long, the end one panicked; pedicels ½-1 in., downy, spreading or ascending. Calyx ½ in.; teeth lanceolate. Corolla 3 times calyx. Pod ½-1 in. long, ¾ 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. Pegu, McLeodland.
A tall shrub, with slender drooping branches, densely clothed at first with short grey pubescence. Petioles ½-1 in.; leaflets subcoriaceous, green, smooth above, with raised parallel main veins and clothed with adpressed grey or brownish silky hairs beneath; and one 2-3 in. long; side ones smaller. Racemes copious, lax, lateral and terminal, the latter often ½-1 ft. long, usually simple; pedicels ½-1½ in., ascending; bracts ¾-1 in., closely imbricated, densely silky. Calyx ½ in.; teeth lanceolate-delto-toid. Corolla ⅓-⅔ in. Pod ½-1 in. long, ¾ in. broad, short-stalked, 4-6-jointed, minutely downy.
Var. amanum; leaflets narrowed to an acute point, racemes most or all terminal. D. amanum, Wall. Cat. 5726._Khasia and Silhet.

****** Joints of pod small, as long as broad, sometimes splitting along the lower suture; upper suture straight, lower slightly constricted. Calyx-teeth long. (Nicolsonia (DC))


Assam, Silhet and Tenasserim, tropical zone._Distribution. China.
Branches terete, woody, clothed with short spreading hairs at first. Leaves subcoriaceous, thick, green, glabrous above, densely cotted with adpressed white silky hairs beneath, 1-2 in. long and broad; side leaflets when present much smaller than the end one; petiole ½-1 in., deflexed at tip. Racemes copious, simple, axillary and terminal, very dense, subsericeus, an inch or less long; bracts ovate, ciliate; pedicels ¾-1 in. Calyx ⅔ in., densely bristly. Corolla twice the calyx. Pod ½-1 in. long, obscurely hairy, under ¾ in. broad; joints 3-5.

34. D. capitatum, DC. Prodr. ii. 336; leaflets always 3 obovate-cuneate, pedicels sharply reflexed. D. obovatum, Wall. Cat. 5722 B. D. polycarpum,
Ceylon, Burnman. Prome hills, Wollich.—Distributed Malay isles, Philippines.

Branches woody, terete, argentee-ascending 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 ½-⅔ in.; bracts small, ovate-cuspidate, ciliat. Calyx ½ in. glabrescent; teeth deep, setaceous. Corolla twice the calyx. Pod ½-⅔ in. long, glabrescent, 4-6-jointed, ⅛ 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, ⅓-1 in. Racemes terminal, peduncled, 2-6 in. long, dense in the upper part; bracts ⅓-⅔ in., ovate-cuspidate, densely silky; pedicels ½-⅔ in., silky, erecto-patent. Calyx ½ in., densely silky; teeth deep, setaceous. Corolla twice the calyx. Pod ½-⅔ 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 round or broad-oblong, cordate, ½-1½ in. long, obtuse or emarginate, subcoriaceous, glabrous above, reticulato-venose and inconspicuous hairy below; petiole ½ in. Racemes copious, close, under 1 in. long, axillary and terminal, nearly sessile; bracts lanceolate, under ⅛ in.; pedicel ½-⅔ in., abruptly crenulate at the tip, as in *Uraria*. Calyx ½ in., clothed all over with dense white hairs; teeth long, lanceolate-cuspidate. Corolla twice the calyx. Pod sessile, 2-jointed, glabrous, not longer than the calyx.


Nilgiri Hills and Ceylon, up to 4000 ft.

An erect undershrub, with young branches densely clothed with short ferruginous silky hairs. Petiole 1-1½ in.; leaflets subcoriaceous, glabrous above, more or less densely argentee-canescent 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 ovato-accurinate, ½-⅔ in., densely silky; pedicels ½-⅔ in., densely silky. Calyx ⅓ in.; teeth lanceolate, exceeding the tube; lowest linear. Corolla ½-⅔ in. Pod short-stalked, 1-1½ in. by ⅛ in., 6-8-jointed; minutely downy.

Himalayas, (ascending to 5000 ft.) and everywhere in the plain to Burma, 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 \( \frac{3}{4} \) 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 \( \frac{4}{3} \) in.; pediciles \( \frac{4}{1} \) in. Calyx \( \frac{4}{3} \) in.; teeth acuminate, exceeding tube. Corolla under \( \frac{3}{4} \) in. Pod \( \frac{3}{2} \) in. long, \( \frac{3}{4} \) in. br., glabrescent or minutely downy, 5-8-jointed.


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, \( \frac{3}{4} \) in. long; base subcuneate; petiole \( \frac{1}{4} \) in. Racemes terminal, peduncled, 4-6 in. long, close upwards; bracts \( \frac{4}{3} \) in., ovate, silky; pediciles \( \frac{4}{1} \) in. Calyx \( \frac{4}{2} \) in.; teeth lanceolate, acuminate, exceeding tube. Corolla \( \frac{4}{3} \) in. Pod \( 1 \frac{1}{4} \) in. by \( \frac{2}{3} \) in.; joints 4-6, rather longer than broad, minutely downy.

40. **D. rotundifolium**, Baker, non Wall.; annual, stems very slender, leaflets 1-foliolate, leaflet orbicular, racemes very lax few-flowered, pedicels ascending, corolla exserted. Alysicarpus rotundifolius, Dalzill 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, \( \frac{3}{4} \) in. long, obtuse or obscurely cuspidate, slightly cordate, membranous, grey-green below with only a few obscure adpressed hairs; petiole \( \frac{1}{2} \) in. Racemes copious, terminal and lateral, the former forked, 3-4 in. long, the lower flowers in distant pairs, upper solitary; pedicels \( \frac{5}{4} \) in. long, arcuate, finely pubescent. Calyx \( \frac{5}{4} \) in., thinly hairy; teeth linear-serrate, very deep. Pod \( \frac{3}{4} \) in. long, under \( \frac{1}{2} \) in. broad, falcate; joints 3-5, glabrescent, reticulato-venose.

41. **D. parviforum**, Baker; annual, stems very slender, leaves oblong 1- and 3-foliolate intermixed, racemes very lax many-flowered, pedicels ascending, corolla included. Alysicarpus parvifolius, Dalz. in Hook. Kew Journ. iii. 211; Dalz. & Gibbs, Bomb. Flora 65.

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\( \frac{1}{2} \) in. long, obtuse or subacute, subobtuse, with only a few adpressed grey hairs beneath; side ones, if present, much smaller; petiole \( \frac{1}{2} \) in. Racemes usually terminal, simple, 4-8 in. long, the lower flowers in distant pairs; pedicels capillary, \( \frac{3}{4} \) in., finely downy; bracts \( \frac{4}{3} \) in., lanceolate-cuspidate. Calyx \( \frac{4}{3} \) in., clothed with short bristly hairs; teeth setaceous, very long. Pod sessile, falcate, \( \frac{3}{4} \) in. by \( \frac{3}{4} \) in., 4-6-jointed, glabrescent.


Plains of Marfaan and Tenasserim, Wallich, Helfer, Parish, Kurz.
Stems cespitose, diffuse, 1-1½ ft., densely clothed throughout with spreading brown silky hairs. Leaves subcoriaceous, pale green, nearly glabrous beneath; and leaflet obovate-oblong, obtuse, ½-1 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, ¼ in. Calyx ⅛ in., shaggy with silky hairs, like those of the stem; teeth linear-setaceous, very long. Pod sessile, silky, under ½ by ½ in., 4-5-jointed.

SUGEN. 7. Sagotia, Walp. Trail ing herbs, with small 3-foliolate stipitate leaves, flowers in sparse lax racemes or 1-2 in the axils of the leaves, deciduous bracts and distinctly jointed pods.

* 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 6-7000 ft. in Kashmir and on the Chenab.—Distrib. Cosmopolitan in tropics.

Stems cespitose, very slender, trailing ½-1½ ft., copiously branched, clothed with fine spreading hairs. Stipules lanceolate, persistent; petiole ¼-½ in.; leaflets obovate, ½ in. truncate or emarginate, with a few adpressed hairs below. Pedicels ¼-½ in. Calyx pubescent, ⅛-½ in.; teeth very long, setaceous. Pod ⅛-⅜ 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, Lobb; Prom, Ava on the Banks of the Irrawaddi, Wallich; Western Peninsula, Wight.—Distrib. Java.

Stem 1 ft. or more long, very slender, glabrous. Leaflet rigidly subcoriaceous, half as broad again as long, ½-¾ 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 ⅛-⅜ in., finally cuneatus. Calyx under ½ in., turbinate, glabrous. Pod glabrous, ⅛-½ in. by ½ 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-acuminated, persistent; petiole ⅛-½ in., pubescent; leaflets
oblong or obovate-oblong, 1/4-1 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 1/3-1 in. Calyx 1/4 in., densely hairy; teeth very long, setaceous. Pod 1/3-1/2 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 Mrsooe, Rottler; Prome, Wallach.

Stems 1 ft. or more long, copiously branched, finely downy at first. Stipules linear-setaceous, minute; petiole 1/4-3/4 in.; leaflets 3, obovate, 3-4 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 1/4-1 in. Calyx 1/4 in., campanulate; teeth subdeltoid. Joints 1/4 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 Kumon.—Distrib. Malay isles, China, Japan.

Stems densely caespitose and branched, wide-trailing, at first pubescent. Stipules 1/8 in., linear-setaceous, persistent; leaflets oblong or obovate, pubescent below, often not more than 1/4-1/2 in. long, sometimes 3-5 in. Racemes copious, but usually terminal on the short branches, laxly 6-10-flowered; bracts boat-shaped, deciduous; pedicels 1/4-3/4 in., permanently ascending. Calyx 1/2-3/4 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 in. broad, the sutures less indented, the upper one nearly or quite straight.—Assam and Khasia, Griffith, Hook. fl. & Thomson.

Surg. 8. Pleurolobium, DC. Erect undershrubs, with large leaves, racemose flowers and indistinctly jointed pods dehiscing 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 Peninsula, Ceylon, Ava, Pegu, Tenasserim.—Distrib. Malay isles, Philippines.

An undershrub, 3-4 ft. high, with subterete glabrous branches. Petiole 3-4 in.; leaflets 1-3, suborbicaceous, 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
Desmodium.]

L. Leguminosae. (J. G. Baker.) 175

hidden by the large ovate deciduous bracts, finally 3-6 in. long; pedicels ½ in., patent, finely downy. Calyx ⅜ in. campanulate; teeth deltoid, shorter than the tube. Corolla ¼ in. Pod 1-1½ in. long, ½-⅔ in. broad, falcate, 6-10-jointed, straight along the upper, slightly indenting along the lower suture.


CENTRAL AND EAST HIMALAYAS, tropical region; GUBHWAJ to KHASIA and CACHAR; Upper Bengal, Pegu, Ceylon.—DISTRIBUTION. Malay isles.

Closely allied to the last, but decidedly shrubby, reaching 3-10 ft. in height. Leaves obtuse, oblong or obovate-oblong, thin or densely pubescent beneath; side ones often suppressed. Racemes shorter and the terminal ones not so copiously panicked; bracts under ¼ in. long, narrowed suddenly at the point. Corolla ½ 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 incurved. Stamens 9, united in a tube slit above, the tenth abort; anthers uniform. Corolla subsericeous, many-ovuled; style short, incurved, beardless, stigma capitate. Pod oblong or linear-oblong, flat or turgescent, moderately firm, thinly septic;—DISTRIBUTION. Species 5; cosmopolitan in the tropics.


HIMALAYAS to Ceylon and Siam, ascending to 3500 ft.—DISTRIEB. Cosmopolitan in the tropics, often planted.

A copiously-branched climber, with slender branches. Leaves 2-3 in. long; leaflets 20-40, membranous, deciduous, ⅔-⅔ in. by ⅛-⅔ in. Racemes many-flowered, crowded, usually shorter than the leaves. Calyx ⅛ in., thinly silky. Corolla reddish or white, 3-4 times the calyx. Pod 1-1½ in. by ⅜-⅔ in. Seeds bright scarlet and black, or white, or mixed black and white, as large as a pea.


KUMON to CHITTAGONG, TENASSERIM and BIRMA, ascending to 3000 ft. in SIKKIM; Ceylon.—DISTRIBUTION. Malay isles, Guinea, Natal, Kaffiria.

General habit exactly of A. precatorius. Leaves 3-4 in. long; leaflets 24-30, similar in texture, ⅔-1⅓ in. by ⅛-⅓ in. Racemes more numerous, flowered, on longer peduncles. Calyx and corolla similar. Pod incurved, 2-2½ in. by ⅜ in., with thinner smooth valves.

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 in. by 4–13 in., densely silky on both sides, or glabrescent above. Racemes few-flowered, exceeding the leaves. Calyx 1/2 in. thinly silky; teeth distinct. Pod 1–1 1/2 in. by 3/4 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 axil of the leaves. Calyx-tube oblique; teeth lanceolate, subequal. Corolla exserted; 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, turged, narrowed into the persistent style.—Distr. Species 7, Mediterranean and West and Central Asian, one widely cultivated.

P. **C. arietinum**, Linn.; *DC. Prodr.* ii. 354; leaflets close oblong 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.

A viscoso much-branched annual. Leaves 1–2 in., with usually a terminal leaflet; stipules small, with a few long teeth. Peduncle 3/4–3 in. Calyx 1/2–1 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.; Pirr, Lahul, Kumaon, Tibet, &c.—Distr. Orient, Afghanistan, Songaria.

A very diffuse annual, with wiry 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 3/4–1 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 exserted; 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 flattish, 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.—Distr. Europe, Orient, &c.**

*Stems* very slender, copiously branched. *Leaves* about 1 in. long; leaflets 3-4 pairs, obtuse or acute, ½-⅞ in. long. *Flowers* on copious axillary peduncles about as long as the leaves. *Calyx* ⅝ in. *Corolla* lilac, distinctly exserted. *Pod* linear-oblong, ⅜ in.


**NORTH-WEST PROVINCES, from the Punja to Nipal, in the tropical and temperate region, frequent in cultivated grounds, ascending to 6000 ft.; Nilghiris.—Distr. Europe, Orient, &c.**

*Stems* rather stronger than in the last. *Leaves* longer, ending in an intricate tendril; leaflets 5-8 pairs, ⅜-1 in., truncate. *Peduncles* shorter than the leaves. *Corolla* smaller, scarcely exserted from the calyx. *Pod* ⅘-⅞ 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**, Grub. in *Wall. Cat.* 5928; 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 Royce Ill.* 200.

**WESTERN HIMALAYAS; SIMLA, Gurwhal, Kumaon, alt. 3-8000 ft.; Silhet, Wallich.**


**NORTH-WEST HIMALAYAS, temperate region; Chenab valley, 6-8000 ft., Thomson. West Tibet, Falconer.—Distr. Europe.**

A subglabrous climber, a yard or more high. *Leaves* 4-6 in. long; leaflets acutish, membranous, silky beneath, 1⅛-1½ in. long; stipules linear, with a single tooth. *Racemes* copious, reaching, as do the peduncles, ½ ft. long. *Calyx* subglabrous, ⅛ in.; teeth very unequal, all shorter than the tube, upper deltoid. *Corolla* ⅜-⅞ 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. sepium*, with stems clothed with fine spreading hairs. *Leaves* 1½-2 in. long; leaflets ⅛-⅜ 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* ¼ 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, ½-3 in., the upper growing gradually shorter; stipules small, narrow, deeply toothed. **Racemes** 12-20-flowered, on peduncles 1-4 in. long. **Calyx** ½ in., glabrous, membranous; all the teeth much shorter than the tube. **Corolla** ½ in. **Pod** 1-1½ 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.

**Punjab**, at Rawul Pindi and Futteyjung, *Dr. Aitchison.*—**Distrib. Afghanistan, Griffith, 1114.**

A straggling annual, 1-2 ft. high, with slender stems, finely silky at first, soon glabrescent. **Leaves** about 2 inches long; leaflets obtuse, scattered, ¾-1½ in. broad, obscurely silky; stipules deltoid, deeply palmately laciniated. **Racemes** about as long as the leaves. **Calyx** ½ in. long, rather silky, the lower teeth half as long as the tube, the upper deltoid. **Corolla** more than ½ 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 oblong, ⅓-1 in. long, firmer in texture than in the others, finely silky beneath, with veins raised like those of a *Tephrosia*; stipules small, half-bastate, deeply-toothed. **Peduncles** 2-3 in. long. **Calyx** ⅔-½ in., glabrous; pedicles longer than in the others, fully ½ 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. Euwicia.** 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. **Leaves** 8-12, of upper leaves ⅔-1 in. long, of lower shorter, broader; stipules small, obliquely lanceolate, deeply-toothed. **Calyx** ⅔ in.; teeth lanceolate-subulate. **Corolla** red-blue, twice the calyx. **Pod** glabrescent, 1½-2 in. long, 8-10-seeded.


Plains of Punjab, Atchison.—Distrib. Europe, Orient.
Stems slender, glabrous, diffuse. Leaflets 10-12, alternate or opposite, 1/4-1 in. long; stipules minute, bifid, with linear divisions. Flowers solitary, on short pedicels in the axils of the leaves. Calyx 1/4 in.; teeth lanceolate, the upper shorter, curved upwards. Corolla purplish-red, twice the calyx. Pod linear-oblong, deflexed, glabrescent, rather recurved, 1-1 1/4 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 1/4 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 Peshawur, Vicary, perhaps introduced.—Distrib. S. Europe, Orient, probably the original of the cultivated Bean.
A stout suberect annual, 1-1 1/4 ft. high, glabrous or finely downy. Stipules large, deeply toothed; leaflets 1-2 in. long, entire in our plant. Calyx 1/4 in.; lower teeth lanceolate, as long as tube; upper deltoid. Corolla purple, more than twice the calyx. Pod 1-2 in. long, downy, 6-7-seeded.

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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 Benghalensis, Linn. seems to be the Mediterranean *V. atropurpurea*, Deef, and to have no claim to be regarded as an Indian plant.

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54. **LATHYRUS**, Linn.

Annual or perennial herbs, with equally pinnate leaves, ending in a tendril or bristle. Flowers racemose or solitary. Calyx-tube campanulate, oblique; teeth long or upper short. Corolla more or less exerted; standard broad; keel shorter than the wings. Stamens didalous, the mouth of the tube not oblique; anthers uniform. Ovary subsessile or stalked, many-ovuled; style flattened, bearded on the inner side, stigma capitulate. Pod terete or flattish, continuous within.—Distrib. Species described 170, spread principally through all the northern temperate zone.

Subgen. 1. **Eulathyrus**. Pedicel 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. 5962; Benth. in Royle 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 adpressed 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
2 linear or lanceolate, flowers solitary, pods oblong winged on the back. **Roxb. Fl. Ind.** iii. 321; **Wall. Cat.** 5963; **Benth. in Royle Ill.** 200; **Boiss. Fl. Orient.** ii. 606.

Spread through the northern provinces, ascending from the plains of **Kutmaon.** Often cultivated.—**Distr.** Europe, Orient, Trop. Africa.

Glabrous, much branched. **Stipules** broad, entire; petiole winged; leaflets 3/4 in. broad. **Peduncle** rather longer than the petiole. **Calyx** 3/4 in.; **teeth** lanceolate, subequal, twice the tube. **Corolla** 3/4 in., red, bluish or white. **Pod** 1 1/2 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 Nilgiri plants distributed by Hohenacker, but has no claim to be considered a native.


North-West Provinces, ascending from **Bunderkund** and the **Punjab** to 6500 ft. in. **Kutmaon.**—**Distr.** Europe, Orient, Abyssinia.

Stems glabrous, very slender, very copiously branched. **Stipules** linear, caudate; petiole 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 3/4 in.; **teeth** equal, as long as the tube. **Corolla** reddish, twice the calyx. **Pod** 2 in. long, 10-12-seeded.

4. **L. pratensis**, Linn.; **DC. Prodr.** ii. 370; perennial, leaflets 2 lanceolate, flowers many in long-peduncled racemes, calyx-teeth subequal. **Benth. in Royle Ill.** 200; **Boiss. Fl. Orient.** ii. 615.

**West Himalayas**, temperate zone, alt. 6-8000 ft.; **Kashmir**, **Gurwhal**, **Simla.**—**Distr.** Europe, Orient, Abyssinia.

Stems slender, wingless, very diffuse. **Stipules** large, lanceolate-caudate; petiole distinct, angular. **Peduncles** often much exceeding the leaves. **Calyx** 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, Jacquetont.**—**Distr.** Siberia.

A sub erect glabrous perennial, ½-1 ft. high. **Leaves** 2-3 in. long; leaflets glaucous, membranous, venose, 3/4 in. broad; **peduncles** lanceolate-caudate slightly toothed. **Racemes** 2-4-flowered; **peduncles** 2-4 in. long. **Calyx** ¾ in.; **teeth** shorter than the calyx, nearly as long as the tube; upper deltoid. **Corolla** reddish, twice the calyx.

**Subgen.** 2. **Orobus**, Linn. Petiole terminated by a mere bristle.


**Kashmir**, 4-6000 ft., **Thomson, Falconer. Scinde, Stocks.**

Habit of *L. sphæricus*, with which it coincides in stem, leaflets, pod and stipules. **Petiole** very short, not winged; leaflets 1-1 ½ in. long. **Calyx** ½ in.; **teeth** subequal, lanceolate-subsululate, as long as the tube. **Corolla** lilac, twice the calyx.


West Himalayas, tropical and temperate zone, ascending from the salt range in the Punjab to 8000 ft. in Kumaon and 10,000 ft. in Khagan.—Distrib. 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, equaling 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. i. 321; Wall. Cat. 5950, 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. AMPHICARPHA, 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, bearded, stigma capitate. Pod flat, linear-oblong.—Distrib. 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 racemed; pedicels very short. Calyx 3½ in.; teeth lanceolate-subulate, much shorter than the tube. Corolla 3½ in., reddish. Perfect pod 1 in. long, linear, recurved, 2–3-seeded. Very near the Japanese species (Shuteria trisperma, Miq. Ann. Mus. Lug. Bat. iii. 51) and the well-known American A. monica, both of which have obovate bracts and copiously racemmed flowers.

56. SHUTERIA, W. & A.

Climbers, with 3-foliolate stipulate leaves, persistent bracts and bracteoles, and middle-sized racemose uniform flowers. Calyx-tube gibbous; teeth distinct, shorter than the tube. Corolla exserted; exariculate standard rather exceeding the keel and distinctly spurred wings. Stamens diadelphous; anthers uniform. Ovary subsessile, many-ovuled; style incurved, filiform, bearded, stigma capitate. Pod flat, linear, recurved.—Distrib. One additional species, Trop. African.


East Himalayas; Khasia, Sikkim, Bhotan and Mishmi, ascending to 5000 ft. Hills of Western Peninsula and Ceylon, ascending to 7000 ft.
Stems slender, woody, glabrescent. *Stipules* lanceolate, rigid, under ¼ in.; petiole 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 gametane; bracts rigid, about as long as the densely hairy pedicels. **Calyx** ¼ in., densely hairy; teeth shorter than tube, upper lanceolate-cuspidate. **Corolla** reddish, twice the calyx. **Pod** 1-½ in. long, linear, hairy, recurved, 5-6-seeded.

**Var. 1. glabrata**; calyx and leaves nearly or quite glabrescent. *S. glabrata*, W. & A. *Prodr.* 207.—**Khasia, Simons, Milghiris, Wight.**


**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.* 232. Glycine involucrata, *Wall. Cat.*, 5506, ex parte.—Gurwhal, Kumaon and Nepal, 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. fil. & Thomson.*

Stems firm, slender, densely clothed with conspicuous deflexed hairs. *Stipules* ¾ 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 themselves, gametane at the nodes; bracts ⅓ in. **Calyx** ⅓ in., thinly hairy; teeth shorter than tube, upper deltoid, lower linear. **Corolla** purple, twice the calyx. **Pod** recurved, densely hairy, many-seeded.


**Nepal**, 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, glaucescent-grey with dense hairs below, ferruginous on the nerves; end one 2-3 in. long. **Flowers** 9-12 together, in short-peduncled racemes. **Calyx** under ⅓ in., subglabrous; upper teeth deltoid, lower lanceolate. **Corolla** ⅓ in., reddish.—Recedes to *Glycine* by its subcaducous bracts and bracteoles.


**Burma**; Prome hills and Taong Dong, Wallich. **Tenasserim, Heilper.**

Stems firm, very slender. *Stipules* linear, ¼ in.; leaflets membranous, subglabrous, glaucous-grey beneath, the end one ⅜-1 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 ⅜ in. long; pedicels distant, solitary, very short. **Calyx** ¼ in., with a few adpressed hairs; teeth all short, lowest lanceolate. **Corolla** ⅔ in., reddish. **Pod** ¾ in. long, glabrous, recurved, 6-8-seeded.

57. **Dumasia**, DC.

Climbing herbs. **Leaves** 3-foliolate, with stipellate leaflets. **Flowers** middle-sized, racemose. **Calyx**-tube cylindrical, very gibbous, 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 capitulate. Pod linear, falcate, torulose.—DISTRIB. One other species, in Japan.

1. **D. villosa**, DC. Mem. Leg. 257, t. 44; Prodr. ii. 241; leaves and leaflets distinctly petioled, the latter ovate, corolla twice as long as the calyx. Wall. Cat. 5523. D. pubescens, DC. loc. cit. t. 45. D. congesta, Grah. in Wall. Cat. 5524; W. & A. Prodr. 206; Wight Is. t. 445.

**HIMALAYAS**, from **SIMLA** and **KUMAON** to **SIKKIM** and **KHASIA**, ascending to 6-7000 ft. Hills of **WESTERN PENINSULA** and **CEYLON**.—DISTRIB. Java, Madagascar, Natal.

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; and one 2-3 in. long. Racemes 2-6 in. long, lax or close, 12-40-flowered, rarely (D. congesta, Grah.) close, subsessile; bracts and bracteoles minute, setaceous. Calyx 1-1/2 in., with a few adpressed hairs. Corolla 1/2-2 in., yellow or purplish. Pod 1/2 in. long, velvety, 3-4-seeded.


2. **D. cordifolia**, Benth. MSS.; leaves and leaflets subsessile, the latter rotundato-cordate, corolla half as long again as the calyx.

**KHASIA**, 5000 ft., Hook. fil. & Thomson.

Stems very slender, at first finely downy. Stipules linear, very minute; leaflets membranous, glabrous, 1-1 in. long, firm, pale green. Flowers 6-10, in a close raceme, on a glabrous peduncle 1-2 1/2 in. long; bracts and bracteoles linear, very minute. Calyx glabrous, membranous, 1-3 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 subsessile, many-ovuled; style short, incurved, bearded, stigma capitulate. 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; and one ovate, acute, 2-4 in. long. Racemes short-peduncled, dense or lax, 1-6 in. long; pedicels very short; bracteoles long, setaceous. Calyx 1/4-1/2 in., densely silky; teeth setaceous, plumose. Corolla reddish, little exserted. Pod linear, straight, 1 in. by 1/4-1/2 in., 4-5-seeded, clothed with adpressed hairs.
2. G. pentaphylla, Dalz. in Kew Journ. iv. 344; stems slender twining, leaflets 5-7, racemes elongated many-flowered, calyx-teeth short, pod broad. Benth. in Journ. Linn. Soc. viii. 266; Dalz. & Gibbs. Bomb. Fl. 68.

Khasia. 3-5000 ft., Hook. fil. & Thomson, Lobb. Concan, Dalzell, Stocks.

Stems wide-climbing, with a few adpressed hairs. Petiole 1-2 in.; leaflets subcoriaceous, with a few adpressed hairs on both sides, green above, grey below, distant; and end one oblong-lanceolate, acute, 3-4 in. long. Racemes lax, usually short-peduncled, reaching 6-8 in. long; pedicels very short, fascicled. Calyx $\frac{1}{2}$ in.; teeth deltoid, shorter than the tube. Corolla reddish, twice the calyx. Pod glabrous, flat, rather recurved, $\frac{1}{2}$ in. by $\frac{1}{2}$ in., 4-6-seeded.


Himalayas, tropical region; Kumaon to Sikkim, Khasia and Ava, often cultivated.—Distr. 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 $\frac{1}{2}$ in., densely hairy. Corolla reddish, little exerted. Pods usually only 2-3 developed in the axil of each leaf, linear-oblong, recurved, densely pubescent, 1$\frac{1}{2}$-2 in. by $\frac{1}{2}$-$\frac{3}{4}$ in., 3-4-seeded, subtorulose.

59. TERAMNUS, Sw.

Twining herbs, with exactly the habit of Glycine. Calyx-tube campanulate; teeth distinct, subequal or two upper not so long. Corolla little exerted; 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, flattish, septate between the seeds.—Distr. Species 4, belting the world in the tropics.


Plains from the foot of the West Himalayas to Ceylon, Burma and Penang.—Distr. Cosmopolitan in the tropics, Natal.

Stems wide-climbing, slender, with a few fine adpressed hairs. Stipules minute, lanceolate, deciduous; petiole $\frac{1}{2}$-$\frac{1}{2}$ 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 $\frac{1}{2}$-$\frac{3}{4}$ in.; teeth lanceolate. Corolla reddish. Pod linear, glabrous, recurved, 1$\frac{1}{2}$-2 in. long, 8-12-seeded. Var. mollis; stems and pods clothed with longer more spreading hairs, leaflets subcoriaceous densely pubescent beneath, calyx-teeth shorter. G. mollis, W. & A. Prodr. 209. G. parviflora, Wall. Cat. 5508, G. H. Teramnus mollis, Benth. in Journ. Linn. Soc. viii. 265.—Distribution of the type.

**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-twining habit. *Leaves* amplexifixed, stipellate, always 3-foliate. *Flowers* large, showy, usually dark purple, turning quite black when dried. *Calyx-tube* campanulate; two upper teeth quite connate; 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* diadelphous; anthers dimorphous, like those of the *Genista*. *Ovary* sessile, many-ovuled; *style* incurved, beardless, stigma capitulate. *Pod* very variable in shape and sculpture, usually covered with brittle needle-like irritating bristles.—**Distributed.** Species above 20, spread everywhere in the tropics.

**Urgyen. 1. Amphiptera.** *Pod* broadly winged down both sutures and the faces covered also by close oblique plaits.


**East Himalayas, Sileen, Sikhim, Assam, tropical region, 1–4000 ft., Wallich Griffith, Hook. fil.**

A woody climber, with slender glabrescent branches. *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* ⅗ 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 ⅗ 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 ½ in. broad.

2. **M. acuminata**, Grah. in Wall. Cat. 5621 from Panang, 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*.

**Urgyen. 2. Citta, Lour.** *Pod* with the faces covered by close oblique plaits, but not winged down the sutures.


**East Himalaya, tropical zone; Khasia, Assam, Chittagong, Pegu; Tavoy, Gomes. 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 $\frac{1}{3}$–$\frac{3}{2}$ in.; bracteoles linear, exceeding the bud. Calyx $\frac{1}{2}$ in., with copious irritating bristles; lower tooth linear; side ones deltoid. Corolla $\frac{3}{1}$ in. long; keel abruptly inflexed at the tip; wings $\frac{1}{2}$ in., standard $\frac{1}{2}$ in. broad. Pod $3$ in. long, obscurely stipitate, clothed with copious ferruginous or dull brown irritating bristles; wings $\frac{1}{2}$–$\frac{1}{2}$ in. deep.


Plains of Western Peninsula and Ceylon. *Malacca, Mainay.*
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, $\frac{1}{2}$–$\frac{3}{2}$ in. Calyx $\frac{1}{2}$–$\frac{3}{2}$ in. long, deeply bilabiate, with a few ferruginous irritating bristles. Corolla dark purple, 2–2$\frac{1}{2}$ in. long; keel abruptly turned up at the end; wings $\frac{1}{2}$–$\frac{3}{2}$ in., standard 1 in. broad. Pod sessile, 3 in. long, the faces traversed with close oblique plaits, and furnished with abundant yellow-brown irritating 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, 5–6 in. long. Flowers 12–30 in long-peduncled drooping close racemes; pedicels 1 in. long. Calyx $\frac{1}{2}$–$\frac{3}{2}$ in., with a few irritating bristles; upper lip subtruncate. Corolla yellow, 1–$\frac{3}{2}$ 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 irritating bristles, 2–6-seeded.

**SUBGEN. 4. Stizolobium, Pers.** Pod without either distinct plait on the faces or wings down the sutures.

5. **M. macrocarpa**, *Wall. Cat.* 5618; woody, branches and leaves glabrous, upper lip of calyx subtruncata, pod very large sublignosae 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 $\frac{1}{2}$–$\frac{3}{2}$ in., velvety, deciduous; bracteoles $\frac{1}{2}$–$\frac{3}{2}$ in. obtuse, oblong. Calyx nearly 1 in. long, with a few irritating bristles; lower teeth as long as the tube. Corolla $\frac{3}{2}$–3 in. long; keel abruptly turned up at the tip; wings $\frac{1}{2}$ in.; standard $1\frac{1}{2}$ in. broad. Pod 1–1$\frac{1}{2}$ ft. by $1\frac{1}{2}$–$\frac{3}{2}$ 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, \(\frac{1}{8}-\frac{3}{4}\) 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 ferruginous or grey hairs. Leaflets ovate-rhomboid, obtuse, with a cusp, membranous, thinly silky above, densely grey-silky beneath, ferruginous on the veins, 4-6 in. long. Racemes short-peduncled, \(\frac{1}{8}-\frac{3}{8}\) 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 Burma.—Distr. Cosmopolitan in the tropics. Often cultivated, as are the two following.

An annual, with slender terete branches, glabrescent when mature. Leaflets membranous, ovate-thomoid, green, glabrescent above, lustrous with fine grey silky pubescence beneath, \(\frac{1}{8}-\frac{3}{8}\) ft. long. Racemes short-peduncled, drooping, \(\frac{1}{3}-\frac{1}{2}\) ft. long, the axis finely grey-silky; pedicels 3-4 in. Calyx \(\frac{3}{4}\) in. long, with a few irritating bristles; upper lip and lanceolate teeth as long as the tube. Corolla purplish, 13-15 in. long; wings \(\frac{1}{8}\) 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 hul only, has closer lacer pubescence and large linear-setaceous bracts.


Foot of the Western and Eastern Himalayas.—Distr. 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. Corymbs with 5-6 flowers, on short ascending peduncles. Calyx and corolla the same. Pod larger, 6-8 in. long, similarly turned up at the end, but the bristles much shorter and deciduous.

AVA and BENGAL, perhaps cultivated only.

Like the preceding, perhaps only a cultivated race of M. pruinosus. Leaflets ½-3 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. pruinosus, 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-foliolate, stipulate. 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.—Dist. Species 3, the two others Chinese and N. American.

1. A. carnea, Benth. MSS. Cyrtotropis carnea, Wall. Cat. 5527; Fl. As. Rar. 49, t. 62.

NIPAL, Wallich. KHASIA, 4-6000 ft., Hook. fl. & Thomson, Lobb.

Stems slender, soon glandose. Petioles 2-3 in.; leaflets usually 5, rarely 3, glabrous, green above, pale beneath, membranous, opposite, oblong, acute, 3-4 in. long. Flowers in long-peduncled flexuous secund racemes 6-9 in. long; lower pedicels fascicled, upper solitary; bracts and bracteoles minute, linear, caducous. Calyx green, glabrous, ½-3 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-foliolate leaves. Calyx oblique, spathaceous, finally sitting 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, turgid, torulose.—Dist. Species 25-30, principally tropical, in both the new world and the old, and at the Cape.

SUSS. 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.—Dist. Java, Polynesia.
A tall tree, with thin grey bark, the prickles minute, conical, usually black. Petioles 4–6 in., mostly unarmed; leaflets membranous, subconcolorous, glabrous, the and one round-cupuliform, 4–6 in. long and broad, truncate or broad-rhomboidal at the base. Racemes dense, ¾ 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 ½–1 ft. long, distinctly torulose.—E. picta, Linn. (Rumph, Amb. 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-lanceolated, 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.

Sub-gen. 2. Micropteryx, Walp. 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. Fl. 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 ½–3 in. long, campanulate-bilabiate. 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; arborescent, leaflets twice as long as broad, glabrous, limb of the standard as broad as long. Wall. Cat. 5961; Wright Ic. t. 247; Bedd. Fl. Sylv. 58; Bentham. Fl. Jungh. 237. E. picta, Wall. Cat. 5960, non Linn. Duchassaingia ovalifolia, Walp. in Linn.œa, xxiii. 742.

Forests of Silhet, Assam, Bengal, Ceylon, Burma and Malacca.—Distria. Java, Polynesia, and perhaps not distinct from American E. glauca, Willd.

Branches pale grey. Prickles usually black, not extending to the petiole. Leaflets subcoriaceous, glaucous, the end one ovate or obovate-oblong, very different in shape from that of any other species, often ¾ ft. long, obtuse or subacute. Calyx 3–½ 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, ¼ ft. long, distinctly torulose, narrowed into a short stalk.

5. E. suberosa, Roxb. Hort. Beng. 58; Fl. Ind. iii. 253; arborescent, 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. & Gibbs, Bomb. Fl. 70. Micropteryx suberosa,
Erythrina.

Walp. in Linnaea, xxiii. 744. E. alba, Roxb. MSS. E. Nalasuta, and E. reniformis, Ham. in Wall. Cat. 5966, 5968.

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 capitulate. Calyx ¾ in. long, faintly downy, soon deeply bilabiate. Standard 1½-2 in. long, its blade ½-⅔ in. broad; keel-petals connate, less than half as long as the standard. Upper stamen free from low down. Pod ¾ ft. long, suberete, 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 flattened. 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 ⅔-1 ft. broad. Flower very like that of E. suberosa, but the calyx larger and the limb of the standard broader. Pod much curved, ¾-3 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, cotermaneous with the leaves. Calyx velvety, ¾-⅔ in. long, finally splitting down nearly to the base in two lips. Standard 1½-1⅜ in. long, the limb oblong, obtuse; keel and wings subequal, ½ in. long. Pod much recurved, 4-5 in. long, broader in lower half, with a stalk reaching 1½-1½ 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 stipitate 3-foliolate leaves. Flowers in long lax racemes. Calyx campanulate, gibbous; teeth short, obtuse, imbricated. Corolla much exerted; 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, axillary, distinctly-peduncled, 1–4 ft. long; pedicels gleminate from the tumid nodes, filiform, drooping ½–1 in. Calyx glabrous, 1½–2 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 stipellate 1-foliate leaves, deciduous stipules and bracts. Racemes with obscurely-swole nodes. Calyx-tube campanulate; teeth elongated, upper 2 shorter. Corolla distinctly exerted, 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, separte between the seeds.—Distrib. Another species reported from Cochin China.


Prome, Wallisich.

A lax climber or trailer, the slender stems with a few adpressed hairs. Leaflet subcoriaceous, glabrous, subconcolorous, reticulato-venose, 3–6 in. long, acute, lower cordate-ovate, upper oblong-lanceolate; petiole ½–1½ in. Racemes 2–3 from each node, 1–3 in. long, the flowers in pairs from the distant nodes. Calyx glabrescent, ½ in.; teeth all exceeding tube, lower linear, upper lanceolate. Corolla ½ in. reddish.

2. G. Dalzellii, Baker; flowers in dense usually sessile heads, bracteoles as long as the calyx. Galactia simplicifolia, Dals. in Kew Journ. iii. 209; Dals. & Gibbs. Bomb. Fl. 69.

Plains of Concan, Dalzell, Stocks.

A herbaceous twiner, the slender stems with a few adpressed hairs. Leaflets 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 ½–1½ in. Flowers 6–12, in copious dense cymes. Calyx ½ 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.


Peuu, Kurz.

Voluble, slender. Leaves broad cordate-ovate, obtuse, mucronate, 1–1½ in. broad, palmately nerved, thinly hirsute on both sides; petiole ½–2 in. Flowers small, yellow, pedicellate, cirsoso-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 stipulate 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* subsessile, many-ovuled; style long, filiform, beardless, stigma capitata. *Pod* linear, flattened, recurved.—**Distr.** Species 45, mostly Tropical American.


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 1–1 1/2 in.; leaflets ovate or oblong, 1 1/2–2 in. long, membranous, green, glabrescent above, grey, obscurely silvery below. *Racemes* copious, peduncled, 1/4–1 ft. long. *Calyx* 4 1/2–1 in. long, finely grey silvery; teeth lanceolate acuminate, exceeding the tube. *Corolla* reddish, 1/2 in. long. *Pod* 1 1/2–2 in. by 1/3 in., glabrescent, 6–8-seeded.


**Var. 2. minor**; stems very slender, leaflets and flowers smaller, the former oblong 1/4–1 in. long thinly grey silvery below, corolla 1/4–1 1/2 in. long, pod 1 in. long glabrous 4–5-seeded. Leucodictyon malvensis, *Dale. & Gibs. Bomb. Flora*, 73. *G. tenuiflora*, *Wall. Cat.* 5509 A.—Western Peninsula.

**Var. 3. villosa**; stems leaves below and pods densely grey-downy, leaflets oblong 1–1 1/2 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 subcoriaceous roundish 1 1/2–2 in. long, racemes elongated, calyx hoary more deeply cleft.—Concan, *Stocks*.


**Tenasseba**; *Tavoy*, *Gomez*. *Amharst, Parish*.

*Stems* slender, clothed with conspicuous spreading deciduous ferrarigous hairs. *Petioles* 2–3 in.; leaflets membranous, green, subconcolorous, with a few adpressed hairs on both surfaces, oblong, 3–4 in. long. *Bracts* lanceolate, nerves, subpersistent; bracteoles linear, as long as the tube. *Calyx* 3/4 in. long; teeth linear-setaceous, 2–3 times as long as the tube, plumose. *Corolla* reddish, 1/2 in. long. *Pod* unknown.—Recedes from *Galactia* by its cymose inflorescence and persistent nerves bracts.

66. **Cochlianthus**, Benth.

A climbing herb. *Leaves* pinnately 3-foliolate, stipulate. *Flowers* racemed. *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 petiolate, 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 sessate, very minute, deciduous. Calyx 1⁄4 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 umid nodes. Calyx campanulate; teeth lanceolate or oblong-deltoid, the upper two connate. Corolla distinctly exserted, its petals subequal, the ksel obtuse, nearly straight. Stamens diadelphous; anthers uniform. Ovary sessile or stalked, 2-ovuled; style incurved, beadless, 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 1–1 1⁄2 ft.; leaflets subcoriaceous, dull green, glabrescent above, obtuse or shortly cuspidate, deltoid at the base, 6–9 in. long. Panicle reaching 1–1 1⁄2 ft. long; branches very downy; pedicels 1⁄6 in. or less long. Calyx 1–1 1⁄2 in., densely grey-velvety; lower teeth lanceolate, nearly as long as the tube. Corolla bright red, half as long again as the calyx. Pod 8–4 in. long, usually 1 in. broad, clothed with ferruginous tomentum, which is thickest and darkest towards the tip, narrowed suddenly into a stalk 1⁄2 in. long.

Var. 1. demudatus; 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.


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 canescent, 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 4 in.; teeth deltoid. Corolla reddish, 3 in. long; limb and standard broader than deep, emarginate. Pod like the samara of a sycamore reversed, finely downy, 3-5 in. long, more membranous than in the last.


*Forests of Tenasserim and Penang, Wallach, &c.*

A robust climber, with branches minutely downy at first, soon glabrescent. Petiole 2-4 in. long; leaflets subcoriaceous, pale grey-green on both sides, much thinner than in *S. crassifolius*, the end one 4-8 in. long. *Panicul* more than a foot long; pedicels much shorter than the calyx. Calyx 1 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. 5954, from Penang. We have a closely allied plant from *Mishm*, Griffith, 1878, with a more rigid much recurved larger pod half a foot long; and another from *Concan*, Stooks (*S. Purpuress*, Benth. *MSS.*) with very dense panicles, dark purple corolla, and longer pedicels, which no doubt is distinct, but of which the pod is unknown.

4. **S. crassifolius**, Benth. Pl. Jungh. 298; leaflets very thick and rigid oblong cuspitate rounded at the base glabrous beneath, flowers small, calyx densely brown-velvety, teeth deltoid half as long as the tube, pod stalked. *Pongamia crassifolia*, Wall. Cat. 5913. 


*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 1/3 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 stipulate leaves. Flowers densely fascicled, large, showy, in axillary racemes or terminal racemes or panicles. Calyx broadly campanulate; teeth short, deltoid. Corolla much exerted; petals nearly equal in the length, the keel much curved, subobtuse or acute. Stamina diadelphous; anthers uniform. Ovary sessile or stalked, 2-ovuled; style filiform, curved, beardless, stigma capitulate. Pod firm, ligulate, splitting round the single apical seed, the lowest pari indehiscent. —DISTRIB. No other species.


Plains from the Himalayas to Ceylon and Birma, 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 1/2 ft.; leaflets 4-8 in. long, coriaceous, glabrescent above, densely finely silken and strongly veined below; end one roundish, with a rhomboid base, obtuse, often emarginate. Racemes 1/2 ft. long; pedicels 1-1 in., densely brown-velvety. Calyx 1/4 in. long, velvety. Petals bright orange-red, equal, thinly clothed on the outside with silveryomentum, the standard 1 in. broad, the keel semicircular, beaked. Pod 6-8 in. by 1 1/2-2 in., argenteo-canescens, narrowed suddenly into a stalk longer than the calyx.

Forests of **Concan, Bengal, Orissa and Burma**.

Very near the last, from which it differs mainly by its scendent 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**; **Nipal, 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** 1–2 ft.; leaflets obtuse or cuspidate, 6–15 in. long, coriaceous, scabrous above, finely silky beneath, the end one orbicular, with a rhomboidal base. **Racemes** 1–1 ft. long. **Calyx** ½–1 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 exserted; petals nearly equal in length; standard roundish; keel obtuse, little curved. **Stamens** diadelphous; anthers uniform? **Ovary** sessile, many-ovuled; style short, filiform, incurved, stigma capitale. **Pod** linear-oblong, flat, indehiscent, the dorsal suture bordered by a narrow erect wing.—**Distribution**. 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 teretes glabrous branches. Leaves 3-foliolate, distinctly petiolate; leaflets subcoriaceous, stipellate, glabrous above, inconspicuously downy beneath; and one obovate-cuspidate, 5–6 in. long, rounded at the base. **Racemes** reaching a foot long; pedicels ½–1 in., geminate, from very tumid nodes. **Calyx** ½ in. long, the tube hidden by a pair of large round striated bracteoles. **Pod** shining, very flat, 3–5 in. by 3–1 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 exserted; standard large, roundish; wings shorter, equaling the incurved obtuse keel. **Stamens** monadelphous; anthers uniform. **Ovary** obscurely stalked, many-ovule; style incurved, beardless, stigma terminal. **Pod** large, linear or oblong, flatish, with a distinct rib on each valve near the upper suture.—**Distribution**. Species about a dozen, two widely-spread in the tropics, the others mostly American.

Dolichos gladiatus, Jacq. Ic. t. 590; Roxb. Fl. Ind. iii. 300. C. Loureirii, G. Don Gen. Syst. ii. 383. 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-twining, perennial or biennial, glabrous. Stipules minute, deciduous; leaflets entire, ovate, membranous, glabrous, 4–6 in. long. Peduncles and racemes each 3–5 ft. long; pedicels very short, glomerate from the very turgid nodes; bracteoles minute, ovate, caducous. Calyx 3½ 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 1–1½ in., glabrescent, rather recurved, 8–12-seeded.

Var. 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. & Gbs. Bomb. Fl. 69.—Perhaps rather the wild form of the plant than a proper variety. Seeds said to be bitter in the variety, estable in the type.

Var. 2. turgida, Gr. in Wall. Cat. 5534 (sp.); leaves like the last, but the pod larger and more turgid, 3–5 in. by 1½–2 in. broad. Miq. Fl. Ind. Bat. i. 215. C. Stockssi, Dalz. & Gbs. Bomb. Fl. 69?

Var. 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 Ceylon 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. Leaves pinnately 3-foliolate, 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 exerted; 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 16, all the others Tropical American.

D. lasiocarpa, Mart., a common Tropical American species with lax racemes, small bracts, densely fuscous pedicels as long as the glabrous calyx and 6–8-seeded strap-shaped pods 4–6 in. long, is contained in the CONCAN 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 ¼–1 ft. long; bracts linear, red-axed, silky, ½ in. long. Calyx ¼–½ in., silky, with a pair of small obtuse bracteoles. Corolla reddish, half as long again as the calyx. Pod 3–4 in. long, glabrescent, but clothed at first with adpressed silky hairs.

72. Pueraria, DC.

Twining shrubs or herbs, with stipellate 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 exserted; 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.—Distr. Only one East Asian species not here represented.

Subg. 1. Pueraria proper. Flowers produced after the leaves fall. Pod ½–2½ in. broad, with constrictions between the seeds that recall the articulations of Hedysarea.


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 panicked racemes, reaching 6–9 in. long; pedicels very short, densely fascicled. Calyx ¼–½ 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 bristy 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. Bentham in Journ. Linn. Soc. ix. 123.

Pey, Wallich, McCl. Moulmein, 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, panicked, reaching a foot or more long, the alkaline rachis subglabrous; pedicels 1½–2 in.; bracts linear, 3–½ in. long. Calyx ½ in., clasped by a pair of minute persistent ovate bracteoles. Corolla twice the calyx; limb of standard rounded, spurred. Pod 3 in. long, few-seeded.

Subgen. 2. Neustanthus, Bentham. Leaflets entire, rarely faintly lobed, contemporaneous with the flowers. Pod ½–2 in. broad, not constricted, 4–12-seeded.

East Himalayas and Khasia Mrs., temperate region, alt. 5-9000 ft.; Nipal, Sikkim, Mishmi.

Copiously twining, the slender firm branches clothed with short deflexed deciduous hairs. Leaflets membranous, green, with a few short hairs above, grey, densely shortly downy beneath; end one roundish, acuminate, 4-6 in. long. Racemes ½-1 ft., short-peduncled, moderately close; nodes never produced into branches. Pedicels ¼-½ in., spreading, densely fascicled. Calyx ½ in., finely grey-silky. Corolla reddish, ½ in. long; standard in. broad, not spurred; keel with a deep purple tip. Upper stamen at last nearly free. Pod quite straight, strap-shaped, 2-3 in. by ½ in., quite glabrous, 4-8-seeded, tegid, opposite the seeds.

4. P. Wallichii, DC. Prodr. ii. 240; shrubby, stipules basifixed, flower-pedicels at most equaling the calyx, calyx-teeth deltoid, corolla middle-sized, pod glabrous rigid-coriaceous. DC. Mem. Leg. t. 43; Wall. Cat. 5353; Benth. in Journ. Linn. Soc. ix. 124. P. composita, Grah. in Wall. Cat. 5570.

East Himalayas, tropical region; Nipal, Silhet, Khasia, Mishmi, ascending to 5000 ft. Burma; Taung-dong, Wallich.

Branches slender, terete, glabrous. Leaflets membranous or subcoriaceous, green, glabrescent above, grey with a few adpressed hairs beneath; end one 4-6 in. long, obovate-cuspidate, with a deltoid base. Racemes copious, ½-1 ft. long; often fascicled or panicked; pedicels finely silky, densely fascicled, the nodes often lengthened out into short branchlets (P. composita, Wall.). Calyx gibbous, ¾ in.; teeth obscure. Corolla reddish, ¾-1 in. long; limb of standard twice as long as broad, not spurred at the base. Pod straight, 4-5 in. long, the sutures sometimes slightly repand.

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, green above, 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 ¼-½ in. Calyx subglabrous, ½ in. long; lower tooth lanceolate, ¼ in. long, the others much shorter. Corolla reddish, ¼-½ in. long; standard ½ in. broad, distinctly spurred. Pod unknown.

6. P. Thomosoni, Benth. in Journ. Linn. Soc. ix. 122; shrubby, stipules fixed by the centre, pedicels very short, calyx-teeth 3-4 times the tube, corolla large, pod densely clothed with long silky hairs. Dolichos spicatus, Wall. Cat. 5557. C. D. grandifolius, Grah. in Wall. Cat. 5556.


A climber with slender branches, clothed with deciduous deflexed fine brownish hairs. Stipules persistent, ¼-½ 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 ½ in. long, densely silky; teeth lanceolate. Corolla reddish, half as long again as the calyx; standard ¾ in. broad, distinctly spurred. Pod 4-5 in. by ½-⅓ in., flat, straight, membranous, 8-12-seeded.


Pegu and Martaban. Kurz.

A perennial, 2-4 ft. high, with suberete branches, tomentose when young. Leaflets
chartaceous, thinly clothed with adpressed hairs on both sides; end one ovate acute, 2-3 in. long. *Racemes* caescent, axillary and forming a terminal panicle; fruit-pedicels $\frac{1}{2}$ in.; bracts small, subulate, persistent. *Calyx* 1 in., puberulous. *Corolla* unknown. *Pod* linear, 1-1$\frac{1}{2}$ in. by $\frac{1}{2}$ in., flat, pale.—I have seen no specimens.


*Pegu*, Kurz.

A 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 $\frac{1}{8}$ in. *Corolla* unknown. *Pod* linear-oblong, $\frac{3}{4}$-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$\frac{3}{4}$-2 in. long. *Racemes* 1-2, stiff, axillary, pilose; bracts minute, subulate, persistent. *Calyx* $\frac{3}{4}$ in., pubescent. *Corolla* unknown. *Pod* linear-oblong, 1 in. by $\frac{1}{2}$ in., pale, compressed, torulose.—I have seen no specimens.

Subgen. 3. **Schizophyllum**. *Leaflets* usually deeply lobed, contemparaneous with the flowers. *Pod* $\frac{3}{4}$-1 in. broad, rather turgid, recurved at the tip, 10-15-seeded.


East Himalayas, tropical region; Assam, Sikkim, Khasia, Silhet, Chittagong, Birm, Pegu, Tenasserim, Penang and Malacca.—*Distrib.* China, Malay isles.

*Stems* wide-twining, often scarcely woody, clothed with dense spreading brown hairs. *Stipules* small, lanceolate, basifixed; 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 subpersistent. *Calyx* 1-3 in. long, densely clothed with adpressed bristly hairs; lowest tooth lanceolate, as long as tube, others shorter, all setaceous 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.

73. **Phaseolus**, Linn.

Twiners, usually herbsaceous, 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 subconicate. 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, suberete or subcompressed, more or less distinctly septate between the seeds.—**Distr.** Species about 60, mostly tropical, many widely cultivated, especially in America.

**Subgen. 1. Phaseolus proper.** Stipules small, basifixed. Pods ¼–3 in. broad, subcompressed. Keel prolonged into a complete spiral.


Everywhere cultivated, probably a native of America.—**Distr.** 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 ½–¾ in., less turgid than in any of the others, with the upper suture recurved and the lower broadly rounded. Racemes reach ½ ft. long, the lower fascicles distant, with 2–4 flowers to a node; pedicels finally 1/8 in. long. Calyx 1/8 in.; teeth all very short. Corolla 3–4 times the calyx. Seeds large, very variable in color.—**P. inamoenus**, Linn., *Xuaresii*, Zucc., *Puberulus*, H.B.K., and *tunkinensis*, Lour., are cultivated varieties.


Universally cultivated, but not anywhere clearly known as a wild plant.—**Distr.** 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 1/₁₄ in. long; bracteoles ovate or roundish, persistent. Pod 4–6 in. by ½ in., glabrous, rostrate, turgid.—The Scarlet Runner, *P. multiflorus*, Willd.; *DC. Prodr.* ii. 392; W. & A. Prodr. 244; P. *coccineus*, Lam., differs by its bright scarlet casually white flowers, arranged in long racemes which often overtop the leaves.

Phasolus. ] L. LEGUMINOSÆ. (J. G. Baker.) 201

Spread in the plains from the Himalayas to Ceylon, not cultivated.—Distr. Cosmopolitan in the Tropics.

A subglabrous perennial, with firmer leaves than in the cultivated species. Stipules ½ in., often reflexed; leaflets entire, 3-4 in. long, subacute. Flowers very showy, crowded in a short-peduncled raceme. Calyx ½ in.; lower teeth lanceolate- or deltoid-setaceous. Standard nearly 1 in. broad. Pod 4-6 in. by ½ in., glabrous, much recurved, 10-15-seeded, subtorulose.

Subgen. 2. Macroptilium. Connects § 1 and 3, agreeing with the former in its basifixed stipules and with the latter in its narrow turgid pods.

4. P. tenuicaulis, Baker; a subglabrous slender twiner, stipules minute lanceolate, racemes few-flowered crowded subsessile, bracteoles lanceolate very minute, calyx campanulate with deltoid teeth, corolla small. P. sublobatus var.? tenuicaulis; Grah. in Wall. Cat. 5598.

Birma; Promes hills, Wallach.

Stems very slender, annual? at first minutely puberulent. Stipules not more than ⅓ 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, ½ in. Corolla 3 times the calyx, reddish. Pod unknown, so that its position is doubtful.


Carnatic; Courtallam, Wight. Ceylon; on the shore at Batticaloa, Thwaites.

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; pedicels about as long as the leaves; pedicels geminate, the lower finally as long as the calyx. Calyx ⅔ in. long. Corolla reddish, 3-4 times the calyx. Pod linear, glabrous, rather recurved, many-seeded, 2½-3 in. by ½ in.


Spread through the Western Peninsula and Ceylon, but probably not wild.—Distr. Trop. America, Malaya.

Stems tall, suberect and shrubby in the lower part, quite terete. Stipules ¼-½ 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, geminate. Calyx under ¾ in. long, split open by the pod. Corolla deep purple and white, 3-4 times the calyx. Pod 3-4 in. by ½ 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
HIMALAYS to CEYLON and BIRMA, wild and commonly cultivated, ascending to 7000 ft. in the north-west.—DISTRIBUTION. 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* 1-2 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*, Grac., *P. crinatus*, 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 overtops the leaves; pedicels very short. *Calyx* campanulate, \( \frac{1}{4} - \frac{1}{2} \) in., pale yellow; teeth deltoid. *Corolla* under \( \frac{1}{4} \) in. long. *Pod* 1-2 in. by \( \frac{1}{8} \) in., subcylindrical, glabrous, recurved, 6-12-seeded.


HIMALAYS 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*, Dals. & Gibs. 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 ghats east of 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 sub erect densely bristly peduncles; bracteoles nerved, obovate-oblong, \( \frac{1}{4} - \frac{1}{3} \) in. long. *Calyx* \( \frac{1}{4} \) in.; teeth lanceolate. *Pod* 2-3 in. long, at first densely bristly.


Southern CONCAN, common, Dalzell, *Stocks*.

*Stems* very slender, climbing, quite glabrous when mature. *Stipules* \( \frac{1}{4} \) in.; leaflets ovate, acute, \( \frac{1}{4} - 2 \) 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 \( \frac{1}{2} \) in.; teeth shorter than the tube, lowest lanceolate. *Corolla* \( \frac{1}{4} \) in., pale yellow. *Pod* 1\( \frac{1}{2} - 2 \) in. by \( \frac{1}{12} \) in., subcyindrical, slightly recurved, 6-12-seeded.

P. *scolopatrites*, 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 membraneous 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. 202 (seeds green); Wall. Cat. 5588 (in greater part); W. & A., Prodr. 245. P. Max, Roxb. Hort. Beng. 55; Fl. Ind. iii. 295 (seeds black); Wall. Cat. 5506. P. aureus, Ham. in Wall. Cat. 5590 (seeds yellow). P. hirtus, Retz. Obs. iii. 38, 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** ½–1 in. long, attached near the base; leaflets membraneous, 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; pedicels very short. **Calyx** ⅓–½ in.; lower tooth deltoid or lanceolate. **Corolla** ⅓–⅞ in., yellow. **Pod** 1½–2½ in. long by ¾–¾ in., subcylindrical, slightly recurved, 10–15-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, Dals. in Kew Journ. ii. 33; Dals. & Gils. Bomb. Fl. 72. Vigna opisotricha, A. Rich. Fl. Abyss. i. 229.

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; Dals. & Gils. Bomb. Fl. 71. P. farinosus, Linn.; DC. Prodr. ii. 395?

Plains of Western Peninsula and Ceylon, ascending to 4000 ft.—Distr. Malaya.

Perennial. Stems copiously twining, never suberect. **Stipules** like those of P. Mungo, but apparently higher up. Leaflets thicker in texture, often distinctly lobed, ovate, acute, 2–4 in. long, dark green, scabrous, with adpressed grey bristly hairs above, still more hairy beneath. **Flowers** 6–12, on long downy peduncles, the raceme finally 1–2 in. long; pedicels very short. **Calyx** ⅛ in.; teeth deltoid. **Corolla** 3–4 times the calyx, yellow or reddish. **Pod** 2–2½ 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 Khalsa.—Distr. Malaya.
Closely allied to *P. Mungo*, and equally variable in general habit. Hairs of the stem 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 ½–1½ in., not so cylindrical as in *P. Mungo*, 8–12-seeded, glabrous from the beginning, considerably recurved.—*P. toboosus*, *Koz. Fl. Ind. iii.* 298, is probably a cultivated form, with short suberect stems and subsessile congested racemes.

Subgen. 4. *Dysolobium*. *Stipules* small, basifixed, caducous. *Pod* linear, subterete, 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; Proma hills, Wallach.

*Stems* firm, wide-twinning, 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 glabrous, spreading, 1½ in. *Calyx* under ½ in., subglabrous, 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 ½–1½ in., brown, clothed with spreading brownish hairs, many-seeded.


East Himalayas, tropical zone; Nipal, Assam, Chittagong. Ava, Moulemein, 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, subscabrous 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 ½–1½ in.; bracteoles roundish, minute, adpressed to the calyx. *Calyx* ½ in., finely silky; lowest tooth lanceolate, shorter than the tube, the others much shorter still. *Corolla* reddish, more than twice as long as the calyx; standard 1 in. broad. *Pod* almost woody, subcylindrical, straight, ¼–¾ ft. by ½ in., deeply channelled down 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 § *Plectotropis* 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.
Voanduzia subterranea, 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 genimate peduncles. Phaseolus repens, Grah. in Wall. Cat. 5608.

Burma, near Prome, Wall. Stems herbaceous, wide-creeping, glabrous. Leaflets firm, glabrous; the end one ovate, acute, 2-3 in. long. Pedicels very short, pubescent. Calyx ¼ in., slightly downy; teeth lanceolate-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. Peduncles equaling or exceeding the leaves. Flowers 6-20, in a close raceme. Calyx campanulate, subglabrous, ¼ in.; teeth deltoid. Corolla yellow, 3-4 times the calyx. Pod 2-3 in. by ⅛ in., quite glabrous from an early stage, subtorulose, 4-6-seeded.


A trailing or twining perennial. Leaflets glabrous, or with a few spreading gray 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 ⅛-¼ in., subglabrous; lower tooth lanceolate, as long as the tube, the others deltoid. Corolla 3-4 times the calyx. Pod glabrescent, recurved, 2-4 in. by ⅛ in., 6-12-seeded.


Native and universally cultivated in the tropical zone.—District. Tropics of old world.
Low and suberect (V. Catiang) or tall and voluble (V. sinensis), always glabrous or nearly so. **Stipules** \(\frac{1}{4} - \frac{1}{5}\) in. long, attached and persistent as in **Phaseolus** § Strophostylis; leaflets membranous, 3-6 in. long, acute, very variable in shape, broad or narrow ovate, or ovate-rhomboidal, with the two sides below the middle prolonged into obtuse lobes. **Peduncles** often exceeding the leaves, 3-6-flowered; pedicels very short. **Corolla** glabrous, under \(\frac{1}{4}\) 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 \(\frac{1}{4}\) in. broad, edible; seeds 10 to 20.

**Surgery. 2. Plectrotropis.** Keel prolonged into a distinct beak, so that this group connects **Vigna** proper with **Phaseolus**.


Himalayas, from Simla to Kumaon and Khasia, ascending to 8000 ft. Hills of West Peninsula and Ceylon.—Distrib. Cosmopolitan in tropics. Cape, Australia.

Root fusiform, perennial. Stems wide-twining, glabrescent when mature. **Stipules** \(\frac{1}{4} - \frac{1}{5}\) 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. **Peduncles** \(\frac{1}{4} - 1\) ft.; bracteoles setaceous. **Corolla** \(\frac{1}{4}-\frac{1}{2}\) in., silky; teeth linear-lanceolate, as long as the tube. **Corolla** reddish-purple. 1 in. or more long; standard 1-1\(\frac{1}{4}\) in. broad. **Pod** 3-4 in. by \(\frac{1}{4}\) in., thinly silky at first, 10-15-seeded.

**Var. Stocksii**, Benth.; leaflets small ovate, brown hairs of the leaves and stem more abundant and persistent. **Concan, Stocks.**


**Arracan, Kurz.**

A perennial climber, with filiform stems. **Stipules** \(\frac{1}{4} - \frac{1}{5}\) in., linear-oblong, petiolar; petiole 1-1\(\frac{1}{2}\) in., pilose; leaflets 1-2 in., thinly hairy on both sides. **Peduncles** equaling or exceeding petioles; pedicels very short. **Corolla** glabrous, \(\frac{1}{4}\) in.; teeth broad, short, acute. **Corolla** yellow, \(\frac{1}{4}\) in. **Pod** 1 in. by \(\frac{1}{4}\) in., stiff, compressed, black, many-seeded. I have seen no specimens.

7. **V. Wightii**, Benth. MSS.; stems woody finely grey-downy, leaflets subcoriaceous small ovate subobtuse, flowers 2-3 on the end of long peduncles, corolla large. **Bedd. Ic. Pl. Ind. Or. t. 296.**

**Carnatic;** Courtallum. **Wight, Thomson.**

A slender twiner, with slender sulcate glabrescent stems. **Stipules** minute, lanceolate, basifixed, caduceus; leaflets glabrescent above, thinly silky below, 2-3 in. long. **Peduncles** reach 6-9 in.; pedicels very short; bracteoles minute, setaceous. **Corolla** \(\frac{1}{4}\) in., finely downy; lower teeth linear, nearly as long as the tube. **Corolla** reddish, \(\frac{1}{4}\) in. long; standard roundish, emarginate, \(\frac{1}{4}\) in. broad. **Pod** not known.

8. **V. dolichoides**, Baker; stems woody with short adpressed grey hairs, leaflets subcoriaceous roundish cuspidate with copious adpressed bristly hairs, racemes many-flowered short-peduncled, corolla middle-sized, pod stout short clothed with dense firm spreading grey silky hairs. **Phaseolus dolicho-

East Himalayas, tropical zone; Silhet, Khasia and Assam.—DISTRIBUTION. 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. Calyx ½ in., clothed with adpressed hairs; teeth deltoid, lowest 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 Bengal 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 subcubaceous. Racemes 2-3 in. long, much shorter than the leaves; pedicels finally ½ in.; bracts and bracteoles minute. Calyx ¼-½ in., thinly silky, oblique; lower tooth lanceolate, as long as the tube. Corolla reddish, twice the calyx. Pod 4-5 in. by under ½ 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, Calyx ¼ in. long, nearly glabrous; lower tooth lanceolate, shorter than the tube. Corolla reddish, 3 times the calyx. Pod beaked, many-seeded.

75. PACHYRHIZUS, Rich.

Wide-climbing herbs. Leaves pinnately 3-foliolate with stipellate lobed leaflets. Racemes long, with turgid nodes and fascicled pedicels; bracts and bracteoles sessile, caducous. Calyx 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.—DISTRIBUTION. Species 2 or 3, the others Mexican and Angolan.

Cultivated throughout our limits, but not known in a wild state.—Distr. Everywhere in the tropics.

Root a large tuber, like a turnip, which is eaten both raw and boiled. Stems wide-twinning, 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, ½-1 ft., the lower nodes often prolonged into short branches; bracteoles setaceous. Calyx ½ in., as long as the pedicel. Corolla reddish, 1 in. or more long. Pod 6-9 in. long, 8-12-seeded, straight, glabrescent.

76. GLITORIA, 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 exserted; 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, flatish or turgid.—Distr. Species 27, in tropics of old and new world, mostly the latter.

Subgen. 1. Ternatea. Pod flatish, the valves not keeled on the face.


Tropical zone from the Himalayas to Ceylon, Burma, and Malacca.—Distr. Cosmopolitan in the tropics, common in cultivation.

A climber, with slender downy stems. Stipules minute, linear; petiole ½-1 in.; leaflets ovate or oblong, obtuse, subcoriaceous, 1-2 in. long. Bracteoles roundish, obtuse, ¾-1 in. long. Calyx ½-2 in.; teeth lanceolate, half as long as the tube. Corolla 1½-2 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 ¾-1½ 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. Dals. & Gibbs. Bomb. Fl. 68.

In the Concan, common; Dalzell, Stocks, Law.

Scarce shrubby, the young branches densely pubescent. Stipules minute, lanceolate; petiole 3-½ in.; leaflets membranous, 2-3 in. long, ovate or oblong, usually acute. Flowers copious, scarcely peduncled; bracteoles ¾-1½ in., ovate or lanceolate aristate. Calyx 1½ 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. fl. & Thosam, Lobb. Tavoy, Wallis. Distr. Mexico, United States.

Stems slender, terete, glabrous. Stipules lanceolate, ¾-1 in.; petiole 1½-2 in.; leaflets membranous, glabrous, ovate, pale beneath, 2-4 in. long, acute or sub obtuse. Peduncles ½-2 in., with a pair of minute lanceolate bracts at the apex; bracteoles lan-
cedate, 4/4 in. Calyx 8/4 in. Standard pale blue, 2 in. by 14 in. Pod more turgid than in the two preceding.


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 2/3 in. long, veined like the stipules bracts and bracteoles; teeth lanceolate, acuminate. Pod 2 in. long, flatish, 6–8-seeded.

Subgen. 2. Neurocarpum. Pod turgid, with a rib along the face of the valves.


A suberect undershrub, with terete pilose branches. Leaflets 3, obovate or oblongate, subcoriaceous, 2–5 in. long, obtuse, grey-caneose beneath; petiole scarcely any. Flowers usually 2, distinctly peduncled; bracteoles small, ovate or lanceolate. Calyx 2/2 in.; teeth much shorter than the tube. Corolla pale violet, twice the calyx or more; standard 14 in. broad.

77. Dolichos, Linn.

Twining herbs, with stipulate 3-foliate leaves and minute subsessile bracts bracteoles and stipules. Flowers racemose or axillary. Calyx-tube campanulate; teeth long or short. Corolla much exerted; 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.—Distrib. Tropics of the Old World.

Subglabrous, wide-twinning, perennial, or under cultivation annual. Stipules lanceolate, basifixed; leaflets as broad as long, always entire, acute, 2–6 in. long, broad ovate, membranous, rarely downy beneath. Racemes and peduncles each reaching 4–5 ft. long; pedicels densely fascicled, ½ or finally ¾ in.; bracteoles oblong, sometimes as long as the calyx. Calyx 5–6 in.; teeth short, deltoid. Corolla red.

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dish or white, $\frac{1}{4}$ in. Pod 1½–2 in. by $\frac{1}{4}$ 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* ½ 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 $\frac{1}{2}$–$\frac{1}{3}$ 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 $\frac{1}{3}$ in., 10–12-seeded.

**SUBGEN. 2. Macrotywoma, W. & A.** Style filiform, minutely penicillate round the stigma, not bearded down the edge.—Connects Phaseolea and Galactiae.


Himalayas to Ceylon and Birma, ascending to 3000 ft. in Sikkim, sometimes cultivated.—DISTRIBUTION. Everywhere in tropics of Old World.

Annual, suberect (D. uniflorus) or lengthened out and twining (D. biflorus), downy, rarely glabrescent. *Stipules* basifixed, ½ in., lanceolate, scorioso; 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* $\frac{1}{3}$–$\frac{3}{4}$ in. long; keel narrow, obtuse, rather shorter than the standard. Pod 1½–2 in. by $\frac{1}{3}$ 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, Wallisch.

Stems very slender, wide-twining, with only a few short adpressed hairs. *Stipules* minute, lanceolate; leaflets 1–$\frac{1}{4}$ 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 $\frac{1}{4}$ 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, perennials. Stems slender, firm, clothed with short spreading deciduous grey hairs. *Stipules* small, nerves, 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, nerves, 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 *Kumaon* 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, or nearly glabrescent. *Peduncles* 1-2 in. long, sometimes scarcely any; pedicels ⅜ in. *Calyx* glabrous, under ½ in.; teeth very short. *Corolla* twice the calyx, its petals nearly equal in length; keel broad, obtuse. *Pod* subtripinate, 2-3 in. by ½ in., slightly recurved.

**Doubtful Species.**

D. *subcarinosus*, *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 stipulate 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 flattish pod ⅜-1 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, stipulate; 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; anthers uniform. *Ovary* subtripinate, many-ovuled; style long, much recurved, flattened laterally, densely bearded round the terminal stigma. *Pod* square, with a distinct wing to each angle, distinctly septicidal 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; peduncles ⅜-⅜ ft.; pedicels glabrous, as long as the calyx; bracteoles ovate, ½ in. *Calyx* ⅜ in., glabrous; side-teeth oblong; lowest shorter, deltoid. *Pod* ⅜-⅜ ft. by 1 in., the wings ⅜-⅜ 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, $\frac{1}{2}$ to $\frac{3}{2}$ ft. long, dense upwards; bracteoles oblong, glabrous, quite enveloping the young calyx. *Pod* 2-4 in. long, $\frac{1}{2}$ to $\frac{3}{2}$ 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, stigmas, 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 exerted, marcescent or caducous; keel not beaked. *Stamens* diadelphous; 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 *Cejurus* mainly by its arillate seeds.

**Subgen. I. Atylia**, Benth. *Petals* marcescent, remaining till the pod is developed.

*Erect.* *Flowers* in sessile or stalked pairs. *Pod* not distinctly lineate between the seeds.


Nigbhiris and Ceylon, up to 4000 ft.

An erect shrub, with rigid sulcate branches, densely clothed with grey or brownish subapatent hairs. *Stipules* lanceolate, minute, silky, caducous; petioles 1-½ 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. *Peduncles* rigid, erecto-patent, of the lower pairs of flowers 1-2 in. long, of the upper often suppressed; bracteoles oblong, caducous; pedicels 1-½ in. *Calyx* 1-½ 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.

2. A. **geminiflora**, Dalt. in *Journ. Linn. Soc.* xiii. 185; petiole produced,
leaflets orbicular thinly hispid on both surfaces, flowers in stalked pairs, corolla small, pod hispid 5–7-seeded.

**Western India, Dalsey.**

Branches suberect, flexuose, clothed with spreading fulvous hairs. Petiole 3 in.; leaflets membranaceous, 3-nerved, pellicudo-punctate, with scattered golden glands, 1½–2½ in. long; 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 Dals. 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 ½–1½ in. long. Pedicels as long as the calyx. Calyx ½–3 in., densely downy; teeth deltoid-cuspidate, the lowest as long as the tube. Corolla twice the calyx; keel obtuse. Pod oblong, straight, ½–1½ 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.

**CONCANN, Stocks, Law, Ritchie.**

An erect shrub, with long straight terete branches, with many grooves, densely clothed with fine short whitish subpatent silky hairs. Stipules setaceous, subpersistent, ½–1 in.; petiole ½–1 in.; leaflets flexible, moderately thick, subdigitate, 6–8 times as long as broad, subacute, triplinerved, persistently grey-silky, 1–2½ in. long. Pedicels very short. Calyx ½ in., silvery; teeth lanceolate, as long as the tube. Corolla ½ in., red; keel with a short obtuse beak. Pod oblong, ½–3 in. long, densely softly persistently grey-downy.

**Twiners with flowers in lax peduncled racemes and distinctly lineate pods.**


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, cuspidate, spathulate-narrowed to a rounded base. Racemes 2–3 in. long, lax, short-peduncled; pedicels glabrous, ½–3 in.; bracteoles large, roundish, reddish, forming a conspicuous tuft before the racemes expand. Calyx ½ in., finely grey-downy; lowest tooth lanceolate, as long as the tube. Corolla yellow, twice the calyx. Pod straight, 1–2 in.
6. **A. villosa**, Benth. MSS.; branches and leaves below thinly grey-downy, 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 ½ in. *Pedicels* decurved, finally ½ in. long. *Pod* 1–1½ in. long, ½ 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 Warre Country, Stocks, Law, Dalzell.

*Branches* firm, slender, terete, glabrescent. *Stipules* ovate-lanceolate, ½–1 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, 1½–3 in. long; stipelle subulate, persistent. *Racemes* lax, short-peduncled, few-flowered; pedicels ½ in.; bracteoles round, enclosing the buds. *Calyx* ½ in., finely downy, lowest tooth linear-acuminate, exceeding the tube. *Corolla* half as long again as the calyx. *Pod* 1½ in. by ½ 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. *Petoiles* 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; petiolo ½ in. long; stipelle distinct, setaceous. *Racemes* lax, few-flowered; pedicels finally ½ in., recurved. *Calyx* 2–3 in., finely downy; lowest tooth linear-setaceous, 3–4 times the tube; the others lanceolate. *Corolla* slightly exceeding the calyx. *Pod* 1½ in. by ½ in., 5–6-seeded.

**Subgen. 2. Cantharospermum, W. & A. Petals** falling before the pod develops.

* Leaflets subdigitate.


**Burma**; Prome and near Zeranghuen, Wallach.

Very like *A. albicans*, with which Wight and Arnott join it, but suberect, not twining. *Branches* slender, woody, terete, grey-canescent. *Petiole* 1 in.; leaflets exstipulate, rigidly coriaceous, 1 in. long, rounded at both ends, thinly grey-canescent above, densely beneath. *Racemes* falling short of the leaves, subcorymbose; pedicels cuneous, ¼–½ in. *Calyx* ½ in., finely downy; all the teeth deltoid. *Corolla* 4 times as long as the calyx; feel obtuse. *Pod* 1½ in. by ½ 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-canecent beneath, not reticulato-venose, greenish and obscurely canecent 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 4-5 in. *Calyx* 6-8 in., thinly canescent; lowest tooth lanceolate, upper oblong or deltoid. *Corolla* 3 times as long as the calyx. *Pod* 1-1½ in. by 3-4½ 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-twinning, 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, 1½-2 in. long, narrowed from the middle to a rather rounded base, exstipellate. *Pedicules* 1-2 in.; pedicels as long as the calyx. *Calyx* 6-8 in., densely pubescent; lower tooth setaceous, twice the tube, the others similar but shorter. *Corolla* scarcely exceeding the calyx. *Pod* oblong, 3-4½ 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 canecent above, densely persistently grey-canecent below, with the veinlets in relief, exstipellate. *Pedicules* 4-½ in., the flowers rarely 4 to each; pedicels as long as the calyx; bracts small, round, thick, caducous. *Calyx* 3-6 in., densely canecent; lower tooth linear, exceeding the tube, the others lanceolate. *Corolla* half as long again as the calyx. *Pod* ¾-1 in. by ¾ in., densely grey-canecent, rounded at both ends.


 Universally spread in the plains throughout India, reaching 5-6000 ft. in the West Himalayas.—*Distr.* China, Malaya, Mauritius, Madagascar.

A biennial, with slender trailing or twining densely grey-downy stems. *Stipules* minute, caducous; petiole ½-1½ in.; leaflets ½ in. long, flexible, twice as long as broad,
oxystipulate, 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 $\frac{1}{2}-\frac{3}{4}$ in., densely grey-silky; teeth linear, the lowest twice as long as the tube. Corolla yellow, $\frac{3}{4}-\frac{5}{6}$ in.; keel abruptly incurved at the tip. Pod straight, distinctly lineate, $\frac{3}{4}-1$ in. by $\frac{3}{4}$ in., clothed with fine spreading grey or pale brown silky hairs.—*C. nervosum*, Royle MSS., is a form with thick leaves, with the veins raised on the under side. The descriptions of Dolichos scarabaeoides 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 $\frac{1}{2}$-1 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 $\frac{3}{4}-\frac{1}{2}$ in., densely pilose; teeth linear-setaceous. Pod flat, 1-1$\frac{1}{2}$ in. by $\frac{3}{4}$ 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 bristly 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 $\frac{1}{2}$-1 in. Calyx $\frac{3}{4}$ 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 $\frac{3}{4}$ in. broad. Pod linear, distinctly lineate, 2$\frac{3}{4}$-3 in. long, $\frac{3}{4}$ 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 $\frac{1}{2}$ 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 $\frac{1}{2}-1$ in.; stipules 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 $\frac{1}{2}$-1 in. Calyx $\frac{1}{2}$ in., shaggy; teeth lanceolate, exceeding the tube. *Standard* half as long again as the calyx; keel equalling the calyx $\frac{1}{2}$ in. broad. Pod $1\frac{1}{2}-2$ in. by $\frac{3}{4}$ in., straight, densely clothed with long grey spreading hairs, narrowed to both ends.
80. CAJANUS, DC.

An erect shrub. Leaves 3-foliolate. Flowers racemose. Calyx-tube campanulate; teeth short. Corolla much exerted, its petals equal in length; keel truncate. Stamens diadelphous; anthers uniform. Ovary subsessile, 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.—Distr. The only species.


Wild? and cultivated throughout our limits, ascending to 6000 ft. in the Himalayas.—Distr. Everywhere in the tropics, probably native of the Old World.

An erect shrub, with slender salcete 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 ½ in. Corolla 3 times the calyx: standard yellow, (C. flavus) or beautifully veined with red (C. bicolor). Pod 2–3 in. by ¼–½ 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; stipellae rarely present. Flowers racemose or axillary. Calyx-teeth long and narrow, the lowest distinctly exceeding the others. Corolla more or less exerted, 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.—Distr. Three more species, reaching North Australia and Japan.

**Subgen. I. 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. Colus 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; stipellae sometimes present. Racemes lax, many-flowered, distinctly peduncled; pedicels downy, gminated, ¼–⅓ in.; bracts large, boat-shaped, soon falling. Calyx ⅔–¾ in., densely downy; lower tooth linear, as long as the tube, the others lanceolate. Corolla 1–1¾ in. long, the standard 1 in. broad, exceeding the wings and keel, ¼–½ in. Pod sessile, straight, 1½–2 in. by ⅜–⅓ 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 woody climber, with slender terete glabrescent stems and petioles. Stipules lanceolate, 1/2-3 in.; leaflets green on both surfaces, with a few minute deciduous hairs, membranous, the end one nearly sessile, obovate-oblong, cuspidate, 3-6 in. long; stipels minute, caducous. Racemes few-flowered, lax, distinctly peduncled; pedicels 1/2-3 in.; bracteoles large, oblong, caducous. Calyx 1/2-3 in., finely downy; lowest tooth acuminate, exceeding the tube. Corolla twice the calyx; standard 2 in. broad; keel subtruncate. Pod 1/2-2 in. by 1/2 in., straight, densely pilose at first, 4-5-seeded.

3. D. pulchra, Bentham. 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.

Lower hills of Sikkim, 1-2000 ft., Hook. fil.

A woody climber, with slender terete glabrescent branches. Leaflets membranous, green, glabrescent above, greyish-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 1/2-3 in.; bracteoles large, navicular, caducous. Calyx finely downy, 1/2 in. long; lowest tooth setaceous, 2-3 times the tube, the others much shorter, lanceolate. Corolla 1-1 1/2 in. long; limb of standard round. Pod as in the last.

Subgen. 2. Rhyncolobium, Bentham. Corolla small, caducous, little exserted.

4. D. debilis, Baker; stems filiform, leaflets subcoriaceous ligulate-oblong obtuse 3-4 times as long as broad, flowers solitary in the axils of the leaves, pod sessile glabrous.

Khasia Mts., alt. 4-5000 ft., Hook. fil. & Thomson, Lobb.

A twining herb, with very slender finely downy stems and distant nodes. Stipules minute, setaceous, persistent; petiole 1/2-3 in.; leaflets grey-green, thinly canescent above, densely so beneath, prominently nerved, the end one short-petioled, rounded at both ends, 1-1 1/2 in. long. Pedicels as long as the calyx. Calyx 1/2 in., grey-downy; teeth linear, the lowest as long as the tube. Corolla yellowish, half as long again as the calyx. Pod recurved, glabrescent, 1/2-2 in. by 1/2 in., 8-10-seeded.


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; and one distinctly petioled, 1-1 1/2 in. long and broad, subacutum. Pedicels very short; flowers rarely 3-4 on a short peduncle. Calyx 1/2 in., grey-downy; lowest tooth as long as the tube. Corolla reddish, 1/2-2 in.; keel distinctly beaked. Pod linear, 1 1/2-2 in. by 1 1/2 in., recurved, 6-8-seeded. — The Japanese Atylosia subhombbea and Javan Dolichos truncatus of Miguel both belong to this section of Dunbaria, and are near this species.

Tenasserim, Kurz.
A perennial twiner, with fine yellowish pubescence. Petiole 1/2–1 in.; leaflets puberulous, pale beneath. Pedicels pubescent, 1/2 in. Calyx 1/2 in., with adpressed yellowish pubescence; teeth lanceolate. Corolla middle-sized. Pod 1 1/2–2 in. by 1/2 in., flat, acuminate, many-seeded; stalk 3/4 in.—Ex Kurz loc. cit.


Moulmein, Griffith. Tenasserim, Hèlèr. Assam, Wall. 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 1/2 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 3/4 in., 8–10-seeded, with a stalk 1 1/2 in. long.—The Wallachian specimen includes the pod of a true Phaseolus.

82. CYLISTA, Ait.
A climbing shrub. Leaves 3-foliolate. Flowers racemed. 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 capitata. Pod small, oblique, oblong, enclosed in the calyx.—Distr. 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. 5596; W. & A. Prodr. 259; Wight & J. t. 1597; Delt. & 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 subhomboidal, 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, 1/2 in. long. Calyx finally 1–1 1/2 in. long, the scariose conspicuously veined lower lip 1 in. broad.

83. ERIOSEMA, DC.
Shrubs or herbs, mostly suberect, with 1–3-foliolate leaves. Flowers racemed or axillary. Calyx campanulate; teeth 5, as long as the tube. Corolla distinctly exerted; 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 capitata. Pod oblong, turbid, 1–2-seeded; seeds oblique, the funiculus attached to the extremity of a linear hilum.—Distr. 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; stipelles present or absent; stipules and bracts caducous. Flowers axillary or racemose. Calyx-tube short; teeth equaling or often much exceeding it, usually not acumen, slightly so in § Phyllomata, 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 incurved, stigma capitata. Pod round or oblong, flatish or turgid, usually continuous between the seeds, the hilum parallel with the sutures and funiculus centrical upon it.—Distrib. Species about 80, spread everywhere in the tropics and reaching the Cape and United States.

Subgen. 1. Phyllomata, 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 Atysia.


Suberect, shrubby, with long trailing shoots, clothed with fine short grey pubescence. 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 ½ in., cernuous. Calyx downy, ½ in. deep, cut down nearly to the base into 6 subequal scarious lobes ⅛ in. broad. Corolla not exserted. Pod ⅛ in. long, roundish, turgid, finely downy.


Plains of Mysore, Heyne. Nilghiris, Beddome.

Shrubby, with densely shortly grey-downy elongated slender branches. Stipules minute, caducous; petiole 1-1½ in.; leaflets oblong, acute, rounded at the base, subcoriaceous, minutely pubescent, the end one 2-3 in. long, distinctly stalked. Flowers in short-pedicelled 2-4-nate racemes of 1-2 distant clusters. Calyx ½ in., downy;
lobes subacute, rounded at the base, $\frac{1}{2}$-1 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, glabrous above, finely pubescent on the edge and lower surface, the end one distinctly-stalked, broadly deltoid at the base. Racemes 2-6-flowered, distinctly peduncled, equaling or exceeding the leaves; pedicels glabrous, very short, cernuous. Calyx $\frac{1}{4}$-1 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, caducous; petiole 1-3 in.; leaflets subcoriaceous, as long as broad, $\frac{1}{2}$-2 in. each way, glabrous above, obscurely pilose below, broadly deltoid at both ends, exstipitate, the end one distinctly stalked. Racemes short-peduncled, 6-30-flowered, about on a level with the leaves; pedicels $\frac{1}{4}$-1 in., densely pubescent. Calyx $\frac{1}{4}$-1 in., densely pubescent; teeth setaceous, the lowest the longest. Corolla bright yellow, scarcely exserted. Pod membranous, subcompressed, $\frac{1}{4}$-1 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. Erxle. 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.

Nigehris.

Stems woody in the lower part, wide-trailing, slender, densely tomentose. Stipules minute, lanceolate; petiole under 1 in.; leaflets coriaceous, very thick, $\frac{3}{4}$-1 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 $\frac{1}{4}$-1 in. long, with a persistent silky lanceolate bract a short distance below the calyx. Corolla $\frac{3}{4}$-1 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. suaveolens, 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 septiculate 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. *Pedicules* slender, erecto-patent, downy, seldom above 1 in.; pedicels shorter than the calyx. *Calyx* $\frac{1}{4}$ in., downy; teeth linear-setaceous. *Pod* oblong, $\frac{1}{4}-\frac{3}{4}$ 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 obovate 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. *Pedicules* slender, $\frac{1}{4}-1$ in.; pedicels shorter than the calyx, with an small persistent lanceolate bract at the base. *Calyx* $\frac{1}{8}$ in., densely silky. *Pod* oblong, $\frac{1}{4}-\frac{3}{4}$ in. long, turgid, glabrescent, 2-seeded.


AVÁ: Taungdong, Wallach. PEKU, 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-canescent beneath, the end one ovate-acuminate, 3-4 in. long. *Pedicules* equaling or exceeding the petioles; pedicels $\frac{1}{4}-\frac{3}{4}$ in.; bracts lanceolate, caducous. *Calyx* $\frac{1}{8}$ in., densely silky; all the teeth linear-setaceous, the lowest the longest. *Corolla* not exserted. *Pod* oblique, oblong, firm, $\frac{1}{4}-\frac{3}{4}$ in. long, 2-seeded.

9. **R. Beddomei**, Baker; leaflets argenteo-canescens on both sides, flowers in subsessile congested racemes, calyx-teeth much exceeding the tube, corolla not exserted.

**Western Peninsula**: Cudrape hills, Beddome.

An erect shrub, with terete white-canescens branches. *Petioles* erecto-patent, $\frac{1}{4}-\frac{3}{4}$ in.; leaflets oblong or oblong-lanceolate, acute, subcoriaceous, thinly persistently argenteo-canescens above, densely so beneath, the veins conspicuously raised, the end one short-stalked. *Flowers* in copious cymes from the axis of reduced leaves; pedicels much shorter than calyx. *Calyx* $\frac{1}{8}$ in., thinly silky. *Corolla* bright yellow. *Pod* 1-seeded, not seen fully mature, oblong, thinly canescent.


Rhynchosia.]  

L. LEGUMINOSE. (J. G. Baker.) 223


Jungles of the Western Peninsula and Ceylon.—Distr. Mascaren isles, Zambesia-land. A robust woody climber, with stems clothed with short grey or brown pubescence. Leaflets subcoriaceous, flexible, softly pilose on both sides, 4–6 in. long, the end one ovate-cuspidate, distinctly stalked; stipules large, setaceous, persistent. Racemes close, distinctly peduncled, ½–1 ft. long; bracts large, round-cuspidate, caducous. Calyx membranous, ½ in. long, densely clothed with grey hairs; tube short, teeth ½–1 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; Hazara to Gyrwhal and Kumaon, ascending to 9000 ft. An erect shrub, 4–6 ft. high, with virgate slender branches, clothed with persistent fine grey pontum. Petiole ½–1 in.; stipules minute, caducous; leaflets subcoriaceous, 1–2 in. long, exstipellate, grey-green, thinly canescent above, densely persistently grey-canescent beneath, with raised veinlets; the end one oblong-rhomboidal, distinctly stalked, apex deltoid, subacute. Flowers in short-peduncled close corymb; pedicels shorter than the calyx. Calyx ½ in., densely grey-canescent; lowest tooth linear-setaceous, exceeding the tube; the others shorter, lanceolate. Corolla ½–1 in.; standard thinly silky. Pod oblong, an inch long, ½ in. broad, straight, hard, persistently grey-canescent, subcompressed, bearing 1–2 seeds in the upper half.


* Leaflets small, subcoriaceous or membranous, usually obtuse. Pod much exceeding the calyx (Copisema, E. Meyer).


Everywhere in the plains, from the Himalayas, where it ascends to 4000 ft., to Ceylon and Birma.—Distr. 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, ½–1 in. broad and deep, obtuse, usually exstipellate, 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 ½–1 in., pubescent; lowest tooth setaceous, twice the tube. Corolla yellow, twice the calyx. Pod ½–1 in. long, under ½ in. broad, glabrescent, torrid, slightly recurved, mostly 2-seeded.

Var. laxiflora; glabrous, leaflets larger 1½–2 in. long acute both the upper and
lower half subdeltoid, racemes laxer 2–4 or even 6 in. long. R. laxiflora, "Camb. in
tenuicaulis, Wall. Cat. 5495. R. filicaulis, Grab. in Wall. Cat. 5592. Dolicho-


Scinna, near Kurrachee, Stocks.—Distria, 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-connate 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 4–5 times the calyx.

**Nilgiris.**

*Stems* wide-trailing, rather stouter than in R. minima, glabrescent when mature. *Stipules* minute, linear, caducous; leaflets subcoriaceous, ½–1½ in. long and broad, green, glabrous above, persistently thinly grey-connate beneath. exstipellate, the end one distinctly stalked. *Cymes* 2–4-flowered, shorter than the leaves; pedicels ½–1½ in. **Calyx** ¼–½ in., finely silky; lowest tooth linear-setaceous, twice the tube, the others much shorter, lanceolate. **Corolla** ¼ in. *Pod* much recurved, 1–1½ in. by ½ 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 Irrawaddi at Seguen, Wallach.

*Stems* very slender, twining. *Stipules* linear, ½ in., subpersistent; leaflets sub-
coriaceous, grey-green above, grey beneath, clothed on the edge and below with con-
spicuous long fine hairs, exstipellate, the end one oblong or ovate-oblong, rounded at both ends, 1½–2 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** ¼ 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-teeth linear exceeding the tube, pod middle-sized 4–5 times the length of the calyx.

**Gurwhal, Falconer.**

*Stems* wide-trailing, slender, densely clothed with short firm deflexed grey hairs. *Stipules* ½–1½ in., subpersistent, linear or lanceolate; petiole 1–2 in.; leaflets sub-
coriaceous, 1–1½ in. long, rounded to both ends, greenish beneath, thinly clothed on both sides with persistent moderately firm grey hairs, exstipellate, the end one dis-
tinctly stalked. *Racemes* 4–6-flowered; peduncles much exceeding the leaves; pedicels shorter than the calyx. **Calyx** pilose, ½ in.; teeth linear. **Corolla** half as long again as the calyx; standard slightly pilose. *Pod* 1 in. by ¼ in., finely pubes-
cent, 2-seeded.

**Leaflets larger, flexible, not coriaceous, mostly acute. Pod much exceeding the calyx.**


*Stems* rather woody, wide-twinning, clothed with deciduous fine short grey viscous pubescence. *Stipules* small, deltoid, subpersistent; leaflets green on both surfaces, finely gland-dotted, often glabrescent, 1½–3 in. long, the apex deltoid, the base broadly rounded, sometimes faintly 3-lobed, rarely stipellate, the end one on a petiolule ½–3 in. long. *Racemes* long-peduncled, lax, 2–4 in. long; pedicels ½–3 in.; bracts minute, ovate-cuspidate, deciduous. *Calyx* ½ in., finely gland-downy; upper teeth deltoid. *Corolla* twice the calyx. *Pod* 1½ in. by ⅛ 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 viscous 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, castipellate, 2–3 in. long; the end one ovate-acuminate, distinctly stalked. *Racemes* ½–⅓ ft. long, lax, distinctively peduncled; pedicels ¼ in.; bracts ½–⅓ in., oblong-lanceolate. *Calyx* ⅛ 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 ⅛ 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.—*Distrib.* Malaya.

*Stems* woody, slender, wide-climbing, densely clothed with soft short spreading grey glandular hairs. *Stipules* lanceolate, ¼–⅓ 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 end peduncle reaching a foot in length; pedicels much shorter than the calyx; bracts lanceolate, silky, exceeding the buds. *Calyx* ½–⅓ in., densely grey-silky; upper teeth deltoid-cuspidate, shorter than the tube. *Corolla* ½–⅓ in.; standard dark purple inside, callose, distinctly auricled, silky on the back. *Pod* 1–1½ in. by ⅛ in., finely-pubescent, turgid, 2-seeded, rather recurved, tipped with the long persistent base of the style.


*VOL. II.*
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. Corolla ½ in. long, densely downy; upper petals deltoid or lanceolate, shorter than the tube. Stamens 413, with fusca or red, 2-seeded, narrowed in the lower half, minutely downy.

21. R. acutissima, Thwaites, 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., Thwaites.

A twiner, with stems clothed with short pale brown tomentum. Stipules lanceolate, caducous; leaflets 2–5 in. long, very acuminate. Racemes equalling or shorter than the leaves; pedicels geminate, ¼–½ in. long; bracts lanceolate-acuminate, decurrent. Calyx ½ in.; teeth lanceolate, the upper pair subconnate. Corolla ⅓ 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. (Arynchymum, Elliott.)


Plains of both sides of the Western Peninsula.—DISTR. 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, ⅓–½ in., persistent. Calyx ⅓–½ in.; teeth all lanceolate acuminate; tube very short. Corolla glabrous. Pod oblong, ⅓–⅓ in by ⅔ in., 2-seeded, pubescent, oblique, narrowed suddenly at the tip.

DOUBTFUL SPECIES.

Dolichos candidans, 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 ⅓–2 in. long, racemes short-peduncled closely few-flowered, small lanceolate bracts, pedicels shorter than the calyx, calyx densely grey-pubescent ⅓ in. long, lowest tooth linear exceeding the tube, the others shorter, lanceolate, corolla scarcely exserted.

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 annules 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.—DISTR. 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 distichously arranged in corymbose simple or slightly branched racemes, both in the axils of the leaves and above them.


Himalayas from Simla and Kumaon, ascending to 8000 ft. to Assam, Khasia, Chittagong, Siam, Malacca, and Ceylon.—Distrb. 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 scarious, linear, ½–1 in.; petiole stiffly erecto-patent, ½–1 in. Racemes 3–6 in. long, usually simple, the slender zigzag rachis densely grey-downy; bracts erecto-patent, short-petioled, deeply coriaceous, ½–1 in. long, membraneous, finely downy, rather broader than long, obscurely cuspidate in the typical form. Calyx ½ in., finely pilose; teeth lanceolate, exceeding the tube. Corolla purple, little exserted. Pod oblong, turgid, ½–1 in. long, finely downy, 2-seeded.


Var. 2. **fruticulosa**; habit low and branches trailing, leaves smaller plicate, racemes fewer-flowered, bracts ⅔–1 in. slightly emarginate. F. fruticulosa, Wall. Cat. 5754; Benth. Pl. Jungh. 245.—Temperate region of Central Himalayas.


**Eastern Himalayas, Hamilton. Behar, Dr. Hooker. Ava, Wallich.**

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 ½–1 in.; teeth lanceolate, as long as the tube. Corolla twice the calyx. Pod as in the last.

**Subg. 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. Moulmein, Helfer.

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 panicule ½ ft. long, with densely grey downy branches, rather laxly flowered nearly down to the base; bracts ovate, pilose, scarious; pedicels shorter than the calyx. Calyx ⅔–1 in., densely grey-downy; teeth lanceolate, acuminate; tube very short. Corolla reddish, little exserted; keel rostrate. Pod ⅔ in., oblong, finely downy, 2-seeded.
4. **F. lineata**, Roxb. Hort. Beng. 56; Fl. Ind. iii. 341; leaves 3-folio-
late oblanceolate-oblong deeply plicate, flowers in copious axillary and terminal
panicled racemes, bracts very minute linear. Wall. Cat. 5752; DC. Prodr. ii.

Plains from the Himalayas to Ceylon, Birma and Siam.—Distr. Malayan
Islands, N. Australia.

An erect shrub, with the ultimate branchlets angular and grey-canescent. **Stipules**
lanccolate, scariosc, subpersistent, \(\frac{4}{5}-\frac{5}{6}\) in.; petiole \(\frac{1}{2}-2\) in., erecto-patent, deeply
sulcate; leaflets rigidly subcoriaceous, 1-3 in. long, obtuse, or with a slight cusp, del-
toid at the base, exstipellate, both surfaces especially the lower finely grey-canescent,
sublucent. **Panicules** from the axil 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** \(\frac{4}{5}-\frac{5}{6}\) in., densely grey-downy; teeth lanceolate. **Corolla**
light exserted; keel beaked. **Pod** \(\frac{4}{5}-\frac{5}{6}\) in., finely downy, rounded at both ends,
2-seeded.

**Subgen. 3. Flemingiastrum**, DC. Erect shrubs. Leaves digitately
3-foliate. **Flowers** in dense subplicate axillary racemes; bracts linear or lance-
olate, 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. 5744, excl. E; W. & A. Prodr. 241; Wight IC. t.
329.

Tropical regions of Sikkim, Silhet, Assam; Birma, Tenasserim, and the Western
Peninsula.—Distr. China.

A tall shrub, with woody triquetrous branches, clothed with only a few short
adpressed hairs. **Stipules** large, lanceolate, rigidly scariosc, soon falling; petiole
3-6 in., triquetrous, deeply sulcate, not winged; leaflets subcoriaceous, \(\frac{1}{2}-1\) 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,
\(\frac{2}{3}-3\) in. long, the lower bracts larger than the others and subpersistent, the upper ones
rigidly scariosc, linear, \(\frac{1}{2}-2\) in. long, shortly silky, densely imbricated before the
flowers expand; pedicels very short. **Calyx** \(\frac{1}{2}-\frac{5}{6}\) 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** \(\frac{4}{5}-\frac{5}{6}\) in. long, glabrescent.

**Var. pteropus**, Baker; petiole distinctly winged, leaflets lanceolate acuminate
pliante, spikes more slender densely fascicled, bracts and flowers smaller.—Pegu,
McClelland.

6. **F. Grahamiana**, W. & A. Prodr. 242; branches subterete, leaflets
obovate obtuse or subacute thinly silky below, bracts linear firm small, calyx

**Nilghiris**, Wight, Gardner, &c.

A low erect shrub, with tomentose young shoots. **Stipules** lanceolate, \(\frac{1}{2}-\frac{5}{6}\) in.
caducous; petiole \(\frac{1}{2}-1\) 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
\(\frac{1}{2}\) in. long, erecto-patent, subrigid, subpersistent. **Calyx** \(\frac{3}{4}\) in.; teeth plumose, linear-
etaceaceus, subequal. **Corolla** not exserted. **Pod** oblong, \(\frac{4}{5}\) in. long, finely pubescent,
and often covered with red viscid glands.

7. **F. congesta**, Roxb. Hort. Beng. 56; Fl. Ind. iii. 340; branches sub-
terete, 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. & Gits. Bomb. Fl. 75.

**Central Himalayas to Ceylon and Malacca, in the tropical region.—Distr.** Malay isles, China, Philippines.

An erect woody shrub, 4-6 ft. high, with terete glabrescent old and rather angular sulcate silky young branches. *Stipules* linear, 1/4 in., caducous; petiole 1-4 in., sulcate 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, 3/4 in. long, silky on the back, like the calyx, deciduous, not at all rigid; pedicels very short. Calyx ½-3 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, 3/4 in. long, obscurely downy, 2-seeded.

**Var. 1. semialata**; general habit and leaflets of the type, but the petiole narrowly winged, the racemes often rather laxer and calyx-teeth narrower. F. semialata, 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 4-9 in. long, bracts 3/4-1 1/2 in. long like the calyx densely clothed with shining adpressed brown silky hairs. F. latifolia, Benth. Pl. Jungh. 246; M. Fl. Ind. Bat. i. 163.—Khasia, 2-3000 ft. Hook. fl. and Thomson, Griffith.—Distr. Java.

**Var. 3. Wightiana**; erect, branches densely silky, leaflets smaller thicker densely clothed with adpressed grey or ferruginous silky hairs below with the veinlets raised, petiole not winged, pubescence of calyx and raceme-rachis denser and less adpressed. F. Wightiana, Gras. in Wall. Cat. 5751; W. & A. Prodr. 242. F. ferruginea, Wall. Cat. 5750.—Nilgiris, Wight. Bhotan, Griffith. Ava, at Taung-Dong, Wallich.

**Var. 4. nana**; a low diffuse undershrub, leaflets obtuse 1-2 in. long plicate reticulato-rugose beneath, heads few subglobose few-flowered sometimes shortly peduncled, calyx-teeth deep very narrow, pod slightly downy. F. nana, Roxb. Hort. Bap. 56; Fl. Ind. iii. 339; Wall Cat. 5748 A; Wight in t. 389 (suberect). F. procumbens, Roxb. Fl. Ind. iii. 338; Wight in t. 408 (trailing diffuse); Dale & Gibbs. Bomb. Fl. 75. F. capitata, Ham. in Wall. Cat. 5749.—Central and Eastern Himalayas, 2-5000 ft., Concan.


**Hills of Western Peninsula.** Prome, Wallich. Mantsans, Kurz. 

Branches slender, erect, densely clothed with short spreading hairs. *Stipules* small, caducous; petiole 1-2 in., faintly winged; leaflets obovate-oblong, 2-4 in. long, glabrous on the upper surface, nearly flat. Heads dense, oblong, sessile, 1-2 in. long, solitary or fascicled. Calyx 3/4-1 in., shaggy, with dense persistent firm spreading grey hairs, slit down nearly to the base into subequal 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 Compositae).


An erect shrub, 2-4 ft. high, with slender terete zigzag woody finely downy branches. Stipules large, scarioso, caducous; petiole 1/2-1 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 scarioso persistent bracts 1/2 in. long. Calyx 1½-1 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. Rhynchosoiodes. Trailing herbs with herbaceous roots. Leaves digitately 3-foliolate; bracts minute, caducous.

10. F. vestita, Benth. MSS.; leaflets obovate-cuneate minutely pilose, stipules large persistent, flowers 4-10 in dense long-peduncled heads, corolla much exerted. Dolichos vestitus, Graham 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 1/2-1 in., lanceolate, scarioso; petiole 1/2-1 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, exstipulate, obtuse or shortly cuspidate, 1/2-1 in. each way. Flowers 3-6 together, in dense heads like Lotus, on pilose peduncles overtopping the leaves; pedicels very short; bracts 1/2 in., silky, oblong or roundish, caducous. Calyx 1−2 in., densely brown-velvety; teeth subequal, exceeding the tube. Corolla bright red, half as long as again as the calyx; keel much incurved, distinctly rostrate. Pod oblong, included, subcylindrical, 1-seeded, finely hairy.

Var. nittheriensis; 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 J. t. 987; Dals. & Gibbs. Bomb. Fl. 75, non 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. Corymbs 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 Shatteria. Calyx ¼ 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, basifixed, 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-raftich zigzag*; leaflets firm, soon glabrescent, 1–3 in. long. *Panicles* much shorter than the leaves, the erecto-petant branches densely pubescent. *Calyx* ⅔ 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, 1¼–4 in. by ⅔–1 in., obtuse with a stalk twice as long as the calyx.


Common throughout the *Western Peninsula*, *Sikkim* and *Behar*, *Hook. fl.* *Bundelcund*, *Edgeworth*.

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* ⅔–¾ 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 ⅔–¾ in., in the place of the seeds distinctly marked but not wrinkled.


Whole plant glabrous, except the branchlets of the panicle. *Leaf-raftich* 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. *Panicle* 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*, *Kurs*.

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, Gardner, Walker, &c.—Distrib. 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 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 ¾-⅞ in., always 1-seeded.

5. D. rimosa, 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. 5855; Wight Ic. t. 262; Benth. in Journ. Linn. Soc. iv., Suppl. 32.

Eastern Himalayas, tropical zone, ascending to 4000 ft.; Khasta, Silhet, Assam. Leaf-rachis straight, 2-4 in. long; leaflets moderately firm, oblong or obovate-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 ⅓ 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 1-½ in., much thickened opposite the large seed. Seeds very rarely 2.


Forests of Ava, Pango, and Martaban. Leaf-rachis straight, 3-4 in. long; leaflets rigidly subcoriaceous, glabrous, not glaucous beneath. Panicle ½ ft., the main branches wide-spreading, rather drooping, the branchlets clothed with thin grey-brown pubescence. Calyx ⅓ 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. rimosa.

** Leaflets few, small.

7. D. rubiginosa, Roxb. Cor. Pl. ii. 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.—Distrib. 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. Gardeneriana, Benth. loc. cit.
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, 1-1\(\frac{1}{2}\) in. long, emarginate. **Panicles** 1-2 in. long, dense, the branches densely brown-velvety. **Pedicels** \(\frac{3}{4}-\frac{13}{12}\) in. **Calyx** \(\frac{1}{3}\) 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, 1\(\frac{1}{2}-2\frac{3}{2}\) in. by \(\frac{1}{4}\) in.


**Prime Hills, Wallich. Bgr., McClelland.**

General habit like that of *D. lanceolaria*. Branches and leaves below glabrous. Leaflets 1\(\frac{1}{2}-2\) in. long, moderately firm, green on both sides. Flowers in copious rather lax panicles, with slender ascending subglabrous branches. **Calyx** \(\frac{1}{2}\) 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, Malagay. —Distr. Malay isles.**

Branches slender, glabrous, often twisted. **Leaves** 2-3 in. long; leaflets thick, rigid, \(\frac{1}{4}-\frac{1}{2}\) in. long, truncate or emarginate, glabrous, slightly glaucous below. **Branches** of the panicule downy, the ultimate branchlets forming distinct scorpoid cymes. **Calyx** glabrous, under \(\frac{1}{2}\) in.; teeth short, obtuse, the lowest the longest. **Corolla** \(\frac{1}{2}\) in. Pod thin, membranous, greenish, glabrous, distinctly stalked, 2\(\frac{1}{2}-3\) in. by 1-1\(\frac{1}{4}\) 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 panicule densely pubescent. **Calyx** \(\frac{1}{3}\) 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 \(\frac{3}{4}-\frac{1}{4}\) 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, $\frac{1}{2}-2$ in. long; stipules large, lanceolate, velvety, more persistent than in the other species. 

Panicles distinctly peduncled, $\frac{1}{2}-\frac{3}{4}$ as long as the leaves, the branches densely brown-pubescent, spreading or ascending; pedicels shorter than the calyx, furnished with small subpersistent bracts and bracteoles. 

Calyx $\frac{3}{4}$ in.; upper teeth very short; lowest lanceolate, rather longer. Corolla twice the calyx. Pod thin, obtuse, brownish, short-stalked, 2-3$\frac{1}{2}$ in. by $\frac{3}{4}$-1$\frac{1}{2}$ in.

18. D. Stocksii, Benth. in Journ. Linn. Soc. iv., Suppl. 42; scandent, leaflets 11-15 oblong obtuse with a few obscure adpressed hairs, flowers in copious axillary panicles with corymbose branches, pedicles 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, $\frac{3}{4}$-1 in. long, emarginate, with only a few obscure short adpressed hairs below when mature. 

Panicles copious, distinctly peduncled, nearly or quite as long as the leaves; branches slender, densely finely grey-downy, densely corymbose at the tip, the lower ones distant. Calyx oblique, $\frac{3}{4}$ in., densely grey-downy; teeth half as long as the tube. Corolla twice the length of the calyx. Pod quite characteristic, thin, glabrous, 2$\frac{1}{4}$-1$\frac{1}{4}$ in. by $\frac{1}{2}$ 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, $\frac{3}{4}$-1 in. long, thinly silky at first, especially beneath. 

Panicles distinctly peduncled, with finely downy ascending curved branches, the ultimate branchlets second. Calyx $\frac{3}{4}$ 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 $\frac{1}{2}$-1 in., with an unusually short stalk.—Closely resembles D. volubilis in leaves and general habit.


Eastern Himalayas; NIPAL, SIKKIM, SILHAT, KHASIA. ascending to 4000 ft., and frequent down the gulf to MALACCA. Hills of Western Peninsula.—DISTRICT, Malay isles.

Branches densely clothed with fine brown pubescence. Leaves $\frac{3}{4}$-1$\frac{1}{2}$ foot; leaflets quite different in shape to that of all the other species, nearly sessile, caducous, moderately firm, $\frac{1}{2}$-1 in. long, glaucous, thinly clothed with brown pubescence beneath, especially on the midrib. 

Panicles sessile, 1-2 in. long, the branches densely brown-pubescent; pedicels shorter than the calyx; bracts and bracteoles minute, downy, persistent. Calyx $\frac{3}{4}$ 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, 1$\frac{1}{2}$-3 in. by $\frac{3}{4}$-1 in.
Dalbergia. || L. Leguminose. (J. G. Baker.) 235

Var. 1. pubescens; branches and leaves below clothed with persistent dense thick pubescence.—Concan, Stocks.

Var. 2. acacioides; leaflets thicker very oblique rigidly coriaceous glabrous bright green above glaucous beneath. D. acacioides, Dals. in Kew Journ. ii. 37.—Concan.

Subgen. 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 ½ in. broad, with a large callosity at the base of the limb, the keel much shorter than the wings. Pod 1½-4 in. by ½-3 in., bright brown, flexible, narrowed to the point and gradually to the base into a long stalk.

17. D. purpurea, Wall. Cat. 5869; scandent, leaflets 11-13 glabrous obtuse, flowers in copious ample terminal and axillary panicles with corymbose branches, pedicels bracteate 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, Wallisch, Griffith. Pegu, Kurz.

Closely allied to D. lanceolaria, from which it differs by its scandent habit, smaller flowers (under ½ in. long), and shorter calyx-teeth.

18. D. volubilis, Roxb. Cor. Pl. ii. 48, t. 191; Fl. Ind. iii. 231; scandent, leaflets 11-13 glabrous obtuse, flowers in copious ample terminal and axillary panicles with corymbose branches, pedicels very short bracteate, 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; Dals. & Gbs. 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 corymbs 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. 256; scandent, 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. Jenk.

A twiner, with glabrous branches. 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 $\frac{3}{12}$ 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*.


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 $\frac{1}{4}$ 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, 2–2$\frac{1}{2}$ in. long, thinly coriaceous, glabrous above. Panicle subcapitate, with villose branches. Calyx glabrous, $\frac{1}{8}$ in. *Corolla* white, a little longer than the calyx.—*Ex Kurz loc. cit.*


Central and Eastern Himalayas, tropical zone; from Garwhal and Kumaon to Bhutan, ascending to 4000 ft.

Leaf-racks 6–10 in. long, finely grey-downy; leaflets obtuse at both ends, firm, with veins rather raised, emarginate at the apex, 1–1$\frac{1}{2}$ 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 obovate, $\frac{1}{8}$ in. broad; keel distinctly shorter than the wings. Pod much smaller than that of its allies, often 3–4-seeded, 1–1$\frac{1}{2}$ in. by $\frac{1}{8}$ in., obtuse or subacute, narrowed gradually into a stalk twice as long as the calyx.


A climber, with even the branches of inflorescence nearly glabrous. Leaflets very firm in texture, greenish on both surfaces, ½–1 in. long, obtuse, slightly emarginate. Inflorescences mainly terminal, the principal branches ereto-patent, the ultimate ones forming distinct elongated scorpionid 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 ½ in., subglabrous. Corolla under ¼ in. long. Pod 2–2½ in. by ½ 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. 5869; 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, Wallach. Pegu and Martaban. Kurz.**

Branches, leaf-rachises and leaves below thinly clothed with deciduous brown silky hairs. Leaves ½–1 ft. long; leaflets rigidly subcoriaceous, 1½–2½ in. long, rounded at the base, narrowed to a point, the veinlets rather raised on the undersurface. Panicles sparse, much shorter than the leaves, the ereto-patent branches finely brown-silky. Calyx subglabrous, ½–1 in.; teeth lanceolate-deltoid. Corolla twice the length of the calyx. Pod strap-shaped, straight, 2–2½ in. by ½–¾ in., pale dull brown, narrowed suddenly at the base to a stalk twice as long as the calyx.

25. **D. stipulacea**, Roxb. Hort. Beng. 53; Fl. Ind. iii. 233; scandent, leaflets 17–25 obtuse glabrous or nearly so, flowers in copious axillary panicles with elongated racemose branches, pedicels longer than the calyx with conspicuous persistent bracts and bracteoles, calyx-teeth as long as the tube, pod firm glabrous one-seeded thickened and veined opposite the seed. *Wight in t. 453; Benth. in Journ. Linn. Soc. iv., Suppl. 47.*

**Eastern Himalayas,** tropical zone, ascending to 4000 ft. in Sikkim; Assam, Khasia, Sylhet, Chittagong, Pegu, Martaban, Tenasserim.—*Distrib. Malay isles.*

Branches glabrous, or at first finely grey-downy. Leaf-rachis 4–6 in. long; leaflets moderately firm, obtuse, 1–1½ in. long, glabrous, or at first minutely hairy beneath, green above, subglabrous beneath. Panicles 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 oblanceolate glabrous bracts and bracteoles. Calyx subglabrous, ½ 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.

**Subgen. 3. Selenolobium, Benth. Stamens in two bundles of 5 each.**

**Pod obliquely orbicular-oblung, rather recurved, usually 1-seeded.**


**Shores of the Western Peninsula, Ceylon and Malayan Peninsula.—Distrib. Malay isles, China, Philippines, N. Australia.**

A wide-twining shrub, with lithe much-twisted black glabrous branches. Leaflets usually 5, obovate-oblung, glabrous, obtuse, often emarginata, 1–1½ in. long. Flowers in sessile congested axillary panicles, 1–2 in. long, the branches only inconspicuously downy; pedicels shorter than the calyx. Calyx ½ in., subglabrous, with a pair of
minute obtuse bracteoles; teeth short, obtuse. **Corolla** ¼ 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, 1-1½ in. long; leaflets firm, obovate-oblong, 1-½ in. long. **Flowers** in congested sessile corymbose panicles, with minutely downy branches; pedicels shorter than the calyx. **Calyx** ¼ 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, 1½-2 in. long, broadly rounded at the base. **Flowers** in deltoid close axillary panicles, shorter than the leaves, the branchlets racemose, densely brown-velvety. **Calyx** ¼ in., campanulate, densely silky; teeth deltoid, shorter than the tube. **Corolla** twice the length of the calyx, white; standard obovate-emarginate. **Pod** glabrous, rigid, usually one-seeded, an inch broad by ¼-½ in., narrowed suddenly into a stalk ¼-½ 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, 1-1½ in. long, retuse, with a minute mucro, chartaceous, glaucescent and thinly pilose beneath. **Panicles** axillary, much shorter than the leaves; rachises pilose; pedicels ½ in. **Calyx** ½ in., pilose; upper tooth very short, obtuse; lower very long, subulate. **Corolla** and stamens unknown. **Pod** linear, 1-2 in. by ½ in., flat, brown, thin, narrowed gradually to a long stalk, indistinctly veined. 1-5 seeded. Pod of *D. sisoo* and habit of *D. lanceolata*. Sikkim at Pankabari, Gamble.—*Ex Kurz loc. cit.*

87. **PTEROCARPUS**, Linn.

Erect trees. *Leaves* with alternate coriaceous exstipulate leaflets. **Flowers** yellowish, in copious paniced racemes; bracts and bracteoles minute, caducous; pedicels distinctly articulated at the apex. **Calyx** turbinate, 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.—**Distrib.** Species about 15; cosmopolitan in the Tropics.

Eastern and Western Peninsulas.—Distr. Malay isles, Philippines, China.
A tall tree, with ascending glabrous branches. Leaves 3/4-4 ft. long; leaflets moderately firm, 2-4 in. long, glabrous, rounded or deltoid at the base, always narrowed to a point; petiolules 1/4-3/4 in.; main veins fine, distant. Flowers in copious terminal and axillary panicles, with subsecond racemose branches, clothed with fine brown pubescence; pedicels 1/4-1/2 in., furnished with a pair of linear spreading caducous bracteoles at the apex. Calyx 3/4-1 in., finely brown-silky; teeth rounded, the two upper much the largest. Corolla exceeding the calyx; standard 3/4-1 in. broad. Pod orbicular, 2 in. broad, silky and veined against the seed, the wing 3/4 in. broad, the style a considerable distance above the base, pointing outwards, at a right angle with the stalk.

2. P. macrocarpus, Kurz in Journ. Asiat. Soc. Beng. xliii. 2, 187; leaflets 7-11 ovate-oblong pointed, racemes simple, pedicels as long as the calyx, stamens diadelphous, beak of pod at the basal corner.

Martaban and Tenasserim, Kurz.
A tree, with fulvo-pubescent branchlets. Leaves 3-6 ft.; rachis fulvo-puberulous; leaflets coriaceous, 1-2 1/4 in. long, at first fulvo-pubescent beneath; petiolules 1/4-1 in. Racemes simple, axillary, fulvo-pubescent; pedicels 1/4-1 in. Calyx 1/4 in., velvety. Corolla slightly exceeding the calyx. Pod canescent, roundish, 1 1/2-2 in. broad; wings subplicate. Ex Kurz loc. cit.

3. P. santalinus, Linn. fil.; DC. Prodr. ii. 419; leaflets 3 ovate obtuse, veining fine, pedicels rather shorter than the calyx, stamens 2-3-adelphous, stalk of pod much exceeding the calyx, beak of pod at the basal corner. Roxb. Fl. Ind. iii. 234; Wall. Cat. 5544; W. & A. Prodr. 266; Benth. in Journ. Linn. Soc. iv., Suppl. 76; Bead. Fl. Sylv. t. 22.

Western Peninsula.
Branches obliquely grey-downy. Leaflets 3 in all our specimens, but said to be sometimes 6, 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. indicus, the pedicels shorter. Calyx 1/4 in.; teeth deltoid, minute. Limb of standard not longer than the calyx. Pod silky at first, the same size as in P. indicus, but the centre more turgid, wing narrower and style brought down to the basal corner.

4. P. Marsupium, Roxb. Cor. Pl. ii. t. 116; Fl. Ind. iii. 234; leaflets 5-7 oblong usually obtuse, veins close and prominent, pedicels shorter than the calyx, stamens monadelphous, stalk of pod scarcely exceeding the calyx, beak of pod at the basal corner. DC. Prodr. ii. 418; W. & A. Prodr. 266; Wall. Cat. 5542; Bead. Fl. Sylv. t. 21; Dalsey & Gibbs. Bomb. Fl. 76. P. bilobus, Roxb. MSS.; G. Don, Gen. Syst. ii. 376.

Plains of the Western Peninsula and Ceylon.
Leaflets thicker than in the others, green and glabrous on both surfaces, 3-6 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 1/4-1/2 in. Calyx 3/4 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 racemose. 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.—**Distr.** 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.—**Distr.** 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, 1/4–1/2 in., with a pair of minute bracteoles in the middle. **Corolla** 1/4 in.; standard silky on the back. **Pod** woody, glabrous, 1/4–1/2 in. thick, 1 1/2 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 exserted; standard broad; keel obtuse, the petals cohering slightly. **Stamens** usually monadelphous, the upper one free in § *Aguanope*; 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.—**Distr.** 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 (1/4 in. or less broad), winged along the upper suture. **Stamens** monadelphous. Leaflets comparatively small. Climbers or erect trees.


A wide-climbing shrub, with branchlets and leaves below at first obscurely grey-downy. Leaves 1/4–1/2 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 1/4–1/2 in. long, the different flowers from the same node expanding at different times. **Calyx** 1/4 in., thinly grey-silky; teeth obscure. **Corolla** pale rose, 3 times the length of the calyx. **Ovules** 6–8. **Pod** 1–3 in. by 1/4–1/2 in., narrowed to both ends, 1–4-seeded, glabrous, turgid, and smooth against the seeds, the wing not more than 1/4 in. broad.

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L. LEGUMINOSAE. (J. G. Baker.) 241

**Ceylon, Thwaites.**

A climber, quite glabrous in all its parts, even the pedicels and calyx. Leaves rigidly subcoriaceous, oblong or obovate-oblong, 1½-2 in. long, green above, rather glaucous beneath. Racemes axillary, short-peduncled, 2-4 in. long; pedicels twice the length of the calyx. Calyx campanulate, ⅓ in.; teeth deltoid, minute. Corolla 4 in., the round petals as long as the calyx. Ovules 2. Pod ligulate, glabrous, 1½-2½ 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 ¼-½ 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 ½-¾ in., finely grey-downy. Calyx ½ 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, ½ in. broad, the wing more distinct than in *D. scandens*, sometimes ⅛ in. broad.

4. **D. dalbergiodides**, Baker; erect, leaflets 25-33 obtuse rather oblique at the base, racemes close shorter than the leaves, pedicels unequal densely fascicled.

**Makhtab. Parish. Tenasserim, Hafier, Malacca, Mainag.—Distrib. Java.**

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-peduncled racemes, like those of *D. scandens* and *robusta*, but the nodes more crowded; pedicels and calyx each about ⅛ 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 Milletia and Lonchocarpus. Leaves 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.)


**VOL. II.**
**Eastern Himalayas, Western Peninsula and Ceylon.—Distri.** China, N. Australia, Polynesia, Madagascar, Zambesi-land.

A wide-climbing shrub, with branchlets and leaves quite glabrous from an early stage. *Leaves* distinctly petioled, \(\frac{3}{4}\) 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 fascicled, as long as the calyx. *Calyx* campanulate, \(\frac{3}{4}\) in., subglabrous; teeth obscure. *Corolla* rose-red, \(\frac{3}{4}\) in. long; blade of standard round, not callose. *Pod* sessile, glabrous, 1–2-seeded, obliquely roundish or oblong, 1–1\(\frac{1}{2}\) 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. trilobata*, *Laur. Pl. Cochis*: 438 (D. affinis, *Benth. Pl. Jungh.* i. 262), but the pod is unknown.


**Malacca, Mainagay.**

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 fascicled; pedicels squalling or rather exceeding the calyx. *Calyx* \(\frac{1}{2}\) in., finely pubescent; teeth obscure. *Corolla* red, \(\frac{3}{4}\) 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; Phanias and Trogla hills, Wall.** *Tenasarium, 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 sub lax, 2–4 in. long, clothed with fine brown pubescence on the rachis and pedicels; pedicels \(\frac{1}{2}\)–\(\frac{3}{4}\) in., the lower nodes sometimes produced. *Calyx* under \(\frac{1}{2}\) in., broadly campanulate; teeth obscure. *Corolla* bright red, \(\frac{1}{2}\) in. long; blade of standard round, not callose. *Pod* just like that of *D. vestita*.


**Ceylon, Walker, Thwaites.**

*Branches* slender, terete, soon glabrescent. *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 branchlets, clothed with finely silky brown pubescence; pedicels \(\frac{1}{2}\)–\(\frac{3}{4}\) in. *Calyx* \(\frac{1}{2}\) in., between tubular and campanulate, brown-silky, with short obscure teeth. *Corolla* red, scarcely \(\frac{1}{2}\) in. long. *Pod* 1–2-seeded, 1–2 in. by \(\frac{3}{4}\) in., rigid in texture, turgid against the seeds, persistently brown-silky, not veined, with a wing under \(\frac{1}{2}\) in. broad down the upper suture.

†† *Leaves* many. *Standard* with two callosities at the base of the limb. (Paraderрис, *Benth.)*

subglaucous, leaflets 9–15 small obovate or oblong-obovate, racemes much shorter than the leaves, standard glabrous, pod broad. D. ovalifolia, Benthi Pl. Jungh. i. 252, in part; Thwaites Enum. 92. Pongamia elongata, Grah. in Wall. Cat. 5915, 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 peltioid, not more than half a foot long; leaflets the smallest of the group, 1½–2¼ in. long by 1/4–1/3 in., obtuse or subacute, quite glabrous, rigidly subcoriaceous when mature, rather glaucous beneath, the veins immersed. Racemes copious, moderately close, subsubtuse, many of the nodes produced into short spreading branchlets; pedicels rather exceeding the calyx, finely grey-silky. Corolla 1/4 in. long. Corolla ⅔ in. long; standard reflexed, nearly ⅔ in. broad. Pod one-seeded in all our specimens, oblong, 1½ in. by ⅔–⅔ in., thin but firm, glabrous, with a distinct wing down the upper suture.


Eastern Himalayas, Nipal, and Sikkim; ascending to 5000 ft. in Silhet and Eastern Peninsula.

Leaves distinctly-peltioid, ⅔–⅔ in. long; leaflets usually 5–7, moderately firm, slightly silky at first beneath, 3–6 in. long, subobtuse or acute, the veins immersed. Flowers very copious, the nodes of the racemes usually produced into branchlets; racemes sometimes fascicled; pedicels finely grey-downy, ½–⅓ in. Calyx ⅔ in., subglaucous, broadly campanulate. Corolla ⅔–⅔ in., bright red; blade of the standard round. Pod 1–3-seeded, 2–3 in. by ⅔–⅔ 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, Benthi. in Journ. Linn. Soc. iv. Suppl. 113; branches subglaucous, leaflets 5–9 large membranous obovate-oblong cuspitate, racemes long and lax, standard glabrous, pod broad.

Sikkim, alt. 2–5000 ft., Hook. fil.

Closely allied to D. cuneifolia, and even more showy. Leaves a foot or more long, distinctly peltioid; 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, 1/4–1 ft. long, with distant nodes, the axils and pedicels nearly glabrous, the nodes not produced into branchlets; pedicels ⅔–⅔ in. Calyx ⅔ in., broadly campanulate. Corolla ⅔–⅔ in., bright red; standard erect, ⅔–⅔ in. broad. Pod 1–2-seeded, 1½–2 in. by 1 in., glabrous, thin, firm; wing very narrow.


Martaban, Birma, Penang, Malacca.—Distrib. Siem, Malay isles.

A large handsome climber, easily distinguished from all the other species by its petals silky on the outside. Leaves long-peltioid, 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. Racemes 4–1 ft. long, obtuse, very lax, with nodes copiously produced into branchlets, the axis and pedicels densely clothed with brown pubescence; pedicels ½–1 in. Calyx very broad, densely silky. Corolla bright red, ¾ in. long; blade of standard round, ½–¾ in. broad. Pod 2–3 in. by ½ 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.)**


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 panicles, which are as long as the leaves, with ascending branches, densely clothed with short brown pubescence. Calyx under ½ in., densely silky. Corolla red, 3 times the length of the calyx; standard obvate, not callose. Pod broad, oblong, 1-seeded. 1¼–1½ in. by 1 in., persistently brown-silky, with a narrow wing down the upper and a very obscure one down the lower suture. Var. coriaceae, Benth.; leaflets much thicker and very rigid glossy above, flowers nearly sessile.—Nilghiris, Hohenacker, 1598.

14. D. eaulata, Bedd. Is. Pl. Ind. Or. 42, t. 186; leaflets 7–9 oblong middle-sized obtusely pointed, racemes copiously panicked 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 ghat. Beddome.

A gigantic creeper, with brown silky branchlets. Leaflets subcoriaceous, glabrous, 2–3 in. long, the veinlets little raised. Flowers in axillary racemes and an ample panicle often 1 ft. long at the end of the branches; pedicels fascicled, ½–1 in. Calyx 8–10 in., densely brown-silky. Corolla reddish, scarce ⅛ in.; standard not callose. Pod ligulate, thin, 4–5 in. by 1–1½ in., 1–3-seeded, each wing ½ in. broad.

15. D. Heyneana, Benth. Pl. Jungh. i. 252; leaflets 5 glabrous obovate-oblong middle-sized subobtuse, racemes copiously panicked 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. & Gibs. Bomb. Fl. 77. Pongamia Heyneana, Graham. in Wall. Cat. 5916.

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. Panicles copious, axillary, as long as the leaves, with numerous very slender ascending branches, with the subdistant nodes produced into short branchlets; pedicels ½–1 in. Calyx ⅜ in., subglabrous. Corolla rose-red, ⅜ in.; blade of standard roundish. Pod oblong or ligulate, 1–3-seeded, 1½–4 in. by ⅞–1 in., thin, firm, rather glossy and veined, the wing of the upper suture ¼–⅛ in. broad, of the lower much narrower.

Var. paniculata; leaflets 5–7 considerably smaller and especially narrower, pedicels a foot long, very lax with branches clothed with fine silky pubescence, pedicels

**Eastern Himalayas**, tropical zone, *Khasia* and *Silhet*, ascending to 3000 ft. A showy climber, glabrous in all its parts. *Leaves* ½–1 ft. 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* ⅛ in., broader than deep when expanded. *Corolla* pale red, ½–¾ in. long; standard ¾ in. broad, not callose. *Pod* thin, flat, ligulate-oblong, glabrous, flexible, finely veined, 3–4 in. by 1½–1¾ in., the upper wing ½–⅞ in. broad, the lower narrower.

17. **D. platyptera**, Baker; leaflets 5–7 large subcoriaceous oblong subacute glabrous, racemes copiously panicled with silky branches, pedicels as long as the calyx, corolla middle-sized, pod glabrous very distinctly winged down the lower suture.

**Martaban**; near Calcutt, *Wight.*

**Branches** glabrous. *Leaves* ½–¾ ft. long; leaflets obtusely pointed, 3–6 in. long, broadly rounded at the base, thin, flexible, finely reticulato-venulose; pedicels ⅛ in. *Panicles* as long as the leaves, with numerous short ascending fine silky branches; pedicels close, but not fascicled. *Calyx* ⅛ in., subtruncated, finely silky. *Corolla* under ¾ 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 ¼ in. broad.


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. *Paniccles* squalling or exceeding the leaves, the nodes often produced into branchlets, the flowers close and pedicels densely fascicled; pedicels ⅛–⅜ in. *Calyx* ⅛ in. *Corolla* under ⅜ in., bright red. *Pod* thin, glabrous, ligulate-oblong, flexible, finely veined, 3–4 in. by 1½–1¾ in., the upper wing ½ 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 panicled racemes with glabrous branches, corolla middle-sized, pedicels squalling 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 ¼ in. long with a standard with a round escalose wing, rounded suddenly to a long claw.


**Eastern Himalayas, tropical zone, Assam and Sylhet.** **Berma, Wallis.**

Branchlets clothed with dense ferruginous pubescence. **Leaflets** 4–6 in. long, cuspidate or subobtuse, rounded at the base, subcoriaceous, green and glabrous above, finely pubescent, especially on the main raised veins beneath. **Panicles** axillary, peduncled, 1/2–1 ft. long, with slender ascending branches, clothed with dense ferruginous pubescence; pedicels 1/2 in., fascicled and nodes often produced into branchlets. **Calyx** 2 in.; teeth deltoid, minute. **Corolla** rose-red, three times the length of the calyx; standard emarginate, 3/2 in. broad. Young **pod** densely brown-silky; old nearly glabrescent, 2–3 in. by 1 in., oblong or ligulate-oblung, rigid in texture, obscurely veined on the faces, the sutures much raised, the wing of the upper 3/2 in. broad, the wing of the lower one sometimes not perceptible.


**Concan**, near Garsuppa, Dalzell. **Leaves** a ft. long; leaflets 2–2 1/2 in. by 3 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, 1 1/2 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 stamen distinctly free from the rest down to the base.

22. **D. sinuata**, Thwaites Enum. 93; leaflets subobtuse half as long again as broad, pedicels as long as the calyx, pod large deeply indented between the seeds narrowly winged down the upper suture. Benth. in Journ. Linn. Soc. iv. Suppl. 113. Pongamia sinuata, Wall. Cat. 5911. P. grandifolia, Graham. in Wall. Cat. 5885, not Zoll. & Moritz.

**Penu, Martaban, Tenasserim, Malacca, Ceylon.—Distrib.** Malay isles.

A robust climber, with glabrous branches and leaves. **Leaflets** 5–7, ovate- or obovate-oblong, 4–6 in. long, rigidly coriaceous, all but the main veins immersed. **Panicles** 1/2–1 ft. long, with numerous ascending thinly brown-silky branches; pedicels 1/2 in. **Calyx** 2 in., thinly silky, broadly campanulate, circumscissile above the base. **Corolla** 2 in., turning dark purple when dried; standard erect, with a round calloso blade. **Pod** very different from that of any of the other species, 1–4-seeded, 2–8 in. by 1–1 1/4 in., smooth, firm, finely veined, the wing usually not more than 3/2 in. broad, and sometimes not perceptible.


**Eastern Himalayas and the Khasia Mts., ascending to 4000 ft.; Eastern Peninsula.—Distrib.** Malay isles.

A robust climber, with glabrous branches and leaves. **Leaflets** 5–9, oblong or
obovate-oblong, rigidly subcoriaceous, 4-6 in. long, the veinlets distinct in the dried specimens. *Podacies* 1-1 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 fasciated, much shorter than the calyx. Calyx 3 in., thinly silky. Corolla whitish, 3-4 times the calyx. *Pod* 1-3-seeded, 1½-2½ in. by 1-1½ in., thin, flat, glabrous, finely-veined, each wing 1½ in. broad. Doubtful species.

Of the following species of § Euoderris the fruit is unknown.

D. acuminata, Bentli. Pl. Jumg. 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 fasciated at the distant nodes, the rachis, pedicels and calyx with a little brown pubescence; pedicels 1½ in., equaling or exceeding the calyx. Corolla rose-red, 3 in. long. Ovary silky, 5-6-ovuled.—Nipal, Wailing; and a plant with 9-11 leaflets of similar shape, and shorter closer racemes of considerably larger (1½ in. long) bright purple flowers in Sikkim, Hook. fil. This last closely resembles *D. microptera*, but the standard is not callose.

D. secunda, Baker. (Pongamia secunda, Grah. in Wall. Cat. 5890. Amerinnum secundum, Hamilt. 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 fasciated, exceeding the calyx. Calyx 1½ in. Corolla reddish, 3 in., the blade of the standard oblong, not callose. Ovary silky.—Assam, Hamilton.

D. polystachya, Bentli. 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 1½ in., slightly pubescent. Corolla 3-6 in., rose-red. Ovary silky, with about 4 ovules.—Khasia, 2-4000 ft., Hook. fil. & Thomson.

D. ovalifolia, Bentli. Pl. Jumg. i. 252, ex parte. (Pongamia ovalifolia, W. & A. Prodr. 262; Wight i. t. 328.) A climber, glabrous in all its parts, with general habit and leaves very like *Dabergia volubilis*. *Leaflets* 9, long-stalked, oblong, obtuse, emarginate, 1½-2 in. long, membranous, with raised veinlets. *Racemes* copious, axillary, ½ ft. long, sometimes geminate, with nodes produced and very abundant small bright red flowers; pedicels twice the calyx. Calyx 1½ in., broadly campanulate. Corolla 1½ 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, Bentli. in Journ. Linn. Soc. iv. Suppl. 111. A robust climber, glabrous throughout. *Leaves* long-petioled; *leaflets* 5-9 obvate-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, 1½-1¾ in. by 3½-4 in., both sutures raised and furnished with a narrow distinct wing.—Sikkim and Sylhet, 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.

with produced nodes. Pod 1–2-seeded, 1–2 in. by $\frac{1}{2}$–$\frac{3}{8}$ in., thin, but firm, rather
veined, 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.


**Khasta Mts.**, Hook. fl. & Thomson.—**Distr.** Java, Formosa.

An erect shrub, with glabrous leaves and branches. Leaves long-petioled; leaflets
3–5, oblong, acute, $\frac{1}{3}$–$\frac{3}{4}$ ft. long, subcoriaceous, opposite, subsessile, pale green, the
veins immersed. Flowers (not seen in Indian specimens) in simple peduncled
racemes; pedicels geminate, minutely bracteate, shorter than the calyx. **Corolla**
pure white, $\frac{1}{2}$ in. long, twice the length of the calyx. Pod oblong, purplish-black,
$\frac{1}{2}$–$\frac{3}{4}$ in. long.

91. **DALHOUSIEA**, Grah.

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** subsessile, 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.

1. **D. bracteata**, Grah. in Wall. Cat. 5330; *Wight* l.c. t. 265. **Podalyria**
bracteata, Roxb. Cor. Pl. iii. t. 259; *Fl. Ind.* ii. 317.

**Eastern Himalayas**, tropical region, Assam, Simla, 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 subsessile
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** $\frac{3}{4}$ 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 panicled. **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 **S. Goebelii**, with
a small hooked mucro. **Stamens** free, or obscurely connate at the very base;
anthers uniform, versatile. **Ovary** stalked, many-ovuled; style incurved, stigma
capitulate. Pod moniliform, sub lignose or membranous in our species, usually indehiscent, the joints turgid, terete or in $Edwardsia$ furnished with four wings.—Distr. Species above 20, widely spread in warm countries.

$\S$ Eusophora. Pod wingless. Keel obtuse, without a mucro.

* Stipules persistent, spiny. Pod finally dehiscing.


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, obvate, obtuse, with a long awn, ½-1 in. long, subcoriaceous, pale green, finely grey-silky on both surfaces, finally nearly glabrescent. *Flowers* in copious sparse axillary racemes; pedicles 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.


Shores of the Eastern and Western Peninsulas, and Ceylon.—Distr. 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 silky, articulated a little below the calyx. *Calyx* ½-3 in., nearly truncate, very oblique. *Corolla* ½-3 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* ½-2 ft. long; leaflets subdistant, membranous, glabrous, ½-1 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 ob lanceolate-spatulate, ½ 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, ½-1 in. long, subcoriaceous,
green, glabrescent above, densely grey-silky beneath, the hairs on the midrib brown, the veins immersed. Racemes dense, terminal, short-peduncled, 1-3 ft. long; pedicels densely silky. Calyx 1/2 in.; teeth distinct. Corolla twice as long as the calyx; blade of standard obovate, 2/3 in. broad. Ped 8-4 in. long, moderately firm, 5-6-seeded, finally dehiscing, but little moniliform when all the seeds are matured.


Ceylon, alt. 4-7000 ft.—Distr. China.

Branchlets at first brown-silky. Leaves 3/4 to 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, 2-3 ft. long; pedicels 1-1/2 in., articulate at the middle, thinly silky, the lower in pairs. Calyx 2/3 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, 1/3-3/8 in. broad, with a broad neck between them when the seeds all mature, the faces distinctly veined.


Hills of the Western Peninsula, Mysore, Coghorn.

Branchlets persistently brown-velvety. Leaves 1/3 to 1 ft. long; leaflets subcoriaceous, 2-3 in. long, bright green above, very glaucous with a thin coating of bright green pubescence, especially on the midrib beneath, the veins on both sides rather raised. Racemes lax, axillary, short-peduncled, as long as the leaves; pedicels twice the calyx. Calyx 1/3 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, Bhotan, Mishmi.

Branchlets thinly grey-silky at first, soon glabrescent. Leaves 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 2-1/3 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.—Distr. Afghanistan, Orient.

An undershrub, with virgate branches, clothed with short adpressed grey pubescence. Leaves 1/3 ft. long; leaflets 15-25, pale green, oblong, subcoriaceous, obtuse, 3-1 in. long, thinly grey-downy above, densely beneath. Flowers in dense terminal racemes 1/3 ft. long; pedicels shorter than the calyx. Calyx 1/3 in., very oblique,
densely pubescent; teeth distinct, deltoid. Corolla bright yellow, 3 times the length of the calyx. Pod \( \frac{1}{4} \) in. broad, sublignose, finely downy, 6–12-seeded, the seeds close and constrictions slight except where the ovules do not develop.

**§§ Edwardsia, Salisb.** Pod furnished with four distinct wings.—**Keyserlingia, Bunge.**

9. **S. mollis**, *Grah. in Wall. Cat.* 5336; flowers smaller developed before the leaves in short crowded racemes. Edwardsia mollis, *Royle Ill. t. 32*, fig. 2. Sophore Houghiana, *Wall. Cat.* 5336 B.

Plains and low hills of the north-west; Hazara and the Salt Range to Kumaon and Nipal, ascending to 4000 ft.

A low epinicate shrub, with finely grey-downy branches, the flowers developed first in copious short simple ascending racemes, the leaves appearing with the fruit. *Leaves \( \frac{1}{4} \) ft. long; leaflets 21–25, rigidly coriaceous, pale, grey green, \( \frac{1}{2}–\frac{3}{4} \) in. long, obtuse, emarginate, prominently veined, finely grey-downy. Racemes 2–3 in. long; pedicels equaling or exceeding the calyx. Calyx \( \frac{1}{4}–\frac{1}{2} \) in., very oblique, finely grey-downy. Corolla yellow, \( \frac{3}{4}–\frac{5}{4} \) in. Pod glabrous, 3–4 in. long, 5–6-seeded, the joints with four distinct crustaceous wings and separated by distinct constrictions.*

**Var. hydropisid:** 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; Anal. 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 \( \frac{1}{4}–\frac{3}{4} \) ft. long; leaflets 19–29, obtuse, emarginate, \( \frac{3}{4}–\frac{1}{2} \) 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 \( \frac{1}{4} \) in., very oblique, obscurely silky. Corolla bright yellow, \( \frac{3}{4}–\frac{5}{4} \) 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 Parasnath, 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, racemose or panicled. 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 capitulate. Pod strap-shaped, flat, membranous, many-seeded, indehiscent, with a narrow wing down the dorsal suture.—**DISTRIBUTION.** Species 6, the others Cape and Abyssinian.

**Virgilia capensis**, Lam., a well-known Cape plant, allied to *Calpurnia*, is included in Hohenacker's Nilghiri plants, but is only cultivated in India.


**Western Peninsula, near Courtallum, and on the Denkinacottab hills in mountain jungles.—**DISTRIBUTION. Abyssinia.
Branches slender, finely grey-silky. Leaflets 13–21, membranous, oblong, obtuse, glabrous, 1–1½ in. long. Racemes copious, short-peduncled, as long as the leaves; pedicels finely silky, much exceeding the calyx. Calyx ⅔ 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, subcoanne. Corolla little exserted; 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. —Distr. 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, ⅓ in., leafy; 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 exserted; 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 exserted 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. —Distr. Species above 20, cosmopolitan in the tropics.

* Leaflets glabrous beneath. Seeds (where known) large.


Silket, Roxburgh, Wallich. Peou and Tenasserim, Kurz.

A large tree, with thick subulate thinly grey-downy 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 ⅔ 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, 2–2½ in. long, sometimes 2-seeded. Seeds oblong, 1½ 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-downer branchlets. *Leaflets* opposite, oblong, cuspitate, rigidly coriaceous, 2–3 in. long, dull grey-green beneath, rounded at the base, slightly downy on the midrib, the veins immersed; petiolules \( \frac{1}{4} \) in. long. *Flowers* crowded on the finely grey-downer branchies; bracts very minute. *Calyx* brown-silky, \( \frac{3}{4} \) in., deeply 3-cleft. *Corolla* white, 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 *panicule* stout, sulcate, glabrous; bracts and bracteoles minute, subpersistent; pedicels brown-silky, \( \frac{1}{4} \) in. *Calyx* \( \frac{3}{4} \) in., densely brown-silky, cleft considerably below the middle. *Corolla* half as long again as the calyx; standard \( \frac{3}{4} \) 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, Wallach.**
A tall tree, with thinly brown-velvety stout sulcate branchlets. *Leaflets* rigidly subcoriaceous, obtusely cuspitate, 3–4 in. long, dull pale green on both surfaces, the veins immersed; petiolules \( \frac{1}{4} \) in. *Flowers* in peduncled racemes, shorter than the leaves; bracts and bracteoles minute, caducous. *Calyx* \( \frac{3}{4} \) 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. microesperma**, 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.
A middle-sized tree, with thick densely brown-velvety branches. *Leaflets* oblong, rigidly coriaceous, 2–4 in. long, grey-green, rather glossy above, broadly rounded at the base, densely persistently short pubescent beneath; petiolules \( \frac{1}{2} \) in. *Branches* of the *panicule* rigidly erecto-patent, densely velvety. *Calyx* \( \frac{3}{4} \) in., with a pair of small lanceolate bracteoles at the base, densely velvety; teeth as long as the tube. *Corolla* twice as long as the calyx. *Ovary* densely silky, 3–4-ovuled. *Pod* orbicular if 1-seeded, \( \frac{1}{3} \) in. long, oblong if 2-seeded, lines between the seeds, the valves thin, rigid, glabrescent. *Seeds* bright scarlet, \( \frac{3}{4} \) in. long, exarillate.—Closely resembles *O. coarctata*, Jacks. in *Trans. Linn. Soc. x. t. 25*, from Guiana, and nearly allied to the Malayan *Macroptropis sumatranana*, Miq. *Fl. Ind. Bat. Suppl. 294*. Kurz refers here *Chenalobium septemjugum* and *decemjatum*, Miq. *Fl. Ind. Bat. Suppl. 302.*

6. **O. parvifolia**, Baker; leaflets 9–13 small acute, long-stalked, veins

**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 ½–1 in. *Racemes* short; flowers crowded; bracts and bracteoles distinct, ovate-lanceolate, subpersistent. *Calyx* ½ 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* obovate-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* ½ in., densely velvety, cleft down to the middle. *Corolla* half as long again as the calyx. *Stamens* distinctly exserted. *Pod* obtuse or subacute, oblong or obvoid-oblong, glabrous, 1½–1½ in. long, 1 in. thick. *Seeds* bright scarlet, exarillate, ½–1 in. broad.

96. **CÉSALPINIA**, 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, deccinate; anthers oblong, uniform, versatile. *Ovary* sessile or subsessile, few-ovuled; style filiform, sometimes clubbed at the tip, stigma terminal. *Pod* oblong or ligulate, 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 ½–1 in. long, rather downy beneath. *Racemes* long-peduncled, simple or panicled, dense at the top, lax downwards; pedicels as long as the calyx, finely brown-downy. *Calyx* ½–1 in. *Petals* ob lanceolate, yellow, little exserted. *Pod* short-stalked, oblong, 2–3 in. long. *Seeds* 1–2, large, oblong, lead-coloured.

**Eastern and Western Peninsulas**, Ceylon.—Distr. Malay isles, Polynesia, West Indies.

Very near *C. Bonducella*, from which it differs by its more robust habit, less downy branches, larger leaflets (often 2–3 in. long), the absence of the reduced stipular pinnae, by its smaller not squarrose bracts, and more tropical dispersion.

**Subgen. 2. *Eucesalpinia*.** Pod dry, naked on the valves, indehiscent or finally dehiscing, the sutures thin except in *C. sepiaria*. Petals broad.


**Chittaong, Silhet, Eastern and Western Peninsulas, and Ceylon.—Distr.** Malay isles, Philippines, China, N. Australia, Polynesia.

**Branches** slender, very flexuose. **Prickles** copious, dark-coloured, hooked. **Leaflets** distinctly petiolule, 1½–2 in. long, obtuse, glossy. **Racemes** axillary and terminal, copiously panicled, with spreading branches; pedicels as long as the calyx. **Calyx** glabrous, ¼ to ½ 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.—Distr. 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, caducent; pedicels ½–6 in. **Calyx** ½ 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, ½–3 in. long, not so oblique as in the last, very obtuse. **Racemes** very broad, the lower pedicels 3–4 in. long. **Calyx** ½–6 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, Japan and introduced in Tropical America.

Branches more or less densely coated with grey or brown pubescence. Prickles small, copious, hooked, pale brown. Leaves $\frac{1}{2}$-1 ft. long; pinnae distinctly stalked; leaflets membranous, very obtuse, $\frac{1}{4}$-1 in. long, green and glabrous above, glaucous and slightly pubescent beneath. Racemes simple, distinctly-peduncled, $\frac{1}{4}$-1 ft. long; pedicels rigidly erecto-patent, twice the length of the calyx. Calyx $\frac{1}{2}$-1 in., more or less pubescent. Corolla $\frac{1}{2}$ 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, subindescent.


**Birma at Chappedong, Wallich.** **Western Peninsula.** **Ceylon.**

Branches armed with copious irregular small prickles, passing down gradually into aculli, bristles and hairs. Leaves 1-1½ ft. long, much narrower than in the other species; leaflets sessile, membranous, sensitive, glabrous, $\frac{1}{4}$-4 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 $\frac{1}{2}$-1 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, sub indescent, clothed with minute deciduous bristles, truncate at the end with a short recurved beak, the sutures not at all thickened.

**Syngen. 3. Cinclidocarpus** (Z. & M.). Pod rather fleshy, indescent, 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 $\frac{1}{2}$-3 ft. long; leaflets close, oblong, obtuse, sessile, $\frac{1}{4}$-3 in. long, dark green and glabrous above, grey and glabrescent or obscurely downy beneath. Racemes peduncled, simple, equalling or exceeding the leaves; pedicels $\frac{1}{4}$-1 in., slender, glabrous, spreading horizontally or rather deflexed. Calyx glabrous, $\frac{1}{4}$-1 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 pannicled, pedicels erecto-patent as long as the
Caesalpinia.].  
L. LEGUMINOSE. (J. G. Baker.)  


ASSAM and SiNHAT.—DISTRIB. Java.

Obscuresly downy.  Prickles scattered, uniform.  Leaves a foot or more long; pinnae 20-24; leaflets close, sessile, obtuse, ligulate, caducous, 1/2-3 in. by 3/4 in., glossy above.  Panicles often as long as the leaves, with finely downy rachises and pedicels.  Calyx 3/4-1 in.  Petals round with a claw, bright yellow.  Stamens little exserted.  Pod oblong, indistinct, 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.

TENasser, Wallach.—DISTRIB. Malay isles.

Branches slightly downy.  Prickles small, scattered, uniform.  Leaves 1-1 1/4 ft. long; pinnae 30-40; leaflets close, glossy, sessile, narrow ligulate, obtuse, 1/4-3/4 in. by 1/2 in., just like those of the last in shape and texture.  Racemes as long as the leaves.  Calyx 3/4 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, imbricate.  Petals oblong or roundish, imbricate, 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, indistinct, with a firm broad wing on each suture.—DISTRIB. Species 6, cosmopolitan in the Tropics.


SINcAPoRe, MaLaCca, AnDaMaNNS, and CeyLon.—DISTRIB. Malay isles, N. Australia.

Young branches clothed with thin bright reddish-brown tomentum.  Leaves distinctly petiolated, 1-4 ft. long; pinnae opposite, 16-20, 3/4-1 1/4 ft. long; leaflets 20-30, close, ligulate-oblong, sessile, obtuse, unequal-sided, 1/3-3/4 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 1/4 in. deep.  Pod 1-4-seeded, rigid, glabrous, 2-4 in. by 1 in., narrowed to both ends, closely longitudinally veined.


Malacca, Griffith, Maingay.—DISTRIB. Java, Sumatra.

Very near P. ferrugineum, with which it agrees in vestiture and leaves.  Flower-racemes 6-9 in. by 3 in.; lower pedicels patent or rather reflexed, 1-1 1/2 in. long; bracts linear, subpersistent, 3/4 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
confined to the base or extending upwards, the lobes imbricated, the lowest the longest, remarkably hood-like. Petals spreading, obovate-spatulate, subequal. Stamens free, dehiscing, usually exerted; anthers oblong, uniform. Ovary sessile, many-ovuled; style filiform, incurved with the stamens; stigma small capitate. Pod large, oblong, flat, thin, indehiscent, with a broad wing down the upper suture.—DISTR. Species 10, mostly Trop. Asiatic, confined to the old world.

* Eumezoneuron. Calyx deeply cleft; disk basal.

Cassapinica cucullata, Roxb. Hort. Beng. 32; Fl. Ind. ii. 358; G. Don Gen. Syst. ii. 431; Wall. Cat. 5828, exctl. B. M. macrophyllum, Blume; Miq. Flor. Ind. Bat. i. 104.

Eastern Himalayas from Nipal, ascending to 4,000 ft. to the Khasia hills, Behar and the Western Peninsula.—Distr. Malay isles.

Branches glabrous, with small dark hooked scattered prickles. Leaf-rachis ½–1 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 virginate, 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 cucullate. Calyx ⅛ in. glabrous, tinged with yellow. Petals bright yellow, streaked with red. Filaments faintly ciliate 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 ⅞ in. broad.

Var. grandis, Hayne in Wall. Cat. 5880, under Cassapinica, sp.; larger in all its parts, the leaflets 3–4 in. long, and wing of the pod ⅛ in. broad. Guilandina macrocarpa, Grif. in Wall. Cat. 5804.—Distribution of the type.

Rheed Hort. Mal. vol. vi. t. 20, on which is founded Guilandina axillaris, Lam. (Cassapinica? axillaris, DC. Prodr. ii. 481) is probably made up of the leaf of this and pod of Cassapinica Sappan.

2. M. glabrum, Desf. in Mem. Mus. iv. 246, t. 10; leaflets 14–18 small glabrous oblong obtuse distinctly stalked, stamens much exceeding the calyx. DC. Prodr. ii. 484. Cassapinica furfuracea, Wall. Cat. 5835.

Tenenkerim, Willich.—Distr. 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, caducous, close, dark green, alternate, ¾ in. long. Racemes simple or forked, as long as the leaves; pedicels exceeding the calyx. Calyx glabrous, ¼ in. long, less oblique than in the last, the upper teeth reaching half down, the lowest twice as long. Filaments densely ciliate near the base. Pod 5–6 in. by 1⅜ in., 2–4-seeded, with a wing ⅜ in. broad.


Branches slender, glabrous; prickles copious, minute, falcate. Leaves ½–1 ft. long; pinnae 16–20, distinctly stalked, 2–3 in. long; leaflets sensitive, glabrous, membranous, ⅛ in. long. Racemes copiously paneled, sometimes a foot long; pedicels slender, glabrous or pubescent, twice as long as the calyx. Flower smaller than in the last. Calyx ⅞ 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 ⅜ in. broad.—Very like Cassapinica sepriaria in habit and inflorescence.

**Ava**; Taong-dong, Wall. **Ceylon**, Thwaites.—**Distr.** Malay isles.

General habit and inflorescence of the last. Branches, leaves below and calyx densely finely grey-downy. *Pinnæ* 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.


**Malacca**, Griffith, Maingay.—**Distr.** 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 obvate-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 \( \frac{1}{12} \) 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 imbrieced, oblanceolate-spatulate. *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 *Wagatua*.


Woody climbers, with the habit of *Cesalpinia*, from which they differ only in pod. *Calyx* deeply cleft, with the disk near the base, the lobes imbricacate, 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 horn-like oblique terminal wing.—**Distr.** Species 4, spread through the Tropics of the old world.


**Western Peninsula**.

Branches slender, finely downy; prickles minute, hooked, uniform. *Pinnæ* 8-16; leaflets 12-16, close, sessile, oblong, obtuse, membranous, sensitive, \( \frac{1}{2} \) 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.; lowest sepal longest. *Corolla* yellow, not showy, as long as the lowest sepal. *Pod* 1\( \frac{1}{2} \) in. by \( \frac{3}{4} \) in.

**Var. 1. microphyllum**, Miq.; *Kurr*, loc. cit. sp.; *racemes* copiously panicked, leaflets \( \frac{3}{4} \) in. long, pod 2 in. long with an obtuse or obliquely acute wing \( 1 \frac{1}{4} \) in. by \( \frac{3}{4} \) in.—*Tenasserim*, *Heller*. *Malacca*, *Maingay*.—**Distr.** Malay isles.

**Var. 2. macropterum**, *Kurr*, loc. cit. sp.; branches stouter, leaflets much larger, pod \( 2 \frac{1}{2} \) in. long with an obtuse wing \( 1 \frac{1}{2} \) in. by \( \frac{3}{4} \) in.—*Pegu*, *Martaban*, *Tenasserim*. s 2
100. **POINCIANA**, Linn.

Erect unarmed trees. *Leaves* just those of *Cassalpinia*. *Flowers* in corymbose racemes. *Calyx* deeply cleft, with the disk a little above the base, the segments valvate, oblanceolate, subequal. *Petals* spreading, subequal, orbicular, with a claw, the blade crispato-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.—**Distr.** 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; *Cassalpinia elata*, Swartz Obs. 166.

Truly wild in the Western Peninsula, planted elsewhere.—**Distr.** Arabia, W. Trop. Africa.

An erect tree, 20–30 ft. high. *Leaves* 3/4–3 ft. long; *pinnae* 10–16; leaflets 30–40, membranous, caducous, close, sessile, obtuse, ligulate. *Flowers* in corymbose racemes; pedicles 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 rachis. *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 dehiscing.—**Distr.** 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 rachis of a bipinnate leaf and have 2–6 *pinnae* congested in their axils. *Pinna* 3/4–1 ft. long, the rachis much flattened, so that when the very minute obtuse oblanceolate leaflets have fallen or are not developed they resemble the phyllodes of an acacia. *Racemes* lax, shorter than the leaves; pedicles long, slender, erecto-patent. *Corolla* tender, yellow, 3/4–3/2 in. *Pod* 3–4 in. long.

102. **WAGATEA**, Dalz.

A climbing shrub. *Leaves* abruptly bipinnate. *Flowers* in long simple or panicked 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* oblanceolate, 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.—**Distr.** 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 panicked dense subspicate racemes with a thick furrowed woody finely brown-downy axis; bracts minute, lanceolate-cuspidate. **Calyx** 3/1 in., scarlet. **Petals** orange. **Pod** like that of Cassalpinia digyna.

**Gleditschta Sinensis**, Linn.; Wall. Cat. 5811, is known in India in cultivation only.

108. **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** 6, imbricated, subequal, usually broad. **Stamens** normally 10, but rarely all perfect, 3–5 being often reduced to staminodia or altogether absent; anthers mostly but not invariably basifixed, 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 septic, the albuminous seeds flattened, sometimes parallel with the valves, sometimes with the septa, dry, dehiscent or indehiscent.—**Distrih.** 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.

**Suren.** 1. **Fistula**, D.C. (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.

1. **C. Fistula**, Linn.; D.C. Prodr. ii. 490; leaflets 8–16 large narrowed to the point, flowers in long lax racemes, bracts caducous, petals veined bright yellow. Roxb. Hort. Beng. 31; Fl. Ind. iii. 333; Wall. Cat. 5502; W. & A. Prodr. 285; Duls. & Gilb. Bomb. Fl. 80; Bedd. Fl. Syl. 97. C. rhombifolia, Roxb. Hort. Beng. 31; Fl. Ind. iii. 334; Wight. l. c. t. 269.

Central and Eastern Himalayas to Ceylon and Malacca, ascending to 3000 ft. in Kumaon, wild and often planted.—Distrih. 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, 1–2 in. long. **Calyx** 1/4 in., glabrous, caducous. **Petals** obvulate, shortly clawed, 1/4–1 in. deep. **Pod** 1–2 ft. long, above an inch thick.

2. **C. nodosa**, Ham.; Roxb. Hort. Beng. 31; Fl. Ind. iii. 336; branches slightly downy, leaflets 12–24 moderately large pointed, racemes short corymbose, bracts persistent, petals moderately large reddish not veined. Wall. Cat. 5331; Wright l. c. t. 410.

Eastern Himalayas and to Malacca.—Distrih. 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
L. LEGUMINOSÆ. (J. G. Baker.)

Cassia.

branches, dense, under half a foot long; bracts silky, lanceolate, persistent; pedicels twice the length of the flower, lower deflexed. Sepals downy, 1/3 in. Petals oblong, acute, 3-1 in. deep. Pod a ft. long, 3 in. thick.


Ceylon and Western Peninsula.

Branches slender, sulcate. Leaves 1/2-1 ft. long; leaves oblong, deeply emarginate, with a distinct macro, 1-2 in. long, rigidly suborbiculare, very oblique, strongly veined, persistently grey-downy beneath. Flowers in copious short axillary racemes and terminal panicles; bracts ovate-cuspidate; pedicels under I in. long.—Flowers and pod like that of C. nodosa, but much smaller.


Birma; Taung-dong mountains and banks of the Irrawaddi, Wallich.

Closely allied to C. marginata. Leaves 1 ft. long; leaves close, nearly sessile, ligulate-oblong, 1 1/2-2 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 I foot long, cylindrical, indehiscent, glabrous.

Subgen. 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 petiole.


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 1/2 ft. long; leaves glaucous, fuscoid, acuminate, 1-3 in. long, glabrous or finely pubescent. Racemes short-peduncled, few-flowered, coriaceous, axillary and forming a terminal panicle; bracts thin, ovate-acuminate, caducous; pedicels spreading, 1/2-3 in. Sepals obtuse, glabrous, 1/2-1/3 in. Petals 1/3 in. pale lilac, conspicuously veined. Pod 4-5 in. by 1/2 in., rather recurved, glabrous, compressed, distinctly torulose. Seeds 15-30.

HIMALAYAS to Ceylon and Penang.—Distr. 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 turdgid pods, which are not usually turdgid when mature.


** 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.—Distr. 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 ¾-2 ft. by ¾ 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, ½-½ in.; stipules small, subulate, caducous. Racemes copious, corymbose, as long as the leaves. Flowers middle-sized, bright yellow. Pods membranous, curved, sausage-shaped, ¾ ft. long, ½ in. thick, the sutures very narrow.


C. Wightiana, Graham. in Wall. Cat. 5329.

A native of Trop. America, introduced in the Nilghiris and Ceylon.

A tall shrub, with the branches and leaves beneath densely matted with grey tomentum. 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. kirsuta, 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-downy. Leaves nearly sessile, 3-4 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 $\frac{1}{2}$–$\frac{3}{4}$ in., straight, ligulate, glabrous, flexible, dark brown, with a distinct space between the uniseriate seeds.

*** Leaf-rachis without glends.


PUNJAB, SCINDIE, WESTERN PENINSULA.—DISTRIB. Arabia, Egypt, Abyssinia.

Subglabrous, scarcely shrubby, 1–4 ft. high. Leaves distinctly petioled, 2–3 in. long; leaflets obovate-oblong, membranous, very glaucous, obtuse, with a minute micro, $\frac{1}{4}$–$\frac{1}{2}$ in. Racemes distinctly peduncled, equaling or exceeding the leaves; pedicels very short. Sepals glabrous, very obtuse. Corolla middle-sized, pale yellow. Stamens very unequal. Pod thin, glabrous, flexible, 1–1½ in. by $\frac{3}{4}$–1 in. Senna obtusa, Rosb. Hort. Beng. 31; W. & A. Prodr. 288; Wight. J. t. 757.

LAVER 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 oblanceolate, 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, 1–3 ft.; bracts large, membranous, caducous. Corolla yellow, very distinctly veined. Stamens very unequal. Pod membranous, dehiscing, straight, glabrous, 4–5 in. by $\frac{1}{2}$ in. Seeds 50 or more.


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 oblanceolate, 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, 1–1½ ft.; bracts large, membranous, caducous. Corolla yellow, very distinctly veined. Stamens very unequal. Pod membranous, dehiscing, straight, glabrous, 4–5 in. by $\frac{1}{2}$ 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 $\frac{1}{2}$–1 ft.; leaflets oblanceolate, glaucous, subcoriaceous, emarginate, strongly veined, subglabrous, distinctly stalked, 2–3 in. long. Corymbs crowded, both axillary and in a terminal panicle $\frac{1}{2}$–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 $\frac{1}{2}$ in., firmer in texture and with thicker sutures than in the two next.

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-
nicle, pod ligulate thin flat not winged, with thin sutures. \textit{W.} \& \textit{A. Prodr. 289; Duls. \& Gibbs. Bomb. Fl. 81.} \textit{C. setigera, DC. Prodr. loc. cit.; Wall. Cat. 5330.}

Hills of the \textbf{Western Peninsula.}

A shrub, with slender glabrous obscurely downy virgate branchlets. \textit{Leaves peti- oled, 4–6 in.; leaflets membranous, firm, oblong, obtuse, glabrous, glaucous, 1–1\frac{1}{2} in. long, tipped with a conspicuous bristle. Corolla} copious, both axillary and forming long end panicles. \textit{Sepals obtuse, glabrous. Corolla} yellow, middle-sized, not veined. \textit{Stamens} subequal. \textit{Pod} stalked, nearly straight, 3–5 in. by \(\frac{1}{4}–\frac{1}{2}\) in., glossy, brown, 12-20-seeded.

13. \textbf{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. \textit{C. palmata, Wall. Cat. 5306.}

\textbf{Birma, Martaban, Tenasserim, Ceylon.—Distr. Malay isles, Philippines, N. Australia.}

A low tree, with slender finely downy branches. \textit{Leaves} \(\frac{1}{4}–\frac{3}{4}\) ft., distinctly petioloed; leaflets oblong, obtuse, 1–2 in., membranous, pale green, finely downy below. \textit{Sepals} downy, very obtuse. \textit{Corolla} bright yellow, middle-sized, slightly veined. \textit{Pod} straight, thin, glossy, flexible, dehiscent, 5–6 in. by \(\frac{1}{4}–\frac{3}{4}\) in., distinctly stalked, 12-20-seeded.

\textbf{Subgen. 3. Psilorhegma, Vogel.} Like the last, but all the ten stamens perfect, with subequal anthers.


\textbf{Himalayas to Ceylon and Malacca.—Distr. Malay isles, Trop. Australia, Polynesia.}

A tall tree, with glabrous terete branchlets. \textit{Leaves} distinctly petioloed, \(\frac{1}{4}–\frac{3}{4}\) ft.; leaflets ovate, acute or subobtuse, 2–4 in. long, subcoriaceous, very glaucous; rachis with conspicuous glands between the lower, rarely (\textit{C. fastigiata}, Vahl), between all the leaves; stipules narrow, caducous. \textit{Racemes} corymbose, not panicled. \textit{Sepals} large, obtuse. \textit{Flowers} large, bright yellow. \textit{Pod} flat, thin, strap-shaped, glabrous, 6–8 in. long; \(\frac{1}{4}–\frac{3}{4}\) in. broad, distinctly stalked, 20–30-seeded.

\textit{Var. sufragrassosa, Koëng;} DC. Prodr. ii. 496, ep.; leaflets 16–18 smaller more numerous, obtuse 1–2 in. long, flowers and pods much smaller, the latter not more than \(\frac{3}{4}–\frac{3}{4}\) in. long 10–12-seeded. \textit{C. sufragrassosa, Wall. Cat. 5311; W. \& A. Prodr. 289.} \textit{C. speciosa, Roxb. Hort. Beng. 31.} \textit{Senna speciosa, Roxb. Fl. Ind. ii. 347.} \textit{C. Horefieldii, Miqu. Fl. Ind. Bat. i. 99.—Distribution of the type.}

\textbf{Subgen. 4. Lasiorhegma, Benth.} \textit{Sepals} narrow. \textit{Stamens} 5–10, all perfect. \textit{Pod} small, strap-shaped, flat, dehiscent, the seeds compressed parallel with the valves.—Diffuse low slender annual or perennial herbs.

* \textit{Leaflets} 4, large, membranous.


\textit{Foot of the Western Himalayas to Ceylon.—Distr. Everywhere in the tropics of old world.}
An erect annual, 1-2 ft. high, with stem and leaves clothed with grey bristly viscos hair. Leaves long-petioled; leaflets oblong, very oblique, 1-2 in. long, obtuse or subacute: stipules small, linear, persistent. Racemes narrow, equaling or exceeding the leaves. Sepals lanceolate, bristly, 1/2-3/4 in. Corolla reddish-yellow, very small. Pod oblique, ligulate, 1-1 1/2 in. long, 5-6-seeded, the thin valves beset with grey bristly hairs.

**Leaflets very numerous, close, small, narrow, rigidly subcoriaceous (Mimosoidae).**


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, 1/2-3/4 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 1/2 in. Corolla little exerted. Anthers 5 equal. Pod 3-4 in. by 1/2-1 in. —Probably this and the next are mere varieties of C. mimosoides.


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, 3/4-1 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 1/2-3/4 in. Petals obovate, little exerted. Pod 1 1/2-2 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, 1/2-3/4 in. long, obliquely mucronate, with the midrib close to the upper border; stipules large, linear-subulate, persistent. Flowers 1-2 together in the axils of the leaves on short pedicels. Sepals 1/2-3/4 in., lanceolate-acuminate, bristly. Corolla little exerted. Stamens 10, alternately longer and shorter, Pod strap-shaped, flat, dehiscent, 1 1/2-2 in. by 1/2 in., nearly straight, glabrescent or finely downy; sepal 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. 3. auricoma; Graham 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. 5809 (C. Bacillus, Gaertn.; Rostl. 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. Calyx with a very short tube and subbasal disk; divisions 4-5, oblong, imbricated. Petals 5, ob lanceolate, 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 capitata. Pod turgid, oblique-oblong, with very thick indehiscent usually rugose 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, subsessile, if 2-jugate (var. heterophylla, Thwaites) the upper much the largest, oblong, subacute very oblique, 3-6 in. long; petiole ½-1½ in. Racemes few-flowered, cor ymbose, sessile from the axis of the leaves of the branchlets, with the primary axis not produced, rarely geminate; outer scales ovate, ½-1 in.; pedicels ⅓-½ in. Sepals ½ in. Pod turgid, very rugose, ½-1 in. long, subsessile.

Var. minoroides, Wall. Cat. 5817, sp.; leaflets all bi-jugate not so unequal as in the bi- jugate 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.; Mig. 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 Travancor and in the Carnatic near Tinnevelly, alt. 2-4000 ft., Beddome. Petioles ⅓-½ in.; leaflets always unjugulate, oblique oblong-lanceolate, subacute, glabrous, 2-3 in. long. Racemes solitary, copious, rounded, few-flowered, with the central axis not at all produced; bracts ½ in., deltoid; pedicels erecto-patent, ⅓-½ in. Sepals ⅓ in., finally reflexed. Filaments twice the length of the sepals. Pod flat, smooth, firm, semicircular, sessile, 1-1¼ in. long.

3. C. inaequifolia, A. Gray Bot. U.S. Expl. Exped. 473; leaflets 4-6, flowers in very dense oblong sessile solitary or geminate racemes from the branchlets, pod flat smooth.

Malacca, Misingay.—Distrib. Philippines, Cuming, 1297.

Leaflets coriaceous, rigid, glabrous, oblique, obovate-oblong, subequal, in our specimens 2-3 in. long. Flowers in very dense oblong sessile cone-like racemes, ⅓-2 in. long, the central axis produced; outer bracts round-cordate, obtuse, ⅓ in.; pedicels
erecto-patent, 1/4-1 in. Sepals 1/4 in., permanently ascending. Filaments twice the calyx. Pod 1/4 in. thick, woody, oblique obovoid, 2-2 1/4 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.


WESTERN PENINSULA, CEYLON, MALACCA.—Distr. Malay isles.

Branchlets slender, glabrous. Petioles very short; leaflets very rarely bigate, 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 1/4 in. Pod like that of C. ramiflora, oblique oblong, very turgid, 1-1 1/2 in. long.

SUBGEN. 2. Pseudocynometra, W. & A. Stamens indefinite.

5. C. polyandra, Roxb. Cor. Fl. iii. t. 286; Hort. Beng. 32; Fl. Ind. ii. 372; DC. Prodr. ii. 509; Wall. Cat. 5815; W. & A. Prodr. 204.

Khasia, Selipet, Penang, Malacca.

Branchlets slender, glabrous. Leaves nearly sessile, 1/2-3 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 corymbs, sessile in the axils of the leaves of the branchlets; pedicels downy, 1/4-1 in. Sepals 1/4 in., reflexed. Stamens 40-60, much exerted. Pod oblique oblong, smooth, woody, 2 in. long.

105. SINDORA, Miquel.

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 dechinate, shortly monadelphous, unequal, the upper longest, exerted; anthers oblong, versatile, dehiscing longitudinally. Ovary 2-ovuled, short-stalked; stigma long, filiform, circinate, stigma minute terminal. Pod like that of Guilandina, oblique, round-oblong, dehiscient, the flat, hard valves armed all over the face with straight large firm prickles.—Distr. Another species or variety in Sumatra.


SINGAPORE, Wallchill; MALACCA, Griffith, Maingay.

A small erect unarmed tree, with branches clothed with short brown pubescence. Leaflets rigidly coriaceous, 2-3 in. long, subobtuse, obovate, glossy above, closely pubescent beneath. Panicles dense, axillary and terminal; bracts cordate, roundish, spreading or reflexed; pedicels nearly as long as the calyx. Calyx 1/4 in., brown-downy, the sepals armed towards the tip with large firm prickles. Pod glabrous, subignose, 2-3 in. long.

Var. 1. siamensis, Teyss., sp.; leaflets 6 obovate distinctly margined larger thinner strongly veined the end one 3-4 in. long.—Siam, Teyssmem.

Var. 2. intermedius, Baker; leaflets 6-8 smaller more acute, flowers smaller, and receding towards the next by its shorter pedicels, caducous 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 \(\frac{1}{2}-\frac{3}{2}\) 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, obovate, subacute, very thick and rigid. *Pedicels* very short. *Buds* \(\frac{1}{2}\) in. long. *Ovary* and lower part of filaments more densely pubescent than in the last. *Pod* not seen.

106. **DIALIUM**, Linn.


*Sepals* oblong-lanceolate, not more than \(\frac{7}{12}\) in. broad.

I. *D. ovoideum*, Thwaites 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. *Beld. Fl. Syl. t. 181."

**Ceylon,** districts north of Kandy, Thwaites.

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 \(\frac{4}{2}-\frac{1}{2}\) in. *Panicle* ample, with slender finely grey-downy branches. *Bud* lanceolate, \(\frac{3}{2}\) in. *Sepals* subpetaloid, lanceolate, under \(\frac{1}{3}\) in. broad, thinly grey-downy. *Filament* nearly as long as the anther in the developed flower. *Pod* ovoid, slightly compressed, \(\frac{1}{2}-\frac{1}{4}\) in. long, edible, with an agreeable acid flavour; seeds round, compressed, shining, yellow or reddish-brown.—Closely allied to the Javan *D. indica*, 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 \(\frac{1}{2}-\frac{1}{2}\) 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* \(\frac{3}{4}\) 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. laurimum*, 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 \(\frac{1}{2}-\frac{1}{2}\) in. *Panicles* axillary and terminal; pedicels very short, ascending. *Bud* ovoid-oblong, \(\frac{1}{2}\) 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, Mainay.**

Leaflets opposite or subopposite, oblong, rigidly coriaceous or subcoriaceous, glabrous, 3–5 in. long, obtusely pointed, finely veined, rather glossy; petiolules ½ in. Panicles both axillary and terminal, ample, flexuose with the distant main branches spreading or even sometimes decurved; pedicels ascending, spreading or cernuous. **Bud** ½ 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, ½ in. long.

**Sepals** ovate-lanceolate ½ in. broad.


**Malacca, Griffith, Mainay.**

Leaflets 5–7, distant, conspicuously alternate, oblong, pointed, 4–6 in. long, rounded or the end one subuneate at the base, rigidly coriaceous, rather glossy above, finely veined beneath, with a persistent coating of bright yellowish-brown silky pubescence; petiolules ¼ in. Panicles ample, deltoid, moderately close, terminal and axillary, the branches clothed with fine brown silky pubescence, the main ones ereto-patent; pedicels ascending or cernuous, much shorter than the calyx. **Bud** ovoid, under ¼ 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, ½ in. long, hard, persistently brown-velvety. **Seeds** oblong, compressed, glossy, chestnut-brown.

**Vari. Wallichisi**, Baker; leaflets 9–11 closer smaller oblong-lanceolate acuminate, the upper 2–2½ in. long, petiolules shorter. "Connaraceae?" Wall. Cat. 8584.—Singapore, Wall. **Malacca, Mainay.**


Unarmed trees. Leaves abruptly pinnate, with few leaflets. Flowers very abundant, minute, panicled. **Calyx** with scarcely any tube and a subssessile disk; sepals 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. **Calyx** sessile, 2-ovuled; style filiform, stigma capitate. **Pod** subindehiscent, dry, with only the upper ovule perfected; seeds exalbuminous.—**Distrib.** One other species, Trop. African.

1. **H. binata**, Roxb. Cor. Fl. iii. 6, t. 209; leaflets 2 sessile oblique flabellately veined, stamens included, stigma large peltate, racemes few-flowered, pod strap-shaped thin with the seed at the tip. **Roxb. Fl. Ind.** ii. 423; **DC. Prodr.** ii. 487; **Wall. Cat.** 5805; **W. & A. Prodr.** 284; **Dals. & Gibb. Bomb. Fl.** 83; **Bead. Fl. Sylv.** t. 29.

**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 ½ 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 petiolulate not oblique, stamens exerted, 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; **Bead. Fl. Sylv.** t. 255.
**Crudia.**] L. LEGUMINOSE. (J. G. Baker.) 271

Gauts of **Canara, Travancore** and the **Carnatic**.

**Leaves** oblong, rigidly coriaceous, acute, 2-4 in. long, vanlose, the upper of the uppermost pair sometimes apparently terminal; midrib central, veining pinnate; petioles $\frac{1}{2}$-1 in. **Petals** 10, alternate, filiform, and terminal, formed of dense slender cylindric racemes; pedicels spreading, $\frac{1}{2}$-2 in. **Calyx** broadly campanulate, under $\frac{1}{2}$ in. long, with a pair of minute adpressed bracteoles. **Filaments** twice as long as the sepals. **Pod** turgid, 1\frac{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 $\frac{1}{2}$, oblong, imbricated, persistent, reflexed. **Petals** 0. **Stamens** 10, exerted, filiform, and anthers oblong, versatile, dehiscing longitudinally. **Ovary** stalked, few-ovuled; style filiform, stigma terminal capitulate. **Pod** flat, rigidly coriaceous, 2-valved. **Seeds** exalbuminous.—**DISTRIB.** Species 10, one African, the rest Trop. American.


**Ceylon,** near Calcutta, 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 $\frac{1}{2}$ in., equalling 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 corimbous panicles, with subpetaloid reddish bracteoles. **Calyx** with the disk at the summit of a cylindrical tube; divisions 4, oblong, unequal, subpeltaloid. **Corolla** 0. **Stamens** 3-8, exerted 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 capitulate. **Pod** flat, dehiscent, rigidly coriaceous. **Seeds** exalbuminous.—**DISTRIB.** Species 6, restricted to India and Malaya.


From the **Central and Eastern Himalayas**, ascending to 2000 feet in Kumaon, Ceylon and Malacca.—**DISTRIB.** Malay isles.

A low erect tree. **Leaves** sessile or subsessile; leaflets oblong or oblong-lanceolate, acute or obtuse, 3-9 in. long rigidly subcoriaceous. **Corymbs** dense, 3-4 in. broad; pedicels stout, $\frac{1}{2}$-3 in. long, below the oblong-spathulate ascending amplexicaul bracteoles. **Sepals** $\frac{1}{2}$-3 in., obovate-oblong. **Filaments** three times as long as

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*Wrongly given as equally pinnate in the Key.*
the sepals. Pod 4—10 in. by 1½—2 in., like that of a Millettia, 4—8-seeded. Seeds oblong, compressed, 1½ in. long.

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, Mainay**.
Petiolules ½ in. long; leaflets rigidly subcoriaceous, strongly veined; upper ob lanceolate-oblong, acute, a foot or more long; lower shorter, more oblong. Corymbs 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 pedicles 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, corymbs 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. Petiolules ½ in.; leaflets thinner than in the last, ob lanceolate-oblong, subacute, ½—1 ft. long. Corymbs solitary from leafless slender branches, with only a few erecto-patent branches; bracteoles almost 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. Siam, Sumatra.**

Petiolules 1½ in.; leaflets ob lanceolate-oblong, subcoriaceous, subobtuse or subacute; upper ¾—1 ft. long. Corymbs sessile from the side of slender branches, round, very dense, sometimes 6—8 in. broad; bracts persistent, spreading or reflexed; bracteoles cleft, under ½ in. long, not boat-shaped or amplexicaul, bright-coloured. Sepals under ¼ in. long. Filaments 3—4 times as long as the sepals. Pod oblong, 5—6 in. by 1½—2 in.—Very near the Malayan 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. Petals 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 capitulate. Pod large, flat, almost woody, dehiscent. Seeds large, round-oblong; compressed, exalbuminous.—**Distr.** A single endemic species.

1. **A. nobilis**, **Wall. Pl. As. Rav. i. p. 1, t. 1—2; Wall. Cat. 596; G. Don Gen. Syst. ii. 437.**

**Martaban, Tenasserim and Malacca**, often planted.
An erect unarmed tree. Leaves very large, abruptly pinnate; leaflets oblong, acuminate, ¼—1 ft., opposite, glabrous, subcoriaceous. Flowers in ample pendulous
Tamarindus.]

L. LEGUMINOSAE. (J. G. Baker.)

111. TAMARINDUS, Linn.

A spineless tree. Leaves abruptly pinnate. Flowers racemose. 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 capitata. Pod ligulate, many-seeded, with a thin crustaceous epicarp and thick pulpy mesocarp. Seeds exalbuminous.—A single species.


Diffused through 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 1 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; sepal 4, oblong, subequal, imbricated. Petals 5 or 3, oblong-spathulate, clawed, subequal, exceeding the calyx. Stamens 5, equal, exserted, 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.—Distr. Species 5, the other Tropical African.


MALABAR and CEYLAN.

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 ½–½ in. Flower ½ in. long, exclusive of the exserted stamens; bracteoles oblong-spathulate, half as long as the calyx. Pod rigid, ligulate-oblong, 3–4 in. long. Seeds 3–4.
2. **H. unijuga**, Bedd. *Ic. Pl. Ind. Or.* t. 190; branches solid, nodes not constricted, stipules not spurred, leaves and 2 leaflets subsessile, petals 5.

**Travancore 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. *Pedicles* \( \frac{1}{3}-\frac{1}{2} \) in., spreading, finely silky; bracteoles obtuse, half as long as the calyx. *Flower* \( \frac{3}{8} \) in. long, exclusive of the exerted stamens. *Petals* bright red.


**Ghuts of Nilgiris 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 cuspitate, 4-6 in. long. *Racemes* axillary, distinctly peduncled, equalling or exceeding the leaves; pedicels \( \frac{1}{3}-\frac{1}{2} \) in., spreading or ascending; bracteoles and calyx grey-downy. *Flower* \( \frac{1}{3}-\frac{1}{2} \) in. long, exclusive of the exerted stamens.


**Nilghiris; jungles 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, subsessile, 1-3-nate; bracteoles and sepals very downy on the back, the latter \( \frac{1}{4} \) in. long. *Petales* very caducous, not exceeding the sepals. *Pod* almost woody, \( \frac{3}{4} \) ft. by 1\( \frac{1}{2} \) in., narrowed to the point.

118. **Afzelia**, 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* 3-9, decline, filaments long, pilose; anthers minute, oblong, opening longitudinally. *Pod* large, oblong, flattened, subglobose, subindescent.—**Distribution**: 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 \( \frac{1}{4}-\frac{1}{2} \) in. *Calyx-tube* \( \frac{3}{8} \) in., cylindrical; *sepals* \( \frac{3}{4} \) in. broad. *Petal* twice as long as the sepals; blade round, \( \frac{3}{6} \) in. broad. *Pod* oblong, subcoriaceous, 3-4 in. by 1-\( \frac{1}{2} \) in.

Afzelia.] L. Leguminose. (J. G. Baker.) 275


Malay peninsula, Wallisil, Griffith.—Distr. Seychelles and Malay isles and Polynesia.

An erect tree, 60 feet high. Leaflets stalked, obliquely oblong, subcoriaceous, glabrous, 2-5 in. long, subacute or obtuse. Flowers in a dense terminal coriaceous panicle; pedicels \( \frac{1}{3}-\frac{1}{2} \) in., grey-downy. Calyx-tube cylindrical, \( \frac{1}{3}-\frac{2}{3} \) in. Petal exserted, 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. Leaflets stalked, oblong, subcoriaceous, obtuse, emarginate, 2-4 in. long; lowest pair distinctly smallest. Flowers in a dense terminal coriaceous panicle; pedicels \( \frac{1}{3}-\frac{1}{2} \) in., grey-downy. Calyx-tube cylindrical, \( \frac{1}{3}-\frac{2}{3} \) in. Petal not exserted. Filaments \( \frac{1}{3}-1 \) in. Pod oblong, almost woody, glossy, 6-10 in. by 3 in., straight or rather curved.

4. A.? coriacea, Baker; leaflets 4-6, panicle thyrsoid with racemose branches, calyx-tube much shorter than the limb, fertile stamens 9. Intsia coriacea, Maingay MSS.

Malacca, Maingay.

Leaflets 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 \( \frac{1}{3} \) 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 Pachyidea, 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 leaflets. Flowers showy, in copious simple or panicked often coriaceous racemes. Calyx-tube with the disk produced to the top, sometimes long and cylindric, sometimes short and turbinate; 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.


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

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North West Provinces to Ceylon and Pegu.—Distrib. Malayan 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, ½ in. Petals 1¼-2 in. long, obvate-spathulate, yellow, the upper with a red blotch on the face. Style ½-¾ in. Pod distinctly stalked, 4-5 in. by ½-⅜ in., 6-10-seeded, glabrous.


Ara; Taong-dong mountains, Wallisch.

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, ½-¾ in. Pod 1¼-1½ in. by ⅜ in., narrowed to both ends, 2-3-seeded, dehiscent.


Martaban; banks of the Attram river, Wallisch.

Another doubtful species, known only in bud and pod. Leaves suborbicular, slightly cordate, 3-4 in. long, glabrous, flexible, obtusely lobed ½-⅔ down. Flowers in narrow close short-peduncled axillary regular racemes 3-5 in. long. Pedicels shorter than the bud, which is glabrous, ovoid-lanceolate, ⅜ in. long. Pod 3-4 in. long, ⅜ 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. 295. B. purpurea, Wall. Cat. 5797, D. B. candida, Ait.; DC. Prodr. loc. cit., non Roxb.

North West Provinces to Ceylon and Malacca.—Distrib. China, Malayan 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, co-rymbose; pedicels erecto-patent, ½-¾ in. long, with linear-spatulate 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, ⅜-¾ in. broad, firm, glabrous, 8-12-seeded; stalk ½ in. long.

Sect. 2. Pileostigma, Hochst. Fertile stamens 10. Calyx with a short tube and spathaceous or 5-cleft limb. Pod narrow, indehiscent.—Erect shrubs, or climbers with small flowers and connate leaflets.


PUNJAB AND GARHWAL TO CEYLON AND PEGU.—Distrib. China, Malayan isles, Timor.
A small crooked bushy tree with drooping branches. Leaves broader than long, rigidly coriaceous, 1½-2 in. long, slightly coriaceous, clothed more or less densely beneath with grey pubescence. Racemes short-peduncled, lax, terminal and leaf-opposed, 5½ ft. long, with densely grey-downy rachises; pedicels ½-1 in., erecto-patent. Calyx-tube turbinate, not more than 1½ in. long; limb ½-1 in., not splitting up. Petals ob-lanceolate, yellow, as long as the limb. Pod ½-1 ft. by ½-1 in., not veinulous, falcate, firm, glabrous, turgid; stalk above an inch long. Seeds 12-20.

B. rupestris, 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.—DISTRIBUTION. 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, glaucous, subglabrous or finely grey-downy beneath. Racemes sessile, dense, axillary, as broad as long; pedicels ascending, very slender, 1½-1 in. long. Calyx clothed with pale brown down; tube cylindrical, turbinate, 1½ in.; limb ½ in. Petals oblong-elliptic, little exerted. Pod 1 ft. by ½-1 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 coriaceous deeply bifid, flowers in short simple corymb, bracts large, pedicels 3-4 times the calyx, calyx-limb 5-cleft, style produced.

SIAM, Sir E. Schomburgh.

Closely allied to the last. Leaves broader than long, rigidly subcoriaceous, 2-3 in. long, glabrous beneath, with two obtuse lobes reaching ¼-½ down. Racemes short-peduncled, as long as the leaves; bracts under 1½ in., oblanceolate, reflexed; pedicels slender, lower 1½-2 in. Calyx thinly grey-downy externally; tube cylindrical, turbinate, 1½ in.; limb 1 in. Petals ½ 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 coriaceous shortly bifid 15-17-nerved, racemes dense forming terminal panicles with reflexed branches, calyx-limb shortly 5-cleft, stigma sessile. ? B. foveolata, Dalz. in Journ. Linn. Soc. 13, p. 188.

CONCAN, Law.

Branchlets slender, terete, scirrhose, thinly grey-downy. Leaves orbicular, rigidly coriaceous, 4-9 in. long and broad, finely downy, the numerous rib 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 ½-1 in., narrow, turbinate; limb ½-2 in., shortly 5-cleft. Petals twice the calyx. Stigma large, peltate, ½ in. broad. Pod unknown.—Agrees with the description of Dalzell's plant except that it is not denticous.


A glabrous erect shrub. **Leaflets** 1½ in., rigidly subcoriaceous, obtuse, finely veined, deeply rounded below the point of insertion. **Flowers** in dense axillary corymbs; pedicels ¼ in., erecto-patent. **Calyx-tube** cylindrical, ½-3 in., finely velvety; sepals lanceolate, equaling the tube. **Petals** much exserted, oblong-spatulate, coarsely pubescent. Pod distinctly stalked, glabrous, 5-6 in. by 1½ in., 8-10-seeded.


**CONCAN, Stocks.** BIRMA, Wallich, Matangay. MALACCA, Griffith.

A glabrous twiner, with circinate 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, 1½ in. **Petals** rather exserted, oblong, with a long claw. **Pod** ½-1 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 3-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 oblancoate-oblong not clawed.

**Penang, Griffith.**

**Branchlets** 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 corymbose racemes, 3 in. long and broad; pedicels erecto-patent, lower above 1 in. long. **Calyx** thinly rusty-downy externally; tube cylindrical, ½-3 in. long; bud ovoid, under ½ in. **Petals** more than twice the length of the calyx-limb. **Ovary** downy, with a short distinct style and stalk; stigma large, peltate.


**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 raceme thinly rusty-downy; pedicels ¼ in. **Calyx-tube** ½ in., cylindrical. **Bud** ovoid. **Petals** ½-3 in. long, glabrous. **Ovary** rusty; style and stalk both very short.


**Penang, Porter.—Distribution: 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, 14–18 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, 4–6 in. long; bracts and bracteoles minute, caducous. Calyx-tube scarcely any; limb ½ in. long, irregularly cleft; bud ovoid. Petals oblong, clawed, twice the sepals, yellow. Style produced, stigma large. Pod flat, 5–6 in. by 1½–1¾ 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 ¼ in. Calyx-tube 1¾ 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.—Distribution. Philippines.

Very near *B. integrifolia*, with which it agrees in leaf, venation and inflorescence. Lower pedicels 1–2 in. long; bracts caducous. Calyx-tube cylindrical, ½–¾ in. Bud broad-ovoid or subglobose. Calyx-limb under ¼ 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 cirrinate tendrils. Leaves rigidly subcoriaceous, rather broader than long (1½–1¾ ft.), deeply
cordate, 11-13-nerved, slit $\frac{1}{4}$ in. down with an open sinus, persistently downy all over beneath. Racemes long-peduncled, terminal, dense, subcorymbose; lower pedicels 1-2 in., with persistent linear bracteoles. Calyx-tube slender, $\frac{1}{4}$ in.; limb under $\frac{1}{4}$ in., splitting into two lobes. Petals 1 in. long, obovate, with a short claw. Ovary ferrugine-tomentose, with a short stalk, long style and minute stigma. Pod subglabrous, rusty-downy, $\frac{1}{4}$-1 ft. by 2 in., 8-12-seeded, finally splitting open.


**MARTABAN, Brandis.**

A climber, with pubescent branchlets. Leaves round-cordate, 3-5 in. each way, chartaceous, slit $\frac{1}{4}$ in. down, glabrescent above, clothed with persistent fulvous pubescence beneath. Racemes terminal, corymbose; pedicels 1$\frac{1}{4}$-2 in.; bracts linear-lanceolate, acuminate, $\frac{1}{4}$ in. Calyx-teeth linear-lanceolate, $\frac{1}{4}$ in., free and reflexed when mature. Petals $\frac{1}{4}$ in., with a long claw and linear-obovate undulated blade. Ovary fulvous-pilose; style thick, shorter than the ovary. Pod unknown. *Ex Kurz*, loc. cit.


**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 $\frac{1}{4}$ down and deltoid lobes. Corymb dense, terminal, sub sessile; pedicels 1$\frac{1}{2}$-2 in., more slender than in *B. Vulcii.* Calyx-tube 4$\frac{1}{4}$ in.; limb equaling the tube, membranous, irregularly slaty. 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, Hefner.**

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 $\frac{1}{4}$ down. Racemes few-flowered, short-peduncled, axillary, corymbose; pedicels $\frac{3}{4}$ in.; bracts deltoid, very minute. Calyx thinly grey-pubescent; tube $\frac{3}{4}$-1 in.; sepals distinct, lanceolate, 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, Hefner.**

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, sub sessile, 3-4 in. long; pedicels 1-1$\frac{1}{2}$ in. Calyx-tube $\frac{1}{4}$ 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, Wallisch. Bris. Malangay.—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 ½ down. *Corolma* sessile, few-flowered, axillary; bracts small, lanceolate, subpersistent; pedicels erecto-patent, lower ½-⅓ in. *Calyx*-tube slender, ⅔-1 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.


Branchlets clothed with deciseous 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, lanceolate, tomentose, persistent; pedicels slender, an inch long, clothed with short spreading hairs; lower deflexed. *Calyx* thinly silky; tube ⅓ in.; limb reflexed, membranous, irregularly cleft. *Petals* nearly oblong, clawed, silky on the back. *Stamens* 3. *Ovary* sub sessile, densely rusty-silky; style ⅓-⅔ in., stigma small pilose.


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 corombose 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 ⅓-⅔ in.; bud subglobe; limb irregularly cleft. *Petals* obovate, clawed, densely silky on the back. *Stamens* 3. *Ovary* short-stalked, densely rusty-silky; style short, stigma small.


**Tenasserim, Holger, and sent from the Calcutta gardens as B. piperifolia.**

Branchlets slender, at first finely grey-silky. *Leaves* shallowly cordate, rigidly sub coriaceous, glabrous, shining above, moderately large, the acute lobes reaching ⅓ down. *Flowers* in dense many-flowered, short-peduncled corymbs, forming a broad terminal corombose panicle; bracts minute, lanceolate; pedicels slender, ascending; lower ⅔-1 in., clothed like the calyx with adpressed grey silky pubescence. *Calyx*-tube ⅓ 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,
L. LEGUMINOSE. (J. G. Baker.) [Bauhinia.


Silkett, Roxburgh, Wallich. Assam, Hamilton.

Branches glabrous, with copious stalked gominate tendrils. Leaves round-cordate, rigidly subcoriaceous, subglabrous, 3–4 in. long, with an open deltoïd sinus reaching 1/4 down and deltoïd subacute lobes. Flowers in forked or simple peduncled narrow sublax racemes 1–2 ft. long; bracte minute, deltoïd; pedicels 1/2–1 in., clothed like the calyx with fine grey silky pubescence. Calyx-tube 1/2 in.; limb campanulate, 1/2 in., regularly 5-cleft half-way down. Petals 1/3 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 exserted.

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 deltoïd acuminate lobes. Racemes copious, few-flowered, congested, sessile, axillary; pedicels scarcely any; bracts minute, deltoïd. Calyx-tube 1/2–5/8 in. long; limb tough, entire, 3/4 in. broad. Stamens 5. Petals obovate, three times as long as the limb, glabrous; not clawed. Immature pod narrow, 3/4 ft. long, glabrous, with a long stalk.


Teinasserim, Griffith, Hefser. Siamese gulf, Finlayson.

Corymbs many-flowered, short-peduncled, axillary, 1/2–1 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 3/4–1 in.; sepals 3–4 in., lanceolate, subconnate. Petals above 1 in. long, with a tomentose claw, exceeding the corolla clefted limb. Ovary grey-downy, with a long style and stalk, stigma small.


Martaban, Dr. Brandis.

A climbing shrub, with thinly puberulous young branches. Leaves thinly chartaceous, cordate-ovate, 3–4 in. long, glabrous, with a sinus reaching half-way down or more, the lobes narrowed to a subobtuse point. Racemes lax, terminal, glabrescent; pedicels 2–2 1/2 in.; bracteoles oblong, subobtuse, 3/4 in. long, velvety within. Calyx velvety; tube 1/2 in. or more long; teeth lanceolate acuminate, finally free and reflexed. Petals pale rose, 1 1/2 in. long, with an ovate-oblong obtuse blade as long as the claw. Ovary glabrous; style thick, moderately long. Pod unknown. Ex Kurs 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.

Tenasserim, Martaban, Penang.—Distr. Malay isles, China.

Branchlets slender, soon glabrescent, with copious tendrils. Leaves the smallest and deepest cleft of the section, coriaceous, firm, 1-3 in. long, the ribs at first pilose, the apical lobes always obtuse. Flowers in copious dense short-peduncled or sessile terminal corymbs; pedicels slender, erecto-patent, 1-1 in., with several setaceous persistent bracteoles. Calyx-tube ¼-3 in.; limb ¼ 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 1½-2 in., with 10-12 small seeds down the middle, like B. dipsycla. —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 ¼-¾ in. long cleft nearly to base clothed beneath with fine ferruginous silky pubescence, corymbs few-flowered.

Singapore, Dr. Osteley.


Penang, Malacca, Singapore.—Distr. Malay isles.

Branchlets soon glabrescent, with a few stout woody tendrils. Leaves rigidly subcoriaceous, deeply coriaceous at both ends, 2-4 in. long, with the ribs at first rusty-pubescent. Flowers in ample terminal racemes, ½-1½ ft. long; pedicels erecto-patent, clothed like the calyx with bright rusty silky pubescence, 1½-2 in. long; bracts minute, lanceolate, caducous. Calyx-tube ½ in. long; sepals lanceolate, coriaceous, distinct. Petals oblanceolate, clawed. Stamens 3. Ovary densely rusty-silky, with a long stalk and style and very large oblique stigma. Pod smooth, thin, ½ ft. long, 1½ in. broad.


Var. 2. excolea, (Phanera excolea, Bumma; Miq. Fl. Ind. Bat. i. 62); calyx-tube oblong ½-¾ in. long much stouter than in the type (¼-½ in.), sepals above an inch long.—Malacca, Griffith. Distr. Malay isles.

32. B. nervosa, Wall. Cat. 5777; cirrhose, pubescence thin ferruginous, leaves 11-15-nerved not lobed half-way down, pedicels long, calyx-limb 5-cleft as long as the cylindrical tube, petals silky exserted. Phanera nervosa, Benth. Pl. Jungh. 262.

Silhet, Wallach. Assam, Griffith. Khasia Mt., 1-3000 ft., Hook. fl. & Thomson. A robust climber, with thinly silky branchlets. Leaves rigidly subcoriaceous, deeply coriaceous, middle-sized, rather longer than broad, at first thinly silky on the ribs, the contiguous lobes sometimes subacuta. Flowers in copious elongated terminal racemes; with branches clothed with bright rusty-silky pubescence; bracts lanceolate, silky, caducous; pedicels erecto-patent, lower ¾-2 in. long. Calyx-tube ½-¾ in., not narrowed upwards; sepals coriaceous, finally distinct. Petals, stamens and ovary as in the last. Pod ½ 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 \( \frac{1}{4} \) down. Racemes few-flowered, short-peduncled, axillary and terminal. Calyx-tube \( \frac{3}{4} \) in. Fertile stamens 5. Petals oblongo-elliptic, 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.—Distrib. China.

A middle-sized erect tree, with moderately stout glabrescent branchlets. Leaves rigidly subcoriaceous, glabrous, shallowly cordate, the lobes obtuse or subacute, reaching \( \frac{1}{4} \)–\( \frac{1}{2} \) way down. Flowers in terminal and axillary short-peduncled few-flowered corymbs; bracts minute, deltoid; lower pedicels \( \frac{1}{2} \) in. Calyx-tube \( \frac{1}{2} \) in.; limb \( \frac{3}{4} \)–1 in., coriaceous, split into two valves, which show a division into 5 teeth. Petals oblongo-elliptic, 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 \( \frac{1}{4} \)–1 ft. by \( \frac{3}{4} \)–1 in., firm, flat, glabrous, late in deshiscing, rather recurved, 12–15-seeded.


From the foot of the Western Himalayas, and Sikkim, alt. 4000 ft., and through India proper, to Birma.—Distrib. 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 \( \frac{1}{4} \)–\( \frac{1}{2} \) down. Corymbs few-flowered, lateral, sessile or short-peduncled; bracts minute, deltoid; pedicels erecto-patent, \( \frac{1}{2} \)–\( \frac{3}{4} \) 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 \( \frac{3}{4} \)–1 ft. long, \( \frac{3}{4} \)–1 in. broad, hard, flat, glabrous, rather recurved, dehiscing, 10–15-seeded.


From Eastern Bengal and Sikkim to Birma and Eastern and Western Peninsula.—Distrib. Malay isles.
Bauhinia.] L. LEGUMINOSAE. (J. G. Baker.) 285

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 ⅓ in., erecto-patent, finely downy. Calyx ⅛ in. long, broadly campanulate, with 5 deltoid teeth. Petals white, oblanceolate, twice the length of the calyx. Pod thin, flat, oblong, glabrous, indehiscent, stalked, 1½-2 in. long, 1-2-seeded.

Sect. 6. Casparea, DC. Calyx-tube fusiform; limb spathaceous. Fertile stamen one.


BRANCI, Dr. Brandis.
Young branches puberulous. Leaves round-ovate, truncate at the base, palmately 11-nerved, chartaceous, 1-⅓ 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 ⅛ in., obovate-cuneate, glabrous, undulated, probably whitish. Ovary stalked, fulvo-villosse; 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 Lysiphyllum, 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, Mg. Fl. Ind. Bat. i. 70.

B. PIPERIFOLIA, Roxb. Fl. Ind. ii. 327 (Phanera, Benthi. Fl. Jungh. 262), from the mountain forests of Sylhet, 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 exerted; 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 Malacoa.—Distrib. Cosmopolitan in tropics. Stems stout, annual, wide-creeping, rarely throwing out suberect branches, producing copious fibrous rootlets from the same nodes that bear the leaves and peduncles. Pinnae 4-6, 2-3 in. long; rachis glandless; leaflets glabrous, obtuse, ⅓ in. long. Peduncles ascending, 1 ft.; bracts small, ovate, subobtuse. Staminodes ⅓ in., strap-shaped, yellow. Corolla ⅛ in. Pod ⅛ in. long, rostrate, dry, soon dehiscing by the upper suture.

**Western Peninsula and Bunderkund.—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 1/4–1 in. Heads small, globose, long or short-pediculed. Corolla yellow, 1/2 in. long. Sterile flowers sometimes quite absent from the heads. Pod 1–1 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, suffruticosus, several feet high. Pinnae 6–10, with a gland between the lowest pair; leaflets like those of the last. Stipules and bracts copious, corydose-ovate, acuminate. Heads copious, oblong. Flowers and heads just like those of _N. oleracea_, but the pod twice as long.

116. _XYLIA_, Bentham.

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, exerted; 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, Birm, Sincapore.**—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 beards, crowded on short branchlets developed with the young leaves. Corolla 1/2 in. Pod 4–6 in. by 1–2 1/2 in., 6–10-seeded.

117. _ENTADA_, Adams.

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 exerted, 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.

Central and Eastern Himalayas. NIPAL, ascending to 4000 ft. in SIKKIM, WESTERN PENINSULA, CEYLON, MALACCA.—Distrib. Cosmopolitan in the tropics.

An immense climber, with slender terete woody branches. Leaves long-petioled, the rachis usually ending in a tendril; pinnae stalked, mostly 4; leaflets oblong or obovate, obtuse or acute, 1–2 in. long, rigidly coriaceous. Spikes peduncled, ½ ft. long or more, usually panicked from the nodes of old leafless branches, sometimes simple from the axis of the leaves (E. monostachy, DC.). Flowers 4–½ in. long, sessile or on short pedicels. Pod 1–2 ft. or more by 3–4 in., curved, constricted between the seeds. Seeds 2 in. broad.

118. ADENANTHERA, Linn.

Erect trees without spines or tendrils. Leaves ample, bipinnate. Flowers minute, in narrow spike-like racemes, hermaphrodite, usually pentamorous. Calyx campanulate, equally toothed. Petals valvate, equal, lanceolate, cohering only at the very base. Stamens 10, free, equalling 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 9–12, leaflets 12–18 obtuse, seeds concolorous usually bright scarlet. Roxb. Fl. Ind. ii. 370; Wall. Cat. 5300; W. & A. Prodr. 271; Wright Ill. t. 84 (80); Bedd. Fl. Sylv. t. 46; Brand. For. Fl. 168.

EAST INDIAS (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, ½–1½ in. long. Racemes short-peduncled, 2–6 in. long, ½ in. broad, simple from the axis of the leaves and panicked at the end of the branches; pedicels as long as the flower, ½ in. Pod 6–9 in. by ½ 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.


119. PROSOPIS, Linn.

Erect trees or shrubs with scattered prickles. Leaves bipinnate, with small narrow leaflets. Flowers minute, in narrow spikes or subspicate racemes, polygamous. Calyx minute, campanulate, subentire or faintly 5-toothed. Petals 5, ligulate, subcohere 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.—Distr. 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. Pl. i. t. 63; Wall. Cat. 5299; W. & A. Prodr. 271; Dals. & Gibs. Bomb. Pl. 84; Bedd. Fl. Sylv. t. 56; Brand. For. Fl. 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, SCIENCE, WESTERN PENINSULA.—Distr. Afghanistan, Persia.

A low tree, with slender grey branches. Prickles copious few or none, ¼–½ in., nearly straight, at first straw-coloured. Pinnae 1–2 in. long; leaflets 16–24, sessile, ¼–½ 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 ½ in. long. Pod straight, edible, glabrous, 4–6 in. long, ½ in. thick, narrowed gradually into a short stalk, the mesocarp farinaceous. Seeds 10–15, dull brown, oblong.


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, ½–1 in. long, ½ in. thick, black, rugose, obtuse, contracted abruptly into the stalk; mesocarp pulpy. Seeds sub-biseriate.

120. **DICHROSTACHYS**, DC.

Shrubs. Leaves bipinnate, with minute coriaceous leaflets. Flowers minuta, 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 subconnate towards the base. Stamens of the perfect flowers slightly exerted, filaments filiform free; anthers gland-crested. Ovary sessile, many-ovuled; style filiform, stigma capitate. Pod small, strap-shaped, coriaceous, indehiscent, subarticulated, continuous within, twisted up when mature.—Distr. Species 4–5, confined to the tropics of the Old World.


NORTH WEST PROVINCES, WESTERN PENINSULA, CEYLON.—Distr. Malay isles, N. Australia, and doubtfully distinct from *D. nutans*, of Tropical Africa.

121. PIPTADENIA, Benth.

Erect trees, unarmed or prickly. Leaves bipinnate. Flowers small, in dense spikes, hermaphrodite, pentamemrous. Calyx campanulate, shortly 5-toothed. Petals 5, valvate, equal, lanceolate, cohering at the base. Stamens 10, free, as long as the corolla; anthers tipped with a deciduous gland. Ovary stalked, many-ovuled; style filiform, stigma terminal. Pod long, thin, strap-shaped, flat. Seeds brown, compressed.—Distrib. Species 30, all the rest but two from Africa Tropical American.


Oudh, in forests under the base of the hills in Gonda, Richard Thompson.


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, exerted, the filiform filaments united in the lower part with each other and the corolla-tube; 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.


Malay peninsula, Roxburgh. Elsewhere cultivated.

Rachis of leaf downy, 1 ft. or more long; pinnae 40-60, 3-4 in. long; leaflets 1-nerved, rigid, 3/4 in. by 3/16 in. Peduncle under a foot long in the specimens seen. Calyx 1/4 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; pinna 20 or more, 3-4 in. long; leaflets 100-120, 1 1/2 in. by 3/16 in., with rarely any other veins than the costa perceptible. Peduncle 1-1 1/2 ft.; flowers in turbinate heads 2-3 in. long. Calyx 1/4 in.; tube cylindrical, glabrous; lobes pilose. Pod 1 ft. by 1 1/2 in., narrowed into a 3-4 in. stalk.

3. P. leiophylla, Kurz in Journ. Asiat. Soc. Beng. xlii. 2, 73; leaflets broad-ligulate 50-60 to a pinna, pinnae 20 or more.
PEGU, Kurz.
An erect tree 80–120 feet high. Leaf 1–2 feet long; rachis fulvo-pubescent, pinnae 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 ¾ 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 ¾ 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. LEUCENA, Benth.


Spread throughout India, as it is through Trop. Asia and Africa, but probably indigenous only in Tropical America.

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.—**Distrin.** Species 230, mostly confined to Trop. America.


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. *Pinnas* 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* $\frac{1}{2}$ 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 Broton, and through India proper.—**Distrin.** Afghanistan.

A low tree, with slender grooved finely grey-downy branches, armed with copious small scattered hooked spines. *Leaflets* 12–24, membranous, $\frac{1}{4}$–$\frac{1}{2}$ in. long, rather downy below, not venulose, with an obscure recurved cusp. *Heads* $\frac{3}{4}$–$\frac{1}{2}$ 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* $\frac{1}{8}$ in. Pod rather falcate, 3–4 in. by $\frac{1}{4}$–$\frac{1}{2}$ in., 6–10-seeded, the sutures rarely furnished (*M. spinosissima*, 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, $\frac{1}{4}$–$\frac{1}{2}$ in. long, downy or glabrous. *Pod* rather shorter and broader, downy or glabrous, 4–6-seeded.


**Singapore, Schomburgk, Maining.—Distrin.** 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, $\frac{1}{4}$–$\frac{1}{2}$ 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 pentameros. Corolla 4/6 in. Pod distinctly stalked, nearly straight, 1½-2 in. by 1/3 in., glossy, finely reticulato-venulose, 6-8-seeded.

126. ACROCARPUS, W. & A.

An erect unarmed tree. Leaves bipinnate. Flowers racemose. Calyx campanulate, cleft about half-way down into 5 equal lanceolate teeth, the disk completely investing the tube. Petals ob lanceolate, 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, litulate, many-seeded, with a wing down the upper suture. — Distrib. A single species.

1. A. fraxinifolius, Wight Ic. t. 254 (excluding the leaf); Arnott in Jardine Mag. ii. 547; Wight Ill. p. 198; Bedd. Fl. Sylv. t. 44. A. combretiflorus, Teysm. & Binn. ; Walp. Ann. vii. 811.


A large unarmed erect tree, 60 feet high before it forks. Pinnae 8, a foot or more long; leaflets 10-12, nearly sessile, oblong, rather obtuse, glandular, subcoriaceous, 3-4 in. long. Flowers in dense simple racemes produced in February, when the leaves are fallen; pedicels short, drooping. Calyx ½ 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 globose heads or cylindrical spikes, hermaphrodite or polygamous, usually pentamerous. 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 capitate. Pod litulate or oblong, not jointed, usually compressed and dry, dehiscent or indehiscent, rarely turgid or subcylindrical, sutures straight or wavy, not thickened. — Distrib. Species 480, the leguminous 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 1/3 in. long on the branches. Leaf-rachises downy, with a minute petiolar gland; pinna 1½ 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 $\frac{1}{3}$ in. diam. Calyx campanulate, very minute. Corolla $\frac{2}{3}$ in.; teeth short, obtuse. Pod 2–3 in. long, $\frac{1}{2}$ in. thick, dull brown, marked with fine close horizontal stria.


**Western Peninsula.**
A tree, with a flat umbrella-like top, and glabrous branches with grey lenticular dots. Spines 4–6 in. long, the old ones spreading, $\frac{1}{2}$ in. thick, very pungent. Leaves glabrous, very small; glands of the rachis 0 or minute; pinnae $\frac{1}{2}$–$\frac{1}{3}$ in. long; leaflets $\frac{1}{2}$ in., rigidly coriaceous, glaucous-green, glabrous. Heads in clusters from the axils of mature branches, $\frac{1}{2}$–$\frac{3}{4}$ in. diam.; peduncles very slender, with the involucre below the middle. Corolla $\frac{2}{3}$ in., yellow, twice the calyx. Pod subcylindrical, 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 $\frac{1}{2}$–$\frac{1}{2}$ in. long; leaflets membranous, green, $\frac{1}{2}$–$\frac{2}{3}$ 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 $\frac{1}{2}$ in., campanulate. Corolla twice the length of the calyx. Pod rigidly coriaceous, subindehiscent, densely persistently grey-downy, 8–12-seeded, $\frac{1}{2}$–$\frac{2}{3}$ ft. by $\frac{1}{2}$–$\frac{2}{3}$ in., distinctly stalked.


**East Himalayas and Punjab to the Western Peninsula and Ceylon.**—Distr. 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, $\frac{1}{2}$–$\frac{2}{3}$ in. Pinnae $\frac{1}{2}$–$\frac{2}{3}$ in. long, with a gland between the lowest pair; leaflets $\frac{1}{2}$–$\frac{2}{3}$ 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 $\frac{2}{3}$ in., funnel-shaped, shortly toothed. Corolla scarcely twice the length of the calyx. Pod distinctly stalked, 6–8 in. by $\frac{1}{2}$ in., thin, flat, straight, drab, glossy, rather venulose, 6–10-seeded.

Plains of the North West provinces.

General habit of A. eburnea, from which it mainly differs in the pod. Spines slender, reaching 1 1/2 in. long. **Pinnae** 1/2 in. long; leaflets grey-green, sub-glabrous, rigidly coriaceous. **Heads** yellow, 1/3 in. diam. **Corolla** 1/4 in., twice the length of the calyx. **Pod** straight, flexible, grey, 2-3 in. by 1/4 in., 5-6-seeded, with a stalk 1/4 in. long.


**Western Peninsula and Ceylon.**

A small tree, with the branches and leaf-rachises densely clothed with fine grey pubescence, the latter with several glands. **Pinnae** 1-2 in. long; leaflets 1/2 in., grey-green, more or less downy, membranous or subcoriaceous. Developed spines 1-2 in. long, spreading, brown, not white. **Heads** purple, 1/3 in. diam.; peduncles stout, densely downy, with a medial involucre. **Calyx** 1/4 in., funnel-shaped, grey-downy. **Corolla** subcylindrical, twice the length of the calyx. **Pod** 4-6 in. by 1/5 in., short-stalked, 6-10-seeded.


**North West provinces to Ceylon and Birma.—Distrib.** Malay isles, Timor. Easily recognisable from all the foregoing by its panicled inflorescence. **Spines** 1/2-1 in., white. Leaf-rachises downy, with several glads; **pinnae** 1 1/2 in. long; leaflets crowded, rigidly coriaceous, 1/2-1 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 1/2 in. diam.; peduncles with the bract medial, the upper very short. **Corolla** under 1/4 in. **Pod** 4-8 in. by 1/4-1/5 in., sessile, subindehiscent, clothed with pale brown or grey persistent tomentum.

**Var. microcephala**, Grah. in Wall. Cat. 5263, sp.; leaf-rachis glabrous, leaflets much larger 1 1/2 in. long. A. densa, Wall. Cat. 5262.—Birma, Wallich.

**Series II. Gymmiferæ spicatae.** Erect trees. **Spines** short and hooked, except in A. Latronum. **Stipules** spinescent. **Flowers** in peduncled spikes in the axils of the leaves.


**Bengal, Behar, Western Peninsula, Ceylon.**

A middle-sized tree, with white bark and downy branchlets. **Leaf-rachis** 1 ft. long, with a large basal gland and smaller ones between several of the upper pinnae; **pinnae** 1 1/2 in. long; leaflets very close, rigidly subcoriaceous, pale green, under 1 in. long. **Spikes** 1-4-nate, 3-4 in. long. **Calyx** 10-12 in., densely grey-downy;
Acacia.]  

L. LEGUMINOSE.  

(J. G. Baker.)  

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teeth deltoid. Corolla nearly white. Pod 3-4 in. by 1/2-3 in., rather thicker than in the two following, veined, 5-8-seeded, distinctly beaked, subindeliscent, narrowed suddenly into a stalk 1/2-3 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; pinnae 2-3 in. long; leaflets 1/2-3 in. long, pale glaucous-green, rigidly subcoriaceous. Spikes dense, 3-4 in. long. Corolla yellowish, 1/2 in. Pod 3-4 in. long, 2/3 in. broad, dark 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, 1/2 in. long, glabrous, pale, glaucous-green. Spikes 2-3 in. long,
not very dense. Calyx $\frac{1}{3}$ in., campanulate, glabrous, deeply toothed. Corolla yellowish. Pod 3 in. by $\frac{3}{2}$ in., thin, grey, firm, indehiscent, 5-6-seeded, narrowed suddenly into a short stalk.


Foot of the **Western and Central Himalayas**.—**Distri. Afghanistan**.

A middle-sized tree, with grey glabrous branches. *Prickles* dark-brown, polished. *Leaf-branches* very slender, finely downy, with a small gland at the base and one between the uppermost pinnae; leaflets thin, rigidly subcoriaceous, $\frac{1}{2}$-in. long, short-stalked, glabrous, oblique at the base, pale green, obtuse or minutely cuspidate. *Spikes* 2-3 in. long, not very dense. Corolla $\frac{1}{4}$ 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. lentischenalis**, 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-straight or subfuscate. *Benth. in Hook. Lond. Journ.* i. 508.

Foot of **Central** and **Eastern and Western Himalayas**, rare, *Hamilton, Royce*. *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* $\frac{1}{3}$ in., grey, campanulate, deeply toothed. Pod 6-8 in. by $\frac{3}{2}$ in., 6-9-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, $\frac{1}{2}$-in. thick, conate 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* $\frac{1}{3}$ 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**. Clumbers with copious panicled prickles. *Flowers* in copiously panicled globose heads.

Eastern Himalayas, Western and Eastern Peninsulas, and Ceylon.—Distrib. Malay isles, China.

Prickles abundant, minute, hooked. Branchlets and leaf-rachises finely grey-downy. Petiole with a large gland near the base and one between the uppermost pinnae; pinnae 2-3 in. long; leaflets 3⁄4 to 1 in. long, pale green above, glaucous beneath, subglabrous. 1⁄2 to 2⁄3 in. broad, with a very oblique midrib, sensitive, often not crowded. Pedicels with densely downy branches, the lower springing from the axis of the leaves, the upper subtended by conspicuous oblique membranous subpersistent bracte; heads yellow, 3⁄4 in. broad. Calyx funnel-shaped, 1⁄2 in. long. Corolla little exserted. Pod strap-shaped, straight, 3-4 in. by 3⁄4 in., 6-10-seeded, with broad sutures, narrowed to a short stalk, depressed between the seeds.

Var. rugata. Ham. in Wall. Cat. 5251, sp.; leaflets and pod larger, the pinna 1 in. and the latter 1-1½ in. broad, ovary villose.—Eastern Himalayas.


Tropical Himalayas, Western Peninsula, Eastern Peninsulas, 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 1⁄2 to 1 in. broad, minutely cuspitate, with the midrib nearer the upper margin, both surfaces glabrous or nearly so, the lower grey-green. Peduncles finely downy, 1-4-nate; heads yellow, under 1⁄2 in. broad. Calyx shorter, and more broadly funnel-shaped than in the last. Pod straight, strap-shaped, glabrous, dehiscient, smooth, 4-6 in. by 3⁄4 in. 8-12-seeded, the sutures straight, or slightly repand, cuneately narrowed at the base to a short stalk.


Var. oxypylia, 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 1⁄2 to 1 in. broad, dark green above, grey-green below, both sides glabrous. Peduncles 1-4-nate, finely downy; heads 1⁄2 in. thick. Corona 1⁄3 in., slightly exceeding the glabrous subcampsulate calyx. Pod straight, strap-shaped, thin glabrous, dehiscient, 6-8 in. by 3⁄4-1½ in., distinctly stalked, 8-12-seeded, the sutures rather raised, slightly repand.

VAR. 2. arrophaula, Don; Wall. Cat. 5257, sp.; pinnae more numerous, leaflets duller in colour and not so firm in texture, panic 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—50 not more than 1/2—1 1/2 in. long, leaflets very narrow and crowded, petiolar glands much smaller, panic elongated sometimes a foot long above the leaves, peduncles often 6—8-nate, heads smaller, A. polycephala, Grub. in Wall. Cat. 5255, non DC.—Martaban, Penang, and Malacca.—Distrib. Malay isles.

IMPERFECTLY KNOWN SPECIES.

A. Wightii, 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—8 pinnae, 12—32 oblique oblong glabrous subcoriaceous leaflets 1/2—5/8 in. long, short glabrous 2—4—nate peduncles with the involucre below the middle, funnello-shaped shortly-toothed calyx 3/8 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 pentamerosus and all hermaphrodite. 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 capitate minute. Pod large, thin, flat, strap-shaped, straight, indehiscent or subindehiscent, continuous within, the sutures not thickened.—Distrib. 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 Nilgiris.

* Leaflets oblong, at least 1/2—1 in. broad.


Tropical Himalayas, ascending to 5000 ft. in the Central Provinces and 4000 ft. in Khasia; through India proper and Ceylon to Burma and Tenasserim.—Distrib. 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 subcoriaceous, oblique, 1 1/2—2 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 3/8 in. downy, Corolla greenish-yellow, twice the calyx, the teeth short, lanceolate. Pod strap-shaped, firm, yellow-brown, 3—1 ft. by 3/4—1 1/2 in., 6—10-seeded.

**Malacca, MAiningay.**

Combines the leaves of *A.odoratissima* with inflorescence of *A. Lebbek*. 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, ½–¾ in. long. **Heads** many-flowered, on crowded downy peduncles from the upper nodes. **Pedicels** and calyx each ½–⅔ 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 expund 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, ½–1 in. long, rigidly subcoriaceous, glossy 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 corymb at the end of the branches and smaller ones from the upper leaf-axils. **Calyx** under ½ in. **Corolla** grey-silky ½ in., with lanceolate teeth. *Pod* firm, flexible, 6–8 in. by ½ in., opaque or glossy, 8–12-seeded. We have not material for separating from this *A. lebekkoides*, Benth., reported by Kurz from Burma.

**Var. mollis**, Benth.; leaflets and leaf-rachises densely grey-downy, the former less rigid than in the type.—*Rohilcund, Thomson. Siwalkis, Edgeworth.*


*Central and Eastern Himalayas, Behar, Western Peninsula, Burma.—District Malay isles, Philippine.*

**Leaf-rachises** glabrescent, with a large gland near the base of the petiole; pinnae 4–12; leaflets rigidly subcoriaceous, grey beneath, glabrous, 1½ in. long, obliquely truncate at the lower side at the base. **Inflorescence** like that of *A. odoratissima*. **Calyx** ½ in., shortly toothed. **Corolla** twice the length of the calyx, deeply cleft. *Pod* 4–8 in. by ½ in., thin, brown, glabrous, finally dehiscing, 8–12-seeded.

**Var. alata**, Baker; leaflets smaller ½–⅔ in. long less oblique at the base. **Mimosa elata, Roxb. Hort. Beng. 40; Fl. Ind. ii. 546. Acacia elata, Grah. in Wall. Cat. 5233.**


**Nipal, Khasia, Assam, Silhet, Ava, and Singapore.**

Diffs 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, 2½ in. long, glabrous, membranous, firm, bright green. Ultimate
branches of the panicle umbeulate or corymbose. Corolla 3–4 times the length of the calyx; teeth lanceolate. Pod 6–8 in. by 1–1 ½, 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. Corolla under ⅔ in., pubescent. **Pod** 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 Harana to Sikkim, ascending to 6–7000 ft.—Distr. 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, ¼ in. long, cuspidate, straight on the upper side, rounded on the lower, ½ in. broad. Heads globose, on clustered erecto-patent peduncles from the crowded leafless upper nodes. Calyx ½–1 in., funnel-shaped, shortly toothed. *Filaments* rose-red, 1 in. *Pod* glabrous, membranous, grey or pale brown, 5–6 in. by ¾–1 in., 8–12-seeded, narrowed to a beak and short stalk, indehiscent.

**Var. mollis**, Benth.; leaflets broader (¼–½ in.) more coriaceous, like the peduncles and calyx densely pubescent. *Acacia mollis*, Wall. Pl. As. Rat. ii. 76, t. 177; Cat. 5235.—Simla to Nepal.


**Tropical Himalayas**, ascending to 4000 ft. in Kumau and Sikkim, to ChyIon and Birm.—Distr. Malay isles.

A tall unarmed tree, with finely grey downy branchlets. *Leaves* with many glands on the rachis; pinnae 12–40; leaflets ¼ in. or less broad, membranous, sensitive, ¼–½ in., sessile, glaucescent 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 ¼–1 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 subpinescent, pod sub sessile. Mimosa microphylla, Roxb. Fl. Ind. ii. 549. Acacia myriophylla, Grah. in Wall. Cat. 5242.

**Eastern Himalayas,** ascending to 3000 ft. in Sikkim. Silhet, Assam, and the Khasia Mts.—Distrib. Siam.

A low tree, with dark brown shoots. Leaf-rachis 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, ½–1 in. by ⅛ in. Heads small, coriaceous, forming an ample terminal panicle, with brown-tomentose branches. Calyx sessile, campanulate, under ⅛ in. long. Corolla funnel-shaped, ½–¾ in. Pod 4–5 in. by ½–1 in., glossy, brown, thin, flexible, 6–8-seeded, narrowed to both ends.

**Var. folioloosa;** leaflets large ½–¾ in. long nearly ⅛ in. broad, rachis less pubescent. Acacia folioloosa, Grah. in Wall. Cat. 5241.—Martaban, Waich.


**Western Peninsula** and Ceylon.—Distrib. Abyssinia (A. sericocephala, 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 ½–1 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 ⅛ in., funnel-shaped, shortly stalked. Corolla 3 times as long as the calyx; teeth lanceolate. Pod 6–9 in. by ¼–1 in., 6–10-seeded, opaque, grey-brown.

129. **SERIANTHES,** Benth.

Unarmed trees. Leaves bipinnate. Flowers racemous, 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 monadelphous, very numerous; anthers minute. Ovary sessile, many-ovuled; style filiform, stigma minute capitate. Pod large, oblong, sub-lignose, indehiscent, rather rugid.—Distrib. Another species in Polynesia.


**Malacca,** Griffith, Mainay.—Distrib. 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, ⅝–1 in. long, oblique, rather falcate, obtuse, with the upper and lower edge subparallel. Flowers shortly pedicellate, in few-flowered axillary coriaceous panicles, which are shorter than the leaves. Calyx and yellowish corolla densely felted on the outside, the former ⅛ in., the latter ⅛ in. long. Stamens many hundreds, much exserted.
130. **CALLIANDRA**, Benth.

Shrubs or trees. *Leaves* bipinnate, with small or large leaflets. *Flowers* in globose heads, polygamous, 5-merous. *Calyx* campanulate, toothed. *Corolla* funnel-shaped, deeply 5-crenate. *Stamens* indefinite, monadelphous at the base, filaments filiform much exerted; anthers minute, not gland-crested. *Ovary* stalked, many-ovuled; *style* filiform, stigma minute capitate. *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.—**DISTR.** Species 80, all the rest Tropical American.


*Khaisa Mrs., Griffith.*

Branches slender, terete, glabrous. General and partial *petioles* very short, glabrous. *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, ½–1 in. *Heads* dense, on slender glabrous ascending peduncles 1–2 in. long, from the axils of developed leaves. *Calyx* ⅓ in., funnel-shaped; teeth deltoid; *Corolla* funnel-shaped, glabrous, ⅔ in.; teeth lanceolate. *Pod* unknown.


*Selhurst, Khaisa Mrs., Chittagong,* and *Penang.*

A tree, with slender glabrous branchlets, sometimes furnished with small erecto-patent stipular spines. *Leaves* short; pinna 2, with a pair of large sessile 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* ⅔ in., yellow, inodorous. *Pod* 6–9 in. by ⅔–1 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 pentamerous. *Calyx* campanulate or funnel-shaped, shortly toothed. *Corolla* funnel-shaped, the petals united below the middle. *Stamens* monadelphous, much exerted; anthers not gland-crested. *Ovary* sessile or stalked, many-ovuled; *style* filiform, stigma minute capitate. *Pod* strap-shaped, falcate or circinate, usually dehiscent and much twisted in a late stage, the sutures not thickened.—**DISTR.** 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, obvate-oblong, rigidly subcoriaceous, obtuse, 1-2 in. long. Heads dense, $\frac{1}{4}$-\$ in. broad, shortly peduncled, on elongated branches. Calyx $\frac{1}{4}$ in., funnel-shaped, grey-downy. Corolla $\frac{1}{4}$ in. Pod 4-5 in. by $\frac{1}{4}$ 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 1-1½ in. long; leaflets bright green, rigidly subcoriaceous, uppermost pair approximated, $\frac{1}{4}$ in. long, obtuse, oblique-ovate; lower smaller, lowest on inside absent. Peduncles slender, pubescent. Calyx campanulate, under $\frac{1}{4}$ in. Corolla 3-4 times the length of the calyx. Stamens $\frac{1}{4}$ in. long. Pod not seen.


**Western Peninsula and Ceylon.** — *Distr.* Malay isles.

A low tree, with branchlets sometimes reduced to spines, but with the stipules pubescent, often small and obscure. Leaf-rachis downy, with a gland between the pinnae and an obscure one between each pair of leaflets; leaflets subglabrous, rigidly coriaceous, ligulate-oblong, obtuse, $\frac{1}{4}$-\$ in. long, the uppermost pair broader upwards, the lowest on the inner side mostly absent. Heads long-peduncled, few-flowered. Corolla $\frac{1}{4}$ in., twice the length of the funnel-shaped calyx. Stamens $\frac{3}{4}$-1 in. Pod very different to those of the other species, recurvato-falcate, indehiscent, jointed, $\frac{1}{4}$ in. thick, 6-8-seeded.

**Series II. Clypearia.** 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.* — *Distr.* Malay isles, Philippines.

A tall tree, with subterete 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** subsessile, 1/12 in., densely brown-silky. **Corolla** silky, 2–3 times the length of the calyx. **Stamens** 3–3 1/2 in. **Pod** once or twice spiral, 3–6 in. by 1/4 1/4 in., the valves rigidly coriaceous, slightly downy, the lower suture not at all reaped.

5. **P. affine**, *Baker*; branchlets densely pubescent, pinnae 2, leaflets 6–8, leaves with glands on the petiole and at the base of the pinnae and leaflets, calyx funnel-shaped, pod not lobed. *Benth. in Trans. Linn. Soc. xxx. 577*.

**Malacca**, Maingay.
Very near *P. bigeminum*. **Branchlets** clothed with dense spreading brown tomentum. **Leaflets** 3–6 in. long, shortly-stalked, rigidly subcoriaceous, glabrous. **Calyx** 1/4 in., densely brown-silky. **Corolla** twice the calyx, narrowly funnel-shaped, shortly toothed, densely silky. **Valves** of the pod more rigid than in *P. bigeminum*, 1/4 in. broad.

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** 2/3 in., glabrous. **Corolla** twice as long as the corolla.


**Penang** and **Malacca**.
A middle-sized tree. **Branchlets** clothed with pale brown pubescence. **Leaflets** coriaceous, oblong, glabrous, obtusely pointed, 3–4 in. long. **Heads** in ample axillary and terminal corymbose panicles. **Calyx** 1/3 in., pubescent; teeth deltoid. **Corolla** 2/3 in., 1–1 1/4 as long as stamens. **Pod** oblong-ligulate, sickle-shaped, 2–3 in. by 1–1 1/4 in., very rigid, the valves persistently clothed with fine brown down. **Seeds** as large as a bean.


**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 1 1/2 in. by under 1/4 in., forms a complete spiral, with thinner valves, which become much twisted when it opens, and seeds not larger than a pea.


**Penang**, **Sincapore**, **Malacca**.—**Distrib.** Malay isles.
A tall tree, with terete branchlets and leaf-rachises. **Glands** flat, depressed; general and partial pediotes 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, $1\frac{1}{2}$–$1\frac{3}{4}$ in. broad, at first forming a circle or more, the lower suture not at all waved.


Peleg, Tenassarium and Malacca.—Distrib. 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 $\frac{1}{3}$–$\frac{1}{2}$ in. Pod firmer than in its allies, 1–$1\frac{1}{4}$ in. broad, lobed halfway 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; Anamally hills, 5–8000 ft., Wight, Peddome. Ceylon, Thouates.

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, $\frac{1}{2}$–$\frac{3}{4}$ 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, 5–6 seeded.


Penang, Singapore, Malacca.

Branchlets long and slender, densely clothed with dull brown pubescence. Leaf-rachis downy, with a small depressed petiolar gland and one below the upper pairs of pinnae; upper pinnae 4–6 in. long, lower much shorter, with fewer leaflets; leaflets $\frac{1}{2}$–$\frac{3}{4}$ 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 $\frac{3}{2}$–$\frac{3}{4}$ 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. Leaves rachises acutely angled, with a conspicuous raised gland on the petiole, and one between each pair of pinnae and leaflets; upper pinnae 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 sulcate branchlets. Calyx campanulate, minute, 3-4 times shorter than the whitish corolla. Stamens \( \frac{1}{2}-\frac{1}{4} \) in. Pod like that of P. contortum, but rather smaller.


Khalsa, Mishmi.—Distrib. Malay isles.

Very near P. Clypearia, with which it quite agrees in vesture, glands, inflorescence, calyx and corolla. Leaflets close, regular, \( \frac{1}{2}-\frac{3}{4} \) 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 \( \frac{1}{2} \) in., campanulate. Corolla white, funnel-shaped, 3-4 times the calyx. Stamens \( \frac{1}{2} \) in. Pod just like those of P. contortum and Clypearia.

182. **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 \( \frac{1}{2}-\frac{1}{4} \) in. long. Pod sessile, 3-4 in. by \( \frac{1}{2}-\frac{1}{4} \) 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. **ROSAEAE.** (By J. D. Hooker.)

Herbs, shrubs or trees. *Leaves* stipulate, rarely opposite, simple or compound. *Flowers* usually bisexual and regular (very irregular in *Chrysobalanaceae*). *Calyx-tube* free or adnate to the ovary, limb usually 5-lobed, often bracteolate, imbricate or valvate. *Petal* 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 *Chrysobalanaceae*; 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.—**Distr.** About 1,000 species, found in all climates and countries, but chiefly in the temperate.

*Chrysobalanus* Icaco, *Linn.*; the Coca-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. Chrysobalanaceae.** *Flowers* usually irregular. *Carpel* 1; style basal; ovules 2, ascending. *Fruit* a drupe. *Radicle* inferior.—*Trees* or shrubs with simple or serrate leaves.

- Calyx-tube elongate. Stamens many, unilateral. Ovary 2–loculate
  - Calyx-tube short. Stamens 2. Ovary 1-celled
    1. **Parinarium**
    2. **Parasitomon**

**Tribe II. Prunaceae.** *Flowers* regular. *Carpel* 1, rarely 2; style sub-terminal, rarely basal; ovules 2, pendulous. *Radicle* superior.—*Trees* or shrubs with simple usually serrate leaves.

- Calyx 5-lobed. Petals 5, large, glabrous. Carpels 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. Carpels 1. Drupe erect, coriaceous
  - Calyx 5-lobed. Petals 5. Carpels 1. Drupe inverted, style sub-basilar
    3. **Prunus**
    4. **Maddenia**
    5. **Pyrosium**
    6. **Prinsepia**

**Tribe III. Spiraeæ.** *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.

7. **Spirææ**

**Tribe IV. Rubeeæ.** *Flowers* regular. Calyx ebracteolate. *Stamens* very numerous. *Carpels* many; styles sub-basal or ventral; ovules 2 or more, collateral; pendulous. *Fruit* of many dry or fleshy carpels not included in the calyx-tube. *Radicle* superior.—Usually shrubs, with often compound leaves.

8. **Rubææ**

**Tribe V. Potentilloæ.** *Flowers* regular. Calyx usually imbricate. *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.
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. Poteriac. 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-fid. Petals 0. Carpel 1; ovule ascending. 13. Alchemilla.
Calyx 5-lobed, ebracteolate. Petals 5. Carpels 1-3; ovule pendulous. 15. Poterium.


Tribe VIII. Neuradace. Flowers regular. Calyx-tube enlarged after flowering and becoming confluent with 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 -ovulated.
Cells of ovary many-ovuled. 17.* Cydonia.
Cells of ovary 3-ovuled. 18. Doctyia.
Flowers corymbose or fascicled. Ovary 5-celled. Fruit a pome or berry. 20. Pyrus.
Ovary 2-3-celled. Fruit 2-3-celled, endocarp thin; testa coriaceous. 21. Photinia.
Ovary 2-3-celled. Fruit 2-3-celled, endocarp thin; testa thick reticulately lacunose. 22. Poulthium.
Ovary 2-5-celled. Drupe with 1-5 bony stones. Leaves cut toothed or serrate. 24. Cratægus.

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 -ovulated.
Cells of ovary many-ovuled. 17.* Cydonia.
Cells of ovary 3-ovuled. 18. Doctyia.
Flowers corymbose or fascicled. Ovary 5-celled. Fruit a pome or berry. 20. Pyrus.
Ovary 2-3-celled. Fruit 2-3-celled, endocarp thin; testa coriaceous. 21. Photinia.
Ovary 2-3-celled. Fruit 2-3-celled, endocarp thin; testa thick reticulately lacunose. 22. Poulthium.
Ovary 2-5-celled. Drupe with 1-5 bony stones. Leaves cut toothed or serrate. 24. Cratægus.

* Parinarium, 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; lobs 5, subequal, imbricate.
Petals 5, sessile or clawed, deciduous. Stamens 6–∞, filaments united into an incomplete ring at the base, or connate into an unilaterial 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. Drupe spherical oblong obovoid or ovoid, with a 1–2-celled 1–2-seeded coriaceous woody or bony stone. Seeds erect, tests membranous, cotyledons large fleshy, radicle small inferior.—Distr. 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 iravancoricum are unknown. P. Jackianum, Bent. (Petrocarya excelsa, 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. Drupe 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 1–¾ in. Pusillae, much branched, clothed with soft tomentum; branches slender; bracts oblong-lanceolate. Flowers ½ 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; ovaries densely tomentose. Fruit (of Penang specimen) ¾–1¾ 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, Bent. I have seen no specimen of Blume's P. costatum.


Malacca, Griffith; Maingay (Kew Herb., 622).—Distr. 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.

3. P. oblongifolium, Hook. f.; leaves 6–10 in. oblong or linear-oblong
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. (Petroparya, Jack).

** Leaves 2-glandular at the base, glabrous and shining on both surfaces. Stamens 20–30.


Eastern Peninsula. Tenasserim or Andaman Islands, Helsor; Malacca, Griffith, Maingay.—Distrib. Borneo.

Branches stout, with black bark. Leaves 5–6 in., narrowed into the short petiole; nerves much arched. Panicles shortly peduncled, closely corymbose, with stout branches and pedicels; bracts very deciduous. Flower 1⁄2 in. diam. Calyx hoary; tube obovate, gibbous, glabrous within except near the ovary; lobes orbicular, linear. Petals obovate-orbicular, glabrous, equalling the calyx-lobes. Stamens 20–30; filaments united above the base into a corymbose short tube which is open and toothed opposite the ovary. Ovary tomentose; style short, curved; stigma capitate. Drupe 1-1 1⁄4 in. long, cylindric-obovoid or subclavate, hoary, 2-celled; cells stuffed with brown soft wool.—Differs from the Javanese P. corymbosum in the hoary calyx; and from the Philippine Island P. salicifolium, Benth. (Grymania, Presl), in the foliage.

Subgen. II. Leaves eglandular at the base. Stamens shorter than the calyx-lobes, irregularly united into a ring. Drupe 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).—Distrib. 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 1⁄2 in.; stipules subulate, Panicles axillary and terminal, hoary, narrow, with rather short spreading branches. Flowers small, 1⁄10 in., very shortly pedicelled. Calyx-tube obovate, pubescent within; lobes short and rounded. Petals very small, obovate, tomentose. Stamens 5–7, filaments united into a short ring that is toothed opposite the ovary. Carpels (1-celled, Griff.) inserted almost at the base of the calyx-tube, villous. Drupe obovoid, 1⁄4–1 1⁄4 in. long, yellow, smooth, glabrous.

Subgen. III. Leaves eglandular or 2-glandular at the base. Stamens longer than the calyx-lobes, unilateral. Drupe large, globose, woody, glabrous within; unknown in P. indicum and travancoricum.

* Leaves eglandular at the base.

6. P. asperulum, Miq. Fl. Ind. Bat. Suppl. 307; branches and leaves quite glabrous, leaves elliptic-oblong obtuse or obtusely acuminate, flowers in short stony tomentose thyrsoid spikes.

Malacca, Griffith, Maingay (Herb. Kew. 618).—Distrib. 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, \( \frac{1}{2} \) 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, \( \frac{1}{2} \) in. long, circinnately incurred, 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 minute. **Drupe the size of a small apple, spherical, very hard; outer surface rough and rust-coloured; endocarp \( \frac{1}{2} \) 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 cotyledon 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 \( \frac{3}{4} \) 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, \( \frac{3}{4} \) 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.


**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\( \frac{1}{2} \) in., obutously 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** \( \frac{1}{2} \) in. long. **Calyx-tube** campanulate; 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 Singapore, 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.—Singapore. **A** lofty tree (*Wallich').


**Tenaesserim, Helperi.**

**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** \( \frac{3}{4} \) in., very shortly pedicelled. **Calyx-lobes** short, rounded. **Petals** very small, ovate. **Stamens** equaling the calyx-lobes.—I have seen but one specimen.

**P. ?** A species, apparently allied to *P. Helperi*, collected by Griffith on hills.

*Parinarium.*] **LI. ROSACEAE.** (J. D. Hooker.) 311
LI. ROSACEÆ. (J. D. Hooker.) [Parastemon.]

at Palor in Mergui; it has broadly linear-oblong 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, Benth. in Hook. Niger Flor. 335 (Petrocarya excelsa, Jack, in Mal. Misc. ii. 66.;) 'a large tree, leaves oblong acuminate glabrous, racemes fur- ruginous and tomentose strict erect sparingly branched, stamens 11 unilaterial 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 this fruit, might be P. asperulum, Miq.

Parinarium dillenifolium, R. Br. in Wall. Cat. 7320 (Petrocarya dillenifolia, Steud.), is Dipterocarpus cornutus, Dyer.


A tree introduced from 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-dioecious, minute, racemose, ebracteolate. Calyx-tube shortly campanulate; lobes 5, inacrate. Petals 5 (or 6), oblong, deciduous. Stamens 2 perfect, unilateral. Carpel 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, Mainyay; TENASSERIM or ANDAMAN ISLANDS, Heifer.—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 ⅓ in. diam., shortly pedicelled. Fruit ½ in. long, ellipsoid, quite smooth and glabrous.

3. PRUNUS, Linn.

Shrubs or trees. Leaves alternate, simple, quite entire or serrate or crenate or glandular-serrulate; 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. Carpel 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 Cerasus section, with ovate crenate leaves, fragrant flowers in pedunclate corymbose racemes, and ovoid drupes ⅛ in. long.

LI. ROSEAE. (J. D. Hooker.) 313

P. AMYGDALUS, Bauli.; leaves appearing after the flowers oblong-lanceolate serrulate, petiole glandular as long as the leaf is broad or longer, stipules fimbriate, flowers peduncled, calyx campanulate, pericarp 2-valved. Brandis For. Flor. 190. Amygdalus communis, Linn.; Roxb. Fl. Ind. ii. 500.—The almond.

Cultivated in the cooler parts of India.

P. PERSICA, Benth. & Hook. f. Gen. Plant. i. 609; leaves appearing after or with the flowers oblong-lanceolate serrate, petiole glandular or not shorter than the leaf is broad, stipules fimbriate, flowers sessile, calyx campanulate, pericarp indiaceous. Brandis For. Flor. 191. Amygdalus persica, Linn.; Roxb. Fl. Ind. ii. 500. A. collinus, Wall. Cat. 723. Persica vulgaris, Miller. P. saligna, Royle Ill. 204 (name only).—The peach. Wall. Cat. 7120.

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 l. 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. AVUM, Linn.; roots without suckers, leaves flaccid drooping oblong-obovate acutely serrate pubescent beneath, petiole long 2-glandular, flower flaccid long-pedicelled, flowering buds leafless, calyx-tube urceolate constricted at the top, lobes entire, petals flaccid spreading almost obcordate, 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.


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.—DistriM. Westward to Spain, ascending to 12,000 ft. in Afghanistan.

A scraggy shrub 5-6 ft.; branches hoary, spreading, suberect or prostrate. Leaves ⅓-1 in., usually snowy white beneath, rarely green, narrowed into the short eglandular petiole. Flowers red, on lateral buds, appearing with the leaves. Calyx-tube ⅓ in., cylindric, glabrous or pubescent; limb with 5 oblong obtuse entire lobes. Petals orbicular-obovate, longer than the calyx, rosy. Stamens much shorter. Fruit ⅓ in., ovoid or subglobose, red-purple, flesh scarcely edible.


3. **P. rufa**, *Wall.* Cat. 721 (*Cerasus*); young branches densely tomentose, leaves elliptic- or oblong-lanceolate ciliate-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. *Brotan*, 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 ⅕ in.; bud-scales linear, membranous, glandular-serrate; stipules filiform lacinate. *Flowers* pink; peduncles glabrous, longer than the pedicels. Calyx-tube ⅛ 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 rugose.

**Flowers appearing before the leaves.**


Western Himalaya; in the Tibetan region, Jacquemont. *Gurwhal*, Malari, alt. 9000 ft., Edgeworth; Niti, 11,500 ft., *Strachey* and *Winterbottom*. *Kunawus*, 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.*) *Drupes* 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 pedicels, 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 Bhotan, alt. 5-3000 ft. *Burma*, East of Bhamo, Kurz.

A large tree, of brilliant appearance in flower, glabrous except the puberulous young shoots. *Leaves* 3-5 in., variable in length and breadth, often doubly serrate, glabrous; petiole slender, $\frac{1}{4}$-3 in.; stipules long, subulate, laciniate. *Flowers* rose red or white, from lateral buds clothed with concave rounded glabrous scales; peduncles 6-1 in., often subcamose, connate at the base or almost umbellate. *Calyx-tube* $\frac{1}{2}$ 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.

**Sect. IV. Prunus proper.** *Leaves* convolute in bud, appearing after the flowers. *Flowers* solitary or fascicled. *Calyx-tube* short. *Drupe* glabrous, usually glaucous.

6. **P. communis**, Huds.; var. *insititia*; shrubby, unarmed or spinous, leaves obovate ovate or obovate-lanceolate serrulate ovate acute or cuspidate, nerves hairy beneath, peduncles solitary or in pairs, calyx-tube obconic, drupe globose or ovoid dropping. *Brand. For. Flor.* 192. *P. insititia*, Lam.; *P. bokhariensis*, and *P. alocntha*, Royle *Ill*. 205 ([names only]).

Western temperate Himalaya; cultivated or indigenous from Gurwhal to Kashmir, alt. 5-7000 ft. (*'true 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. alocntha* 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.** —*Distr. 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 $\frac{1}{4}$ in. *Calyx-lobes* longer than the tube, ovate, acute, margins glandular. *Petals* $\frac{1}{4}$ 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.

**Sect. V. Laurocerasus.** *Leaves* conduplicate in bud. *Flowers* in axillary or terminal many-flowered racemes. *Calyx-tube* short, obconic. *Drupe* glaucous or not.

*Leaves deciduous.*

8. **P. Padus**, Lam.; leaves oblong-ovate or -lanceolate acuminate, sharply closely serrulate, base rounded or cordate, nerves 10-20 pair, petiole often eglandular, racemes elongate pendulous, flowers $\frac{1}{4}$-4 in. diam., stamens 30-40, drupe $\frac{1}{4}$ 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 *Bhotan.* —*Distr.* 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, serrations often double very close-set; nerves often with hairs in the axils beneath, under-surface not glaucous; nerves spreading, slightly arched; petiole ½—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 ¼ 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. Puddnum. Foliage red in autumn.

9. P. nepalensis, Ser. in DC. Prodr. ii. 540 (Cerasus); leaves lanceolate or oblong-lanceolate acuminate crenate-serrate glabrous 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 Mts., 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 Mts., 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 Nasserim, Kurz.

Branches 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 ⅓—½ in., slender, eglandular. Racemes 1—7 in., usually on the old wood; peduncle and rachis strict; pedicels ¼ in. long. Flowers ¼ in. diam. Calyx-tube obconic, coriaceous; lobes erect, ovate, obtuse. Petals small, orbicular. Stamens 60—80 in many series. Ovary glabrous, style long, exserted; Drupes ½ in. long, cylindric oblong, pointed, apparently dry; stone thin-walled, smooth.—Foliage like that of P. java-
12. **Prunus acuminata**, Wall. Pl. As. Rar. ii. 78, t. 181 (Cerasus); glabrous throughout, leaves lanceolate cAudate-acuminate quite entire or remotely serrate, racemes axillary solitary or fascicled very slender, petals oblong, stamens about 15. Wall. Cat. 719. O. integerrima, Wall. Cat. 722.

Temperate Central and Eastern Himalaya, from Nepal and Sikkim, alt. 5-7000 ft., to Mysore. 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 pairs, obliquely ascending, slender but evident; petiole ½ in., eglandular; stipules linear. Racemes 3–5 in., suberect or drooping, many-flowered; pedicels ½ in., slender; bracts minute. Flowers ⅓–⅜ in. diam., yellowish-white. Calyx-tube broadly campanulate; limb patent, obscurely 5-toothed. Ovary villous. Drupe ovoid, subacute, ½ 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 serrulate dotted with minute glands beneath, racemes subcorymbose, 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 ½ in., eglandular; stipules filiform. Racemes axillary, solitary, or the leaves, 8–10-flowered; peduncle very slender; pedicels ⅓–⅜ in., subcorymbosa towards the top of the peduncle. Flowers ⅓ in. diam. Calyx-tube obconic; lobes 5, rounded, cili ate. Petals orbicular, cili ate. Ovary glabrous. Drupe globose; stone thin-walled, quite smooth.

14. **P. Jenkinsi**, Hook. f. & Thoms. in Herb. Ind. Or. (Cerasus); leaves linear-oblong cAudate-acuminate serrate undulate shining eglandular, racemes axillary short cylindrical dense-flowered pubescent, stamens about 50.

Assam, Jenkins; at Choorpura, (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 arching; petiole ½ in., eglandular; stipules linear-lanceolate. Racemes 1⅓–2⅓ 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, erose. Ovary glabrous. Drupe with the stone ⅔ 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 coryumbs, 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. Carpels 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 Prunus in the form of the fruit habit, and deciduous foliage, and from Pygeum in the flower which is altogether that of Pygeum except for the carpels.


Temperate Eastern Himalaya; Sikkim, Lachen River, alt. 8-1000 ft. [Maddenia. Griffith.]

A small tree, 20-30 ft.; bark of branches red brown, shining. Leaves 3-5 in., variable in shape, ovate or obovate-lanceolate cuneate-acuminate, rather membranous, densely woolly or glabrate beneath, base acute rounded or cordate, cilia of the margin often gland-ribbed 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 turbinated; lobes obtuse and petals together 10, the latter minute unequal linear-oblong. 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.


*Mishty 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**, Gaertn.

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 indistinguishable from the calyx-lobes. Stamens 10-50, in one or more series at the orifice of the calyx-tube, filaments slender incurved; anthers small. Carpels 1, basal in the calyx-tube, ovoid or subglobose; style terminal, slender, exerted 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.

Diffrers 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.


A tree. Leaves 4-6 by 1½-3 in.; nerves spreading; petiole ½ in. Racemes almost equalling 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, exerted. Drupes 1 in. transversely, dark-purple.
2. **P. glaberrimum**, Hook. f.; leaves oblong-lanceolate caudate-acuminate quite glabrous, basal glands 0 or obscure, racemes slender and pedicels glabrous. *P. acuminatum*, Herb. Ind. Or. *H. f.* & *T.*

Eastern tropical Himalaya, Sikkim, alt. 3–5000 ft., J. D. H. Khasa Mts., alt. 3–4000 ft., Simmonds, etc. *Chittagong, J. D. H. & T. T.*

A branchy tree, 30–50 ft. at base, 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 ¼ in. Racemes numerous, erect; rachis and pedicels slender. Calyx-tube obovate; limb obliquely 6-lobinate, 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;** Adamallay, Shevarry, Pulney and Tinevelly ranges, Beddome. *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 ¼–½ in. Racemes 2–4 in.; axillary, rachis and peduncle stout; pedicels sometimes ½ in. long. Flowers ¼ in. diam. Calyx-tube obovate or turbinate; limb 5–rarely 4- or 6-lobed, lobes acute. Petals 4–6, oblong, tip rounded, softly tomentose. Stamina about 20. Ovary quite glabrous; style stout. Fruit ½ 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 ½ in. transversely.


**SINGAPORE,** Lobb.

Branches very slender, young ones and pedicels puberulous with appressed hairs. Leaves 3–4 in., base very acute, rather glaucescent beneath; nerves very oblique, midrib with a few silky hairs; petiole ¼–½ in., slender. Racemes ½–¾ in. chiefly on the branches below the leaves, about 10-flowered, pubescent, sometimes almost globose, subsessile; pedicels ½ in. Flowers ½ in. diam. Calyx-tube turbinate, limb very shortly lobed. Stamina about 12; style slender. Ovary perfectly glabrous. Fruit not seen.—Differs from *P. persimile*, 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 ¼ in., slender, glabrous. Racemes ½ in. almost globose, rusty tomentose; pedicels very short, exceeding the oblong bracts. Calyx-tube obovate, glabrous within; lobes oblong, obtuse, villous. Stamina 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. Andersonii**, Hook. f.; quite glabrous, leaves oblong subacut or obtuse crenate-serrate eglundular, racemes very short axillary dense-flowered glabrous, calyx 5-lobed, petals broadly ovate with villous margins.

**Bengal**, summit of Parasnathh. alt. 4000 ft., *T. Andersonii*.
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 ¼ 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, exserted, stigma broad.—Next to *P. Lampango* (Kurz, l.c.). I have a specimen from Helffer 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 oboconic and limb with 6 oblong obtuse lobes.—A Malacea 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-lobed, 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* ¾ in. diam., urceolate; teeth rounded. *Stamens* in several series, filaments not longer than the calyx. *Ovary* hirsute; style stout, exserted.


**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 ¼ 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* ¼ 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 in. Racemes contracted, not ½ in. long, 6-10-fld; 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 'Lacon, T. Lobb,' in Herb. Hook., is probably so ticketed by mistake. Lobb having visited Mt. Ophir no doubt collected it there.


Western Peninsula, Nilomiri Hills, Gardner, Wight. GTATE 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 at 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, lenticellate. 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-toothed, petals 0, stamens about 15, style hairy.

TENasserim, Hefor.

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 arching; petiole ½ in. Racemes solitary or crowded, sessile, ½ in. long, very dense-flowered; pedicels very short. Calyx-limb tomentose 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 **vol. II.**


A small tree; branches 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., st. Racemes 1–1 1/2 in., solitary or fascicled on the old wood; pedicels short; bracts not seen. *Flowers* 1/2 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 1/2 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 MSS. The sinuated margin of the leaf is a remarkable character.

16. **P. arboreum**, 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 axil of fallen leaves.

**Martaban** hills to Tenasserim, alt. 3,400 ft., Kurz.

A tree, young branches and buds rusty-tomentose. Leaves 4–6 in., rigidly chartaceous or almost coriaceous, almost wrinkled above. Racemes 2–3 in., pedicels 1/16 in. *Calyx-teeth* minute. Petals hardly longer, villous. *Ovary* densely rusty villous. *Drupe* almost 1/2 in. transversely, almost didymous, covered with fugacious rusty-brown stiff hairs, soon glabrescent.—I have taken the description from Kurz, having seen no specimens. Miquel divides the *P. arboreum*, Endl. (Gen. Plant. 1250) into two species, *P. pariformum*, Teysm. & Binnend., and *P. latifolium*, Miq. The former with a hirsute and the latter with an almost glabrous ovary—both are Javanese.

**Doubtful Species.**

Maingay's No. 628 (Distrib. Kew) from Malacca not being in flower is undeterminable; it has slender glabrous branchlets, oblong-lanceolate cuneate-acuminate quite glabrous rather membraneous leaves 3–4 in. long, with short slender pedicles, 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-cells often unequal, separated by a broad connective. Carpel 1, sessile; style basi, ascending, stigma capitate; ovules 2, collateral, pendulous. Drupes obliquely ellipsoid or cylindrical, with the remains of the style at its base; epicarp thin; stone coriaceous, smooth. Seed erect, cotyledons amygdaloid, radicle inferior.

1. P. utilis, Boyle Ill. 206, t. 38, f. 1; Brandis For. Flor. 196; Wall. Cat. 8554.

Dry rocky hills on the temperate Himalayas, alt. 4,000 to 9,000 ft., from Hazara to Sikkim ascending to 9,000 ft., and Bhutan; Khasia Mrs., alt. 5,000 to 6,000 ft.

A shrub, 3-5 ft.; branchlets green, soft, pubescent when young; pith sepalate. Leaves 1-5 in., coriaceous, acuminate, entire or serrate. Flowers ½ in. diam., white, usually opening in autumn. Drupes ½-⅔ 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.—Distr. Temperate and cold regions of the N. hemisphere; species 50.


1. S. vestita, Wall. MSS.; lateral leaflets small or 0, terminal very large acutely palmately 3-5-lobed, stipules ½-ornicular, cymes proliferous. S. Kamtschatcica, Wall. Cat. 704 (not of Pallas). S. Kamtschatcica, var. himalensis, Lindl. in Bot. Reg. 1841, t. 4.

Western temperate Himalaya, from Kashmir to Kumaon, alt. 7-12,000 ft.—Distr. 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, ½-1½ 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, ½ in. diam. Calyx small, lobes obtuse. Petals oblong-ornicular. Carpels many, villous, 2-ovule.—Very similar indeed to S. Kamtschatcica, a plant confined to the country whose name it bears, and to Mantchuria, but quite distinct by the stipules.


Western and Central temperate Himalaya; from Sirmore, alt. 10,000 ft., T. Thomson, to Nepal, Wallich.—Distr. 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, petiololes short; leaflets 1-2 in. (1-10 in. in Japan specimens) rather membranous. Flowers dense, white, ½ in. diam. Calyx-tube turbinate, lobes y 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.


Western temperate Himalayas; from Kunawur to Kumon, 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 inflorescence. 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 cylindrical. Flowers white, ½ in. diam. Calyx-tube hemispheric; lobes rounded. Petals orbicular. Carpels 5, glabrous or pubescent; ripe oblong, dehiscing dorsally.


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 ½-3 in., in very open corymbose spreading cymes, pale or deep rose-red, Calyx-tube obonic; 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.

5. S. bella, Sims, Bot. Mag. t. 2426; leaves broadly oblong ovate or ovate-lanceolate doubly inciso-serrate or crenate glaucous and glabrate or pubescent beneath, cymes much branched pubescent, flowers subdioecious, bracteoles equalling the calyx, ripe carpels exposed glabrate. Don Prodr. 227; Kunze in Linnaea, xx. 60. S. callosa and fastigiata, Wall. Cat. 707,708. S. glauca and stellarata, Wall. Mss. S. expansa, Wall. Cat. 702.

Temperate Himalaya from Sirmore alt. 7-10,000 ft., to Sikkim and Bhutan, 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 stout stems, and closely
resembles _S. callosa_, differing chiefly in the apparently more or less discuous flowers.
_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. _Flowers pink, or rarely white. Calyx-lobes acute, tube
villous within. Stamens minute and deformed in the ♀ flowers, long in the ♂.
Ovaries small or absent, those of the ♀ flowers with long styles, of the ♂ short.
Disk of broad incurved scales. _Ripe carpels_ as in _S. callosa._

6. _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. _S. callosa var. macrophylla_, Hook. f. & Thomps. _Herb. Ind. Or._

Eastern temperate Himalaya; Sikkim alt. 6–8000 ft. _J. D. H._; Bhotan, alt.
5800–10,000 ft., Griffith.

Very similar to the _fastigiata_ form of _S. bella_, but more lax in habit, leaves some-
times 7 in., very membranous or coriaceous. _Flowers _½–¾ _in. diam., in very long
spreading panicules, pale coloured. Disk-glands large. Calyx-tube villous within.
Bracteoles filiform, often much produced. _Ripe carpels_ much smaller than in _S. cal-
losa_ and _bella_, clothed densely with spreading hairs.

7. _S. canescens_, Don Prodr. 227; softly tomentose, branches stout
arching, leaves small subsessile obovate or cuneate-ovolate quite entire or ob-
tusely 3–5-toothed at the tip, corymbs small compound, flowers hermaphrodite, ripe

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. _Leaves_ ½–¾ in., coriaceous, acute
or obtuse; nerves very oblique; petiole very short _Corymbs_ very numerous,
1–1½ in. diam. _Flowers_ pale pink or white, ½ in. diam. _Stamens_ not exceeding the
petals. _Disk_ with broad notched glands. _Ripe carpels_ sunk half or whole way in the
turbinate calyx-tube.

8. _S. arcuata_, Hook. f.; glabrate, branches stout arched, leaves small
petioled obovate obtusely 3–8-toothed or -lobed at the rounded top rarely entire
and acute, corymbs small compound puberulous, flowers hermaphrodite, ripe
carpels wholly exserted glabrous shining. _S. canescens_, var. _glabra_, _Herb. Ind.
Or._ H. f. & T.

Sikkim Himalaya, subalpine; Yemutong and Lachoong, alt. 12–14,000 ft.,

A small woody ramous shrub, with very stout horizontal arcing glabrous dark
brown shining deeply grooved branches, flowering branches very short. _Leaves_ ½ in.,
glabrous or nearly so, narrowed into a slender petiole. _Corymbs_ dense-flowered.
_Flowers_ ½ in. diam., red. _Stamens_ not exceeding the petal. _Disk_ with broad notched
glands. _Ripe carpels_ not at all sunk in the turbinate very short calyx-tube.—Closely
allied to _S. canescens_, but more robust and glabrate, with more petioled leaves, larger
red flowers and very different fruit.

9. _S. vaccinifolia_, Don Prodr. 227; leaves small petioled ovate or
elliptic-lanceolate acute or obtuse serrate or crenate glaucous and hoary be-
neath, corymbs much branched tomentose, flowers hermaphrodite, ripe carpels
glabrous. _Lindl. in Bot. Reg._ 1839, Misc. 60; 1840, t. 17. _S. laxiflora_,
_Lindl. in Bot. Reg._ 1839, Misc. 60; _Lindl. & Puxt. Fl. Gard._ ii. 98, fig.
183. _S. rhamnifolia_, _Wall. Cat._ 700.

Western temperate Himalaya; from Murree to Kumaon.
An erect shrub, with strict hoary branches. Leaves ¾-1 in., usually elliptic and acute at both ends, serratures or crenatures small; nerves beneath faint; petiole ½-¾ in., slender. Corymbus dense-flowered; flowers small, ⅛ in. diam. Ripe carpels minute, glabrous, half sunk in the villous calyx-tube.


Western temperate Himalaya; KISHTWAR alt. 6-8000 ft., T. Thomson.

A graceful shrub, with slender branches, and drooping floriferous branchlets, glabrous throughout or with minutely downy inflorescence. Leaves ¾-1 in., very rarely ovate and serrate, usually broadly elliptic, thin and almost membranous, flat; nerves very indistinct on both surfaces. Inflorescence sometimes of many simple corymbbs with long capillary pedicels (sometimes ½ in.) collected into lax broad panicles that terminate drooping lateral branches; in other specimens the corymbbs are branched as in S. bella, &c. Flowers ¾ in. diam. Ripe carpels very small, ⅛ 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 case 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**, Bois. Flor. Orient. ii. 690; a small excessively branched shrub, leaves minute obovate-cuneate entire or 3-5-lobed or -toothed tomentose, corymbbs 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 spinous branchlets. Leaves ½-⅓ in., usually glabrous or puberulous above, and white with dense pubescence beneath, but in some of Stock's Beluchistan specimens nearly glabrous on both surfaces; petiole very short. Flowers ⅛ in. diam., in shortly peduncled tomentose panicles.

**DOUBTFUL SPECIES.**


S. nutans, Royle (argentea, Loudon), is unknown.

S. corymbosa, Poir. Dict. vii. 350; Camb. Monogr. in Ann. Sc. Nat. i. 374; DC. Prodr. ii. 544, brought from India by Sonnerat, 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. corymbosa, Roxb. Fl. Ind. ii. 512. S. chamaedrifolia, L.? Wall. Cat. 701, is S. cantoniensis, Lour., a native of China only (see Bentham. Fl. Hong Kong, 105) and not of the N. of India.

**8. RUBUS**, Linn.

Creeping herbs or erect or sermentose 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
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 hisrate and prickly, leaves orbicular-remiform 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, Wall. Sikkim alt. 6–9000 ft. Bhotan alt. 8300 ft. Khasia Mrs. 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 1–1 in.; broadly ovate, serrate. Flowers 1 in. diam., solitary or in twigs, 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-acuminate doubly serrate, flowers small corymbose long pedicelled, corymbs axillary and in elongated terminal panicles, bracts seaceous glandular, calyx-lobes ovate glabrous with pubescent margins, carpels about 5. **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 Mrs. 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, 1–2 in.; stipules slender, almost seaceous, glandular. Panicles sometimes a foot long; bracts small. Flowers ½ in. diam., in threes or fives; pedicels 1–2 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 acuminate 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 corymbs 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,
pubescent tomentose or glabratre, prickles short stout recurved, leaves oblong-obtuse acute or acuminate sarrate, stipules pectinate, panicles terminal, bracts tomentose pectinate not exceeding the buds, calyx hoary with white down, petals small, carpels 6. 


Assam, Silhet and the Khasia Mts. ascending to 4500 ft. Katchyen hills, Ava, Kurz.—Distr. Yunan.

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 ½-1 in. Flowers ½-1 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. pyriformis 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 sarrate, stipules pectinate, panicles terminal, bracts glabrous pectinately laminar far exceeding the buds, calyx with appressed hairs, tips of lobes long acuminate usually laminar, petals small, carpels 6. R. pyriformis, Ham. in Herb. Wall. not of Smith; Wall. Cat. 725 in part.

Central and Eastern tropical Himalaya; Bhutan alt. 5000 ft., Griffith; Sikkim alt. 2-3000 ft. J. D. H. Assam, Hamilton, Masters, &c.

Very similar to R. hexagonus, 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 laminar curved bracts which are membranous and curving over the young buds give a curiously crinate appearance to the immature panicles; the sepals also have usually longer tips split into setaceous lobes. Fruit as in R. hexagonus.

6. R. assamensis, Focke Batogr. in Abhandl. Naturwiss. Verein, Bremen, iv. 197 (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 white 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 ½ 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 Bijld 1111; eglandular, branches slender and eaves 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. Hasskarlii, Miguel, Flor. Ind. Bat. i. pars, 381. R. acerifolius, Wall. Cat. 744.


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 cuneate-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-oblong, carpels many glabrous. Wall. Cat. 749. R. tiliaceus, Sm. t. c.; Wall. Cat. 745.

Temperate Himalaya from Rajahri, 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, sparingly hairy above, lateral lobes usually very obscure; midrib without prickles; petiole 1-2 in., slender, rarely with a prickle; 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 cuneate-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 pricklely, 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.


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 pinnately pinnatifid. **Flowers** ½–2 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 Birma? in Griffith’s Herb. is more glabrous with more slender pistiloes. **R. Pinlaysonianus**, **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.

11. **R. moluccanus**, **Linn.**; **DC. Prodr.** ii. 566; eglanular, tomentose villous or sublanate, prickles scattered short curved, leaves long-petioled usually deeply cordate broad ovate or orbicular obtusely or acutely 3–7-lobed toothed smooth sebrid or rugose above, beneath clothed with grey or yellow wool or pubescence, panicles axillary and terminal, calyx villous and silky, lobes lanceolate or ovate entire or with pectinate margins, carpels very many.— **Roxb. Fl. Ind. ii.** 518; **Mig. Fl. Ind. Ind. Bat.** i. part 1, 382; **Wall. Cat.** 743; **Kurz For. Flor. Brit. Burm.** i. 437. **R. rugosus**, **Smith in Rees Cyc.** 330. **Rubus 34; Don Prodr.** 234; **Wight et Arn. Prodr.** 399; **Dalz. & Gibbs. Bomb. Flor.** 89; **Thwaites Enum.** 101; **Wight. Is. t.** 225; **Wall. Cat.** 748; **Plant. As.** **Rar.** iii. 10. t. 234 (Hamiltonianus). **R. alocefolius, Poir. Encyc.** vi. 247. **R. micropetalus, macrocarpus, and Fairholmiannus, Gardner in Calc. Journ. Nat. Hist.** viii. 6. **R. cordifolius, Don Prodr.** 233. **R. reflexus, Ker in Bot. Reg.** 461; **Benth. Hong-Kong** **Flor.** 104. **R. Hamiltonianus. Seringe in DC. Prodr.** ii. 566.— **Rumph. Amboin.** v. 88, t. 47, f. 2.

Central and Eastern tropical and temperate Himalaya. **Nepal, Wallach.** **Sikkim**, alt. 3–7000 ft. **Assam**; **Khasia Mts.** alt. 3–5000 ft. **Burma. Eastern Peninsula.** **Western Peninsula** or the Ghats from Bombay Southward. **Ceylon** ascending to 7000 ft.— **Distribution.** Malay Archipelago and Islands.

**Stem** very robust, with wide spreading subscandent 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 nerves; 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 ½–1 in., in rather contracted terminal panicles and axillary capitate clusters; bracts like the stipules, never bearing gland-tipped hairs. **Calyx-lobes** ½–3 in. long, usually tri angular-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 Wallach (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 ¾ in. long. The branches and inflorescence of Malacca 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's Ic. t. 225); b. leaves smaller, narrower more acute, stipules and bracts cut into filiform segments, petals small, fruit dark red (R. micropetalus, Gard.); (I should refer this to glomeratus, Bl.); c. tomentose, pale, leaves very rugose and coriaceous, stipules and bracts less deeply cut, panicle dense, calyx-lobes ovate-lanceolate toothed, fruit dark red (R. Fairholmanus, Gard.); d. prickles 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, prickles few minute or 0, leaves cordate-ornicular subacute 5–7-lobed reticulated on both surfaces finely downy beneath, panicles entire or laciniate 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.


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 petiolar and leaves densely clothed with long spreading flexuous hairs, prickles 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.

Birma; in the Patkaye 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. Panicles (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 persistent, flowers large solitary clustered or in short panicles, bracts leafy persistent, petals orbicular small, carpels very numerous hairy.—Rubus No. 24, Hook. f. & Thomson. Herb. Ind. Or.

Eastern temperate Himalaya; Sikkim, alt. 7–10,000 ft., Dr. Tretuler.
A large leafy erect bush, with often glandular bristles mixed with the soft felxuous 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 ⅓–1 in. diam., shortly pedicelled; bracts sometimes reduced to narrow segments. Calyx-tube hemispheric, villous and often bristly; lobes large, often leafy and laciniate, or pectinately pinnatifid. Petals nearly orbicular, much smaller than the calyx, white or pink. Staminodia 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, lobes 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 ⅓ in., broadly ovate, obtuse, toothed or quite entire. Flowers ⅓ in. diam., white, peduncle ⅓–1 in. slender. Calyx-tube glabrous; lobes acuminate, tips slender. Petals ovate, acute. Carpels about 5, not seen ripe.—Very near to R. triflorus, Richards. *S. japonica* of Japan; see Maximovics Diagnoses, Dec. x. 375.


Temperate Himalayas; from Garwhal, alt. 7–8000 ft., to Sikkim, alt. 8–10,000 ft.—Distr. 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 ⅓–1 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 ⅓ in. pubescent in the outer margins and within, suberect in fruit. Petals white, orbicular, shorter than the calyx. Staminodia 1-seriate. Fruit globose; drupes 12–15, large, glabrous, stone rugose.

18. **R. Thomsoni**, Focke Botogr. 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 unarmcd, lobes acute or cajdate, carpels many pubescent.

**Sikkim Himalaya, alt. 8-11,000 ft., J. D. H., &c.**

A slender trailing species, nearly glabrous or with pubescent branches pedicules 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 3-3/2 in. diam., peduncles and pedicels short. Calyx-tube nearly glabrous; lobes pubescent, sometimes produced and leavy, 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 Bijd. 1108; eglandular, prickles 0- or few small scattered, leaflets 3 or 5 elliptic oblong or lanceolate ciliate-serrate cajdate-acuminate, beneath with many straight nerves and dense silky silvery tomentum, calyx-lobes ovate acuminate silky. Miguel Fl. Ind. Bat. i. part i. 378. R. pulcherrimus, Hook. f. 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 3-2 1/2 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 3-1 in., membranous, ovate-oblong, obtuse, entire, glabrate. Flowers in axillary short heads and terminal elongate silvery panicles, 3-1 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-acuminate 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 Punkabarri in a hot region, but I suspect some error.

**Series III. Leaves pinnately 3-foliolate.**

* Stems slender creeping or prostrate.

21. **R. saxatilis, Linn.; Boies. Flor. Orient. ii. 691; eglandular, glabrous or slightly pubescent, prickles few slender straight, leaflets 3 rhombic-ovate somewhat lobed acutely doubly-toothed, calyx unarmcd, lobes ovate-lanceolate acutc longer than the narrow petals, carpels few glabrous.

Western temperate Himalayas in the Tibetan region from KASHER to KUMAON, alt. 10-11,000 ft. **Western Tibet, Dras, alt. 10,000 ft.—Distrib. Caucasian and westward to the Atlantic, Siberia, Dahuria.**
Stems annual from a stout woody rhizome, short, erect. Leaflets 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 $\frac{1}{2}$ 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 sparrow quill, 1–2 ft. long from a woody rootstock; hairs rather stiff, red-brown when dry. Leaflets 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 $\frac{3}{4}$–1 in. Fruit of few scarlet drupes; stone smooth.

Var. \textit{nepalensis}; more slender, smaller in all its parts, leaflets $\frac{1}{3}$–$\frac{1}{2}$ in., flowers $\frac{1}{4}$–$\frac{2}{3}$ in. diam., calyx-lobes acuminate, not quite entire.—East Nepal, Tambur River, alt. 8000 ft. \textit{J. D. H.}

23. \textit{R. Fockeanus}, \textit{Kurz in Journ. As. Soc. Beng.} 1875, ii. 200; 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 Phullahong and Singalelah, alt. 10–14,000 ft. \textit{J. D. H.}, C. B. Clarke.

Stems wholly procumbent, widely creeping, slender, very sparingly pubescent. Leaflets $\frac{3}{4}$–1 in. diam., not shining above, and with very few hairs on the nerves beneath, lateral petiolulate; petiole 1 in.; stipules $\frac{1}{4}$ in., oblong, obtuse, toothed or quite entire. Flowers on very short lateral shoots; peduncle exceeding the petiole. Calyx $\frac{1}{4}$ in. across the lobes, tube almost glabrous, lobes acuminate. 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 \textit{R. nutans}.


Eastern temperate Himalaya; Sikkim, alt. 7–9000 ft.

A low shrub, almost hispid with gland-tipped hairs, prickles slender. Leaflets petiolulate, often subequal, 2–5 in., bright green, base 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-
lions. Fruit globose, \( \frac{3}{4} \) 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, surmounted 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 laterally 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, petals small, obovate pink, carpels many villous. R. gracilis, Roxb. Cat. Hort. Beng. 39; Fl. Ind. ii. 519.

Temperate Himalaya, from Kashmir to Bhotan, 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 purplish, 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 cordate, usually membranous and glabrous, above sometimes (*R. concolor*) green and glabrous beneath also; petiole slender, 1–2 in., with usually 1–2 prickles. *Flowers* \( \frac{1}{4} \) in. in diam., usually on slender unarmed pedicels, lower axillary often solitary, upper corymbose arranged on a long peduncle, nodding; bracts filiform. *Calyx-tube* short, flat; lobes ovate-lanceolate, quite entire, \( \frac{3}{4} \)–\( \frac{3}{2} \) in., tomentose on both surfaces, spreading or reflexed in fruit. *Petals* much smaller than the calyx-lobes. *Stamens* 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, corymbs of 10–12 shortly pedicelled flowers \( \frac{3}{4} \) in. diam.—Nepal and all along the Himalayas.

**Var. pedunculosus**; more robust, leaflets 3–5 in. broader bases more rounded, flowers solitary or in pairs on slender pedicels \( \frac{3}{4} \) 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. Muirre, 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 *coryllifolius* might be,

**Var. hypargyrus**; leaflets \( \frac{1}{4} \)–1 in., sometimes 5, doubly serrate-toothed membranous hoary beneath all over or on the nerves only, or quite glabrous. *R. hypargyrus*, Edgew. in Trans. Linn. Soc. xx. 45. *R. concolor*, Royle MSS. Approaches *R. lasiocarpus*.

**Var. Aitchisoni**; slender, finely tomentose, leaflets broad membranous with very large cutinates, fruit \( \frac{3}{4} \) in. diam. of very numerous orange fleshy almost glabrous drupes. Kashmir common at 7000 ft., Aitchison “fruit edible.”

**Var. microcarpa**; branches and petiole (6 in.) nearly glabrous, leaflets 4–6 in. broad membranous lobulate and crenate, flowers \( \frac{3}{4} \) 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 1–1 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 Kiahengunga 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 one as niveus for another that is in no way distinctive of the species.


Temperate Himalaya; from Hazara, alt. 4–6000 ft., Stewart, and Kishtwar, alt. 5–9000 ft. to Sikkim and Bhutan, alt. 6–9000 ft.

Stems trailing, stout, red-brown, obtusely angled, shining; prickles much flattened, ½–1 in. Leaflets 1½–2 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 ½ in. diam.; peduncles ½–⅓ in., pubescent, rarely 2–3-flowered. Calyx silky outside, tomentose within; lobes cadate, erect in fruit. Petals orbicular-ovobate, 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 cadate, 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 ½ in. Peduncles ½–1 in., pubescent glandular and bristly as is the calyx. Flowers ½ 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.


Temperate and subtropical Himalaya, from Sirmur, alt. 2–7000 ft. to Sikkim, alt. 4–7000 ft. and Bhutan. **Khasia Mts.**, alt. 4–5000 ft. **Birma.** Western Ghats from Canara southwards. **Ceylon**, central province, alt. 4–7000 ft.—**Distr.** Yunan, A tall suberect bush; branches stout, spreading and recurved, obscurely 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 ½–⅓ in. diam. Calyx densely pubescent and bristly or not; lobes ovate, acute acuminate or obtuse and mucronate, erect in fruit. Petals obvate, larger than the calyx, white. 'Stamens 1-seriate. Fruit globose, exposed; drupes on a cylindric hairy receptacle, many, golden yellow, succulent; stone rugose.


Western temperate Himalaya, alt. 8–7000 ft. from Murrer to Jamu.—*Distrib.* Afghanistan and westward to the Atlantic.


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 2–¾ 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, ¾ in. diam., solitary in the lower axile, 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 I 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-oval acuminate lobulate and acutely doubly toothed, faintly pubescent beneath, stipules linear-lanceolate acuminate, corymb 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* ⅔–Ⅳ in., green, persistent, quite entire. *Peduncles* often 2–¾ in., stiff, erect, the terminal continuing the branch and bearing a branched corymb; pedicels often long and slender; bracts filiform. *Flowers* erect, ⅔–Ⅳ 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-obovate, white, about equaling the limb of the calyx. *Carpels* on a columnar pubescent receptacle.


**RUBUS.**] **LI. ROSACEAE.** (J. D. Hooker.) 337
prickles, leaflets 3 (rarely 5) broad-ovate coarsely acutely doubly crenate white beneath, cymes axillary few-flowered, flowers drooping, carpels pubescent.

Western temperate Himalaya, Kunawur, in the Tibetan region, alt. 11—14,000 ft., T. Thomson.—Distribution. N. China.

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 {\textfrac{1}{3}} in. diam., solitary in the lower axile, 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. —Kishhtwar, 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 Abhandl. 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. lavigatus, 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—6 in., brown when dry, coriaceous, serratures simple, acute, petioles 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, {\textfrac{1}{3}} in. diam., in fascicles or short corymb; pedicels slender. Calyx densely hoary; tube very short; lobes oblong, obtuse or apiculate, erect in fruit. Petals equalling the sepals, pink or white, ovate, 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. foliolosus) 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 Sikkim, alt. 7—9000 ft., to Sikkim, alt. 8000 ft., and Bhutan.

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—1{\textfrac{1}{2}} in., rarely more, acutely toothed or serrate, pubescent or hairy above, densely tomentose beneath; petiole slender, 1—2 in., prickly, pubescent; stipules {\textfrac{1}{2}} in. Peduncles 1—1{\textfrac{1}{2}} in., unarmed or prickly, usually glabrous; bracts subulate. Flowers {\textfrac{1}{4}}—{\textfrac{3}{4}} 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, {\textfrac{1}{2}} 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 1600 ft. in *Kumaon*); to *Sikkim*, alt. 4–10,000 ft. *Burma*. Western *Peninsula* and 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 doubtfully 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 ¼ in., linear-subulate. *Corymb* axillary and terminal, simple or subpanicked, 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 caduate, spreading or suberect in fruit; *laciniate* and much lengthened in *Moulmayne* specimens. *Petals* deep pink, orbicular or broadly obovate, rarely exceeding the calyx. *Fruit* ½–1 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, corymb many-flowered, sepals lanceolate. *Kirschwar, Thomson*.


**Var. roseifolius**, quite glabrous except the branches of the corymb and margins of sepals, leaflets 1–1½ in., inciso-serrate membranous, dark brown when dry, flowers small in axillary corymb, sepals with filiform points.—*Sikkim*, alt. 9–10,000 ft., *J. D. H.*

**Var. subglaber**, *Thwaites Enum.* 101; leaflets 1–1½ 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. roseoflorus to R. roseofolius, 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 petiolar 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, coryms axillary and terminal, calyx prickly, petals large red, carpels many villous. **R. lasiocarpus**, Sm., *Var.? Miq. Pl. Exot.** Hohenack. No. 1152.

**Nelkini Mrs., Adam, Gardner, &c. Pulney Mrs., 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, coryms, petiolar, &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 petiolas are nearly glabrous, and in all the branches are beautifully pruinose. The sepals are caudate 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 petiolar 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 coryms, 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; Ghamra 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 ½ 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 ½ 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. biflorus* 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 petiolas 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 Moffong, alt. 5500 ft., Griffith; **J. D. H. & T. T.** Upper Kals 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 1½–2½ 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, ½ in. diam.; bracts setaceous, very tomentose. Calyx densely tomentose and bristly; 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, petals and single-flowered peduncles densely clothed with hooked prickles, calyx-tube hemispheric densely clothed with straight prickles, petals purple, carpels villous.

**Brotan. et Pangsa.** 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 ½–1 in., equally clothed with long soft flexuous hairs on both surfaces, acute or acuminate. Peduncle clothed and armed like the petioles, ½ in., always 1-flowered. Calyx-tube ½ 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, rugously 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 Galmuz at 8600 ft., Atchison. **Khagan.** 100 miles N.W. of Kashmir, alt. 8000 ft., Stewart.—**Distrib.** Japan (a variety).

Branches long, lax, cylindric, trailing, green, glabrous except the pubescent tips. Leaves 2–4 in., petiole very slender, sometimes glandular, unarumed or with faintly hooked prickles; leaflets 1–1½ 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 ½ in. long, pubescent on both surfaces, spreading in fruit. Petals obovate-spatulate, 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. rosæfolius**, Smith Ic. ined. 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. Birm.** i. 439; **Hook. Ic. Fl.** t. 349. R. pinnatus, Willd. 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 Mrs., alt. 3–4000 ft. Ava and Martaban Hills, Kurs.—Distr. 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 crinitate 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 3/4–1 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-ovata. 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. xvii.), and perhaps also R. frazini-folius, Poir.; it has larger leaves and smaller calyx and fruit than rovonfollis. R. Javanicus, Céleticus and others are in various respects intermediate, and all may prove forms of one common Malayan plant.

Doubtful species.

R. hirsiscifolius, Foche Batogr. in Abhandl. Naturwiss. Verein, Bremen. iv. 197; unarm'd, 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. palnatus, Th., flowers like those of R. moluccanus. Nipal, Wallis in Herb. Copenhagen (Foche).—I have no idea what this species can be; I find nothing like it in Herb. Wallisch.


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-braclate; lobes 5, imbricate or valvate. Petals 5. Stamen 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.—Distr. Temp. and cold regions of N. and S. hemispheres; species about 50.

Sect. I. Geum proper. Style in fruit hooked at the tip or below it.

1. G. urbanum, Linn. ; Boiss. Flor. Orient. ii. 696; erect, sparingly softly hairy, lower leaves pinnatisect, leaflets 9–11 with the alternate smaller, upper sessile, flowers erect, head of hispid achenes sessile. G. Roylei, Wall. Cat. 713.

Western temperate Himalaya, alt. 6–11,000 ft., from Murree to Kumaon.—Distr. 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** $\frac{1}{2}$–1 in. diam.; peduncle slender. **Petals** yellow, narrowly obovate, equalling or exceeding the calyx-lobes, which are scuminate and reflexed in fruit. **Achenes** spreading and recurved, hispid with long hairs; $\frac{1}{2}$ 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.**


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 $\frac{1}{2}$–1 in., close and imbricating or scattered, uniform and 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** $\frac{1}{2}$–1$\frac{1}{2}$ in. diam. **Calyx-lobes** droptoid-ovate, acute, silky, spreading in fruit. **Petals** orbicular, yellow, much exceeding the calyx. **Carps** sessile on the base of the calyx, clothed with long silky hairs. **Achenes** elliptic-said, acute at both ends, hairy; style $\frac{1}{2}$ in., slender.


10. **Fragaria**, Linn. Strawberry.

Perennial scapigerous herbs, with creeping stolons. **Leaves** digitately 3–rarely 5-foliolate 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. **Carps** many, on a convex receptacle; styles ventral, persistent; **ovule** 1, ascending. **Achenes** many, name only, in a surface of a large fleshy receptacle.—**Distribs.** 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. Nilghiri Mts. Penang (Roxburgh)—Distrib.** Afghanistan, Mountains of the Malay Islands, Japan, Corea, and Formoss.

More or less silky hairy. **Rootstock** stout, with many long slender prostrate stems. **Leaves** distant; leaflets rarely 5, 1–1$\frac{1}{2}$ in., petiolulate or sessile, membranous, simply

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or doubly crenate or toothed or serrate, base cuneate entire, nerves parallel; petiole 1–5 in., very slender; stipules leafy, toothed. **Peduncles** very slender, squalling 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** obvate, 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 *P. 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. ubiocola; slender, silvery, nearly glabrous, runners filiform, hairs on petioles and few flowered peduncles appressed, calyx-lobes narrow spreading in fruit. *F. ubiocola*, Linn. in Wall. Cat. 1238.

Var. collina, slender or stout runners with spreading hairs, hairs on pedioles 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.—Distra. *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 peduncles with spreading hairs, and the peduncles with spreading or appressed ones; Ledebour (Fl. Ross.) describes the hairs of its peduncles as appressed, and Dcneisse (Jardin 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 pediole 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 *F. vesca* as var. ubiocola. 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. ubiocola, are marked *F. vesca* without a doubt by M. Gay. This slender silvery form occurs throughout the temperate Himalayas; it has often small accessory pinnales 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 recognisable 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. Achenes many, on a dry receptacle.—Distr. 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 Ranunculi do. 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 trawl-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 imbricated, 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.

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 Kumaon, alt. 12,000 ft. Strach. & Winterb. (with Potentilla 26), and the Tibetan region of Sikkim, alt. 16,000 ft., *J. D. H.*

A much smaller plant than *P. Sibbaldi* in all its parts, and always 4-merous. Leaflets 1/4-1/2 in. Flowers 1/4 in. diam. Petals narrowly obvolute, *Stamens 4, Achenes 10-12.*


Western Tibet, alt. 14-18,000 ft., *Falconer, Thomson,* and Tibetan region of Sikkim, alt. 16-16,000 ft., *J. D. H.*—Distrib. Altai Mts.


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, *Kumaon, 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 cauline; leaflets 1/4-1/2 in., sessile, membranous, base cuneate entire; *petiole* 1/4-1/2 in.; stipules small, broad, membranous, toothed. *Flowers* 1/4 in. diam.; pedicels 1/4-1/2 in. *Calyx* hairy, lobes triangular-ovate; bracteoles linear-oblong. *Petals* very small, oblong, yellow? Sta-
**Potentilla.**]  
LI. ROSACEÆ. (J. D. Hooker.)  


6. *P. 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 sheathe, and bearing short lateral branches with tufts of leaves and flowers. Leaves $\frac{1}{2}$-3 in. long, hairy; leaflets 5, sessile, $\frac{1}{2}$ in., obovate-cuneate, 2-3-fid at the apex, green above, paler beneath. *Flowers* $\frac{1}{2}$ in. diam., solitary or twin from the axils of the leaves, peduncle naked. *Calyx* hairy, lobes triangular-ovate; bracteoles linear. Petals longer than the calyx, narrowly obvate, pale purple. Disk dark purple. *Stamens* 5. Achenes ovoid, smooth.

***Leaves pinnate.***


Subalpine Himalaya from KASHMIR, alt, 8-10,000 ft., to SIKKIM, alt. 12-16,000 ft., J. D. H., C. B. Clark.

Rootstock stout. Stems many, 6-12 in., flexuose, branched, pubescent. *Lower leaves* 2-4 in.; leaflets 5-9, very unequal, $\frac{1}{4}$-1 in., orbicular or obovate, lateral smaller, lower smallest, green and glabrous above, snow-white beneath; petiole very slender; stipules sometimes $\frac{3}{4}$ in., loose, sheathing, brown, acute, adnate for half their length to the petiole. *Flowers* $\frac{1}{2}$ in. diam., on slender peduncles 1-2 in. *Calyx* white-tomentose, lobes triangular; bracteoles linear-oblong. Petals 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.—DISTRIB. 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, $\frac{1}{2}$-1$\frac{1}{2}$ in.; leaflets $\frac{1}{4}$-1 in., coriaceous; petiole slender; stipules large, membranous, obtuse. *Flowers* usually solitary, $\frac{1}{2}$-1$\frac{1}{2}$ in. diam.; peduncle rarely 1 in., silky; bracteoles entire or 2-fid. *Calyx*-lobes ovate or lanceolate. Petals broadly obvolute. *Stamens* many. Achenes numerous, minute, with long hairs, and sunk in the long hairs of the receptacle.

**Var. glabrata**: very short, glabrous, leaflets lanceolate. Sikkim, alt. 15,000 ft.  
**Var. ochreraea**: Leh. slender, very silky, almost white, leaflets much-reduced linear-lanceolate with revolute margin, flowers smaller. *P. ochreraea*, Lindl. in Wall.
Potentilla.

Cat. 1028; Lehms. Revis. Potentill. 17. Western Tibet, from N. of Kumaon to Ladak, alt. 13–17,000 ft.


Var. inglisii; very dwarf, most densely tufted, leaflets ¼ in. linear-lanceolate, flowers often peduncled, peduncle bracteate. P. Inglisi, Royle Ill. 207, t. 41; Lehms. Revis. Potentill. 18. Kumaon and West Tibet, alt. 14–15,000 ft.—Very near P. bispora, Wild. of the Altai and American Polar region, which has obcordate petals.

Var. armerioides; dwarf, forming dense hard tufts or cushions, branches with the densely crowded spreading leaves ¼ 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.—Distrib. Altai and Thian Schan Mts.

Stems 1–3 ft. woody and as thick as the finger below. Leaves 4–6 in.; leaflets 1–1½ in., subopposite, subequal, petiolate, coriaceous, white or green beneath, base rounded; petiole stout; stipules membranous, caducous. 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-foliate.


Temperate and Alpines Himalaya; from Kashmir, alt. 10–14,000 ft., to Sikkim, alt. 9–15,000 ft.

Rootstock stout or slender. Stems 1–6 in. Leaflets ¼–½ in., sometimes as broad as long, sometimes glabrate and glaucescent beneath; petiole ¼–1 in.; stipules variable. Flowers ¼–½ in. diam.; peduncle ¼–1 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.—Foliate of P. Siberica.

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. Lehms. 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;
leaves 1½-1½ in., thin, bright green on both surfaces, 3-multifid; petiole ½-3 in.; stipules silky, acute. Flowers 1-1½ in. diam.; peduncle ½-3 in., naked. Calyx glabrous; lobes ovate, acute; bracteoles broadly elliptic, sometimes exceeding the calyx-lobes. Petals orbicular-oblanceolate, yellow. Achenes minute, clothed with very long fine 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 18. P. leuconota.)

12. P. Mooniana, Wight Jo. t. 283; hirsute or villous, leaflets very many pair elliptic obtuse serratate paler beneath, the smaller orbicular or cuneate, flowers panicked or corymbose, bracteoles broad toothed, achenes quite smooth, style very short ventral. Lehm. Revis. Potentill. 54. R. polyphylla and barbatata, Wall. Cat. 1030, 1026; Lehm. t. c. 53; Monogr. Suppl. 1, t. 5. P. sordida, Klotzsch. in Reis. Fr. Wald. Bot. t. 9.

Temperate Himalaya; from Kumaoon, alt. 11,500 ft. to Sikkim, alt. 10-12,000 ft. Khasia Mrs., 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, ½-1½ in., smaller ½-1½ 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 ½-3 in. diam. Calyx villous, lobes ovate, acute; bracts larger or smaller than the lobes, ovate or cuneate, usually 3-toothed or lobed. Petals obovate-oblanceolate. 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 Mrs., 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 ½-1½ 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 superseded 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, scarce 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, Pitti, &c., alt. 12–16,000 ft., Thomson; Balti prov. of Kashmir, alt. 7700 ft., C. B. Clarke.—Distr. Kashmir, 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 1–2 in., sessile, smaller ones often minute lanceolate and entire; stipules membranous. Flowers ¼–1 in. diam.; scape 1–5 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 10. P. leuconota).

15. P. leschenaultiana, Ser. in DC. Prodr. ii. 584; robust, villous, hairs long spreading soft and silky, leaflets 5–7 obvate or broadly elliptic obtuse coarsely toothed white beneath, flowers corymbose, petals obsolete, achenes on an elevated receptacle wrinkled, style subterminal. Wight in t. 990; Wight & Arn. Prodr. 301; Lehm. Monogr. Potentill. Suppl. 1, t. 3; Revis. 41. P. Grahamiana, Wight Cat.

Temperate Western Himalayas, from Kashmir to Kumaon. Nilgiri Hills abundant.

Rootstock short, stout. Leaves 1–10 in.; leaflets usually 5, sometimes 9 or even 11, 3–1 in., membranous or rather coriaceous, teeth acute or obtuse; petals slender; stipules, lower membranes entire, upper often leafy and toothed. Flowering stems erect or ascending, 2–18 in., usually corymbose branched above, the corymbs lax and spreading or close. Flowers subsessile or long-pedicelled, ¼–½ 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 obsolete or more or less obuncinate. 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. bannalensis; 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. bannalensis, Camb. in Jacq. Voy. Bot. 52, t. 64; Lehm. Revis. Potentill. 41.—Kumaon to Kashimar, alt. 6–12,000 ft.


Temperate Himalayas, from Waziristan, Stewart, to Kumaon and Bhutan.—Distr. 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. *bannenhalensis*, 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, *Wallach*.—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 Kamtchatka.

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 divericate 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 ½–1 in., approximate, sessile, rigidly coriaceous, toothed ½ 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 flat, spreading, dichotomously branched, with sessile leaves; pedicel stout, ½–1 in. **Petals** ovate, 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 pinnaulifid 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* 16, *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 ½–1 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** ½–1 in. diam.; pedicel ½–2 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 prostrate flowering stems and pointed tips to the calyx-lobes.

**Var. 1**; very slender, flowers ½–¾ in. on slender long pedicels, petals small.—Sikkim, alt. 7–9000 ft.

**Var. 2**; robust, sometimes ¾–4 in. high, flowers ½–1 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., J. D. H.; C. B. Clarke.

Rootstock very long and stout, inclined. Leaves 2-18 in., linear- or ovate-oblong in outline, 1-2 in. diam. across the broadest part; leaflets usually close and often imbricate, 1\(\frac{1}{2}\)-1\(\frac{3}{4}\) 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 1\(\frac{1}{2}\) in. diam.; pedicel along with flowering. Calyx silky, lobes triangular acute; bracteoles various, usually toothed. Petals orbicular, yellow. Stamens 20-30. Achenes few, \(\frac{1}{2}\) 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 \(\frac{1}{2}\) in. broadly obl. long membranous less closely serrate softly hairy on both surfaces.—Kumaon at Kalari, alt 13,000 ft., Strach. & Winterb. I have but one specimen, and though I find no approach to pubescence on it, judging from the variation of *P. splendens*, Moenia, 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.


Alpine Himalaya; Garwhal, 10,000 ft., Madden; Nipal, Wallich; Sikkim, alt. 10-16,000 ft., J. D. H.—DISTRICT 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, \(\frac{1}{2}-\frac{3}{4}\) 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 infructescence. Flowers \(\frac{1}{2}\) in. diam., crowded the pedicels along stiffer forming and forming an imperfect umbel as the fruit advances. Calyx silky, lobes acute; bracteoles linear-lanceolate, entire. Petals obovate, retus 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 or rounded pinnately 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 \(\frac{3}{4}\) in. Leaflets opposite and alternate, uniform, \(\frac{1}{2}-\frac{3}{4}\) 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 undivided leaf and bud above the middle, rarely 2-3-flowered. Flowers \(\frac{1}{2}-\frac{3}{4}\) in. diam. Calyx-lobes acute or obtuse; bracteoles oblong. Petals orbicular or obovate, yellow. Stamens 30-40. Achenes in a globosa head on a villous receptacle.

Var. a. microphylla proper; densely tufted, rootstock stout woody, leaves 1 in., petiole filiform, leaflets \(\frac{3}{4}\) in. 3-5-fd pointing forwards and upwards. P. microphylla, *Wall.* and *γ, depressa*, *Wall.*; *Lehm. Revis. Potentilla*, 30; *Monog. Suppl.* t. 2, f. 2.

Var. b. glabriniucaula, *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. 5. lattifolia**, 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, Royte 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.

**Var. commutata**; leaves 3–4 in., leaflets ½ in. separate flat broadly oblong pinnatifid to the middle, lobes slightly falcate glabrous above sparingly silky beneath, scapes shorter than the leaves, calyx-lobes and bracteoles obtuse. P. commutata, Leh. Fl. Pugin. iii. 16; Revis. Potentill. 65.—Kumaon, Wall. Herb.; Barger Kang Pass, Str. & Winterb. The most developed form, approaching in size and habit P. peduncularis, var. obscura, but widely differing in the fruit.


Western Tibet, alt. 10–14,000 ft. and Tibetan border of Lahul, Kumaon, and Sikkim, alt. 13–17,000 ft.—Distribute, Soongaria, Altai Mts., Mongolia, Caucasus, Taurus.

Rootstock long, slender, branched, tortuous. Stems 4–8 in., suberect or diffuse. Leaves ½–2 in.; leaflets ½–3 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 ½ in. diam.; peduncles ½–1 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.

**23. P. coriandrifolia**, Don Prodr. 232; sparsely hairy or glabrate, rootstock very thick, leaflets 6–∞ pair broadly ovate deeply cut into spreading linear or subulate hair-pointed lobes, flowering stems ascending and prostrate, flowers subumbellately corymbose, petals obcordate, achenes nearly glabrous, style slender terminal. P. meifolia, Wall. Cat. 1011; Leh. Revis. Potentill. 29; Monog. Suppl. i. t. 1.

Central and Eastern Alpine Himalaya; Nipal, Wallach; Sikkim, Jongri, alt. 13,000 ft., C. B. Clarke. Rootstock as thick as the thumb, inclined. Leaves excessively numerous, spreading, 2–4 in.; leaflets ½–3 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, declinate and then ascending, with appressed hairs and a few much reduced leaves. Flowers ½ 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-foliate glabrous above, leaflets linear-oblong or obovate pinnatifid nearly to the base, segments linear or lanceolate ascending, mar-VOL. II. A A

KASHMIR and WESTERN TIBET, alt. 10–16,000 ft.; Niti Pass, KUMAON, alt. 16,300 ft., Str. & Wtn.—Distr. Afghanistan to the Caucasus. Northern and Central 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, suberect or prostrate or ascending stems. *Leaves* \( \frac{1}{2} - 2 \) in. diam., normally with 5 subdigitate lobes, but often with lobes more pinnately dispered on the slender petiole which is sometimes 4 in. long; divisions of pinnules \( \frac{1}{6} - \frac{1}{2} \) in. broad. *Flowers* \( \frac{1}{2} - \frac{1}{2} \) 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-obovate, retuse. *Achenes* 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. verticillaris*, Step., referred here by Ledebour, is according to our specimens partly *P. multifida* and partly *sericea*.

*Var. glabrata*; dwarf, rootstock stout, stem prostrate, leaves dense nearly gla- brous, flowers small.


*Var. Saudensiana*; very small, leaves palmately 3–5-foliolate, leaflets \( \frac{1}{6} - \frac{1}{2} \) in. deeply incised tomentose or silky beneath. *P. Saudensiana*, Royle Ill. 207, t. 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. niesia*, L. and *var. hololeuca* of *P. sericea* may be referable here. Dwarf forms of these 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.—Distr. 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. *Achenes* quite smooth.—I can find no character whereby to separate *P. soongarica* from the common Tibetan form of *ser- cea* and it is difficult to retain *hololeuca* and *polychista* as distinct forms, to which may be added certain forms of *P. pesagnuica*, L.


*Var. hololeuca*, Bois.; Fl. Orient. ii. 710 (sp.); dwarf, leaflets 3–5, ovate pin- natifid 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,
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-foiolate, or upper 3-foiolate. (See also states of 24. P. multifida, 25. sericea, and 37. nivea).


Western Himalaya; in the dry region of KASHMIR and KISHTWAR, alt. 7–9000 ft., Thomson, C. B. Clarke.—DISTRIB. SONGARIA.

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.; cauleine leaves short-petioled or sessile, 3-foiolate; stipules ¼–½ in. Flowers ½–½ in. diam., sunk amongst the uppermost leaves; peduncle elongating in fruit, strict and stout. Calyx large, ½ in. long; lobes lanceolate, acute; bracteoles entire or 3-fid. Petals orbicular-obovate, dark yellow, not much exceeding the calyx. Achenes very numerous, on a globose villous receptacle. P. Kotschyaniana; Fenzl, of Cilicia, Æc., seems to me to be this plant.


Western temperate Himalaya, alt. 5–9000 ft., from MURRES to KUMAOHN.

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; cauleine stipules 3–1 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-foiolate, 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 1–1½ in., sessile, the lateral much shorter and broader, all cut ¼ way down into subacute lobes or serratures, paler and almost silvery beneath; petiole 1–2 in.; stipules lanceolate, acute. Inflorescence 6 in. diam., repeatedly forked and more corymbose than pinnate, 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. napa-
lensis; 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 cymose 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.

29. **P. argentea**, *Linn.; Boiss. Fl. Orient.* ii. 714; hoary with appressed white tomentum, stems leafy, leaflets oblanceolate pinnatifidly cut into broad subacute teeth, base entire cuneate, flowers very numerous subcorymbose, pedicels slender, petals yellow, achenes minute smooth, style subterminal.

**Kashmir**, *Jacquemont*; *Pir Punjal*, *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-tri-chotomously branched, leafy. **Flowers** ½ in. diam.; pedicels ¼-1½ in. **Calyx** densely tomentose; lobes acute; bracteoles entire. **Petal** rather exceeding the calyx, obovate. **Achenes** on a villous elevated receptacle.

30. **P. reptans**, *Linn.; Boiss. Fl. Orient.* ii. 723; glabrous, sparsely hairy, stolons long slender rooting, leaflets 5 obovate or oblanceolate crenate-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, sometimes petiolar, sometimes petiolulately; petiole 1-6 in., slender; stipules small, oblong, entire. **Peduncle** 1-4 in., erect. **Flowers** ½-1½ 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.


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-few-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. curvissita*, but far more robust, with 3-5 much broader leaflets, that have rounded 6-7-toothed tips.

††† **Leaves** digitately 3-foliolate (see also 30. *P. reptans*, var. *? trifoliolata*, states of 24. *P. sericea* and 23. *multifida*).

32. **P. argyrophylla**, *Wall. Cat. 1020*; tall, leafy, clothed with white silky hairs rarely with opaque tomentum, leaflets 3 elliptic-ovate-oblong orbicular 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 petiolate, green, glabrous or finely silky above, dirty white beneath; nerves not very prominent, teeth acute; petioles 3-6 in.; cauline stipules ovate-oblong, acute. Flowers 1/2-1 in. diam.; pedicels sometimes 2 in., and very slender. Calyx silky, lobes acuminate; bracteoles allipitic-oblong, obtuse acute or acuminate. Petals obcordate-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 Potentilla argyrophylla and Potentilla rosmoracea, 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.


Western temperate Himalaya; from Kashmir to Kunawur and in Western Tibet, alt. 12-17,000 ft.—Distribution. N. Asia from the Caucasus to Dahuria.

Usually covered with soft spreading hairs, sometimes glandular, rarely somewhat silky. Rootstock rarely large. Leaflets 1/3-1/2 in. long, sessile or petiolate, usually entire for 1/2 or 3/4 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 1-1 1/2, rarely 2 in.; stipules of cauline leaves 1/2-3/4 in. long, hoary. Flowers 1/4-1 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 glabrous. 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 Potentilla grandiflora and Siberian Potentilla fragiformis, Wild. (exclusive of the Japanese plant so called by A. Gay).


Kashmir, alt. 9-10,000 ft., Jacquemont, Thomson.

Very similar to Potentilla gelida, but distinguished by the more leafy flowering stems,
the oblanceolate stipules and tridentate 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. genista, under the name of P. grandiflora.

35. P. monanthes, Lindl. in Wall. Cat. 1025; glandular or sparsely pubescent, leaflets 3 broadly oblanceolate coarsely crenate at the apex, cauline stipules broad-ovate acute, flowering stems very many ascending leafy, flowers sessile and pedicelled at the top of the stem, calyx-lobes broad obtuse, bracteoles orbicular-oblong, achenes minute smooth, style terminal. Lehmr. Revis. Potentill. 175. P. cryptantha, Klotzsch in Reis. Pr. Waldem. Bot. t. 12.

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 cauline, all short petiolar; leaflets 1/2–1 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-orbicular, not much exceeding the calyx, yellow. Achene 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. subtorporoides; much smaller, stems filiform prostrate, leaflets 1/2–1 in. broader, flowers 3/4 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-oblong 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 6–9 hairy, style terminal.

Kashmir; at Tilail, alt. 12,000 ft., C. B. Clarks.

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 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 cincinnately incurved after flowering, naked or with a bract at the middle. Calyx 1/2 in. diam., silky; lobes lanceolate, acuminate, much larger than the oblong bracteoles. Stamens and carpels about 20. Achene 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 Tibet and drier Alpine regions of the whole Himalaya, alt. 10–17,000 ft. —Distribs. 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. multiflora_ on the one hand, and for the smaller flowers, from _P. lembeckii_ on the other, which again resembles closely _P. argyrophylla_ of the Himalayas and _P. wigilaeformis_ of Arctic America.—Rootstock very stout and woody. Leaves 1-2 in.; leaflets 1-1 in., sessile, very coriaceous, glabrous or slightly white, more or less white beneath; petiole stout; stipules ovate, acute, downy, entire or toothed. Stem with 1 (rarely more) reduced leaf. Flowers ½ in. diam., on short peduncles. Calyx wooly; lobes acute; bracteoles oblong, obtuse. Petals yellow, obcordate. Achene few, pale, tupid, on a densely woolly low receptacle.

** Root annual.

38. **Potentilla.** _P. kleiniana_, Wight & Arn. _Prodr._ 300; sparsely silky hairy, stems many from the root very slender prostrate leafy, leaves digitately 3-5-foliolate, leaflets 5 narrowly obovate or oblanceolate obtuse obtusely serrate, stipules ½-lanceolate, flowers small in terminal panicled cymes, achenes minute deeply wrinkled, style terminal. _Wight_ Ill. t. 86; _Lehm. Revis. Potentill._ 79. _P. Wallachiana_, _Wall._ Cat. 1022; _Lehm. Rev. Potentill._ 80, t. 34, not of _DC. Prodr._ _P. gracilis_, _Wall._ MSS. Duchesnea sundaca, _Miq._ _Fl. Ind._ _Bat._ i. part 1, 372, t. 6.

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 ½ in. diam., usually pedicelled, or in spreading cymes. Calyx sparsely silky; lobes entire; bracteoles acute or obtuse. Petals yellow, not much exceeding the calyx. Achene 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 Nilgiri Hills; ascending the Himalaya to 8500 ft. in the north-west. Iskardo in Western Tibet, alt. 7-8500 ft.—_Distrib._ Afghanistan and westward to the Atlantic, N. Asia and N. Africa.

Stems very numerous from the root, 6-18 in., spreading, dichotomously branched, prostrate or subrect. stout or slender. Leaves 1-3 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 ¼-½ in. diam.; pedicels ¼-½ in., slender. Calyx-lobes obtuse or acute, as are the bracteoles. Petals oblong, yellow, smaller than the calyx. Achene 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., achene minute smooth. _Plains of India._
VAR. 2; stems more robust more dichotomously branched, flowers \( \frac{3}{8} \) 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 \( \frac{1}{2} - \frac{3}{4} \) in. elliptic-ovate or obovate acutely toothed hairy beneath; caulis stipules small, cut, flowering stem inclined or prostrate slender 2-3-leaved, cymes corymbose rusty tomentose leafy flowers \( \frac{3}{4} \) 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. CHAMERKODOS, 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, equaling 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.—**DISTRIBUTION. Mountains of Northern Asia and N. America; species 4 or 5.

1. **C. sabulosa, Bunge; Ledeb. Flor. Ross. ii. 35; Jc. t. 257; tufted, glandular and villous; leaves 3-partite, segments narrow lobed obtuse.**

**Western Tibet,** alt. 12-15,000 ft.—**DISTRIBUTION. 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 \( \frac{1}{4} \) in. Flowers \( \frac{3}{4} \) 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 coating 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.—**DISTRIBUTION. Natives chiefly of the American Andes; a few are European, N. Indian, and American; species 30.

1. **A. vulgaris, Linn.; Boiss. Fl. Orient.** ii. 729; leaves plaited orbicular-cordate 7-9-lobed toothed, stipules confluent into a funnel-shaped tube with short broad spreading toothed lips.

**Kashmir,** alt. 3-9000 ft., Falconer, Stewart, C. B. Clarke—**DISTRIBUTION. 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 racemose or panicled. Flowers \( \frac{1}{4} \) 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.; stigmas $\frac{1}{2}$-1 in., the free portion membranous, erect or spreading, ciliate. **Cymes** globose, dense-flowered, on slender axillary peduncles 1-2 in. long. **Calyx** villos, $\frac{1}{10}$ in. long or less.

**Var. subthorpioides**; very slender, leaves $\frac{1}{2}$-3 in. diam., cymes panicled.—CEYLON, Gardiner.


Slender erect leafy perennial herbs. **Leaves** interruptedly pinnate; leaflets coarsely serrate; stigmas partially adnate to the petiole. **Flowers** small, yellow, in terminal spike-like 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. **Carps** 2, included in the calyx-tube; styles exerted, stigma 2-lobed; ovule 1, pendulous. **Fruit** pendulous, of 1 or 2 achenes enclosed in the hardened spiny 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. **Khalsa Mts.,** alt. 4-5000 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; stigmas large, leafy, $\frac{1}{2}$-lobate, entire or toothed. **Racemes** slender, lengthening in fruit; pedicels reflexed in fruit; bracts 3-fid or 3-partite. **Flowers** $\frac{1}{2}$ in. diam. **Petals** oblong-obovate, yellow. **Calyx-tube** $\frac{1}{2}$ 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 glabrous 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.

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 centrifugal 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.—**Distrib.** 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** ¼–½ in. diam., quite white; bracts orbicular or oblong, membranous, glabrous; flowers monoeccious. **Calyx-tube** ellipsoid. **Style** very slender, stigma capitata.

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 Himalayas; Nepal, Wallich. Sikkim, alt. 10–13,000 ft., J. D. H.

**Stems** erect, 2–3 ft., branched above. **Leaves** 6–10 in.; leaflets ½–1 in., opposite or alternate, membranous, often complicate when dry, creatures or teeth variable, acute or obtuse. **Heads** ½–2 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.

Ceylon, Sir J. G. McKenzie; Adam's Peak, Alwis.

Very similar to P. diandrum in stature, habit, foliage, &c., but leaflets with fewer teeth, petiole and midrib of leaflets underneath with flexuous hairs; bracteoles orbicular, clawed, elliptic; calyx segments slightly hairy or sebroid on the back; fruit ½ in., trapezoid, with short-wings and a bony endocarp. The flowers are probably polygamous; I find 12 imperfect ones in one bud, and fewer perfect, but my materials are very insufficient.—This is a very little known plant, the only specimen I have seen is Sir J. McKenzie’s (in Herb. Benth.). Gardiner described it from some found by Mr. Alwis. Dr. Thwaites says that he has searched for it in vain. Like Agrimonia, the genus is unknown in the Indian Western Peninsula.


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., paniced, on slender stiff peduncles. Flowers purple, hermaphrodite; bracteoles oblong, fimbriate. Calyx-tube ellipsoid, 4-angled, compressed, pubescent, segments in opposite pairs of which one is broader than the other, thick, and thickened towards the tip which is notched with a mucro in the notch and 3-nerved, back with a few hairs. Stamens with slender filaments. Style filiform, elongate, stigma capitulate. Fruit broader than long, ½ in. long, wings membranous.

** Carpels 2.**

5. P. Sanguisorba, Linn.; Boiss. Fl. Orient. ii. 738; sparsely hairy, leaflets petiolulate orbicular deeply toothed, heads globose, stamens about 20, fruit trapezoid acute at both ends.

Waziristan (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, ½–¾ in., membranous, base rounded, petiolules very short; petiole slender. Heads paniced.—I have seen flowering specimens only, which seem not to differ in any particular from the European plant.

16. **Rosa, Linn.**

Erect, sarmentose 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. Achenes 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. BRACcATE. Fruit and branchlets densely tomentose; prickles twin, mostly infra-stipular; flowers bracteate; sepals deciduous.
2. R. BRACcATEA, Wendl.; flowers large white, calyx-tube clothed with prickles.

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. CANNINE. Prickles uniform; bristles 0; flowers purple red, rosy or white.
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. BANKSIANE. 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. FORTUNANA, 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, Thumb.; Bot. Mag. t. 1069; Bot. Reg. t. 425; stipules and bracts pectinate; flowers double rosy; pedicels and inflorescence with long soft hairs and no glands; sepals broad ovate.—Japan, China.
Sect. I. Styles distinct.

* Sepals deciduous in fruit.


By the sides of streams of the Gangetic Plain. Westward to Mt. Abo in Marwar and eastward to Birma and along the lower Himalaya from Kumon eastwards. Mysore, Munro.

A bushy thorn, erect or with arching subdendent 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 on both surfaces or tomentose on the under; stipules small laciniate. Flowers 2–3 in. diam., white, fragrant, solitary or in short corymbs, rarely axillary and longer pedicelled; peduncles and pedicels sometimes with glandular hairs; bracts more or less glandular-serrate, especially below. Calyx tube obvoid; lobes cuneate-acuminate, quite entire, deciduous. Petals reflex. Fruiting globose, densely tomentose; mass of stigmas discoid, exserted; achenes very many, 1½ in. long, pale.—Except that one is described as scadent I cannot distinguish R. involucrata from R. Lyellii. This is the common rose of the Bengal plains and foot of the Himalaya and the only really tropical species of India. Lindley’s varieties burmata, parajolia, glabra, and acutifolia (in Wall. Herb.) explain themselves. Wallich’s specimen of involucrata var. glabra is stated to come from the mountains of Pundus on the confines of Sythet, i.e. the Khasia Mts., which I greatly doubt, for I found it in the Jhels only of Sythet; and Blinkworth’s habitat of the Alps of Srinuggur probably applies to the Dhyara dhoon. Wallich who procured R. Lyellii in Nipal describes it as a large climber in woods, possibly confounding it with R. moschata. Crepin hazards the conjecture that Lyellii 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. anserinaefolia, Boiss. Fl. Orient. ii. 677; tall, subdendent, prickles hooked, bristles C, leaflets broadly elliptic obtuse simply serrate and pedicels 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. Afghanistan and Beluchistan.

This is a common wild and cultivated Afghan 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 petioles and calyx covered usually with a rather furfurose pubescence mixed on the petioles and calyx with minute prickles and glands. Leaves 1–3 in.; leaflets ½–½ 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, ½–1½ in. diam., fragrant; pedicels short, glabrous or pubescent; bracts ovate-lanceolate, densely glandular. Calyx tube globose, usually smooth and glabrous; lobes ovate-lanceolate, cuneate-acuminate, tomentose, deciduous; tips pubescent, sometimes dilated. Fruit smooth, ½ in. diam.; head of stigmas very large; achenes ½–½ 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 Murrue, alt. 3500-10,000 ft. to Sikkim, alt. 8-10,000 ft.—Disturn. 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 pedicels and calyx usually very bristly and glandular; bracts foliaceous, oblong or lanceolate, glandular on the margin. *Calyx-tube* ½-⅓ in.; lobes 1-2 in., persistent. *Petals* broadly obcordate. *Fruit* sometimes 2 in. long; styles hairy, exserted; achenes large, often ⅛ in. long, few or many.

Var. *minor*, Lindl. i. e.; leaflets ½ in. often obtuse, flowers 1-⅓ in. diam. Var. *Hookeriana*; nearly unarmed, leaves very pubescent, peduncles and calyx hardly glandular. R. Hookeriana, Wall. Cat. 691, *not of* Bertol. R. torulosa, Wall. MSS.


Drier parts of the inner Himalaya, from Kishwar westward and in Western Tibet, alt. 8-11,000 ft.—Disturn. 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, ⅜-⅓ in.; petiolulate, elliptic-ovobate 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.; pedicels often glabrous; bracts ovate-lanceolate, long-acuminate, glandular. *Calyx-tube* glabrous, unarmed or prickly; lobes long-acuminate, tomentose, persistent, entire or with marginal lacinia; tips usually dilated. *Petals* obcordate, variable in depth of colour.


Drier inner Himalaya, from Kashmir to Kumaoon 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, ⅛-⅓ in., straight or curved, with long bases, yellow. *Leaves* ⅝-2 in.; leaflets 2-5 pair, ⅜-⅓ 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 cuneate-acuminate, glandular, often with dilated tips, entire, persis-
tent. Petals obcordate. Fruit ovoid or globose, 1/2–1 in. diam., glandular or glabrous stigmas villous; achenes many, 1/2 in. long, pale.—Differ from *R. pimpinellifolia* in the fewer leaflets, uniform prickles, pubescent longer sepals, and fruit not depressed.


Temperate Himalaya, from Kumaon 9–18,000 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 1/4–1 1/2 in., straight, brown. Leaves 1–3 in., crowded; leaflets 7–9, 1/2–1 in., usually oblong, obtuse with an excurrent midrib, rarely villous on both surfaces; stipules oblong, membranous, apiculate. Flowers 2–2 1/2 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, 1/2 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 1 1/2–2 in. diam., very numerous; pedicels 1–1 1/2 in., slender. Calyx-tube small, obovoid; lobes 3/4 in., lanceolate, caudate-acuminate, entire or cut or pinnatifid, reflexed after flowering, deciduous. Petals orbicular-obovate, yellowish-white. Fruit 1/2 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. Corymbs short, more or less glandular, sometimes with minute prickles; bracteae large, lanceolate, caudate, glandular all over. Flowers 1 1/2 in. diam.; pedicels rather stout. Calyx-tube broadly obovoid; lobes very large with often ciliated toothed tips, sometimes with a few long teeth at the side. Petals obcor-
date, silkily tomentose externally. *Fruit* $\frac{1}{2}-\frac{3}{4}$ in. diam.; styles far exerted; achenes $\frac{1}{4}$ in.—Crepin sums up the distinction between this and its very near ally *R. sempervirens*, 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; **Niliheri** and **Pulney** Mts.

Very closely allied indeed to *R. brevicuspis*, and I believe only a variety of that plant, itself too near *sempervirens*; it differs in being more glandular, leaflets less acuminate, larger sepals and petals, the latter of 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. Eglanteria*.

R. Jacquemontii, 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* $\frac{1}{2}-\frac{3}{4}$ in., ovate, tomentose on both surfaces. *Flowers* $\frac{1}{2}$ in. diam., shortly pedicelled. *Fruit* $\frac{1}{2}$ 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 herbageous, 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.

18. **DOCYNIA**, Done.

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.


Eastern temperate Himalaya; Sikkim, alt. 4–6000 ft. J. D. H. Bhotan, alt. 7500 ft. Khasia Mts., alt. 6000 ft. Birma, Kurz.—Distrib. Poonahs (Yunnan).

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, 1/2–1 in. Flowers 1–1 1/2 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, 1–1 1/2 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 austere with a slight quince flavour and forms a good stew.—D. Griffithiana from Bhotan is only D. indica.

2. **D. Hookeriana**, Done. Mem. Fam. Pom. 131, t. 15; leaves oblong or linear-lanceolate long-acuminate serrate, 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 woolliness, but no doubt in a younger state the branches and leaves are as woolly as those of D. indica.

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 cylindrical or flattened on one side, tests 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. *Brotan* 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, shortly pedicelled. *Calyx-tube* short, obconic; lobes also short, semicircular. *Petals* contorted, orbicular, concave, claw glabrous. —Mied 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 pedicels, 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.

*Moalmays*; on Thong Gyns, 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. *Panicles* 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.

Mishmi 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 ½ in. Panicles 4–5 in. long, glabrate; branches rather slender. Flowers shortly pedicelled, white. Calyx appressed-pubescent, tube obconic; limb ½ in. diam.; lobes triangular, obtuse, glabrous within. Petals coholate, claw glabrous. Styles 2, the united part pubescent.—I have not seen the petals, which Decaisne describes; he refers to Photinia, but the habit foliage and inflorescence are altogether those of Eriobotrya.

4. E. Hookeriana, Dowe. Mem. Fam. Pom. 146; robust, leaves 8–12 in. very shortly and stoutly petiolated elliptic- or oblong-lanceolate acuminate sharply coarsely serrate, more or less pubescent beneath, nerves 20–30 pair, panicle tomentose, branches spreading. Photinia subeaeilis, King in Herb. Calcutta.

Eastern Himalaya; Sikkim, alt. 6500–8000 ft., J. D. H. Bajt analt. 4–5500 ft. Griffith.

A small tree, with very stout branches. Leaves 8–12 by 2–4½ in., when young thickly covered with rustily 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 ½ in. diam., white; bracts small, ovate; pedicels short, stout. Calyx-tube shortly obonic; lobes rounded, obtuse. Petals contorted, orbicular, claw woolly. Styles 2, base woolly, elliptoid, yellow.


Central and Eastern Himalaya; Nepal, Wallich; Sikkim, alt. 5–6000 ft., J. D. H. Bajtan 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 ½–1 in. Panicles 2–4 in. long and broad; branches rather slender. Flowers not crowded, ½ in. diam., white, shortly pedicelled; bracts short, subulate. Calyx-tube short, obonic; 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 ½ in long, shortly ellipsoid, 1-seeded, estable.


A large robust tree. Leaves often 2½ and sometimes 3¼ in. broad, sometimes acute, obtuse or rounded with coarse lobules or crenatures; petiole stout or slender, ½–1½ in. above, glabrous. Panicles 3–5 in. long and broad, branched from the base, branches rather stout. Flowers ½ in. diam., white, smelling of hawthorn. Calyx-tube obconic; lobes acute or obtuse. Petals orbicular, claw slightly woolly. Styles 2, base very woolly. Fruit ½ in. long, ellipsoid, 1–2-seeded, uncatable.—Confounded by Wallich, myself.
and others with *E. dubia*, but very distinct; a much larger tree, with longer broader petioloed leaves with slender petioles; the top of the ovary being woolly also well distinguishes it.

7. **E. angustissima**, Hook. fl.; quite glabrous, leaves erect 2-4 in. very narrow linear-lanceolate narrowed into the short petiole obtuse remotely serrate, panicel small glabrous.

**Khassia** Mrs. alt. 5000 ft. Simons; Mosoysa, and between Mrung 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 fastigiate 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, ⅔ in. *Panicles* 1½ in.; branches short, erect, glabrous. **Flowers** few, ⅓ in. diam. *Calyx* pubescent; tube short; lobes rounded. **Petals** obovate or obcordate, claw woolly. **Styles** 3, slender, base and crown of ovary woolly.

**Petals quinuncial. Styles** 5.

8. **E. elliptica**, Lindl. in Trans. Linn. Soc. xiii. 102; very robust, leaves petioloed 6-10 in. obovate or oblong-lanceolate entire or coarsely serrate glabrous beneath, nerves about 20 pair, inflorescence densely clothed with soft spreading wool, flowers sessile, styles 5, fruit small obovoid or globose. *Wall.* Cat. 667. *E. japonica, β. elliptica*, Wenzig in Linneae, 1874, 100. Mesipilus Ouida, *Ham.* in Don Prodr. 288.

**NEPAL, Wallieh; 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, spathulate, recurved. Griffith’s specimens have fruit, which is nearly globose upwards of ⅔ 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 narrow 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-tube** short; lobes ovate, subacuate. **Petals** broadly ovate. **Fruit** 1-1½ in. long, rather narrower, yellow, rarely as many as 6-seeded.

**IMPERFECTLY KNOWN SPECIES.**

**E. macrocarpa**, Kurs, *For. Fl. Brit. Barm.* ii. 443; evergreen, glabrous, leaves 5-6 in., from obovate to oblanceolate shortly subobtuse acuminate quite entire narrowed into the stout ½-⅔ in. petiole coriaceous smooth glossy, fruit subglobous 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.—*BRMA*, rare in forests on N. E. slopes of Kambala-toung; and Pegu at Yomah, alt. 2-3000 ft., Kurs.

20. **PYRUS**, Linn.

Trees or shrubs. **Leaves** deciduous, simple or pinnate; stipules deciduous. **Flowers** white red or pink, in terminal cymes or corymbs; bracts subulate or
linear. Calyx-tube urceolate turbinate or obconic, lobes 5 erect or reflexed, persistent or deciduous. Petals 6, 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) flabby, 2-5-seeded; cells with a membranous or cartilaginous often 2-valved endocarp, 1-2-seeded. Seeds when in pairs plano-convex, tests coriaceous; cotyledons amygdaloid.—DISTRIB. N. temp. and cold regions; species 40.

SECT. I. Malus. Leaves entire. Ovary 3-5-seeded; styles more or less united below. Fruit globose; flesh of uniform consistence; endocarp coriaceous or like parchment.—Flowers fascicled or subumbellate.


Apparegly wild in the northern Western Himalaya, ascending to 9000 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.

A tree, rarely exceeding 30 ft. Branches and foliage at length glabrous. Leaves 2-3 in.; petiole half the length of the blade, tomentose or woolly. Flowers 1½-2 in. diam. Calyx-lobes broad-ovate, acute, persistent. Petals with a tomentose claw. Styles 5, united below the middle. Fruit globose, intruded at both ends.


Temperate Himalaya; from Kashmir to Kumaon, alt. 6-10,000 ft. (sometimes cultivated), and in Bhutan, alt. 7500 ft., Griffith. Khasia Mts., alt. 6000 ft.—Distr. 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 Pallas 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. Bhutan, 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 5-celled; styles free. Fruit globose or pyriform, flesh granular.—Flowers in few-flowered corymbs.


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.


A deciduous tree, in a young state like a *Crataegus* with 3 lobed and doubly sharply serrated leaves glabrous or woolly beneath, and often spinose 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 fascicled or umbellate; pedicels ½–2 in., slender in flower, stout in fruit. Flowers 1 in. diam. Calyx-lobes ovate, acute, usually woolly, especially externally. Petals orbicular-obovate. Stamens about 30. Styles 3–5, quite free, more or less woolly at the base. Fruit very variable in size, ½–1½ in. diam., dark yellow-brown, scurfy, covered with raised white spots, auster, eatable 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*, Dcne. *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 warted.

Western Himalaya, from KASHMIR to KUMAON, alt. 5–8000 ft., *Royle, Strach.* &c. *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*, Dcne. *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.

SECT. III. Aria. Leaves simple, entire or margin lobulate. Calyx-lobes persistent. Ovary 2–5-celled, styles 2–5. Fruit pyriform or globose crowned with the calyx-lobes, flesh granular, endocarp membranous.


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 ½–⅔ in. Corymbs short, 2–5 in. broad, terminal and subterminal, much branched. Flowers shortly pedicelled, ½ in. diam., white. Calyx turbinate; lobes short, ovate, acute. Petals narrowly obvate, narrowed into naked claw. Stamens 20. Styles 2–3, densely woolly. Fruit very few in a corymb, or solitary, ⅓–1 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 confused; 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. t. 1655, not of Don; Wenzig in Linnaea, 1874, 60.

Temperate Himalaya; from GAREWHAL 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 serrat 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.

SECT. IV. Sorbus. Leaves pinnate. Calyx-lobes persistent. Ovary 2–4-celled. Styles 2–5, free. Fruit globose crowned with the persistent calyx; endocarp membranous or coriaceous.

10. P. Aucuparia, Gartn.; Ledeç. Fl. Ross. ii. 100; glabrous or with white woolly down, leaflets 7–12 pair linear-oblong obtuse and apiculate or

Western temperate Himalaya, from Kasimir to Kumaon, alt. 11,500–13,000 ft. Distria. 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 ½–1½ in., entire towards the rounded base. Coryms usually quite glabrous. Flowers ½–1 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, ½–1 in. diam., red.—Strechev 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 and inflorescence 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 foetid, 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 urisina) 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 urisina 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 subdecandent plant with more deeply serrate leaflets, ½–2 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 Himalayas.

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 foliosa, Wenzig in Linneae, 1874, 76, 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 ¼–½ in diam., white.Styles 3, glabrous. Fruit (unripe) very small, ovoid, ⅓ in diam.—A very distinct species.

14. P. insignis, Hook. f.; very robust, leaflets 4–6 pair 3–4 in. linear-oblong acutely obscurely 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, apiplate in the sinus between the obscure cuticles, which are incurved in old leaflets, pale and rather glaucous beneath; base unequal-sided; young petioles densely silky. Flowering corymbs appearing with the young leaves, densely rufous woolly, with stout peduncle and branches. Flowers crowded, ¼ 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, ⅓ in. diam. (when dry).


* Leaves shortly petiolate, narrowed to both ends; nerves very oblique close set nearly straight, very prominent.


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, ⅓–2 in.; nerves 12–14 pair, very prominent beneath, slightly curved; petiole ⅓–⅔ 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** 3, slender, united below the middle or free, glabrous. **Fruit** \(\frac{1}{4}\) in. diam., smooth, endocarp thin; cells 2-seeded. **Seeds** plano-convex.

**Leaves more or less ovoate (rarely ovobovate), petiole slender. Disk in the umbo of the fruit tumid or flat not lobed.**

17. **P. khasiana**, *Dcne. Mem. Fam. Pom.* 169 in part (Micromeles); leaves 4 in. elliptic-ovobovate rather suddenly acuminate serrate, nerves very oblique nearly straight, fruit \(\frac{1}{2}\) in. diam. spotted 4-celled.  

**Khasia** Mts.; at Ningbree wood, alt. 5000 ft., *Griffith*.  
A tolerably large tree, in foliage more like *P. rhomboides* than any of the following species, having many nearly straight nerves. The only specimens (*Griffith, 2078, 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 Mamloc, 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–\(\frac{1}{4}\) 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.—Diffs from *P. khasiana* in the ovate leaves with arching nerves.


**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 flowering 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, \(\frac{3}{4}\)–\(\frac{3}{4}\) in., umbo large for its size, depressed with a conical centre.


**Khasia** Mts., alt. 4–6000 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 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** obovate, woolly within in bud, claw pubescent. **Stamens** slender. **Disk** glabrous, inconspicuous. **Styles** 2, very slender, united below the middle, glabrous. **Fruit** ½ in. diam., rather pyriform, crown tubular ¼ its own diameter, with a deep depression and conical centre.

21. **P. ferruginea**, Hook. f.; branchlets leaves beneath and corymbs densely clothed with rusty wool, leaves very shortly petioloed broadly elliptic suddenly acuminate serrulate, corymbs few-flowered, styles 3. **Sorbus sikkimensis** var. ferruginea, Wenzig in Linnaea, 1874, 60.

**Brotan**, 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 ½ in., densely woolly. **Corymbs** densely woolly, of few primary subumbellate branches 3–4 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. **Stamens** 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, glabrous, styles 2–4, fruit ¾ 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 ¼–½ 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. **Stamens** 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, Done. Mem. Fam. Pom. 169; “leaves oblong or oblong-lanceolate acuminate base obtuse acutely serrate glabrous, petiole rather long slender, peduncle and pedicels floccose when young, fruit small. **Sorbus sikkimensis**, Wenzig in Linnaea, 1874, 58.” 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 small, woolly, calyx-lobes ovate acute.—Sumba in Upper Nepal, Hamilton. Obs. P. Polieveria differs in the shorter broader serratate not crenate leaves and in the more numerous flowers."—I do not recognise the above.—Can it be the common pear?


Evergreen small trees or shrubs. Leaves coriaceous, quite entire or serrulate; stipules subulate, deciduous. Flowers small, corymbose, white. Calyx-tube ob-conic; 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.


**Nilgiri 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 1½–2 in., cylindric. Corymb 3–5 in. diam., much branched from the base, branches stout. Flowers ½ in. diam., pedicelled; bracts subulate. Calyx-lobes rounded. Petals orbicular-ovate, claw distinct. Styles 2, very stout, short. Fruit ½ 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.


**Nilgiri hills and Pulney Mts., Wight, &c.** Khasia Mts., alt. 4–5000 ft. Martaban, 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 2½–6 in., very variable, sometimes ciliate-acuminate, thickly coriaceous, the numerous nerves very delicate, hardly shining above; petiole 3½–2 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 ½ in. diam., blue, glaucous; endocarp membranous. Seeds compressed, radicular and incurved.—I refer Kurz’s plant here on the authority of his citation of Beddome; he describes the leaves as sometimes euneate-oblong and with a few inconspicuous teeth.


I have great difficulty in distinguishing this from *P. Notoniana* (in the Khasia Mts. especially), its best character is the very short petiole and uniformly oblanceolate smaller leaves 3–5 in. long. In the Himalayas, it is very constant in its characters, but in the Khasia Mts., it comes very near small states of *Notoniana*, 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*, Miguel (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.


*Bhutan Himalaya*, at Trelagong, Griffith.

A large tree; branchlets rather slender, woolly, pubescence whitish. *Leaves* 5–7 by \(1\frac{1}{2}-2\frac{1}{2}\) in., much more membranous than in any preceding species, very finely acuminate, serratures very finely, 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 beneath short petiole and inflorescence clothed with white wool, leaves very membranous elliptic or lanceolate acuminate serrate base acute, corymbs rounded many-flowered, flowers \(\frac{1}{2}\) 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 lenticel; 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, caducous, 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* \(\frac{1}{2}\) in. long, ovoid, crowned with the persistent calyx; endocarp thinly crustaceous, septum membranous. Seeds nearly as long as the fruit.
22. FOURTHIHA, Dene.

Shrubs or small trees, glabrous or woolly when young. Leaves simple, crinate, persistent; stipules minute, subulate. Flowers small, white, in few-flowered corymbs, with warty fruit-bearing branchlets. Calyx-tube obconic; lobes 5, acute. Petals 5, contorted, obovate, obliquus and notched, claw glabrous. Stamens 20, filaments slender. Ovary 2-3-celled; styles 2-3, connate high up, stigma capitulate 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; tests thickly coriaceous with reticulated grooves on the convex side; cotyledons plano-convex; radicle curved, short, exserted.—DISTRIBUTION: Himalaya, China, Corea, Japan.


Khasia Mts., alt. 3-5000 ft., abundant. BIRMA, Griffith. Foot of the Sikkim Terai, Gamble (var. Hookeri only).

I can distinguish but one Indian species of this very abundant Khasian bsh, 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 1½-2 in. coriaceous ovate-lanceolate acuminate quite glabrous in age, nerves 8-10 pair, corymbs subsessile few-flowered sometimes almost capitate, fruit ½ in. diam. globose. P. arguta, Dene. l. c.


VAR. 3. salicifolia; leaves 4-5 in. coriaceous narrowly lanceolate caudate-acuminate more persistently woolly beneath, corymbs 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 1½-2½ in. rather coriaceous oblong or oblong-lanceolate acuminate more persistently woolly beneath, serratures smaller, corymbs umbelliform, branches 1½ in., flowers longer pedicelled. Hookkoom valley, Birma, Griffith.


23. STRANVIESIA, 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 capitulate 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, muciligenous; embryo plano-convex.—DISTRIBUTION: Himalaya and China; species 3 or 4.

1. S. glaucescens, Lindl. in Bot. Reg. t. 1956; leaves obovate oblanceolate or narrowly lanceolate acuminate or obtuse and apiculate entire or serrulate quite glabrous, calyx and pedicels woolly. Brand. For. Fl. 210; Wenzig


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 in. broad, more obovate than is usual in the Eastern, hardly shining above, paler beneath; in Khasian specimens the leaves are sometimes 4 by ½–¾ in., long-acuminate and curved (var. angustifolia, Dene.), always narrowing into the petiole; nerves very slender; petiole ½–¾ in. Corymbs 2–4 in. broad; branches slender, hairy or glabrate. Flowers pedicelled, ½ in. diam., pedicels woody. Calyx woolly; lobes acute, persistent. Petals spreading, usually notched, not oblique. Ovary small; crown hardly raised, hairy. Style-column woolly below. Fruit ½ in. diam., orange yellow, crowned with the incurved calyx-teeth; flesh thin; crown of the crustaceous carpels exerted, glabrous.

24. CRATEGUS, Linn.

Shrubs or small trees, often spiny. Leaves simple lobed or pinnatifid; stipules deciduous. Flowers in terminal corymbose cymes, white or red; bracts caduceous. 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-seeded stone, or with 1–5 bony 1–rarely 2-seeded stones. —Dis-tn. N. temp. regions, chiefly American, extending south into New Granada; species about 50.


Western temperate Himalaya, from Murree to Kishwar, alt. 6–9000 ft. —Dis-tn. 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 slender; stipules leafy, upper usually falcate, sorrate, lower larger orbicular and cut; Corymb many-flowered. Flowers ½ 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 seamy; 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. opague 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-obovate.
**Crataegus.**

*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 Sirom to Bhutan (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* \( \frac{1}{4} \) to \( \frac{1}{3} \) in. diam., white; pedicels slender. *Calyx-tube* hemispheric; lobes obtuse. *Petals* orbicular, claw very short. *Styles* 5, inserted ventrally. *Carpels* 5, free for \( \frac{1}{3} \) 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 \( \frac{1}{3} \) free and protruded between the calyx-lobes.—Diffe 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.—*Distr.* Europe, temp. Asia; N. Africa, Mexico; species 16.

A genus distinguishable only by habit from *Crataegus*. 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 1\( \frac{1}{2} \)–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.* 660. 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 Bhutan. 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 divericate and branchlets pilose" in *bacillaris*, do not distinguish Wallich's var. The other specimens marked
as oblong are the C. affinis of Lindley and differ only in the tomentose undersurface of the leaves and corymbs, 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 \( \frac{1}{2} \)–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. Holmacker’s Nilgiri specimens, which I take to be frigida, are from a tree cultivated in Lord Elphinstone’s garden at Kaitee. Decaisne quotes Jacobmout as having found this, but I suspect that C. bacillaris var. affinis is the plant intended, as C. frigida occurs nowhere in Jacobmout’s region of travel.

** Leaves \( \frac{1}{2} \)–2 (rarely 4–5) in. Cymes few-flowered or flowers solitary.


Temperate Himalaya, from SIRMOON 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 S. mondidii, 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 \( \frac{3}{4} \)–1 \( \frac{1}{2} \) 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 WAKHISTAN, alt. 5–11,000 ft. — DISTRICT 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. 10,600 ft. collected by Mr. C. B. Clarke have leaves 2 in. long.


**Kashmir, Jacquemont; Niti Pass KumAon, alt. 11,500 ft. Strach. & Winterb.—Distr. Altaï, Persia, Soongaria.**

I refer the Garwhal plant to Bunge’s *multiflora* with some hesitation; it closely resembles the Altaï and Soongaria plant in its thin pale leaves glaucous beneath, but they are usually ovate and acute whereas in the Altaï and Soongarian ones they are orbicular obovate 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.


**Western Tibet and Kashmir, alt. 6–11,000 ft.—Distr. Soongaria, Afghanistan and Westward to Asia Minor.**

A smaller subevergreen, more woody rigid species than *C. vulgaris*, with smaller leaves sometimes only 1/2 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, Wallach, to Sikkim, 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 Wallach’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. acuminate*. Baker’s *C. prostrata* from Saunders’ garden is identical with specimens of *rotundifolia* from the Hort. Soc. Gardens in Harb. 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. Simonsdii**, Hort.; *Baker in Saunders Refug. Bot.* i. t. 55; an erect bush with slender branches, leaves 1/2 in. subdistichous rhombic- orbicular
acuminata glabrous above sparsely silky beneath, nerves distinct, margins subrecurved, flowers solitary or twin subsessile, fruit turbinate scarlet. C. acuminata, var. Simondsii, Done. Mem. Fam. Pom. 175.

Khasia Mts.?
The origin of this is unknown. It is probably named after Mr. Simonds 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, ½ 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 dried 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. 50; an almost prostrate woody intricately branched shrub, leaves ⅓-⅔ in. cuneate-obovate or oblong tip rounded or retuse glossy above pubescent or tormentose beneath, margins recurved, flowers solitary ½ in. diam., fruit small globose scarlet. C. microphylla, Wall. Cat. 662 B. Crategus 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 Nynae Tal.


Western Peninsula, NILGHIRI and PULNEY Mts. ? Temperate Himalaya from SIMDONS, 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 Nilghiri 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 summit, 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 albumin 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 Spiraea in Rosaceae.

TRIBE I. Saxifrageae. Herbs.

* Ovary 2-celled.
Leaves twice ternate more than a foot long 1. Astilbe.
Leaves simple 2. Saxifraga.

** Ovary 1-celled.
Flowers racemose. Petals 6, minute 4. Tiarilla.
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. Deutzia.

** Stamens 20–40 11. Philadelphus.
TRIBE III. *Escallonieae*. Trees and shrubs. *Stamens* equalling the petals in number. *Ovary* inferior or half-superior.


Flowers racemose or subsolitary.

1. **AStILBE**, 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 acutate at the top, divaricating, dehiscing ventrally. *Seeds* small, narrow, oblong, tailed at both ends.—*Distribution.* Species 3 or 7; from the Himalaya, Java, Mantchuria, Japan and Virginia.


**TEMPERATE HIMALAYA.** from KASHMIR to BHOTAN, alt. 5000-9000 ft., abundant. KHASIA MTS., alt. 4000-5000 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 petiole woolly-pubescent, and brown-villose; pedicels short with a small bract at the base. *Sepals* green, subglabrous, oblong, obtuse, erect, \( \frac{1}{2} \) in. Young carpels but slightly united. *Ripe carpels* \( \frac{1}{2} \) in. long. *Seeds* numerous.—*Spiraea tridentata*, Wall. Cat. 708 is reduced to *Astilbe 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 *Astilbe* by the carpels, suddenly narrowed at top into short divergent beads, usually 3-4 in number, with few larger and much less tailed seeds. *Astilbe speciosa* Junghuhn (Miq. Flor. Ind. Bot. 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. 4959; 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 petiole 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. & Deane; *A. Thunbergii*, Maxim.; and *A. chinensis*, Maxim., differ by being more slender and less villose.

**EXCLUDED SPECIES.**

*A. Stoliczkaei*, 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. *Porphyryum* 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 3–6) 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 petioled, reniform, lobed. **Bracts** 2, unequal at base of peduncles.

—In the Indian species the surculi are represented by bulbils, covered with fulvous hairs, forming a cluster at the base of the stem.


**Western Temperate Himalaya**, alt. 10,000 ft.; *Kumaon, Blinkworth; Kulu, Edgworth; Gurwhal, Falconer; Lahul, Jaschke.*

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 *Stemrb. 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, subangular, 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 referred 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.


**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.
Saxifraga. \[\text{DII. SAXIFRAGACEE. (C. B. Clarke.)}\]

S. Stem 4–6 in. high. Radical leaves reniform, palmately 4–6-lobed; upper leaves 3-1-fld passing into bracts. Calyx-tube in the ripe fruit short, campanulate or funnel-shaped; lobe ovate-linear, approximate, with acute sinuses.—Turiousanow judiciously remarks (Fl. Baikal-Dahur. i. 454) that the only reason for not treating S. cernea 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, Jaquen., 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. cernea, B. paniculata, Sternb.

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 petiolar, upper sessile more or less stem-clasping.—DISTRIBUTION: 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., Walum, Strachey & Winterbottom.

Stems 2–5 in. high. Leaves ciliate; the lowest radical leaves spatulate, obtuse or orbicular; cauleine ½ in. Styles exceedingly short. Ripe carpels hardly equalling the sepals. Seeds trigonous, ellipsoid, smooth.


Sikkim and East Nepal, alt. 12,000–15,000 ft.; Yeumtong and Kambachen, J. D. H.; Yakla Pass, C. B. Clarke.

Stems 2–4 in. high. Leaves ciliate; the lowest radical leaves spatulate, obtuse or orbicular; cauleine ½ in. Styles exceedingly short. Ripe carpels hardly equalling the sepals. Seeds ellipsoid, angular, smooth, testa lax somewhat plaited.


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.***


**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.***

*Stem-leaves* hardly ¼ in. long, glabrous. *Sepals* glabrous, slightly adnate to fruiting carpels. *Petals* scarcely ⅔ 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 crowded 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 ⅓ by ⅔–1 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, cauleine leaves ⅔–1 in., sepals strongly deflexed, base often brown-villos 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; Alp of Europe to the Caucasian.

**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.) Dom. 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. subdita;** 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. γ. H. f. & T. in Journ. Linn. Soc. ii. 69.

Western Tibet; Falconer; Lenak Pass, alt. 15–17,000 ft., T. Thomson.


Sikkim, alt. 10,000–12,000 ft., J. D. H.

Stem 6–10 in. high, densely glandular-pubescent upwards. Radical leaves petioloed, oblS, obtuse; cauleS about 1 in., sessile, broadly oblS. Petals pale yellow, spatulate, 1½ times the calyx. Styles short.


Alpine Himalaya; from Kashmir to Bhutan, alt. 9000–17,000 ft., abundant.

Stems 8–18 in. high, leafy, glandular, often finally glabrous. Radical leaves long-petioloed, narrow into the petiole or (var. pannatifolia) ovate, subcordate; cauleS 1½ in., ovate or broad oblS. Sepals at length reflexed. Petals with 4 stalked glands at their base, 1½–2 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., Wallanchoon, J. D. H., C. B. Clarke.


This differs from S. diversifolia in being much smaller with smaller leaves and flowers. The starred 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 alternate 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. Bhutan, Griffith.

Stem 4–8 in. high, somewhat rigid, paniculate upwards; upper axilS generally producing hispid bulbs, so that the flowers are only 1–3. Lower subrosulate leaves
1-2 in., sessile, oblanceolate, with one or two acute teeth. Petals small, exceeding the sepals. Styles short. Capsule less than ¼ in. long. Seeds minute, smooth, elliptic, angular.


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.


Alpine Eastern and Western Himalaya, alt. 9000–11,000 ft.; Edgeworth; Dhurmsala, *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, ½–2 in. high.—Tufts dense formed by the stems 1–3 in. long, branching and crowded, covered upwards with densely whorled undivided small obtuse leaves about ¼ in. long.


Alpine Himalaya, from Sikkim to Kasmir, alt 12,000–17,000 ft., Royle, Jacqumont, J. D. H., &c.

Leaves ½–1 in., ovate-elliptic, glabrous or a little ciliate, hardly glandular. Petals narrow, twice the sepals, deciduous; white (C. B. Clarke noted in the field, also Jacqumont and Jaeschke); yellow in the figure of Royle. Fruit less than ½ in. long.

—All the examples now referred surely to *S. imbricata* at Kew exhibit some perforated leaves; var. 7. and 8. 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 ½ in., obovate, 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 ¼ in. long.
20. **S. perpusilla**, H. f. & T. in *Journ. Linn. Soc.* ii. 72; flowers yellow on glandular peduncles $\frac{1}{2}$ in. high, uppermost leaves about $\frac{1}{2}$ in. obovate-oblong concave white ciliate on edges otherwise glabrous, sepals ciliolate erect in fruit. *Engler Monog. Saxifrag. 210.*

Sikkim, alt. 16,000–17,000 ft.; Mt. Donkish, J. D. H.

Stems scarcely an inch long. Petals golden, twice the sepals, obovate, 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 $\frac{1}{2}$ in., leaves obovate glabrous, sepals much adnate below erect in fruit, petals 0 or obovate 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. 13,000–18,000 ft.; *Jacquemont*, Edgeworth, J. D. H., &c.

Lower leaves $\frac{1}{2}$–$\frac{3}{4}$ in., orbicular or elliptic, glabresent; upper glandular-pubescent or nearly glabrous. Petals $\frac{1}{2}$ in. long, nearly twice, the sepals, elliptic, persistent. Fruit ovate, shorter than the petals. Seeds minute, ellipsoidal, smooth, tests reticulate not tuberculate.

Var. 2. *S. Stella-aurea*; (sp.) *H. f. & T. in Journ. Linn. Soc.* ii. 72; peduncles $\frac{3}{4}$–2 in.—from Sikkim to Kashmir, alt. 13,500–17,000 ft.; J. D. H.

Sect. V. Flowers yellow, on sparsely leafy peduncles 1–3 in. from tufts formed by weak stems clothed upwards with subrosulate undivided spathulate-oblong small leaves $\frac{1}{2}$–$\frac{3}{4}$ in. long.


Central and Western Himalaya, from Nepal to Kashmir, alt. 8500–12,000 ft.; Wallach, Jacquemont, Strachey & Winterbottom, &c.

Stems 2–6 in. long, branches crowded into tufts; branches barren or producing a flower-stem, terminated by rosulate crowded leaves. Rosulate leaves spathulate-oblong, sometimes very small, sometimes $\frac{1}{2}$ in., margins cartilaginous; leaves on the peduncle linear-spathulate or narrow-oblong. Petals obovate, 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., cauline $\frac{1}{4}$ in. long, narrow oblong, very glandular-pubescent. Peduncles $\frac{1}{4}$-$\frac{3}{4}$ 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 $\frac{1}{4}$-$\frac{3}{4}$ in. long, acute, rigid, often spinulose.


Alpine Himalaya, from Bhutan to Kumaon, alt. 9000-13,000 ft., common. Leaves about $\frac{3}{8}$ 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 ripe carpels. Seeds ellipsoid, subtrigonous, smooth.


Alpine Himalaya, from Sikkim to Kumaon, alt. 11,000-14,000 ft.; Wallich, J. D. H.; Strachey & Winterbottom.

Leaves about $\frac{3}{8}$ 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 $\frac{1}{4}$-$\frac{3}{4}$ 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, Faleoner, 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 $\frac{1}{4}$-$\frac{3}{4}$ 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. evolvoluoideus, Wall. Cat. 447; DC. Prodr. iv. 46; Sternb. Saxifrag. Suppl. t. 23.

Alpine Himalaya, from Bhutan to Nipal, alt. 13-15,000 ft. Nipal, Gossain Than, Wallich; Bhutan, Griffith; Sikkim, Kankola, J. D. H., Jongri, C. B. Clarke.

Sect. 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 Himalayas, from Sikkim to Kashmir, alt. 16,000 ft.; Wallich, Jacquin-mont, T. Thomson, J. D. H., &c.

Glabrous; 2-8 in. high. Rosulate leaves ¼-¾ in.; cauline usually small. **Sepals** 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 papillate.

30. **S. pilifera,** H. f. & T. in Journ. Linn. Soc. ii. 66; stems corymbose 1-4-flowered, pedicels short about ¼ in., leaves hardly ¼ in. spatulate-linear or oblong, margins not spinulose, petals equalling the sepals. Engler Monog. Saxifrag. 223.

Sikkim, alt. 14-15,000 ft., J. D. H.

Stems 1-3 in. high, pubescent. **Leaves** ¾-½ 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 Kumaon, alt. 13,500-17,000 ft., common, to Sikkim, alt. 18,000 ft., Lama Kongra, J. D. H.—District. 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. macronulata** (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. **Porphyton.** 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 ¼-⅓ in. obovate glabrous or the upper ciliolate, no disc surrounding the carpels. Engl.

W ESTERN TIBET, alt. 15-17,000 ft.; Sassa, T. Thomson.—DISTR. 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, ¼-2 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 ⅞ in. long, obovate-oblong, twice the sepals. Seeds ellipsoid, rugulose, minutely papillose.—In Dr. Thomson’s specimens some flowers have 3 carpels.

S ECT. IX. B ERGENIA. Rootstock stout. Leaves ample, undivided, with a large sheath at the base of the pedicle. Scapes 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 ciliata, base cordate, pedicels and calyx glabrous, calyx-teeth ovate not narrowed at base, fruit-pedicels cornuous. Wall. Cat. 449; Don in Trans. Linn. Soc. xiii. 348; Hook. Exot. Flora, i. t. 49 (excellent); Hook. Bot. Mag. v. 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 Bhutan to Kashmir, alt. 7-10,000 ft., common. Khasia Mts., alt. 4000 ft.

Leaves 2 in. diam. in Khasia; smaller in Bhutan until 2 in. diam. in Kumaon; glabrous on both surfaces, dotted on the lower. Petals ½-1 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; Royce Ill. t. 49 (sp.); Hook. Bot. Mag. t. 4915; H. f. & T. in Journ. Linn. Soc. ii. 60; leaves hisrate on both surfaces.—Nipal and Kumaon, alt. 6-8000 ft.; Royce, 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, i. 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.


D OUBTFUL SPECIES.

S AXIFRAGA from Karnag in Tibet, stated to be near S. diapensoides by Kurz (Flora, 1872, 286) is quite unknown to me. It is not described.

Annual or biennial herbs. **Leaves** opposite, entire; stipules 0. **Flowers** axillary, usually geminate, subsessile or pedicelled. **Calyx-tube** entirely adherent to the ovary; lobes 5, valvate, persistent in fruit. **Petals** 5, epigynous. **Stamens** 5, epigynous. **Ovary** inferior, 1-ovuled, with 2 pendulous many-ovuled placental styles; 2, stigma capitate. **Capsule** dehiscing at the apex between the styles. **Seeds** numerous, minute, ellipsoid, smooth.—**Distrib.** Species 3; in tropical and subtropical Asia, and in tropical and South Africa.


Dry places of India, from Ceylon to Bundeikund and the Punjab, frequent.—**Distrib.** Persia, Egypt, tropical Africa.

Glandular-pubescent. **Stem** 6-12 in. high, erect or diffuse, branched. **Leaves** ½-1 in. long, subessile, oblong, narrowed at both ends, ovate or lanceolate. **Petals** about ½ in. long, white (ex Roxb. yellow), obovate. **Stamens and styles** about ½ in. long in the Indian specimens, these parts much larger and the filaments pubescent in the African var. **Weldeni**. **Capsule** about ½ in. diam., subglobe. This and the succeeding species when in fruit must be carefully distinguished from Oldenlandia which has the capsule completely 2-celled. The leaves of *Vahlia* have often a connecting line as if falsely stipulate. *Mitrecia* which differs by its single style is also mixed with *Vahlia* in Herbaria.


Tropical dry portion of the Western Peninsula and Ceylon; **Shuter, Perottet, Roxburgh, Wight,** &c.—**Distrib.** Tropical Africa.

Glandular-pubescent upwards. **Stem** 3-12 in. high, erect or diffuse, branched. **Leaves** ½-2 in. long, subessile, linear or linear-ovate. **Calyx-lobes** not exceeding the tube. **Petals** about ½ in. long, white, obovate. **Capsule** about ½ in. diam., subglobe.

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, subbracteate. **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-ovuled 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.—**Distrib.** Species 5, one Himalayan and Japanese; the other 4 North American.

1. **T. polyphylla**, Don. Prodr. 210; stem-leaves several all petiolated cordate-ovate subpentagonal crenate-serrate, petals small linear or 0, fruit cernuous.

Temperate Central and Eastern Himalaya; from Bhutan 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 ¼ in. long, the other ½ in.

5. **CHRYSTOSPLENUM,** Linn.

Weak, succulent herbs, growing in damp or watery places. Leaves undivided, petioled; 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 America; in the Andes to Magellan's Straits.

* Leaves opposite.


Temperate Himalaya; from Bhutan to Kumaon, 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 obsolescent 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. 7–8000 ft.; Edgeworth, Madden; Dwali, alt. 8000 ft., in Kumaon, Strach. & Winterbottom.

A rather stouter plant than *C. nepalense,* the leaves ½–½ 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 ¼–½ 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
Chrysosplenium. | LII. SAXIFRAGACEAE. (C. B. Clarke.)


Sikkim Himalaya, alt. 14–15,000 ft., Yeumtang and Kankola ‘near the perpetual snow,’ J. D. H.

Leaves about \( \frac{1}{2} \) 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.


Bhotan; Griffith.

Leaves \( \frac{1}{2} \)–1 in. broad; lobes 6–16, very obtuse, often \( \frac{1}{2} \) in. deep.—Very near C. nudicaule, Bunge.


Temperate Western Himalaya; Kedarkanta in Gurnhal, Royle; Madhari Pass, in Kumāon, alt. 10,000 ft., Strachey & Winterbottom.

Stems 1–3 in. long. Leaves \( \frac{1}{2} \) 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 scapigeroys herbs. Scope 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, inbricate. 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, loculi—dally 3–4-valved. Seeds many, obovoid or subcylindrical, 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).—Distr. Northern temperate hemisphere, extending south to the mountains of the Indian Peninsula. Species 12.


Petals ovate-elliptic with a broad claw. *Stamina* nearly hypogynous. **Capsule** 4. **Capsule** superior or nearly so, oblong-elliptic, much longer than the sepals. **Seeds** cylindric; testa loosely reticulate.

**Sect. II. Fimbriopetalum.** Staminodes ending in several long gland-bearing processes. **Petals** fimbriate.

2. **P. foliosa**, *H. f. & T.* in *Journ. Linn. Soc.* ii. 79; stem with 4-8 leaves, staminodes ending in 3 long processes each tipped with a distinctly clubbed gland. **P. foliosa** and *P. Nummularia*, *Drude in Linnaea*, xxxix. 313.


**Stem** 8-12 in. high. Radial leaves orbicular, deeply cordate. **Sepals** patent or reflexed. **Petals** ovate above a short claw, fimbriated around their whole edge. **Capsule** 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. foliosa* 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 triglottous, superior or nearly so.


**Nilgiri** Mrs., alt. 7000 ft. **Khasia** Mrs., alt. 4500-6000 ft. ‘Himalaya,’ *Wally*.


**Stem** 8-18 in. high. Leaves often 1½ in., reniform or oval, deeply cordate. **Petals** (at least in the Khasia plant) light yellow. **Placentia** near the base of the capsule. **Seeds** ellipsoid; testa reticulate, not very lax.


Eastern Himalaya; *Sikkim*, alt. 8000-12,000 ft.; *Lachen* and *Yeumtong*, *J. D. H.* Mts. of the Western Peninsula. **Khasia** Mrs. alt. 3500-5500 ft.

**Stem** 3-8 in. high. **Leaves** ½-2 in. diam., reniform, deeply cordate. **Petals** small, white. **Seeds** small, ellipsoid; testa somewhat laxly reticulate.

**Capsule** half-inferior.

5. **P. nibicola**, *Wall.* in *Wight Ill. t.* 21; margins of petals not (or slightly) fimbriate, staminodes broadly dilated upwards 3-lobed, capsule ½ in. long obconic below subhemispheric 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 Linnaea*, xxxix. 315.

Temperate and Alpine Himalaya from *Sikkim* to *Kashmir*, alt. 6000-12,000 ft., frequent.
Parnassia. LII. SAXIFRAGACEAE. (C. B. Clarke.) 408

Stem 4–18 in. high, subulate with 4–5 ridges under the fruit. Leaves 1–2 (sometimes 3) in., ovate or cordate, oblong. Petals \( \frac{1}{2} \) in. long, white, ovate. Carpels and stigmas 3; (Drude says 4 but they are nearly invariably 3 in the Kew plentiful examples). Seeds ovoid-ellipsoid, smooth; testas reticulate, not lax.

6. P. ovata, Ledeb. in Mem. Acad. Petersb. v. 528; margins of petals not (or slightly) fimbriate, staminodes broadly dilated upwards 3-lobed, capsule \( \frac{1}{2} \) in. long obconic below subhemipheric above, style manifest in long. DC. Prodr. i. 320; Ledeb. in Fl. Ross. t. 224; Fl. Ross. i. 263; H. f. & T. in Journ. Linn. Soc. i. 82; Drude in Linnaea, xxxix. 320. P. Turczaninovii, Ledeb. Fl. Ross. i. 263; Drude, l. c. 321. P. affinis, H. f. & T. l. c. ii. 81; Drude, l. c. 317. P. Laxmannii, Pall. in Roem. & Sch. Syst. vi. 696; Ledeb. Fl. Ross. i. 364. P. trinervis, Drude, l. c. 322.
Temperate and Alpine Himalaya from Sikkim to Kashmir, alt. 8000–15,000 ft., frequent.—Distr. Altai Mts.

Stem 3–8 in. high. Leaves \( \frac{1}{2} \) in., ovate or ovate-oblong, often cordate; cauline usually solitary in the lower half of the stem. Petals \( \frac{1}{2} \) in. long, spathulate-oblate. Carpels 3, rarely 4. Testa of the seed close (Drude).—This differs from P. nubicola by the smaller size of all its parts and the manifest style. P. cabulica, Planch in Herb. Griffith, differs by the stamens being usually leafless. P. subacaulis, 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. masoerensis.

7. P. pusilla, Wall. ex H. f. & T. in Journ. Linn. Soc. ii. 81; margins of petals slightly fimbriate or quite entire, staminodes with a very short claw hardly longer than broad dilated upwards 3-lobed, capsule \( \frac{1}{2} \) in. long obovoid-ellipsoid adnate about \( \frac{1}{2} \) its length, style manifest in long. Wall. Cat. 1245; Arn. in Wight. Ill. p. 45 and in Comp. Hook. Bot. Mag. ii. 315; Drude in Linnaea, ix. 318.

Alpine Himalaya from Sikkim to Kunawur, alt. 12–15,000 ft., Wallich, J. D. H., Munro, &c.

Stem 1–2½ in. long. Leaves \( \frac{1}{2} \) in., reniform or ovate-cordate; cauline leaf usually one, often in the upper half of the stem. Petals \( \frac{1}{2} \) in. long, obovate. Carpels 3. Seeds ellipsoid, smooth; testa reticulate not lax.—This species should probably be estimated an alpine var. of P. ovata, from which it differs in its stunted size and shorter staminodes.

SECT. IV. SAXIFRAGASTRUM. Staminodes cylindric, undivided at the vertex.

8. P. tenella, H. f. & T. in Journ. Linn. Soc. ii. 80; petals \( \frac{1}{2} \) in. long green-white reflexed obovate, capsule \( \frac{1}{2} \) in. long obcordate triquetrous. Drude in Linnaea, xxxix. 323.

Sikkim Himalaya; alt. 10,000–12,000 ft.; Lachen and Lachoong, J. D. H.

Stem 2–5 in. long, weak. Radical leaves \( \frac{3}{4} \) in. broad, reniform, margin minutely erose; petiole with adnate fimbriate stipules at the base; cauline usually 1, cordate-ovate. Staminodes thick, cylindric, 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. Corymb 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-fld. *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.—**DISTRIBUTION.** 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 *Guewhal* 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 calyptro-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 tessellations but not tomentose, styles normally 2. **H. cyanema**, *Nutt. in Bot. Mag.* t. 6038.

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 subbruniate. *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. 4600-5500 ft. Arborescent, 15 ft. high; branchlets hairy. **Leaves** 4-9 in., ovate or oblong, serrate, base sometimes cordate; upper surface with scattered hairs, lower tessellated and densely clothed with white densely papillose hairs. **Corymb** hirsute. **Sepals** of the radiate flowers entire. **Styles** occasionally 4.

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.

Branches and branchlets puberulous. **Leaves** 2 in., serrate, elliptic, narrowed at the base. **Corymb** pilose. **Sepals** of the radiate flowers crenate-dentate.

**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. alissima**. **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.


**Khasia** Mts., alt. 3000-5000 ft.; **Griffith**; **T. Lobb**; **Nunklow**, J. D. H. & **Thomson**.—**Distrib.** Japan, Formosa.

**Leaves** 3-5 in. **Panicle** with a few linear-lanceolate bracts ½ in. long. **Flowers** small; filaments elongate, ⅕-⅘ in. long.
9. DICHROA, Lour.

A shrub. Leaves opposite, serrate, lanceolate, persistent. Panicle terminal. Calyx-tube adnate to the ovary; limb 5-6-toothed. Petals 5 or 6, thickish, valvate, blue or purplish. Stamens 10 or 12, epigynous. Ovary 3-5-inferior, 1-celled; styles 3-5; ovules numerous, on 3-5 parietal placenta formed by the indented margins of the carpels. Berry 3-5-inferior, blue. Seeds numerous, small, obovoid; tests with large reticulations.


Stems 5-9 ft. high, somewhat virgate. Leaves 3-5 in., tapering into the petiole, pubescent or puberulous on the nerves, otherwise glabrous, usually narrow, sometimes obovate-lanceolate. Petals 3-5 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. Stamens 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 septicidial. Seeds minute, numerous, obovate-ellipsoid; tests reticulate, a little longer than the nucleus, appearing at last as a short stalk at its base, as a point at its summit.—Distr. 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.—Distr. China, Mantchuria, Amurland.

Leaves 1-2 in., oblong or elliptic lanceolate; 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 \(\hat{\text{D.}}\) 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 Nepal and named *D. staminea* should be referred to *D. corymbosa*.

Leaves 1–2 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. **PHILOPHIUS**, 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 short conical, at length loculicidal. Seeds numerous, oblong, testa loosely reticulated.—DISTR. Species 8; central Europe, the Himalaya, Japan and N. America.


**Temperate Himalaya**; from Kashmir to Bhotan, alt. 5000–9000 ft.; frequent in GURWHAL and KUMAON.

Leaves 1½–3½ in., ovate-lanceolate, serrate; petiole ¼ in. *Cymes* few-flowered, often with linear bracts ½ in. long; pedicels 1–1½ in. Calyx-teeth elongate-triangular, acute. Petals ½–1½ in. long, white. Capsule ½ in. long.—The typical *P. coronarius* (of which Zeyheri, floribundus, verrucosus, latifolius, and many others are varieties) is a native of Europe and the East, extending to North China and Japan.

12. **ITHEA**, 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 ⅜-superior, 2-celled; style short, simple; ovules
many, axile. **Capsule** ½-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. **Kurrinia** ?, **Wall. Cat.** 7200.

Subtropical Eastern Himalaya; Bhotan and Sikkim, alt. 1000-4000 ft., Griffith, Gamble. **Khasia Mts.**, alt. 2000-4000 ft., frequent.—**Distrib.** Java.

A small tree. **Leaves** often 6 by 3 in., broadly ovate, acute, glandular-denticulate, 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** ½-3 in. long, the bases of the carpels clearly sunk below the limb of the calyx-tube; the calyx-teeth finally wear off.


**Khasia Mts.**, alt. 4000-5000 ft., Wallich, &c.—**Distrib.** China, Hong Kong, Formosa, &c.

A shrub. **Leaves** usually 3 or 4 in., oblong, narrowed at both ends, glandular-denticulate, 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** ½-3 in., bases of the carpels hardly sunk below the calyx-tube; calyx-teeth persistent, suberect.


**Gurwhal and Kumaon**, alt. 3000-5000 ft., Royle, &c.

A shrub. **Leaves** 3-5 in., elliptic-oblong, acute, glandular-denticulate. **Capsule** ½ in. long; calyx-teeth persistent, erect.


Evergreen trees, branchlets petioles and inflorescence pubescent. **Leaves** opposite or subopposite, petioled, 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, stigmas simple; ovules 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 Malay 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.—Distr. 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., pubescent on the nerves beneath. Lower flowers of the raceme ⅝ in. long; pedicels ⅜ 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. 1. typica; leaves quite entire.


MALAY PENINSULA; Malacca, Griffith, Maingay.—Distr. 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 1-½ in., quite entire, rarely obscurely glandular-denticulate; upper surface sometimes softly hairy, sometimes shining and glabrous, lower always hairy. Pedicels ½ in. long, woolly. Flowers ⅛ in. long. Fruit erect on the pedicels, the bracteoles remaining horizontal become very prominent.—P. latifolium 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.—Distr. Species 56; temp. Europe, Asia, N. America, and the Andes.


Alpine Western Himalaya, from Kumaun to Kashmir, alt. 9000–12,000 ft.; frequent.—Distam. North and Alpine Europe; the Atlas, Greek and Caucasian ranges.

Prickles usually 3 beneath each axil; stems smooth or with numerous prickly sets. Leaves suborbicular, obtusely 3–5-lobed, the lobes incise-crenate, somewhat villose beneath. Pedicules usually solitary. Calyx-tube long, produced above the fruit. Berry ½ 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.—Distam. 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. in 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 ½ in. linear-lanceolate usually much exceeding the pedicels, calyx-segments oblong, berries ½ 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.

Temprande and Alpine Himalaya, from Bhotan to Kashmir, alt. 7000–12,000 ft.; common and often ophiistic.

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 ½ in. long, spatulate-oblong much exceeding the pedicels, calyx-lobes lanceolate, berries glabrous small less than ½ 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 \( \frac{1}{2} \) in., lobes crenate-serrate. Racemes pubescent, erect in fruit, short. Flowers sub- sessile, chestnut. Calyx-tube of the flower subcampanulate.—Very near R. glacialae; the leaves are in general outline subreniform while those of R. glacialae 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.—Distrib. 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 \( \frac{1}{2} \) in. long linear-lanceolate exceeding the pedicels, berry \( \frac{1}{2} \) 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 Himalayas, from KUMAON to KASHMIR, alt. 8000-12,000 ft., frequent; Royce, T. Thomson, &c.—Distrib. 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-fld more rarely 6-8-fld, 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 *Triocista* and in a few *Sedums*) with a hypogynous gland or scale at the base of
—
;

412

(C. B. Clarke.)

LIU. ceassulacej:.

[TillcBa.

each ; free, or connate below, narrowed upwards into the styles ovules many on
the edp^es of the carpels (few in Tilkea, Triaeiina and some Sedums).
Follicles
dehiscing down the inner faces, many-seeded, or 1- few-seeded in Tilliea, Triactma and a few Sedums. Seeds albuminous embryo terete, cotyledons short.
DisTEiB. 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.
;

;

;

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Stamens

as

many

as the petals, leaves opposite (see also Cotyledon).

Small herbs with minnte axillary sessile flowers
Succulent herbs with flowers in a paniculate cyme

**

f

1.

2.

Tillsa.
Cbasscia.

Stamens twice as many as the petals.
Petals connate, at least at the hose.

Calyx shortly 4-fid
Calyx 4-partite
Calyx 5-partite

4.

Betophyllum.
Kalanchob.

5.

Cotyxedoit.

6.
7.

Seduji.
SaMPKBTiTDir.

8.

TEiAcnKA.

3.

tt Petals free.
Carpels &-4 (rarely 3) free or slightly connate
Carpels 6-8
Carpels 3, connate half their length

1.

TXXiXiSBA,

Linn.

Small glabrous succulent herbs. Leaves opposite, entire, flat in the Indian
Flowers minute, axillary, often fasciculate, solitary or cymose, white
CSi/ya: 4^5-fid.
or red.
Petofe 4^, free or connate at the base. Stamens A^5.
Hypogynous scales 4^5 or 0. Carpels 4r-5, free, narrowed into short styles with
minute stigmas ; ovules 2 to each carpel in tiie Indian species. Follicles 2seeded.—DisTRiB.
genus of 20 species, widely distributed, scarcely separable
from Crassula.

species.

A

1. T. pentandra, Royle
III.
222 (name only) ; leaves lanceolatelinear acute, flowers sessile in the axils often 2-3-nate, seeds ellipsoid subtrigonous pointed at the end. Fdyw. in Trans. Linn. Soc. :kx. 50 ; S. f. ^ T.
Crassula (Disporo-

carpa) Schimperi, Fisch.

8r

Mey. Ind. Sem.

viii.

66.

Subtropical Himalaya, from Kumaon to Kashmie, alt. 3000-6000 ft., frequent.
Deccan Peninsttla ; Mysore, T. Lobb NUghiris, Hohemaclcer Concan, Stocks.—
DiSTBiB. Tropical Africa, Abyssinia and the (^meroons.
;

;

Stems procumbentjbranched ; intemodes shorter than the leaves. Leaves J-i in.
long, connate at the base.
CoZyx- segments lanceolate-acuminate, Petals elliptic,
acuminate, white, not exceeding the sepals. Hypogynous scales cuneate, truncate
{ex C. A. Meyer).
2. T. phamaceoides, Hochst. in Schimp. Serb. Abyss. No. 104 ; leaves
ovate-lanceolate or lanceolate, flowers densely clustered in the axils pedicelled,
H.f. Gen.
Pl.i. 657.
Crassula (Disporocarpa) phamaceoides,
Fisch. Sr Mey. Ind. Sem. viii. 56.
0. eampestris, Harv. 8; Stmd. Fl. Cap. ii.
351.


PUNJAB PLAIN; Hushiarpore, Aitchison; Peshawur, Vicary.—Distrib. Persia, Central and South Africa.

Stem decumbent, branched; internodes longer than the leaves. Leaves ¼-½ in. long, connate at the base. Pedicels very short or ¼ in. long. Calyx-segments lanceolate, acuminate. Petals shorter than the sepals, united at the base, very acute or hair-pointed. Hypogynous scales minute, spathulate (ex Richard).—This species is still smaller than T. pentandra, its flowers are less than ¼ 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-fid 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. Bhutan, Griff.

Lower leaves 1–1½ in. long, blunt or shortly acute; stem-leaves sessile, subdecurrent, usually narrow oblong. 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, crenate. 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-fid 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 1–1½ in. long, purplish green. Corolla globose-octagonal at the base, green, constricted in the middle; the exserted parts redish-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 herbes. 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 flax-shape 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 oblong. 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 8–16 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 petioled. 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; Wallach.—Distr. Warm China, Java.

Stem 1–4 ft. high. Lower leaves commonly 3–4 (sometimes 10) in. long beside the petiole; upper leaves (with the petiole) often 3–4 in. long by ½ in. broad, frequently sessile. *Corymb* flatish or more rarely elongate, with few scattered linear bracts ½–1 in. long. Flowers clear yellow, the corolla-tube glabrous. Calyx in fruit often as much as ¾ in. wide.—This species should probably be united with *K. egypthiaca* (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...

_Mrs. of the Deccan Peninsula, alt. 2000–7000 ft.; common._


_Nilgiri and Pulney Mrs., alt. 7000–8000 ft.: Gardner, Wight, &c._


_Mrs. of the Deccan Peninsula; Tovequary Hill in Belgaum and North Deccan Hills, Ritchie.—Distr. Brazil, Tropical Africa._


_Tropical regions of the Deccan Peninsula; in Bengal at Patna, Dacca. Burma, Balisieh, Malacca, Mainag.—Distr. Yunn., Java, Tropical Africa._

_Var. 1. typica; leaves once pinna-tifid, 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.
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.—Distr. 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, staminodia 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 ½ 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, rosulate narrow lanceolate aristate, flowers at the summit of the branches 3–1 nodding white. Umbilicus Oreades, Dcne. in Jacq. Voy. Bot. 62 (U. luteus, Ic. 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 rosulate 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.

6. SEDUM, Linn.

Succulent herbs. Leaves alternate or rosetulate, rarely opposite; entire or \textit{laciniate}. Flowers cymose, hermaphrodite, or unisexual by abortion. \textit{Calyx} 5-4-partite. Petals 5-4, free. \textit{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. \textit{Follicles} 5-4, many-seeded.—Distr. Species 130; mostly in the cold and temperate regions of the northern hemisphere; one species is found in Abyssinia and one in Peru.

\textbf{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).


\textit{Alpine Western Himalaya}; from \textit{Kumaon} to \textit{Kashmir}, alt. 12,000-17,000 ft.; frequent.—Distr. The arctic and alpine regions of America, Europe and Asia.

Very glaucous. Rootstock having an odour of roses. Stems 3-15 in., thick. Leaves $\frac{1}{2}$-1$\frac{1}{4}$ in. long, imbricated (often very closely) from a narrow or broad base. Cyme densely congested. Sepals narrow oblong. \textit{Stamens} long, exert. Carpels in fruit $\frac{1}{2}$ in. long, not narrowly gradually at the base.—The examples of \textit{S. imbricatum} have dioecious (or functionally dioecious) heads; and the carpels have short recurved styles, altogether as in Sect. \textit{Rhodiola}.

2. \textbf{S. heterodontum}, \textit{H. f. \& T.} in \textit{Journ. Linn. Soc.} ii. 95; leaves ovate incise-dentate from a broad or cordate or auriculate base prominently white-margined, flowers rose-coloured \textit{i} (ex \textit{H. f. \& T.}). \textit{S. serratum}, \textit{Jacquin} \textit{Journ.}


\textit{S}tems 12-18 in. Leaves loosely imbriccate. \textit{Cyme} very dense, especially in fruit. Otherwise agrees closely with \textit{S. Rhodiola}, of which \textit{H. f. \& T.} suggest it may be a variety.

3. \textbf{S. crenulatum}, \textit{H. f. \& T.} in \textit{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. Blanford. Kumaon, alt. 12,000–17,000 ft., Chumpus 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 1-2 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 (Wergang Pass) T. Thomson; Lahun, Jaeschke.—Distrib. Kabul, 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. Stracheyi, 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 indistinguishable 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 ½ 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 ½–½ in. loosely imbricate narrow-ovate 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, 7237.

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 ½ in. long, black-purple.—S. atropurpureum, Turez. 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.
Sedum.]

LI. CRASSULACEA. (C. B. Clarke.)

Stems 6-14 in. high, glabrous, or the cyme puberulous. Hypogynous scales black purple, broadly cuneate-square (ex H. f. & T.).


**Alpine Himalaya**, from Sikkim to Kashmir, alt. 10,000-18,000 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 ½ in.

9. **S. fastigiatum**, H. f. & T. in *Journ. Linn. Soc.* ii. 98; stems numerous, leaves 1-½ 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 quadrangular. Follicles more than ½ 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 1-½ in. long, linear or linear-oblong, cymes 1-4-flowered, sepals ovate acuminate, petals lanceolate wider upwards than the sepals.

**Sikkim**, alt. 15,000-16,000 ft.; Yumtong and Tumbing Pass, *J. D. H.* Flowers large for so small a plant. Hypogynous scales broad square (ex H. f. & T.).—This species is distinct from the other Indian species by its sepals.


**Nepal**, 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, subcuneate (ex H. f. & T.).

**Var. Wallichianum**, H. f. & T. in *Journ. Linn. Soc.* ii. 100 (sp.); Hook. *Lc. Pl.* t. 604; leaves broader more denticulate sometimes subpinnafuld.—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.


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. typical; 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 pedicelled, 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 obvoid, not compressed, the testa not loose.**

* Follicles 5, erect in fruit. Radical leaves rosulate.


Stem glabrous, more rarely glandular-pubescent. Rosulate leaves $\frac{1}{2}$-1 $\frac{1}{2}$ in. spatulate or elongate obovate. **Cymes weak, straggling, often subsecund or subscopoid with long pedicels $\frac{1}{2}$-1 in. long. Follicles small, thin-walled, erect. Seeds ellipsoid, somewhat obvoid, smooth, longitudinally striate.**


Rosulate leaves $\frac{1}{2}$-1 $\frac{1}{2}$ in. spatulate or elongate obovate. **Cymes lax with pedicels 1-1 in. long, often with two or more erect elongate branches. Follicles thin-walled, erect. Seeds obvoid, 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.

17. S. Griffithii, C. B. Clarke; stems 2-4 in. very weak glabrous, cauline leaves $\frac{1}{4}$-$\frac{3}{4}$ in. linear, cyme leafy corymbose, sepals narrow oblong, petals white elliptic lanceolate. S. adenotrichum, Var. β.; H. f. & T. in Journ. Linn. Soc. ii. 101.

Botan; 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. rosetatum. It differs from both in the linear cauline leaves and particularly in the cyme, which is corymbose and somewhat dense, with linear bracts like the cauline leaves.

18. S. trullipetalum, H. f. & T. in Journ. Linn. Soc. ii. 102; glabrous, stems 2-4 in., cauline leaves $\frac{1}{4}$ in. imbricate lanceolate-linear acute, cymes dense, petals white-yellow with a very long claw and ovate corolate or lanceolate limb.

Temperate and Alpine Himalaya from Sikkim to Kashmir, alt. 11,000-16,000 ft. Rosulate leaves $\frac{1}{4}$ 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; cauline 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 $\frac{1}{2}$ in. long. Calyx segments $\frac{1}{4}$-$\frac{1}{2}$ 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 corymbs.

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 corymb branches are $\frac{1}{2}$ 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 Sogangaria.
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 obvoid, testa not loose.

** Follicles 3-5, divaricate in fruit.

21. S. pallidum, Bieb. Fl. Taur. Cauca. i. 353 and iii. 314; stems 1-5 in. annual solitary cymose at top, carpels minutely squamose-tuberculate, seeds

PUNJAB PLAIN; Peshawur, Vicary; Hurroo and Hassahabad, Aitchison.—District. 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, three as long as the triangular acute sepals. Cyme—branches minutely glandular, divaricate-recurred 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 Brotan; frequent. —Districts. China and Japan.

Leaves ½–1 in. long, linear-oblong, acute. Flowers subsessile, petals yellow. Cyme branches divaricate in fruit, usually elongate, subscorpoid.

23. S. perpusillum, H. f. & T. in Journ. Linn. Soc. ii. 103; glabrous, stems 1–2 in. branching crowded, follicles short oblong turgid small, seeds large (therefore few in each carpel) obovoid hispid with elongate papillae.

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.—District. 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.

Stems 4–8 in. high. Rosulate leaves 1–2½ in. long, obovate-lanceolate or nearly linear; cauline ½ in., sessile, oblong, acuminate, but little imbricate. Cyme somewhat lax. Petals glabrous, purple-rose, twice or thrice the sepals. Seeds narrow obovoid, striate longitudinally.

Alpine Himalaya, from Kumao to Kashmir, alt. 10,000-12,000 ft.; Kumaon, Strachey & Winterbottom; Niti, Edgeworth; Gurwhal, Falconer; Kashmir, Jacquemont.

Stems 2-6 in. high. Rosulate leaves 1½ in. lanceolate; cauline sessile, oblong-lanceolate, more or less pubescent. Cyne somewhat dense. Petals white, scarcely twice the sepals. Seeds narrowly obovoid, striated longitudinally, hardly half so big as in S. acuminatum.


Stems 1-3 in. Rosulate leaves ½ in. long; cauline ½ in. somewhat densely imbricate, sessile, oblong or elliptic, glandular-pubescent. Cyne 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 ½-1½ in. long, entire, narrowly obovate. Flowers subsessile. Sepals very small. Seed ellipsoid, somewhat obovoid, hispid with elongate papillae.

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. 90 characterise Triactina as having polyspermous 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. DROSERAEE. (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 6–8)–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, capitata 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.—Distribution. 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. **Drosera**, Linn.

Perennial herbs, scapigerous or with a leafy stem, glandular-pilose. Leaves rosetulate or alternate, usually circinate in vernalation; 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-ellipsoid with the testa black smooth reticulate not lax.—**Distrib.** Species 100, scattered throughout the world except Polynesia; very numerous in Australia.

1. **D. Burmanni**, Vahl, Symb. iii. 50; leaves all radical rosetulate cuneate-spatulate, stipules equalling half the petiole, scapes 1-3 glabrous, flowers racemose with glabrous pedicels, styles 5 undivided. *Don Prodr.* 212; *DC. Prodr.* i. 318; *Roxb. Fl. Ind.* ii. 113; *Wall. Cat.* 1242; *Wight. Ill.* t. 20 (the styles incorrect); *Wight Ic.* t. 944; *W. & A. Prodr.* 34; *Planch. in Ann. Sc. Nat. ser. iii.* vol. ix. 190; *Miq. Fl. Ind.* i. pt. ii. p. 120; *H. & T. in Journ. Linn. Soc.* ii. 82; *Thwaites Enum.* 21; *Dalz. & Gibbs. Bomb.* Fl. 12; *Kurz in Journ. As. Soc.* 1876, pt. ii. 310.

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.

Leaves ½-1½ in. long. Scapes 2-8 in. high; pedicels erect in fruit. **Calyx** minutely papillose.


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 ½-⅓ 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.—Distrib. Malay Archipelago to Australia.

Stems 3-12 in. high, simple or corymbose upwards. Racemes subterminal, pedicels \( \frac{1}{2} - \frac{3}{4} \) in. long. Flowers white. Seed as in the preceding species; with a close testa (as Benth. correctly) and not tuberculate, 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. Moulmein and Singapore.

Var. 2. lunata; 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. petiata 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.

A weak succulent diaphanous glabrous floating herb in water. Stems articu-
culate, with whorls of spathulate-orbicular leaves at the nodes, the laminae \( \frac{3}{4} \) in. diam., contorted, bladdery. Flowers peduncled, axillary, solitary. Calyx 5-partite. Petals 5, hypogynous, connivent in a cap. Stamens 5, hypogynous. Ovary 1-celled; styles 5 with terminal branching stigmas; ovules numerous, on 5 parietal placentae. Capsule globose, 5-valved. Seeds numerous, broad, obovate, tests black shining.


Salt-pans south of CALCUTTA; Roxburgh; T. Thomson; S. Kurz.—Distrib. Central Europe and Australia.

ORDER LV. HAMAMELIDEE. (By C. B. Clarke, F.L.S.)

Trees or shrubs, often with stellate pubescence; prosenchyma of the wood
marked with discs as in the Coniferae. 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-\( \infty \), 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-\( \infty \), 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 horny separating from the exocarp. Seeds 1, or many when usually only the lowest in each cell is perfect.—Distrib. Species 90; 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. Parrottia.
Ovary superior. Flowers separate, not in heads. 2. Distylium.

** Petals present.


B. Ovules several in each cell.

Male flowers without a perianth. Leaves oblong-lanceolate, serrate. 8. Altingia.

1. Parrottia, 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 membranaceous 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, Dcne. in Jacq. Voy. Bot. t. 82; anthers less than \( \frac{1}{4} \) in. long subquadratce, 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, Falc. 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 \( \frac{3}{4} \) in. long. Flowers small, involucral bracts ovate \( \frac{1}{4} \) in. long. Calyx-segments narrow, oblong or linear. Fruit in harsh spherical heads 1-1\( \frac{1}{4} \) 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.
Diospyrum.]

LV. HAMAMELIDÆ. (C. B. Clarke.) 427

1. D. indicum, Benth. in Herb. Griff. No. 3377; leaves 3–4 in. more or less stellately pubescent beneath, petiole ¼ in., ripe fruit ½ in. long densely stellate tomentose.

**Khasia Mts.**; **Griffith.**

Griffith’s specimens are all in half-ripe fruit. Bark lenticelled, the end of the twig and stipules with rusty stellate pubescence. **Spikes** 1–3 in. long, with stellate pubescent, each bearing 2–4 fruits, pedicels ½–1 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 ½ 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 spires, both sexes in the same spike. **Male**: calyx very small; petals 0; stamens 8 (of which several appear abortive); rudimentary ovary 2-fid. **Female**: calyx-tube adnate to the ovary for ⅔ 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 ⅓ in. long. **Spikes** less than 1 in. stellately pubescent (and with sheathing bracts Benth. & H. f.). Young fruits ½ 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. *Petal* 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 divericate; ovules 1 in each cell, pendulous. **Capsule** woody, endocarp horny, separating from the exocarp. **Seeds** narrowly ellipsoid, tests black shining.—**Distrib.** 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 lenticellated. Leaves 4 in., round-ovate and acute, or smaller and narrower, often cordate at base with a petiole \( \frac{1}{2} \)–1\( \frac{1}{2} \) 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 Fokien, 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.

A much branching woody shrub. Leaves alternate, oblong, entire, persistent; stipules membranous, soon deciduous. Flower-heads peduncled, quasi-terminal, ebracteate, of 6–8 sessile flowers. Calyx-tube adnate to the ovary, limb of 4 valvate lobes. Petals 4, perigynous, linear, cincinate in aestivation. Stamens 4, perigynous, filaments very short, connective produced as a horn. Hypogynous scales 4, very small. Ovary half-inferior, 2-celled; styles 2, distinct, soon divergent; ovules in each cell 1, pendulous. Capsule woody, ovoid, endocarp horny, separating from the exocarp. Seeds narrowly ellipsoid, testa black shining.


Khasia Mts. alt. 4000–5000 ft.; J. D. H. & T. Thomson.—Distrib. South China. Twigs and inflorescence with much stellate pubescence. Leaves 1–2\( \frac{1}{2} \) in. long, stellate-hairy on both surfaces (small in the Chinese specimen), acute, from a rounded base; petiole \( \frac{1}{2} \)–\( \frac{3}{4} \) in. long. Petals \( \frac{1}{2} \)–\( \frac{3}{4} \) in. long, 4 or 5 times the sepals, 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. **Maingayya**, Oliver.

A tree. Leaves alternate, undivided, petioloed, 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, cincinate in aestivation. 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 2–5 in. long, oblong-lanceolate, petiole \( \frac{3}{4} \)–\( \frac{5}{6} \) in. long glabrous. Petals \( \frac{3}{4} \)–\( \frac{1}{2} \) in. long, 4–6 times the sepals. Dehiscing capsule \( \frac{1}{2} \) in. long and \( \frac{1}{2} \) in. broad.—Maingayya 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-pعدuncted 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 6-lobed. Petals in the 2 flower linear-spatulate, fleshy, variable in number; in the 3 rudimentary. Stamens 10–14 (in the 3 a 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.


TEMPERATE Himalaya, from NEPAL to BHOTAN, alt. 5000–8000 ft., common. Khasia Mts., alt. 4000–6000 ft., common. BURMA, Griffith, Kurz.—DISTR. 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 1–6 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 tricuspis does not differ in the smallest point from Himalayan specimens some of which have tricuspidate leaves and sericeous petioles. Of 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 achlamydeous 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 3-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.—DISTR. 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 acuminate, and much more shortly petioled.

**Order LVI. HALORAGIDÆ.** (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- or 1-celled; styles 4, 2 or 1, fimbriate or simple; ovules 4, pendulous (or in *Hipparis*) 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 . . . 1. **HALORAGIS.**

**Terrestrial.** Male flowers pedicelled. *Stamens* 8 . . . . . 2. **SERPICOLA.**

Aquatic. *Stamens* 1. *Style* 1. *Ovule* 1 . . . . . . . . . . . . . . 3. **HIPPIRUM.**


1. **HALORAGIS,** Forst.

Branching wiry herbes. *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* § in., opposite, very shortly petioled; upper sometimes alternate passing by degrees into the lower bracts. *Flowers* very small; pedicels about § in. *Petals* thrice the triangular sepals. *Fruit* about § in. long, shining, glabrous with 8 ribs, 1-celled, 1-seeded.

2. **SERPICULA, Linn.**

Herbs, small, decumbent, branching. *Leaves* opposite or alternate (often on the same plant). *Flowers* monocious, 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 papillos or plumose stigmas; ovules 4, pendulous. **Nut** minute, ovate, 1-seeded, 8-ribbed or smooth.—**Distrib.** Species 2-4 in the marshes of warm Asia, Africa, and America.

1. **S. zeylanica**, Arn. in Herb.; suffruticose, leaves linear or linear obovate 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** 1-4 in. opposite and alternate on the same stem, densely approximated. **Pedicels** of the male fl. equally the leaves. **Stamens** 8. **Nut** most minutely puncticulate between the ribs not pilose.

**Var. minor:** stems very delicate scarcely 2 in. *S. indica* Thwaites β. 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. My- sore, T. Lobb.**

Pilose, or sometimes glabrous except the ovary and calyx. **Leaves** 1-4 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. **Nut** generally very free from ridges or tubercles.
S. veronicaefolia, Bory of Java; Tulase 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 tuberculate. *Serpicula verticillata*, Roxb. Cor. Pl. t. 164 and Fl. Ind. iii. 578 is *Hydrolla 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. *Stamens* 6, *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.


W. Tibet, alt. 10,000–15,000 ft.; Falconer, T. Thomson, Strachey & Winter-bottom.—Disturn. 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 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; monocious or hermaphrodite. **Male**: *calyx*-tube short, limb 2–4–5d 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.—Disturn. 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* Ill. t. 109 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 *Haloragis oligantha* Wight Ic. t. 1061 is *M. intermedium* DC., as are Wight's own herbarium specimens of his *Haloragis oligantha*; but not so Arnott's, as see under *Serpicula 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 1/3 in. linear cuneate toothed upwards, fruit 3/4 in. long, a broad furrow between the acute carpel-backs, both the ridges and the broad furrows carrying pointed small tubercles. *Wall* Cat. 6397; DC. Prodr. iii. 69; *Miq. Fl. Ind. Bot.* i. pt. i. 635. *M. intermedium*, *Wight* Ill. t. 102 as to the fruit only. *M. indicum*, *Griff*. Not. iv. 637.

**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**, Willd. Sp. Pl. iv. 407; spikes in fruit subterminal, floral leaves ¾ in. narrow-lanceolate or linear-lanceolate, upper entire or crenate, fruit scarce ¾ 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. 389; M. Fl. Ind. Bat. i. pt. i. 634. M. tetrandrum, Roxb. Fl. Ind. i. 451; Griff. Notul. iv. 686; W. & A. Prodr. 389; M. Fl. Ind. Bat. i. pt. i. 634. [M. indicum, Wight Ill. t. 102 to be altogether excluded.]

**Assam and Bengal**, in the jheals 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*.


*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 ¾ 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. **Kymox**, alt. 5000 ft.—Distrib. Cabul, 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 corky and thickened; called *M. spicatum* Linn. var. muricatum by Maximowicz (Diag. Pl. xx. 183) who quotes correctly Griff. No. 2442 (Kew Distrib.).

5. **M. intermedium**, DC. Prodr. iii. 69; fruit axillary, floral leaves ¾–1 in. long alternate solitary or 2–3-nate linear and entire to lanceolate and incis-serrate, fruit very small hardly ¼ in. long but less broad, carpels rounded and most minutely scabrous on their backs, furrows shallow. M. Fl. Ind. Bat. i. pt. i. 694. M. indicum, Wight Ill. t. 102, the plant only, not the fruit. M. variifolium, Hook. Ic. Pl. t. 289. M. linearae, Heyne in Herb. Bottl. Haloragis oligantha, W. & A. Prodr. 388; Wight Ic. 1061 not of Arn.

**Nileghri** Mrs., alt. 7000 ft.; Hohenacker No. 1563, Gardner, Schmidt, Wight. Cuttalam, Deccan Peninsula, Rotter, Mayaburam, Sir T. Adam.—Distrib. Malaya, Australia, New Zealand, South America.

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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. variabilis 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 Hottotia 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. CALLITRICE, 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 monocious, solitary, or sometimes one male and one female in the same axil simulating a hermaphrodite flower; acalyx absent; 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.—Distrib. 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.]


Indian mountaine from the Himalaya, alt. 5000–10,000 ft., to the Deccan, alt. 7000 ft. Ceylon, alt. 5000 ft., Tawates.—Distrib. Europe. North Asia, Tropical Africa, Malaya, Australia and New Zealand.


Temperate Western Himalaya, alt. 5000–8000 ft., Edgeworth; Kashmir, alt. 7000 ft., C. B. Clarke.—Distrib. Europe. Cold and temperate Asia and North America.

Order LVII. RHIZOPHORES. (By the Rev. G. Henslow, F.L.S.)

Trees or shrubs. Leaves opposite, stipulate (except Anisophyllum), usually coriaceous, glabrous; stipules interpetiolar, very caducous. Flowers axillary, usually bisexual, surrounded at the base with connate or cupuliform bracts or bracteate. Calyx more or less adnate to the ovary (except Bieparistemma); limb produced beyond the ovary, 4–14-lobed; lobes valvate, persistent. Petals equal in number to the sepals, entire or subulate, 2-fid or lacerate. 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
Anisophyileae); 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.—

**Distribution.** 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. Legnotideæ.** 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 bracteolate, half-superior, lobes erect . . 5. *Carallia.*

Calyx-tube ebracteolate, half-superior, lobes reflexed . . 6. *Pellicalyx.*

Calyx-tube ebracteolate, adnate to the base of the ovary; cells of the ovary 4-ovuled . . . . . . . . . . . . . . . . . 7. *Gynotroches.*

Calyx-tube with connate bracteoles, adnate to the base of the ovary, lobes patent; cells of the ovary 2-ovuled . . . . 8. *Weinea.*

Calyx-tube ebracteolate, adnate to the base of the ovary, lobes erect . . . . . 9. *Blepharistemma.*

**Tribe III. Anisophyileae.** Leaves alternate, exstipulate. Ovary inferior; styles 4. Embryo exalbuminous.

Characters of the tribe . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . 10. *Anisophyilea.*

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, surrounded 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.—**Distribution.** 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, subcommis, coriaceous; margins involute.—A variety in Malacca, R. stylosa, Griff. (sp.) Notul. iv. 666; and L. Pl. Asiut. t. 640, differs according to Griffith from R. conjugata in its smaller stature, length of style, smaller radicles, 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 pedioles 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.


2. **GERIOPS, Arn.**

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 capitate 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 ½ 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.
Kandelia. | LVII. RHIZOPHORES. (G. Henslow.) 437

3. KANDELIA, Wight & Arn.

A small tree. Leaves oblong, obtuse. Peduncles axillary, dichotomously branched, few-flowered. Flowers rather large, white. Calyx 5-6-merous, surrounded at the base by conuate bracteoles, adnate to the base of the ovary; lobes linear, valvate. Petals 2-fid; lobes multifid, segments capillary. Stamens indefinite, filaments slender exserted. Ovary 1-celled, prolonged above the calyx into a fleshy cone; stigma 3-lobed; ovules 6, fixed in pairs to a central column. Fruit ovoid, girt by the reflexed limb of the calyx, 1-celled, 1-seeded. Radicle fusiform, very acuminate. Germination as in Rhizophora.


Sunderbunds and tidal shores of both Peninsulas and Ceylon.—District. Malay Islands.

A small evergreen tree. Leaves 2-4 by 1-2 in., narrowed at the base, quite entire, dark green above, reddish brown beneath, glabrous. Peduncles about 1½ in., erect, twice branched dichotomously. Fruit 1 in. long, conic-ovoid.

4. BRUGUIERA, Lam.

Trees. Leaves usually coriaceous, oblong, quite entire. Peduncles axillary, recurved, 1-go-flowered. Flowers rather large, coriaceous. Calyx 8-14-merous, obconical or campanulate, ebracteate, 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.—District. Species about 8 in the tropics of the Old World.


Littoral and especially estuarine forests of India from the mouths of the Indus to Malacca and Ceylon.—Districts. 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 cuneous, shorter than the pedicels. Flowers about 1 in. diam. Calyx-tube almost campanulate, limb 10-14-cleft. Petals 10-14. Radicle fusiform with about 8 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.
2. **B. eriopetala**, *W. & A. in Wight Ill. i. p. 210; Jc. t. 239 B.; peduncles 1-flowered, calyx usually about 10-cleft, lobes linear acuminate about 1 in. exceeding the ribbed tube in fruit, petals with margins densely hisrate with silvery hairs from base to apex lobes somewhat obtuse, one seta on each lobe and one longer in the notch, ovary 3-4-celled. **Wall. Cat.** 2451; **Brand. For. Fl.** 219. B. Rumphi, **Blume Mus. Bot.** 138. B. parietosa, **Griff. Notul.** iv. 670; **Jc. Pl. Asiat.** t. 641.

**Malabar; at Quilon, Wight. Malayan Peninsula,** **Griffith.**—**Distrib.** Malayan 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.** Malayan Archipelago.

A small tree. Leaves oblong to oblong-lanceolate, acuminate at both ends, scarcely coriaceous. *Peduncles* shorter or nearly equaling the petioles, 1-5- usually 3-flowered; **buds** subacute, pedicelled. *Calyx*-tube obtuse at the base, not ribbed. **Fruit** about 1 in., urceolate, slightly constricted below the calyx-limb. **Radicle** subcylindraceous, subacute.

4. **B. malabarica**, *Arn. in Wight Ill. i.** 210; peduncles about 3-flowered, calyx about 8-cleft, lobes subobtuse reflexed about 1 in. and half the length of the tube in fruit, ovary 2-celled. Rhizophora cylindrica, **Linn. sp. 635 in part.** —**Rheed. Hort. Mal.** vi. t. 33.

**Malabar Coast; Rheed, Wight.**

A tree. Leaves herbaceous. *Peduncles* equaling the petioles, 3-flowered. **Buds** obtuse, sessile. **Fruit** about 1 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.** Malayan 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-chozomatous 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 epigynous, 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; testa fibrous; embryo curved.—Distr. Species about 7, natives of the Indian Ocean.


Forests of the outer Sikkim Himalaya, Bengal, Assam, SiIhert, Burma, both Peninsulas and Ceylon.—Distr. 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 once 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. l.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 Itc. iii. t. 604; Kurz For. Pl. Brit. Burm. i. 437; Wight Itc. t. 604. C. confinis, Blume Mus. Bot. i. 129. C. lucida, Roxb. Cor. Pl. iii. t. 211; Wight Itc. iii. t. 605. C. lanceolaria, Wall. Cat. 4881.

Tropical forests of Tenasserim, Kurz.—Distr. 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 Ratnapoors, at no great elevation, Thwaites.

A great tree. Leaves 1½-3 by 1-1½ in., ovate, shortly acuminate, narrowed at the base, punctate beneath; petiole ½-1½ in.; stipules about ⅜ in. very deciduous. Bracteoles rounded, retuse, often mucronate, about 1½ in. Flowers subsessile, ½ in. diam. Calyx-lobes 4, equalling the tube. Petals broadly cordate, clawed, margin incisosinuate. Ovary 4-celled; stigma crenate.

Var. B. Thwaites l.c.; leaves shorter more rounded and coriaceous. Central Province, alt. 4-5000 ft., Thwaites.

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-fld, recurved, campanulate above the ovary. **Petals** 2–6, tips lacerate. **Stamens** 10–12, inserted with the petals on the margin of a crenulately 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, pendulums from the axis. **Fruit** pisiform or turbinate, black, fleshy, 5–10-celled, many-seeded. **Seeds** ovoid, testa striated; embryo becoming green, black, in the axis of the albumen; cotyledons scarcely broader than the terete elongated radicle.

1. **P. axillaris**, Korth in *Van der Hoec. et de Vries* Tijdschr. iii. 20, t. 2; *Benth. in Journ. Linn. Soc.* iii. 75; *Griff. Notul. iv. 429; *Io. Pl. Asiatic.* t. 486 (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; peduncles 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, furrowed, 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.—**DISTRIBUT.** Species 2, natives of the Malay Islands.


**Leaves** 2–5 in., oblong or elliptic, acuminate, coriaceous. **Flowers** small, numerous, axillary, subdiesecious; 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.


Trees or shrubs. **Leaves** oblong, quite entire or obtusely serrate; stipules interpetiolar, oblong, deciduous. **Flowers** in axillary 1- or more flowered peduncles. **Calyx** with connate bracts; limb 4–5-fld, patent. **Petals** inserted under the margin of an obscure disk, clawed, spathulate, fimbriate-lacerate,
longer than the sepals. *Stamens* 16–30, 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 dehiscing into 2–4 valves; cells 1–2-seeded. *Seeds* arillate, ovoid, subtrigonal, testa coriaceous; embryo straight, cotyledons elliptical, radicle terete.—*Distrib.* Species 5, natives of S. and Trop. Africa, Madagascar, and Ceylon.


Maias and Carnatic, Wight, &c. Ceylon, Galle District, Trincomales, &c., at no great elevation.

A very much branched shrub or small tree. *Branches* terete. *Leaves* 3–3¼ by 1½ in., petioled, glabrous, acuminate, rounded at the base, green and shining above, pale beneath, nerves reticulate prominent on both surfaces; petiole about ⅓ in. *Petioles* solitary or in pairs, shorter than the petioles. *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, petioled, membranous, elliptic-oblong, acuminate, crenately-toothed; stipules small, caducous. *Flowers* in 2–5-choctomous 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* obtusely subtrigonal, contracted at the base, ovoid, free, 3-celled; cells 2-ovuled; style of the female longer than the calyx, stigma obliquely 3-lobed. *Fruit* unknown.


Western Peninsula, Hayna, &c.


10. **ANISOPHYLLEA**, Br.

Trees and shrubs, glabrous, young parts silky. *Leaves* exstipulate, dichotous; 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, exalbuminous, tests coriaceous; embryo elevate, cotyledons very small or 0, radicle large.—Distribution. 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 venation, the smaller squamiform 1-nerved caducous, the larger 5-nerved with involute margins. Flowers small, subsessile. Bracts minute. Calyx-limb superior, 4-cleft; lobes acute, valvate, persistent. Petals somewhat fleshy, laciniate, induplicate in aestivation; segments 5, linear-subsulate. Stamens 8, alternately shorter; filaments subulate, inserted on the calyx; anthers versatile. Styles 4, erect, conico-subsulate, stigmas capitate.


**Malay Peninsula;** Java. **Singapore.—Distribution. 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-fid. Stamens as long as the petals; anthers 2-celled. Ovary 4-gonous, 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 ½-1½ 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 subsessile branches.

**Penang, Mainay.**

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 ⅔ in. in diam., female rather larger. Male Fl. Sepals 4, valvate, puberulous; lobes triangular. Petals 4, fringed. Stamens 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, petioled, 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 panicled); not rarely polygamo-monocious. Calyx-tube adnate to the ovary and produced above it (sometimes to a great length), the limb of 4–6 (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 2–5) pendulous from the apex of the cell. **Fruit** coriaceous or drupaceous, generally indehiscent, ovate, angular or very commonly winged; in Calycoperis and Gyrocarpus crowned by the greatly enlarged calyx. **Seed** 1, without albumen; cotyledona 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 Calycoperis) deciduous.

**Flowers** spiked or racemose. Calyx-limb deciduous . . . . . . . 1. Terminalia.

Calyx-limb much accrescent on the fruit . . . . . . . . . . 2. Calycoperis.

Flowers capitate. Calyx-limb deciduous . . . . . . . . . . 3. Angoeissus.

**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; anther 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 carpel-panulate mouth, limb of 5 short valvate triangular lobes, deciduous. Petals 0. Stamens 10 inserted on the calyx-tube; epigynous disc within them densely hairy. 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, exalbuminous, cotyledons convolute.—Distribution. Species 80; in the tropics of the whole world, less numerous in America.

_T. angustifolia_, J. E. Hook. _Vindob. t._ 100 not of _Roxb._; leaves attenuated at both ends lanceolate, with two glands at the apex of the petiole, fruit narrowly 2-winged. _Willd. Sp. Pl._ iv. 970; _DC. Prodr._ iii. 11; _W. & A. Prodr._ 312; _Miq. Fl. Ind. Bat._ i. pt. 1. 599. _T. Bensoin, Linn._; _Spreng. Syst._ ii. 358; _Lamk. Dict._ i. 349; _Wall. Cat._ 3976. *Catappa Bensoin, 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.—Distribution. 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.


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 Burmah, mostly at 0-1000 ft. alt.—Distribution. 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 1-2 in. Spikes (and innovations) grey or rusty tomentose or pilose, the upper flowers male, the lower hermaphrodite, the bracts minute. 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 alternate clustered towards the ends of the branches obovate attenuated into a very short petiole, spikes solitary axillary simple, fruit ellipsoid obscurely 5-sided, not in the least compressed. _Wall. Cat._ 3974; _Kurz For._ _Fl._ _Brit._ _Burm._ i. 454. _Terminalia sp._ nov. No. 168, _Kurz in Journ._ _As._ _Soc._ 1876, pt. ii. 130.

Andamans; _Roxburgh, Kurz._ Nicobar; _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 ⅔ 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 1¾ in. obovate ellipsoid subacute, compressed with one face convex the other flat.

**Mergui and Malacca;** Griffith. Malacca, Maingay No. 644, 6434.

Leaves 6 in., glaucous 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.—Disturn. 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 1–1½ 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.


**Var. 2. belerica**, Roxb. *Hort. Beng.* 33. *Cor. Pl.* t. 198. *Fl. Ind.* ii. 481; two glands at the apex of the petiole beneath the leaf. DC. *Prodr.* iii. 12; Miq. *Fl. Ind.* Bat. i. pt. i. 600.—Circar Mts., Roxb.; also Malaya, if T. microcarpa, *Dcne. Herb.* *Tumor* 129; Miq. *Fl. Ind.* Bat. i. pt. i. 602; *Benth. Fl. Austral.* ii. 502 be referred here; the examples in the Kew Herbarium exactly agree but do not show the fruit.

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, Willd. 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*, Willd., 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, Gardner, Col. Walker.*—Distribs. Java, Malaya. T. nitens *Presl. 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 ¾ in. Guared small trees on the summit of Parasrnath in Behar alt. 4000 ft.: but pass by degrees into var. 2 the common form at the base of Parasrnath.

VAR. 4, tomentella, 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 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 Heurek & Muell. Arg. Obs. Bot. 220. Ceylon; Thwaites.—The flowers are not smaller nor the fruits more acutely ribbed than in some examples of T. Chebula.

6. T. citrina, Roxb. Hort. Beng. 33, Fl. Ind. ii. 435; leaves subopposite elliptic or oblong acuminate narrowed into the petiole, spikes terminal and lateral often packed, fruit nearly 2 in. oblong-lanceolar, while fresh obscurely 5-angular. Wall. Cat. 3970; DC. Prodr. ii. 12; Miq. Fl. Ind. Bat. i. pt. i. 602. Myrobalanus citrina, Gaertn. Fruct. ii. t. 97; W. & A. Prodr. 313; Brand. For. Fl. 223.

ASSAM, EAST BENGAL, BURMA AND TENASSERIM; frequent. MALACCA at Mount Ophir.
Attains 80 ft. Leaves 3-6 in., when adult glabrous shining, the interspaces 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 every 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. Nicolaz; Kurz. Maingay sends a similar form from Malacca No. 845.

Sect. II. Pentaptera. Fruit with 5 acute subequal wings. Spikes usually panicked.


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 every very short, 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 panicked, 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 50-100 ft. Leaves 4-8 in., petiole ½ in. Flowers often attacked by a Cynips producing numerous galls which simulate fruit. Bracteoles very small. Sylis-teeth without tomentose villous or glabrous.

Var. 2. *crenulata*; leaves narrowed into the petiole obvate-elliptic adult nearly glabrous beneath, young ovary glabrous. *T. crenulata*, Roth Nov. Sp. 380; *W. & A. Prodr.* 315. *Pentaptera crenulata*, Roxb. Hort. Beng. 34, Fl. Ind. ii. 458; DC. Prodr. iii. 15; Wall. Cat. 3978. P. macrolepsis, 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. coriaeea**; 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. 458.—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 3 in., often much smaller.


**Malabar**; lower hills from Bombay to Cochin; common: Nilothiri and Kurr 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 ¾–1 in. Spikes very dense, bracteoles and young ovaries villous. Fruit about ¾ in. long, with one wing ½ in. broad, the other two wings hardly ½ in. broad.


**Pegu to Tenasserim,** frequent; *Kurz, Helfer* (ex *Presi*). *Prome; Maclelland.*

Attains 80 ft.; glabrous except the innovations and spikes. Leaves 2–4 in., coriaceous, narrowed into the petiole; petiole ¾–1½ in., without glands. Calyx densely tawny or brown-pubescent. Fruit ¾–1 in. long, the two lateral wings about ½–1 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.**—**Distr.** Ava, Bhomo.

Attains 80–100 ft., the innovations pubescent-tomentose. Leaves 4–8 in., base obtuse, nerves numerous and very parallel, upper subopposite; petiole about ¾ in.
usually with two glands at its apex. Spikes dense, bracteoles and young ovaries villous. Epigynous disc with very little or no hair. Fruits ½–1½ in. long, exceedingly numerous, minutely villous, broad wings each ½ 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, 1–1½ in., with two very broad wings. (Really allied to Sect. Catappa).


- Burma and the Andamans; Madelland, Kurz.
  
  Attains 80–100 ft. Leaves 5 in., glabrous when adult; petiole 2½–3½ in. Spikes very long, the upper flowers male, the lower hermaphrodite. Young ovary and calyx brown-pubescent or tomentose. Calyx-teeth hairy within. Fruit 1½–1¼ 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 petals have a thickening simulating an articulation, and M. Planchon has suggested (by a note on the specimen) that the leaves are those of an *Elacarpus*.

- T. angustifolia, 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, villous, 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.—Distr. 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; Royce I. l. 45; W. & A. Prodr. 316; Wight & Arn. t. 994; Dals. & Gibs. Bomb. Fl. 91; Mig. Fl. Ind. Bot. i. pt. i. 605. Andersonia altissima, Herb. Madr.

From the Himalaya to Ceylon; very common, ascending to 3000 ft. Not in the Transagantic 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.

2. A. acuminata, Wall.; Bedd. Fl. Sylv. t. 16; leaves elliptic or oblong acute at both ends villous or pubescent beneath, peduncles solitary (rarely clustered) very rarely divided, ripe fruits shining glabrous. Wall. Cat. 4014; Brand. For. Fl. 228; Kurz For. Fl. Brit. Burma i. 406. A. hirta, Wall. Cat. 4016. Conocarpus acuminata, Roxb. Hort. Beng. 34 and Fl. Ind. ii. 443; W. & A. Prodr. 316; DC. Prodr. iii. 17 and Mem. Combr. t. 3; Mig. Fl. Ind. Bat. i. pt. i. 605.
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. BUNDL KUND, Edgeworth, Mountains above the Ciears; Roxburgh. Godavery forests; Brandis. North-west India, Boyle.

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 ½ 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.

PREG, Trinasshrim and Kookie-lanc.

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.


FROM; Wallich.

Apparently a shrub or small tree. Leaves 1½ in., subsessile, narrowed at base, glabrous or silky beneath. Peduncles ⅓–½ in., solitary or clustered, rusty-pubescent, much less shaggy than in A. acuminata var. lanceolata. Fruits about ⅓ 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. phillyreaefolia 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. Fl. 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.

BUNDL KUND; Edgeworth. NORTH-WEST INDIA; Royle. COMMON in RAIPUTANA; Brandis. DRUSA; 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, Wildi.

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, ⅔–1 in., including the calyx-limb, longitudinally striate or nearly smooth. Seed 1; cotyledons convolute.—DISTRICT. Species 2; on the shores of the tropics of the Old World, and of Polynesia.
LVIII. COMBRETAGINAE. (C. B. Clarke.)


On the coasts of *India*, *Ceylon* and the *Transgangetic Peninsula* as on the *Andamans* and *Nicobars* (Kurz); general.—*Distrib*.* Tropical Africa*, *Malaya*, *North Australia*, *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. namum*) with long pendent or scandent branches, without spines (except *C. spinosum*). *Leaves* entire, petiolar, 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 convolute.—*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.


*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 axile of the nerves beneath; petiole $\frac{1}{2}$ in. Racemes numerous, very villous, in large terminal quasi-pauci-panicles, the leaves thereon 2–3 in., becoming petaloid at the time of flowering; bracteoles linear, $\frac{1}{2}$ in., somewhat persistent. Ovary sessile. Calyx segments lancolate-subulate, suberect. Petals oblong, glabrous, hardly exceeding the calyx or twice as long as the calyx (Kurz). Disc covered with short hairs. Fruit $\frac{3}{4}$–1 in., oblong or elliptic, subquadrate, nearly smooth.


**East Bengal**; alt. 9–1000 ft., from Silhet to Megrezi 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 $\frac{3}{4}$–1 in. Bracteoles $\frac{1}{2}$ in., narrow-lanceolate, somewhat persistent. Ovary sessile. Calyx-tube upwards 5-fluted, the segments triangular acute erect. Petals narrow-ovobovate, 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. spinescens**; with stout spines at the base of the branchlets, otherwise does not differ. Irawaddy bank; Wall. Cat. 4006. Cachar, Keenam.

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.


**Pegu**; Wallich, Maclelland, Kurz.—**Distrib.** Burma.

A scandent shrub or (ex Kurz) a weak tree 15–20 ft. high. Leaves 1–4 in., subopposite, the petiole $\frac{1}{2}$–1 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 $\frac{1}{2}$ in., linear, exceeding the young ovaries. Ovary sessile. Calyx-teeth lanceolate, erect. Petals 0. Disc covered by short hairs. Fruit $\frac{1}{4}$ in., elliptic, nearly circular, glabrous, surface between the wings covered with close sessile circular glands.


**Pegu**; Kurz.—**Distrib.** Burma.

A scandent shrub, with the habit of **Combretum ovalifolium**, the innovations rusty puberulous. Leaves $\frac{3}{4}$–2 in., opposite or alternate, punctate on the upper surface,
petiole \( \frac{1}{2} \) in. Fruit \( \frac{1}{2} - \frac{3}{4} \) in., glabrous.—Herbarium twigs of this species are much like whole plants of \( C. pachystachyum \), but the fruits are hardly half as long.

** Fruit with 5 sharp angles.**


** Transgangetic Peninsula from Pegu to Singapore, alt. 0-1000 ft., frequent.—**

**Distr.** Burma, Java.

A scandent shrub. Leaves 2-4½ in., opposite, not seldom ternate, sometimes sub-alternate, usually shining, the petiole \( \frac{1}{2} - \frac{3}{4} \) 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 \( 1\frac{1}{2} \) 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) = Combrutum No. 19 of Hk. f. & T. distrib.—** Distr. 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 \( \frac{1}{4} - \frac{3}{4} \) in. *Bracteoles* \( \frac{1}{4} \) 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 \( \frac{3}{4} - 1 \) 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-fld 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 \( \frac{1}{2} \) 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 obovate leaves. Kurz however says that the calyx-tube in C. tetraraphocarpum is "short oval," whereas in C. tetralophum it is "elongate nearly flliform," 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.


Transgangetic 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. Malay Peninsula 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 ½ 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 ½ 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 ⅔-⅞ in. (Subsection Flagrocarpae).


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 ½–1 in. *Bracteoles often ½ 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 1–1½ 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 axils of the main nerves, racemes rusty-puberulous undivided axillary solitary and approximated almost impossibly in the uppermost axils, calyx shortly constricted above the ovary then funnel-shaped or subcampanulate puberulous without. *Wall. Cat.* 3999.

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 ½ in. Bracteoles minute, fugacious. Calyx-tube filled densely with long hairs exsert from the mouth, teeth short triangular suberect. Petals small, obovate. Fruit ½–1 by 1¼–1½ 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. i. p. 608, which these authors suggest to be allied to *C. latifolium* or *C. Wrightianum,* 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 SINGAPORE; 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 ½–1½ in., sometimes broader than high or not; clothed between the wings with close flat round glands.*


Moulmein, Wallách. Tenasserim, Héfor 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 1½–3 in.—Hardly distinguishable from C. squamosum Roxb. but by the small flowers and the leaves attenuated at the base. C. Van Heurck, 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. 725 quoted cannot be found at Kew.

13. C. dasystachyum, Kurz Journ. As. Soc. Beng. 1874, pt. ii. 187; leaves opposite and often ternaite 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.


Transangheetic 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 ⅔–⅓ in. Calyx-teeth triangular, erect. Petals narrow-obvate, 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 obvate obtuse usually narrowed into the petiole, uppermost sometimes lanceolate.

Var. 2. Porterianum, 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 obvate 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 subglabrous. DC. Prodr. iii. 21; G. Don in Trans. Linn. Soc. xv. 429; Wall. Cat. 3994. Brand. For. Fl. 221.

Himalaya Terai from Sikkim to the Punjab; Wallách, Boyle, Edgeworth, Vicary, Strachey & Winterbottom, J. D. H.
A deciduous 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 $\frac{1}{2}$–$\frac{3}{4}$ in. Raceme often subterminal and solitary, 6–7 in. with a peduncle 1–2 in.; bracteoles $\frac{3}{8}$ in. linear-spathulate. Calyx-teeth triangular, erect. Petals narrow-obovate, far exceeding the sepals. Disc and base of calyx within covered by long fuhvous hairs.


Throughout the Decan Peninsula, common; and in Ceylon.

A large scandent shrub, nearly glabrous. Leaves typically 4$\frac{1}{2}$ 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 2½ 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 $\frac{1}{4}$–$\frac{1}{2}$ in., terminated by a short campanulate 4-fid limb.


**Decan Peninsula.** Ceylon. Transganggetic 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 1 in. and nearly as broad, puberulo-glandular or nearly glabrous.

18. **G. sundaicum**, 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
scarce|ly pubescent, calyx-teeth triangular acuminate reflexed, buds ovate very
cute.

MALACCA, Maingay No. 1681.—DISTRIB. Sumatra.
Leaves 3–5 in., punctulate on both surfaces; petiole $\frac{1}{3}$ in. Calyx with $\approx$ 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 Termi-
nalias.

COMBRETUM (Sect. Poivrea) SEMI-ADNATUM, Hewcok & Muell. Arg. Obs. Bot. 244;
leaves ternate short-petioloed elliptic acute at first simply puberulous, racemes axil-
lary long-pediculed dense, flowers long pedicilled, 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, subindefecent. Seed 1,
cotyledons (occasionally 3, Kurz) not convolute.—DISTRIB. Species 4, tropical;
3 Indian, 1 African.

Known from Combretum Sect. Poivrea by the elongate calyx-tube, and from Com-
bretum Sect. Quisqualoides by the 5-merous flowers and the fruit.

1. **Q. indica**, Linn. Sp. Pl. 556; calyx-tube above the ovary $1\frac{1}{4}–2\frac{1}{2}$ in.,
calyx-teeth triangular not acuminate, fruit with very sharp angles scarcely
winged. Lour. Fl. Cochinch. 336; Lamk. Ill. t. 357; DC. Prodr. iii. 23;
Rozb. Fl. Ind. ii. 427; Wall. Cat. 4010; Wright Ill. t. 92; W. & A. Prodr. 318;
Mig. Fl. Ind. Bot. i. pt. i. 610; Brandis For. Fl. 290. Q. villosa, Rozb. Fl.
Ind. ii. 426; Sprenq. Syst. ii. 331; DC. Prodr. iii. 23. Q. glabra, Burm. Fl.
Ind. t. 28. Q. pubescens, Burm. Fl. Ind. t. 35. Q. ebracteata, Beauv. Fl.
Ovar. t. 35. Q. Loureirii, G. Don Gen. Syst. ii. 667. Q. sinensis, Lindl. in

Throughout India, alt. 0–1000 ft., cultivated: wild probably in the Transsange-
tic Peninsula.—DISTRIB. Cultivated generally in the tropics, wild in Malaya.

Leaves 4 in., nearly glabrous or in var. villosa shortly pubescent beneath; petiole
$\frac{1}{4}–\frac{3}{2}$ in., rusty villous as are the innovations. Spikes somewhat dense; bracteoles
$\frac{1}{8}$ in., usually lanceolate, but variable, generally subpersistent. Petals rose or
scarlet, oblong or nearly round. Fruit $\frac{3}{4}–1\frac{1}{2}$ by scarcely $\frac{1}{2}$ in., glabrous, black, very
acute at the top.

Penang; Wallich. Moulesein; Falconer. Malacca; Griffith. Singapore; Lobb. Leaves 4-6 in., nearly glabrous; petiole 3⁄4 in., rusty-pubescent. Spikes dense, fulvo-pubescent; bracteoles 3⁄4 in., lanceolate, pubescent, subpersistent. Petals less than 1⁄2 in., scarlet. Fruit 1 by 3⁄4 in., shining, quadrangular, oblong; the wings narrow but distinct, papery.—This species seems congeneric with Combretum pilosum above.

3. Q. malabarica, Bedd. Ic. Pl. Ind. Or. t. 155; calyx-tube above the ovary 3⁄4 in., calyx-teeth lanceolate-subulate, petals 1⁄2 in. and more.

Deccan Peninsula; Carcoor Ghat, Wyndham, alt. 1500 ft., Beddome. A large climber, nearly glabrous, the petioles becoming permanent as rigid spines. Leaves 4-5 in.; petiole 3⁄4 in., glabrous. Spikes somewhat few-flowered, minutely grey-puberulous or pubescent; bracteoles 3⁄4 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 petioluled 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.—Distr. Species 7 or 1, extending from Khasia to Singapore, Malaya and the Philippines; and one aberrant species in Angola having 5 leaflets.


Stem striate, nearly glabrous. Petiole 2-4 in. petiolo 1 in. (variable as in most of the species), more or less fulvo-pilosse; 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 often 6-8 in.; bracteoles minute, ovate, and the calyx without minutely pubescent. Fruit 1 by 21⁄4 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 epunctate very coriaceous with an incurved cartilaginous margin, staminodes subpetaloid hooded and enfolded not emarginate, fruit 21⁄4-31⁄2 in. wide 2-winged.
III. 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. GYROCARFUS, 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. Females or hermaphrodite 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 spathulate coriaceous calyx-lobes. Seed with convolute cotyledons.


Deccan Peninsula, alt. 0-1000 ft., frequent. Bengal, 1876. 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. MYRTACEÆ. (By J. F. Duthie, F.L.S.)

Trees or shrubs, rarely herbs. Leaves opposite, seldom alternate or whorled, petiolated, simple, entire, rarely denticulate or crenate, 3-nerved or pinately-nerved and usually with an intramarginal nerve, generally coriaceous and dotted with pellicid glands. Stipules if present small and deciduous. Flowers regular, very rarely irregular, hermaphrodite or polygamous by arrest, axillary, solitary or in spikes cymes corymbss 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 Rhodamnus); 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 loculical or septical dehiscence; or baccate and indehiscent with the cells many-seeded or 1-seeded by arrest. Seeds angular, cylindrical 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 Nilgiri 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.

Glaphrya sericea, Jack, in Trans. Linnaei Soc. xiv. 128, from Penang, may be a species of Leptospermum by description only. Myrtus androsmemoïdes, Poir. is Myonima multiflora, Ait. A native of Mauritius. Hirta Pinlayesiana, Wall. Cat. 3566 F. is Dacepernum paniculatum, Kurz.

A. Fruit capsular.

TRIBE I. LEPTOSPERMEA. 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 . . . . . . . 1. BECKEA.

Stamens \( \infty \), free, in one series. Leaves alternate. Flowers few or solitary in the axils . . . . . . . . . . . 2. LEPTOSPERMUM.

Stamens \( \infty \), slightly combined below into bundles opposite the petals and exceeding them. Flowers in heads or spikes . . . . . . . . . . . . . . . . . 3. MELALEUCA.

Leaves broad. Stamens \( \infty \), united into 5 bundles opposite the petals. Flowers in axillary cymes . . . . . . . . . . . . . . . 4. TRISTANIA.
B. Fruit fleshy.

TRIBE II. MYRTAEÆ. Ovary 2- or more-celled (except RHODAMNIA). Fruit a berry or drupe.

Limb of calyx closed in bud with the lobes subimbricate, rather deeply valvately divided when in flower. ... 4. PSIDIUM.
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. LECHYTHIDÆ (Sub-tribe Barringtoniæ). Ovary 2- or more-celled. Fruit indehiscent, hard and fibrous or fleshy. Leaves alternate, not gland-dotted.

Stamens all perfect. Fruit angular, fibrous, 1-seeded. ... 9. BARRINGTONIA.

Outer or inner stamens or both without anthers. Fruit ovoid or globular, fleshy, many-seeded. ... 10. CAREYA.

1. BECKEA, 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 ¼-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.

1. B. frutescens, LINN.; leaves linear pointed ascending or spreading, flowers axillary shortly peduncled, calyx-lobes roundish petaloid, stamens 10 rarely 8, ovary 3-celled. DC. Prodr. iii. 229; Sm. in Trans. Linn. Soc. iii. 260; Bot. Mag. t. 2802; Blume Mus. Bot. i. 69; Mig. Fl. Ind. Bat. i. pt. i. 406; Benth. Fl. Hongk. 118. B. Cumingiana, Schauer in Walp. Rep. ii. 920. B. chinensis, Gaertn. Fruct. i. 157, t. 31.—Osbeck Itin. 231, t. 1.

Eastern Peninsula; MALACCA, Griffith, MAINGAY, CUMING, Lobb, Low.—Distrib. Sumatra, Borneo, Philippines, S. China.

A slender shrub with rod-like branches. Leaves small, ¼-½ 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, scariosus, 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 \( \infty \), in a single series, not longer than the petals; anthers versatile, their parallel cells bursting longitudinally; connective swollen, gland-like. Ovary inferior or \( 1/2 \)-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 \( \infty \), linear or winged, often sterile; embryo straight.—**Distr**. Species upwards of 25, chiefly Australian, a few in New Zealand and New Caledonia.

1. **L. amboinense**, Blume Bijdr. p. 1100; Mus. Bot. i. 68; glabrous or silky on the young parts, leaves linear-lanceolate or obovate obtuse, flowers sessile or nearly so solitary terminal or axillary, ovary 5-celled. DC. Prodr. iii. 229; Miq. Fl. Ind. Bat. i. pt. i. 404. L. flavescens, Sm. in Trans. Linn. Soc. iii. 262; DC. Prodr. iii. 227; Bot. Mag. 2695; BentH. Fl. Austral. iii. 104, var. a. Macklottia amboinensis, Korth. in Ned. Kruidk. Arch. i. 196.—Myrtus amboinensis, Rumph. Herb. Amb. ii. 77, t. 18.

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 \( 1/2 \) 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.


Maulmein; exposed rocks, alt. 5000 ft., Lobb.—**Distr**. Java, Sumatra?

A shrub, \( 1/2 \)–1 ft. high. Leaves \( 1/2 \)–1 in. by \( 1/2 \) in., narrowly obovate with silky hairs on the edges and beneath, midrib prominent beneath, lateral nerves soon vanishing upwards. Flowers about \( 1/2 \) in. across, few or solitary, axillary. Calyx-lobes ovate, obtuse, membranous, deciduous. Anthers attached to a dark-coloured gland-like connective. Style about \( 1/2 \) 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 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.—Distr. 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, racis and calyx glabrous or woolly. Benth. Fl. Austral. iii. 142; Kurz in Journ. As. Soc. Beng. xlvi. (1877) pt. ii. p. 61; For. Fl. Brit. Burm. i. 472.

**Tenasserim and Mergui**, Griffith; **Malacca, Maingay, Cuming.**—Distr. 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 ⅓ in. Staminal bundles under ⅓ in., each with 6-8 filaments. Ovules 2, ascending, attached to an oblong placenta. Fruiting-calyx about ⅔ 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."

**Var. Leucadendron**; spikes glabrous. *Linn. Mant. 105 and Suppl. 342; Lour. Fl. Cochinch. 468; Roxb. Fl. Ind. iii. 397; DC. Prodr. iii. 212; Wall. Cat. 3646; Blume Mus. Bot. i. 66; Miq. Fl. Ind. Bat. i. pt. i. 401. Myrtus Leucadendron, Linn.—Rumph. Herb. Amb. ii. 72, tt. 16, 17, f. 1.—Cultivated in India.


Miquel (Fl. Ind. Bat. l. c.) describes *M. Cumingiana* as specifically distinct, distinguishing it from *M. lancefolia* 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 O. Calyx-tube turbinate campanulate or open, attached below to the ovary; lobes 5, imbricate in aestivation, persistent. Petals...
5, spreading. Stamens \(\infty\), shorter than the petals, usually united in 5 bundles and opposite to them; anthers versatile, cells parallel and opening longitudinally. Ovary inferior or \(\frac{1}{2}\)-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 petioled ob-lanceolate acuminate glabrous closely pinnate-nerved, cymes corymbose dichotomous long peduncled terminal and axillary equalising or exceeding the leaves, branches angular pubescent, bracts leaf-like, flowers small on short pedicels, staminal bundles 3-androus, capsule very small almost wholly exserted, seeds narrow compressed winged. T. sumatrana, 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 cuspitate, 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.

2. **T. burmannica**, Griff. MSS.; leaves alternate or crowded at the ends of the branches shortly petioled oblong-lanceolate obtuse or obtusely acuminate glabrous or tomentose, cymes axillary few-flowered much shorter than the leaves branches angular pubescent, flowers small yellowish on short pedicels 2 or 3 together with linear bracts at the base, calyx-lobes sub-acute, staminal bundles about 5-7-androus, capsule exserted about \(\frac{3}{4}\) its length, seeds \(\frac{1}{2}\) in. long winged. Kurs in Journ. As. Soc. Beng. xlvi. (1877) pt. ii. p. 61; For. Fl. Brit. Birm. i. 474. "Tristania facic," Griff. Notul. 648. Hypericinea micrantha, Wall. Cat. 4829.

TENASSERIM, Helfor; MOULMEIN and MALACCA, Falconer, Griffith, Wallich; PROU, 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 \(\frac{3}{4}\)-1½ in., shining above, lighter below or rusty-coloured, coriaceous, margins revolute, dots inconspicuous, lateral nerves slender, prominent, uniting in a continuous looping one near the margin; petiole \(\frac{1}{2}\) in. or less. Cymes compact, dichotomous. Petals nearly round, shining. Ovary silky-pubescent; ovule many, suspended. Capsule \(\frac{1}{2}\) 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 \(\frac{1}{4}\) in., the capsules and seeds however are similar to those of Wallich's Hypericinea micrantha; 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 petioled or sessile obovate-lanceolate obtuse or obtusely acuminate glabrous, panicles on long peduncles, branches angular pubescent above, bracts leaf-like, calyx-lobes oblong rounded


A tree with pendent branches. Leaves 2-7 by \( \frac{1}{2} \) in., gradually narrowing towards the base, often recurved 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 \( \frac{1}{2} \) 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 8 in each cell, compressed, \( \frac{1}{2} \) 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 ob lanceolate 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 \( \frac{1}{2} \) in roundish exserted \( \frac{1}{2} \) its length, seeds winged 9-10 in each cell.

Malaya, Maingay; Kew Distrib. 767 in part.

Leaves \( \frac{1}{2} \) by \( \frac{1}{2} \) in., dark and polished above, rusty-yellow beneath, dotted, margins slightly revolute, nerves not prominent. Cymes dichotomously branched; peduncles \( \frac{1}{2} \) 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 \( \frac{1}{2} \) in. in diam.


Meroui, Griffith; Psov, Kurz.

A shrub. Leaves coriaceous, pellucid-punctate. Terminal buds with imbricating membranous scales. Calyx-tube turbinate; lobes 5, ovate, acuminate, falling off circumcissely 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.—Distrib. 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, $\frac{1}{2}$ in. long, 1–3-flowered; buds ovoid in the adnate part, the free part also ovoid but larger and more or less pointed. *Petal* broad, $\frac{1}{2}$ 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.)


5. **RHODANNIA**, 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 or more 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, cotyledone very short.—**Distrib.** About 12? species; 3 in Australia, and the rest natives of Tropical Asia.


**Tenasserim,** Holzfr.; **Malacca,** Cuming, Griffith; **Singapore and Penang,** Walker, Wallich; **Nicobar Islands,** Kurz.—**Distrib.** 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 1½–2½ in., sometimes rugose beneath, shortly petiolate, subacutate 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 $\frac{1}{2}$ in. in diam.—I have adopted Mr. Kurz's nomenclature who includes the various forms under the following varieties.


Var. *spectabilis*; leaves silvery-white beneath or greyish when old, flowers usually
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, tests hard; embryo curved or spiral, radicle very long, cotyledons small.—Distr. 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 Spirol. Neillg. 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 ft., 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; Benth. Fl. Hongk. 121; Bedd. Fl. Syd. Anal. Gen. t. xiv. Myrtus tomentosa, Att.; DC. Prodr. iii. 240; Vahl Symb. i. 56; Blume Beitr. 1031; W. & A. Prodr. i. 328; Wight Ill. ii. 12, t. 97*, f. 3, Io. 522; Roxb. Fl. Ind. ii. 498; Wall. Cat. 9630; Korth. in Ned. Kruidk. Arch. i. 197. M. canescens, Lour. Fl. Cochinc. i. 311.

Western Peninsula, Pulney Hills, Beddome; Nilghiris, Adam. Eastern Peninsula, Malacca, Griffith, Maingay; Singapore and Penang, Thomson, Anderson. Ceylon, alt. 6-8000 ft., Walker, \( \& \). A shrub, 4-5 ft.; young parts clothed with thick tomentum. Lower leaves in threes, upper ones and those of the branches opposite, 1-2\( \frac{1}{2} \) in. with 3 or rarely 5 prominent nerves starting from near the base, dark brown above, at length glabrous and shining, hoary beneath and pungose. 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 dissepiments; 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.—**Distr.** Species about 4, inhabiting Tropical Asia and Australia, and the Pacific Islands.

Closely related to Myrtus.


**Eastern Bengal, Khasia Mts.; Pegu, Kurz; Mergui, Griffith; Malacca, Maingay, Cuming.—Distr.** 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, squarrose or exceeding the leaves; bracts deltate, 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 ½ 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. pallascens* as a synonym on the authority of Kurz (*Journ. As. Soc. Beng.* xlvii. 57). Some of Maingay's Malacca specimens with an abnormally congested leafy inflorescence somewhat resemble *N. leucocoma*.

**Var. khosiana;** leaves narrower, panicles long peduncled lax few-flowered, flowers larger, petals ⅔ 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 squarrose the petals. *N. polymorpha*, *Blume Mus. Bot.* i. 75, t. lx.; *Hiresa 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 cyms, 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 calyptra. *Stamens* ⅞, 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 ⅞ 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.—**Distr.** 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-spread branches. Bark soft, ash-coloured, marked with the scars of fallen leaves. Branchlets alternately compressed or subtrigoniouss. 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, branchlets clavate joined 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.

VAR. ternifolia, Roxb. Hort. Beng. 37; Fl. Ind. ii. 489 (sp.); leaves in threes. W. Cat. 3607; Wight ill. ii. 14; To. t. 611; Blume Mus. Bot. 92 (Jambosa).—Sikkim, J. D. H.; Assam and Silhet, Wallach. Pegu, McClelland.


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.

MALAYA, Maingay, Griffith. CHITTAGONG (cult.? ) J. D. H. & T. T. Tenasserim.—
DISTRIBUTION. Malayian 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, ¾–1½ in. Flowers large and handsome. Calyx-tube ¾ in.; lobes unequal, rounded, with membranous edges, the larger pair ⅔ in. long. Petals large, suborbicular, glandular. Stamens numerous, about 1 in. in length. Style long, persistent, nearly equaling the stamens. Fruit large and juicy, very generally eaten, but insipid (Roxburgh).—In a cultivated specimen from Chittagong the leaves are distinctly pellucid-pectinate with large glands.

VAR. purpurea; fruit ovoid dark purple. E. purpurea, Roxb. Hort. Beng. 37; Fl. Ind. ii. 483; Wight Ill. ii. 14; Io. ii. 549. J. purpurea, Wall. Cat. 3610. J. domestica, var. purpurea, Blume Mus. Bot. i. 92; Miq. t. c.—J. nigra, Rumph. Amb. 126, 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 ⅔ 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 Jamboosa emala, Blume, and J. media, Korth.

** Flowers terminal and axillary.

† Calyx-tube broadly turbinate.

§ Calyx ⅔ 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 ⅔ 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 III. ii. 14; Io. t. 546; leaves shortly petioloed 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 2–3 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, Aya, Pegu, Martaban, and Tenasserim (apparently only planted, Kurz).—CEYLON, 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, ashy-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 Jambosa; 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 Jc. t. 627? Jambosa densiflora, Korth. in Ned. Kruidk. Arch. i. 200; Blume Mus. Bot. i. 93; Miq. Anal. Ind. i. 17; Fl. Ind. Bot. i. pt. i. 416. Myrtus densiflora, Blume Bijld. 1087.

MALACCA and SINGAPORE, Maingay, No. 758, 760, 769½.—DISTR. Malayan Islands.

Upper branches stout, 4-gonous, with reddish bark peeling off in shreds. Leaves 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 uniting to form two conspicuous intramarginal nerves; petiole ¼ in. Branches of inflorescence thick and 4-gonous, often articulated and breaking up into cubical segments. Calyx-tube turbinate, ½ in.; lobes 4, large, rounded, with membranous edges, opposite pairs equal. Style long, persistent. Fruit ⅔ in. in diam., crowned with the persistent calyx-lobes.—Allied to E. Jambos, 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. Miguel says (Fl. Ind. Bot. 1. c.) “seems to be the same as E. corymbosa, Roxb. (Wight Jc. ii. 627),” but the petals in Roxburgh’s coloured fig. No. 1143 are bright yellow.

Indigenous in the SIKKIM TERRAI (Brandie); BURMA (cult. only Kurz); PEI, McCLELLAND; PENANG, Wallisch.—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, 1 1/2-2 in. broad; nerves reticulate beneath; midrib stout; petiole short and stout, 1/2 in. or less. Calyx-tube produced above the ovary; lobes round. Berries 1-2 in. diam. Var. diavericata; 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 CHTITAGONG, WALLISCH; CACHAR, KENAN; MOUMEN; FALECONER; MALACCA, GRIFTH, MAINGAY (736 Kew Distrib.); PEIUT and MAERTAHAN, ascending to 2000 ft., FALCONER, BRANDIS.—DISTRIB. MALAY ARCHIPELAGO.

Branchlets 4-gonous. Leaves rarely subalternate, or in threes, 5-10 by 4-4 in.—In Maingay's Malaccas specimens the angles of the branchlets are winged, and the bark is of a reddish colour; the petioles are stout, rather less than 1 in.; calyx-tube 4 in.; style long and persistent. Roxburgh describes the fruit as about the size of an orange, and resembling that of Delonix 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. Kenan describes it as being rather a tall tree with short horizontal branches; buds roundish, rosy; the bruised leaves smell like cinnamon, and the stigmas are clove-scented. In Griffith's plant the calyx-tube is finely striate, and there is a slight constriction near the middle.

Eugenia.]  LIX. MYRTACEAE.  (J. F. Duthie.)  475

(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 1¾-2½ in., or larger in cultivated examples; nerves indistinct above, slender but prominent beneath and uniting in loops within the margin.  Calyx-tube turbinate, about ¾ 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 petioled 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 petioled oblanceolate or ovate-lanceolate narrowed below obtusely acuminate subcoriaceous pellucid-punctate, principal lateral nerves prominent beneath and widely separated, cymes terminal and axillary 6-7-flowered, flowers large the lower ones long pedicelled, calyx-tube turbinate.

Malacca, Griffith, 2349, Maingay, 747.

"Rather a small tree with pendent branchies" (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 ¾ in.  Peduncles equaling the pediolos or a little longer; lower pedicels about ½ in.  Calyx-tube ½ in.; lobes 4, rounded, with membranous edges, opposite pairs equal, reflexed after flowering.  Petals large, orbicular.  Style very long, 1½ in., persistent.

§§ Calyx less than ½ in. in length.

a. Flowers pedicelled.

13. E. Wallichii, Wight III. ii. 17; Ic. t. 536; leaves lanceolate or elliptic-oblong acuminate 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. praecox, Roxb. Fl. Ind. ii. 488?; Wight Ic. t. 619; Kurz in Journ. As. Soc. Beng. xi. (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 ¾ in. long.  Stamens about 4 times the length of the calyx.  Style long, persistent.  Berry about ½ in. crowned with the cup-shaped calyx-limb.—In Roxburgh’s figure of E. praecox the inflorescence is more branched and the flowers rather smaller; the leaves are drawn acutely acuminate.


b. Flowers sessile.

14. E. grandis, Wight III. ii. 17; Ic. t. 614; leaves large thick hard and coriaceous shining broadly obovate or suborbicular abruptly acuminate or
routed at the apex narrowed or rounded at the base, nerves prominent beneath
or on both surfaces, panicles terminal and axillary not exceeding the leaves,
flowers large, calyx-tube turbinate attenuated below, petals free and expanding,
berry globose or somewhat pyriform crowned with the large spreading cup-like
3603; not of DC. *Jambosa* grandis, Blume Mus. Bot. i. 108. *J. firma*, Blume
l. c. *J. urceolata*, Korth. in Miq. Fl. Ind. Bat. i. pt. i. 418 in part. *Syzygium
Hort. Beng. 87; Fl. Ind. ii. 492; not of Lam. *S. firmum*, Thouettes Enum. 417.
S. montanum, Thouettes l. c. 118.

**Silhet, Wallich**; *Peku, Martaban, and Tenasserim, Brandis; Moulinin
and Metugu, Griffith; Malacca, Griffith, Maingay; Singapore, Walker; Ceylon,
Thoueties, 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 3-1 in. *Calyx-lobes* short, rounded, unequal.
*Berries* 1 in. to 1½ in.—Blume distinguishes his *J. firma* specifically by the nerves not
being impressed on the upper surface, and by the more prominent calyx-lobes. The
Ceylon specimens have the leaves very much polished, the lateral nerves more numeros
and uniting closer to the margin, the cymes more lax and fewer-flowered. A
plant from Amherst named *E. fietifolia*, MSS. in Herb. Wallich 3603 B, has the
leaves very large and more rounded at the base.

15. *E. lepidocarpa*, Wall. Cat. 3618 in part; leaves broadly ovate or
elliptic-oblong abruptly acuminate or rounded at the apex shining above, nerves
prominent on both surfaces, interspaces finely reticulate, panicles terminal few-
flowered, flowers sessile, calyx ¼ in. campanulate spreading above, petals free and
Ind. Bat. Suppl. i. 313.

_Peku and Tenasserim, Brandis; Malaya, Griffith, Maingay; Singapore, Wallich._
—Distrib. Sumatra.

Branchlets greyish, more or less compressed at the nodes. Leaves thick, coria-
ceous, smaller than those of *E. grandis*; midrib furrowed above, stout beneath; petiole
about ¼ in. Panicle branches angular, much compressed below the nodes. *Calyx*
pedicel-like below; lobes rather unequal, rounded, with membranous edges. *Berries*
about ½ 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. Wallisii._—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-gonous, petals free.

_Tinnevelly Hills_; alt. 5000 ft., Beddome.

A large tree. Leaves 4½ by 3 in., rounded or emarginate at the apex; petiole
¾ in. or less, stout; midrib channelled above. *Flowers* like those of *E. grandis*.

16. *E. tetraedra*, Miq. Fl. Ind. Bat. Suppl. i. 310 (Jambous?); branch-
lets compressed acutely 4-gonous 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 \( \frac{1}{3} \) 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. tetrædræ* 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 \( \frac{1}{4} \) 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, \( \frac{1}{4} \)–\( \frac{1}{3} \) 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 \( \frac{1}{3} \) in. (in fruit) rounded.

†† Calyx-tube hemispherical.


From S. Canara to Cape Comorin, at about 3000 ft. alt., *Kurg Mts.*, *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 \( \frac{3}{4} \)-\( \frac{1}{2} \) 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. hemspherica. 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. 3006; leaves very shortly petioled crowded oblong acuminate rounded at the base shining and convex above, lateral nerves uniting at some distance from the margin in two conspicuous ones, corymb 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; H. t. 609. E. laurifolia, Roxb. Hort. Beng. 92; Fl. Ind. ii. 489; Wall. Cat. 3005. 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**s rather lax, two or three times shorter than the leaves, shortly peduncled. **Flowers** large, white, on slender pedicels. **Petal**s orbicular, shortly clawed, twice as large as the calyx-lobes, minutely crenulate. **Stamens** numerous, long, spreading. **Berry** pendulous, ⅓ in. long, yellow.—In some of Wallich's specimens named *E. laurifolia* the corymb appears to be terminal.

22. **E. filiformis,** Wall. MSS.; leaves petioled 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 tubinate or subcyllindrical, lobes nearly equal, berries ovoid or roundish crowned with the 4 reflexed calyx-lobes 2-seeded. *Syzygium filiforme, Wall. Cat. 3580. S. capillars, 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 1½–3 in.; midrib prominent beneath, lateral nerves spreading out nearly at right angles with the midrib; petiole about ⅓ in. **Pedicels** ⅓ in. **Berries** ½ in. long by ⅓ 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.

23. **E. Kurzii, Duthie in Journ. As. Soc. Beng. xlvi. (1877) pt. ii. p. 68; Kurz For. Fl. Brit. Burm. i. 491; leaves more or less broadly lanceolate acute or attenuate at the base obliquely acuminate coriaceous pale beneath, flowers rather small white peduncled arranged in short axillary racemes or at the axils of fallen leaves, calyx-tube clavate-turbinate spreading above, lobes 4 rounded persistept, petals free, berry globose size of pea. E. cerasiflora, Kurz in Journ. As. Soc. Beng. xlii. (1879) 233; not of Miquel.

**Sikkim, alt. 1–5000 ft., J. D. H.; Assam, Jenkins; Khasia Mts., Kurz; Mishmi, Griffith; Cachar, Keenan; Pegu 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 ⅛ to ⅜ in. **Cymes** about 5-flowered. **Calyx-tube** ½–⅗ in., the produced portion ⅓ in.; lobes ⅛ in., reflexed after flowering. **Petal**s ⅛ in. **Filaments** slender. **Style** persistent. **Berry** ⅓–⅗ in., 1–2-seeded, smooth, crowned with the spreading calyx-
limb.—The Assam specimens have smaller flowers and a more slender calyx-tube. No. 2356 of Griffith's collection from E. Bengal? differs from the above in having nearly sessile leaves and flowers. It is probably distinct, but the specimen is too incomplete, and the locality somewhat doubtful.

24. **E. albiflora**, Duthie in Journ. As. Soc. Beng. xlv. (1877) pt. ii. 68; Kurn 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 nervèd above; lateral nerves rather distant and prominent beneath faintly uniting within the margin, interspaces finely reticulate; petiole ⅓ in. "**Buds white**" (Griffith MSS.). **Calyx-tube** about ⅜ 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.

**Dark 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 ⅔ in. **Calyx-tube** ⅔ in. in length and ⅔ in. across at the widest part; lobes 4, rounded, reflexed after flowering. **Style** persistent, exerted 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 shorty 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 Bombay southwards, Hamilton, Beddome, Gibson, Ritchie, Stocks.

A small or middling-sized tree; branchlets terete, **Leaves** 4–5 by 1½–1⅔ in., secondary nerves crossing the primary ones more nearly at right angles with the midrib; petiole ⅓ 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, glaucular. **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 obovate-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 1 1/4–1 1/2 in. The nervation forms a characteristic feature in this species, the lateral nerves uniting in a double system of intramarginal loopings, the inner one being situated about half-way between the midrib and the margin; petiole 1 1/4–1 in. Flowers large, 1/2 to nearly 1 in. diam., white, turning to purple. Calyx-tube 1/2 to nearly 1 in. long. Petals orbicular, dotted. Fruit 1 1/2–2 in. diam.—Blume (Mus. Bot. i. 114) compares this with his Clavimyrtus viridis; but the latter is distinguished by a more contracted inflorescence and the calyx shorter and less attenuated below.

28. **E. ramosissima**, Wall. Cat. 3604; 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 glandular. Clavimyrtus ramosissima, Blume Mus. Bot. i. 115.

Sikkim, J. D. H. Silhert, Wallich. **Khasia Mrs., Griffith.**

A tree; branchlets terete, with a pale yellow bark. Leaves 3–4 by about 1–1 1/2 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 1/2 in., tapering gradually to the base with nearly straight sides.—This species resembles Jamboza 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. Helfrei**, Duthie; upper branches 4-gonous, leaves shortly petioloed 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 1/2 in., lobes 4, opposite pairs equal.

**Mergul**, Helfter (2418). **Singapore, Lobb.**

Bark of upper branches and of inflorescence reddish, deciduous. Leaves 3 1/2–4 by 1–1 1/2 in.; petiole about 1/2 in.—Allied to J. Teysmanni, 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 3/4 in. dilated above, petals free. E. reticulata, Wight Ill. ii. 16; Jc. t. 541.

**Assam, Griffith, G. Mann; Silhert, Wallich; Khasia Mrs., alt. 3–4000 ft., J. D. H. & T. T.**

Branchlets terete. Leaves 3–5 by 1–2 in., shining above; lateral nerves unifying 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. Bot. i. pt. i. 435) speaks of it as being closely related to Jamboza conferta, Korth.

31. **E. inophylla**, Roxb. Hort. Beng. 37; Fl. Ind. ii. 496; leaves shortly petioloed ovate-oblong with an acute base obtusely acuminate closely nerved dark above and shining, cymes terminal corymbose, calyx clove-shaped,

SIKHT, Wallich; MEGUI, 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 ¼ in. Calyx ¼ 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 staminal 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 corymbose, 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 1½–1½ 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 (¼ 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 petiolate; lateral nerves uniting in conspicuous loops at some distance from the margin and with a fainter set near the margin, interspaced reticulate. Calyx-tube about ¼ in.

34. E. Thumra, Roxb. Hort. Beng. 92; Fl. Ind. ii. 495; leaves broadly ovate or ovate-lanceolate shortly acuminate base subacute dark and shining above reddish beneath, lateral nerves horizontal prominent on both surfaces uniting conspicuously within the margin, cymes terminal and axillary long-peduncled, flowers sessile umbellate, calyx-lobes 4 rounded, petals free, berry spherical or subpyriform. Wight Io. t. 617; Kurs in Journ. As. Soc. Beng. vol. xlvi. (1877) pt. ii. p. 67; For. Fl. i. 488. Syz. speciosum, Wall. Cat. 3988.
Marshy parts of Pegu forests, Kurz. Rangoon, Maingay. AMHERST and MOULMHN, Wallich; TANASSERIM, Helfer.

Branchlets terete, compressed. Leaves 5-8 by 2½-3½ in., coriaceous, reticulate beneath; petiole ½ in. Branches of inflorescence lax, quadrangular, many-flowered, bracteate.—A specimen in the Kew Herbarium under this name (I can find no type-specimen) 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 Ic. t. 564 (ep.); petals 8. E. octopetala, Ham.—Margui, Griffth.


Chittagong forests, Roxburgh. TENASSERIM from MouMHN to Mergui, Griffth, 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 ½ 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; SILOET and TAVOT, Wallich; BURMA, Griffth; MOULMHN, Hefier; MALACCA, Maingay, Griffth; SINGAPORE and PUTO DINDING, Wallich, Kurz.—DISTRICT, 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 ½-¼ in. Peduncles equalling 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 acumen more prominently nervet, lateral nerves spreading out towards the margin, petiole longer, calyx nearly truncate.

The leaves which remain green after drying resemble those of E. verucunda. E. rostrata, Bedd. MS.—Anamallays. Perhaps a distinct species.

37. E. toddaloides, Wight Ill. ii. 16; Ic. t. 542; leaves lanceolate acuminate attenuate towards the base coriaceous pellucid-punctate, cymes lateral
di-trichotomous 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? E. MIGOU, Griffith in Hb. Wight.
A small tree. Branchlets suberote. Leaves 2-3 by 1-2½ in.; lateral nerves many uniting close within the margin. Flowers about ¼ in.—Habit of E. Gardneri and E. ussophylla but the petals are shorter than those of the former and the inflorescence is different from both.


E. Bengal, Griffith; Pegu, McClelland; Sincapore, Wallich.—Distrib. Sumatra, Borneo.
A shrub or small tree with 4-gonous branchlets. Leaves 1½-3 by 2-1 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.

39. **E. micrantha**, Thouates Bacum. 117 (Syzygium); leaves ovate or elliptic obtusely acuminate narrow at the base obscurely dotted, cymes about equal to the leaves, flowers small, calyx acutely 4-lobed, petals free, berries red round size of pea. *Beld. Fl. Sylv. Anal. Gen. cviii*.

CEYLON, central province, alt. 3-5000 ft., Thouates, Gardiner.
A moderate-sized tree. Leaves 2-4 by 3-2 in.; petiole ½ to nearly 1 in.—In Wight's herbarium there are specimens of this named *E. rubicunda*, which it resembles in many respects.


MEROU, Helder; MALACCA, Malagay; PENANG, Porter.—Distrib. Java.
Branchlets terete or subtetragonous. Leaves 3-6 by 1½-2 in.; lateral nerves slender beneath; petiole ½ in. Inflorescence-branches long, angular. Calyx saucer-shaped above after flowering. Petals only slightly united.—In Helder'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*; *Lc. t. 999*; leaves elliptic-oblong acuminate coriaceous closely nerved, cymes dense from the upper axils branches stout, flowers subsessile in umbels of 8-12, bracteoles long cadaceous, petals dis-

Common on the Nilghiri and [Pulney Hills, alt. 6-7000 ft., Wight, &c. *Anamalay* 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 rusted lower branchlets, calyx-tube elongate clavate about ½ 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 ½ 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.


*Siikkim* and *Khasia* Mts., alt. 2-4000 ft., *J. D. H.* & *T. T.; Silhet* and Chittagong, *Wallich*; *Petu*, *Kurz*; *Nicobar* and *Andaman Islands*, *Kurz*; *Tenasserim*, *Holfers*, *Simpfene* 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 ½ in. long including ½ in. of projecting calyx-limb.


*Siikkim*, foot of hills, *J. D. H.* & *T. T.; Petu*, *Kurz*; Rangoon, *Cleghorn*; *Moulmein*, *Mulflower*; *Meru*, *Griffith*; *Amherst*, *Wallich*; *Simpfene* and *Penang*,
Wallich; Andaman Islands, Helder, Kurz.—Distrib. Malay Archipelago to Australia.

A moderate-sized tree. Leaves 4–5½ by 1½ in., pale, finely nervéd. Calyx-tube about ¼ 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; Ic. 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; Ic. t. 530; DC. Prodr. iii. 284; Bedd. Fl. Sylv. Anal. Gen. cx.; W. & A. l. c. (Syz.); Thwaites Enum. 119 (Acmena). Syzygium Wightianum, Wall. Cat. 3577; W. & A. Prodr. i. 330. Myrtus Soneratii, Spreng. Syst. ii. 485.


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. polypetala in the Jamboza section.

Flowers in terminal and axillary corymbs. Calyx shorter.

46. E. polypetala, Duthie; leaves narrowly oblong or oblanceolate rounded or subacute at the apex finely and closely nervéd 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. xlvi. pt. ii. p. 65; For. Fl. i. 481, not of Poir.

Martaban to Tenasserim, Helder (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.).—Atran 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. cumecta, Wall.


Western Peninsula, from Concan southwards; Silhet; Malay Peninsula to Singapore; Penang; Andaman Islands, Kurz; Ceylon, up to 4000 ft., Thwaites.

—Distrib. Sumatra, Borneo.

Assam. Jenkins, Griffith; Khasia Mts., Griffith; Pegu, Kurz; Moulmein, Wallich; Mergut, Griffith.

A small tree. Leaves 3-5 by 1-2 in., sometimes almost acutely acuminate. Calyx-tube tapering below, pruinose, usually quite smooth or longitudinally ribbed when dried. Berry about ⅓ 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 acuminate subfalcate indistinctly nervet above, flowers crowded at the ends of the branchlets, calyx campanulate pruinose limb 4-partite, petals free, berry size of a pea crowded with the persistent calyx-lobes.

*India*? Herb. Wallich (without locality).

Leaves 2-3 by ⅓-⅓ in., conspicuously dotted above; lateral nerves distant, uniting within the margin; petiole about ¼ 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-ovate obtusely acuminate attenuate at the base nerves close indistinct on both surfaces, cymes short crowded towards the ends of year-old branches, calyx-tube narrowly clavate or subcylindrical nearly ⅓ in. much produced lobes 4 small, petals free?

Penang, Government Hill, Maingay, 744.

Branchlets terete. Leaves 2¾ by about 1 in., brownish-yellow when dried.—Allied to *E. chlorantha*, and No. 1567 of Beccari's Borneo plants.

A specimen at Kew, collected by Halfier (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 nervet.

51. *E. skiophila*, Duthie; leaves elliptic-lanceolate with a slender obtuse acumon 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, 4¾-6 by 1¾-2 in.; midrib rounded beneath; lateral nerves close, inconspicuous above, spreading at right angles and uniting close within the margin. Calyx-tube ⅓ 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 $\frac{1}{2}$ 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.* (Eng.).

MALACCA, *Griffith*, Mainagay, 733; SINGAPORE, Wallich.—*Distrib. Malay Islands.*

"A very elegant tree when in flower" (Mainagay MS.). Branchlets terete. Leaves 2½–5½ by 1½–3 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 $\frac{1}{3}$ in., reflexed. Filaments bright red.

53. **E. lineata**, Blume Bijd. 1087 (*Myrtus*); *Mus. Bot.* i. 116 (*Clavi-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 $\frac{1}{4}$, petals free, berry size of large pea crowned with the constricted calyx-limb. *E. corymbosa*, Wall. Cat. 3506 F. Jambosa lineata, DC. Prodr. iii. 287; *Miq. Fl. Ind. Bat.* i. pt. i. 428.

MALACCA, Mainagay (720), *Griffith* (2390 in part); PENANG, Jack.—*Distrib. Java, Borneo, Sumatra.*

A shrub or small tree. Branchlets terete. Leaves 2–3½ by 1–2 in., coriaceous, shining above, finely nerved. Extreme branches of inflorescence 3–5. Calyx-tube about $\frac{1}{3}$ 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 $\frac{1}{4}$ in. obovate-cylindrical, lobes 4, petals free.

TENASSERIM, Helfer; MALACCA, *Griffith*.—*Distrib. Java.*

Branchlets subterete, reddish. Leaves 2–3 by $\frac{3}{4}$–2 in., stiffly cartilaginous; midrib prominent beneath, tinged with red; lateral nerves close, distinct beneath, interspaces subreticulate; petiole $\frac{1}{2}$–$\frac{1}{4}$ in., channelled above. Flowers nearly sessile. Calyx-lobes ovate, rounded, scarious at the edges. Anthers cordate-apiculate.

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, coryms terminal trichotonous long-peduncled, calyx-tube about $\frac{1}{4}$ in. gradually tapering to the base lobes $\frac{1}{2}$ shallow, petals united, berry oblong. *Syzygium pyrifolium*, DC. Prodr. iii. 261 (*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 1½–3 by $\frac{3}{4}$–2 in.; acumen sometimes $\frac{1}{2}$ in. long; lateral nerves close, conspicuous; petiole about $\frac{1}{4}$ in. Flowers sessile, in threes.—*Syz. punctatum*, 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 $\frac{1}{3}$ in. narrow swollen below the middle.

MALACCA, Mainagay, 755.

Branchlets terete. Leaves 2½–3½ in., chocolate-coloured above, rusty-yellow.
beneath when dried; lateral nerves slender, uniting close within the margin; petiole \( \frac{1}{2} \) in. *Panicula* 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-gonous.

57. *E. montana*, Wight Ic. t. 1000; young shoots acutely 4-angled, leaves petioloed coriaceous lanceolate with a short obtuse acumen to obovate or orbicular obtuse, cymes terminal very numerous corymbose many-flowered branches often leafy, flowers small sessile or subsessile, fruit globose size of a currant. *Bedd. Fl. Syl. Anal. Gen.* cvii.

NILGIRI Mts., *Wight*, *Gardner*, *Schmidt*.

A very large tree; branchlets winged at the angles. Leaves occasionally alternate or subalternate, 5–6 by 2\( \frac{3}{4} \) in., smooth and shining above; primary nerves prominent beneath, becoming less distinct towards their union within the margin; midrib stout, channelled above; petiole \( \frac{1}{2} \)–nearly \( \frac{3}{4} \) 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 Ic. ii. 15; Ic. t. 531; young branches 4-gonous 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-gonous, limb repandly 4-lobed. *Kurz in Journ. As. Soc. Beng.* vol. xlvi. pt. ii. p. 66; *For. Fl.* i. 482.


A shrub or small tree. Leaves 4\( \frac{1}{4} \)–7 by 1\( \frac{3}{4} \)–2\( \frac{1}{2} \) in.; midrib rather prominent beneath, primary nerves slender and uniting close within the margin, coriaceous, more or less pubescent above, dots not conspicuous; petiole about \( \frac{1}{2} \) in. Branches of *inflorescence* with acute angles. *Flowers* conspicuous, white according to Maingay.


CONCAN, *Stocks*; NILGIRI Mts., Herb. G. Thomson; Ceylon; forests in the Central Provinces, alt. 3–5000 ft., *Thwaites*.

A moderate-sized tree. *Branchlets* quadrangular. Leaves 1\( \frac{1}{2} \)–3 by \( \frac{1}{2} \) to about 1 in.; petiole \( \frac{1}{2} \)–\( \frac{3}{4} \) in.—This plant much resembles *E. Gardneri*, but can be distinguished by its 4-sided branchlets, narrower leaves and shorter petioles.

Tipperah Hills, Roxburgh; Pegu, Kurz.

Bark dark brown, smooth. Ovary 2-celled.—Wight's figure is copied from Roxburgh's (Ic. t. 1560) with the addition of a terminal panicle. Miquel (Fl. Ind. Bat. i. pt. i. 468) compares it with Syz. kalathienne, Korth, but the leaves of the latter are smaller and of a different shape. In Kurz' specimens the branchlets have white bark.

61. **E. gardneri**, 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 subtetragonal. *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.


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 ½-nearly an inch in width; petiole about ¼ in.—This differs from *E. lisospi-phylla* in the shape and nervation of the leaves; the inflorescence is similar in both (Thwaites).

63. **E. valdevenosa**, Duthie; leaves large elliptic acuminate petioled, midrib very prominent beneath, lateral nerves uniting to form a conspicuous marginal one interspaces finely and sharply reticulate, cymes terminal lax, calyx-tube gradually tapering to the base, quadrangular lobes shallow, berry globose size 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 tetragonal. *Leaves* 8-13 by 3-4½ in.; primary nerves ¼-½ in. apart; marginal nerves double; petiole ¼ in. or more. Branches of inflorescence angled and winged. *Calyx tube* about ½ in. Petals falling together. *Style* persistent.

64. **E. scoparia**, Wall. Cat. 3594 (Syzygium); branchlets virgate 4-crenate leaves shortly petioled 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 calyptate, stamens short, fruit small spherical.

Singapore, Wallich.

*Leaves* 2½-2½ by ¾-1 in., reddish-brown above and yellowish beneath when dried, margins slightly revolute; petiole ½ 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.

a. Calyx-tube shortly turbinate.
65. **E. crenulata**, Duthie; leaves broadly ovate-oblong or subobtuse, 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. Bracts small at the base of the flowers and at the joints of the inflorescence-branches. Calyx-tube about ⅓ 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 corymbs, branches lax spreading exceeding the leaves, calyx-tube obconical ⅞-⅞ in. limb nearly entire, corolla calyptrate, fruit subspherical crowned with the circular rim of the calyx-limb.

**Malacca**, Wallace, Maingay 741, &c.; **Singapore**, Wallich, Walker.

Bark grey; branchlets terete. Leaves 1¾-3 by 1-2 in.; primary nerves uniting close within the margin, interspaces reticulate, dots inconspicuous; petiole about ⅓ in. Main branches of inflorescence 1-2 in. Berry about ¾ in. diam., longitudinally furrowed.—In Maingay’s plant, which I would refer here, the corolla is rather more exserted in bud.


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 turbinate, 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 acumens cuneate at the base polished above lateral nerves slender prominent on both surfaces, cymes axillary and terminal shorter than the leaves, calyx-tube about ⅘ in. narrow below suddenly enlarging above lobes very shallow, petals united. *Syz. venosum*, *DC. Prodr.* iii. 260; *Mém. Myrte.* t. 17; Wall. Cat. 3590.

**Nepal**, Wallich.

 Branchlets terete. Leaves 3-4 by about 1½ in., subcoriaceous; petiole ⅛-⅛ in.—Habit of *E. mangifolia* but smaller in all its parts.

69. **E. areolata**, *DC. Prodr.* iii. 260 (*Syzygium*); *Mém. Myrte.* 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 nerves and dots pellucid, cymes from the upper axils or terminal lax, flower-buds pyriform 1 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 1 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 corymbose much branched shorter than the leaves, calyx-tube 1 in. or less gradually tapering to the base limb truncate, petals calyptrate.

MALACCA, Maingay (746).
Branchlets terete or subtetragonal; bark greyish. Leaves 3-4 by 11/2-13/4 in., shining a little above, lateral nerves uniting close within the margin, interpaces reticulated. Inflorescence-branches sharply 4-angular, compressed towards the nodes. Filaments slender; anthers small.

72. E. expansa, Wall. Cat. 3567 (Syzygium); leaves shortly petioloed 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 1-2 in., polished a little above; lateral nerves slender, raised on both surfaces, uniting within the margin, interpaces reticulate; petiole 1/2 in. Calyx-tube 1/2 in., gradually tapering to the base. Fruit not seen.

77 Calyx-limb 4-5-lobed.


CEYLON; Ambagamowara and Ratnapura 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 1 in.; lobes 4. Petals calyptrate. Berries subglobose, about an inch in diameter.—E. androssemoides of Wight's Herb. is E. obovata, Wall.

74. E. subdecussata, Wall. Cat. 3530 (Syzygium); leaves ovate or very shortly petioloed 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 calyptrate.

SINCAPORE, 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 corymbs, petals united, calyx about ⅜ in. with 5 shallow lobes.

MALACCA, Maingay, 749.

Branchlets terete, reddish-brown. Leaves 4–5½ by 1½ 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 III. ii. 17; Jc. 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. cxxii.; not of Berg. Syzygium revolutum, Thwaites Enum. 117.

NILGIRI Mrs., 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 petioled, variable in size, polished above, dull and glaucous beneath. Calyx 4–5-toothed. Petals free, or cohering and falling off as a lid.—The Nilgiri 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. parvifolia; the leaves are about 1 by ⅛ in.


ASSAM, Jenkins; KHASIA Mts., SELHET, CHITTAONG, Pegu, and MARTABAN to TENASSERIM; PENANG and SINCAPORE, Wallich.—DISTRICT. YUNAN.

A tree; branchlets terete, reddish-brown. Leaves 3–4 in., often with a long slender point, shining above, turning dark when dried; petiole ¼–⅛ in. Cymes tri-chotomous, on long peduncles. Flowers rather large, sessile. Calyx-tube about ⅛ in., gradually tapering to the base; lobes 4 or 5, unequal, persistent. Stamens numerous, long; anthers with an apiculate connective.

78. E. laevicaulis, Duthie; leaves ovate-lanceolate acuminate nerves close uniting very near the edge, cymes terminal and axillary short contracted branches ascending, calyx-tube about ⅛ 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 ½ 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 nervet, the lateral nerves horizontal and unifing close within the margin, margins somewhat revolute; petiole ½–¾ in.—In Wight's figure the leaves are drawn too acute.

80. E. assimilis, Thwaites Enum. 116 (Syzygium); leaves petioloed ovate-lanceolate or obvate 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. Sylv. Anal. Gen. cvii.

CEYLON; up to alt. 5000 ft., Thwaites.

A moderate-sized tree. Leaves 2–5 by 1½–2 in.; petiole ½–nearly ¾ in. Peduncles obtusely 4-sided. Flowers rather large, about ¾ in. in diam. Petals falling in one piece.—Differences 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 ½ in. or less lobes 4 distant subacute nearly equal, petals united.

MALACCA, Griffith, Maingay, 727 & 731.—Distrib. Borneo?.

Branchlets subterete. Leaves 2½ 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 nervet, 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.
83. **E. cyclophylla**, Thwaites MSS. (*Syzygium*); leaves shortly petiolar 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 nervously 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 ½–1 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 ½–2½ in. long, nervously beneath, margins revolute. Calyx obovate, shortly 5-toothed. Berries red turning to black.—Closely allied to the preceding species, differing chiefly by its petiolar glossy leaves.


**Nilgiri**, Wight, Adam, Gardner; Sisparah, Wight. **Ceylon**, Adam's Peak, alt. 6–7000 ft., Thwaites.

A large spreading tree with a fine unbranched head; young branches 4-gonous. Leaves glabrous, about 1 by ½ in., reticulated 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.

Eugenia.]  LIX. MYRTACEÆ.  (J. F. Duthie.)  495

+++ Leaves narrow.

88. E. olivifolia, Duthie; leaves small shortly petioled spatulate obovate 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. spatulatum, Thwaites Enum. 118; not of Berg (Eug.); Bedd. Fl. Sylv. Anal. Gen. cviii.

Ceylon, alt. 3–5000 ft., Thwaites.

A small tree. Leaves 1–1½ by ¼–¾ 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 ⅓ in.; petiole ¼–½ 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 axis exceeding the leaves, flowers small, calyx-tube narrowly turbinate 1/8–¼ in. truncate above, petals calyptrate, 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 clove-shaped.

MALAY PENINSULA, Maingay, 737.

Branchlets terete or subtetragonous, stout. Leaves 7–9 by 3⅓ 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 ⅛ 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 \( \frac{1}{2} \) in.


**Pen. Kurz; Mergui, Griffith; Amherst and Penang, Wallich.—Distrib. Amboina.**

A tree. *Branchlets* terete or subtetragonous; bark white. *Leaves* 2\( \frac{1}{2} \)-6 by 1\( \frac{1}{2} \)-3 in., shortly petiolate, glossy above, paler beneath; nerves finely impressed above, prominent beneath. *Bracts* 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., corymbs 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 1-1\( \frac{1}{2} \) in., pale yellow; petiole midrib and margin tinged with orange.—Wallich was inclined to connect this with his *S. conicum*; 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 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 axils, 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 \( \frac{1}{2}-\frac{3}{4} \) 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 ob lanceolate 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 axils, flowers small, calyx rather deeply 4-lobed, petals free and expanding. *Not of Wallich, Cat.* 3603; *not of Miq.* (Syz.). *E. lucidula*, Miq. Fl. Ind. Bat. i. pt. i. 444. *Myrtus cymosa*, Blume Bijd. 1080, *not of Spr.* (ex *Miquel* l. c.).

**Tenasserim, Helfer; 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.* cxi.; leaves obovate-spathulate or quite obcordate rarely oblong margined 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; *Wymaard*, 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 $\frac{1}{2}$–$\frac{3}{4}$ 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 oblanceolate 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.

Dark of older branchlets grey; upper branchlets subtetragonal. 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 $\frac{1}{4}$ 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; *Jo.* 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.


A large tree. Branchlets terete. Leaves 3–8 in., rounded at the apex or rather suddenly obtusely acuminate, dark green and shining above pilifer 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.


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 $\frac{1}{4}$ 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.
101. \textit{E. oculus}, Miq. Fl. Ind. Bat. i. pt. i. 460 (Syzygium); leaves on longish petioles elliptic obtusely acuminate acute 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.**—Distr. Java.

Branchlets terete or subcompressed upwards, light brown or whitish. \textit{Leaves} 2-4 in., varying in width, rusty-brown when dried; midrib furrowed above; petioles about 1 in. Panicles shorter than the leaves, branches divaricate or subdeflexed. \textit{Buds} globose. Calyx-tube upwards of \(\frac{1}{2}\) in.—The calyx and corolla are apparently fused together in the calyptraceous operculum. Under this species Mr. Kurz refers \textit{E. cerasoides}, Roxb., \textit{E. polyanthum}, Wight, and the specimens 2394 & 2395 of Griffith's and Hefler's collection.


**Sub-Himalayan forests from the Jumna to Assam, ascending to 2000 ft. Oudh and Gorakhpur forests, Cachar, Chittagong, Provinces of, Kurz.** Ceylon, up to 3000 ft.  

—\textit{Distr.} Indian Archipelago and S. China, Yunnan.

A large tree; branchlets suberete or 4-gonous. \textit{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 \(\frac{1}{2}-\frac{3}{4}\) in. \textit{Inflorescence} often thyrsoidal. \textit{Petunodes} long, acutely angled. \textit{Flowers} small, greenish, in threes, nearly sessile, odorous, \textit{Calyx} campanulate, with short obtuse lobes, or nearly truncate. \textit{Petals} united and falling in one piece, calyptra often-acuminate. \textit{Berry} \(\frac{1}{2}-\frac{3}{4}\) in., rugose, juicy. The wood is used for building and for agricultural implements. The fruit is eaten.


103. \textit{E. Stocksi}, Duthie.; leaves elliptic-oboivate rounded or obtusely acuminate at the apex indistinctly nerved dots not pellucid, cymes axillary and from the leafless axils half the length of or equalling the leaves, flowers small, petals calyptrate.

\textit{Concan, Stocks.} \textit{Wynaad, Beddome.}

A lofty tree; branches acutely 4-gonous. \textit{Leaves} 4-6 by \(1\frac{3}{4}-3\) in., thin; lateral nerves few slender below curving upwards and becoming faint towards the margin.
Eugenia. ]  LIX. MYRTACEEE.  (J. F. Duthie.)  499

Peduncles 1–2 in. Flowers about ⅛ in. Calyx-lobes 4, rounded or subacute.—Habit of E. balsamea, but the cymes are much longer peduncled and the leaves are not pellucid-punctate.


**SIXHIN, alt. 2000 ft., J. D. H. & T. T.; E. BENGAL, Griffith; Pscu, Kurz; Silhet, Wallioh, J. D. H., & T. T. ASSAM, Masters.—DISTRIB. YUNAN.**


**Silhet and CHITTAGONG, Roxburgh, Wallioh; Pscu, Kurz; TENASSEHIM, Hefor.**

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.

106. **E. Jambolana**, Lam. Dict. iii. 198; leaves ovate or obovate obtuse or more or less acuminate coriaceous closely nerved, panicles lateral below the leaves rarely axillary or terminal, calyx shortly turbinate limb truncate or obscurely 4-lobed, petals calypterate, berry olive-shaped to globose purple from size of a pea to a pigeon's egg; *Ham. in. Wern. Soc. Trans.* v. 342; *Roxb. Fl. Ind.* ii. 484; *Wight* Lc. t. 635; Benth. Fl. Austral. iii. 285; Bedd. Fl. Syv. i. t. 197; Brander For. Fl. 233; *Kurs in Journ. As. Soc. Beng.* vol. xlvi. pt. ii. 67; *For. Fl.* i. 485. Syz. Jambolanum, DC. Prodr. iii. 259; Wall. Cat. 3560; W. & A. Prodr. i. 329; Dalz. & Gibbs Fl. Bomb. 93. E. frondosa, Wall. Cat. 3560 G; not 3590. E. Moorei, *F. Muell. Framg.* v. 33. Calyptranthes Jambolana, *Willd. Sp. Pl.* ii. 975. C. capitellata, *Ham. in Wall. Cat.* 3560 B.

Common (wild or cultivated) and generally distributed throughout India in both peninsulas and in Ceylon; from the plains to 4–5000 ft.—DISTRIB. 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 uniting within the margin; petiole ½–1 in. Cyme short and compact or laxlypaniculate. 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.

500 LIX. MYRTACEAE. (J. F. Duthie.)


Var. obtusifolia; leaves obtuse, berries oblong. E. obtusifolia, Roxb. Hort. Beng. 37; Fl. Ind. ii. 485; Wight l.c. 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 obtusely acuminate narrowed at the base coriaceous pale pellucid-punctate lateral nerves slender close interspaces finely reticulated, panicles from the leafless axis dense, calyx-tube broadly campanulate much produced lobes 4 shallow. Calyptranthes tenus, Ham. MSS.

SUKANAGHAR, Hamilton.

Leaves 41–42 by 11-1½ in.; margins slightly revolute; midrib slender, orange-coloured as well as the edges of the leaves; petiole about ½ in. Peduncles ¾ 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 nerved, cymes lateral from the scars of fallen leaves rarely axillary, calyx-lobes unequal, petals united, berries oblong. Calyptranthes Danca, Ham. in Herb. E. salicifolia, Grab. Cat. Bomb. Pl. 78; not of DC.; not of Berg or Wall. Cat. 3597 (Syz.); Wight III. ii. 16; l.c. t. 539; Dalz. Bomb. Fl. 24 excl. syn. Wall.; Bedd. Fl. Sylb. Anal. Gen. cix.

WESTERN PENINSULA; beds of rivers in BERAR; BOMBAY GHATS and CONCAN, Stocks; CANARA, Ritchie; Coorg, Heyne; Sagoor, Vicary.

A small tree or shrub. Leaves 3–5 by ¾–1 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, Mig. 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.)

† Staminal disk broad.

109. E. Jossinia, Duthie; leaves shortly petiolated obovate-spathulate obtuse cuneate below coriaceous glabrous, peduncles axillary solitary or crowded at the end of the branches 1-flowered, pedicels and calyx rusty-pubescent, calyx-limb 4-lobed persistent, berry about the size of a sloe. E. cuneata, Heyne in Wall. Cat. 3025; not of Wall. Cat. 3593; Bedd. Fl. Sylb. Anal. Gen. cxxi. Jos- simia indica, Wight III. ii. 12, t. 122; l.c. t. 523; Blume Mus. Bot. i. 122; Mig. Fl. Ind. Bat. i. pt. i. 468.

SEVACHERRY HILLS, TINNEVELLY DISTRICT, Wight, Beddome; COURTALLUM, Wight. A small tree or shrub. Leaves 1½–2½ by ¾–2½ in., revolute at the edges; nerves inconspicuous above. Peduncles ½ in. long. Calyx-tube subglobose; lobes rather unequal. Petals hairy, ½ 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 cymses 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 Calcaed, 3-4000 ft., *Beddome.*
A large and beautiful tree. Leaves very thick, 3-5 by 2-3¼ 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, ½-⅜ in. Flowers about 1 in. diam. Disk large, subglobose, woolly.

111. *E. codicensis*, Munro 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.

NIOHSHI and KURO MTS., *Munro.*
A shrub with stout terete branchlets; young parts clothed with white pubescence. Leaves 1¼-2¼ by ⅜-⅞ in., coriaceous, glabrous, shining above; dots minute, pollen; lateral nerves slender, prominent, uniting within the margin; petiole ⅘-¼ in. Calyx-tube campanulate, silky-pubescent; lobes 4, broad, persistent, ciliate. Petals oblong, twice the length of the calyx. Berries about ⅛ 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 Mauritian.


*CEYLON*; Wattekelle Hill, 5000 ft. alt., *Thwaites.*—Distr. Bourbon, Mauritius. Leaves 1¼-2 by 1-1½ in.; nerves indistinct above, slender beneath and uniting within the margin; petiole about ⅛ in. Flowers upwards of an inch in diam. Pedicels ⅛ 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 equaling or exceeding the calyx-tube, calyx-lobes 4 long narrowly lanceolate acute exceeding the obtuse petals.

N. CANADA, *Stocks.*
Upper branches stout, terete or compressed at the nodes; bark brownish. Leaves 3-4½ by 1½-⅓ 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. calcedensis*, Bedd. *Fl. Ind. Or.* 35, t. 162; *Fl. Sylv. Anal.* Gen. ex.; young parts rusty-pubescent, leaves opposite or subalternate elliptic to subobovate obnate very rugoose on the upper surface but glabrous in age except the channelled midrib, peduncles axillary solitary about equal to the petioles 2-3-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 in. by 1¼ in., coriaceous, not dotted; nerves inconspicuous above slightly prominent beneath, the primary ones joining within the margin; petiole ⅔ in. Pedicels 1¼ in., with a subulate bract at the base of each. Flowers 1½-1½ in. in diam., with 2 small linear bracts at the base. Calyx-lobes rounded. Petals oblong ciliate ⅔ 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.

†† Staminial disk not enlarged.

§ Flowers pedicelled.

115. *E. bracteata*, Roxb. *Hort. Beng.* 37; *Fl. Ind.* ii. 490; young parts and inflorescence rusty-pubescent, leaves shortly petioled ovate-oblong tapering or cuneate at the base obtusely acuminate glabrous when old coriaceous shining pellucid-dotted, peduncles axillary short 1-flowered solitary or 2-3 together or in fascicles with 2 small bracteoles under each flower, berry globose 1-2-seeded.


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. zeylamica* have the leaves upwards of ½ in. long. In Wight’s figure the peduncles are incorrectly represented as 2-flowered.

*Var. fasciculata*; leaves 2½-3 in., flowers fascicled more erect peduncles shorter. *E. fasciculata*, *Wall. Cat.* 3622; *Blume Mus. Bot.* i. 87.—*Silhet*, *Wallich*.

116. *E. Rottlerianna*, *W. & A. Prodr.* i. 331; much branched, young shoots petioles 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 III.* ii. 13; *Ic.* t. 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 \( \frac{1}{2} - \frac{3}{4} \) in.; petiole \( \frac{1}{2} \) in. or less.—Col. Beddome mentions two distinct forms, the one with leaves 1–1 \( \frac{1}{2} \) by \( \frac{1}{2} \) in., the other 2 in. by \( \frac{1}{2} \) in. The former coming very near E. Willdenowii (of Wight).


**Ceylon**; up to no great elevation, Thwaites.

A middling-sized tree; branchlets terete. Leaves 2\( \frac{1}{2} - 5 \) by \( \frac{1}{2} - 2 \) in., membraneous, faintly reticulate; lateral nerves prominent beneath, 5–8 on each side marginal often double; petiole \( \frac{1}{2} - \frac{3}{4} \) in. Peduncles axillary and terminal, short, few-flowered; pedicles 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 2\( \frac{1}{2} - 4 \) by 1–1\( \frac{1}{2} \) in.; petiole \( \frac{1}{2} \) in. Berries \( \frac{1}{2} - \frac{3}{4} \) 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 1–1\( \frac{1}{2} \) in. or much narrower in some of Mr. Thwaites’ specimens; petiole about \( \frac{1}{2} \) 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**, Wynsad, alt. 3000 ft., Beddome.

A small tree or shrub. Leaves 4–5\( \frac{1}{2} \) by 1\( \frac{1}{2} - 1\frac{1}{2} \) 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 \( \frac{1}{2} \) to nearly \( \frac{3}{4} \) 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 1/2–3 in. *Petals* white, equaling the calyx-lobes, 1/2 in.


**Ceylon**; Pasdoon Corle, at no great elevation, *Thwaites.*

A small tree with terete branchlets. *Leaves* coriaceous, 4–6 by 2 1/2–3 in., the young ones rusty-tomentose beneath; petiole about 1/2 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 3–4 1/2 in.; midrib stout longitudinally striated; principal nerves very prominent below and uniting to form a conspicuous intramarginal one; petiole about 1/2 in. *Petals* oblong, pale purple, 3/4–1 1/2 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.*

**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 1/2 in. *Flowers* white. *Berries* red or nearly black, 1 by 3/4 in.—Champion’s single specimen from Galle has only one flower terminating a lateral branch; the calyx-tube is spa-
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 Delobage District, up to 1500 ft., *Thwaites.*

A small tree; branchlets terete. *Leaves 2–6 by 1⅓–2 in.; nerves inconspicuous above, more prominent beneath and uniting in a distinct marginal nerve with often a second fainter one nearer the edge. *Pedicels ¼–¾ in. Bracts ovate, acute. Petals 4, oblong, white, about ⅛ in. in length, longer than the roundish calyx-lobes.—Some of Mr. Thwaites’ specimens, 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; Fl. ii. 551; not of Gardner in *Hook. Jour. of Bot.* ii. 352 (1848); shrubby, glabrous or the young shoots puberulous, leaves short-pediciled 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. cx.*

**Courtauldon, Wight; Nilgiri Hills, Hb. Hohenacker; Seyagher 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 petiole and flower-stalks. *Leaves 1¼–2½ by ⅛–⅓ in.; acumen short and obtuse, or prolonged to a fine point. *Pedicels about ⅛ 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 busifolita, ½–2 by ¾–1¾ in.*

129. **E. microphylla**, *Bedd. Fl. Sylv. Anal. Gen. cx.*; 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, Assamboo Hills, Travancore, 4-5000 ft. alt.
A small tree, much branched and very dense. Leaves 1½ by 1½ in., bright red, quite glabrous when young, prominently black-dotted; petiole 1½ in.—I have seen no specimens.


Ceylon, Ambagamowa District, Thwaites.
A tree; branchlets terete. Leaves sparingly pilose, at length glabrous, 3-5 by 1½-2½ in.; petiole nearly ½ in. Pedicels about ½ in. or more. Calyx-lobes unequal. Petals ciliate, downy outside. Berries red, about ½ in. in diameter.

131. E. singampattiana, Bedd. Ic. Pl. Ind. Or. 65. t. 278; 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 1½-2 in.; primary nerves numerous, forming a continuous looping one near the margin. Flowers about ½ in. across. Petals prominently nerv ed.

Doubtful and Excluded Species.
E. Caryophyllata, Wild. (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. Wynaedensis, Bedd. in Mod. Lit. Soc. Journ. ex Ic. 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 acum en quite glabrous on both surfaces when old, peduncles supra-axillary, calyx-lobes lanceolate acuminate a little longer than the corolls, 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 ¼ in each cell.

Western Peninsula; Wynas, alt. 2-3000 ft., Beddome.
A small tree or shrub. Leaves 3-3½ by 1-1½ in., rather thin; lateral nerves indistinct above, slender beneath and uniting into a continuous one within the margin; petiole 1½ in. Peduncles ½ 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, pendulous. Fruit fibrous or somewhat berried, globose ellipsoid or quadrangular, crowned with the calyx, by abortion 1-seeded. Seed ovate or ellipsoid, without albumen; embryo large, exhibiting two layers, cotyledons nearly obsolete.—Distr. 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-costs.—Distr. 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. Racemes 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.


An evergreen tree attaining 50 ft, glabrous. Leaves 10 by 3 in., cuneate-oblong, lightly crenate-denticulate; petiole ½–1 in. Racemes 12–18 in., pendulous, flowers distant, pedicels ½–2 in. Calyx-lobes ⅔ 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.


*Ceylon*, south of the island abundant; *Thwaites*.

Treated by Mr. Thwaites as a var. of *B. racemosa*, and after specific separation by Miers l.c. reduced to *B. racemosa* again by *Kurz in Journ. As. Soc. 1877*, pt. ii. 70. *Butonica intermedia*, Miers l.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 $\frac{2}{4}$ in., oblong, narrowed downwards, at the very base cordate, crenulate-accretate or nearly entire; petiole $\frac{1}{2}$ in., thick. *Raceme* $\frac{4}{4}$ in., lax, but erect; pedicels $\frac{1}{2}-\frac{3}{4}$ 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, $\frac{3}{4}$ in., ovate. *Petals* and *style* as in *B. racemosa*. *Fruit* $\frac{1}{1}$ by 1 in., conically ovoid, broadest at the very base and there 8-winged; wings produced downwards in 8 semi-cordate processes.—Mr. Miers l.c. has asserted that *Griffith's* figures are mixed, and that part of them refer really to *B. alba*, *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'*.

sect. *Stravadium*, *Juss.* (gen.). *Calyx* lightly imbricate, 3-5- (usually 4-) lobed. (*Stravadium* and *Doxomma* of *Miers*).

*Ovary* 2-celled, whole calyx less than $\frac{1}{3}$ 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 *Bik. Fl. Austral. iii. 288*).

Attaining 30-40 ft., glabrous. *Leaves* 5 by 2 in., minutely dentilicate-crenate, narrowed into the petiole $\frac{1}{6}-\frac{1}{4}$ in. *Racemes* often 1 foot, glabrous, rachis not succulent; pedicels 0-$\frac{1}{2}$ in. *Calyx-tube* in the bud very short, funnel-shaped; lobes $\frac{1}{2}$ in., roundish, not longer on the fruit. *Petals* $\frac{1}{2}$ in., pink. *Filaments* long, usually red. *Fruit* $\frac{1}{1}$ by $\frac{1}{2}$ in., broadest in the middle, angles broad, rounded.—“*Indian Oak*” of the English denizens.
**Barringtonia.**] **LIX. MYRTACEÆ (BARRINGTONIAE by C. B. Clarke.)** 509

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 \( \frac{1}{3} \) in. (Doxomma, Miers).**

† Petiole short usually less than \( \frac{1}{2} \) in.


Moulmein 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 \( \frac{1}{4} \) in. Raceme sometimes 3 ft., always elongate with a thick rachis, pendulous; bract to each flower \( \frac{1}{4} \) in., ovate or lanceolate, caducous. Calyx total length \( \frac{1}{2} \) in., minutely white-tomentose. Petals \( \frac{1}{4} \) in., ovate, white (Parish). Fruit (half-ripe) 1 in., ellipsoidal, somewhat obovoid, quadrangular, wings 4, narrow.


Tenasserim and Andamans; Helder (Kew Distrib. No. 2428).

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 Helder’s plant is referred by Miers) the wings are broad sinuous even in the bud.

†† Petiole long, usually more than \( \frac{1}{2} \) in.

8. **B. pterocarpa**, Kurz in Journ. As. Soc. 1873, pt. 234; For. Fl. i. 498; leaves obovate-lanceolate petiole often 1 in., spikes 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.]

Peou and Martaban to Tenasserim; Kurz No. 3021.

An evergreen tree, 30–50 ft., glabrous. Leaves 10 by 3 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 \( \frac{1}{3} \) 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.


Meroui; Wallich, Griffith, Parish. Malacca; Griffith, Mainay No. 763.—Dist. the 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 ½–1 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 subsessile, 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. Fruit 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. Strawavium, 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 placemtas, 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.—Distr. Species 3; confined to India.

1. **C. herbacea**, Roxb. Cor. Fl. i. 13, t. 217; Fl. Ind. ii. 638; a small undershrub, leaves cuneate-oblong or obovate serrulate. DC. Prodr. iii. 295; Wall. Cat. 3638; Wright ex. t. 557; Brand. For. Fl. 237; Kurz For. Fl. i. 499; 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 0–½ in. Flowers 1–2 rarely several on each shoot, terminal; peduncles ½–1½ in. grey puberulo-pubescent; bracts 2, ½–1 in., linear, at the base of the calyx; flower subarticulated within the bracts. Calyx total length ½ in.; tube campanulate, terete; lobes ovate, obtuse. Petals 1½–2 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. Pt. iii. 14, t. 218; Fl. Ind. ii. 638; a tree, leaves obovate or oblong, spikes about 3-flowered, petals obtuse. DC. Prodr. iii. 295; Wall. Cat. 3640; W. & A. Prodr. 334; Wight. Ill. 99, 100; Dals. & Gibbs. Bomb. Fl. 95; Bedd. Fl. Syr. t. 205; Brand. For. Fl. 286; Kurz For. Fl. i. 499; Miers in Trans. Linn. Soc. ser. ii. Bot. i. 97.—Rheed. 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 acuminate, 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 ½—1 in., terete, campanulate, obscurely pubescent; lobes ovate, obtuse. Petals 1½ in., white, elliptical. Filaments red. Ovules in two rows in each cell of the ovary (Kurz). Fruit 2½ by 2 in., globose, surmounted by an enlarged mouth having a depressed pit at the vertex within the calyx-teeth. Seeds ½—1 in., ellipsoidal.—Dissempiments of the fruit permanent, at least sometimes. C. orbiculata, Miers l. c. i. 98 t. 16, fig. 6—8 (found 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 Jc. t. 147, 566; Kurz For. Fl. i. 500; Miers in Trans. Linn. Soc. ser. ii. Bot. i. 97, t. 10, 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 ½ in., obtuse or scarcely acute, much narrowed at the base, denticulate; petiole ½ in. Raceme short, terminal; flowers middle-sized. Calyx-tube ¼ in., top-shaped, obscurely 8-angled; segments ½ in., ovate, rounded. Petals 1 in., obtuse, reflexed. Filaments 1½ in., purplish. (Description chiefly copied from Kurz).
Doubtful genus.

Lencymmea, 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. Melastomaceae. (By C. B. Clarke.)

Herbs or shrubs, more rarely trees, sometimes climbers. Leaves opposite or rarely whorled, generally petaled, entire or nearly so, often palmately 3–5–7-nerved from near the base to the apex (usually pinnate-vinced in Memecylon); stipules 0. Flowers spike or corymbose, 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 appendaged 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); placetas in the Melastomeae axile, in the Astoremeae parietal, in Memecylon free central. Fruit included in the calyx-tube, capsular or burred, breaking up irregularly or by slits through the top of its cells. Seeds minute, very many (in Memecylon one only); albumen 0; cotyledons short (or in some of the Memecylae long thin convolute).—Distribution. Species 1800, tropical with a few subtropical; very many in America, many in south-east Asia, a few in Africa and Polynesia.

Suborder I. Melastomeae. Ovary 3–6 (usually 4–5) celled. Ovules very many, on placetas radiating from the axis. Seeds very many. Anthers opening by a single terminal pore (rarely by 2).

Tribe I. Osbeckieae. Seeds curved through half a circle, minutely pectate.

Stamens all alike. Fruit capsular 1. Osbeckia.
Stamens all nearly alike. Fruit a berry 2. Otanthera.
Stamens very unequal 3. Melastoma.

Tribe II. Oxyssporea. Seeds straight, oblong or cuneate, raphe often excurrent. Ovary with the vertex usually free conical. Petals more than 3. Inflorescence not scorpoid. Fruit capsular.

* Inflorescence terminal (see also Ochthrocharis).

Panicles broad showy 4. Oxysspora.
Panicles narrow. Flowers minute 6. Allomorphia.

** Inflorescence axillary, stamens equal, flowers minute.

Stamens 4 7. Blastus.
Stamens 10 8. Ochthrocharis.
Stamens 8 9. Amerincheleus.
TRIBE III. Sомерляе. Seeds straight, oblong or cuneate, often angular, raphe sometimes excurrent. Ovary flattened or depressed at the vertex. **Fruit capsular.**

Petal 3. Inflorescence scorpioid. **10. Sомерня.**
Petal 4. Flowers nearly sessile. **11. Sarcopteryx.**

TRIBE IV. Мединиллеа. 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. **13. Марумия.**
Cymes lateral. **14. Диссохата.**
Panicles terminal. **15. Анплентрум.**

** Longer stamens having the connective at base variously appendaged but not with two long bristles in front. **16. Мединилла.**
Four vertical plates on the ovary. **17. Pogonanthaea.**

*** Stamens equal or nearly so. **18. Астрония.**
Connective at base without bristles behind. **19. Pternanandra.**
Connective at base with bristles behind. **20. Кириесса.**

SUBORDER II. Астрониае. Ovary 4–5-celled; ovules very many on parietal nearly basal placentas. Seeds very many. Anthers short opening by slits. **Fruit baccate.**

Calyx-tube verrucose. Cymes small. **22. Dissochata.**
Calyx-tube with scales. Flowers solitary or clustered. **23. Lebea.**

SUBORDER III. Мемекиляе. 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. **1. Осбелкия, Linnaeus.**

Herbs or shrubs, mostly erect and setose; branches commonly tetragonal. Leaves opposite or sometimes ternate, entire, subcoriaceous, 3–7-nerved. Flowers terminal, solitary capitulate or panicled, 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. Рігеді 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.—Distributed. 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-fld or 5-fld flowers it should be premised that several *Osbeckias* which have the flowers normally 4-fld carry also a few 5-fld flowers on the same plant; and that sometimes a strong plant may produce all or nearly all the flowers 5-fld. This occurs eminently in *O. crinita* and in *O. cupularis*]

**Sect. I. Amblyanthera.** Perianth normally 4-merous. Anthers not beaked. Herbs or small shrubs.


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-ribbed, 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. Kurculi**; plant scarcely 2 in. with very small leaves and flowers, capsule ovoid ribs altogether obscure.—Parasanath Summit, Behar, alt. 4200 ft.; *Kurz*.


Annual and biennial, drying yellow. *Stems* 8–20 in., tetragonal, glabrous upwards, with simple ascending often closely-opposed hairs. *Leaves* 1–2 in., elliptic, subacute, 3- (or sub- 5-) ribbed, hairy on both surfaces; petiole \( \frac{1}{2}-\frac{1}{2} \) in. *Bracts* ovate or oblong, glabrous on their backs. *Calyx-tube* and teeth with stalked stellate hairs; teeth patent subpersistent. *Petals* \( \frac{3}{4}–\frac{1}{2} \) in., dark-purple or nearly white.

**Var. erythrocephala**, *Naud. in Ann. Sc. Nat. ser.* 3. xiv. 58. *O. Leschenaultiana*, *Thwaites Enum.* 194.—*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 glabrous and slightly produced at the vertex; flowers in this variety seem always 4-fld.—*Triana* distinguishes (under the name *O. cupularis*) *Wight* No. 1093 which has sometimes 5-fld 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-fld or 5-fld; he thus places *O. cupularis* in the 5-fld section at a great distance from *O. brachystemon*; then he says (under the head of *O. Leschenaultiana*) that *O. cupularis* has 4-fld 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* \(\frac{1}{3}-\frac{3}{3}\) in., ovato-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 \(\frac{3}{4}\) in. *Petals* \(\frac{1}{2}\) in., pale purple. *Fruit* \(\frac{3}{4}\) 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 *Amblyantha*.

**Sect. II. Genuine.** Flowers normally 4-fid, not large. *Calyx* campanulate, not produced or produced into a short neck in the fruit. *Anthers* beaked.


**Himalaya Terai** from *Kumaon* to *Bhotan*, up to 4000 ft. alt. Abundant in *North* and *East Bengal* including *Assam* and *Khasia* and thence to *Singapore*. Also in *Crota Nagpore*, alt 2000-4000 ft.—*Distrib.* Through China and Malaya to Japan and North Australia.

Stems 2 ft., branches descending, tetragonous, with adpressed hairs. *Leaves* commonly 2 in., narrow-oblong, sometimes 6 in., long-linear; in the *Parasenath variety* ellipse-oblong from a subcordate base, acute, 3-5-nerved, hairy on both surfaces; petiole less than \(\frac{1}{4}\) 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 stalked. *Petals* \(\frac{3}{4}\) in., mauve. *Anthers* with a beak about half their own length. Bristles on the apex of the *ovary* about 16. *Fruit* \(\frac{1}{2}\) in. wide (or much larger in the *Parasenath 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 $O. \text{ chinensis}$ is common, $O. \text{ octandra}$ 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 $O. \text{ chinensis}$ 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* $\frac{1}{2}$ in., mauve. *Anthers* with a beak more than half their own length. Bristles on the apex of the ovary about 16. *Fruit* ovoid, $\frac{1}{2}$ 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* $\frac{3}{4}$–1½ 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* $\frac{3}{8}$ in., purple-mauve. *Anthers* with a beak more than half their own length. Bristles on the apex of the ovary about 16. *Fruit* $\frac{1}{2}$–$\frac{3}{4}$ in. broad, ovoid-oblong, calyx-limb deciduous.

Var. *Hefleri*; 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.—Tennessee and Andamans, Helder. *Wallach, 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.

8. **$O. \text{ hispidissima}$**, *Wight* Ic. t. 1612; stems with reflexed strong bristles $\frac{1}{4}$–$\frac{3}{4}$ in., bracts to the pedicels round many extra ones without pedicels, calyx-segments oblong obtuse glabrous on the back strongly ciliate. *Triana in Trans. Linn. Soc. xxviii. 53*.

Mysore; Westara, Cleghorn. Deccan Peninsula; Munda Rani, *Wight* No. 1100. Sufruticose, 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 $\frac{1}{4}$–$\frac{3}{4}$ in. *Corollas* 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* 1/3 in. broad, urn-shaped, entirely without neck; scales permanent, calyx-segments deciduous.

9. **O. stellata**, Wall. Cat. 4062; branches with short adpressed rigid hairs, calyx-tube most densely covered with stellate white yellow or brown hairs, teeth stellate hairy, neck of the fruit short or not exceeding half the length of the fruiting ovary dilated at the top. *DC. Prodr. 142* as to var. a.; *Bot. Reg. t. 674*; *Hook. Exot. Fl. i. t. 37*; *Don Prodr. 221, partly*. *O. crinita*, *Naud. in Ann. Sc. Nat. ser. 3. xiv. 72*; *Smith in Wall. Cat. 4062*; *Kuru in Journ. As. Soc. 1877*, pt. ii. 75. *Melastoma crinita*, *Roxb. Fl. Ind. ii. 402.*

**HIMALAYA.** *Terra* from Kumaon to Bhutan, common; ascending the hills to 5000 ft. alt. *Chittagong, Roxburgh.*—*Distrib. 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 1 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* 1/4 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 woolliness 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* f. 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.

10. **O. crinita**, Benth. in Wall. Cat. 4066; branches with spreading hairs, calyx-tube with many stellate rufous-brown hairs teeth stellate hairy, neck of the fruit (in Wall. Cat. 4066 typical example not quite ripe) equalizing or exceeding the fruiting ovary much longer than its own breadth. *O. stellata*, *Don Prodr. 221, partly*. *O. stellata* var. β, *DC. Prodr. iii. 142*. *O. stellata*, *Naud. in Ann. Sc. Nat. ser. 3. xiv. 72.*


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 1–2 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* 1/4 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 summit 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.

221; D.C. Prodr. iii. 142; Wall. Cat. 4058. O. pulchella, Wall. Cat. 4059; Naud. in Ann. Sc. Nat. ser. 3. xiv. 73. O. campestris, Wall. Cat. 4063; O. longicollis, Wall. Cat. 4065. Melastoma pulchella, Roxb. Fl. Ind. ii. 403.—Melastomaceae, Griff. Je. 688.

In the swamps at the foot of the Himalayas, 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 fruit. 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 bristly-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. xxx. 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; Assamallay Mts.; alt. 4000 ft., Col. Beddome.

This species (only known from Col. Beddome's description here copied) is referred by Triana (Trans. Linn. Soc. xxviii. 54) to his section Ceramicalyx, which has very long beaks to the anthers. Col. Beddome's plant seems really nearer O. octandra DÖ, 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 addressed, flowers smaller than in the type.

**Decan Peninsula; Wight, Ceylon; at no great elevation, Thwaites.**

A low shrub, woody below; branches often elongate, adpressedly scabrous. *Leaves 1–2 in.; petiole 1/3–1/2 in.*. *Corynums* usually 3–6-flowered. *Calyx-lobes* much longer than broad. *Fruit* 1–1/3 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. Kleinii and *O. glauca*; but they must be very minute.

**Var. 1. typica**: no stellate hairs on the calyx.

**Var. 2. Kleinii**: several or very few stellate hairs on the calyx-tube, hairs at the summits of calyx-lobes clustered but hardly stellate.


**Trincinale, Travancore, Quilon are the localities on the examples of Wall. Cat. 4073.**

Small, woody, branching; branches adpressedly hairy, glaucous upwards. *Leaves 1–1 1/4 in.; petiole 1/3–1/2 in.*. *Calyx-lobes* much broader than long. *Fruit* 1–2/3 in. broad, campanulate, truncate.—With larger flowers and more silky hairs than *O. aspera*.


**Ceylon; alt. 6000–8000 ft.; Walker, Gardiner, Thwaites No. 1571.**

A small shrub; branches hispid. *Leaves* 1 in., 3-nerved; *petiole* 1/3 in. *Flowers* 1–3, in terminal clusters. *Calyx-tube* with small clustered stellate hairs. *Fruit* 1–1 1/2 in. broad, campanulate, truncate.—This species is close to *O. buxifolia*, *Arn. from which it differs by the petiolated 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. Bechettii by *Triana*.

17. **O. Wightiana**, Benth. in Wall. Cat. 4060; silky 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 1/3 in. ovate-oblong obtuse covered with simple or somewhat clustered hairs. *W. & A. Prodr.* 323; *Wight* l.c. 998; *Naud. in Ann. Sc. Nat.* ser. 3. xiv. 63; *Triana in Trans. Linn. Soc.* xxvii. 54.

**Decan Peninsula, Southern Mountains. Ceylon, alt. 3000–5000 ft., Thwaites (No. 1570 var. 5).**
A branched shrub. Leaves 1½—2½ in.; petiole ¼—½ in. Fruit ½ in. wide, campanulate, truncate.—United by Mr. Thwaites with \textit{O. aspera} above, from which it differs by the more pectinate-scyly calyx, and hardly by any other character.

18. \textbf{O. Leschenaultiana}, \textit{DC. Prodr.} iii. 142; flowers 1—5 clustered with much rufous hair, leaves subessile ovate obtuse or elliptic acute usually somewhat rounded at the base, calyx-tube densely clothed with stalked stellate rufous hairs teeth \(\frac{1}{2}\) in. oblong obtuse with clustered bristles. \textit{Triana in Trans. Linn. Soc.} xxviii. 54. O. Gardnoriana, \textit{Wight} \textit{Jc.} 997.

\textit{Nilsghir} Mts., alt. 6000—3000 ft., frequent.
A branched shrub; stem usually patent hairy. Leaves 1—1½ in., 3—5-nerved, hairy on both surfaces. Fruit \(\frac{1}{2}\) in. wide, campanulate, truncate.


\textit{Ceylon}: \textit{Wight}, \textit{Walker}, \textit{Gardner}.
A branched shrub. Leaves 1—2 in., usually rounded at the base. Calyx-teeth \(\frac{1}{4}\) in. Fruit \(\frac{3}{4}\) in. wide, campanulate, truncate.—Triana reduces here \textit{O. elliptica}, \textit{Naud.} i.c.; but Naudin says his \textit{O. elliptica} has short triangular calyx-teeth: while \textit{O. rubicunda} only exists as a species upon its lanceolate acute calyx-teeth. Thwaites is probably right in referring \textit{O. elliptica} \textit{Naud.} to \textit{O. cupularis var. erythrocephala} above.

20. \textbf{O. reticulata}, \textit{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-recticulate 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. \textit{O. alveolata}, \textit{Bedd.} \textit{Jc.} t. 168.

\textit{Decan Peninsula}; \textit{Adamallay} Mts., above 6000 ft. alt.; \textit{Col. Beddome}.
A branched shrub. Leaves 1—4 in., round or subcordate at the base, 5—9-nerved; petiole \(\frac{1}{2}—1\) in. Fruit \(\frac{3}{4}\) in. broad, campanulate, truncate.


\textit{Ceylon}; Colombo and Saffragam District; somewhat rare, \textit{Thwaites}.
Stems elongate, roundish, with scattered lax hairs. Leaves 1—3 in., broad-elliptic, acute, 5-nerved, hairy on both surfaces; petiole \(\frac{3}{4}—1\) in. Peduncles \(\frac{1}{2}—\frac{1}{3}\) in., solitary or few and subumbellate, carrying small round or ovate bracts. Calyx-tube densely clothed with stalked stellate hairs standing at right angles to the surface. Fruit less than \(\frac{1}{2}\) in. broad, campanulate or somewhat ovoid, truncate.

22. \textbf{O. aspericaulis}, \textit{Hook. f. ms.}; \textit{Triana in Trans. Linn. Soc.} xxviii. 55; stem erect simple scabrous with short hairs ending in a robust much-branched corymb, leaves 6 in. petiole \(1\frac{1}{2}\) in., fruit ovoid truncate distinctly 10-angled.

\textit{Tenasserim} of \textit{Andamans}, \textit{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
Oseckia.]  

LX. MELASTOMACEAE. (C. B. Clarke.)  

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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 $\frac{2}{3}$ in. Fruit $\frac{1}{2}$ 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 $\frac{1}{2}$ 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. polycephala, *Naud. l. c. 67*. O. Wightiana, *Benth. in Wall. Cat. 4074*. [Of the figures quoted by Triana, *Bot. Mag.* 2235 and *Wight l.c.* 998 do not refer to the present plant; *Bot. Mag.* 4026 has referred to *O. chinensis*; and *Wight l.c.* 376 may represent our *var. major* but does not give any idea of the typical *O. octandra*, D.C.]

South Deccan Peninsula in and near the mountains; plentiful. Ceylon, up to 3000 ft. alt.; Thwaites.

Branches subquadruangular with adpressed hairs, or woody nearly round and glabrous. Leaves (in the typical *O. octandra*) not more than 1 in.; petiole $\frac{1}{2}$ 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 l.c.* 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.* 64.

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 1 $\frac{1}{2}$ by 1 $\frac{1}{2}$ in.; petiole $\frac{1}{2}$ in. Flowers mauve-purple, not very large. Fruit $\frac{1}{2}$ in. broad, campanulate, truncate.

25. **O. Wynaadensis**, *C. B. Clarke*; stems with adpressed short hairs, leaves 5 in. oblong-lanceolar petiole $\frac{1}{2}$ 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 $\frac{1}{2}$ 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 $\frac{1}{2}$ 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, obovate. 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, placenta 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. braeatea, Korth. has the calyx-tube covered with long simple approximated ascending bristles, the broad bracts on the pedicels several close together subsessile: otherwise it is much like O. moluccana. Kurz in For. Fl. i. 502 and in Journ. As. Soc. 1877, pt. ii. 75, says O. braeatea, 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. braeatea.]


Nicobar; 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 ⅓–3 in., ovate or oblong-ovate, acuminate, rounded at the base, 5-nerved, shortly striose on both surfaces; petiole ½ in. Petals 5, purple. Stamens subequal, anthers with two auricles added at the base.—Not seen.
3. MELASTOMA, Linn.

Strigose or villous shrubs. Leaves petiolated, 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, placentas axile, radiating. Fruit coriaceous or somewhat berried, bursting irregularly. Seeds minute, very many, curved through half a circle, minutely punctate.—Distr. 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; Dals. & Gbs. Bomb. Fl. 92; Naud. in Ann. Sc. Nat. ser. 3. xiii. 285; Thwaites Enum. 106 (a. and b.); Kurz For. Fl. i. 503, not of Miq. 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.—Disperso. 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 3 in. Flowers 1-5, clustered, mauve-purple. Fruit 4 in. wide, short-ovoid, truncate, becoming pulpy within. Calyx-teeth often 4-5 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. xii. 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

**SINGAPORE; Sir R. Schomburgk, T. Anderson.**—Distr. Throughout Malaya abundant to North Australia.

Only differs from *M. malabathricum* in the smaller bracts and shorter calyx-teeth; and is united with it by Mr. Bentham.


A large shrub, reaching 20 ft. in the interior Himalaya. *Leaves 3—5 in., lanceolate; petiole ½—¾ in. Flowers 3—10, clustered; bracts not large nor enclosing the buds; petals a brighter more rosy mauve than in *M. malabathricum*. Fruit as in *M. malabathricum* or rather larger.—*M. velutinum* Seem. of Polynesia does not belong here.

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.

**EAST BENGAL; Griffith (Kew Distrib. No. 2242). Penang, Wallich; Tenasserim, Helber (Kew Distrib. No. 2243).**

Apparently very large. *Leaves 8 in., broad-elliptic, acute; petiole 2 in. Flowers in terminal clusters of about 12; bracts not large. Fruit ¾—⅞ in., ovoid.*

**Hairs on the calyx-tube long, at their base spreading, then ascending or patent.**


**Penang, Singapore and Malacca; Wallich, Cuming, Griffith, Maingay.**—Distr. Malaya and South China.

*Leaves 4—6 in., narrowly lanceolate; petiole ½—¾ in. Flowers 1—4, clustered, often very large, rose-purple. Bristles on the calyx-tube often ½—⅞ in., hair-pointed. Fruit ¾ in. wide and upwards.*

**Var. malle*, Wall. Cat. 4046; leaves 6 by 2½ in. with scattered villous hairs on both surfaces. *M. crinitum, Naud. l. c. 280.*

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PEGU, Kurz. TENASSERIM OF ANDAMANS; Heffer (Kew Distr. No. 2241).
Leaves 4–5 in., broad-lanceolate; petiole 1/2–1 in. Flowers clustered. Hairs on
calyx-tube 1/2–1 in.—This species is essentially like M. sanguineum, but the indu-
mentum 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. trilobum, Naud.; ellipticum, 
Naud.; microphyllum, Naud.; lamunigneum, Blume; Royenii, 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. malabathricum (including M. polyanthum and M. imbrici-
catum); M. normale; and M. sanguineum (including M. Houtteanum).

As to the 13 species of Melastoma described by Roxburgh, the first eight are 
androus; 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 subcorylliform 
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 branchies 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. Petiole 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; raphe lateral, produced at top in front into a point.—
Distrib. Species 4, whereof 3 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. Bar.
t. 88; DC. Mem. Melast. t. 4 (not correct as to the base of the connective); Wall.
Cat. 4076; Micr. Fl. Ind. Bot. i. pt. i. p. 556. O. vagans, Bot. Mag. t. 4563; 
Lemaire Jard. Fl. t. 79. Arthrostemma paniculatum, Don in Mem. Wm. Soc.
v. 299; Prodr. 222 (partly). Melastoma rugosa, Roxb. MS.

SUBTROPICAL AND TEMPERATE HIMALYA, from NIPA to BhotAN; alt. 3000–7000 ft.
Khansa Mts.; alt. 3000–5000 ft., common. Abundant in the interior of Sikkim covering 
the hill sideoes.
Leaves 4–5 in. (in some examples attaining 14½ 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 $\frac{3}{4}$ by $\frac{1}{2}$ in.


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 12½ 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 tinged the forest red. Leaves opposite, petiolar, oblong or obovate, obtuse, fleshy. Flowers terminal, in few-flowered umbels or solitary, large; peduncles stouter, 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 $\frac{1}{8}$ 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.


Anamallays; Col. Beddome. Ceylon, alt. 3000–5000 ft.; Wight; Walker; Gardnner, 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 all 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 ¼ in. Petals ⅝ 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.—**Distribution.** Species 5; whereof 4 are from the Malay Peninsula and its attached islands; 1 from Canton.

1. **A. exigua**, Blume in Flora, 1831, p. 523; leaves lanceolate or ovate-lanceolate not cordate at the very base, pedicels in fruit not more than ⅛ 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.

PENANG and MALACCA; Wallich, Griffith, &c.—**Distribution.** Philippines.


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 ⅛ in. and more. *Kurz For. Fl. i. 506*.

TENASSERIM OR ANDAMANS; Helfer (Kew Distrib. No. 2260).

Shrub 10 ft. (Helfer); 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 umbel 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 ¼ 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, oblone-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 1/4-1 in. Peduncles in fruit 1/4 in. or less. Fruit less than 3/4 in. broad.

8. **OCHTHOCHARIS, Blume.**

Small erect glabrous shrubs, branches round. Leaves opposite, petiolated, oblone or lanceolate, 3-5-nerved, minutely denticulate-serrulate. Flowers minute in axillary clustered cymes, rarely in axillary and terminal lax cymes. Calyx-tube obvoid, 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 1/4 in. Panicle 1 by 1 1/2 in., rusty puberulous, short-peduncled; branches opposite, supported by small linear bracts 1/4-1/2 in., the ultimate pedicels 1/8-1/2 in. Calyx-tube campanulate, nearly glabrous; teeth 5, minute. Petals 5, 1/2 in., ovate, subacute, rose-purple. Fruit (not ripe) 3/4 in. diam. subglobose.


† **T. TENAJSSERIM, Hafner (Kew Distrib. No. 2277). SINGAPORE; Wallich, Griffith No. 2278, T. Anderson, Maingay.—Distrib. Java.**
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.


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.

10. **Sonerila**, Roxb.

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 scorpionid 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; raphe 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 III. 215, t. 45; stem 2-4 in. erect little-divided, pedicels 0-½ in., anthers short oblong truncate hardly narrowed at the top. Wall. Cat. 4003 partly.

**Subtropical Western Himalaya**, Royle, Edgeworth. Chota Nagpaur, alt. 1000-2000 ft., abundant; C. B. Clarke.

*Stem* weak, sometimes winged, puberulous or minutely pubescent. Leaves ½-1 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 ½ in., trigonous, elongate funnel-shaped, ribs between the angles very obscure, often narrowed at the base so as to be sessileless. 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. PEGT 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 ½-1 in., obovate, rose-purple. Capsule ½ 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 Courallium 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 dentilations, uppermost sometimes in whorls of 4, often purplish beneath.—Moulmein; Lobb No. 341; Parish, No. 427.


*Stem* bifariously hairy. Leaves ½ in., equal or unequal, lanceolate, slightly ovate at the base, hairy on both surfaces, subentire or minutely denticulate, sessile and long-petioled on the same plant. Racemes 2-6-flowered. Calyx-tube minutely pubescent. Petals ½ in., ovate, acute, rose. Anthers ovate, much narrowed upwards. Fruits ½-1 in., ¼ in. apart.

†† *Species* of Ceylon and the South Deccan Peninsula.

Sonerila. ]  LX. MELASTOMACEAE. (C. B. Clarke.) 531

Ceylon, alt. 6000 ft.; Thwaites, Walker.

Stems 4–12 in. with many spreading branches. Leaves 3–4 in., ovate or narrow-oblong, acute, dentate, 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 pedicle. 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 anthers, which (as above stated) are usually ½–¾ 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, f. t. 1059.

South Deccan Peninsula; Courtaulld; Wight No. 1142. Ceylon, Newera Ella; Thwaites.

Stems 4-angled. Leaves 4–2½ in., with a few scattered hairs above and microscopic puberulous dots beneath; petiole ½–1¼ in. Petals ½ in., mauve-purple, ovate acute. Capsules ½ in., narrow-funnel-shaped, with six thick ribs, longer than the pedicles, 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.


Travancore, Quilon; Wight No. 1111. Ceylon; tropical; Thwaites.

Stems and peduncles glabrous or pubescent. Leaves 1–2½ in., ovate or oblong, minutely serrulate, sparingly 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 sides near the top.

8. S. Arnettiana, 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 $\frac{1}{3}$ in. broadly funnel-shaped trigonous 6-ribbed somewhat scabrous usually longer than the pedicel. *Bedd. Ic. Pl. Ind. Or.* t. 300.

*Ceylon*, alt. 6000 ft.; *Thwaites.*

Leaves nearly 2 by $\frac{3}{4}$ in., oblong or ovate, with 3–5 longitudinal nerves, nearly glabrous or with few scattered hairs above, minutely serrulate; petiole $\frac{3}{4}$–1 in. Calyx-tube with lax spreading hairs. *Petals* $\frac{1}{3}$–$\frac{2}{3}$ in., ovate, acute, purple. *Seeds* covered with elevated points, raphe excurrent the whole length of the seed.

Var. *tenella*, *Beddome* in Trans. Linn. Soc. xxv. 217; stem leaves petioles and calyx-tube nearly glabrous.—*Anamallays*; alt. 3000 ft., *Beddome.* Stated by Col. Beddome to be allied to *S. Arnottiana*, *Thwaites*, and reduced to it by *Triana* in Trans. Linn. Soc. xxviii. 75. The examples communicated by Col. Beddome to Kew do not show fruit but seem the same as *S. Brunonis*; they differ considerably in their glabrousness from *S. Arnottiana*.

9. *S. Wightiana*, *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 $\frac{1}{3}$ in. funnel-shaped trigonous 6-ribbed scabrous usually shorter than the pedicel. *Triana in Trans. Linn. Soc.* xxviii. 75.

*Ceylon*: Adam's Peak; *Thwaites.*

Leaves $\frac{1}{2}$–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. Calyx-tube with lax spreading hairs. *Petals* $\frac{2}{3}$ in., purple, ovate, acute. *Anthers* ovate-oblong, obtuse. *Seeds* covered with elevated points, raphe scarcely excurrent.—This species only slightly differs from *S. Arnottiana* by its greater hairiness, its rather larger flowers, and more elongate capsule.

10. *S. Hookeriana*, *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 $\frac{1}{6}$ in. funnel-shaped trigonous 6-ribbed scarcely scabrous usually longer than the pedicel. *Naud. in Ann. Sc. Nat. ser. 3. xv. 321; Triana in Trans. Linn. Soc.* xxviii. 75.

*Ceylon*, Adam's Peak; *Walker, Thwaites* No. 173 and 426 partly.

Leaves $\frac{1}{2}$–1 in., ovate or oblong, with 3–5 longitudinal nerves, serrulate; petiole $\frac{1}{2}$–$\frac{3}{4}$ in. Calyx-tube with many spreading rufous hairs. *Petals* $\frac{1}{3}$ in., ovate, acute (pale?). *Anthers* ovate-oblong, obtuse. *Seeds* with subtubercular raised points, raphe much excurrent near the top of the seed.

11. *S. Gardneri*, *Thwaites Enum.* p. 107; stem 12 in. round rufous-villous, leaves ovate from a broad base short-petiolated, petals $\frac{2}{3}$–$\frac{3}{4}$ in. broad-elliptic, capsule $\frac{1}{4}$ in. ovoid trigonous slightly scabrous and hispid usually longer than the pedicel. *Triana in Trans. Linn. Soc.* xxviii. 75; *Bedd. Ic. Pl. Ind. Or.* t. 298.

*Ceylon*, alt. 5000 ft.; Horton Plains, *Thwaites.*

Leaves $\frac{1}{2}$–1 in., minutely serrate with scattered hairs on both surfaces, nerves beneath rufous-villous; petiole $\frac{1}{2}$–$\frac{3}{4}$ in. Peduncles short and with the calyx-tube rufous-villous. *Petals* mauve-purple. *Anthers* ovate-oblong, obtuse. *Seeds* subtubercular 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.

Var. *firma*, *Triana l. c.;* leaves sessile. *S. firma*, *Thwaites ms.*—*Ceylon*, alt. 5000 ft., Central Province at Wattehelle; *Thwaites* No. 3873.—The example of this communicated by Mr. Thwaites to Kew is in flower and does not show fruit. It seems exactly *S. Gardneri* except as to the sessile leaves, but the fruit may prove it to be something quite different.
**Anthers long attenuated or acuminated upwards.**

† Plants with distinct stems, the leaves of each pair not very unequal.

§ Species of Ceylon and the South Deccan Peninsula.

12. **S. robusta**, Arn. in Hook. Comp. Bot. Mag. ii. 308; stem attaining 21 in. shaggy with russet-brown hair, leaves cordate-ovate sessile with long rusful hairs above and on the nerves beneath, capsule nearly \(\frac{1}{2}\) in. campanulate trigonous hispid-scabrous 6-nerved, pedicel about \(\frac{1}{4}\) in. Naud. in Ann. Sc. Nat. ser. 3. xv. 327; Triana in Trans. Linn. Soc. xxviii. 76.

**Ceylon**; **Walker**; Adam's Peak, alt. 6000-7000 ft. Thwaites No. 426 partly. Branches ascending, round, with hish or soft hairs. Leaves \(\frac{3}{4}\) in., nearly entire. Calyx-tube with many spreading hairs. Petals \(\frac{1}{2}\) 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. glabriusulis**, Thwaites ma.; 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 \(\frac{2}{4}\) in., rhomboid-oblong, unequal-sided, obtuse or subcordate at the base, glabrous on both surfaces, denticulate; pedicel about \(\frac{1}{2}\) in. Racemes short. Petals \(\frac{3}{4}\) in., elliptic, acute, purple.—Triana in Trans. Linn. Soc. xxviii. 76 has erroneously called this species *S. Hartweyi*, 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 \(\frac{1}{4}\) in. (sometimes much smaller), thin, sparsely pilose above, minutely glandular-dotted and sometimes thinly hairy beneath; pedicel \(\frac{3}{4}\) in. Calyx-tube nearly glabrous, or with a few lax hairs. Petals \(\frac{1}{4}\) in., ovate, acute, mauve. *Anthers* oblong, attenuated upwards. Seed with raised points, raphe excurrent on one side near the top.—See the remarks under No. 4 *S. sylvanica*.

**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 \(\frac{1}{2}\) in. funnel-shaped trigonous 6-ribbed about as long as the pedicel.

**Ceylon**; at no great elevation, Thwaites.

Leaves \(\frac{1}{2}\) in., 3-nerved the lateral nerves near the margin, minutely glandular-punctate; pedicel \(\frac{1}{3}\) in. Petals \(\frac{1}{4}\) in., purple-mauve. Seeds with raised points, raphe excurrent on one side near the top.

16. **S. amabulis**, 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 \(\frac{1}{3}\) in. funnel-shaped or somewhat campanulate trigonous 6-ribbed smooth.
Southern Deccan Peninsula, Tinnivelly, 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 3-½ 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. J. A. Pl. Ind. Or. t. 156; branches stout round adpressedly villous, leaves elliptic acute subentire pinnate-nerved with many long brown hairs on both surfaces, capsule ¼ in. subcampanulate trigonous 6-ribbed smooth longer than the pedicel. Triana in Trans. Linn. Soc. xxvii. 76.

Travancore, alt. 4000 ft.; Col. Beddome.
Leaves 1½-3 in., acute but scarcely acuminate, glandular-dotted, shaggy on the nerves beneath; petiole 1-1½ in. Racemes 3-9-flowered, short, pedicels with few scattered hairs. Calyx-tube glabrous or sparsely pilose. Petals 3-½ in., mauve, elliptic, acute. Anthers oblong, much attenuated upwards. Seed with raised points, raphe excurrent on one side near the top.

18. S. hirsutula, Ann. 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-pedicled, about 4-flowered. Petals ½ in., elliptic, acute, mauve. Anthers greatly elongate. Capsule 1½ 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.


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 ¼ in. along the petiole. Perhaps a form of No. 22 S. elegans.


Hills of the South Deccan Peninsula, frequent: Nilghiris, 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, dentilicate or subserrate; petiole 1–2 in. **Racemes** often subpaniculate with 8–14 flowers and very hirsute. **Calyx-tube** generally with much lax brown hair. **Anthers** shortly beaked. **Capsule** definitely but lightly 6-ribbed, erect, usually longer than its pedicle. **Seeds** with raised points; raph large, excursive, like a hood near the top of the seed on one side.


**Nilgiris**; near Sisparah, **Wight, Gardner.**

**Leaves** 1–2 in., crowded on the branchlets, oblong or elliptic, narrowed at both ends, acute, not much acuminate; petiole ¾–2 in. **Racemes** densely flowered; peduncles short, terminal. **Calyx-tube** glabrous. **Anthers** much attenuated. **Capsule** ½–3 in., funnel-shaped, smooth, obscurely ribbed.

22. **S. elegans**, **Wight Ic.** t. 995–3; 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.

**Nilgiris, Sispara; Wight No.** 1109 partly, **McIvor.**

**Suffrutescens**; branches glabrous or with few scattered hairs. **Leaves** 2–4 in., elliptic-lanceolate from a rounded base, minutely serrulate, sometimes purpuraceous beneath; petiole ½–2 in. **Racemes** lateral and terminal, long-peduncled. **Petals** ½ in., light mauve. **Capsule** ¾ in., erect, funnel-shaped, trigonous, rather obscurely 6-ribbed, longer than its pedicel. **Seeds** with prominent raised points, raph much excursive near the top on one side.—This has been confused with the next species by **Triana (Trans. Linn. Soc.** xxviii. 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 Ic.** 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. Ic.** t. 1058.

**Nilghiris; Wight; Gardner, &c. Mysore, T. Lobb.**

**Suffrutescens**, 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** ½ in., mauve. **Capsules** 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, raph excursive 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.


**Ceylon, alt.** 1000 ft., **Walker, Thevattas.**

**Suffrutescens**; branches round, glabrous. **Leaves** 2–3 in., 3-nerved from the base distantly serrulate upwards; petiole less than ½ in. **Petals** ½ in., mauve, broad elliptic, acute. **Anthers** not much attenuated. **Seeds** smooth or nearly so; raph large, hooded, excursive the whole length of the seed.

*CeYLON*; District Galle, *Thwaites* No. 2799 partly.

*Stem* 6 in.; branches wiry, subquadangular. *Leaves* 1½ by ¼ in., with remote shallow crenatures upwards; petiole ½ in.—The species is distinguished from No. 16 *S. rhombifolia* Thwaites by Triana, and the leaves appear very different. The specimen of *Thwaites* has no flowers.

§§ Species of the Transyangetic Peninsula.


*MALACCA*, Mount Ophir; *T. Lobb, Mainingay* No. 779.—*Distrib. Java*.

*Leaves* ½—2 in., unequal, often pilose above; petiole ½—1 in. *Anthers* oblong, attenuated. *Capsule* 1–1½ in., trigonous, shorter than its pedicel, mouth 4–5 in. broad. *Seeds* with raised points, raphe excurrent on one side near the top.


*MOULMEIN*, on Mount Gerai, alt. 3000 ft., T. Lobb No. 345, 425.


*MERGUI*, Griffith; *Moulmein, T. Lobb, Parish.*—*Distrib. Sumatra*.

*Stem* 4–8 in., little divided, pubescent or subtomentose upwards. *Leaves* 1–4 in., nearly glabrous, pubescent on the nerves beneath, usually none of the nerves quite basal and 2–3 nerves high up the midrib, blotched white or not along the midrib above; petiole ½–½ in. *Capsule* (ex Korthals) funnel-shaped, trigonous, sparsely pilose. *Seeds* with raised points, raphe very excurrent, hooded.

Var. *Lobbii*; stem very rusty tomentose, leaves small scarcely 1 in.—Top of Thongyuen, Moulmein, alt. 4000 ft.; T. Lobb.


*TAVYI*; Wallich.

*Stem* 2–4 in., with 4–5 large leaves approximated at its summit. *Leaves* 2–4½ 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 \(\frac{3}{4}-\frac{3}{4}\) 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, petiole jointed 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 \(\frac{3}{4}-1\frac{1}{2}\) in., glabrous, attenuated into the petiole; stipules \(\frac{1}{4}-\frac{1}{4}\) in. Racemes few-flowered; peduncles subterminal, short. Calyx-tube glabrous. Petals \(\frac{1}{4}-\frac{1}{4}\) in., oвate, acute, mauve. Capsule \(\frac{1}{4}\) in., glabrous, funnel-shaped, subtrigonous, hardly ribbed, pedicel very short. **Seed obovate, 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 \(\frac{1}{4}-\frac{1}{4}\) 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 \(\frac{1}{4}-\frac{1}{4}\) in., mauve, elliptic, acute. Capsule \(\frac{1}{4}\) in., oblong, glabrous, subtrigonous, ribs obscure. **Seed obovate, with minute raised points, raphe not excurrent.—One example collected by Sir J. D. Hooker has broadly lanceolate leaves, \(\frac{1}{4}\) 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 cernuous in clusters of 5-15. **Wall. Cat. 4091; Triana in Trans. Linn. Soc. xxviii. 76; Kurz in Journ. As. Soc. 1877, pt. ii. 78. S. emaculata, Roxb. Fl. Ind. i. 178. S. angustifolia, Roxb. l. c., not of Wall. Cat.; Wall. Pl. As. Rar. t. 102. S. pieta, **Griff. Notul. iv. 676 (ex Kurz in Flora 1871-90). S. Brandisiana, Kurz in Flora, 1871, 290. Sonerila sp. 3 and 4, Griff. Notul. iv. 676.**

NIPAL; Wallich. ASSAM HILLS and KHASIA MTS., alt. 1000-5000 ft., plentiful. MARTABAN and TENASSERIM. **Kurz.**

Leaves often 4 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 \(\frac{1}{4}\) in., oblong or somewhat funnel-shaped, slightly trigonous, 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 \(\frac{1}{4}\) in., capsule

**PINANG; Wallich, Griffith, Malacca; Malacca; Malacca; Singapore; Wallich, Lobb.—Distrib. Malayas.**

Leaves ovate-lanceolate, very unequal at the base, pinnate-nerved, with much rufous or brown hair on both surfaces, ciliate, hardly serrulate. *Colya-tube* very shaggy. Petals $\frac{1}{3}$ in., elliptic, acute. Capsule less than $\frac{1}{3}$ in., broad-campanulate, longer than its pedicle. Seeds almost epunctate, 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 $\frac{1}{2}$ to 5 in. often broad or cordate at the base sometimes acute, minutely denticate or entire, usually puberulous and also with a few scattered hairs; petiole $0-2\frac{1}{2}$ in. *Pedicule* 1–8 in.; flowers 3–17, crowded, subumbellate; pedicels glabrous. Petals $\frac{1}{3}$ in., elliptic, acute, mauve. Anthers not greatly elongate. Capsule $\frac{1}{4}$–$\frac{1}{10}$ in. exclusive of the margin, shorter than the pedicle.


**Bombay Ghats, Dalseil; Concan and Bababoodun Hills, Law; Mysore, Lobb.**

Leaves commonly $\frac{1}{2}$–1 in., broad or cordate at the base, minutely crenate-serrate, glabrous, sometimes glandular puberulous dotted above; petiole often 2 in. *Pedicule* 1–3 in.; flowers 4–10, crowded, subumbellate; pedicels glabrous or nearly so. Petals $\frac{1}{4}$–$\frac{1}{2}$ in., elliptic, acute, mauve. Anthers much elongate. Capsule $\frac{1}{4}$–$\frac{1}{8}$ in., shorter than the pedicle.—The peduncle pedicels and pediolo 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 nerved 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. Jc. Pl. Ind.* Or. t. 169.

**South Deccan; Anamallays, alt. 6000 ft.; Beddome.**

Leaves $\frac{1}{4}$–$\frac{1}{2}$ in. diam., cordate at the base, minutely denticate, glabrous and minutely puberulous, dotted on both surfaces; petiole $\frac{1}{4}$–$\frac{1}{2}$ in. *Pedicules* $1\frac{1}{4}$–3 in. Petals $\frac{1}{2}$ in., orbicular-obovate, mauve. Anthers short for the genus, little attenuate, truncate. Capsule $\frac{1}{10}$–$\frac{1}{10}$ in., shorter than the pedicle.


§§ **Capsule oblong funnel-shaped, distinctly trigonous.**

38. **S. Griffithii**, C. B. Clarke; leaves glabrous minutely dotted puberulous beneath, capsule ⅛ in. funnel-shaped, pedicel nearly ⅛ 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, Maingay No. 781.**

Stemless, or the stem 1–2½ in. *Leaves* ½–1 in., ovate, glabrous or with scattered bristly hairs above, minutely denticulate, subciliate, nerves from near the base; petiole ¼–1 in. *Peduncle* 1–1½ in., 2–6-flowered; raceme short, glabrous or nearly so. *Petals* ⅛ 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 ¼ 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).**


**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 ¼–2½ in. *Peduncle* 1–3½ in., 3–8-flowered. *Petals* ⅛ in., mauve, elliptic, acute. — In this and the next species the rufous bristles at the base of the pedicel 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 pedicel is not jointed on a tubercle of a woody stem as in those species.

41. **S. khasiana**, C. B. Clarke; bundles of rufous bristles ¼–½ in. about the base of the pedicels, leaves usually with scattered bristly hairs above, capsule ⅛–⅕ in. oblong shorter than the pedicel, seeds with minute dots raphe not excurrent.

LX. MELASTOMACEE. (C. B. Clarke.) [Sonerilu.

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., many, elliptic, acute. Anthers long, narrowed upwards but scarcely acuminate.—Near S. violaefolia, 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. 48, 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 tri-androus by all who quote it: cf. Mq. Fl. Ind. Bot. i. pt. i. 563.

43. **S. Bensonii**, 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. BULLATA, Griff. Notul. iv. 675, from Malacca, is not identifiable. Triana (Trans. Linn. Soc. xxviii. 77) thinks it may be a Driessenia, 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. HELFERII, 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 peduncle less than ½ in., capsule ½–3 in. funnel-shaped subsessile nearly glabrous with triangular erect teeth.—**TENasserim or Andamans, Helfer (Ksw Distrib. No. 2295).**

S. MACULATA; Rheede’s plant ( Hort. Mal. ix. t. 65) usually referred to S. maculata is certainly not that plant; it may be No. 20 S. speciosa, Zenk.

11. **SARCOPOYRAMIS, Wall.**

An erect glabrous herb; stem quadrangular. Leaves petioled, 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-adnate 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.


Nepal and Sikkim, alt. 4000–9000 ft.; plentiful. **Khasia Mts.**, alt. 4000–6000 ft.; plentiful. **Burma and Malayan 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 ¼–1 in. Calyx-tube glabrous, sometimes with minute bundles of hairs between the bases of the teeth. Petals scarcely ⅛ in. Fruit about ⅛ in., quadrangular, mouth of the calyx-tube very wide.

—Triana reduces (in Trans. Linn. Soc. xxviii. 77, 78) to this species Sonerila Naudiniana Miq. Fl. Ind. Bat. i. pt. i. p. 565 with syn. But Miguel 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, petiolated, 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 glandularly raised dots, raphe slightly recurrent along one side of the seed its whole length.—**Distr.** Species 2; one Malayan, one Bornean.


**Malacca**: **Griffith, Maingay.** P. tenasserim or Andamans. **Holfér 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, ⅛ in. wide and upwards. Calyx-teeth from short-ovate with a mucro to ovate-lanceolate attenuate. Capsule about ⅛ in., fruiting pedicel about ⅛ in.—Holfér’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. Holfér’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-petiolated, 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, placentas 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. —Distr. Species 10, extending from the southern half of the Transagentic Peninsula to Borneo and the Philippines.


Leaves 3–4 in., shining, minutely puberulous above, rufous-stellate beneath; petiole ½ in. *Peduncle* 1–2 in.; pedicels 2–4 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 ½–1 in. *Peduncle* 1 in., pedicels 4–6 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.—Distr. Sumatra and Java.

Leaves 2–3½ in., shining impressed- reticulate above, with scattered stellate pubescence beneath; petiole ½ in. *Peduncles* ½–1 in., chiefly from the upper axils forming a quasi-terminal panic; pedicels ½ 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.
14. DISSOCHETA, Blume.

Shrubs, usually twiner. Leaves opposite, petiolar 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.—DISTR. 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 panicle and leaves beneath with much ruff stellate tomentum, panicle narrow leafy with large bracts to the young flowers, calyx-tube of the buds more than ¾ in. densely woolly-rufous and stellate-hairy, teeth distinctly triangular. Melastoma bracteatum, Wall. Cat. 4044, partly.


Leaves 3½-4½ in., glabrous above or minutely pubescent on the nerves; petiole ½ in. Panicle consisting of axillary cymes (exactly resembling that of Marumia reticulata); bracts ⅛ in., oblong, caduceous; pedicels less than ¼ 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); Mainagay No. 789. Singapore and Pinang; Walker.

Leaves 3½-3½ in., glabrous above, with scattered dark-red stellate hairs beneath; petiole ½-⅔ in. Panicle terminal, pedicels hardly more than ½ 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, 495; 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 ⅛-⅔ in. with more or less stellate pubescence limb (in the bud) nearly entire or very obscurely 4-toothed. Mjq. Fl. Ind. Bat. i. pt. i. 629; Triana in Trans. Linn. Soc. xxviii. 84. D. bracteosa, Naud. in Ann. Sc. Nat. ser. 3. xv. 76; Mjq. Fl. Ind. Bat. i. pt. i. 527. Melastoma bracteatum, Jack in Trans. Linn. Soc. xiv. 9; Wall. Cat. 4044, partly.

**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 ease 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 pedicels 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 ferruginous, fruit 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.**


7. **D. gracilis**, Blume in Flora, 1831, p. 498; leaves beneath and panicle glabrous or very nearly so, fruit less than 1/2 in. broad glabrous ovoid much nar-

PINANG and SINGAPORE; Wallich.—Distrib. Malay Archipelago.

Leaves 3 in.; petioles sometimes ½ in. Nodes of panicle often thickened. Stamens 8 or 4, as in the two preceding species. Petals nearly white (Jack). Bracts ⅓ in., oblong, much exceeding the expanding buds.

15. ANPLECTRUM, 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 appendaged 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, placentas axile. Berry ovoid or globose, crowned with the calyx-limb. Seeds very many, small, falcate, obvoid; raphe long, lateral.—Distrib. Species 12, extending from Mergui, Pinang and Singapore to Borneo, and the Philippines.


PINANG; Wallich. Mergui and Malay Peninsula; Griffith (Kew Distrib. No. 2288); Maingay No. 793–2. Tenerseheim or Andamans; Helfer (Kew Distrib. No. 2290).—Distrib. Malay Archipelago.

Flowers cernuous. Shorter stamens 4, 2 or 0. Fruit ⅓–½ ½ 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 1½–2½ in. glabrous or minutely puberulous beneath 3- or 5-nerved (scarcely 5-nerved) suddenly narrowed into a long obtuse subcaudate tip. Naud. in Ann. Sc. Nat. ser. 3. xv. 304; Mig. 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 ½ in. broad, glabrous. Young calyx-tube often minutely but densely rufous tomentose.—Some of the Archipelago examples have leaves 4½ in. and are then very like A. glaucum.

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Pinang; Wallich, Walker. Malacca; Griffith, Malacay No. 794; Cuming, No. 2259.—Distrib. Java to Philippines.

Leaves usually 2-2½ in., oblong, acute, glabrous above or rufous stellate-tomentose on the nerves; petiole ½-1 in. Young calyx-tube densely stellate-tomentose. Shorter stamens often 2, sometimes 4 or 0. Fruit less than ½ 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 ½-1 in., with spreading bristles. Panicle with spreading bristles, and rufous-tomentose. Young calyx rufous-tomentose. Fruit ½ 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 Distrib. No. 2285).

Branches stout. Leaves 5-7 in., very acute, cordate at the base; petiole ½-1 in., densely coarsely bristly. Panicle (in fruit) terminal, large, repeatedly trichotonous; fruits very numerous (like those of Amplectrum), smooth, campanulate at the base (not ripe ½ in. broad).—Flowers not seen.

A. Barratum, Triana in Trans. Linn. Soc. xxviii. 84; Melastoma? barbatum, Wall. Cat. 4082 from Chappeledong in Martaban.

The Wallachian example exhibits neither inflorescence, flowers nor fruit, and is indeterminable. Leaves 4 in., ovate, shortly acuminate, glabrous; petiole ½ 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. Flowers in terminal panicles or lateral cymes, white or rose, with or without bracts, 4- or 5- rarely 6-merous. Calyx-tube ovoid or cylindric, 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 taberules 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.—Distrib. 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), *Maingay* No. 796.—*Distrian* Marianna Islands.


**Malacca**; *Maingay* No. 799.—*Distrib.* Malay Archipelago.


†† Leaves opposite.


**Singapore**; *Wallich*. **Malacca**; *Maingay* 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 ¼–½ in. Anthers at the base distinctly but shorty 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).


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 \( \frac{3}{8} \) in. diam., when ripe black, edible though insipid, rim of the calyx then evanescent. — This plant really differs little from M. Hassallii; 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 2–3½ 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 \( \frac{1}{3} \) 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 \( \frac{1}{2} \)–1½ in., 3–5-nerved, minutely glandular beneath (Thwaites). Calyx-tube green-red. Petals \( \frac{1}{6} \) in., pale-rose. Anthers shortly produced at the base, connective with a short spur. Fruit \( \frac{1}{2} \) in. broad, very small, subcampanulate.

Var. Thwaitesii, leaves cuneate-ovate—Ceylon; Hellesdeen, Pasdoon Code, Thwaites No. 3443.

7. M. Beddomei, C. B. Clarke; branches round, leaves short-petioled orbicular or broad-elliptic, peduncles 1-flowered, flowers 4-merous large. M. radicans, Bedd. Id. Pl. Ind. Or. t. 184, not of Blume. Triplectum radicans, W. & A. Prodr. 324.

Leaves 1–1½ 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 Thwaita 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. Id. Pl. Ind. Or. 157; branches round striate somewhat verrucose, leaves 2–3 in. elliptic narrowed to both ends 3–5-nerved, petiole less than \( \frac{1}{2} \) 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.
9. **M. speciosa**, Blume in Flora 1881, 515; branches thick smooth with numerous erect bristles at the nodes, leaves 6-10 in. in whorls of 4 or 3 less often in pairs subsessile obovate-lanceolate 7-9-nerved one pair of nerves starting 1-4 in. above the base of the leaf. *Bot. Mag.* t. 4821; *Naud. in Ann. Soc. Nat. ser. 3. xv. 291; Miss. Fl. Ind. Bat. i. pt. i. 540; *Triana in Trans. Linn. Soc. xxviii. 87.* Melastoma eximium, *Blume Beijd.* 1072, not of Jack.

**MALAYA; Maingay No. 798.—DISTRIBUTION. Java, Moluccas.**

Panicle long, branches whorled; bracts ¼ in., narrow obovate-lanceolate; pedicels calyx and petals rose. Anthers shortly produced at the base, spur of the connective short. Fruit ½-¾ 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 ½ in. Flowers ½ in. diam., rose. Anthers 2-tubercled at the base, connective without a spur. Berry ½ in. diam., spherical.—This species has been confounded in herbarium 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 Distr. No. 2283).**

Leaves 1½ in., 3-nerved from the base, abruptly acuminate. Flowers ¾ 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-fid, petals ¼ 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 ¼-½ in., inflorescence in weak axillary cymes, fruit small, seeds of the genus.—**Mishmee; Griffith (Kew Distr. No. 2281).**

This differs by its large long-petioled leaves from all the other species.

**M. Merouvensi, C. B. Clarke;** glabrous, branches round smooth, leaves 2-3½ in. obovate-elliptic obtuse 3-nerved, petiole ¼-½ 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.—**Merouvi; Griffith (in Herb. Wight).**

Only a detached fragment of the panicle is preserved. This may be a *Pachycentraria.*
17. **POGONANTHERA**, Blume.

**Shrubs**, nearly glabrous; branches round, minutely scaly. **Leaves** opposite, petioled, oblong or ovate, entire, glabrous, 3-nerved. **Flowers** small, pulverulent, 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, placenta 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 ½-1½ 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 slits down the front, connective spurred at the base or unappended. **Ovary** inferior, 2-5-celled, glabrous at the apex; style short, stigma capitellate; ovules numerous, placenta 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 1-1½ in. Panicle 1–3 in., ultimate pedicels 0–½ in. Petals less than ⅓ in., obovate. Capsule ⅓–½ in. broad, ovoid or hemispheric.

19. PTERANDRA, Jack.

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. Calyx-tube verrucous, 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, placertas sub-basal. Berry ovoid, truncate. Seeds very many, cuneate-ovoid, raphes excurrent on one side towards the end, somewhat angular.—Distrib. Species 6 (or perhaps 2 only), from Pinang and Malacca through to Malaya to the Philippines.


Pinano and Malacca; Wallich. Meryou; Griffith. Tenasserim; Helfer. Nicolas; 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 ⅓ in. broad, narrower at the mouth.

Var. Jackiana; petioles attaining ⅔ in., cymes axillary few-flowered.—Malacca; Griffith; Macangay No. 801.


Leaves widest near the base; petiole less than ⅓ in.—Doubtfully distinct from *P. cerulescens*; the leaves are usually much larger while the cymes are smaller.


Pinano; Porter. Malacca; Griffith (Kew Distrib. No. 2273).—Distrib. Sarawak.

The normal leaves are about ⅝ by 2 in., the abnormal leaves on the "panicles" are very narrow lanceolate, often 1 by ⅔ in.—This is probably only a prolific state of *P. cerulescens* as Korthals and Miquel treat it.
20. **KIBESSIA, DC.**

Large shrubs, glabrous or minutely pubescent. Leaves opposite, short-petiolated, 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 calyptriform 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-obovoid, angular.—**DISTRICT.** Species 14; confined to Malaya, from Pinnang to Borneo.


**PINANG and MALACCA;** Wallich, Griffith, &c. **SINGAPORE;** T. Anderson.—**DISTRICT.** 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 3/4–1 in. Peduncles 1–3-flowered; bracts nearly 1/4 in., oblong, persistent. Scales of the calyx-tube minutely rusty pubescent.


**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 1/4 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.


**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 1/4 in. Bracts of the buds 1/4 in., ovate.

**Malacca**; **Maingay No. 805.—Distrib. Sumatra.**

**Branchlets round, glabrous. Leaves** 2–3 in., ovate or elliptic, shortly acuminate, glabrous; petiole $\frac{1}{2}$–1 in. **Peduncles** glabrous, clustered, 3–5-flowered; bracte less than $\frac{1}{2}$ in. **Fruit** $\frac{1}{2}$–$\frac{3}{4}$ in. diam.

21. **MEMECYLON, Linn.**

**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 panicled 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 that 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** 2–2½ in., somewhat diichtious, elliptic, suddenly acuminated, base roundish, punctate on both surfaces; petiole scarcely $\frac{1}{16}$ in. **Peduncles** solitary; flowers few, very small, sessile at their apex; petals white (**Thwaites**). **Berry** scarcely $\frac{1}{4}$ in. diam., globose, areola $\frac{1}{16}$ in. wide.—A variety communicated by Mr. Thwaites has the leaves much larger, 4½ in., the acuminated apex much shorter.

2. **M. Gardneri, Thwaites Enum.** 113; leaves acute scarcely acuminate, inflorescence clustered, peduncle 0½ 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 $\frac{1}{4}$ 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. subsessile elliptic-lanceolate base cordate, peduncle 0, pedicels clustered \( \frac{1}{8} \) in., calyx-tube at the time of flowering subcampanulate.

**Western Peninsula; Ceylon; Ritchie.** Ceylon, alt. 3000–4000 ft., Thwaites. A tree 25 ft.; ultimate branchlets stout, acutely quadrangular. Secondary nerves conspicuous, marginal looped nerve obscure. **Buds obtuse, calyx-limb 4-dentate. Petals blue.** Berry \( \frac{1}{2} \) in. diam., globose.—United by Triana with *M. amplisepala* No. 24, which has round stems, much larger flowers, and the calyx-tube at the time of flowering saucer-shaped.

4. **M. Hookeri**, Thwaites Enum. 113; leaves 6–9 in. sessile oblong-lanceolate base cordate, peduncle 0, pedicels \( \frac{1}{4} \) in. clustered, calyx-tube at the time of flowering saucer-shaped. **Triana in Trans. Linn. Soc.** xxviii. 158.

**Ceylon; alt. 1000 ft.; Thwaites.**

An erect shrub 8–12 ft., sparingly branched; ultimate branchlets stout, acutely quadrangular. Leaves very conspicuously nerved, secondary nerves running into a conspicuous marginal nerve. **Buds obtuse, but apiculate; calyx-limb obscurely 4-lobed. Petals blue.** Berry \( \frac{1}{2} \) 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 \( \frac{1}{4} \) in. clustered. **Triana in Trans. Linn. Soc.** xxviii. 158, not of Kurz, in For. Fl. i. 515. **M. cœruleum, 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–\( \frac{1}{4} \) in. Flowers rather large, pale blue* (Griffith); buds obtuse. **Calyx-tube at the time of flowering funnel-shaped, limb nearly truncate. Disk 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. Campiongum*, 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. margarica.

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 \( \frac{1}{4} \) in., peduncles \( \frac{1}{3} \) in. 3 or 4 together carrying mostly simple umbels, pedicels \( \frac{1}{8} \) 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. subsessile ovate-elliptic ace of shortly acuminate, cymes very short, peduncle 0–\( \frac{1}{4} \) in., pedicels \( \frac{1}{8} \) in. Malacea, *Griffith* (No. 2324 Kew Distrib.); Mount Ophir, *Maingay* No. 818, 820. **Branchlets somewhat flattened, repeatedly forked, ultimate quadrangular, at least under the node. Leaves at the base rounded or acute but not at all acuminate, secondary nerves conspicuous,**
marginal obscure; petiole sometimes manifest, attaining \( \frac{3}{4} \) 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 \( \frac{1}{8} \) in. wide.

†† Leaves rarely attaining \( \frac{1}{4} \) in., usually opaque, nerves obscure.

7. **M. amabile**, Bedd. *Ic. Pl. Ind. Or.* t. 163; leaves 1\( \frac{1}{2} \)-2\( \frac{1}{2} \) in. nearly sessile oblong-lanceolate opaque, base cordate, peduncles \( \frac{1}{4} \)-\( \frac{1}{2} \) in. 1-3 together axillary and terminal, pedicels \( \frac{1}{4} \) 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 1\( \frac{1}{2} \)-2\( \frac{1}{2} \) in. oblong acuminate base rounded very opaque coriaceous, peduncles \( \frac{1}{4} \) in. clustered axillary and terminal, cymes simple, pedicels less than \( \frac{1}{6} \) in.—Malacca, *Maingay* No. 819.—Branchlets quadrangular, 4-winged below the nodes. Petiole \( \frac{1}{8} \) 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; Thwaiites.**

Leaves acute at the base, nerves obscure; petiole \( \frac{1}{8} \) in. Flowers white. Berry spherical, the size of a pea.

9. **M. gracile**, Bedd. *Ic. Pl. Ind. Or.* t. 164; leaves 1-1\( \frac{1}{2} \) in. elliptic-lanceolate acuminate apex obtuse, peduncles solitary \( \frac{1}{4} \) in. 3-flowered, pedicels \( \frac{1}{4} \) in.

**Travancore and Tinnevelly Ghats; Col. Beddome.**

A small tree or large shrub; branchlets slender, distinctly quadrangular. Leaves opaque, nerves very obscure; petiole \( \frac{1}{8} \)-\( \frac{5}{8} \) 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 \( \frac{1}{4} \)-\( \frac{1}{2} \) in. subsessile rhomboid oblong or elliptic obtuse or acute but not acuminate opaque acute at the base, pedicels scarcely any, pedicels less than \( \frac{1}{4} \) in. *Miq. Pl. Ind. Bat.* i. pt. i. 578; *Triana in Trans. Linn. Soc.* xxviii. 158; *Kurz For. Pl.* i. 514. *M. australae*, *F. Mueller* ex *Triana in Trans. Linn. Soc.* xxviii. 159. *M. umbellatum*, *Benth. Fl. Austral.* iii. 293, not of others.

**Chittagong; H. f. & T. Mergui; Griffith; Tenasserim, Helfer (Kew Distri. No. 2332). Andaman; Kurz. Singapore; Lobb.—Distrib. Through Malaya to North Australia.**

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 \( \frac{1}{10} \) in. wide; pedicel \( \frac{1}{4} \)-\( \frac{3}{8} \) in.—Miquel (*Pl. 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 0-½ in. but often distinct, leaves 2½ in. broad-elliptic obtuse or shortly acuminate apex obtuse, base round or acute not acuminate, peduncles clustered 0-½ in., pedicels attaining ½ in. *Triana in Trans. Linn. Soc. xxviii.* 169.

**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 ⅔ in. wide.

12. **M. varians**, Thwaites Enum. 112; leaves ½-1¼ in. oblong acute or obovate rhomboid or elliptic obtuse always narrowed at the base, nerves very obscure, 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.* 169. **M. parvifolium**, Thwaites Enum. 113; *Triana l. c.*

**Ceylon**; alt. 2000-7000 ft., Thwaites.

A small tree. *Petals* white or blue. *Berry* ½-⅔ in. diam., spherical, shortly pedicelled, areola ⅓ 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 acuminate. It is also very near *M. pauciflorum* (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.


**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* ½ in. broad (in flower?).


**Ceylon**; alt. 4000-5000 ft., near Adam's Peak; Thwaites.

A small tree; branchlets thick. *Leaves* very thick, coriaceous, nerves obscure. *Berry* ⅓ in. diam., areola raised on a cylindric neck, disc within the mouth elevated and strongly rayed in the ripe fruit.—Thwaites *ovoideum* No. 2522, 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.

**Birma and Malay Peninsula; Griffith** (No. 2337 Kew Distrib.). **Malacca**; *Maingay* No. 816. **Singapore**; *Maingay* No. 815.—**Distrib. 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** ¾ in. diam. or more, areola ¼ 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 ½ in. diam. very succulent.

**Chittagong; Kurz**. Leaves dried olive-yellow, lateral nerves obscure; petiole ½ in. Flowers not seen. Peduncles (of the fruits) ⅛ in., pedicels ¼ 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 ¾ 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 ¼ 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 ½ in. diam., calyx-limb 0, areola scarcely ¼ 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 ¼ in., slender. Buds obtuse; calyx-tube funnel-shaped at the time of flowering, rays of the disc very obscure.

†† **Berry** less than ¼ in. diam. Inflorescence 2 in. or more, except in **M. mergicicum** 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.—Distrib. Java.*
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. 1. Horsfieldii, Miq. Fl. Ind. Bat. i. 572 (sp.); nerves less prominent, inflorescence shorter, buds acute. M. celastrinum, Kurs For. Fl. i. 515.—Pegu, Kurs. Malacca; Maingay No. 811.

Var. 2. pubescent; leaves 3–4½ in. glabrous elliptic suddenly acuminate, cymes proliferously umbellate, branches distinctly rusty-pubescent.—Malacca; Griffith (Kew Distrib. No. 2336). Branchlets round. Leaves acute, hardly acuminate at the base, secondary and marginal nerves somewhat prominent; petiole ½ in. Inflorescences 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. ambigua Bl. ?

Var. 3. khasiana; leaves 3–4 in. elliptic acuminate at both ends, apex acute, petiole ½ in., fruit in a lax panicle extending 2–3 in., berry ½ in. wide areola somewhat prominent 1½ in. wide.—Khasia Ms.; 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 ½ 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. mergioa; leaves 4–6 in. elliptic and broad-elliptic obtuse narrowed gradually to the base subpetiolate, nerves somewhat distinct, peduncles solitary or clustered ½–2 in., cymes compound. M. Griffithianum, Kurs 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 truncate. Buds medium-sized, obtuse; disc on the apex of the ovary rayed prominently. Fruit ½ in. diam., areola 1½ 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 ½ in., ellipsoid, longer than broad; areola prominent, more than ½ 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 petioled.


Southern Ghats of the Deccan Peninsula; Canara; Gibson, Dalsell.
A shrub 2-3 ft. (Dalzell). **Calyza-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 ¼ in. wide.—This species has the branchlets with 4 lines and sometimes almost quadrangular: it is probably not distinct from *M. amabile* No. 7.


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. **Calyza-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 inflorescences hardly more slender than in *M. caeruleum*. Kurz appears to have abandoned the distinction he founded on the less ellipsoid berry.


**FINAN** 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 petioled, never acuminate, secondary nerves obscure.—Nilghirisa, Mts. of Kurg, &c., plentiful. Not from Ceylon, for Thwaites, No. 2570 cited by Triana is *M. Wightii*, No. 3.

**Var. 2. cordata,** Wight ms. ; branchlets distinctly quadrangular.—This seems not remote from No. 7 amabile.

25. **M. macrophyllum**, Thwaites **Eum.** 111; leaves 6-12 in. oblong lanceolate, peduncles 0, pedicels short, berry ½ in. diam. 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., Hinidoo Corle; *Thwaites*.

A small tree. **Buds** small, obtuse. **Calyx-tube** at the time of flowering saucer-shaped. Petals blue. Disc obscurely rayed.


**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 almost cordate at the base, opaque, thin, secondary nerves not prominent; petiole ⅛ 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 ½ 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 ½ in. diam. in the Ceylon plants, but his specimens at Kew do not show fruit.

**Var. 1. latifolia**; 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 at all impressed.—Thwaites No. 2468.

**Var. 2. angustifolia**; leaves linear-lanceolate when dry orange yellow thick and opaque.—Thwaites No. 1555.
†††† Berry less than ½ 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._ **Tenasserim and Andamans; Helfer** (Kew Distrib. No. 2328). _M. Malacca; Maingay No. 817.—Distrib. Java, Sumatra, Borneo._

Branchlets round (Blume says subquadrangular in *M. lævigatum*, 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* ½ in. diam., globose, subsessile, mouth small.

_V. sylviaticum_, Thwaites Enum. 110 (sp.); petiole somewhat shorter, leaf long decurrent (but in Thwaites' example No. 1567 the leaves are petioloed exactly as in *V. sylviaticum*).—Ceylon; alt. 2000–4000 ft.; common, Thwaites. As Mr. Thwaites remarks, some of his examples of *V. sylviaticum* 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.


_Tenasserim of Andamans; Helfer_ (Kew Distrib. No. 2335).—Distrib. 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. lævigatum*; the leaves are narrower with a longer acumination; 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 ½–⅔ in., cymes lateral short, otherwise like *M. edule*.

_Pen.; 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.

_V. sylhetense_; peduncles 0–½ in. clustered, inflorescence extending hardly ¾ 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. lævigatum* Blume? by Triana, but the inflorescence as well as the leaves must be nearer _M. plebejum_, unless all are referable to one species.

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33. **M. acuminatum**, Smith ex Triana in Trans. Linn. Soc. xxviii. 158; leaves 2-2⅓ in. broad-elliptic acuminate at both ends apex long rostrate obtuse, petiole ¼-⅓ in., peduncles solitary (or 2 together) ⅓-⅔ 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. laviegatum*; 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. laviegatum*.*

**Var. flavescens**; leaves 2½-3 in. elliptic acuminate at both ends apex rostrate secondary and marginal nerves distinct, petiole ⅙-⅓ in., inflorescence extending ⅓-⅔ in., peduncles clustered about ⅓ 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 sebaceous almost puberulous. Calyx-tube at the time of flowering saucer-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 2-2½ in. nearly sessile elliptic acuminate rostrate base acute, nerves slender but visible, inflorescence extending less than ½ in. **Triana in Trans. Linn. Soc. xxviii. 159.**

**Ceylon;** Kokool Corle, at no great elevation; **Thwaites No. 2926, 287.**

*Berry ½ in. diam., spherical, ex Thwaites.—Mr. Thwaites in a note on No. 2926 doubts if it is really distinct from *M. laviegatum var. sylviacum* (No. 36 above).*

35. **M. rostratum**, Thwaites Enum. 111; leaves 1½-2 in. elliptic acuminate rostrate apex obtuse base attenuate opaque coriaceous, inflorescence extending less than ½ in. **Triana in Trans. Linn. Soc. xxviii. 159.**

**Ceylon;** Central Province, alt. 3000-4000 ft. **Gardner, Thwaites.**

*A small tree. Petals white. Berry ½ in. diam., spherical, mouth scarcely ⅛ in. wide.*

36. **M. rhinophyllum**, Thwaites Enum. 110; leaves 2-3 in. subsessile elliptic acuminate apex obtuse base acute opaque nerves very obscure, inflorescence extending less than ¾ 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 ½ in., clustered; cymes small, somewhat dense; buds small, not acute. Flowers pale blue. Berry ¼ in. diam., black-purple, spherical.—Diffsers 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 ½ in. diam. Inflorescence less than 2 in. Leaves usually less than ⅔ in., not acuminate though often acute, base not cordate.

37. **M. angustifolium**, Wight Lc. t. 276: leaves 2 in. opaque very narrow-oblong obtuse base attenuate, petiole ⅛ in. **Thwaites Enum. 111; Triana in Trans. Linn. Soc. xxviii. 158.**
Decan Peninsula; Wight, No. 1069. Ceylon; up to 2000 ft. alt.; Thwaites.

Shrub 6-8 ft. high. Inflorescence dense, extending hardly \( \frac{3}{4} \) in. ; peduncles usually \( \frac{3}{4} \) in. in., clustered. Flowers blue, as of \( M. \) edule. Calyx-tube at the time of flowering saucer-shaped, limb truncate. Disc on the apex of the ovary depressed, very obscurely rayed. Berry size of a pea, black-purple. (Thwaites.)

Var. 1. attenuata; leaves still narrower elongate attenuate apex obtuse.—Ceylon, Thwaites.

Var. 2. Helferi; branchlets quadrangular, berries \( \frac{3}{4} \) in. diam.—Tenasserim or Andamans; Helfer (Kew Distrib. No. 2334).—This has been placed with \( M. \) angustifolium because of its narrow leaves, which are, however, more obtuse and less petiolated than those of \( M. \) angustifolium. If not placed here, it must form an additional species near \( M. \) varians No. 12.

38. \( M. \) phyllanthifolium, Thwaites ex Triana in Trans. Linn. Soc. xxviii. 150; leaves \( \frac{3}{4} \) 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 \( \frac{3}{4} \) 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 2 in. 4 in. subepetiolate elliptic acute base attenuated opaque, calyx-tube at the time of flowering distinctly campanulate.

Malacca; Griffith, Memecylon No. 6 (No. 2325 (not 2325-1 nor 2325-2) of Kew Distrib.).

Leaves suddenly narrowed, sometimes very shortly acuminate. Peduncle 0; pedicels \( \frac{1}{2} \) 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 \( M. \) cereum, Jack; it seems very much nearer \( M. \) lavigratum, 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 1-3\( \frac{1}{4} \) in. elliptic or ovate acute at both ends hardly acuminate, petiole \( \frac{3}{4} \) 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 \( \frac{3}{4} \) in. diam., black-purple, globose or slightly ovoid, mouth about \( \frac{1}{8} \) 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. \( M. \) myrsinoides, Blume, differs from \( M. \) edule by its quadrangular branchlets. Triana reduces \( M. \) umbellatum, Wall. Cat. 4109, to \( M. \) myrsinoides, Blume: but the examples of Wallich 4109 have the branchlets exactly round.

Var. 1. typica; peduncles clustered \( \frac{1}{2} \) in., leaves acute or obtuse. \( M. \) edule, Roxb. Fl. Ind. ii. 260; DC. Prodr. iii. 6; Wall. Cat. 4107; Dals. & Gibbs. Bomb. Fl. p. 93; Kurs For. Fl. i. 512. \( M. \) edule var. a, Thwaites Enum. 111. \( M. \) umbellatum, Burm. Fl. Zeyl. t. 31. \( M. \) tinctorium, Kans. ex W. & A. Prodr. 319; Wight Ill. t. 83. \( M. \) globiferum, Wall. Cat. 4108. \( M. \) pyrifolium, Naud. in Ann. Sc. Nat. ser. 3. xviii. p. 277.

Var. 2. ramosiflora; inflorescence densely clothing the branches, peduncle often (but not always) wanting. \( M. \) edule, Lamk. Dict. iv. 88; DC. Prodr. iii. 6; W. & A. 002
Var. 3. capitellata; peduncle more elongated sometimes 1 inch. M. capitellatum, Linn.; DC. Prodr. iii. 6; Roxb. Hort. Beng. 28. ? Lamk. Ill. t. 284.


Var. 5. leta; nerves distinct, peduncle elongate often 1-1½ in., pedicels 0, calyx prominently 4-toothed. M. capitellatum, Thwaites Enum. 110 (not of Linnaeus).—Ceylon; Thwaites No. 1564, 1585; 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-carulea, Thwaites Enum. 415 (ep.); Triana in Trans. Linn. Soc. xxviii. 159.—Ceylon; East Matelle; Thwaites.—Mr. Thwaites says this differs from M. edule by the leaves more acuminate with the base more rounded. But the specimen (No. 3809) sent to Kew has the leaves very obtuse not at all acuminate, 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 (ep.); Triana in Trans. Linn. Soc. xxviii. 159.—Ceylon; alt. 3000 ft.; Thwaites No. 2638. 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 (ep.); 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 nervé.

Var. 9. scutellata, Triana in Trans. Linn. Soc. xxviii. 157. M. myrtifolium, Wall. Cat. 4111. M. obtusum, Wall. Cat. 4110. M. punctatum, Presl, and scutellatum, Naud. ex Kurs For. Fl. i. 513. —Transgangetic Peninsula from Chittagong to Singapore.—Distr. Malay Archipelago. Leaves very thick, opaque, obscurely punctate on both surfaces, narrowed much at the base, subepiclitate; otherwise much like M. edule type.—Kurz separates specifically M. punctatum, Presl, having the calyx with a tubercled 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 Helfer No. 2330 Kew Distrib.: the tuberculation is caused by an insect.

Var. 10. Thwaitesi; 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 Cinghales, 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. subquadranulare, DC. Prodr. iii. 6; no example known, and not recognisable from description.

M. Royenti, 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. pauciiflorum, Wall. Cat. 4114 is Canthium glomeratum, Miq.
M. acuminatum, Wall. Cat. 4106 is not a Memecylon.
M. subtrinervum, Miq. var. grandifolia, Kurz in Journ. As. Soc. 1876, pt. ii. 181, from the Nicobars, with leaves 8–10 in., and obovoid-oblong berries \( \frac{3}{4} \) in. diam., is perhaps next to M. heteroleurum No. 19, but we have seen no specimen.

Two branchlets 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, opposite, sometimes alternate or whorled; stipules 0. Inflorescence various, often in cymes or panicles. Flowers hermaphrodite, regular, rarely oblique, unisexual in Cryptotrimia. 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, stigmas capitate rarely 2-lobed; ovules very many, placentae axile (rarely parietal). 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.

Neesa triflora, Kunth, introduced into Wight and Arnott’s Prodromus (p. 307), is a Mauritian plant collected occasionally in India.

TRIBE I. AMMANNIEÆ. Low or aquatic herbs with small or minute flowers. Calyx membranous.

Herbs growing in moist places .... 1. AMMANNIA.
Herb growing in water the flower-spike exert .... 2. HYDROLYTHRUM.

TRIBE II. LYTHREÆ. Trees or shrubs. Calyx herbaceous or coriaceous. Petals often large wrinkled.

* Calyx curved, flowers second.

Stamens declinate .... 3. WOODFORDIA.

** Calyx straight, flowers symmetric.

Flowers 6-fid. Capsule circumscissa .... 4. PEMPHIS.
Flowers 4-fid. Capsule irregularly breaking up .... 5. LAWSONIA.
Flowers minute subunisexual. Capsule 2-valved .... 6. CRYPTOBIONIA.
Flowers 6-fid. Capsule 3–6-valved. Seeds winged .... 7. LAGERRSTREMA.
Berry subglobose, 10–15-celled, \( \infty \)-seeded .... 9. SONNERATIA.

Anomalous genera with inferior ovary.

Calyx-lobes 5–7, thick. Stamens \( \infty \) .... 10. PUNICA.
Calyx-lobes 5, small. Stamens 10 .... 11. AXINANDRA.
1. **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 cyms; 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, raphes on the inner face, ellipsoid or nearly hemispheric.—**Distr.** Species 30, 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.—**Distr.** 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, ½-2 in., elliptic, narrowed at the base, sometimes almost petioled. *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.

**Belgaun.** in rice fields, *Ritchie*.

*Stems* 6-12 in. rooting amongst floating weeds (*Ritchie*). *Leaves* opposite, cauline ½-2 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.

INDIA; common, in rice fields &c. throughout the plains and in warm places in the lower mountains; not received from Ceylon.—Dier. 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 shortly petioled, nervèd, 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, obvate, twice the length of the calyx-teeth, bright rose. Capsule ellipsoid, a little longer than broad. Seeds brown-yellow, ellipsoid, 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 COCONUT 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 ½-1½ 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, obvate, 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 *iii. 206*, not good and the reference to the figure wrong; *Hook. i.c.* t. 826; *Dalt* & *Gibs*. *Bomb. Fl.* 96. *Nimmonia floribunda*, Wight in Madras Journ. of Science vi. 34, t. 20.

Mahableshwar Hills, Bombay; Law, Stocks.

Erect or but shortly creeping at the base; stems often much branched, 8-10 in. Lower leaves 1-2½ in., broad-oblong, obtuse, sessile, base broad, upper leaves ½-1½ 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, obvate, 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.


DECCAN PENINSULA; Wight, Rottler. Ceylon, abundant, Thwaites.

DISTRIB. Australia. Tropical Africa.

Erect or shortly creeping; stems 3–6 in. Leaves 1/4–1 in, sometimes somewhat ovate at the base. Lower whorls of flowers often distant, upper sometimes almost spike.

Calyx tubular; teeth 3–5, small. Petals small, fugacious, or 0. Stamens 3–5.

Capsule ellipsoidal, longer than broad. Seed half-ovoid, the plane face somewhat excavated.—Hypobrichia Spruceana, Benn. in Herb. Spruce which has been reduced to a synonym of Rotula verticillaris, differs in its inflorescence and short calyx.

7. A. dentelloides, Kurz in Journ. As. Soc. 1870, pt. ii. 76; leaves opposite linear, flowers sessile axillary, capsule 2-valved.

Sikkim Terai near Siligori; Kurz, C. B. Clarke.

Stems 2–4 in., procumbent. Leaves 1–3 in., linear or narrow oblong, obtuse. Flowers scattered, not at all spike.

Calyx-tube elongate-campanulate, 5-ribbed; teeth 5, triangular, acute; teeth and sometimes the whole tube with minute scattered hairs, accessory teeth 0. Petals minute. Capsule ellipsoidal, much longer than broad. Seed half-ellipsoidal, excavated on the plane face.

** Calyx in fruit hemispheric, tube as broad as or broader than long.


Stems tufted, 1–3 in. Leaves 1–3 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 spike, 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-ellipsoidal 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 Thes. Capens. ii. t. 189, differs from the Indian plant only in the larger and longer capsule. Compare Rotula filiformis, Hertn 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.

9. A. simpliciuscula, Kurz in Journ. As. Soc. 1871, pt. ii. 54; leaves opposite narrow-oblong, flowers solitary axillary short pedicelled, capsule 3-valved.

CHITTAGONG; tropical rice fields; H. f. & T., Kurz.

Stems decumbent, 1–2 1/4 in. Lower leaves 3 in., almost petioled, upper shorter, 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.

10. A. pentandra, Roxb. Fl. Ind. i. 425; cauline leaves opposite elliptic-oblong sessile fairly nervet, flowers solitary axillary sessile, capsule 3-valved.

Throughout Tropical India, in moist places, very common.—Distrib. 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. Calyline leaves usually 1 in., upper floral leaves becoming bracteform, 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.

**Subgenus II. Eu-Ammannia.** Flowers in whorls, cymes or clusters. Capsule circumsacc, or bursting irregularly.


Throughout Tropical India, in moist places, very common.—Distrib. Afghanistan, Malaya, China, Australia, Tropical Africa.

Glabrous, erect, 6–8 in. sometimes 2 ft. Lower leaves and branches usually opposite; calyline 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 circumsacc above the middle. Seeds black, subhemispheric, excavated on the plane face.


Glabrous, erect, sometimes 2 ft. high, leaves and branches opposite. Calyline leaves often 2 in. by less than ⅛ in., frequently cordate 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. verticillata. Bois. 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.

13. A. cordata, W. & A. Prodr. 304; glabrous, leaves sessile oblong cordate subamplexicaul, flowers 2-5 shortly pedicelled in each axil, capsule globose covered by the calyx-teeth. Wall. Cat. 6322. A. salicifolia, Monti var. 3. Thwaites Enum. 121.

East 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 petiolate, flowers 2-5 shortly pedicelled in each axil, calyx campanulate minutely pubescent, petals large. A. verticillata, 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 subpubescent. 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-Ammannia. Capsule globose. Seed subhemispheric, excavated on the plane face.

15. A. senegalensis, Lamk. Ill. t. 77, f. 2.; leaves opposite elongate-oblong sessile subauriculate at the base, cymes peduncled compound, capsule ½ in. diam. globose. DC. Prodr. iii. 77. A. auriculata, Willd. Hort. Berol. t. 7; DC. l. c. 80; Boiss. Fl. Orient. ii. 743.


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-ellipsoidal, excavated on the plane face.—This species is distinct so far as the Indian material is concerned. Some African 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. 420; leaves opposite elongate-oblong sessile subauriculate at the base, cymes peduncled compound, capsule ½ in. diam. globose. DC. Prodr. iii. 79; W. & A. Prodr. 305; Wall. Cat. 2101;
Throughout India on the plains.—Distrib. Afghanistan. Persia. Australia. Glabrous, very erect, 6-24 in.; branches numerous, sharply quadrangular. Cauline leaves 1-1 1/2 in. Bracteoles on the cyme-branches most minute, linear. Calyx campanulate, hemispheric or scarcely elongate; teeth 4, short-triangular. Petals 0, or small and caducous. Stamens 4, 6 or 8. Capsule often ultimately red, globose, not enclosed by the calyx. Seeds half-ellipsoid, excavated on the plane face.—Very closely allied to A. senegalensis and united with it by Mr. Hiern, perhaps correctly, but the two forms do not meet or pass into each other in India. Cryptotheca dichotoma, Blume Bijd. 1128; DC. Prodr. iii. 76 (Ammannia microcarpa, DC. Prodr. iii. 77), from Java and Timor, has been united with A. multiflora Roxb. by Kurz in Journ. As. Soc. 1871, pt. ii. 56, but differs in the much more elongate calyx-tube and larger cauline leaves: it is certainly very near A. multiflora.

17. A. octandra, Linn. f. Suppl. 127; leaves opposite linear-oblong subauriculate at the base, cymes very shortly peduncled 3-5-flowered, calyx in fruit large campanulate 4-angular with 8 distinct ribs. Roxb. Cor. Pl. t. 133; Fl. Ind. i. 425; DC. Prodr. iii. 80; Wall. Cat. 2097; W. & A. Prodr. 304; Blume Mus. Bot. ii. 132; Dals. & Gibs. Bomb. Fl. 97; Kurz in Journ. As. Soc. 1877, pt. ii. 86. Ammanella linearis, Miq. Fl. Ind. Bat. i. pt. i. 619. Diplostemon octandrum, Miq. l.c. 615.

Deccan Peninsula; Bottler; Heyne; Wight; G. Thomson. Ceylon; Thwaites. Chittagong; Kurz.—Distrib. Malaya.

Erect, 6-18 in., branches quadrangular, often scabrous. Cauline leaves 1-2 in., sometimes very narrow. Calyx in fruit 1 1/2 in., often minutely pubescent or scabrid, nearly truncate; teeth 4, small. Petals 1/4 in., ovate, rose-coloured. Stamens 8, filaments long, dark-red. Capsule somewhat ellipsoid, as long as the calyx. Seeds subhemispheric.—This species is reduced to A. latifolia Linn. by Griseb. Fl. Brit. West Indies 270; but the West Indian specimens, though like the Indian in leaves and habit, are entirely without the subulate angles of the ripe fruit which form the essential character of A. octandra.

18. A. subrotunda, Wall. ex Kurz in Journ. As. Soc. 1871, pt. ii. 55; "leaves sessile almost orbicular pinnate-nerved, flowers on slender short pedicels forming shorter or longer slender racemes."

Burma or East Bengal; Kurz.—Distrib. Ava.

Not seen: diagnosis copied from Mr. Kurz.

2. HYDROLYTHRUM, Hook. f.

A glabrous aquatic herb. Lower leaves whorled, linear. Spikes exsert out of the water with oblong bracteiform leaves. Flowers whorled, subsecasal in the axils of bracts, lower whors 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 capitate; ovules not many, placenta axile. Capsule small, globose, 2-celled. Seeds 3 or 4 in each cell, ovoid, concave.—A genus only separable from Ammamnia by habit: for hypogynous glands exist in Amm. rotundifolia.


Stems 8 in., weak, little divided, probably erect in the water. *Leaves* ½–1 in., about 8–12 in each whorl; emerged leaves ½ 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 septeclidally 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.

3. **WOODFORDIA, Salisb.**

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-obovate, quite smooth, without hairs or papilae.


Throughout India, common; ascending to 5000 ft.; but not seen in the alluvial mud of Bengal.—Distrib. 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* ½–1 in., bright red. *Petals* scarcely longer than the calyx-teeth. *Seed* (figured by Blume and by Beddome as densely covered by long papilae and stated by Kurz to be papilllose-pilosulous) 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. **PEMHIHS, 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, placentas 3 sub-basal. *Capsule* coriaceous, obovoid or nearly globose, included in the calyx-tube or exert 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 coast of both Peninsulas and of Ceylon.—Distrib. Tropical coasts of the Old World.

Branchlets young leaves and in florescence with short grey hairs. *Leaves* 1 by \(\frac{3}{4}\) in. Pedunclos \(\frac{4}{5}\) 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 panicled 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, placentas 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.—Distrib. Cabul, Persia. Cultivated in many tropical and warm temperate regions. About 6 ft. high, often trimmed so as to make a close fence. *Leaves* \(\frac{2}{4}-\frac{3}{4}\) in., narrowed at the base, sometimes very shortly petioloed, acute or obtuse. *Flowers* \(\frac{1}{2}\) in. diam., sweet-scented, rose or white. *Sepals* \(\frac{1}{2}\) in., permanent. *Capsule* size of a pea.

6. Crypteronia, Blume.

Trees. *Leaves* opposite, petioloed, 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-dioecious. *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 capitate sub-2-fid; ovules many, placentas axile. **Capsule** 2-celled, globose, pubescent, crowned by the persistent style, dehiscent at the vertex across the dissepiment so as to divide the style; fruit-pedicel deflexed. **Seeds** many, long-ellipsoid, testa 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). Pinango.

Tree 30 ft. (attaining 80 ft. fide Kurs); branchlets nearly glabrous. Leaves 3-4½ in., from broad-elliptic to lanceolate, narrowed at both ends; pubescence beneath yellowish or brownish, **Panicels** pubescent; pedicels scarcely 5/8 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**, Kurs 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 Ic. Pl. Asiat. t. 564, fig. ii.—Amberst and Tavoy; Wallich. Mergui; Griffith and Helfer (No. 2512 Kew Distrib.). Malaya; Maingay No. 650-2.—Henslovia leptostachyx, Planch. (with which **H. paniculata**, Miq. coincides) differs by the smaller flowers much more remotely placed or more slender racemes. From Kurs's description (glabrous leaves) it seems that his **C. paniculata** exactly coincides with Wallich's **H. Hookeri**, and does not include (as Mr. Kurs supposes it does) the plant of Griffith. **C. pubescens** and **C. glabra** may possibly be united under **C. paniculata**, Blume, but **C. Griffiththii** is distinct.


KHASIA MTS., alt. 1000-3000 ft.; Wallich; H. f. & T. CHITTAGONG, alt. 1000 ft.; H. f. & T.—DIST. Philippines.

An erect tree, 50-60 ft. **Leaves** lanceolate or elliptic-lanceolate, narrowed at both ends, membranous, nerves prominently raised beneath but slender. **Panicel-branches** glabrous or minutely pubescent; pedicels 9/13 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 ½ in. or more, the calyx is smaller.
7. **Lagerstroemia**, Linn.

Trees or shrubs. Leaves opposite, distichous (or the uppermost alternate), entire, oblong or ovate. **Panicules** 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 crose or fimbriate. **Stamens** very many, inserted near the bottom of the calyx-tube; filaments long, exert. **Ovary** sessile, in the bottom of the calyx, 3–6-celled; style long, bent, stigma capitellate; ovules very many, ascending, placenta 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.—**Distimn.** Species 18, in South-east Asia extending to Australia; Burma being the centre of the genus.

**Sect. I. Velaga.** Calyx-tube smooth, neither ribbed nor subulate.

* Calyx glabrous or puberulous, not fulvous-tomentose.

1. **L. indica**, Linn.; **DC. Prodr.** iii. 93; petals ½–¾ in. long-clawed, capsule ½ in. diam. nearly globose, calyx-teeth erect on the fruit. **Roxb. Hort. Beng.** 88; **Fl. Ind.** ii. 505; **Bot. Mag.** t. 405; **W. & A. Prodr.** 308; **Wight Ill.** t. 80; **Kurz For. Fl.** i. 521. L. elegans, **Wall. in Puxt. Mag. Bot.** xiv. 269, with fig. Velaga globose, **Gaertn. Fruct.** t. 133.

Throughout **India**; common in gardens; possibly wild in the eastern boundary.—**Distimn.** 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. **Panicile** not condensed, minutely pubescent or glabrous. **Petals** bright pink. **Calyx-teeth** on the fruit long-triangular, erect but distant, thin not woody. **Seed** ½ in. including its wing.

2. **L. parviflora**, Roxb. **Hort. Beng.** 88; **Cor. Fl.** t. 66; **Fl. Ind.** ii. 505; leaves glabrous or shortly pubescent beneath, petiole less than ½ in., petals less than ½ in., calyx-teeth ultimately woody erect closely appressed to the fruit. **DC. Prodr.** iii. 93; **Wall. Cat.** 2119 altogether not partly as say **W. & A. Prodr.** 308; **Wight Ill.** t. 92; **Griff. In. Pl. Asiat.** t. 592; **Bedd. Fl. Syr.** t. 31; **Dals. & Gibbs.** **Bomb. Fl.** 98; **Brand. For. Fl.** 239; **Kurz For. Fl.** i. 521. L. Fatiosa, **Blume Mus. Bot.** ii. 125. L. Fatiosa neepaulensis, **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.—**Distimn.** Ava.

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. **Panicules** 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. majorcula**; leaves glabrous larger sometimes 4–5 by 2 in., fruit very large, sometimes exceeding 1½ by 1 in. L. lanceolates, **Bedd. Fl. Syr.** 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. benghalensis**; leaves pubescent beneath at least on the midrib, fruit smaller than in the type, often less than \( \frac{3}{4} \) in., fruit-calyx campanulate instead of funnel-shaped at base. — Nypal; Wall. Cat. 2119 partly, Sikkim; alt. 1000–5000 ft.; J. D. H., Gamble, C. B. Clarke. Assam; Mrs. Mack. Birma; Griffith, whence his t. 592.

3. **L. lanceolata**, Wall. Cat. 2120; leaves glabrous often very white beneath, petiolo usually \( \frac{3}{4} \) in., petals \( \frac{3}{4} \) in., calyx-teeth ultimately thick patent or reflexed. **W. & A. Prodr. 309; Dalz. & Gibbs. Bomb. Fl. 98; Brand. For. Fl. 240. L. microcarps, Wight Ic. t. 109; Bedd. Fl. Sylv. t. 30.**

**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, \( \frac{3}{4} \) by \( \frac{3}{4} \) in.—A species distinguishable from all the forms of L. parviflora by its calyx-teeth patent in fruit and its longer petioles. Walllich’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;** Meloon on the Irrawaddy near Thayet Myoo; Wallich.

Leaves 3–4 \( \frac{1}{2} \) 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; petiolo \( \frac{3}{4} \) in. Panicle lax, tomentose. **Calyx** in the bud fully \( \frac{3}{4} \) in. with dense brown-red stellate wool without any trace of grooves or ribs. **Seed** \( \frac{1}{2} \) in. including the wing.—Named by Rottler L. kirsuta? 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.

A tree, 60–70 ft. Leaves 5–7 in., oblong, acuminate, short-petioloed. **Panicles compound, with ferruginous or fulvous tomentum. Calyx** in fruit cup-shaped campanulate, closely adpressed to the capsule, without grooves or rib, densely ferruginous-tomentose; lobes short-triangular, reflexed. **Capsule** oblong, shining.

**Sect. II. Adambea.** Calyx-tube grooved, ribbed or subulate.

† Adult leaves glabrous or nearly so.
7. **L. Flos-Reginae**, Retz Obs. v. p. 25; petiole distinct usually ½ in., calyx covered with hard white (sometimes ferruginous) tomentum, ribs 12–14-flat or round not acute on the back, apex of the ovary glabrous. **Kurz For. Fl.** i. 524. L. Reginae, Roxb. Cor. Fl. t. 65; Hort. Beng. 38; Fl. Ind. ii. 505; DC. Prodr. iii. 93; Wall. Cat. 2114; W. & A. Prodr. 308; Wight To. t. 413; Blume Mus. Bot. ii. t. 41; Mig. Fl. Ind. Bat. i. pt. i. 623; Bedd. Fl. Sylva. t. 29; Dals. & Gibbs. Bomb. Fl. 98; Brand. For. Fl. 240. L. macrocarpa, Wall. Cat. 2114. Adamabea glabra, Lamk. Dict. 39.—Rheed Hort. Mal. iv. t. 20, 21.

From Assam to Malacca. abundant. Hills of the Deccan Peninsula, common; and in Ceylon. In North-West India only cultivated.——Distrib. 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 Ham, 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 crose-undulate, hardly fimbriate. **Calyx** in fruit thickened, woody; lobes triangular spreading. **Fruit** large, sometimes reaching 1¼ 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.)

**Vaa. angusta**, Wall. Cat. 2113; leaves 15 (excl. petiole) by 6 in.; fruit 1½ in., more acute at the apex. Irrawaddy, Wallich. Rangoon; McClelland.——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.

8. **L. hypoleuca**, Kurz in Journ. As. Soc. 1872, pt. ii. 307; For. Fl. i. 523; leaves shortly petioled sometimes glaucous white beneath, calyx covered with hard white tomentum, ribs 12 acute.

**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** ½ in., oblong, lilac, undulate on the margin (Kurz). **Capsule** ½ 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 obscurely excurrent in Mr. Kurz's specimens.

9. **L. floribunda**, Jack in Mal. Misc. i. 38; petiole very short, calyx covered with ferruginous stellate woolly tomentum with 12 acute ribs, apex of hairy ovary. **DC. Prodr.** iii. 98; Wall. Cat. 2115; Mig. Fl. Ind. Bat. i. pt. i. 623 (not Blume Mus. Bot. ii. t. 41); Griff. Notul. iv. 509; Kurz For. Fl. i. 522.

**Burma to Singapore**; frequent.——Distrib. Siam, Malaya, China.

Tree 30 ft. Leaves 5–7 in., oblong, acute, subsessile, 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** ½ by ½ in.; calyx-teeth spreading, small, not woody.

**Vaa. 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**, Mig. Fl. Ind. Bat. i. pt. i. 623; calyx grey puberulous, teeth 6–9, ribs 6–9 almost winged alternate with the teeth, calyx-teeth in fruit spreading woody.
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 ⅔ in. Panicle 4-6 in.; branches stout, ashy- or grey-puberulous. Calyx in the bud funnel-shaped not campanulate, smaller than that of L. Flos-Reginae. Petals ¾-⅔ in., flat, shortly clawed, sparingly erose-undulate on the margin. Fruit ⅔ by ⅔ 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.

11. L. villosa, Wall. ex Kurz Pegu For. Report Append. B. 54; leaves lanceolate acuminate pubescent on both surfaces, flowers small apetalous congested at the summits of the panicle-branches, calyx-ribs 6 obscure in the bud. Kurz For. Fl. i. 524.

BURMA; Griffith (Kew Distrib. No. 2240); McClelland (Lagerstroemia sp. 9); 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, rib only to be seen near the summit of the tube as six horns alternating with the primary calyx-teeth. Capsule ⅔ by ⅔ in., the calyx-tube finally distinctly ribbed.—The name villosa is not in Wallich's Catalogue nor does it exist on any specimen at Kew, so that it cannot be guessed where Mr. Kurz found it: but the species is very good and unmistakable.


BURMA; Griffith & Hæfer (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 ¾ in. Calyx in the bud fulvous, tomentose, with 12 blunt ribs to the base. Petals ½ in., finely clawed, erose, subflabellate on the margin. Capsule ¼ by ¼ 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. Loudonii, Tevyn & 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. DUARANGA, 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 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.—**DIST.** Species 2, extending from Nipal south-eastswards to the Philippines and Borneo.


**NIPAL to MARTABAN;** alt. 500-3000 ft.; common in the Sikkim and Bhotan Thrail.

Tree attaining 100 ft. Leaves commonly 10 by $3\frac{1}{2}$ in.; petiole usually $\frac{1}{2}$-4 in.—*D. moluccana* differs from the calyx in flower much narrower at base, the petals 4 smaller, the capsule 4-valved: but agrees closely in habit.


Trees, growing near the sea, glabrous. Leaves opposite, petaled, 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-called; style long, stigma capitate; ovules very many, ascending, placenta axile. Berry subglobose, supported by the persistent calyx, 10-15-celled. Seeds very many, small, curved, angular; cotyledons convolute.—**DIST.** Species 4-5 on the tropical sea-shores of the Eastern hemisphere.

† Stigma very large, umbrella-shaped.

1. **S. apetala**, *Ham. in Syme Emb. Ave i. 313, t. 25; leaves narrow-oblong, calyx-lobes 4, petals 0, stigma more than $\frac{1}{2}$ in. broad, capsule $\frac{1}{2}$-2 in. broad globose. *DC. Prodr. iii. 231; Roxb. Hort. Beng. 38; Pl. Ind. ii. 506; Roth Nov. Sp. 283; Wall. Cat. 3642; W. & A. Prodr. 327; Griff. Notul. iv. 650; Kurz For. Fl. i. 527.*

**Common in the Sonmberun. Decan Peninsula as far as the Conan, Law. Transangaetic Peninsula to Moulmein, Fcaledon.**

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 $\frac{1}{2}$ in. Calyx in flower $\frac{1}{2}$ in., style included or scarcely exsert. Capsule broader than high, convex at the top, walls not thickened.

†† Stigma capitate, not very large.

2. **S. acida**, *Linn. f. Suppl. 252; leaves oblong or narrowly obovate-elliptic, calyx-lobes 6, petals 6 linear-oblong dark-red, capsule globose much depressed often 2 in. broad. *Roxb. Hort. Beng. 38; Pl. Ind. ii. 506; Roth Nov. Sp. 253; DC. Prodr. iii. 231; Wall. Cat. 3641; W. & A. Prodr. 327; Wright Jo. t. 340; Griff. Notul. iv. 652; Blume Mus. Bot. i. 396; Madagascar Fl. Ind. Bat. i. pt. i. 496; Dalz. & Gibbs. Bomb. Fl. 98; Brand. For. Fl. 242; Kurz For. Fl.
580 XI. LYTHRACEÆ. (C. B. Clarke.) [Sonneratia.


BENGAL; Griffith. Soonderbun; C. B. Clarke. RANGOON; Mc Clelland. Pegu; Kurz. DECCAN PENINSULA; Rottler. Ceylon; Thwaites.—DISTRIB. JAVA, Siam.

A small tree, not exceeding 15 ft. (Kurz), growing in mangrove swamps flooded by the tide. Leaves 3–4 by 1–1 1/4 in., attenuate almost to the base so that the petiole is subobsolete. Buds ellipsoid, 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. Pagatpat, obovata, evena, lanceolata for which see Mich. Ind. Bot. i. pt. i. 496, 497.


BURMA; Griffith (Kew Distrib. No. 2433). Pegu and Tenassirim; Kurz. Leaves 3 by 2 1/4 in. narrowed at the base; petiole more than 1/2 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.


MENGUI; Griffith (Kew Distrib. No. 2432). Pegu; Kurz. MALAYA; Maingay No. 634.2.—DISTRIB. Tropical shores of Africa with its islands, Malaya and Australia.

A small tree not exceeding 16 ft. (Kurz), growing in the saline littoral forests. Leaves 3 in. oblong or nearly round, narrowed at the base; petiole 1/2–1 in. Flowers the size of S. acida, with a very long style. Fruit 1 in. broad, calyx obovate at the base (not flat as in S. acida) ribbed as shown in Klotzsch' 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. Staminens very many, inserted round the mouth of the calyx. Overy inferior with many cells in two whorls; style long, bent, stigma capitate; 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.—Distrib. Wild in Cabul and Persia; cultivated throughout the warmer regions of the globe.

Leaves commonly 2 by 2-3 in., narrower at both ends especially at the base, intramarginal nerve distinct or obscure. Flowering calyx about 1 in., mouth ½ in. broad. Petals ¾ 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, petiolated, coriaceous, entire, acuminate, finely nervèd 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.—Distrib. Species 4-5 from Ceylon, Malacca and Borneo.

A. Ex-Axinandra. Petals convolute. Ovule 1 in each cell.


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 ½ in., hardly lengthened in fruit. Calyx glabrous or microscopically puberulous. Petals falling off in a cap before expansion (Thwaites). Capsule 1 by ½ in.; valves usually 3, very thick, woody.

B. Naxiandra, Baillon. Petals induplicate-valvate. Ovules 2 in each cell.

2. **A. Maingayi**, C. B. Clarke; branchlets terete, leaves narrowed at the base, petiole often ¼ in., calyx-tube at the time of flowering 10-ribbed, style long (excised portion longer than the whole flower).

Malacca; Maingay 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. ONAGRACEAE. (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, cylindrical or subulate, stigma capitate or nearly 2-lobed or 4-fid; ovules one or many in each cell, pendulous or half-ascending, placentas axile. Fruit various, dehiscent or indehiscent, membranous capsular or bony, 1- or several-celled, 1 or ∞-seeded. Seeds without albumen, or nearly so.—Distrib. Species 300, spread throughout the world, most abundant in the North Temperate Zone.

*Genus* 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. tetrapetra* and *E. odorata* have also run wild on the Nilghiris.

* Seeds very many.
  ♦ Seeds comose.
  ♦♦ Seeds not comose.

 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 cylindrical, 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, obvoid 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.

Sect. I. Chamaenerium. Flowers irregular. Stamens deflexed on one side. Style bent on one side in aestivation.

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, Lank. Dict. ii. 373; DC. Prodr. iii. 40; Wall. Cat. 6324.*

Temperate Western Himalaya, alt. 8000-12,000 ft.; from Kashmir and Baltistan to Gurwhal.—Distrib. 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 \( \frac{3}{4} \) 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* \( \frac{3}{8}-\frac{1}{2} \) in., rose-purple, ovobase, clawed. *Style* somewhat hairy above the base; stigmas 4, distinct, spreading. *Capsule* 2\( \frac{1}{2} \)-3\( \frac{1}{2} \) in., closely pubescent. *Seed* narrowly obovoid, smooth, coma fulvous.

2. **E. reticulatum**, C. B. Clark.; leaves narrow-lanceolate pubescent beneath reticulating nerves prominent primary nerves diverging at acute angles from the midrib, peduncles distinct 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 \( \frac{3}{4} \) in., all scattered, nearly sessile, minutely denticulate, acute. *Calyx-segments* broad-lanceolate, acuminate, purplish, subpetaloid, free to the base. *Petals* \( \frac{3}{8}-\frac{1}{2} \) in., rose-purple, ovobase. *Style* densely hairy above the base; stigmas 4, distinct, spreading. *Capsule* (not ripe) 3 in. on a peduncle 1\( \frac{1}{2} \) 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 distinct in the axils of leaves that are not bractiform nor caducous. *E. speciosum, Done. in Jacq. Voy. Bot. t. 69. E. Gerardianum, Wall. Cat. 6326.*

**Alpine Western Himalaya**; alt. 11,000-14,000 ft. *Kashmir; Jacquemont, C. B. Clarke. Shimore; Gerard, Edgeworth. Kumaon; Strachey & Winterbottom.—Distrib. Dahuria, 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\( \frac{1}{2} \)-3 by \( \frac{3}{4} \) 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* \( \frac{3}{8}-\frac{1}{2} \) in., rose-purple, ovobase. *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. Thomson, &c.—Distrib. 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 \( \frac{1}{2} \) 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 maturation mucronate. *Petals* \( \frac{3}{8} \) in. *Stigmas* 4, distinct, spreading. *Capsule* 2-3\( \frac{1}{2} \) in., hairy, lower peduncles \( \frac{1}{2}-1 \) 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. 6329 (sp.) in part; middle cauline leaves much smaller often about 1 in. not semi-amplexical at the base little pubescent, no white silky hairs on the plant.—Kashmir; Jacquinon. Chumba, alt. 3000 ft.; C. B. Clarke. Kumaon; Wallich; near Almora, 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 ½–¾ in., dentate, pubescent over both surfaces. Sepals green, oblong, acute, in the bud mucronate. Petals usually smaller than those of *E. hirsutum* but are ½ in. in the Himalayan plant. Stigmas 4, distinct, spreading but hardly revolute. Capsule 2–3½ in., sparingly hairy, lower peduncles 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 papillae 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, 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-pedicilled, 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 ½ 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 ¼ in. or thereabout constitute *E. montanum var. himalayense* of Indian herbarii: 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-
seeds in., DC. Seeds in., but reduced stem 760 it stem T. alpinum by Thomson, but stem E. E.

entirely not all rowed or faces, lowe resemblance the middle axillary long-peduncled, It papillose. This E. 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. cylindricum, Don Prodr. (sp.) 222; stem glabrescent often with distinct hairy lines, linear-lanceolate on longer petioles 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 petioles 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 ellipsoid. Epilobium No. 11, Herb. Ind. Or., H. f. & T.


Stem 2–3 ft., quite round, usually thick set with leaves. Leaves 1½ by ½ in., denticate; nerves much impressed above, elevated and covered with crisped pubescence beneath. Petals ½ in., purple. Stigma clavate, elongate. Capsules 2–3 in., scattered, leaves peduncled often ½ in. Seeds obtuse, not narrowed at the apex, only slightly narrowed at the base, most minutely papillose, coma fulvous.

8. E. khasianum, C. B. Clarke; stem without lines uniformly villose, middle cauleine leaves opposite sub sessile elliptic-oblong villous over both surfaces, seeds ellipsoid. Epilobium No. 6, Herb. Ind. Or., H. f. & T.


Stem 2–3 ft., quite round. Leaves 1½ by ½ in., approximate, clothed with tawny hair, nerves impressed. Petals ¼ in. and upwards. Stigma clavate, very obscurely lobed. Capsules 2–3 in., scattered, little pubescent, lower peduncles ¼–1 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) obovoid not narrowed upwards. Boiss. Fl. Orient. ii. 748.

Northern Kashmir and Baltistan; alt. 8000–14,000 ft.; T. Thomson, C. B. Clarke.—Distr. 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 ½ 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 heat or production of the testa at the apex.

Var. majus; stem 1–2 ft., middle cauleine leaves 2–3 in. often much denticulate sometimes pectiolated and sometimes broader elliptic when the plant can only be dis-
tunguished from E. roseum var. indicum 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 not at 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.—Distr. Northern cool temperate and Arctic zones.

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 ½ in.; in the var. E. Balansae Boiss. (collected by J. D. H. also in Sikkim) the petals exceed ¾ in. Capsule 1½–3 in., peduncle also variable in length. Seed minutely puncticulate, comat. fulvous.

Var. villosum; stem villous, leaves ½–1 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. 91. —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 ¼–1 in., denticulate obscurely or prominently, scarcely acute. Capsule 1½ in., peduncle ¼–⅜ in. Seeds minutely papillose, narrowly elliptic, 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 oblong or narrow-elliptic glabrous but with crisped hair on the raised nerves beneath usually denticulate-serrulate rarely acute. Boiss. Fl. Orient. ii. 748. E. brevifolium, Don Prodr. 222.

Sikkim, alt. 5000–12,000 ft., very common. Khasia Mrs., alt. 4000–6500 ft., common.—Distr. 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, ⅜–2 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 ¼–⅜ in. Seeds narrowly elliptic, not narrowed at the summit, very little narrowed at the base, minutely papillose, coma fulvous.
Epilobium.]

V.  

V. amplexicaulis, Wall. Cat. 6230; stem obscurely quadrangular or the bases of the leaves cozenent and decurrent in two hairy lines, leaves nearly sessile often somewhat rounded at the base.—Kumtaon; Wallisch. Sikkim, alt. 10,000-13,000 ft. (Tungr and Lachen); J. D. H.

Except that the hairy lines down the stem are strongly marked this plant might be E. origanifolium above.

Doubtful Species.

E. laxum, 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.

2. JUSSIEA, Linn.

Herbs or undershrubs, growing usually in swamps. Leaves alternate, undivided, mostly entire. Flowers yellow or white, axillary, solitary; pedicel usually 2-bracteate at the apex. Calyx-tube scarcely produced above the ovary, linear; teeth 4-6, acute, persistent. Petals 4-6, epigynous. Stamens double the number of petals, epipogynous. Ovary inferior, 4-5-celled; style simple, usually very short, stigma 4-5-lobed; ovules oo, 8, in several vertical rows at the inner angle of each cell. Capsule linear, round or angular, 4-5-celled, 8-10-ribbed, opening septicidally in valves separating from the persistent ribs or irregularly between the ribs. Seeds very many, without coma.—Distr. Species 30, in the tropics of the whole world, most numerous in America.


Throughout India with Ceylon; very common.—Distr. 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 ½-1½ in. Leaves very variable in size, ½-3 in., usually glabrous sometimes hairy, upper usually 1-2 in., nearly always obtuse in the Indian examples. Pedicel usually as long as the capsule, sometimes quite short. Petals about ½ in., obturate. Capsule ½-1½ in., linear-cylindric, glabrous or with scattered hairs. Seeds smooth, reticulated.

In all India except the western desert region; and in Ceylon.—Distr. The warmer moist parts of the whole world.

Erect, branching, sometimes 4-6 ft. Leaves 3 by $\frac{3}{8}$ in., more or less villous (rarely in Indian examples subglabrous), sometimes short, ovate-lanceolate, sometimes nearly linear, shortly petioled or sessile. Pedicel very short, bracts inconspicuous, or (in var. bracteata of Rottler) foliaceous, 1 in. Petals 4-5 in. Capsule 1-2 in., linear-cylindric, more or less villous or finally glabrous, 8-ribbed, membranous, breaking up along 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. Staminodia 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.—Distr. 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 $\frac{3}{8}$ by $\frac{3}{8}$-1 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 Bijld. 1134; DC. l. c. D. jussieoides, Wall. Cat. 6335 not of Linn. and others.


Erect, 8-24 in. glabrous. Leaves 2-3 by 1-2 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 $\frac{3}{8}$ by $\frac{3}{8}$ in. linear, seeds in one row in each cell, raphe narrow but prominent. DC. Prodr. iii. 59; Wight Ic. 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 Bijld. 1133; DC. l. c. Nematopyxis prostrata, pusilla, and fruticulosa, Meq. Fl. Ind. Bat. i. pt. i. 630.


Prostrate, or decumbent and then erect, 8-24 in., glabrous. Leaves 2-3 by $\frac{3}{8}$ 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 extracted 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. **Circea**, Linn.

Herbs. Leaves opposite, petioled, ovate, sinuate-dentate, membranous. Flowers small, white, pedicelled, in terminal and lateral peduncled racemes, finally lax; pedicles spreading, with minute subulate (or 0) bracts at their base. Calyx-tube ovoid, scarcely produced above the ovary, limb bifurcate. Petals 2, obcordate, 2-lobed, epigynous. Stamens 2, epigynous. Ovary inferior, 1-2-celled; style filiform, stigma capitulate almost 2-lobed; ovules attached to the inner angle of the cell; 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 patented-deflexed shorter than its pedicel 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.; Wallisch, Major Madden, 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 1–1 ½ 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 Wallisch 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 patently-deflexed little longer than broad from a broad rounded unequal base covered with long hooked hairs, not shorter than its pedicel.


Stems 1–2 ft., stouter and more hairy than of L. lutetiana, erect. Leaves 2½ by 2 in., sometimes larger; petiole often 1½ in. Bracts 0. Petals yellow (ex Royle) and appear so in the dried examples. Fruit scarcely ½ in., nearly or quite as much broad, the two carpels at the base generally descending unequally on the pedicel.

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 pedicel, 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 ½ 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 ⅓ in., ovovoid, 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. himalalica; stem taller 10–18 in., leaves much larger 1½ in. more pubescent not pellucid.—In the Himalaya only; the type of Wallisch’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; emerged roseulate, 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 the segments persistent and becoming spinose 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 capitate; 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, indesicent, with a short cylindric beak at the top through which the radicle is protruded. *Seed* 1, inverse, cotyledons very unequal.—**Distrib.** Species 2, extending through the warmer parts of the Old World, from Central Europe to China and to Tropical Africa.

1. **T. bispinosa, Roxb.** *Cor. Pl. 234; Hort. Beng. 11; Fl. Ind. i. 428; leaves usually very villous beneath, fruit with 2 angles spinose. DC. Prodr. iii. 64; Wall. Cat. 6339; WoA. & A. Prodr. 337; Miqu. Fl. Ind. Bat. i. pt. i. 636; Dulz. & Gibs. Bomb. Pl. 99; Kurz in Journ. As. Soc. 1877, pt. ii. 91. T. quadrispinosa, Wall. Cat. 6340 not Roxb.—Rheed. Hort. Mal. xi. t. 33.

Throughout **India and Ceylon.**—**Distrib.** South-eastern Asia and Malaya; 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* ½ in. long and broad, glabrous or hairy; two opposite angles each with an often retrorsely secalous 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 ⅔ in. much less villous beneath incise serrate on the anterior margin.—Marked also *T. quadrispinosa* 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. *Lamk. Ill. t. 76; Bois. Fl. Orient. ii. 753. T. quadrispinosa, Roxb. Hort. Beng. 11; Fl. Ind. i. 451; DC. l. c.*

**Kashmir; Falconer, Jacquemont.** **Silké; Roxburgh** (but no example thence at Kew).—**Distrib.** 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* ⅔ in. broad, the 4 angles all spinose but the two lateral spines shorter.

**Order LXIII. SAMYDACEAE.** (By C. B. Clarke, F.L.S.)

Trees or shrubs. *Leaves* alternate, often distichous, petioled occasionally subsessile, simple, entirely or lightly crenate or serrate, often closely punctulate beneath; stipules small, deciduous. *Flowers* regular, small, axillary, shortly pedicellate, densely fascicled or in long simple or panicked 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...
Shrubs or small trees. Leaves alternate, distichous, petioled, 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 staminodes 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.—Distr. 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 cordate at the base, pedicels with minute yellow hair, fruit ½ in., ellipsoid. DC. Prodr. ii. 49; Bent. Fl. Hongk. 122; not of Kurz Flor. Fl. i. 530. C. ovata, Wall. Cat. 7192 E, not of Roxb.

Sikkim, Bhutan and Khasia, alt. 3000–5000 ft., common.—Distr. Hong Kong (and probably Malay, for the examples of C. giabara 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, staminodes yellow.—A plant collected in Sikkim by Mr. Kurz, marked "C. giabera," has bark densely uniformly lenticellate, petioles ½ in. and the young buds and pedicels without the smaller yellow hairs; it can scarcely be Roxburgh's C. giabera from the Moluccas and which is not represented in the Kew Herbarium.


Singapore; T. Lobb.—Distr. Java, Philippines.

Branchlets nearly glabrous. Leaves 5–6 by 2 in.; petiole ½ in. Pedicels ½ in.; buds minutely hairy, larger than those of C. giabera.—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 Lobb 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) 4 by 2½ in., broadly elliptic, little acuminate, rounded at the base; petiole 1½ 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, aureo-pubescent below the articulation glabrous above to near the base of the calyx. Calyx always pubescent at the base, above sometimes densely aureo-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 Wallachian 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. Cansiala, 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 Cansiala is hairy.


MALABAR, from BOMBAY to KURG, frequent. CEYLON, plentiful; Thwaites. MOULMEIN and SIAM, Lobb. Griffith, Maingay.

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 ½–1½ in. Pedicels short, usually less than ½ in. fruit, jointed at the base. Carpels 2, with 2-fid stigma (Thwaites No. 2604, 2657); but carpels often 3 (see Beddume Fl. Syiv. 208).—C. Championii Thwaites with very entire coriaceous acuminate leaves is exactly the form sent from Moullenui and Singapore.

Var. angusta; leaves narrow-lanceolar 4 by 1 in.—CEYLON; Thwaites No. 2603 reduced with hesitation to C. esculenta by Mr. Bentham in Fl. Austral. ii. 309.

5. C. coriacea, Thwaites Enum. 20; leaves obovate obtuse or rounded at the vertex entire, pedicel above its articulation and calyx glabrous, fruit 3–4 in. ellipsoid. C. varians var. γ obovata Thwaites i. c.

CEYLON, alt. 6000–8000 ft.; Thwaites, Gardner, Walker.

A small tree, branches glabrous. Leaves 2 in., much narrowed at the base; petiole ½ in. Carpels always 2 (Thwaites).

**Bombay** G. Haours, Concan and Korg; Dalzells, Stocks, Ritchie.*

A shrub 4–6 ft. (Dalzell); branches glabrous to the final stipules. *Leaves* 4½ by \( \frac{\sqrt{3}}{4} \) in., acuminate, coriaceous often ruddy (but not more so than some examples of *C. esculenta*); petiole \( \frac{1}{4} \) in. *Pedicels* short, usually less than \( \frac{1}{4} \) in., jointed at the base. *Calyx-lobes* broad, 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 1\( \frac{3}{4} \) by \( \frac{1}{6} \) in.

**Pinang;** Maingay 660–2.

Branchlets reddish, glabrous. *Leaves* 5 by 1½ in., entire, acute at both ends, reddish, reticulate, shining; petiole \( \frac{1}{4} \) in. *Pedicels* few, not exceeding \( \frac{1}{4} \) in., glabrous, reddish, buds glabrous. *Seeds* \( \frac{1}{4} \) in., obovoid, compressed.

8. **C. albicans**, Wall. Cat. 7197; leaves oblong acute at both ends, pedicels glabrous, fruit 2 by \( \frac{1}{6} \) in. ovoid bright yellow when ripe (Maingay).

**Pinang;** Wallich. Malacca; Maingay, No. 660.

Branchlets thick, glabrous, striate. *Leaves* 9 by 2½ in., entire, coriaceous, nerves much raised beneath; petiole \( \frac{1}{4} \) in. *Pedicels* clustered, \( \frac{1}{4} \) 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.**

9. **C. Varea**, Roxb. Hort. Beng. 33; Fl. Ind. ii. 418; leaves oblong closely serrate softly hairy beneath, pedicels above the articulation glabrous, fruit \( \frac{1}{4} \) in. broadly ellipsoid yellow or pinkish yellow. *Wall. Cat. 7194; Kurz For. Fl. i. 630.*

Terasi of the Himalaya from Sikkim eastward and of Khakia, at 500–3000 ft. elevation, plentiful.—**Distrib. Ava.**

A shrub, branchlets pubescent. *Leaves* 3½ by 1½ in., often somewhat chovate, obtuse suddenly narrowed but sometimes acuminate; petiole \( \frac{1}{4} \) in. *Pedicels* less than \( \frac{1}{6} \) in., usually jointed far above the base, very hairy below the articulation. *Staminal* tube elongate, stamina 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 synonomy.


Throughout India and Ceylon, common.—**Distrib. Malaya and North Australia.**

VOL. II.
A shrub, or tree attaining 25 ft.; branchlets tomentose pubescent or nearly glabrous. Leaves 4 by 1 3/4 in.; tomentose beneath or pubescent or only slightly hairy about the base of the midrib, rarely so closely serrate as in Wight &t. t. 1849, often nearly entire; petiole variable from 1 3/4 to 6 in. in Central India examples. Pedicels usually numerous, less than 1 1/2 in.; buds usually hairy, sometimes nearly glabrous. Staminal tube short, stamens 7-10; buds nearly glabrous, more crenate-serrate and more narrowed at base. With these the Malayan examples agree. As to C. Canziata, 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. graveolena. 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).


Moulmein and Singapore, T. Lobb; Malacca, Griffith.

Branchlets round, softly hairy. Leaves 2 1/2-3 by 3/4-1 1/4 in.; petiole 1/2-1 in. Buds most minutely pubescent. Fruit sub sessile.—Scarcely differs from C. tomentosa but by the more acuminate leaves.

12. C. grewiæfolia, Vent. Choix. 48; leaves large oblong hairy beneath entire or crenulate base rounded or cordate, pedicels pubescent, fruit 3-1 in. DC. Prodr. ii. 51; Miq. Fl. Ind. Bat. i. pt. i. 706. C. variabilis, Blume Mus. Bot. i. 252. C. subcuneata, Miq. i. c. C. cinerea, Turcz. in Bull. Soc. Nat. Mosc. 1858, pt. i. 462.

Malacca, Maingay No. 659, 661.—Distrib. Malaya to the Philippines.

A small tree (Maingay), branchlets more or less pubescent. Leaves 7 by 2 1/4 in.; petiole 3/4 in. Pedicels often 1 1/2 in., jointed at the base, buds generally pubescent.—Diffs little from C. tomentosa but by the coriaceous 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.; Beddom.

A small tree (Beddom), branchlets aureo-villosus. Leaves 4-6 by 1 1/2-2 in.; petiole 1 3/4-2 in. Pedicels not very many together, 1 1/2 in. or less; buds minutely pubescent. Stigma 4-lobed (Beddom).—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 (1/3 in. f.). C. glomerata var. puberula, Kurz in Journ. As. Soc. 1877, pt. ii. 92; For. Fl. i. 530.


Branchlets minutely pubescent. Leaves 3 by 2 in.; petiole nearly 1 1/2 in. Pedicels not very many together, 1 1/2 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. grewiafolia. 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. grewiafolia.

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 (side 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.


CASSARIA ? ACUMINATA, Wall. Cat. 7198, has opposite leaves and is remote from the genus and order.

CASSARIA ? LUCIDA, Wall. Cat. 7199, is a Euphorbiaceous plant, possibly the male of Wall. Cat. 7198.

2. OSMELIA, Thwaites.

Trees. Leaves alternate, petioled, ovate or oblong-lanceolate, entire or obscurely serrate, pubescent; stipules minute, deciduous. Flowers small, very nearly sessile, in long racemes which are simple or panicked. 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, I-celled; styles 3, short, with capitellate stigmas; ovules few, placenta 2, 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.

Younger branches and panicle pubescent. Leaves 2-4 by 1-1 ½ in., narrowed at the base; petiole ½ in. Panicle lax, racemes 4-6 in. Flowers white tinged with red, each supported by a single cup-shaped bract. Stamens 10. Ovary very hairy. Capsule ½ in, coriaceous. Seeds 1-4, subglobose.

3. HOMALIUM, Jacq.

Shrubs or trees. Leaves alternate, crenate or subentire, petioled or sessile, rarely punctate. Flowers hairy, small, in slender axillary and sub-terminal simple or panicked 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.

DISTRIBUTION. 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.

SECTION I. Blackwellia. Stamen 1 opposite each petal.

* Racemes panicled.

1. H. nepalense, Benth. in Journ. Linn. Soc. iv. 34; leaves ovate or elliptic subacute petioled crenate glabrous, panicles with divaricate branches minutely tomentose or nearly glabrous. Blackwellia nepalensis, Wall. Pl. As. Rar. t. 179; Wall. Cat. 4900; DC. Prodr. ii. 54. B. (Astranthus) acuminata, Wall. in Herb.

Nepal; Wallich.

Leaves 4½ by 2½ 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-fld.

** Racemes elongate simple.

2. H. tomentosum, Benth. in Journ. Linn. Soc. iv. 34; leaves nearly sessile ovate oblong-glabrous, or pubescence beneath, flowers clustered subsessile. Kurz For. Fl. i. 531. Blackwellia tomentosa, Vent. Choix t. 57; DC. Prodr. ii. 55; Mig. Fl. Ind. Bat. i. pt. i. 714. B. spiralis, Wall. Cat. 4897, partly; DC. l.c.

Bhout; Wallich, Kurz.—DISTRIBUTION. 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-fld. 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 macrostachya, Turcz. in Bull. Soc. Imp. Mosc. 1863, 610 ex descr.

Pinano; Phillips. Malaya; Maingay No. 665.

Tree not very large but high (Maingay). Leaves 4–7 by 1¾–2½ in.; petiole ½ in. Racemes 6 in., axillary, scattered, but mostly towards the ends of the branches, tomentose or scarcely more than puberulous; pedicels short, usually less than ½ in. Flowers small, 6–8-fld.—For the synonym Wall. Cat. 4897 in part adduced by Mr. Bentham see H. propinquaum below.

4. H. minutiforum, Kurz For. Fl. i. 532; glabrous, leaves petioled oblong coarsely crenate, pedicels glabrous, flowers minute about ½ in. long.

Burma, probably Martaban or Tenasserim; Brandis.

An evergreen tree. Leaves 3–5 in., obtusely apiculate, thin, coriaceous; petiole ¾ 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,

**Malanara**, up to 4000 ft.; not uncommon; *Law, Stocks,* &c. *Ceylon,* moister parts up to 8000 ft.; *Walker,* &c.


**Sect. II. Racoubea.** *Stamens* 2–7 opposite or subopposite each petal: some of the filaments sometimes having no anthers.

* Racemes panicked or more or less divided.

6. **H. Schlichti**, *Kurz* For. Fl. i. 532; leaves petioloed elliptic narrowed at both ends coarsely crenate glabrous, racemes terminal or subterminal, panicked grey-pubescent; stamens 3 before each petal.

**Chittagong, in tropical forests; Kurz.**


**Pemut; Wallich.**

*Leaves* 4–8 by 1 1/ in., obtuse, base usually narrowed sometimes unequally rounded; petiole scarcely 1/ in. villous. *Racemes* 6 in., towards the ends of the branches, villous-tomentose, simple or branched once; pedicels about 1/ in. *Flowers* small, 6-fid. *Stamens* 2 before each petal, both bearing anthers.

**Racemes elongate, simple.**


**Masuli,* *Griff.* No. 901. *Tensserim,* *Heffer.*

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 1/ in. densely villous. *Racemes* 6 in., tomentose; pedicels very short, less than 1/ in. *Flowers* small, but larger and much more hairy than those of *H. foetidum.* 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. foetidum,** *Benth.* in Journ. Linn. Soc. iv. 37; leaves petioloed elliptic narrowed at both ends glabrous crenate, flowers clustered pedicelled 6–8-fid, calyx-tube short segments a little shorter than the petals. *Blackwellia foetida,*
MALACCA; Griffith, Maingay No. 664.—Distributed Malaya.

A tree, branchlets leaves and petioles glabrous. Leaves 4–7 by 1 1/2–3 1/2 in., base narrowed; petiole 1/2–1 in. Racemes 6 in., minutely tomentose or glabrous; pedicles short, often 1/2 in. Stamens 2 or 3 before each petal. Ovary densely villous. Styles 3–4 (5 ex Maingay). Fruit 1-seeded according to a note of Maingay.

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.

Leaves 6 by 2 1/2 in.; petiole hardly 1/4 in. Racemes 6 in., puberulo-pubescent or tomentose, pedicels about 3 in. Flowers large, calyx-segments after flowering 3 in. Ovary even in flower with the apex much elevated. Styles 5.

11. **H. travancoricum**, Bedd. Fl. Sylb. t. 211; leaves petioled elliptic-crenate glabrous, flowers subsessile clustered usually 6-fid, calyx-tube short turbinate segments hardly half 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 1 1/2–1 3/4 in., obtuse acute or acuminate, base subacute or obtuse hardly rounded; petiole less than 1/4 in. Racemes 2–4 in., axillary, puberulo-pubescent, not so dense-flowered as in **H. scolytanicum** (ex Beddome); but the flowers appear as dense as in other species.

**DOUBTFUL SPECIES.**

**H. fetidum**, Kurz For. Fl. i. 522 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. fetidum**.

**ORDER LXIV. PASSIFLOREÆ.** (By M. T. Masters.)

Twining herbs or shrubs, rarely erect. Leaves alternate, stipulate, simple or lobed, penni- or palm-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 introrsely. 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 scanty; embryo straight, cotyledons flat leafy, radicle short terete.—**Distr.** 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. Passiflorae.** **Flowers** hermaphrodite. **Stamens** hypogynous.

**Twining herbs or shrubs**

**Erect shrubs**

1. **PASSIFLORA.**

**TRIBE II. Modeceae.** **Flowers** unisexual. **Stamens** perigynous.

3. **MODECCA.**

**I. 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 basal corona; filaments 5, flat; anthers oblong, 2-celled, dorsifixed; pollen grains reticulate on the surface. **Ovary** 1-celled; styles 3, stigmas reniformi-capitate. **Fruit** baccate. **Seeds** arillate.—**Distr.** 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. fistula** and **suberosa**. A form of the latter species was described by Wight as indigenous to Ceylon under the name of **P. Walkeri**, 39 Ill. ii. (t. 108), but there is no reason to suppose it indigenous.

1. **P. Leschenaultii, DC. Prodr.** iii. 326; leaves semiorbicular truncate palminnervely shortly 3-lobed glandless pubescent especially beneath. **Wall. Cat.** 1231; **W. & A. Prodr.** 352; **Hook. Io. Pl.** t. 353; **Wight Io.** t. 39.

**Khasia, Pulney and Nilghori 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 truncately 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 axis 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-oblung. **Fruit** 1½ by 1 in., ovoid, glabrous, yellowish; rind leathery.

\textit{NIPAL}, Wallich. \textit{Sikkim}, alt. 4–6000 ft. \textit{Khasia Mrs.}, alt. 3–6000 ft., \textit{H. f. & T.} A glabrous climber with slender angular branches and distant leaves. \textit{Stipules} \(\frac{1}{8}\) in., linear-subulate. \textit{Leaves} 24–4 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 \(\frac{1}{4}\) in., usually with two glands above the middle. \textit{Peduncles} simple, in pairs in the axile of the leaves, about half the length of the petiole, slender, 1-flowered, jointed above the middle, rarely cymose; cymes lax, few-flowered. \textit{Flowers} less than \(\frac{3}{8}\) in. diam., cup-shaped; tube short, cylindrical. \textit{Calyx-lobes} longer than the tube. \textit{Petals} equal to the calyx-lobes. \textit{Corona} of many rows of short threads. \textit{Gynophore} shorter than the flower. \textit{Ovary} ovoid or subglobose, glabrous. \textit{Fruit} subglobose, the size of a large pea, purplish.

\textbf{EXCLUDED SPECIES.}

\textit{P. caloneura}, \textit{Kurs in Journ. As. Soc.} 1877, ii. 95, described as from “Burma probably Upper Tenasserim or Martaban, \textit{Brandis},” is, according to an authentic specimen sent by Dr. Kurz from the Calcutta Herbarium, the \textit{Aristolochia triobata}, L., of the West Indies and South America, no doubt introduced into India; it is not in flower or fruit, but the nervous of the leaf, no less than its form and indumentum, leaves no doubt as to this identification.

\textit{P. heyneana}, \textit{Wall. Cat.} 1233 bis (alias 2248) is an \textit{Olacineae}, probably referable to \textit{Erythrophalum populifolium}, Mast.

2. \textbf{PARROPSIA}, Noronh.

\textbf{Shrubs.} \textit{Leaves} simple. \textit{Flowers} in dense axillary cymes. \textit{Calyx-tube} short; limb 5-parted. \textit{Petals} 5, springing from the base of the calyx-tube. \textit{Corona} of fine threads springing from the tube of the calyx and more or less divided into five antipetalous phalanges. \textit{Gynophore} short; filaments flat; anthers oblong. \textit{Ovary} subglobose. \textit{Style} short dividing into three branches; stigmas reniform-capitate. \textit{Fruit} capsular.—\textbf{DISTRIB.} 4 or 5 species, natives of tropical Africa and Malaya.


\textit{Malacca}, Maingay, \textit{Griffith}.

A shrub. \textit{Leaves} \(\frac{3}{8}\) by 1 in.; petiole \(\frac{1}{8}\) in. \textit{Flowers} \(\frac{1}{8}\) in. diam. \textit{Calyx} campanulate, tube short covered with tawny down; lobes oblong, obtuse, 4 or 5 times longer than the tube. \textit{Petals} oblong, 1-nerved, half the length of the sepals. \textit{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. \textit{Gynophore} shorter than the petals. \textit{Stamens} 5; filaments filiform; anthers oblong. \textit{Ovary} globose, villose. \textit{Stigmas} large, capitatenreniform.


\textit{Malacca}, \textit{Griffith}.

Shrub, more or less rusty pubescent. \textit{Leaves} 6 by 2\(\frac{1}{8}\) in., coriaceous, glabrous.
above; petiole under \(\frac{1}{8}\) in. Peduncles \(\frac{1}{2}\) in. Flowers nearly \(\frac{1}{2}\) in. Calyx-segments leathery. Petals narrow at the base, ciliate. Ovary turbinate, villous. 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, capitate, opposite the sepals. Stamens 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 funicules to parietal placentas.—Distree. 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 Jc. 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, surrounded 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 \(Vitis lanoeadoria\), 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. *Cymes* many-flowered, on a cylindrical peduncle as long as the petiole, one branch cirrose. **Male flowers** ⅓ 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* ⅓ 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 laciniate 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 petioloed, slightly glaucescent 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* trifid or styles 3; stigmas capitate.


**Sikkim, Assam, Khasia Mts., Cachar, Chittagong.**

Glabrous. *Branches* terete, glabrous, sulcate. Leaves remote, broader than long, 6–8 by 8–9 in., 3–5-lobeed, cordate or bastate at the base; lobes oblong-obovate, acuminate, central one narrowed to the base. *Glands* 2, orbicular, at, on the under surface of the leaf near the base; petiole 4 in., cylindrical, with a pair of glands at the extreme apex. *Peduncles* axillary, 5–6 in., divided near the apex into a leafless, many-flowered cyme, one branch of which is cirrose. **Male flower**: *Calyx* less than ⅓ in., campanulate, 5-lobeed, lobes oblong, obtuse. **Petals** oblong-obovate, springing from the base of the calyx-tube. **Stamens** 5, united at the base, filaments slender; anthers linear, obtuse. **Glands of the disc** 5, ligulate, incurved, opposite the sepals. *Rudimentary ovary* minute. **Female flower**: *Calyx* and petals as in the male, but larger. **Glands of the disc** 5, ribbon-like, recurved. **Staminodes** 5, united at the base.
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 ½ 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; stigmas 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 Cingaleses (Thwaites l. c.). **M. integrifolia**, Wall. Cat. 6765, is a garden species 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-lobed segments lanceolate narrow at the base with a gland beneath the sinus on the under surface, 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 herbaria, 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. Prone, 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 glandular, 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. Cucurbitaceae. (By C. B. Clarke, F.L.S.)

Climbing herbs or shrubs; tendrils solitary, lateral, spiral, simple or divided. Leaves alternate, petiolated, frequently cordate, simple lobed or pedately divided. Flowers monoecious or dioecious, yellow or white, racemose and solitary, less commonly panicled. Calyx-tube wholly adnate to the ovary (except in Actinostemmatum); limb rotate campylane 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 calyx-tube (in Dicelospermum 3 erect from the base of the ovary?). Fruit generally berries 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.—Distributed. Species 400, in the warmer parts of the whole globe especially in the tropics.

Tribe I. Cucumerinaceae. Ovules horizontal (or pendulous). Female flowers usually solitary, never panicled. Leaves not divided into distinct leaflets (except rarely in Thaladiantha).

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. Gymnopetalum.
Seeds many, horizontal. Tendrils 2–3-fid. Petiole without glands. . . . . . . . . . . . . . . . . . . . 4. Warra.
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.
Lxv. Cucurbitaceæ. (C. B. Clarke.) 605

Male flowers (partly) in racemes. Fruit opening by a stopple. 7. Luffa.
Flowers all solitary. Fruit very fleshy, indehiscent. 8. Benincasa.

B. Stamens inserted below the mouth of the calyx-tube; anthers more or less cohering.

Male flowers (partly) racemose. Tendrils simple. 9. Momordica.
Male flowers clustered or solitary. Tendrils simple. 10. Cucumis.
Flowers all solitary. Tendrils 2–3-fid. 11. Citrullus.

** Corolla campanulate, divided half way down or thereabout.


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 simple. 15. Mukia.

†† Male flowers corymbose or subumbellate or racemose.

Fruit on a capillary peduncle. Connective produced. 17. Melothria.
Fruit sessile, beaked. 18. Rhynchosperma.
Fruit circumciss near the base. 19. Corallocarpus.
Fruit subseissile, indehiscent, without a beak. 20. Chrasiocarpum.
Ciliate bracts resembling stipules at base of the petioles. 21. Ctenolepis.

** Flowers large deep yellow, male raceme stout.

Calyx-tube short. Seeds very many. 23. Thladiantha.

Tribe II. Orthospermeæ. Ovules and seeds erect.

Seeds 3, each with two empty cells. 22. Digtelospermum.

Tribe III. Zanonicæ. Ovules pendulous. Flowers small, the females in panicles or many-flowered racemes. Stamens 5, free, each with a single small straight anther.

A. Leaves not divided into separate leaflets.

Fruit long clavate. Leaves subentire. 28. Zanoniea.

B. Leaves pedately divided into 3–5 leaflets.

Fruit pea-like. Leaflets serrate. Tendrils simple. 27. Gynostemma.
Fruit elongate clavate. Leaflets entire. 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 campylolate; 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 globular, 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. 3000 ft. **East Bengal** and **Cuttagee;** **Pinu** and **Martaran;** *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.; bracteoles 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 monoeccious, white; male peduncles usually in axillary pairs, one 1-flowered caducous, the other racemose; bracts large or small or 0; female flower solitary. **Male:** calyx long-tubular; teeth 5, lanceolate, entire saccate 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, ellipsoidal, sometimes angular on the margin.—**Distr.** 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 ¾ in. scarcely angular on the margins. *Wall. Cat.* 6688 excl. C. F; *W. & A. Prodr.* 350 as to a and b; *Wight Ill.* t. 104, 105; *Dalz. & Gibb. Bomb. Fl.* 103. *T. laciniosa, Wall. Cat.* 6689 A, B. *T. aspera, Heine in Herb. Rattler.* *T. tricuspis, Miq. Fl. Ind.*
Trichosanthes.] LXX. CUCURBITACEÆ. (C. B. Clarke.) 607


From the Himalayas to Ceylon and Singapore; very common in all moist thickets, ascending to 5000 ft.—Distrib. Malaya, China, Japun, North Australia.

Climbing often 30 ft. Diocious so far as all the examples go, but Roxburgh has placed it in Monacca without remark. Leaves 2–6 in. diam., not at all hairy beneath, usually glabrous or less commonly scabrous on the nerves, often with several larger glands near the apex of the petiole, cordinate at the base; segmente dentate, serrate, divaricate, sometimes subpinnatifid (var. incisa Heyne), usually acute (but obtuse in var. sinuata, Heyne); petiole 1–3 in. Tendrils commonly 3-fid. Male peduncles usually paired, the raceme 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 serrat or subpinnatifid. Fruit 1 3–2 in. diam., not acute, bright red with 10 orange streaks. Seeds very many, immerced 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 petals more or less covered with scattered round white minute flat scales. The Himalayan specimens recede further by their large subscutulent flaccid leaves and very large flowers.

Var. Scotanthus, C. B. Clarke; calyx-teeth broad-lanceolate entire, petals nearly destitute of frriburations 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. 1154, 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 Maximowicz. They belong to the commonest Bengal type of T. palmata, but bear the name T. japonica, Regel, which in Regel Ind. Sem. 1888, p. 90, is said to have solitary male flowers, and has been referred by authors to the neighbourhood of T. cucumerina. A Trichosanthes collected in Mengui by Griffith No. 759 (No. 2322 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 1 ½ in. more or less angular on the margins. T. grandibracteata, Kurr in Journ. As. Soc. 1877, pt. ii. 90 ex descr.


Rambling extensively. Diocious. 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-fid. Male peduncles usually paired, the raceme one 6 in., naked below. Calyx-tube 1–2½ 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.


From the base of the Eastern Himalaya in Sikkim and Assam to Pegu. Frequent in the Khasia Terai and Cachar.

An extensive climber. **Dioscious. Leaves** often 6–8 in., dentate-serrate; tendrils usually 3-fid. Male *peduncles* usually paired, the racemed one often 8 in., stout; bracts pubescent. **Calyx-tube** 1½ in., densely hairy without, segments finely acuminate. **Fruit** almost exactly as in *T. palmata*, bright red, orange-streaked, apex not acute.

VAR. *subpedata*; 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. macrostiphus*, Kurz in Journ. As. Soc. 1872, pt. ii. 308, differs less from *T. cordata*, Roxb. than does this var. *subpedata*.

**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 subpeltate entire or irregularly tricuspid glabrous denticulate or not, bracts ovate slightly serrate nearly glabrous, female plant unknown.

Sikkim, alt. 1000 ft.; J. D. H. Khasia Mrs., alt. 4000 ft. (Cherra Coal-pit) H. f. & T.; C. B. Clarke.

Stems twining; tendrils 2–3-fid. **Leaves** glabrous coriaceous or membranous, polymorphous, sometimes exactly ovate with a rounded subentire margin sometimes deeply 3-cuspidate. **Male peduncle** 6 in. **Calyx-tube** ½–1½ in., somewhat tomentose without: corolla (ex Hook. f.) greenish-white.


Sikkim, alt. 2000–5000 ft. from Yaksun to the plains; J. D. H., C. B. Clarke.

Stems extensively climbing, with the petioles and leaves pubescent and hairy. **Dioscious. Leaves** 6 in., usually deeply palmate, irregularly serrate; tendrils 3-fid. Male **peduncles** 3–4 in., bracts ½–2 in. **Calyx-tube** 1½–2 in., very narrow, little hairy without. **Fruit** 3–4 by 1–1½ in., nearly circular in section. **Seeds** ½–¾ in. diam., polymorphous, sometimes obvoid the broader part subtrimerous, sometimes drum-shaped.—Certain seeds were sent by Dr. Anderson to Nandin, 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. *glabrior*; leaves glabrous above pubescent or securis 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.
6. **T. dicelosperma**, C. B. Clarke; leaves cordate-ovate acute denticulate softly shortly pubescent on both surfaces, fruit 1½ in. diam. globose, seeds ½ in. compressed subquadrate equally 3-celled the lateral cells empty. ?T. reniformis, **Kurz in Flora 1871, 294.**


Stems long, twining, innovations at least pubescent. **Diacious.** Leaves 4 by 3½ in., not at all lobed; petiole 1½ in.; tendrils 2-fld. Male peduncles paired, one early 1-flowered, the other 2–3 in., racemed, ebracteate. Calyx-tube 1½ 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, **MJ. Fl. Ind. Bat.** i. pt. i. 675, which has obtuse lobes to the leaves and the male spikes leafy-bracteate.

7. **T. dioica**, Roxb. **Fl. Ind.** iii. 701; leaves cordate oblong acute, petiole scabrous woolly, male flowers not racemed woolly without, anthers free. **Wall. Cat.** 6592 A, B, D.

Throughout the plain of **NORTH INDIA** from the **PUNJAB to ASSAM and EAST BENGAL,** common.

Stems twining extensively, more or less woolly and scabrous. **Diacious.** 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 racemed in any example at Kew. Calyx-tube 1½ in., narrow. Fruit 2–3½ in., oblong or nearly spherical, acute, orange-red. Seeds ½–1 in., half-ellipsoid, compressed, corrugate on the margin.—United with the next species by **Benth. in Fl. Austral.** iii. 315. Roxburgh says “Stems three distinct” which has been repeatedly verified in the living plant.


**Deccan Peninsula**; **Quilon**, Wight. **Kurg** (tropical region); G. Thomson. **Ceylon**; not uncommon up to 5000 ft.; **Thwaites.**

Stems twining, glabrous. **Diacious.** Leaves 3 by 1½–2 in., membranous, sinuate-dentate, not lobed; petiole ½ in.; tendrils 2-fld. Male peduncles usually paired, the second-flowering carrying a raceme (finally elongate and zigzag) of about 12 flowers. Calyx-tube 1½ in. Fruit (and seeds from Rheede’s drawing) 2–3 in., circular in section, about twice as long as broad, acute. Seeds ½–1 in., half-ellipsoid, compressed, corrugated on the margin.


Throughout **INDIA and CEYLON.—DISTRICTS**. **MALAYA, NORTH AUSTRALIA.**

*Stems twining, more or less pubescent. Diacious or less often (when cultivated) monocious.* Leaves 2–4 in. diam., usually 5-lobed about half-way down, lobes obtuse or if acute not acuminating; petiole ½ in.; tendrils 2-fld. Male peduncles in pairs, the earlier 1-flowered, the later racemed; occasionally in place of the earlier is found a female. Calyx-tube 1 in. Seeds ½–1 in., half-ellipsoid, compressed, in red pulp.—In **Bth. & Hk. f. Gen. Pl.** i. 833, under *Ceratoanthes, T. cucumerina* is a misprint for *T. cordifolia.*

**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 polymorphous. Miquel places this species at the head of his *Involucrata* 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-ellipsoidal, compressed, margins entire.—Probably a variety of *T. cucumerina* as suggested by *W. & A. Prodr.* 360. *T. lobata*, *Kprz* 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 nerved 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 ½ in. *Fruit* 2 in. diam., red. *Seeds* ½ in., smooth, oblong, oblique, compressed, truncate at the hilum, with two indentations at the vertex, tests 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 infrlorescence, and if the male flowers are all solitary the species must be near *T. dioica*, *Roxb.*

**DOUBTFUL SPECIES.**

*T. macrocephoph*, *Kurz in Journ. As. Soc.* 1172, pt. ii. 308, from Tenasserim, in the absence of both the male infrlorescence 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 ¼ 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, cells conuplicate; 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; placentas 3, long, vertical. Fruit ovate-oblong, acute at both ends. Seeds many or few, ellipsoid, compressed, margined, nearly smooth.—DISTR. 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; tendril simple or 2-fid. Male racemecus peduncles sometimes 6–8 in., usually shorter; bracts ½ in., incise-serrate, lobes often again incised. Calyx-tube ½ 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 ½ in., orange-red, somewhat scabrous, with 10 longitudinal ribs, pulp greenish, not very succulent. Seeds ½ by ½ and ¼ in. thick.


Rangoon; McClelland. Pinang; Porter. Malay Peninsula; Griffith. Singapore; G. Thomson.—Distr. Malaya to Borneo.

Agrees very closely with the last species; the segments of the leaves are here narrow, subinate, 3-fid or pinnatifid, but gradually towards the half-lobed form of G. cochinchinensis.—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 *Cerasia cockburnii*.)


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 monoeious, all solitary, white; male peduncle 1½ in., female peduncle ¼ in. Male: calyx-tube elongate, deeply 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 ¾–1 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.

4. WAREA, C. B. Clarke.

Extensively scandent, 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 cylindric, narrow, then suddenly widened campamulate subhemispheric, teeth 5, linear; petals 5, ovate, nearly separate, entire; stamens 3; anthers connate, included, one 1-celled, two 2-celled, cells conuplicate. Female: calyx and corolla as in the male; ovary oblong; style long, with 3 wide stigmatic lobes; ovules horizontal, many, placentas 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.

Differs from Gymnopetalum by the large campamulate mouth to the calyx, by the divided tendrils, and the anthers exserted from the tabular 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 5-lobed or cut nearly to the base into narrow segments; petiole 4 in. Male peduncle 8 in., pedicels ¾–2 in. Calyx-tube 1½ in., pubescent, cylindrical portion more than ½ in. Petals ¾ in. Fruit 4 by 1½ in. Seeds ¾ 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. 884.
5. 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.


Stems 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., pedicle 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 1 in., more or less pubescent. Seeds usually 12 sometimes 18, ½ by ⅓ and ⅜ 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 Benth. & Hook. f. Gen. Pl. i. 834, described from imperfect materials, includes H. caudigerum, Warea tongiensis and Edgaria darjeselingensis. 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 3 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 idolatica, Seringe l. c. 299. Cucurbita Lagenaria, Linn.; Lamk. Ill. t. 705; Roxb. Fl. Ind. iii. 718; Wall. Cat. 6719.—Rheede 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 ¼ in., pubescent. Petals 1–2 in. Fruit often 1½ ft., in India usually bottle- or dumb-bell-shaped. Seeds ¾ by ½ and ½ in. thick, with an impressed groove parallel to and near the margin.

7. LUFFA, Cav.

Olimbers, 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, monoecious, 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, lobes 5, 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 cymidicular, 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 cuneiform 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, denticulate, punctulate, scabrous above, pubescent on the nerves beneath; petiole 2–3 in. Male pedicels few, much shorter than the petiole; petals 5, ¼ in., yellow, entire; stamens 5. Female peduncle short, sometimes divided with 2–3 flowers, each pedicel carrying a small ovate entire thick bract ¾ in. Fruit 2 by 1 in., covered with papillae, scarcely spinous, obscurely 10-striate, dehiscing horizontally near the top, stopple without papillae. Seeds scarcely ¼ in., very many, packed in fibres, smooth, not margined.


Thoughout India very common, often cultivated.—Distrib. Cultivated throughout the tropics, native country uncertain (Naudin).
Extensively climbing hairy; tendrils 2-3-fld. Leaves 4 in, diam., reniform-orticular, 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, \( \frac{1}{2} \) in., yellow, often with elevated hairy green veins. Stamens 5. Female flower solitary, peduncle 1-3 in. Fruit 5-12 in. Seeds \( \frac{1}{2} \) by nearly \( \frac{1}{2} \) in., usually black, very narrowly winged, smooth or very sparingly tuberced.—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; Thevates.—Distrib. Malaya.

Very near L. pentandra from which it differs by having 5 stamens as noted by Roxburgh and verified by Thevates. The fruit is usually smaller, often only 3-4 in.—The figure of L. fezza in Cav. t. 9, shows clearly 5 stamens and is not Roxburgh’s plant. Rheed Hort. Mal. viii. t. 7, is much more probably L. acutangula than this species. L. acutangula No. 1106 in Herb. Wight is pentandrous and is L. acutangula exactly. All these, and all descriptions found 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. & Gibs. Bomb. Fl. 102; Novt. in Ann. Sc. Nat. ser. 4, xii. 123. L. Plucacentiana, 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. SCinde; Stocks. Purneau (Bengal); Kurz. DACCA; C. B. Clarke.—Distrib. Tropical Africa.

Climbing not extensively, sparingly scabrous-pilose; tendrils 2-fld. Leaves 1-2 in. diam., coriaceous, reniform-orticular, 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 1\( \frac{1}{2} \) in., ribs not visible; spines \( \frac{1}{2} \) in., ciliate; stopple without spines, calyx-teeth persistent. Seeds \( \frac{1}{2} \) in., many, slightly scabrous.

Var. longistyli, 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.

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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, monoeious, 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 exsert, 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.—**Distribr.** Cultivated in Malaya, China, Japan, Tropical Africa; where wild uncertain.


Climbing, with simple tendrils. *Leaves* cordate, petioled, undivided in the Indian species. *Flowers* yellow or white, monoeious or dioecious, females solitary peduncled, males solitary or racemose, 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 con duplicate, 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 or corrugate or sculptured.—**Distribr.** 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; monoeious, 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;
Momordica.]

LXV. CUCURBITACEÆ. (C. B. Clarke.) 617

Wall. Cat. 6746; W. & A. Prodr. 348; Bot. Mag. t. 2455; Miq. Fl. Ind. Bat. i. pt. i. 663; Wright Ic. t. 504; Dals. & Gibs. Bomb. Fl. 102; Naud. in Ann. Sc. Nat. ser. 4, xii. 131; Kurs in Journ. As. Soc. 1877, pt. ii. 102. M. humilis, Wall. Cat. 6747. M. mucrata, DC. i. c.; Roxb. i. c.; Wall. Cat. 6745; Miq. i.e. M. senegalensis, Lamk.; DC. i. e. Cucumis africanus, Bot. Reg. t. 980.—Rheedè Hort. Mal. viii. t. 9, 10.

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, bract. Calyx-lobes ovate, acute. Petals ½-¾ in., yellow. Female peduncle 2-4 in., slender, bracteate near the base; ovary fusiform, muricate. Fruit 1-3 in., rostrate. Seeds ½ in., compressed, corrugate on the margin, somewhat sculptured.


PUNJAB; T. Thomson, Edgeworth. NORTH-WEST INDIA; Royce. Scinde; Stocks.—Distr. Malaya, 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 ½-1½ in. Male peduncle 1-3 in.; calyx-lobes ovate or oblong, acute; petals ½-¾ in., yellowish, black at the base. Female peduncle short, less than ½ in., ebracteate. Fruit 1-3 in., rostrate, red, usually quite smooth, in the example of Edgeworth's obscurely ribbed and slightly muricate. 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, denticulate or mere or less 3-5-lobed, glabrous, often punctate beneath; petiole 1-2 in. Male peduncle 2-6 in.; bract large, cowl-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., ellipsiod, 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 spinousness 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: \textit{M. renigera, Wall.} has a large woolly bract: \textit{M. Heyneana, Wall.} has the leaves deeply 3-lobate: \textit{M. Hamiltoniana, Wall.} has the bract foliaceous crumpled serrate. \textit{M. Balsamina, Wall.} is the typical \textit{M. dioica, Roxb.} Thwaites' \textit{M. dioica} \textit{\& denudata} is altogether remote from \textit{M. dioica} (see No. 5).


\text{Bengal to Tenasserim, common. Decan Peninsula; Wight. Canara; Law.—Distrib. Formosa, Philippines.}

\text{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-anthered 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 \(\frac{1}{2}\) in. high. \textit{Seeds} \(\frac{1}{2}\) by \(\frac{1}{3}\) and \(\frac{1}{2}\) in. thick, many, horizontal, irregular, ovate, compressed, black, corrugated on the margin, sculptured on the faces.}

** Male peduncles several-flowered.

5. \textbf{M. denudata}, Thwaites Enum. 120; dioecious, leaves ovate-lanceolate, flowers small, many males on one raceme with inconspicuous bracts, filaments 3, anthers conduplicate, fruit ovoid rostrate muricated with triangular papillae.

\text{Ceylon; alt. 3000-4000 ft.; Gardner, Thwaites, Walker.}

Slender, climbing, nearly glabrous; tendrils simple. \textit{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 \textit{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 \(\frac{1}{2}-\frac{3}{4}\) in.; filaments inserted near the top of the calyx-tube, anthers much exerted. Female \textit{peduncle} 1-flowered, about as long as the male, bract minute near the middle. \textit{Fruit} \(\frac{1}{2}\) in. long and broad, suddenly rostrate.

This species is evidently closely allied to the next which Sir J. Hooker removed from \textit{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 \textit{M. denudata} and \textit{M. Cymbalaria} with \textit{Luffa} rather than \textit{Momordica}.


\text{Decan Peninsula; Wight. Mysore; Heyne. Corcan; Stocks.—Distrib. Tropical Africa.}

\text{Root a large woody tuber as in many others of the genus. \textit{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 \(\frac{1}{2}-\frac{1}{1}\) in. Male \textit{raceme} 1-2 in., with usually only 2-4 flowers; calyx-lobes lanceolate; petals \(\frac{1}{2}\) 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 exerted. Female peduncle 1½–2 in., 1-flowered, ebracteate. Fruit ½ by scarcely ½ in. Seeds ½–¼ in., few, shortly obovoid, 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, monoecious, males clustered in the axils, females solitary, all shortly peduncled. Male: calyx-tube top-shaped or campanulate, lobes 5. Stamens 5; 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; placentae 3. Fruit fleshy, indehiscent, large or small, spherical or elongate, smooth or tuberculate. Seeds very many, oblong, compressed, mostly smooth.—Distirb. Species 26, of which half are African, a few in the tropical regions of Asia, Australia and America, and several widely cultivated of doubtful origin.


Throughout India.—Distirb. Malaya, North Australia, Afghanistan, Persia.

Root perennial, by which character alone it can be distinguished from C. Melo according to Nuadin, 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 1–3 in. diam., orbicular subpentangular, in the typical plant deeply palmate-lobed, lobes very scabrid and often narrow; in the more flacid 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. trigonous by Nuadin in the Kew Herbarium. Kurz (in Journ. As. Soc. 1877, pt. ii. 108) separates C. trigonous with solitary peduncles from C. pubescens with clustered peduncles and makes the latter a variety of C. Melo, Linn. C. pubescens of Thevetes Enum. (C. P. 3534) 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 ¼ 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. 758; Nuad. in Ann. Sc. Nat. ser. 4, x. 14.

Scinde; Stocks.—Distirb. Boloochistan, Arabia, Tropical Africa to Guinea.

Stem scabrid; tendrils short. Leaves 1¼–1½ 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 ½ in., fruit glabrous sometimes tuberculated commonly elongate. Lamk. Ill. t. 785; Roxb. Fl. Ind. iii. 720; Wall. Cat. 6737; W. & A. Prodr. 342; Miqu. Fl. Ind. But. i. pt. i. 671; Naud. in Ann. Sc. Nat. ser. 4, xi. 27; Kurz in Journ. As. Soc. 1877, pt. ii. 103. C. muricusatus, Wall. Cat. 6735 A. O. 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 mucrinate with rigid prickles. Fruit commonly cylindric, 12 by 1½ in. The Cucumber.


Oclimbing 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 monocious, all solitary, tolerably large. Male: calyx-tube campastulate, lobes 5; stamens 3, short; anthers scarcely cohering, one 1-celled, two 2-celled, cells conduplicate, connective not produced. Female: calyx and corolla as in the male; ovary ovoid; style short, stigmas 3, reniform; ovules very many, horizontal; placenta 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 often apparently wild.—Distr. Western Asia, Arabia, all Africa except the Cape, Spain.

Whole plant sebroid. Leaves 2½ by scarcely 2 in. in the typical wild very sebroid form, larger in the cultivated forms approaching *C. vulgaris*, ovate, middle segment compound-pinnatifid; petiole 1 in. Petals ½ in., obovate, light yellow. Ovary villous. Fruit smooth, variegated green and white. Seeds ½–1 in., not margined.

Throughout India, cultivated.—Distrib. 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 Citrullus amarus 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, erectae. Male: calyx-tube campanulate, short, limb 5-lobed; corolla campanulate, 5-lobed about half-way down; stamens 3; anthers exert, 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; placertas 3, vertical. Fruit fleshy, indehiscent, cylindric, smooth. Seeds many, ovoid, compressed, margined.—Distrib. Species 12; all African, one extending to India and Malaya.


Throughout India, common.—Distrib. Malaya, Africa.

Leaves 2–4 in. diam., 5-angular, papillose, scabrid; petiole 1 in. Male: peduncle 1 in., jointed below the flower; calyx-lobes linear-oblong; corolla nearly 1 in., lobes long-triangular. Female peduncle about ¾ in. Ovary smooth. Fruit bright scarlet.

Var. palmata, W. & A. Prodr. 348; leaves deeply lobed segments sometimes narrow and sinuate. B. alcefolia, Herb. Rottler.—Principally in the Deccan Peninsula. Hook. f. in Oliv. Fl. Trop. Afr. ii. 551 keeps C. quinqueloba (Schrad. in Eckl. & Zeyh. 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. Mormo 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-fld. Leaves petioled, cordate, ovate, 5-angular or lobed. Flowers monoecious, all solitary, yellow, very large. Male: calyx-tube campanulate, lobes 5, linear or foliaceous; corolla
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Cucurbita.
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, bisul; ovules very many, horizontal; placentas 3. Fruit fleshy, indehiscent, often large. **Seeds** ovoid or oblong, compressed, margined or not.—**Distrib.** 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 subentire sinus between the lobes narrow, hairs of the petiole equal not pungent, calyx-segments lanceolate-linear, fruiting peduncle stout corky striated not grooved. **DC. Prodr.** iii. 316; **Wall. Cat.** 6720; **Naud. in Ann. Sc. Nat.** ser. 4, vi. 17.

Throughout India, cultivated.—**Distrib.** Cultivated in all warm and temperate parts of the globe.

Annual. Leaves 4–6 in. diam., hispidulous and also with much soft hair, dentilicate; petiole often nearly as long as the blade. Male peduncle 4 in., female 1½ in. Corolla 3–4 in.—The Common Gourd.

2. C. moschata, Duchesne; **DC. Prodr.** iii. 317; hairs of the petiole equal not pungent, calyx-segments spathulate or foliaceous. **Naud. in Ann. Sc. Nat.** ser. 4, vi. 47; **Kurz in Journ. As. Soc.** 1877, pt. ii. 104. C. maxima, **W. & A. Prodr.** 351; **Wight Ill.** t. 105; **Wight IIc.** t. 507. C. Melopepo, Roxb. Fl. Ind. iii. 719; **Wall. Cat.** 6725. C. Camolenga, **Wall. Cat.** 6718.—Rheedt Hort. Mal. viii. t. 2.

Throughout India, cultivated.—**Distrib.** Widely cultivated in tropical and sub-tropical regions.—The Musk-Melon.

3. C. Pepo, **DC. 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.—**Distrib.** 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 2-fid in the Indian species. Leaves petiolate, 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.—**Distrib.** Species 12, in the warm and temperate regions of the old world.

1. B. laciniosa, Linn.; **DC. Prodr.** iii. 308; scabrous or nearly glabrous, leaves generally deeply palmately 5-lobed sinus sometimes shallow, fruit nearly
Bryonia.]

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From the Himalaya to Ceylon. Pegu; Kurz.—Distrib. 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 ½ in. diam., green with white vertical stripes. Seeds ¼ in.

16. MUKIA, Arn.

Scabrous climbing herbs; tendrils simple. Leaves 3–7-angular, not deeply lobed, cordate, petiolated and sessile 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 3, 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, indescent. Seeds not very many, ovoid, compressed, strongly margined, faces rough or smooth.—Distrib. Species 2; one South Indian; the other African, Asiatic, and Australian.


Throughout India, common: ascending the hills as far as subtropical warmth extends.—Distrib. Africa, Malaya, Australia.

Stem angular, slender, hispid or scabrid. Leaves 1–3 in., serrate; petiole often very short, sometimes 1 in. or more. Flowers ½–¾ in. diam. Ovary very hispid. Fruit ½–¾ in. diam., bright red.

Var. gracilis; leaves ½ by 2½ in. hastate elongate very acute wide at the base long-petioled nearly entire. Bryonia gracilis, Wall. Cat. 6714.—Pagamew (Burma); Wallach. Possibly a distinct species.

2. M. leiosperma, Thwaites Enum. 125; scabrous, leaves hispid beneath and with much long soft hair, seeds smooth on their faces. Bryonia leiosperma, W. & A. Prodr. 345. B. myosorensis, Mig. in Herb. Hohenacker.

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; ovules many, horizontal; placenta 3. *Fruit* succulent, indehiscent, globose ellipsoid or cylindric. *Seeds* many or few, ovobovoid 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*; *Canares*, *Stokes*; *Belgaum*, *Ritchie*.—**Distrib.** Malaya, Japan, Norfolk Island, Fiji; but the area cannot be separated from that of the next species.

Weak, nearly glabrous. *Leaves* 2 in. diam., generally sharply denticulate; petiole \( \frac{3}{4} \) in. or short. *Flowers* frequently monoecious in the same axils, sometimes apparently dioecious; male peduncle usually 1–2 in., female less than \( \frac{1}{2} \) in., undivided in all the Indian examples, but occasionally the female peduncle is elongate umbellate according to *Wight*.—Roebuck’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 Roebuck’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 \textit{Z. Bauriiana} 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 \textit{Z. Bauriiana}. The African distribution of this cannot be defined, as \textit{Z. scrobiculata} and even \textit{Pilosyne luoida}, \textit{Naud.} can hardly be distinguished from it.


Throughout \textit{India} and \textit{Ceylon}, very common.—\textit{Distr.} Malay, China, North Australia.

Stem and leaves usually nearly glabrous, or leaves scabrous above; petiole short, often hirsut. \textit{Leaves} polymorphous; sometimes 6 by scarcely 1 in., narrow triangular lanceolate, sometimes cordate-oblong much rounded, often palmate nearly to the base with 3-5 narrow diverse segments; basal lobes usually produced strongly backwards, rounded subacute or more acute. \textit{Inflorescence} usually discoidal, male coxyls much 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. \textit{Fruit} bright-red, usually much larger than that of the two preceding species. \textit{Seeds} about 12; sometimes only 4-6 in the typical \textit{Z. umbellata}, as said always in \textit{Z. amplexicaulis} by \textit{W. & A.}—\textit{Wight} says that \textit{Z. umbellata} may be distinguished from \textit{Z. amplexicaulis} by having small oblong bracts on the middle of the pedicels, but these cannot be made out even in \textit{Wight’s} own specimens.

\textit{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. \textit{Bryonia nepalensis}, \textit{Seringe in DC. Prodr.} iii. 307.—Temperate Western \textit{Himalaya}, alt. 4000-7000 ft.; \textit{Royse; Thomson; Jacquemont; Strachey & Winterbottom, &c.}—A variety many times collected but only within a very limited area in Gurwhal, Kumaon and Runawur.

17. \textit{MELOTHRIA}, Linn.

Climbing herbe; tendrils simple or 2-fid. \textit{Leaves} petioled, deltoid, truncate or hastate, entire or deeply 3-lobed, little hairy, often punctate. \textit{Flowers} small, white, usually monoeious, 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. \textit{Male}: calyx-tube short, teeth 5, small; corolla 5-partite; stamens 3, inserted in the middle of the calyx-tube; anthers free, one 1-cell, two 2-celled; cells free, straight, simple, more or less lateral, connective prolonged, undivided, glabrous. \textit{Female}: calyx and corolla as in the male; ovary oblong, style long, stigmas 3 subglobose; ovules many, horizontal; placentas 3, vertical. \textit{Fruit} indehiscent, globose, acute, or fusiform subostrate. \textit{Seeds} many, small, oblong, much compressed, obscurely margined, smooth or very nearly so.—\textit{Distr.} Species 26, all tropical.

\* \textit{Fruit} fusiform, subtrigonoous.

**Cyprin**; 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 pedicels. 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. deltoides* is pre-occupied by Benth. in *Flora Nigrit.* 368 for a different plant.


**Pione** (Burmah); Wallchich.

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 ½ in. Fruit rostrate, attenuate at the base, resembling closely that of *M. zeylanica* but rather larger. Seed nearly ½ in., larger than those of *M. zeylanica,* many, oblong, very complate, hardly margined, smooth on the faces.

**Fruit globose, subquadrate, obtuse.**


**Sikkim,** alt. 3000 ft.; C. B. Clarke. **Silhet** in the Jheels; *H. f.* & T. Chitta-gong; Kurz.—Distribute. Malay to the Philippines, China, Japan.

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 ½-1 in. globose quadrate very obtuse. Bryonia odorata, *Ham.* in *Wall. Cat.* 6706 A, B, C.

**North-West Himalaya; Royse.** Throughout the plain of East Bengal, common, and ascending the hills to 7000 ft. alt.

Nearly glabrous, stem often stouter than in *M. indica.* Leaves 2-3 by 1½-2½ in., acute, often punctate on both surfaces; petiole 1-1½ in. Male peduncle long, somewhat zigzag, with a cluster of pedicels (each ½-2 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 ½-1 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 marginalion of the seeds can hardly be relied on.

**Var. triflora**; lobes of leaf divaricating sometimes very narrow and long, petiole often shorter than in the type. Bryonia triflora, *Wall. Cat.* 6707.—East Bengal.
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Soorna 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 racemose.

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 2–8 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 petioled, orbicular and undivided in the Indian species. Flowers monoecious or dioecious, 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-called, the others 2-called; 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, indescent. Seeds ovoid, compressed, not very many.—Distr. Species 5; in warmer Africa, one also in Western India.


GUERRAT; Dryzell. DECCAN PENINSULA; Rottler; Wight. Malabar Hills? Stocks; Dr. Ritchie. AYA, Wallich.—Distr. 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-called. Seeds ½ in., distinctly margined.

SPECIES IMPERFECTLY KNOWN.


Upper TANASSAHERM, Attarum, Brendl; Paou and Ramoe, Kurs.

Not seen; from the description it may be a variety of R. fœtida.

19. CORALLOCARPS, Welw.

Climbing or prostrate herbs, scabrid or submentosae; tendrils simple. Leaves petioled, roundish-cordate, somewhat thick, entire lobed or palmate. Flowers

s s 2
very small, monoeocious; 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; placenta 3–2, vertical. Berry ovoid, campanulate, near the base, usually rostrate. Seeds not very many, ellipsoid or nearly globose, somewhat compressed, smooth or nearly so, little margined.—DISTR. Species 6, in Tropical Africa, the Persian Gulf, and Western India.


**Gujerat**, near Malpor and Gandor; Dalsell. Also in Stocks’ collection probably from Scinde.—DISTR. 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.


**Sciende**; Dalsell.—DISTR. Persian Gulf and Tropical Africa?

Whole plant villous. Leaves 2 in. diam., subsutire or more or less 3–5-lobed, lobes rounded; petiole ¼ in. Male *peduncle* 3 in. with 12 flowers at the top. Male and female flowers as in *C. epigaea*. Fruit ½ in. the beak ⅛ in. Seeds about 12, ⅛ in. diam.

20. **Cerasiocarpum**, Hook. f.

Climbing glabrous herbs; tendrils simple. Leaves long-petioled, oblong, cordate, nearly entire. Flowers very small, monoeocious; 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-dentilicate; petiole ½–1½ in. **Flowers** ½–2 in. diam., yellow; petals broad, acuminate. **Berry** at most ½ in. diam. **Seeds** ½–1 in. diam., little compressed, incompletely margined, 2–6 to each fruit.

**DOUBTFUL SPECIES.**


**Penang**; **Wallich**

**Stems** rather strong, minutely pilose; tendrils simple. **Leaves** cordate-oblong, acute, entire slightly denticulate, scabrous above minutely hispid beneath. **Flowers** monoeceous, all peduncled, solitary female and racemus males from the same axil; male peduncle ⅛ in. with 8 small pedicels at the summit. **Fruit** ⅛–⅜ in. diam., smooth, nearly globose. **Seeds** to 6, ½ 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 ⅛–⅜ 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 ⅛ in. **Male peduncle** ½ in. with 8 minute pedicels at the summit; female from the same axil. **Stamens** of the genus. **Fruit** ⅛ by less than ⅜ in., oblong, subacute. **Seeds** 10–12, less than ⅜ 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, monoeceous; 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, bluish, indehiscent. **Seeds** 2 or 3, ellipsoid, much compressed, acutely margined, somewhat boat-shaped. **DISTRIBUTION**: 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 \( \frac{1}{2} \) in., fruit not longer than broad. Bryonia Garcini, DC. Prodr. ii. 308; Roxb. Fl. Ind. iii. 727; Wall. Cat. 6719; W. & A. Prodr. 344. Zehneria Garcini, Stocks in Hook. Kew Journ. Bot. iv. 149; Dalz. & Gide. Bomb. Fl. 99.

**Bundelkund; Edgeworth. Deccan Peninsula; Bottler, &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 \( \frac{1}{4} \) in.; stipuliform bracts \( \frac{1}{2} \) in. and more, elliptic, with long cilia. **Fruit** \( \frac{1}{4} \) by \( \frac{1}{4} \) in.


**Scinde; Stocks. Gujerat; Dalzell.** — **Distr.** Tropical and Southern Africa. Hardly distinguishable from *C. Garcini*. Leaves usually larger, sometimes 3 in. diam.

**22. DICELOSPERMUM, C. B. Clarke.**

A climbing scabrous herb; tendrils simple. **Leaves** petiolar, cordate or hastate, ovate, acute, little lobed. **Flowers** minute; males and females clustered in the same axis, 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. Bitchiei, C. B. Clarke.**

**Belgaum; Ritchie.** Also in Herb. Stocks doubtless from Western India. Exceedingly like *Mukia scabrella* except as to the seeds, and the flowers are smaller. **Leaves** 2\( \frac{1}{2} \) by \( \frac{1}{2} \) in., scabrid and somewhat hispid on both surfaces; petiole \( \frac{3}{4} \) in. **Fruit** \( \frac{1}{4} \) in. diam. **Seeds** \( \frac{1}{4} \) by \( \frac{1}{4} \) and \( \frac{1}{4} \) in. thick, attached to the very bottom of the fruit, erect.—**Female flowers** not seen.

23. **THLADIANTHA, Bunge.**

Climbing herbs; tendrils simple, rarely 2-fid. **Leaves** petiolar, entire or trilobate, deeply cordate, denticulate, softly pubescent or nearly glabrous. **Flowers** dicous, yellow, large or small. **Male peduncles** in the fully developed plant paired, one 1-flowered ebracteate caduceus, the other racemed 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.—**Distr.** Species 2, Bengal, Malaya, China.

The generic character is here widened to include the Khiasia species. As in most Cucurbitas with paired male peduncles, either the simple or the racemous one is often wanting, and the two do not flower together; the simple peduncle generally falls off.
by the time the racemed 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 6000 ft. in the hills. The female plant is rare and has never been collected in the plains. *Peru*; *Kurz*.—*Distrib. Malaya, China.*

A large climber. *Leaves* 4 by 2½ in., denticulate, not at all angular, usually villous beneath sometimes nearly glabrous; petiole ½ 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 incis-serrate; calyx-teeth very narrow; filaments minutely hairy. Female *peduncle* 2–3 in., more or less hairy; young ovary densely woolly. *Fruit* ½ by ¾ in., glabrous, obtuse at both ends. *Seeds* scarcely ½ 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 ½ in.

*Assam; Griffith (Kew Distrib. No. 765, 2553). *Khasia Mts.*, alt. 4000–6000 ft.; *Myrung and Nunclow*; *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 1½ in., the two lateral lobes very cordate and surmounted on the outer base; petioles hardly ½ 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 ½ in.; peduncle about 1 in. Male *racemes* 1½ in., slender; flowers pedicellate, scattered, yellow; petals scarcely ¾ 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, ½ in.—The ebracteate male raceme of this with pedicels ½ in. is exceedingly unlike that of *T. dubia*: but in all other points they appear congenic, and the habit the same.


A large scendent herb; tendrils 2-fid. *Leaves* petioled, entire, ovate, acute, deeply cordate, more or less pubescent. *Flowers* large, diocious, 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 6-partite, with obovate acute segments; stamens 3, included in the calyx-tube; filaments exceedingly short; anthers connate into a cylindrical tube, one 1-celled, two 2-celled; cells straight, linear-oblong, connective not appendaged. *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, coriaceous or somewhat 3-lobed at the lower end and faces when dry.
Gymnepetalum sp. 5, Herb. Ind. Or., H. f. & T.

**Guewhal;** 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 ½ in., widely patent. *Fruit* 3 by ¼ in., somewhat pilose, with 2 wavy vertical ribs on each face. *Seed* ½ by ½ and 1/10 in. thick.


Climbing, weak, succulent herbs, tendrils 2-fid or simple. *Leaves* petiolod, pedate, with 5-7 lanceolate serrate leaflets. *Flowers* small, monoeious (sometimes at least), males racemed; females panicked or clustered. **Male**: calyx rotate, 5-partite, with oblong segments; corolla 5-partite, with elongate crosse 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 margin.—**Distrib.** Species 2, one in the Himalaya one in Burma.

1. **G. cissiformis**, Griff. Pl. Cantor. p. 26; capsule somewhat succulent ½ in. wide at the summit, seeds ½ 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** ½ in.


**Burma**; at Taong-dong; Wallych.

The leaves and inflorescence closely resemble **G. cissiformis**. The capsule is ½ in., but narrow linear-oblong.

26. **Actinostemma**, Griff.

A climbing weak herb; tendrils simple and 2-fid. *Leaves* petiolod, deeply cordate or hastate, elongate, much toothed, nearly glabrous. *Flowers* small, monoeious, 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, circumciss above the middle. **Seeds** 2-4, compressed, ovate, corrugated and denticulate on the margin.
Actinostemma.  

LXV. CUCURBITACEAE. (C. B. Clarke.) 633


Sicyos oxyacanthus, Wall. Cat. 6683. 

Momordica Paines, Wall. Cat. 6742. 

Ocucurbitaceae, Wall. Cat. 9680.

Plains of East Bengal, frequent. ASSAM. SIKHET.—DISTRIB. Amurland, Japan.

Leaves 4 by 2 in., acute, scarcely lobed in the Bengal specimens, palmately lobed in Maximowicz; petiole often 2 in. 

Panicles 3–6 in. 

Fruit ½ by ½ in., not at all trigonous, upper part muricated as well as the lower. 

**Seeds** by ½ in.

27. **GYnostemma,** Blume.

A climbing herb; tendrils simple. 

**Leaves** pedate; leaflets 3–5, ovate-lanceolate, serrate, membranous. 

**Flowers** small, dicoceous, 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 2–3, 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.

1. **G. pedata**, Blume Bijd. 23; leaflets glabrous beneath or slightly pubescent, panicles more or less pubescent. Miq. Fl. Ind. Bat. i. pt. ii. 687. 

G. cissioides, pedata and Wightiana, Bth. & Hk. f. Gen. Pl. i. 839. 


Z. cissioides and laxa, Wall. Pl. As. Rar. ii. 28, 39; 

Wall. Cat. 3726, 3727. Z. pedata, Miq. Fl. Ind. Bat. i. pt. i. 683. 

Pestalozzia pedata, Zoll. et Mor. Syst. Verz. 31. 

P. laxa, Thwaites Enum. 124.

KUMAOI; Strachey & Winterbottom. 

NIPAL; Walleich. 

Sikkim, Assam, Khasia, common up to 5000 ft. alt. 

CYYLON; Thwaites.—DISTRIB. Malayas, Japan.

Glabrous or pubescent. 

**Leaflets** 5 or 3 by 1½–2 in., lanceolate or obovate-lanceolate; petioles ½–3 in.; petiole 1–½ 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** ½ in. diam., glabrous or puberulous. 

Seed ½ in., ellipsoid, subtrapezoid.

28. **Zanonia**, Linn. 

Climbing herbs; tendrils simple. 

**Leaves** long-petioled, simple, ovate or oblong. 

**Flowers** dicoceous, in large compound pendulous racemes, males pedicellate, females subsessile. 

**Male** sepals 3, oblong 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. 208; leaves ovate rounded or cordate at the base glabrous or nearly so, fruit 4 in., seeds few pendulous from the summit of the fruit (Dalsell) wing 2–3 in. 

Lamk. Ill. t. 816; Blume Bijd. 987.

Assam and East Bengal; Griffith. Deccan Peninsula; Wight. Malabar Mts.; Stocks, Law, Dalecull. Ceylon; not uncommon up to 2000 ft., Thwaites.—Distrii. Malaya.

Leaves 6–8 by 3–4 in., usually acute; petiole 1 in. Male flowers very small, pedicels ½–1 in.; female flowers including the ovary § 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 \( \frac{1}{16} \) 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 wing) 6 in. broad curved lunate.

20. 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, 5-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.—Distri. 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 1\( \frac{1}{2} \) by \( \frac{1}{2} \) in. at the top, seeds including the wing \( \frac{1}{2} \) in. very verrucose on the rounded faces. Kurz in Journ. As. Soc. 1878, pt. ii. 106. Zanonia sarcophylla, Wall. Pl. As. Rar. t. 183; Cat. 3724.

Birma; from Mandalay to Prome, Wall. Kurz.—Distrib. Siam.

Leaflets 2\( \frac{1}{2} \) by 1\( \frac{1}{2} \) in. obtuse; petiolule scarcely \( \frac{1}{2} \) 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 \( \frac{3}{4} \) 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 \( \frac{1}{2} \) in. acute; petiolule often exceeding \( \frac{1}{2} \) in. Seeds yellowish-white, much flattened, with several deep triangular spines teeth at the apex, teeth of 2 lamelle, between which the wing is inserted, split in the plane of complication of the fruit, and the wing sprouting from these narrow splits.—Wallich's description of the seed of Z. clavigera is incorrect and appears to be taken from that of Z. indicus, which grows in the same locality.
Begonia.]

LXVI. BEGONIACEAE. (C. B. Clarke.)

635

Var. Hookeri; seeds without any wing.—Khasia Mts., alt. 3000-4800 ft.; J. D. H.—The example is a stout leafless one with large ripe fruits. The seeds are in situ in the capsule so that the wing cannot have been broken off (as happens with seeds of Zanonia kept separate). This may be an accidental var. of A. clavigera or it may be a new species.

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, monococious. Male: perianth (of the only Indian genus) of 2 outer valvate opposite sepalloid segments, and 2-0 inner smaller segments; stamens indefinite often very many, free or monadelphous, anthers narrowly obvoid. Female: perianth (of the only Indian genus) of 5-2 segments. ovary inferior (in Hildebrandia half-superior), 2-3-4-celled; placenta vertical, at (the time of estivation), 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 cylindrical, testa reticulated: albumen very scanty or 0.—Distributed. Species 400 (of which 398 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, connective 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 lanciolate, glabrous, deciduous. Cymes short, axillary, dichotomous, with narrow lanciolate 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. Fruct. ⅔ in. diam. pendant; walls very thick, succulent, indehiscent or finally dehiscent at the angles. Seeds shortly ellipsoid, somewhat obovoid.—Catheart. Lc. Kent. represents the cells of the ovary as occasionally 3 which is not improbable, or his artist may have confounded B. Candollei (No. 4) with the present species.

2. B. silhetensis, C. B. Clarke; stemless, inflorescence shorter than the petioles, leaves ovate finely denticate hardly serrate or lobed, fruit globose thick-walled 4-celled densely covered with shaggy brown hair. B. gigantea, Wall. Cat. 3677 B. Casparya? silhetensis, A. DC. Prodr. xvi. pt. 1. 277. Begonia sp., Wall. Cat. 9107.

Khasia Mts.; Wallich. EAST BENGAL; Griffith (Kew Distr. 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., hisrate in Griffith's examples, less hairy in Wallich's. Scapes 2-4 in., 1-7-flowered. Male: sepals 2, hairy without, ⅓ 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 bifid with tortuous stigmas. Fruct. ⅔ 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 Casparya? silhetensis: two species are possibly here mixed, but the material is not sufficient to justify a new species.

3. 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.

ASSAM; Griffith (Kew Distr. No. 2588). 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 B. Roxburghii. Fruct. about ⅔ in. diam., slightly pubescent.—This solitary example may be a stunted example of 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. B. inflata, C. B. Clarke; stem lengthened, inflorescence axillary, leaves oblong-lanceolate glabrous or nearly so sinuate-dentate scarcely serrate, fruit 3-celled.

Darjeeling, alt. 3000 ft.; C. B. Clarke. BUTAN; Griffith (Kew Distr. No. 2587).

Erect, 2-4 ft., branched. Leaves 4 by 1⅛-1⅓ in., acuminate, very unequally cordate; petiole ⅔-3 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-ovate; stamens about 50, scarcely monadelphous; anthers narrow-oblong; connective produced, obtuse. Female: perianth of 4 segments; ovary 3-celled, placentas 2-fid. Fruct. ⅔ in. diam., trigonous or almost triquetrous; carpels round, as it were inflated, with a narrow line down the back, glabrous or nearly so, indehiscent or probably at length dehiscing down the ridges as in R. 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.

Moulmein; Mooree 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 ¾ 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-oblong; connective 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. Alaecida.** Fruit triquetrous, faces with a medial line; carpels dehiscing dorsally, angles with short subequal wings below the middle; placentas divided.—Small small-flowered plants; filaments monadelphous; styles connate.


Moulmein; 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-oblong; stamens not very many; anthers very short, obvoid; connective not produced. Female: styles united a long way, stigmas lunate; ovary with glandular hairs. Capsule scarcely ½ 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.

Moulmein; 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 ¼–1 in., pubescent; stipules minute. Cymes 2–3 in., minutely pubescent; bracts ovate, minute. Male: sepals 2, ovate; petals 2, narrowly obvolute; stamens not many; anthers very short, obvoid; connective not produced. Female: perianth of 4 segments, much as in the male: styles combined below, each with two curved branches. Capsule less than ½ 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.

Moulmein; Parish.

Rootstock a small cluster of tubers. Stem 0–¼ in., glabrous. Leaves ¼–1½ in., somewhat cordate, incise-crenate, minutely pilose above; petiole ¼–¾ in., glabrous; stipules small, lanceolate. Cymes 2–3 in., glabrous; bracts small, lanceolate, glabrous, persistent; flowers pink. Flowers fruit and seeds closely resembling those of *B. tricuspidata*.

**Sect. III. Knesebeckia.** Capsule 3-celled, triquetrous, the angles produced 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-fid. *Stamens* very shortly monadelphous, anthers obovoid, connective not produced.

A. Segments of female flower 5 (rarely 6), imbricate, inner smaller, innermost often smallest or 0. Sect. Knesebeckia A. DC.

*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 cauline 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 ⅔ 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 Rungsait, alt. 2000 ft.; Herb. Griffith, C. B. Clarke, Dr. Treviuller.

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 dentilicate-ciliate, closely pubescent above, rufous-villous on the nerves beneath; petiole of the cauline 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 ¼ in., wings not very unequal about ¼ in. broad (but the capsule not well ripe). Seeds (not well ripe) like those of **B. pecta** but narrower.—A very beautiful plant with bright rose flowers.

**Ovary and capsule glabrous (except sometimes in 12, B. Josephi).**

Pinang; Evans ex Andrews.—Distrib. Java, China, Japan.

Rootstock tuberous (ex A. DC.). Stem 2 ft., nearly glabrous; peduncles from the upper axils, elongate, several times dichotomous. Leaves 3–6 in., somewhat angular and denticulated; petiole 2–6 in.; stipules ovate-lanceolate, glabrous. Flowers, bracts, and pedicels rose. Male: sepals 3, round, glabrous; petals 3, smaller; stamens very many (more than 60), long monadelphous; anthers obvoid; 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.

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. 3868 A, not of A. DC.

Sikkim, alt. 3000–5000 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 8–20; anthers obvoid; connective not produced. Female: perianth-segments 4–6; styles 3, nearly separate, 2-fid near the top, stigmas in large specimens 2 tortuous, in small simple lunate. Capsule ½ by ½ in., including the wings, styles persistent, upper margin of the wing horizontal, narrow between the two very narrow wings, the other faces broader below; dehiscing first by 4 lines, two on either side of each of the two narrow wings. Seeds short-ellipsoidal.—All three varieties are equally common in Sikkim and pass into each other: only the typical has been collected in Khasia. The plant is believed to be very plentiful in West Bhutan and East Nepal, but all the numerous Himalayan examples at Kew are from Sikkim itself. As regards the name: Wallis's Begonias are greatly mixed: even on the same sheets. The three sheets of No. 3868 at Kew are B. scutata, A. DC., but the type sheet of B. scutata No. 3868 in the Linnaean Society's Herbarium is B. Josephi, A. DC., which is also mixed with B. picta in the sheet of 3868 A.

V. 1. typica; peduncles elongated, leaves large often lobed, ovary flowers and capsule glabrous. B. Josephi, A. DC. l. c.

V. 2. macracarpa, A. DC. l. c.; ovary flowers and capsule with lax hairs.—Both large and very small plants occur with a hairy ovary; the fruit is not larger than in the typical form.

V. 3. minima; scape 2–3 in., leaf small without lobes, ovary usually glabrous.

13. B. pedunculosa, Wall. Pl. As. Rar. 82, t. 97; Cat. 3872 A. not 1 B; caulescent with subterminal inflorescence, leaves narrow-oblong acute from an unequally cordate base pilose above, stipules and bracts persistent. A. DC. Prodr. xv. pt. i. 314.

Khasia Mts., alt. 3000–6000 ft., frequent. Bhutan; Griffith.

Rootstock tuberous, or elongate woody. Stem erect, 4–8 in., usually with some brown hairs and zigzag, not unfrequently bearing bulbils in the upper axile. Leaves 2–3 in., sharply doubly-serrate, pubescent on the nerves beneath; petiole usually short (less than 1 in.) but sometimes elongate; stipules ½ in., ovate, acute, ciliate. Gyne repeatedly dichotomous; bracts ovate, acute, ciliate; flowers small, rose-red.
**Begonia.**

_Male_: sepals 2, glabrous or nearly so; petals 2, smaller; stamens shortly monadelphous, about 30, anthers obovoid, 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 $\frac{1}{2}$ by $\frac{3}{2}$ in. including the wing, upper margin of the longest wing horizontal; capsule detaching 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 Aracan, 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* 1–1½ by 1–1½ in., nearly glabrous, obscurely acuminate, obtuse at the apex, base equal or unequal; petiole ¼ 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 obovoid, connective apiculate, but not produced. **Female**: perianth-segments 5; ovary 3-celled, glabrous, placenta bipartite (Kurz); styles 3, nearly distinct, divided only near the top, stigmas lunate. *Capsule* less than $\frac{1}{2}$ by $\frac{1}{2}$ in. including the wings, styles deciduous in the few examples seen, upper margin of the wings convex, detaching 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-acuminate 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.—**Distr.** Yunnan.

Glabrous or nearly so. *Rootstock* tuberous. **Stem** erect, sometimes a foot. *Leaves* 3–4 by 2 in., not lobed, caudate-acuminate, base very unequally cordate or very obliquely subtruncate; petiole 1½–2½ 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 obovoid, connective slightly produced in a triangular point. **Female**: perianth-segments 5, much enlarged in fruit; ovary glabrous, 3-celled, placenta 2-partite; styles 3, nearly distinct, broader upwards, stigma lunate. *Capsule* rather more than $\frac{1}{2}$ by 1 in. including the wings; styles deciduous; 3 wings prominent, their upper margins horizontal, one often very greatly produced; capsule detaching 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. hydropilum_.

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. Lobbia_, A. DC. ms. not _B. Lobbia_, Husek. _B. velutina_, Parish ms.; _Kurz in Journ. As. Soc._ 1873, pt. II, 81.

_Moulmein_ and Martaban; _T. Lob_; on limestone rocks, Parish. **Tenasserim**; _Dr. Stapf_ (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 $\frac{1}{2}$–1 in., of the radical leaves often much longer, slightly pubescent; stipules very
small, lanceolate. Peduncles 4–10 in., nearly glabrous, laxly dichotomous; bracts ½–1 in., lanceolate, sometimes fimbriate; 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, monodelphous, anthers obvoid, connective not produced. Female: perianth of 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. parvalilora "a cauliflorous wholly glabrous herb" distinct from B. velutina "a scapeous herb with leaves pilose above:" but A. DC.'s type of B. parvalilora (marked by him B. Lobdiana) 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, acuminate, 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 monoeccious. Male: sepals 2; petals 2, narrower; stamens numerous, shortly monadelphous, anthers obvoid, 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 margin 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 bulbs. Alph. DC. gives dioecious as a character of his section Pulsecydia, but this, the only species of that section is, as all other Indian Begonias, monoeccious or occasionally dioecious.

18. B. cordifolia, Thwaites Enum. 129; stemless, leaves orbicular-cordate crenate-serrate, capsule with 3 subequal not broad wings. A. DC. Prodr. xv. pt. i. 328; B. Arnottiana; A. DC. l. c. 322. Diploclinium Arnottianum and cordifolium, Wight Is. t. 1815, 1816.

South Deccan Peninsula; Courtallum; Wight. Ceylon; Thwaites. Rootstock tuberous. Leaves 1½–3 in. diam., rarely subsutate, nearly equal at the base, pilose above, laxly pubescent on the nerves beneath; petiole 2–5 in., laxly pubescent; stipules ½ in., ovate-lanceolate, glabrous. Sepals 6 in., repeated dichotomously; flowers medium-sized, numerous; bracts ½ in., lanceolate. Male: sepals 2, round; petals 2, smaller, narrow; stamens numerous, shortly monadelphous, anthers obvoid, connective not produced. Female: perianth-segments 5–4–3 (3-in. Wight's Icon 3-lobed); styles 3, nearly separate, divided half way up into two curved branches. Capsule ½ by ½ in. including the wings, perianth deciduous, style 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* 3-8 in., glabrous, loosely dichotomous, few-flowered; bracts ovate-oblong, caducous; 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* 3/4 by nearly 4 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.


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, caducous; 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 3/4 by 2/4 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. Treutler. Khasia Murs., alt. 4000 ft.; H. f. & T.

Rootstock of several tubers; whole plant rarely exceeding 6 in. Cauline leaf 1 or 0. Leaves 1-2 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; bracte oblong or lanceolate; flowers rather small, white or rose. Male: sepals 2, obovate; petals 2, narrow-obovate; stamens about 20, shortly monadelphous, anthers obvoid, connective not produced. Female: perianth-segments 3, 2 obovate subequal, 1 lateral much smaller, deciduous; styles 3, nearly distinct, divided half-way up into two curved branches. *Capsule* 3/4 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.
2. B. subperfoliata, Parish ms.; Kurs in Journ. As. Soc. 1877, pt. ii. 109; stemless, glabrous, leaves ovate, crenate-dentate, subpeltate prominently reticulated on both surfaces, bracts inciso-serrate.

**Moulmein,** on limestone rocks; Parish.

**Root tuberous. Leaf solitary, radical, 3½ by 2 in., acute not acuminated, hardly serrate, equal at the base, petalate or the auricles only overlapping; petiole 2–4 in. Peduncle 3 in. with about 10 small flowers; bracts ½ in., persistent, divided to near the base or sharply serrate. Male: sepals 2, elliptic; petals 2, narrow-oblong; stamens about 26, much monadelphous, anthers obovoid, connective not produced. Female: perianth very nearly as in the male; styles 3, combined half-way up, stigmas lunate. Capsule 3-celled, ¾ 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-ellipsoid.**

23. B. moulmeinensis, C. B. Clarke; stemless, very pubescent throughout, leaves ovate, serrate, bracts inciso-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 petalate), serrate, 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. Female leaves narrow their upper margins shortly horizontal. Diploclinium Lindleyanum, Wight &t. t. 1817.

South Deccan Peninsula; Courtauland 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 suffrutescent. Leaves 4 by 2 in.; petiole 1 in.; stipules oblong, deciduous. Peduncle many times dichotomous, many-flowered, shorter than the leaf; bracts numerous, minute; flowers medium-sized. Male: sepals 2, rounded; petals 2, narrow-oblong; stamens numerous, shortly monadelphous, anthers obovoid, connective not produced. Female: perianth-segments 3, 2 large round, 1 small narrow lateral; styles 3, nearly separate, divided half-way up into two curved branches. Capsule ½–¾ in. long and broad including the wings. Seeds shortly-ellipsoid, somewhat obovoid.—Not seen: the above is drawn up from Wight's figure: the plant is of the section Triobaria if all Wight's details are without error.

**Sect. IV. Platycenrum. 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 Mesiera, A. DC.


**Nipal; Wallach. Sikim, alt. 3000–6000 ft.; Herb. Griffith, J. D. H.; alt. 1000–4000 ft., frequent, C. B. Clarke.**

Rootstock thick, woody, 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 \( \frac{1}{2} - \frac{3}{4} \) 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 9; 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-fid placentas (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-fid and more or less contorted. Capsule \( \frac{1}{2} \) 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.


**Bhutan**; **Griffith** (Kew Distrib. No. 2504, 2573). **Khasia** Mts., alt. 4000 ft.; **H. f. & T., C. B. Clarke**.

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 \( \frac{1}{2} - \frac{3}{4} \) in.; stipules \( \frac{1}{2} \) in., very persistent, lanceolate, subulate, glabrous. Inflorescence often from the middle and lower axile 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-oblanceolate; 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 Bhutan examples, the stems upwards peduncles and leaves on both surfaces are very pubescent, and the petioles are \( \frac{1}{2} - \frac{3}{4} \) in.; Clarke's examples (from Bishop's Falls, Shillong) are very nearly glabrous with the petioles 1\( \frac{1}{2} \) 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. Dumeong, Bhutan**, 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 \( \frac{3}{4} \) 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* 3-16 in., stem puberulous or minutely pubescent. *Leaves* 3-8 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, ciliate, 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** ½-1½ 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. Meisneri**, *Wall. Cat.* 6294; shortly caulose, leaves linear-lanceolate very tomentose on the nerves beneath.—Khasia Mts., Wallich; alt. 3500 ft., C. B. Clarke.—**Leaves** 2-4 by ½-1½ in.; petiole ½-1½ 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, ciliate-acuminata, 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 and more or less villous or tomentose; petiole ½-1½ in.; stipules ½ in., persistent, lanceolate, mucronate, pubescent. **Peduncles** 3-6 in., usually from one or two uppermost axils, tomentose; bracts large, oblanceolate, 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 ovate-cordate, or filaments nearly free, about 50, anthers free; 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** ½ 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. flavo**; flowers full yellow, leaves green finely serrate, ovary and sepals pubescent or nearly glabrous.—Sikkim, alt. 6000 ft.; J. D. H., *Tretour*; Darjeeling, 7000 ft., alt.; C. B. Clarke; *Herb. Griffith* (Kew Distr. 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., *Tretour.*

From Sylhet and Cachar to Burmah, 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 5 or more, scarcely monadelphous, anthers obvoid; connective much produced, ovate-oblong. Female: perianth-segments 6, 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 from the upper axils, often 5 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 obvoid; connective produced, obtuse. Female: perianth-segments 6, nearly equal; styles 2, long, combined at the base, with long tortuous branches. Capsule and seeds as in *B. rubro-vena.*

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 obvoid; connective produced, triangular, obtuse. Female: perianth-segments 6, inner bright-red gradually smaller; styles 2, combined at the base, branches very tortuous. Capsule and seeds as in *B. rubro-vena.*


Sikkim, alt. 3000–8000 ft.; *J. D. H.; C. B. Clarke.* *Birma; Griffith (Kew Distrib. No. 2582); Kurz. Moumen; 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; cauliflorous, 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)**; **Hook. f. & T.**

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.


**Botan.; 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.

36. **B. Rex, Putzeys in Fl. des Serres.** t. 1255, 1256; stemless, leaves cordate-ovate acute pubescent on the nerves beneath, peduncle upwards bracts ovary and flowers glabrous. **Bot. Mag.** t. 5101; **A. DC. Prodr.** xv. pt. i. 350.

**Assam and Mishmi; 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 obvoid; connective produced, acutely triangular. **Female:** perianth-segments 5, inner gradually smaller; styles 2, combined below, branches very tortuous. **Capsule** \( \frac{1}{3} \) by 1–1\( \frac{1}{2} \) in. including the wings: much as that of B. rubro-vena. — 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, petiole scape flowers and ovary glabrous or very nearly so.

**Khasia; Terai, alt. 1000 ft.; H. f. & T.**

Flowers and fruit much smaller than in any of the preceding species of this section. **Rootstock** tuberous. **Leaves** 1–3\( \frac{1}{2} \) 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, shorty monadelphous, anthers oblong; connective much produced, obtuse. **Female:** not seen. **Capsule** \( \frac{1}{3} \) by \( \frac{1}{4} \) in., recurved, styles deciduous; two smaller wings very narrow, broader wing descending its upper margin conelave very thin; dehiscing by \( \pm \) lines on either side of each of the two narrower wings. **Seeds** short-ellipsoid.—This species resembles in habit many of the sections Parvibegonia and Kneveboecia, and is very unlike any Platycentrum with a produced connective.
**Connective not produced above the anther-cells.


Western Ghauts from Bombay to Mysore; *Law, Dalsell, &c. Moulmein; 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 50, monadelphous, anthers obovoid. *Female*: perianth-segments 5, inner gradually smaller; styles 2, combined below, branched and much twisted upwards. *Capsule* ½ by ½ 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; Mainay No. 675 partly.*

Diffs 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.


*Martaban; near Tavoy, Wallich.*

Rootstock thorny. *Stem* 6–9 in., weak. *Leaves* 3–5 by ½–1½ in., very unequal at the base, glabrous beneath, sometimes with a few scattered hairs above; petiole ½–1 in.; stipules ½ in., oblong, acuminate. *Peduncles* from the upper again, hardly so long as the leaves; bracts ovate, deciduous. *Male*: sepals 2, ½ 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 ½ 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 ciliate excessively unequal at base.

*Burma, alt 3700–4000 ft.; Griffith (Kew Distrib. No 2579).*

*Stem* 2 ft. *Leaves* 5–6 by ½–1 in., nearly entire or serrate near the apex, one auricle excessively produced backwards often in an angular or quadrate form; petiole ½–1½ 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. episcopalis*, 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 ⅓–1 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 ⅔ in., diam., with some pubescence; petals 2, oblong; stamens 60 or more; anthers obvolute, emarginate. **Female**: not seen. **Capsule** ⅔ by 1 in. including the wings, glabrous, recurved; styles deciduous; the two narrower wings ⅜ in. broad and nearly an equal breadth for the whole length of the capsule, the broad wing descending, dehiscing by 4 lines one on either side of the two narrower wings.

**Sect. V. Papyraceae.** **Capsule** 2-celled (3-celled in *B. dehiscatula*), papyraceous dehiscing by the very thin faces breaking up irregularly, placentas 2-īd.—Small plants with small flowers.

A. **Ovary** 2-celled. **Capsule** winged, the wings not much produced above or below the cells. **Sects.** *Porrdebogonia*, *Lauchea* and *Monophylion*, Alph. DC.

43. **B. verticillata**, Hook. L., Pt. t. 311; radical leaf 0 at the time of flowering, cauline leaves often whorled, bracts ovate marginal with stalked glands. **A. DC. Prodr.** xv. pt. i. 353; Kurz in *Jour. As. Soc.* 1877, pt. ii. 106.

**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 ¼–1½ 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 ½ by ⅔ 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** ⅔–4 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 ½ 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. Fimbriata possibly belongs here: but the example is very imperfect and the leaves are 2–3, some of them petioled.

45. **B. palenea**, Kurz in Flora 1871, 297; cauloine leaf 1 obliquely cordate-ovate or orbicular, petioles and inflorescence with short paleaceous hairs, capsule winged below.

**Martaban; Attaran Valley; Brandis.**

An erect low herb, simple or nearly so, succulent; rootstock tuberous. **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 papillose, 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 obvoid, 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. integrefolia, No. 38.


**Pinang; Wallich, &c. Tenasserim, Parish, &c. Malaya; Mainay 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, denticate-sinuate; 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 obvoid, 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 obvoid.

47. **B. andamensis**, Parish ms.; caulescent, nearly glabrous, leaves cordate-ovibaricar shortly petioled or the upper sessile; capsule winged below.

**Andamans and Moulinem; Parish.**

**Rootstock** tuberous. **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 cauline 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 dehiscence 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.

MOULMEIN; 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 stigmas being pubescent and the lower bracts often ciliate or fimbriate.

49. B. Parishii, C. B. Clarke; caulescent leaves 1–3 all sessile cordate orbicular with lax scattered pubescence above and on the nerves beneath; capsule winged above.

MOULMEIN; 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, obvolute, 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, ½–1 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 ¼–½ in. A. DC. Prodr. xv. pt. i. 356; Dalz. & Gibbs. Bomb. Fl. 104. B. minima, Bedd. Ilc. Pt. t. 110.

MALAHAR coast, alt. 0–3000 ft., from BOMBAY TO WYNAAD. ?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 ½–2 in.; stipules small, ovate, acute, glabrous. Peduncles weak; bracte 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.

**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. delicatula,** Parish *ms*; styles long combined.

**Moulmein; 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-ovate, cordate, subequal at the base, doubly serrate, very delicate, with weak scattered pubescence above and on the nerve beneath; petiole of the cauleine 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, ob-long, ciliate or puberulus, pedicels and young ovary with minute sparse lax pubescence. Male: sepals 2, ½ in., round; petals 0; stamens 20, much monadelphous, anthers narrow-obovoid, connective not produced. Female: perianth of 4 segments, inner two obvulate, not very narrow; styles 3, stigmas lunate. Capsule ½ in. diam., almost exactly globose, very membranous, breaking up irregularly, wingless. Seeds shortly ellipsoid.**

**Sect. 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 axes only.

54. **B. fibrosa**, C. B. Clarke; cauline leaves 2 orbicular sessile with many peduncles from the axils of each.

**Moulmein;** 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 puberulus-pubescent; bracts foliaceous; lower ½ in., elliptic, glabrous, often petiolar; upper smaller. Male: sepals 2, ½ 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 ½ by ½ in. including the wings, upper margin of the broader wing horizontal or somewhat descending. Seeds small, ellipsoid.**


**Ceylon, Walker. Pas-de-m Corle; Thwaites.**

**Rootstock somewhat thick, tuberous. Leaves 2–4 in. diam., obtuse or subacute,**
subsequently cordate at the base, minutely dentilicate not serrate, with scattered weak pubescence on both surfaces, the young leaves very shaggy; petiole 2–5 in.; stipules nearly \( \frac{1}{2} \) 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 older ones glabrous. **Male**: sepals 2, 1–\( \frac{3}{5} \) in., round, pubescent on the back; petals 2, oblong; stamens about 40, anthers oblong, 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 Io. t. 1812; stemless, leaves ovate, petioles pubescent, pedicles and young ovary glabrous. *A. DC. Prodr. xv. pt. i. 386.*

**South Decan Peninsula**; probably Malabar or Travancore, Wight. **Ceylon**, 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**.

57. **B. concanensis**, *A. DC. Prodr. xv. pt. i. 314*; caulescent, glabrous or nearly so, leaves ovate serrate and sometimes lobed. *Dals. & Gbse. Bomb. Fl. 104.*

**Concan**, tropical region, **Stocks. Bombay**, above the Ghats, **Laws**.

**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 1–2\( \frac{1}{2} \) in., of the radical often very long; stipules \( \frac{1}{2} \) in., ovate, acute. **Peduncles** elongate, dichotomous; bracts lanceolate; flowers rose-coloured, not very many. **Male**: sepals 2, nearly \( \frac{1}{2} \) 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** \( \frac{1}{4} \) by \( \frac{3}{4} \) 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 petals without patent hairs. As to the placenta which are taken as bipartite by Alph. DC., but are at least sometimes undivided, it is curious that the example of **B. concanensis** at Kow authenticated in A. DC.’s handwriting is typical **B. trichocarpa**.


**Malabar Ghats**: **Concan**, **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 \( \frac{1}{2} \) in., ovate, lanceolate. **Peduncles** scarcely elongate, repeatedly dichotomous; bracts \( \frac{3}{4} \) 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 oblance-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; placenta undivided.
59. **B. nivea**, Parish ms.; Kurz in Journ. As. Soc. 1873, pt. ii. 81; radical leaf solitary elliptic-oblong doubly serrate, petiole 0-5 in., scape leafless or with two very small leaves near its base.

**Moulmein**; Parisi.

Rootstock tuberous. Radical leaf 2-3½ in., obtuse, subequal scarcely 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, ½-¾ 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** 3-4½ 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 ½ in., lanceolate, glabrous. **Scape** 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, ½ in., round; petals 2, elliptic; stamens 40, very short monadelphous, anthers oblong, 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, denticate 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 ½ in., broad-elliptic, acute, scariosus. **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 ¼ in., round; petals 0; stamens 40, 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, caullein 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 5-6 in., glabrous; caulline leaves much smaller and shorter-petioled, usually 5-lobed. **Pedicule** very long, subradical, many times dichotomous; pedicels capillary; bracts lanceolate, minute; flowers very many, white,
minute. Sepals of either sex 2, \( \frac{3}{4} \) 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 \( \frac{1}{2} \) in., ovate, acute, glabrous, 3-winged; wings retrorsely produced below the cells, 2 broad-oblong obtuse, the other linear-oblong; placenta 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 \( \frac{1}{3} \) in., viscidly pubescent; stipules \( \frac{1}{4} \) in., ovate, acute, ciliate. Peduncles 2 in., few-flowered; bracts \( \frac{1}{2} \) in., ovate, acute, scarious, pubescent, persistent. Male: sepals 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 \( \frac{1}{2} \) by \( \frac{1}{2} \) 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.

64. **B. malabarica**, Lamk. Dict. i. 393, not of Roxb.; flowers medium large, capsule more than \( \frac{1}{4} \) in. Wall. Cat. 3676, excl. D; A. DC. Prodr. xx. pt. i. 392; Thwaites Enum. 128 (3) only. B. dipetala, Graham. in Bot. Mag. t. 2849; Lodd. Bot. Cab. t. 1730; Lindl. & Paxt. Flora. Gard. i. t. 14; Wight & Arn. t. 1818; A. DC. i. c. 391. B. tuberosa, Herb. Mad.; Wall. Cat. 3675. B. hydrophila, Mag. in Flora 1853, 769; A. DC. i. c. 392.

Malabar Mrs.; 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 \( \frac{1}{3} \) in., persistent, ovate, acute, glabrous. Peduncles axillary, rarely exceeding 2–3 in., glabrous or nearly so; bracts \( \frac{1}{2} \) in., lanceolate, acute; flowers rose-coloured, not very many on one peduncle. Male: sepals 2, \( \frac{3}{4}–\frac{1}{2} \) in., round, glabrous; petals 0; stamens 40, shortly monadelphous, anthers obvoid, 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 \( \frac{1}{2} \) by \( \frac{1}{2} \) 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 obvoid.—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.
LXVI. BEGONIACEAE. (C. B. Clarke.) [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. xhassiana, C. B. Clarke; flowers minute, capsule less than \( \frac{1}{3} \) in. B. pendunculosa Wall. Cat. 3672 B.

SYLNET MTS. (which means Khasia): Wallich.
Branches weak, succulent, scariose winged, repeatedly divided with many leaves. Leaves \( 1\frac{1}{2} \)–2 in., cordate, acute, very unequal at the base, serrate, pilose above, laxly sparsely villose on the nerves beneath; petiole \( \frac{3}{4} \)–1 in.; stipules \( \frac{1}{4} \) in., persistent, oblong, acute, glabrous. Peduncles from the lower as well as from the upper axils, 1–1\( \frac{1}{2} \) in., few-flowered; bracts minute, elliptic, acute, ciliate, limbricate. 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 \( \frac{1}{2} \) by \( \frac{1}{3} \) 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; placenta not seen.

B. TENTIFOLIUM, Dryand. in Trans. Linn. Soc. i. 162, from Pulo Pontangh, is not a Pulo Pinang plant as A. DC. suspects from the similarity of the names (see Prodr. xv. pt. i. 351).

ORDER LXVII. DATISCACEAE. (By C. B. Clarke.)

Trees or herbs. Leaves petioled, simple or pinnate; stipules 0. Flowers small, dioecious in the Indian species, clustered racemose or panicled. 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 placentae, 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, Cental Asia, Java, and North-West America.

Tree. Styles 4, simple. Leaves all simple . . . . . . . . . . . . . . . . 2. Tetrameles.

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 Nepal, 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., petioluled; upper much smaller and less divided; floral simple, 3 by 1¼ in. Pedicels often carrying linear bracts. Anthers oblong, rather large; filaments very short. Styles ⅓ in. Capsule ⅓ by less than ⅔ in.

2. *TETRAMELES*, R. Br.

A large tree. Leaves petiolated, ovate, pubescent beneath at least on the nerves. Flowers diecious, 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; stamene 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, tests very lax and extending much beyond the nucleus as a loose ragged large-ribulated membrane.


Sikkim, alt. 2000 ft.; J. D. H. Western Ghats from Bombay to Ceylon. Burma, Tenasserim and Andamans, frequent, Kurz.—Distrib. Java. Attains 100–150 ft. Leaves 6–6 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 pedicels pubescent; flowers sessile or nearly so, bracts minute or 0. Anthers small, roundish; filaments long. Capsule ⅓ by ⅔ in., glandular.

**Order LXVIII. CACTI.** (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 5–6, 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 cylindric, stigma 2–5-rayed; ovules very many on parietal placentas, horizontal. Berry 1-celled, placenta 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 *Rhapisola cassutha.*

*Opuntia Dilleni, Haw.; DC. Prodr. iii. 472; Cactus indicus, Roxb. Hort. Beng. 37, Fl. Ind. li. 475; Wight Ill. 114; an American plant, is naturalised in India, and* vol. II.
is nearly or quite the same species as that on which cochineal is tended in Tenerife; see Lowe Fl. Madeira, 318-319; Brand. For. Fl. 245-247. Roxburgh states that the cochineal "insects" brought from America thrive 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 3–6. **Petals** 6–10, spreading, oblong. **Ovary** smooth; style filiform, stigma 3–6-rayed. **Berry** globose, smooth; the placentas projecting inwards nearly to the axis. **Seeds** obovoid; albumen 0.—**Dist.


Ceylon; upon rocks and trees throughout the Central Province and certainly indigenous, *Walker; Thwaites.*—**Dist.** 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. FICOIDÆ.** (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 *Gesickia*); 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.—**Dist.** Species 450, chiefly African, a few are scattered through most tropical and subtropical regions.

**Tribe I. AIZOIDEÆ.** Calyx-tube elongate. **Stamens** inserted on the calyx-tube.

* Carpels dehiscing dorsally.

**Hairy woody small herbs.** . . . . . . . . . . . . . . 1. **AIZOON.**

**Capsule circumsciss.**

**Ovary (and capsule)** 3–5-celled . . . . . . . . . . . . 2. **SESUVIUM.**

**Ovary (and capsule)** 1–2-celled . . . . . . . . . . . . 3. **TRIANTHEMA.**
TRIBE II. Molluginaceae. Calyx deeply 5-partite. Stamens hypogynous.

† Carpels dehiscing dorsally.

Petals many, small, hypogynous 
Petals 0. Stipules scarious, fugacious

** Capsule of separate cocci.

Carpels 3–5, separate in the flower 
Carpels 2, combined in the flower

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. Pl. Grass. t. 156, Prod. iii. 453.

Scinde; Stocks, Vicary.—Distr. Afghanistan, Arabia, Africa.

Small, wooly, closely procumbent, repeatedly dividing. Leaves 1–1 ¼ in., papillose and simply hairy or tomentose, petiole 0–½ in. Flowers in nearly every axil. Calyx-lobes ⅜ in. ovate. Capsule ⅛ in. broad, the summit when looked down upon pentagonal. Seeds black, smooth, with a few continuous raised ridges concentric with regard to the unappendaged 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 obovate to linear epathulate or subcylindric; petiole often dilated at base with scarious mar-
LXIX. FICOIDAE. (C. B. Clarke.) [Trianthema.

3. TRIANTHEMA, Linn.

Diffuse prostrate branched herbs, glabrous or papilllose. 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, circumcissa, 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.


From the Punjab to Ceylon: not in Bengal.—Distrib. Throughout Africa.

Minute papillose or glabrous. Leaves ½–⅓ in., narrowly oblanceolate or elliptic; petiole very short or obscure. Flowers often very many, solitary densely clustered. Calyx-lobes triangular, cuspidate. Capsule ½ 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.


The Punjab, Scinde and plains of NORTH-WEST INDIA.—Distrib. Western Asia and Tropical Africa.
Papillate 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 ⅜ 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 indescendent or only finally splitting. Rar. Hort. Beng. 34, Fl. Ind. ii. 444; DC. Prodr. iii. 352; Wall. Cat. 6839; W. & A. Prodr. 355; Wight Ic. t. 296; Dalz. & Gibbs. Bomb. Pl. 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; Ave (ex Kurz).

Glabrous or minutely papillate. Leaves 1-1½ in., oblong or elliptic; petiole ½-⅞ in. Flowers in nearly sessile clusters. Calyx-lobes ovate, usually obtuse, often scarious on the margin; bracts scarious. Capsule ⅜ in., beak a truncate solid cylinder, not at all or very obscurely nitiflorus. Seeds 4, 2 lower dull black puberulous, with numerous faint concentric raised lines. Closely allied to the preceding species.


**Mogolian; Edgeworth. Scinde; Stocks. Bombay; Law.**—Distrib. East Tropical Africa.

Mintately papillate or glabrous. Leaves ½-1 in., oblong or elliptic, often with scarious margins; petiole ⅛-⅜ 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 ⅜ 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 at right angles to the lines on the seeds of the four preceding species).—Flowers separated, or clustered. T. polysperma, Oliv. is indistinguishable from some of Stocks’ Scinde specimens. Diplachomum sessuvioides, Fenzl. in Harv. & Sond. Fl. Cap. ii. 473 is separated by the very numerous stamens and shining seeds, as Edgeworth has noted.

4. **OBYGIA**, 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, debiscing 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.
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. *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* ½-1 in., opposite or whorled, usually obovate but vary from round to narrow-lanceolate; petiole 0-½ in. *Flowers* usually sessile or nearly so; pedicels sometimes ½ in. *Sepals* ½-1 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 ½ in. more or less stellately tomentose. Glinus dictamnoides, W. & A. *Prodr.* 362.

**Var. 2. lotoides,** W. & A. *Prodr.* 362 (sp.); pedicels of the flowers ½-3 in., sepals ¼ in. stellately tomentose.—*Hills of the DECCAN PENINSULA.*

**Var. 3. Keenan**; *stem* slightly pubescent, leaves glabrous petioled lanceolate, flowers sessile, sepals ¼ 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.)—Distr. Tropical Africa and Australia.

Stems branching, diffuse, leafy. Leaves 1-1 in., usually whorled, spatulate lanceolate or elliptic; petiole 0-1 in. Pedicels 0-1 in. Sepals 0-3 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.—Distr. Eastward to Malacca, China, Japan, Fiji.

Often a foot high. Leaves 1-1 in., whorled or opposite, varying from lanceolate acute to obovate obtuse, much narrowed at the base; petiole hence obscure. Cymes compound, the branches sometimes racemose so that the inflorescence becomes like that of M. disticha. Sepals 0-3 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.—Distr. Asia, Africa to the Cape, Australia.

Stems 3-6 in., erect, usually several. Leaves 1-3 in., radical tufted spatulate or obovate, cauline linear-oblong often 4-8 in a whorl, whence spring umbellately many branches. Peduncles trichotomous or umbellate-cymose. Sepals 0-3 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 in. t. 3. Pharmaceum diistichum, Linn. Mant. 221.

South Deccan Peninsula and Ceylon.

Stems often 12-18 in. Leaves 1-1 in., usually whorled, tapering almost to the base. Flowers in cymes, the branches often ultimately prolonged as racemes. Sepals 0-3 in., ovate. Stamens 5. Styles 3, short. Capsule as long as the sepals, globose or shorty 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.

6. **GISEKIA, Linn.**

Diffuse branched herbs. Leaves opposite or falsely whorled, fleshy, spathulate, 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 3–1 ½ in., oblong or elliptic, entire, narrowed at the base; petiole 0–½ in. Sepals ½ in. Filaments dilated below. Carpels usually 5, in fruit as long as the sepals. Seeds blackish, smooth, minutely glandular-punctate; embryo curved less than a semicircle.

7. **LIMBEUM, 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.

Order LXX. UMBELLIFERAE. (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 (vitae). Seed 1 in each carpel, pendulous, albumen cartilaginous; embryo small, next the hilum, radicle superior. — Distrib. 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.

Trorygium is stated in Gen. Pl. i. 871 to be Himalayan. We have seen no specimens.

An umbellifer in flower, Edgew. No. 1754, from the North-west Himalaya, alt. 6000-7000 ft., may be Johrenia alpina, Fenzl.

Clavis of the Genera (as to the Indian species only).

Series I. Heterosciadaceae. Umbels simple or irregularly compound. Vitta 0.


Leaves spinulose-serrate. Flowers capitate. 2. Eryngium.

Leaves compound not spinulose. Umbels subcorymbose. 3. Sanicula.


Tribe I. Ammineae. 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. Trachydiscum.
Bracteoles entire, lanceolate, white-margined 6. Elytrigia.

** Carpels in outline 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.
Ridges of the fruit thick, corky 9. Cicuta.
Ridges of the fruit slender, valleys 1-vittate 11. Carum.
Ridges of the fruit obtuse, corky, valleys 2-3-vittate 12. Stym.
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. Osmorhiza.
Fruit oblong, narrowed upwards, distinctly ridged, glabrous 15. Chrysocephalum.
Fruit narrowed upwards into a long beak 16. Scandix.
Fruit oblong, narrowed upwards, obscurely ridged, hispid 17. Anthriscus.

** TRIBE II. Seselineae.** 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 subglobose, ridges distinct. Petals white 18. Seseli.
Central flower of the umbellule sessile perfect, lateral male
Leaves cut into filiform segments. Bracts 0. Petals yellow 20. Pemennum.
Fruit ⅓ in., roughly corrugate between the ridges 21. Fragos.
Fruit with all the ridges equal, broad, obtuse, corky 22. Genanthe.
Bracts prominent. Fruit ovoid, vittae ☞ 23. Schulzta.
Bracts 0, or small. Fruit ovoid, vittae ☞ 24. Polylepis.

** 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 ⅓ in. 25. Liosticum.

†† Valleys next the dorsal ridge 1-vittate (very rarely 1 or 2 additional small superficial vittae are present), in Pleurospermum Candollii 3-2-vittate.

Tall. Leaves very compound. Seed plane on the inner face 26. Serinum.
Stemless, or short. Carpels much compressed dorsally 27. Cordia.
Seed grooved or concave on the inner face 28. Pleurospermum.
Leaves compound pinnate with large segments. Fruit ⅓ in. 29. Angelica.

** TRIBE III. Peucedanaceae.** 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. Vittae rarely reaching the base of the fruit 33. Heracleum.
Wings of carpels hyaline with a very thick border 34. Zosimia.
Hydrocotyle.] LXX. UMBELLIFERÆ. (C. B. Clarke.) 667

Series III. Diplozygone. 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. Caulis.
Bracts linear-lanceolate, membranous ................. 37. Psammogoton.

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; vitae 0, or most slender, obscure; carpophore 0. Seed laterally compressed.—Distrib. Species 70; in wet places in tropical and temperate regions, more numerous in the Southern Hemisphere.

Section I. Bu-Hydrocotyle. Petals acute, valvate, Secondary ridges 0. Pericarp not thickened.


Leaves 1–3 in. diam., pubescent or glabrous. Peduncles 1/4–2 in., lower solitary, leaf-opposed. Umbels many-flowered; bracts minute lanceolate scales among the pedicels; pedicels 0.1–2 in., glabrous. Fruit 1 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 pedicels and peduncles pubescent and are identical with the Indian. H. hirsuta, Blume, is a form with fulvous pubescence abundant in the Eastern Himalaya.—H. polycophala, 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 $\frac{1}{2}$ in. Miq. Fl. Ind. Bat. i. pt. i. 732.—Sikkim, Bhotan, Khasia, frequent.—Peduncles sometimes 3 in. Fruit 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. Prodr. iv. 61 (=H. densiflora, DC. Prodr. iv. 61), does not differ unless with the fruits being slightly less compressed.

VAR. 2. Hooker; leaves very pentagonal little lobed, pedicels 6 in., fruit little compressed yellowish shining with red glandular dots.—Khasia, alt. 5000–6000 ft.; H. f. & T.—Leaves 2$\frac{1}{2}$ in. diam., sparingly setulose. Fruit somewhat pentagonal, the intermediate primary ridges more defined, nearly as in H. rotundifolia. This may be a distinct species.

2. H. burmanica, Kurs 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 $\frac{1}{2}$ in., fruit moderately compressed somewhat pentagonal.

  *UPPER TENASSERIM*; alt. 3000–5000 ft.; Brandis, Parish.

Leaves 1–2$\frac{1}{2}$ in. diam. Peduncles 1–2$\frac{1}{2}$ in., lower solitary leaf-opposed, upper 2–3-nate. Umbels many-flowered; bracts minute. Fruit $\frac{1}{2}$ 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-petalled 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; Nilgerry Mts., Gardner, Schmidt.

Leaves 1–2$\frac{1}{2}$ in. diam., setulose. Umbels 5–15-flowered; pedicels when visible glabrous, any bracts obscure. Fruit $\frac{1}{2}$ 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 $\frac{1}{2}$–1 in. diam., glabrous and shining or pubescent or subvillos on both surfaces. Peduncles glabrous, 0–$\frac{1}{2}$ in., sometimes on the same specimen; bracts obscure; umbels 10–15-flowered. Fruit $\frac{1}{2}$ 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 subserate leaves, the peduncles $\frac{3}{4}$ in.; other plains' examples closely procumbent on mud are villous with sessile umbels. *H. hiso*, R. Br. differs (if at all) by its laxly hairy peduncles; see *Benth. Fl. Austral.* iii. 540, as to *Var. pusilla* only. *H. sibthorpiodes*, Lamk.; DC. *Prodr.* l. c. 66, which extends throughout South-Eastern Asia and Japan, only differs (from the form *mitidula*) 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.—Distr. 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 $\frac{1}{4}$ in., often 2-3-nate, laxly pubescent or glabrous; bracts $\frac{1}{4}-\frac{3}{4}$ in., not scattered among the pedicels (as in *Eu-Hydrocotyle* and in *Araliaeae*). Fruit $\frac{1}{4}$-in. Carpels oblong, subhyalindrica, curved, slightly compressed, much longer than broad, reticulate-rugose, often crowned by the persistent petals, each with 9 curvilinear subhilar 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 *Umbelliferae* and *Araliaeae* (see *Gen. Pl.* i. 861).

**2. 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 cylindrica; carpels dorsally subcompressed, subconcave on the inner face; primary ridges obtuse not prominent, secondary 0; vitre 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.—Distr. Species 100, temperate and tropical; plentiful in Western Asia.


Stems 2-8 ft., erect, undivided below, corymbose and often bluish above. Radical leaves $\frac{5}{4}$ by $\frac{1}{2}$ in., petiole 2-6 in.; lower cauline often similar smaller with shorter petioles, but more often subsessile, elliptic, acute, undivided, serrate or subspinulose. 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, subtiridif. Calyx-tube densely scaly; teeth lanceolate-subulate, spinulose. Fruit $\frac{1}{4}$ in.—This
has been referred to *E. dichotomum*, Desf. which has the radical leaves oblong entire not spinulose and altogether differs. It is certainly Boissier's plant referred by him to Biebersteins.


KASHMIR, alt. 5000-6000 ft.; *Jacquemont, Falconer, &c.* LADAK; T. THOMSON, *Scline*; *Stockes*.—DISTR. Western Asia.

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 cauline 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 ovary. *Calyx* with lanceolate scales, teeth lanceolate-subulate epinerves. *Fruit* ½ in.—The Indian examples are all smaller with smaller heads than the type-specimens of *E. Billardieri* and are perhaps *Var. metecephalum*, *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. ceruleum* but can generally be distinguished by its much less strict stem and dissected lower cauline 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* with short petioles villous, subechinate; teeth herbaceous. *Petals* white, emarginate, slightly imbricate. *Fruit* echinate, ovoid or slightly compressed laterally, commissure broad, carpophore 0; carpels 4-terete or subterete, plane on the inner face, ridges all obscure, lateral primary commissural; vitre 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.


HIMALAYA; from KASHMIR to Bhotan; alt. 4000-12,000 ft.; common. KHASIA Mts., alt. 3000-5500 ft.; common. BURMA. Mts. of MALABAR and Ceylon.—DISTR. Europe, Asia, Africa.

Height 1-3 ft. Radical leaves 2-6 in. diam., persistent; petiole 1-6 in. *Umbel* 2-3 to 18 in. diam.; rays divaricate, repeatedly 2-3-chotomous. *Umbellules* few-flowered; male pedicels often ½ in. *Calyx* teeth lanceolate. *Fruit* ¼ in., densely covered with hooked bristles, slightly compressed laterally.

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; vittae 2–3 in each furrow, not large; carpophore entire or bifid. Seed subterete, grooved on the inner face.—

**Distribution.** Species 2–3, Himalayan.

Separable from *Pimpinella* only by the deeper groove on the inner face of the mericarps 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 ½ in., very rarely more than 1 or slightly divided; primary rays of the umbel 6–12, ½–2 in., rigid, angularly striate; bracteoles 3–5, often as long as the umbellule. **Fruit** ½–1½ 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 ½ in. **Fruit** 1½–2½ in., oblong or narrow-oblong; disc prominent; styles short.—**United with V. conifolium** 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 pinnule 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.

**Bracts** small or 0. **Bracteoles** linear, unequal, some overtopping the flowering umbellules. **Fruit** (not quite ripe) ½ in., rather larger than that of *V. conifolia,* ridges obscure; vitte in each furrow 3–4, small.

5. **TRACHYDIUM, Lindl.**

Perennial herbs, glabrous or minutely hispid. **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 squashing 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, epongy, 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.—Trachydiun 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 subpinnatifid. Umbels often subsessile; rays 2–3 in., thick, often hollow; rays of the umbellule often 15–20. Petals lurid green. Styles very small. Fruit ⅓–⅔ in., ovoid, subquadrate, somewhat cordate at the base, slightly narrowed does above 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 ¼–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 0.5–2 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 umbelbed; bracts leaf-like; bracteoles 5–10, 1–2-partite, with lanceolate acute ultimate segments, often white-membranous on the margin. Fruit ⅜–⅔ 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 ¼–terete, dorsally subcompressed, subpentagonal.

3. **T. dissectum**, C. B. Clarke; radical leaves 2-pinnate, secondary pinnae pinnatifid 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.; bracts linear-oblong, pinnatifid, segments lanceolate-linear acute; bracteoles pinnate with narrow acute segments; primary rays ⅓–⅔ in. Styles prominent in the young fruit. Fruit ½ 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 pinnatifid hisrate 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. Umbel solitary, sessile, with some of the rays again umbellated. Bracteoles 3–6, 1/4–1 in., 3-fid or pinnatifid. Carpophore stout, 2-fid. Fruit nearly as of T. dioscyrum, but the ridges less acute, the style-bases less prominent.


Nepal, Gossain Than; Wallis. 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 Nepal 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 Nepal ones. Fruit 1/2 in.; style-bases conical, prominent; primary ridges lax; pericarp thin, somewhat inflated; vitae usually 2 between the primary ridges; carpophore 2-fid. Seed semitector, dorsally subcompressed, hardly concave on the inner face.

Var. stricta; ultimate segments and bract more acuminate, primary rays shorter, fruit more truncate less narrowed upwards. Trachydiscum, 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 1–3/4 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, vitae in each furrow 3–1, minute; carpophore 2-partite or entire. Seed lunate, margins incurved, hence broadly grooved on the inner face.—Distrib. 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.—Distrib. Persia, Syria.

Root fusiform. Stem 1–3 ft., erect, panicked upwards or (in the small Indian example) simple. Reys of the umbel 5–11, 3/4–1 in. Pedicels 6–12, 3/4 in., Fruit 1/2 by 3/4 in., depressed didymous; ridges obsolete; vitae 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.

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7. BUPLEURUM, Linn.

Glabrous herbs, or shrubs. Leaves entire. UMBELS compound; bracts and bracteoles f oliaceous, or setaceous, or 0. F lowers yellow or lurid, pedicelled or subsessile. Calyx-teeth 0. Petals obvolute, emarginate. Styles short. Fruit laterally compressed, slightly constricted at the commissure; carpels terete or subpentagonal; primary ridges distinct, sometimes subulate, rarely obscure; secondary 0, or obscure; vittae 1–3 between the primary ridges, rarely 0 or many; carpopore 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. Cat. t. 281; upper cauline leaves broadly oblong obtuse mucronate, bracts 3–5 elliptic foliaceous, fruit \( \frac{1}{2} \) in. oblong subquadrate subulate, furrows 1-vittate.

Mt's. 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 \( \frac{1}{2}–1\frac{1}{2} \) in., subsessile, shortly narrowed at the base; nerves 10–30, subpalmate; secondary numerous, distinct, reticulate. Bracts \( \frac{1}{4}–1 \) in., subequal; bracteoles 4–5, \( \frac{1}{2}–1\frac{1}{2} \) in., oblong-elliptic, mucronate; rays 6–12, grooved; pedicels 4–12, shorter than the fruit. Carpels strongly pentagonal; ridges thick, obtuse, suborbicular, corky; furrows glancscent, vittae very large; carpopore 2-fid, often 2-partite. Seed subterete, deeply but obtusely 5-ridded.

2. B. lanceolatum, Wall. Cat. 551; middle cauline leaves petiolar ovate or broadly lanceolate, bract 1 small lanceolate or 0, fruit ovoid-oblong, ridges obscure, furrows 3-vittate. DC. Prodr. iv. 182.

NORTH-WEST HIMALAYA; from KASHMIR to N INFAL, 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 \( \frac{1}{2}–3 \) in., ovate, acuminate, occasionally rounded at the base, nerves 5–7, subpalmate; secondary nerves numerous, distinct, reticulate. Bracts \( \frac{1}{2} \) in., acute; bracteoles less than \( \frac{1}{2} \) in., linear, usually obsolete in the fruit; rays 5–8, unequal; pedicels 6–12, \( \frac{1}{2} \) in., subequal. Fruit \( \frac{1}{2}–\frac{3}{4} \) in. Carpels much incurved when ripe, yellowish-brown, subviscid; ridges distinct in imperfectly ripe fruit, small obsolete in the fully ripe; carpopore 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 \( \frac{1}{2}–1\frac{1}{2} \) in.; upper 1–4 by \( \frac{1}{2}–\frac{3}{4} \) in., acute, rarely acuminate, narrowed shortly at the base, subsessile or sessile and amplexicaul; primary nerves 8–12, often subpalmate, oblique; transverse nerves numerous, distinct, reticulating. Bracts 2–3 or 0, \( \frac{1}{2}–1\frac{1}{2} \) in., ovate or oblong, acute, foliaceous, angular; bracteoles \( \frac{1}{2}–\frac{3}{4} \) in., foliaceous, frequently longer than the fruiting umbellule; rays 5–8, rather short; pedicels about half as long as the carpels. Carpels \( \frac{1}{3} \) in., yellowish-brown, semi-terete or dorsally subcompressed; ridges distinct, but not thick nor winged; carpopore entire.
Bupleurum.]  
LXX. UMBELLIFERAE. (C. B. Clarke.) 675

Seed nearly terete.—The Kashmir and Chumba examples are much more slender than the Sikkim.


Kashmir; Budrawur, alt. 7000 ft., C. B. Clarke. Lahul; Jaeschke.—Distrb. Amurland.

Stems 1–2 ft., erect from a decumbent base, corymbose with long branches. Lower cauline leaves 1–1½ in., orbicular, petiole scarcely ½ in.; upper 1–2 in., orbicular or obovate-oblong, mucronate, not pellate; primary nerves 10–20, palmate; transverse nerves numerous, distinct, oblique, reticulating. Bract 1, 1–1½ in., ovate, foliaceous, often ampelocalyx or cordate, occasionally 0; bracteoles 4–5, usually ½ in., often 0; rays 5–8, somewhat stout, angular; pedicels about half as long as the carpels. Carpels nearly as in B. Candelit, but rather longer, ½ 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 obovate-lanceolate, ridges subulate.—Kashmir, alt. 7500–10,000 ft., C. B. Clarke; common. Lower cauline leaves 5 by ½ 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-ampelocalyx, 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 in.; bracteoles usually as long as the flowering umbellules, ciliate; rays of the umbellule often 20, about half as long as the mericarp. Fruit 3½ in., oblong, subcylindric; 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, Lede.; Boiss. Fl. Orient. ii. 851, 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 ampelocalyx. Bracts 0, or 1, small, lanceolate; rays of the umbel 8–14; pedicels ½ in. Fruit 3½ in. glaucous, in outline oblong; disc brown, subprominent.—United with B. falcatum, Linn. both by Reichenbach i.e. and in Boiss. Pl. Orient. ii. 850: it differs in the completely ampelocalyx, usually inflated, base of the cauline leaves, the lower leaves linear not at all obovate, the fruit glaucous much more strongly ribbed. Whether regarded as a species or variety, India produces the plant of Rochel in its most characteristic form.

Himalaya; alt. 3000–12,000 ft., from Kashmir to Bhutan, frequent. Khasia Mts.; alt. 3000–6000 ft., frequent.—Distr.: Central and W. Asia, S. Europe.

Stem 1–4 ft., erect, corymbose upwards. Radical leaves amplexicate-oblong in the typical European specimens, in the Indian (which belong to the form *B. gracilellum* Villo.) they are but slightly broader upwards. Cauline 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 umbelwle, narrowly lanceolate; rays 5–8, ½ in.; pedicels 5–15, usually less than half the length of the fruit. Fruit ½ in., brown; carpels terete, 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. 52 (sp.); cauline 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, Jaquem. ms. (sp.); stems numerous from the crown, often procumbent, cauline leaves ovate-lanceolate or linear widest very near the amplexicaul base, bracts 3–4, ½ in. lanceolate-linear, disc prominent on the half ripe fruit purplish-black. B. virgatum, Wall. Cat. 555 not of W. & A. *B. gracilellum*, 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. *aneum*, *Boiss. Pl. Orient.* ii. 849, but the leaves seem never oblong.


Mrs. of the South Deccan and Ceylon; alt. 5000–8000 ft.; plentiful. Differs essentially from *B. falcatum*, 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 ½ in., the bracteoles are more prominent usually exceeding the flowering umbelwles, and the upper cauline 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 umbelwles, carpels strongly ridged, furrows usually with solitary large vitta.—South Deccan.

Var. 2. ramosissima, W. & A. i. c. (sp.); stem corymbose upwards, leaves less obtuse, bracteoles about as long as the flowering umbelwles, carpels distinctly ridged, furrows usually 2-vittate.—South Deccan.

Var. 3. virgata, W. & A. i. c. (sp.); habit nearly of *B. falcata* but the fruit very markedly ellipsoid, often only ½ in. long and nearly as broad, ridges not very promin-
nent, furrows usually 3-vittate.—Ceylon.—Stem usually simple, erect, laxly corymbose above, cauline 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 Mrs., 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 (1⁄4 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, 1–2 1⁄2 in., somewhat stout, striate. Petals and disc usually black. *Fruit* 5–7 in.

**Var. 1. himalaensis, Klotzsch in Reis. Pr. Waldem. Bot. 146, t. 51 (sp.); upper leaves ovate-lanceolate base amplexicaul ovate almost cordate, bracteoles 8–10 very broad imbricate.—Kashmir, alt. 12,000 ft., frequent.—Connected by imperceptible gradations with the Eastern plant.**

**Var. 2. Dalhousieana;** 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.—Dalhousie and Dhurmsala, 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 folioaceous, the transverse nerves far less prominent.—The true affinity of this form is very doubtful; it differs from *B. Candolletii* in the cauline 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. 12,000–15,000 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 3 in., longer than the fruiting umbellule; rays of the umbel stout, ascending not divaricate. Fruit longer than in any form of *B. longicaule,* sometimes 1 in.—This is almost surely allied to Var. Dalhousieana: 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, 1/4-1 in., lanceolate or obovate-lanceolate; bracteoles 4-5, 1/4 in., obovate-lanceolate, often as long as the fruiting umbelle or longer; rays 3-8, usually less than 1 in., never stout; pedicels rarely exceeding 1/4 in. Fruit broadly oblong, yellowish brown; carpels terete; vitreous in each furrow solitary, sometimes obscure.—Distinguished from B. Candolii 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 often very bushy from the base, corymbose dichotomous with ascending branches, whereas in B. tenue type there is a simple main stem with divericate sub-horizontal branches. Bracts often 1/4 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. ramossissima in its leaves bracts and bracteoles, but differs in its shorter, smaller pedicelled fruit. We have not seen Martaban specimens, but as Kurz (Journ. As. Soc. 1877, pl. 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 1/4 in., fruit 1/4 in. oblong strongly ridged, furrows 2-3-vittate.—Bupleurum No. 8, Herb. Ind. Or. H. f. & T.

North-West Himalaya; Mussorie, 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 1-1 1/3 in., scarcely amplexicaul. Bracts 1-3, 1/4 in., lanceolate, often 0; bracteoles 3, less often 4-5, 1/8 in., lanceolate or linear, rays 3-8, less than 1/4 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 depauperated mountain form.


Kashmir, alt. 4500 ft.; Kishtwar, C. B. Clarke; Stewart.—Distr. Bithynia.

Annual. Stem 18 in., erect, above divaricately branched. Cauline leaves 1-1 1/2 in., uppermost 1 in., setaceous, 3-nerved. Peduncles 1/4-1 1/2 in., usually springing as though from a bifurcation whereof one branch is arrested. Bracts 1-4, 1/4-5/12 in., narrowly linear-lanceolate, usually longer than the fruiting umbel; pedicels 1-4, less than 1/4 in. Fruit obscurely transversely rugose between the ridges; vitreous large, 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. APiUM, 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.—Distr. 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.

1. A. graveolens, Linn.; DC. Prodr. iv. 101; radical leaves pinnate with large deeply lobed segments, cauline 3-partite, segments once or twice trifid coarsely toothed. Wall. Cat. 7212; W. & A. Prodr. 367; Boiss. Fl. Orient. ii. 856.

Base of the North-West Himalaya, and outlying hills in the Punjab; Falconer, Jaquemont, &c.—Distr. Cabul, West Asia, Europe, North Africa.

Biennial. Stem 1-8 ft., erect, branched. Peduncle 0-1 in., leaf-opposed: rays of the umbel 5-10, ½-1½ in.; pedicels 6-16, ½-1 in. Fruit ½-1 in.; ridges narrow, vittae broad, occupying the whole breadth of the furrows.—Wild celery.

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 oburate, 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.—Distr. Species 3, in the North Temperate Zone.


Kashmir; Falconer; Srinugur, alt. 5200 ft., C. B. Clarke.—Distr. Throughout Europe and Temperate Asia; in marshes and ditches.

Stem 2-5 ft., striate, hollow. Leaflets 1-2 by ½-½ in. Peduncles 2-3 in., terminal and leaf-opposed. Bracts 0; bracteoles 2-8, ½ in., linear or narrowly lanceolate-linear; rays often 15, 1½ in.; pedicels often 30-40, ½-1 in. Fruit ½ in. in Indian examples (often ¾ in. in European), lateral primary ridges commissural; commissure obscurely constricted in some Indian examples.—Water hemlock.

10. PITURANTHOS, Flw.

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 obovate. 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.—Distr. Species 5 African, 2 Indian.

1. P. nuda, Bentham. in Gen. Pl. i. 890; much branched upwards with virgate almost naked branchees, umbels long-pediculed, rays 3–8, fruit scarcely laterally compressed. Eriocyla nuda, Lindl. in Royle II. 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 1 in., oblong, lobed and toothed; upper much reduced, often to oblong acute sheaths ½ in. Bracts 1–5, ½ in; bracteoles 5–10, ½–1 in., linear; rays 1–4 in.; pedicels 8–12, ½–2 in., obscurely pubescent. Fruit ½ in., at first densely hairy, ultimately much less so; carpels oblong, narrower upwards; lateral primary ridges marginal.

2. P. Thomsoni, C. B. Clarke; stem with many lateral branches and umbels, rays 4–8, fruit much laterally compressed.—Eriocyla sp. 2, Herb. Ind. Or. H. 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 ¼ in., oblong, deeply pinnatifid, toothed; upper leaves greatly reduced. Umbels long- or short-pediculed, sometimes sessile; bracts 4–8, ½ in., linear; rays ½–1½ in., pubescent, subomentose; bracteoles and pedicels much as in P. nuda, but more hairy. Fruit ½ in.; carpels oblong, hardly narrowed upwards; lateral primary ridges within the distinctly constricted commissure.

11. CARUM, Linn.

Herbs, perennial or annual. Leaves pinnate, or decomposed. 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 oblong, laterally compressed and more or less constricted at the commissure; carpels terete, subpentagonal, 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 vitro, from Seseli by the fruit being more or less constricted at the commissure. (See Pimpinella caspitoa which has solid vitreus.)

* Fruit glabrous or very nearly so.

1. C. Carui, 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. 879.

Baltistan, Kashmir and Gurwhal, 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 ½–¾ in., of the upper ½–1 in. Bracts 1–3, small, linear, or 0, rarely divided; rays 3–8, ½–2 in., unequal; pedicels 3–8,
Carum.} LXX. UMBELLIFERÆ. (C. B. Clarke.) 681

3.1–3 in., unequal. Fruit \( \frac{3}{4}–\frac{1}{2} \) in., yellowish-brown, almost viscid; carpels terete narrowed upwards, primary ridges thin but very distinct; vittae solitary, rather large; carpophore entire, or shortly 2-fid.—C. meifolium, Bieb. Boiss. Fl. Orient. differs by its lower leaves with linear segments, its more numerous bracts; but is perhaps hardly distinguishable.—Caraway.


NIPAL; Wallisch.

Glabrous. Stem 3 ft. or more, much branched, sparingly leafy upwards. Leaves 2–3 in.; pinnae \( \frac{2}{3} \) by \( \frac{1}{3} \) in., acute, or in the upper leaves often linear. Bracts 1–3, \( \frac{1}{3} \) in. linear or 0; bracteoles 0–5, \( \frac{1}{2} \) 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, \( \frac{1}{3} \) in., nearly terete, probably resembling that of C. Carui, but may become broad at the commissure when it may be referable to Funiculum.

3. C. nothum, 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, \( \frac{1}{3} \) in., very narrowly oblong, subobtuse; rays 3–7, 1–1\( \frac{1}{2} \) in.; pedicels 3–8, rarely attaining \( \frac{3}{4} \) 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 Ptychitis 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.


Glabrous. Root tuberous. Stem 6–30 in., erect, branched. Leaves 2–3-pinnate, finely dissected, ultimate segments of the lower often \( \frac{1}{2}–1 \) in., of the upper leaves very narrow. Bracts 0, or several, linear, sometimes divided; rays 6–16, 1\( \frac{1}{2} \) in.; pedicels 10–15, \( \frac{3}{4}–\frac{1}{2} \) in. Fruit \( \frac{3}{4}–\frac{1}{2} \) in., yellowish-brown, almost viscid; carpels exactly oblong, hardly widened at the middle, semi-terete, dorsally subcompressed; ridges thin, distinct; vittae solitary, rather large.

5. C. stictocarpum, C. B. Clarke; ultimate segments of the lower cauline leaves narrowly linear-lanceolate, bracteoles 4–8 linear-lanceolate with scarious ciliate margins, fruit shining minutely pubero-punctate.—Ptychitis sp. 3, Herb. Ind. Or. H. f. & T.

CONCANC; Stocks, Law.

Glabrous or minutely hairy. Root fusiform. Stem 1–3 ft., erect, much branched. Leaves 2-pinnate, ultimate segments often 1 by \( \frac{3}{4} \) in., upper often with linear segments. Bracts 3–6, \( \frac{1}{2} \) in., nearly linear; bracteoles \( \frac{1}{4} \) in.; rays 6–12, \( \frac{1}{2}–2 \) in., equal, slender; pedicels 8–20, \( \frac{1}{4}–\frac{1}{2} \) in. Ovary minutely pubero-pubescent. Fruit
sometimes a Wight C. 891 52. rays Wight Wight. sp. Athamantha Athamantha Apium 109 P. ex.. exactly and 891. L. C. invohtcrata Bracts 891 ultimate ultimate vittse Dalz. tispidnlous Ptychotis Ptychotis Sison Stocks, as OAFOBB ** 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 $\frac{1}{10}$–$\frac{1}{5}$ 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 vittae are more 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 Decan.—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 $\frac{1}{2}$–$\frac{1}{4}$ in. Bracts several, linear, rarely 0, sometimes divided; rays 4–12, $\frac{1}{2}$–$\frac{1}{4}$ in.; pedicels 6–16, $\frac{1}{10}$–$\frac{1}{2}$ in., more or less pubescent. Fruit $\frac{1}{10}$ in., ovoid; carpels subpentagonal, dorsally compressed, nearly plane on the inner face; ridges usually distinct; vittae solitary, 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.

8. C. khasianum, C. B. Clarke; lower leaves 3-partite pinnate or sub-2-pinnate ultimate segments oblong crenate-serrate, fruit very nearly as in C. copticum, but shorter.—Ptychotis? sp. Wall. Cat. 7218. Ptychotis sp. 9, Herb. Ind. Or. H. f. & T.

Khasia Mt.; alt. 3000–5000 ft., common, Wallich, &c.

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 \( \frac{1}{2} \) in., narrowed at the base, distinctly reticulate-nerved, of the upper narrower, sometimes filiform. Bracts 0-5, \( \frac{1}{4} \) in., linear; rays 4-8, \( \frac{1}{2} \) in., hispid; pedicels 8-16, \( \frac{1}{4} \) in., bracteoles shorter than the pedicels. Fruit \( \frac{1}{2} \) in., ovoid, mucrate hispidulous, ridges prominent; carpels subpentagonal, dorsally subcompressed; vittae solitary, small.


NIPAL, Wallich. KUMAON; Almora alt. 5000 ft., Strachey & Winterbottom.

Puberulo-pubescent. Root fusiform. Stem 2-4 ft., erect, leafy, corymbose upwards with long peduncles. Leaves 2-3-4-pinnate, ultimate segments \( \frac{1}{4} \) in., sometimes lanceolate-linear; rays \( \frac{1}{2} \) in.; bracteoles 4-8, \( \frac{1}{2} \) in., linear; pedicels 15-30, \( \frac{1}{2} \) in.—Ripe fruit not seen; young very pubescent.

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.

GUJWHAL; 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 \( \frac{1}{2} \) in.; rays \( \frac{3}{4} \) in.; bracteoles 4-6, \( \frac{1}{2} \) in., oblong, subobtuse; pedicels 8-16, \( \frac{1}{2} \) in., with scattered hairs. Petals pubescent. Fruit \( \frac{1}{2} \) 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, pinnate 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 bi-partite, 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 Siyum rather than in Pimpinella. Siyum 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 BALTIISTAN, 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 vittae scattered nearly all round the carpels. S. latijugum is that plant which Bentham (in Gen. Pl. ii. 898) 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. lanceolatum* in which the fruits are much smaller the ridges slender with broad 3-vittate furrows. *S. nipponicum*, Maxim. in Bull. Acad. Petersb. Mel. Biol. ix. 766, is very near *S. latijugum*, but its calyx-teeth are manifest, and there are vittae scattered under the ridges besides the subsidiary vittae in the furrows. In *S. multipapillatum* the lateral ridges are rather larger than the others, and form with the commissure a wide plane face, there are 2 vittae only on the commissure close to its median line. The 4 vittae 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 decom- pound, rarely undivided, toothed. Umbels compound; bracts few or 0; bracteoles usually linear, sometimes 0. Flowers hermaphroditic or polygamo-monoeious. Calyx-teeth 0 or small, lanceolate. Petals usually emarginate, ovate acute or lanceolate caduate. 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. caespitosa* 1-vittate); carpophore entire 2-fid or 2-partite. Seed terete, ½-terete or dorsally subcompressed, inner face plane or nearly so. — Distrib. 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 cauline leaves 3-4-pinnate ultimate segments linear-lanceolate, bracts 1-5½ in. linear, rays 8-10. Athamanta achilleifolia, Wall. Cat. 568. Ptychotis achilleifolia, DC. Prodr. iv. 100.

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 2-½ in., often 3-furcate, somewhat rigid, upper leaves reduced, sometimes almost to the inflated sheaths. Bracteoles 4-6, ½ in. linear; rays ½-2½ in.; pedicels 8-20, ½-1 in. Fruit ½ in., elliptic, oblong, glabrous, laterally compressed, ridges distinct, furrows 2-3-vittate; disc conical, prominent.

2. **P. nervosa**, C. B. Clarke; cauline leaves twice 3-partite secondary pinna 1-2 in. broadly lanceolate serrate nerves beneath much elevated minutely scabrid.

Khansia Mts.; Nonkreem, alt. 5500 ft., H. f. & T.

Nearly glabrous. Stem 2-3 ft., stout. Peduncles 1-6 in. Bracts 0; rays 6-12, 1-2½ in.; bracteoles 3-8, linear, overtopping the umbellules. Flowers all herma-phroditic. Calyx-limb 0. Petals emarginate, white or purplish. Styles short. Fruit ½ 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 *Elyopodium*, but there are small vittae in the unripe fruit.

**Pimpinella.**] LXX. **UMBELLIFERAE.** (C. B. Clarke.) 685

zyllanicum, Herb. Rottler & Klein. Anethum trifoliatum, Roxb. Fl. Ind. ii. 96?.


Nearly glabrous, or the leaves pilose. Stem 2-4 ft., erect, branched. Ultimate segments of the lower leaves often 1-2 by ½-⅔ in., serrate, of the upper narrower sometimes linear. **Bracts** 0; rays 6-12, 1-2 in., glabrous or nearly so; bracteoles 1-2, ¼ in., often 0; pedicels 6-10, ½-⅔ in. **Fruit** ⅓-⅔ in.; carpels ellipsoid, almost globose, ridges slender, rarely white and conspicuous; disc obsolete; carpophore 2-6d, 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. hayneana* and *diversifolia*. Wallich identified it with his *trifoliate* (diversifolia, DC.) a Himalayan plant, but W. & A. with more probability refer it to *P. hayneana*.

4. **P. sikkimensis**, C. B. Clarke; cauline leaves 2-3 sub-3-pinnate, ultimate segments oblong bristle-serrate, fruit ⅓ in. elliptic longer than broad.—Ptychitis 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 (⅓ in.) opposite. **Bracts** 0 or 1-2, scarcely ¼ in., linear; rays 8-14, 1-3 in., stout, angular, divaricate; bracteoles few, scarcely ¼ in., linear; pedicels very many, but only 6-12 fruiting, ⅔ in. **Fruit** lanceolate. **Pedals** 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; vitellus 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 pinnae 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 ⅔-⅔ in., often 3-fld, not setulose. **Bracts** 0; rays 6-12, ⅔ in., rigid; bracteoles 1-2, less than ¼ in., linear, or 0; pedicels 8-12, hardly ¼ in. **Fruit** ⅔ in., laterally subcompressed; disc inconspicuous; ridges prominent; carpophore stout, 2-partite; carpels dorsally compressed, subpentagonal, plane on the inner face; vitellus externally somewhat conspicuous, usually 3 in each furrow and 4 on the commissure.

6. **P. Saxifraga**, Linn.; DC. **Prodr.** iv. 120; radical leaves pinnate pinnae round or elliptic toothed upper 2-pinnate, fruit ellipsoid rather longer than broad. Boiss. **Fl. Orient.** ii. 873.—**Var. dissectifolia**; pinnae (even of the radical and lower cauline leaves) deeply lobed, lobes lanceolate.

**Var. dissectifolia**; KASHMIR; Tisilal, alt. 13,000 ft., and WESTERN TIBET; KARAKORUM, alt 14,000 ft.; C. B. Clarke.—**Distrib.** 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, pinnae ⅔-⅔ in. diam. **Bracts** 0; rays 5-10, ⅔-⅔ in., unequal, stout, ascending; bracteoles 5-6, ⅔ in., linear; pedicels 5-10; ⅔-⅔ in. **Petals** often pink or purplish. **Fruit** ⅔ in.; carpels ⅔-terete, subpentagonal, dorsally subcompressed; inner face plane; ridges thin, distinct; vitellus 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.
7. **P. acuminata**, B. C. Clarke; lower cauline leaves 2-pinnate secondary pinnae toothed or incised, pedicels slender, fruit terete. Reuteria acuminata, *Edgew. in Trans. Linn. Soc. xx. 52*

From Kashmir to Kumaon, alt. 4—8000 ft., frequent. Glabrous, or the leaves obscurely pubescent. *Stem* 3—4 ft., corymbose upwards. Secondary *petiole* 1—2 in. *Bracts* 1—5, \( \frac{1}{4}—\frac{1}{2} \) in. linear; rays 5—10, 1—3 in.; *bracteoles* 3—5, \( \frac{1}{4}—\frac{1}{2} \) in. linear; pedicels 1—2 in. *Petals* yellowish-green or nearly white. *Fruit* nearly globose, laterally compressed, yellowish-brown, subviscid; carpels terete, ridges slender, furrows 2—3-vittate; disc small.—Easily recognised by the long slender pedicels.

8. **P. bella**, B. C. 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 pinnule opposite, often white beneath. *Bracts* 0, or 1 linear, 1 in.; rays 10—15, 1—2 in., angular, stout; *bracteoles* 2—5, \( \frac{1}{4}—\frac{1}{2} \) in., linear; pedicels 8—16, \( \frac{1}{4}—\frac{1}{2} \) in. *Calyx—margin* obsolete. *Petals* ovate-lanceolate, plane. *Disc* large, conical. *Carpophore* 2-partite. *Fruit* \( \frac{1}{4} \) in.; carpels terete, subpentagonal, inner face hardly grooved; ridges slender, furrows 2—3-vittate.

9. **P. Hookeri**, B. C. Clarke; leaves pinnate sub-2-pinnate segments of the lower leaves oblong of the upper linear, fruit ovate as long as broad.—Acronema sp. 2, *Herb. Ind. Or. H. f. & T.*

Sikkim, Northern valleys, Samdong and Lachen, alt. 8—11,000 ft., *J. D. H.* Glabrous. *Root* tuberous. *Stem* 1—2 ft., slender, sparingly leaffy, 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; *bracteae* and *bracteoles* 0, or inconspicuous; pedicels 4—6, \( \frac{1}{4}—\frac{3}{4} \) 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 plant being emarginate with a short inflexed point). *Fruit* 0.13 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 Benth. 1. 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 carpophere undivided thick; fruit \( \frac{1}{4} \) 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—5 in. stout, bracts 1—5 \( \frac{1}{2} \) in. linear.
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. *dissecta*; segments $\frac{1}{4}$ in. Rays 6-12, 1-1$\frac{1}{4}$ in, stout; bracteoles small; pedicels 10-16, $\frac{1}{3}$-$\frac{1}{2}$ in. Petals elliptic, obtuse, plane, white or pinkish. Fruit nearly as that of *P. tenera.*—This closely resembles *Vicatia millefolia,* but the plane petals exclude it from that genus.


Khassia Mts.; Moilong, alt. 6000 ft., Griffith, H. f. & T.; Mairung, alt. 6000 ft., C. B. Clarke.

Root fusiform. Stem 3 ft., erect, obscurely pubescent, sparingly leafy, laxly corymbose upwards. Leaves 2-4 by 1-1$\frac{1}{2}$ in., nearly glabrous above; upper cauleine sometimes 3-partite with cordate ovate leaflets, uppermost sometimes reduced with narrow segments. Bracts 0; rays 5-8, 1-1$\frac{1}{4}$ in, scabrid, subpubescent; bracteoles 0, or 1-2, $\frac{1}{2}$ in., linear; pedicels 5-10, $\frac{1}{2}$-$\frac{1}{3}$ in. Fruit $\frac{1}{2}$-$\frac{1}{2}$ in., brown, subdysmous, acute upwards, dorsally subcompressed, inner face slightly concave; ridges obscure, furrows 2-vittate; disc prominent, conical; carpophore 2-fid or 2-partite. Seed $\frac{4}{3}$-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-oblung glabrous or when young with a few scattered hairs. *W. & A.* Prodr. 369; *Wight* L. t. 1005; *Thwaites* Enum. 151.

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 6-16, 1-1$\frac{1}{4}$ in, scabrid-pubescent; bracteoles 1-3, $\frac{1}{2}$ in, linear; pedicels 6-12, $\frac{1}{2}$-$\frac{1}{3}$ in. Fruit $\frac{1}{2}$-$\frac{1}{2}$ in., narrowed upwards, strongly compressed, brown, finally glabrous; carpels $\frac{4}{3}$-terete, not dorsally compressed, inner face plane; ridges not prominent, furrows 3-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-scabrous or pubescent.** (See also No. 13, *P. Leschenaultii*).


Mrs. 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 petioloated 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 $\frac{4}{3}$-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. monoica**, Dalz. in Hook, Kew Journ. iii. 212; lower cauleine leaves 3-partite leaflets long-petioloated cordate-ovate, fruit terete papillose subsacrid.

Throughout the HIMALAYA, alt. 4-10,000 ft., very common. KHASIA Mts. alt. 3-6000 ft., common.—DISTRICT, China.

Villous, submentose, or scarcely pubescent. Stem 2-5 ft., corymbosse upwards. Radical and lower cauline leaves often round-ovate; cauline often with 3-5-leaflets, or twice 3-partite or sub-2-pinnate; segments of the uppermost narrower, occasionally almost linear; leaflets usually 1-3 by 1-1 in., serrate, sometimes laciniate or subpinnatifid. Bracts 0, or 1-2, 1/2-1 in., linear; rays 6-16, 1/2-1 1/2 in., sometimes villous, never quite glabrous; bracteoles 8-3, 1/2 in., or 0; pedicels 8-16, 1/2-3 in., all fruiting. Petals emarginate, white greenish or lurid. Fruit 1/2-1 in., laterally compressed, ridges never prominent sometimes quite obscure, furrows 2-3-vittate; disc not prominent; carpels 1 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 papillose-rugose fruit: from these P. mononca Dale. 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 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 cylindrical apex conical.—Pimpinella sp. 3, Herb. Ind. Or. H. f. & T.

**KUMAOI**; 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 1/2 in.; carpels terete, ridges slender, furrows 2-vittate. Young ovary villous. Fruit ultimately glabrescent shining yellow-brown.—Nearly allied to No. 22, P. carpitosa.

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 Zwasabakins, Parish. Habit of P. diversifolia, much divided and very leafy upwards. Leaflets 1-2 by
Pimpinella.] LXX. UMBELLIFER.A. (C. B. Clarke.) 689

4-1 in., sparingly pubescent, very irregularly cut, sometimes pinnatid. Umbels pubescent, nearly as in P. diversifolia, but with bracts and prominent bracteoles. Bracts 4-3 in. pubescent, lanceolate or the bases broad and subconcin; bracteoles very similar, exceeding the flowering umbrellas. Fruit not seen.—This resembles P. diversifolia, differing in the more developed involucres: in the absence of ripe fruit, it may be a Heracleum or some other genus.


Bombay (probably in the Ghats) Dalzell; Concan, Stocks.
Pubescent, somewhat villous upwards, hardly tomentose. Stem 2-4 ft., much branched upwards. Lower leaves large, ovate, ultimate leaflets 1 in., petioloied, 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 in. Fruit 8 in. almost rostrate, laterally compressed, hardly constricted at the commissure; style-bases elongate, conical, yellow-brown; carpels terete, obscurely pentagonal; ridges very obscure; furrows 2-3-vittate; carpellary slender, 2-fld.


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 in., diam., acutely serrate; upper leaves reduced, often more divided. Bracts 4-7, 1 in., linear; rays 4-12, 1 in., glabrous; bracteoles 4-7, 1 in., linear, minutally ciliate-pubescent; pedicels 8-16, 1 in. Fruit 1 in., brown, hardly acute, laterally compressed, disc not prominent; carpels terete, hardly pentagonal, not dorsally compressed; ridges obscure; furrows 2-3-vittate.


Deccan; in ravines, common; Dalzell.
Puberulous, 1-1½ 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.


Guewhal; Niti, alt. 12,000 ft., Edgeworth, Strachey & Winterbottom. Kunawur; above Rogi, alt. 9-10,000 ft., Thomson.
Rootstock short, woody, branched. Stems many, 4-8 in., sparingly leafy upwards. Pinnae of the lower leaves 1 in., diam., coarsely serrate, hardly mucronate, sometime lobed or 3-fld. Bracts 4-3 in.; rays 4-6, 1 in., with much spreading soft white hair; bracteoles 4-6, 1 in., lanceolate; pedicels 6-12, 1 in. Fruit 15-16 in., very villous when young, ultimately glabrescent, laterally compressed; style-bases vol. II.
large, subglobose on the young fruit; carpels \( \frac{1}{3} \)-terete, dorsally compressed; ridges obscure; furrows 1-vittate on the few fruits available.—Strach. & Wint. suggest that this is the *Thaspium foliosum*, Royle.

14. **OSMORRHIZA**, 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 \( \frac{1}{4} \)-terete, dorsally subcompressed, inner face grooved.—**Distrib.** Species 4, North Asia, Japan, North America, Andes.


**North-West Himalaya**, from Kashmir to Kumaon, alt. 5000–8000 ft., frequent.—**Distrib.** 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 \( \frac{1}{3} \) in., linear; rays 3–6, 1–4 in.; bracteoles 4–6, \( \frac{1}{10} \) in., lanceolate; fruiting pedicels 3–6, \( \frac{1}{10} \) in.; several other short abortive pedicels indicate male flowers. Fruit \( \frac{1}{4} \) by \( \frac{1}{10} \) in., rather suddenly narrowed into conical style-bases; styles in fruit variable in length. —The Japanese examples have the pinnæ more pinnate, the Himalayan have the pinnæ generally 3-partite: the length of styles cannot be invariably connected with any other character, geographical or morphological.

15. **CHEBOPHYLLUM**, 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. capnoidei*); 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.—**Distrib.** 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. 226.

HIMALAYA, from KASHMIR to SIKKIM; alt. 5000–12,000 ft., frequent. KHASIA
Mts., alt. 4000–6000 ft., frequent.
Root fusiform. Stem 1–4 ft, erect, branched, always hispid below, often hairy upward. Leaves large, secondary pinnae of the upper pinnate or pinnatifid, ultimate segments scarce ½ 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, ½–1 in., linear, often white margined, soon reflexed; pedicels 10–15, often 3–8 fruiting. Fruit ½ in., equally broad its whole length, narrowed somewhat suddenly at the tip.

2. C. reflexum, Lindl. in Royle Ill. 232; glabrous or very sparsely pliöse, 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 DALHOUSSIE 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 umbelule; pedicels of the other flowers being reflexed, as sometimes in a much less degree in C. villosum. Fruit ½–1 in., beak ½ in.; vittae of the commisure 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 ½ 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 (½ in.) fewer (often 2–3) to the umbelule.—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. aurum, Linn.


KASHMIR; Jacobrenst. KISHTWAR and BANAHAL; alt. 6000–8000 ft., Thomson.
Nearly glabrous. Stem 12–24 in. Leaves 4–8 in., lax, ovate; ultimate segments ½ by ⅓ in., undulate, mucronate. Bracts 0; rays 4–8, 1–3½ in., stout; bracteoles 4–7, ⅓ in., lanceolate; pedicels 6–12, ½–1 in., most of them fruiting. Fruit ⅜ 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 subconic, epicap thin, no trace of vitæ.—The Algerian Balansea Fontanesii, Boiss. & Reut., said hardly to differ from this by Benth., l. 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 commisierre, and has large vitæ.

5. C. cachemiciricum, C. B. Clarke; upper leaves sub-2-pinnate secondary pinnae oblong deeply toothed or subpinnatifid, fruit oblong-lanceolate, ridge obscure.

yy2
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 ½ in., lanceolate, pubescent or ciliate; pedicels 3-8, hardly ¾ 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 ½ in. Flowers often radiant. Fruits ¾ 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 3-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; vitæ in each furrow solitary, usually prominent; carpophor 2-partite, 2-fid or entire; disc not prominent on the fruit. Seed 3-terete; in *S. trilobum* dorsally compressed, inner face excavated.—**Distri.** Species 40; in the N. temperate zone of the Old World; with 2 doubtful Australian.


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, ⅓ in. lanceolate; pedicels 10-25, ⅓-⅔ in. Young fruit ½ in. densely villous, in age less so; carpels 3-terete, dorsally compressed, inner face plane; epicarp somewhat thickened, ridges strong, subequal, vitæ minute; carpophor 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, ⅓ in., narrowly lanceolate, ciliate, pubescent; rays 8-16, ⅓-1 in.; bracteoles like the bracts but rather smaller; pedicels 8-16, ⅓ in. Flowers white or pinkish. Fruit 1½-2 in. (in Roxburgh’s drawing copied in Wight Ic. t. 569) glabrous; in Wall. Cat. 7215, and *W. & A. Prodr.* 371, very hisrute (and hardly half as large); hairs often clubbed or subulate at the apex; carpels 3-terete; vitæ distinct; carpophor entire.—There are examples with fruit intermediate between the two extreme types above described.

3. *S. daucifolium*, C. B. Clarke; leaves 2-3-pinnate ultimate segments linear or narrowly lanceolate, bracts many often divided, fruit globose glabrous. Ammi daucifolium, Wall. Cat. 7209.—Discopleura sp., Benth. in Gen. Pl. i. 907.

- *Bast Bengal*; from Bhotan and Assam to Dacca and Chittagong; Wallisch, &c.—**Distri.** 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 ⅓-½ in., sometimes pinnate; rays 8-16, usually shorter than the bracts; bracteoles 6-12, ⅓ in., linear; pedicels 10-25, ⅓-⅔ 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_, Cuss.; _DC. Prodr._ iv. 152; to which _Seseli daculifolium_ 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; Nrrt, alt. 8000–10,000 ft., _Edgeworth._ _Gurwhal._ Falconer. _Kumaon_; Millem, alt. 11,000 ft., _Strachey & Winterbottom._

Stem 8–24 in., villous and little leafy upwards. Leaves minutely pubescent above; secondary pinna ½ to 1½ in., crenate-serrate or irregularly lobed. _Bracts 3–5, ½ in._; rays 5–10, 1–2 in.; bracteoles 5–8, 3–½ in., linear; pedicels 10–20, 1½–½ in. _Fruit_ ½–1 in., but little longer than broad; carpels convexo-concave, much dorsally compressed; ridges strongly marked, subequal, villous 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 3–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. villowei._ If this point be withdrawn from the generic character of _Pycnocycla_, it will include _Seseli trilobum_, Bentham.


**North-West India, Royle;** Sutlodge banks, Falconer. _Jubbulpore_; Beddome. _Sattura Hills, G. Thomson._—_Distrib._ Abyssinia.

Branched from the base, 1–2 ft.; branchlets terete, striate, subglaucesse. Radical leaves long-petiolate, pinnately dissected; segments remote, glabrous or nearly so; cauline similar, but smaller more shorty 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_ ½ 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 herbs, 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 $\frac{1}{2}$-terete, ridges prominent subequal, furrows 1-vittate; carpophore 2-particle. Seed somewhat dorsally compressed, inner face slightly concave. —Distrib. 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. Jc. Fl. Germ. t. 1931 (with short linear ultimate segments) has not been communicated from India.


Tall, perennial herbs. Leaves 3–4-pinnate. Umbels compound; bracts and bracteoles many. Calyx-teeth 0. Petals emarginate, yellow. Fruit oblong, commissure broad; carpels $\frac{1}{2}$-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; vitrea small, numerous; carpophore 2-particle. Seed dorsally compressed, inner face slightly concave, with a deep narrow T-shaped groove. —Distrib. Species 25, in the Mediterranean and West Asian regions.

1. P. pabularia, Lindl. in Quart. Journ. Sc. xix. (1824) 7; glabrous, ultimate segments of the leaves $\frac{1}{2}$–1 in. setaceous, fruit ridges undulate furrows with corrugations. DC. Prodr. iv. 239; Wall. Pl. As. Rar. ii. 7, t. 212. Laserpitium sp. Wall. in Trans. Agri. & Hort. Soc. Ind. i. 74–82.

Kashmir and Baltistan, alt. 6000–11,000 ft., Falconer, &c. —Distrib. Cabul, Kashgar.

Stem 4–5 ft. Leaves 12–18 in., very compound. Umbels 6–18 in. diam., sometimes very compound. Bracts 4–5, $\frac{1}{2}$ in., linear. Pedicels 15–25, $\frac{1}{2}$–$\frac{3}{4}$ in., whereas 4–8 may produce fruit. Fruit $\frac{1}{2}$–$\frac{2}{3}$ in.; wings $\frac{1}{2}$ in. broad; style-bases depressed; styles short, early reflexed. Seed $\frac{1}{2}$–$\frac{3}{10}$ in. diam.

22. Cnathus, 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
glaubrous, ellipsoid, longer than broad, or globose, nearly terete, commissure broad; carpels 4-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.—DISTRIBUTION. 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.—DISTRIBUTION. Java, China, Japan.

Glaubrous or nearly so, 2-4 ft., rooting freely from many of the lower nodes. Leaves from 3-partite to 2-pinnae; ultimate segments 1-2 by 1/2-1 in., those of the upper leaves never linear. Rays 6-30, 1/2-2 in., stout. Carpels 3 by 1/2 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. Lajd. Bot. 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. lacintatum**, Miq. Fl. Ind. Bot. i. pt. 741, does not appear to differ.

VAR. 1. *khasiana*; very large, secondary pinnae large, nerves beneath reticulated elevated ecbabrid subpubescent, rays 3 in.—Khasia Mts., near Moflong, alt. 6000 ft., H. f. & T.—Calyx-teeth less prominent than in the type; bracteoles much exceeding the flowering umbelhules.—This may be a distinct species; but the examples do not exhibit fruit.

VAR. 2. *corticata*, Edgew. in Trans. Linn. Soc. xx. 53 (sp.); leaves often simply 3-partite, fruit scarcely 1/2 in. subglobose.—Banks of the Delhi Canal, Edgeworth.


BENGAL PLAIN and ASSAM, common.—DISTRIBUTION. FORMOSA, BONIN, LOO-CHOO.

Glaubrons or nearly so; 8-16 in.; usually erect on muddy banks. Secondary pinnae 1-1 in. of the lower leaves often ovate, of the upper lanceolate. Umbel often sessile. Bracts 0; rays 4-6, rarely 4 1/2 in., stout. Calyx-teeth small. Carpels 3 by 1/2 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 much more difficult to separate the Chinese and Japanese specimens.

3. **E. linearis**, Wall. Cat. 586; stem decumbent, nodes rooting freely, leaves 2-pinnae ultimate segments of the upper 1 1/2-1 in. linear, peduncles and umbels nearly as in **E. stolonifera**. DCC. Prodr. iv. 138.
NIPAL; Wallich.
Closely allied to C. stolonifera, and only differing in the more narrowly cut leaves, ultimate segments of the uppermost often \( \frac{3}{4} \) by \( \frac{1}{8} - \frac{1}{12} \) in. Wallich's specimens have no fruit. Mr. Bentham (in Gen. Pl. i. 906) has admitted this plant to specific rank.

4. C. 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 \( \frac{1}{2} \).—Dasyloma sp. 1, Herb. Ind. Or. H. f. & T. Umbellifera, No. 986, Griff. Itin. Notes 57.

Glabrous, or the rays sometimes pubescent. Stem 2 ft., erect, fistulous, scarcely divided. Peduncles elongate. Bract 1, \( \frac{1}{2} \) in., linear, or 0; rays 4–8, \( \frac{1}{2} - \frac{1}{2} \) in.; bracteoles often longer than the flowering umbellule. Calyx-teeth obsolete. Carpels \( \frac{1}{2} \) by \( \frac{1}{8} \) in., almost exactly as in C. benghalensis, much smaller than in C. fistulosum, which this plant resembles in habit.

5. C. Thomsoni, C. B. Clarke; leaves finely 3–4-pinnate ultimate segments scarcely \( \frac{1}{2} \) in. linear, peduncle elongate, carpels dorsally compressed.—Dasyloma sp. 2, Herb. Ind. Or. H. f. & T. Umbellifera, No. 1001, Griff. Itin. Notes 65.

SIXSIM and BHOTAN, alt. 5000–8000 ft., frequent. KHASIA Mts., alt. 4500–6000 ft., frequent.
Glabrous, 2–3 ft., weak, diffuse, branched. Leaves 6 in., ovate, sometimes 5-pinnate. Rays 4–8, \( \frac{1}{2} - \frac{1}{2} \) in.; bracteoles not prominent. Carpels \( \frac{1}{3} \) by \( \frac{1}{2} \) in. dorsally compressed, otherwise much resembling C. benghalensis and C. Hookeri. Seed dorsally compressed.

23. SCHULTZIA, Spreng.

Glabrous perennial herbs. Leaves 1–2-pinnate, ultimate pinnae toothed pinnatifid 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 \( \frac{1}{3} - \frac{1}{2} \) 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.

24. POLYCYGUS, Dalz.

A glabrous herb; root tuberous. Leaves 2-pinnate or twice 3-partite, secondary pinnae ovate lobed or deeply pinnatifid. 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 ½-terete, dorsally compressed, inner face plane.


Bom'ay and Malwa, Dalsell; Concan, Stocks; Canara and Mysore; Lou. Stems 8-18 in., several, weak. Secondary pinnæ of the leaves ½-1½ in., ultimate segments lanceolate or ovate. Rays 3-8; ½-1½ in.; pedicle 6-12, ½-1 in. Fruit ½ in.; style-bases depressed, inconspicuous.—This resembles a *Pimpinella*, but the habit is weak, straggling.

25. **LIGUSTICUM**, Linn.

Perennial herbs. Leaves 1-2-3-pinnate or twice 3-partite, ultimate pinnæ 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-pinnate pinnæ oblong lobed or pinnatifid, fruit ellipsoid terete, lateral ridges scarcely wider than the dorsal.—Oreocephse 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 pinnæ 1 by ½ in., lobed, or sometimes deeply pinnatifid; upper leaves reduced nearly to sheaths, or small more finely cut. *Bracts* 5-8, ½-3 in., white-margined, deciduous; rays 10-20; bracteoles like the bract but smaller. Fruit ½ by ½-1 in.; ridges subulate; dorsal furrows 3-2-vittate, lateral 3-vittate, commissure 6-10-vittate.

Var. *rutilans*; larger, leaves larger 2-pinnate 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 pinnæ 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., pinnæ 1-1½ in. deeply pinnatifid, lower sometimes subpinnate; segments oblong, serrate or lobed, often minutely pubescent. Peduncles long, pubescent upwards. *Bracts* 1-5, ½ in., linear; rays 12-20, ½-1½ in.; bracteoles 4-8, ½-½ in., linear. Fruit larger than in *L. Thomsoni*, the lateral ridges much wider than the dorsal; vittæ 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-pinnate secondary pinnæ 1-3 in. ovate pinnatifid, fruit elliptic much dorsally compressed. Cortia

North-west Himalaya; Simla, alt. 7000-8000 ft., Edgeworth: L. pinnatifidum. Jaseschiak.

Stem 2-3 ft. Lower leaves 12 by 8 in., secondary pinnate; upper pinnate or reduced to sheaths. Bracts 1-4, ½ in., linear, or 0; rays 12-40, 1-½ in.; bracteoles 6-12, ½ in., linear; pedicels very many. Fruit ½-3 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 bivittatis in the specific character being a misprint for trivittatis. 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 obvate, emarginate, white or yellowish-green. Fruit ovoid or subquadract, commissure broad, more or less dorsally compressed or complanate; lateral primary ridges winged, corky 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 suberete, or more or less dorsally compressed, inner face plane or slightly concave, not grooved.—Distr. 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. temusifolium 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 ½ in. narrowly oblong-lanceolate, fruit little dorsally compressed, ridges subequally winged, vittae all solitary, seed about twice as broad as thick. Laserpitium striatum, Wall. Cat. 683 (not Ligusticum striatum, DC. Prodr. iv. 158).

Nipal; Wallach. Khasia 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, ¼-¾ 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 1-1½ in., lateral furrows 1-vittate, vittae twice as wide as those in the dorsal; commissural vitte 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.

2. S. tenuifolium, Wall. Cat. 579, chiefly; ultimate pinnae \( \frac{1}{4} \) in. broad-elliptic pinnatifid deeply into narrow lanceolate acutest segments, fruit \( \frac{1}{4} \) in. much dorsally compressed, lateral ridges much the broadest, dorsal furrows 1-vittate lateral 2-3-vittate, seed 4-6 times as broad as thick. S. Candollii, Edw. in Trans. Linn. Soc. xx. 55, not of DC. Peucedanum Wallichianum, DC. Prodr. iv. 181. Pleuroserpbum cicutarium, Lindl. in Royes Ill. 233. Oreocome Candolliana, Edw. l. c.

Himalaya; alt. 6000-13,000 ft., from Kashmir to Bhutan, 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, \( \frac{3}{4} - 1 \) 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, subcomplanate, 3 dorsal ridges approximate, often hardly elevated (whence DC. considered the plant a Peucedanum); commissural vitæ 4-6, distant from the medial line. Seed complanate, inner face plane or subconvex.

Var. 1. filicifolia; quaternary pinnae pinnatifid into more remote lobes. Oreocome filicifolia, Edw. 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; referring probably to the lateral ones; which have 2-4 vittæ.

Var. 2. elata; quaternary pinna \( \frac{1}{4} - 1 \) in. broad-elliptic, fruit \( \frac{1}{4} \) 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, Edw. in Trans. Linn. Soc. xx. 55.—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 pinnae 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 \( \frac{1}{4} - \frac{3}{4} \) in. broad-elliptic pinnatifid deeply into narrow-lanceolate acutest segments, fruit \( \frac{1}{4} \) in. somewhat dorsally compressed, ridges all distinctly subequally winged, furrows all 1-vittate, seed 2\( \frac{1}{2} \) times as broad as thick. Angelica ? Candollii, Wall. Cat. 582.

Kashmir; alt. 7000-8000 ft., Thomson, NIPAL AND KUMAON; 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; vittæ 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 \( \frac{1}{4} \) in. dorsally compressed, ridges all winged the lateral more broadly, vittæ obsolete, seed 3 times as broad as thick. Cortia vaginata, Edw. in Trans. Linn. Soc. xx. 55.

From Kashmir to Kumaon, alt. 6000-12,000 ft., frequent.

Glabrous, or nearly so, 2-4 ft. Leaves 4-10 in., elliptic; lower like Stium lati-
follum; upper reduced; primary pinnae sometimes sessile on the sheath. Bracts few, usually inconspicuous; bracteoles 8–12, ½–1½ in., usually exceeding the umbellule. Calyx-teeth long linear lanceolate. Fruit subquadrato, 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 vitæ; but the compound bracteoles and long calyx-teeth refer it to Selinum.

5. S. papyruscaum, C. B. Clarke; tertiary pinne ½ in. ovate serrate or half-pinnatifid into lanceolate segments, fruit ½ 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 BALTISTAN and KASHMIR to SEIKIM, 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 corky 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 vitæ close to the carpophore.

DOUBTFUL SPECIES.

?S. dissectum, Wall. Cat. 581; leaves pinnate segments twice pinnatipartite, lobes linear-oblong acute, bracts 0, bracteoles few, flowers yellowish, fruit nearly orbicular narrowly margined, furrows 1-vittate, vitæ very distinct, commissural pair close to the carpophore. Peucedanum dissectum, DC. Prodr. iv. 178.—NIPAL; Gossain Than, Wallach. Habit of Æthusa.—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. CORTHIA, DC.

Perennial herbs, often nearly stemless. 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 approximated much narrower sometimes hardly winged; dorsal vitæ solitary, lateral solitary or in pairs; carpophore 2-partite. Seed much dorsally compressed, inner face plane.—DIERRA. 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. Hookeri, 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 \(\frac{1}{2}-\frac{3}{4}\) 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 H. f. & T.

Sikkim; alt. 18,000-18,000 ft., Donkiah, Jongri, &c., J. D. H.; Yakla, alt. 16,000 ft., C. B. Clarke; Phalloot, 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 \(\frac{1}{4}-\frac{1}{2}\) in., linear. Rays usually pubescent; bracteoles \(\frac{1}{4}-\frac{1}{2}\) in.; pedicels of the fruit \(\frac{1}{4}-\frac{1}{2}\) in., often ultimately thickened; umbellules generally unisexual, males with long stamens and obsolete styles. Fruit \(\frac{1}{2}\) by \(\frac{1}{2}\) 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 \(\frac{1}{6}\) in., and much more remote.

28. Pleurospermum, Hoffm.

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; terete or dorsally compressed; 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; carpopore 2-partite. Seed dorsally compressed, 2-3 times as broad as thick, inner face grooved concave or nearly plane. — DISTRIBUT. Species 16; Asiatic and Russian.

1. P. Govanianum, Benth. in Gen. Pl. i. 915; leaves pinnate pinnae \(\frac{1}{4}-\frac{1}{2}\) in. toothed or pinnatifid, bracteoles obovate toothed or subpinnatifid at the apex, fruit \(\frac{1}{4}\) in. lateral ridges narrowest. Ligusticum Govanianum, Wall. Cat. 546. Hymenocrena Govianiana, DC. Prodr. iv. 246; Royle Ill. 283, t. 62.

From Kashmir to Gurwhal, alt. 10,000-15,000 ft., Jacquemont, &c.

Stem 1 foot or less, thick, hollow. Leaves 4-8 in. long, pinnas 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 \(\frac{1}{2}-\frac{1}{2}\) 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.
Sikkim, alt. 13,000–16,000 ft.; J. D. H., C. B. Clarke.

Stem 2–3 ft., thick, hollow. Leaves 4–8 in., oblong; pinnae often distant, never finely cut. Bracts 1–1½ in., usually pinnatifid at the apex; rays 1–3 in.; pedicels very many, short; umbellules capitate and embraced by the bracteoles. Fruit narrow-oblong, rather broader upwards; calyx-teeth small; disc depressed; epicarp dull brown, somewhat corky; furrows 1-vittate. Seed concave or slightly grooved on the inner face.


From Kashmir to Kumaon, alt. 10,000–15,000 ft.; frequent.—Distrib. Tianschan Mts.

Stem 6–18 in., usually very thick. Leaves 4–8 in., oblong; pinnae often distant, never finely cut. Bracts 0–3 in., often like reduced upper leaves, sometimes a mere sheath; rays many, 2–8 in., sometimes carrying scattered white elliptic veined bracts; bracteoles obtuse, sometimes mucronate, embracing and usually overtopping the umbel. Fruit ellipsoid; ridges narrowly winged. Seed grooved on the inner face.—This has numerous vittae, but the bracteoles and broad commissure are of Pleuroserpentum.

4. P. rotundatum, Benth. in Gen. Pl. i. 915; leaves pinnate or 3-particle, leaflets of the lower 1–3 in. diam. with 3 rounded lobes, bracts 0 or 1 small, bracteoles 5–8 ½ in. narrow-lanceolate cuneate entire white-margined. Ligusticum rotundatum, Wall. Cat. 549. Hymenolaena rotundata, DC. Prodr. iv. 245.

Nipal; Gossain Than, Wallich.

Stem 2 ft., not very thick. Leaflets 3–5, petioluled, distant, entire or crenate, scarcely serrate, more often with 3 rounded lobes. Rays 8–12, 1½ in.; pedicels 3–6, some as long as the bracteoles. Calyx-teeth 0. Disc and styles small. Young fruit subcylintric with incipient ridges.—Wallich's examples show no ripe fruit, so that the genus is doubtful. The elongate not thick stem, the subobseolate bracts, and the little-prominent bracteoles do not look like Pleuroserpentum.


Nipal; Gossain Than, Wallich.

Stem 2–3 ft. Pinnae pinnatifid; lobes distant, large, coarsely serrate Bracts 4–6, 1–1½ in. oblong, coarsely lobed or pinnatifid at the apex; rays 4–12, 1–2½ in. Fruit ellipsoid, dorsally compressed; calyx-teeth obsolete, style-bases somewhat prominent; furrows 1-vittate. Seed broadly concave on the inner face, hardly grooved.


Kashmir; Falconer. Kumaon; Rutam River, alt. 11,500 ft., Strachey & Winterbottom. Nipal; Wallich.

Stem 3–4 ft. Leaves 12–18 in.; segments of the secondary pinnae often 1–3 in.,
serrated somewhat closely and regularly. Bracts 5–8, 1–1 ½ in., narrowly-lanceolate, entire, white-margined; rays 10–20, 1–4 in.; pedicels in fruit ½–3 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.

7. P. dentatum, Benth. in Gen. Pl. i. 915; leaves 2-pinnate pinnae ½–2 in. ovate, bracteoles 5–8 ½ in. lanceolate entire or minutely denticulate near the apex, fruit ½ in. ellipsoid. Ligusticum dentatum, Wall. Cat. 547. Hymenolaena dentata, DC. Prodr. iv. 245.

From Kumaon to Sikkim, alt. 9000–13,000 ft., Wallich, &c.

Stem 2–4 ft. Segments of the pinnae 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 plano.—Ovidium cuneatum, Ledeb. Fl. Alt. i. 331 (Aulacospermum, J. F. Ross. iv. 7, t. 319) 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 leaflets; the latter may indicate a different species as DC. suggests, but the typical P. dentatum has sometimes many bracts.

8. P. pumilum, Bent. 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; Islambo, 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-marginied, 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-marginated obtuse lobed or very shortly pinnatifid at the apex, fruit $\frac{1}{2}$ in. ellipsoid somewhat longer than broad, epicarp of very lax tissue, seed grooved on the inner face. Selinum stellatum, Don Prodr. 185; DC. Prodr. iv. 165. Hymenolepis stellata, Lindl. in Royle Ill. 233.

North-west Himalaya; Royle. Kumaon; Milam Glacier, alt. 13,000 ft., Strachey & Winterbottom.

Stem 1–6 in. Leaves 2–4 in., oblong; pinnae ovate, acutely serrate, or subfalcately pinnatifid or nearly 2-pinnate with mucronate lobes. Bracts 1–4, $\frac{1}{2}$–1$\frac{1}{2}$ 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. Hymenolepis Lindleyana, Klotzsch in Bils. Fr. Waldem. Bot. 180, t. 49. H. nama, Osten-Sacken & Rapport Sect. Tianschan. 49. Hymenolepis, sp. No. 9, Herb. Ind. Or. H. f. & T. ? Aulacosepermum simplex, Oot. & Rap. i. c.—West Himalaya, alt. 13,000–16,000 ft.; Kashmir, Thomson. Lahul; Rev. H. 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 Aulacosepermum simplex, the authentic example has the fruit not half-ripe, the bracteoles are rather smaller.

11. P. apiolens, C. B. Clarke; leaves pinnate pinnae $\frac{1}{2}$–1$\frac{1}{2}$ in. ovate often pinnatifid with 3–5–7 lobes, bracteoles 6–10 obovate caudate often toothed near the apex, calyx-teeth obsolete, fruit $\frac{1}{6}$–$\frac{3}{8}$ in. ellipsoid subquadrate.—Hymenolepis 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 4–6, $\frac{1}{2}$–1$\frac{1}{2}$ in., obovate-lanceolate, toothed, sometimes slightly pinnatifid, rarely subentire; rays 8–16, 1–2 in.; pedicels many, scarcely $\frac{1}{2}$ 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 $\frac{1}{4}$ in. ovate or oblong toothed or pinnatifid, bracteoles 6–10 obovate-lanceolate subentire white-margin, calyx-teeth ovate.—Hymenolepis sp. 8, Herb. Ind. Or., H. f. & T. Oreocome 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, 1–1$\frac{1}{2}$ in. lanceolate, often toothed or pinnatifid at the apex; rays 4–8, 1–3 in.; pedicels very many, $\frac{1}{4}$–$\frac{3}{4}$ 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-marginated often not prominent. West Tseem, alt. 14,000–16,000 ft., Thomson; Shelshed River, alt. 16,500 ft., Strachey & Winterbottom.—Fruit $\frac{1}{4}$ in. ellipsoid; epicarp loose but not of open tissue; ridges thin, narrowly winged, lateral a little broader. 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 Selinum tenvisfolium by H. f. & T. (mas.) 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 Selinum.
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 ⅓–⅓ in. with 5 subequal somewhat broad ridges, seed distinctly grooved on the inner face. Hymenidium? densiflorum, Lindl. in Royce Ill. 233. H. suaveolens, Klotzsch in Reis. Pr. Waled. Bot. 145, t. 48.

North-west Himalaya; Royce. Kashmir, alt. 11,000–14,000 ft., Levings, C. B. Clarke. Gyrwhal, 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 tetrate; 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 obvate often pinnatifid at the apex, fruit ⅓–⅓ in., dorsal and intermediate ridges narrowest, seed exactly plane on the inner face. Ligusticum Brunonis, Wall. Cat. 545. Hymenoclæa Brunonis, DC. Prodr. 245. Hymenidium Brunonis, Lindl. in Royce 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 lax 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.

29. 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 lurid-purple. 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.—Distrib. Species 18 in the north-temperate and arctic regions, and New Zealand.

1. A. glauca, Edgw. in Trans. Linn. Soc. xx. 55; leaves twice or thrice 3-partite or 2-pinnate, leaflets few 1–3 in. ovate serrate glaucous beneath.

From Kashmir to Simal, alt. 8000–10,000 ft., Falconer, &c.

Glabrous, 4–12 ft. Bracts several, 1 in., linear; bracteoles many, ¼ in. Rays often 20–30, 1–3 in., equal; pedicels hardly half as long as the fruit. Fruit ½ by ⅛ in., subquadrate; dorsal and intermediate ridges approximate, rounded, somewhat cory; furrows 1-vittate; commissure 2–4-vittate; carpels plane on the inner face. Seed less than ¼ in. wide, but about twice as wide as thick; almost grooved on the inner face.
30. **ARCHANGELICA, Hoffm.**

Tall perennial herbs. Leaves 2–3-pinnae, 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; carpophore 2-partite. Seed dorsally much compressed, inner face plane.—**Distrib.** Species 5, in North Temperate regions.

1. **A. officinalis, Hoff. Fl. Umb. Gen. i. 163;** leaves 1½–4 by ½–2 in., bracteoles as long as the flowering umbellule, fruit ¼ in. **DC. Prodr.** iv. 169. A. decurrens, **Ledeb. Ic. Fl. Ross.** ii. 21, t. 166. Angelica Archangelica, **Linn.**

**Var. himalaina;** flowers twice as large, fruit ½ by ½ in.

**Kashmir;** 8–13,000 ft., C. B. Clarke; **Atchison.** J. C.; 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, ¼–½ in. Lateral ridges usually winged; pericarp somewhat corky, 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-pinna-tulate or 2–4-pinna. Umbels compound. Flowers yellow, often polygamous. Calyx-teeth obsolete. Petals ovate, obtuse, or emarginate. Fruit orbicular or ellipsoid, much compressed dorsally; lateral ridges winged, dorsal and intermediate filiform or obscure; vittae many or few; carpophore 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*.

**Secr. 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, caulete sheaths large, from which simple or scarcely compound umbels. Terminal umbel large, compound, leafless. Vitta 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. v., which is Scorodosma fistildum, Bunge in Borcz. Ferul. tit. 1, 2, with hairy ovary and many very minute (or 0) vittae. Whether it is the F. Asafetida founded by Linnaeus on the figure in Kämpf. Aman. p. 536, is a disputed point. That figure does not represent the numerous lateral submarginal umbels arising from the sheaths of the cauleine 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 Kämpfer's plant preserved in the British Museum do not suffice to determine the point. T. Thomsonii (No. 2) has the submarginal umbels of Falconer's plant (in cultivation), and has also a divaricate corymb very like that figured by Kämpfer.

2. F. Thomsonii, C. B. Clarke; glabrous, tertiary pinnae 2 by \( \frac{1}{2} \) in. sub-entire mostly petiololed, inflorescence as in F. Narthex.—Dorema No. 6, Herb. Ind. Or. H. f. & T.

Kashmir; Banahal, alt. 5000-6000 ft., Thomas.

Reembling F. Narthex, but with leaves cut into remote lanceolate subacute leaflets.—Thomson's examples are in flower, but a fruiting corymb 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 \( \frac{1}{2} \sim \frac{1}{2} \) in. elavate at the apex; carpels \( \frac{1}{4} \) by \( \frac{1}{2} \) in., much compressed, elliptic narrowed at both ends, plane or almost convex on the inner face; dorsal and intermediate ridges filament, 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 \( \frac{1}{2} \) by \( \frac{1}{2} \) in., vittae very large solitary in each furrow. F. fistidissima, Regel & Schmalh. in Gartend. 1878, 196-198, 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 corymb often appears elongate subpaniculate, sometimes divaricate and corymbose; pedicels bearing nearly simple umbels also proceed from the large sheaths of the cauleine 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 Schmalh. 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 oblanceolate, emarginate or 2-fid. Ovary glabrous. Fruit much dorsally compressed, ellipsoidal, 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 1-2-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 vitae are abbreviated or not.

* Ultimate segments of the leaves $\frac{1}{2}$-1 in., linear.


Throughout tropical and subtropical India; often cultivated.—*Distam.* Cultivated in S. Europe and W. Asia.

Glabrous, 1-3 ft. Leaves 2-3-pinnate. *Pedicels* many, $\frac{1}{8}$ in. *Styles* small. Dorsal and intermediate ridges distinct, slender; *vitae* 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 $\frac{1}{2}$-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 $\frac{1}{8}$ in. sessile usually entire, carpels $\frac{1}{4}$ by $\frac{1}{8}$ in.

*North-west India*; Sub-sewaiiks up to 4500 ft.; *Edgeworth.* KMAMAN, in the subtropical region; *Strackey & Winterbottom.* *North Bengal*; Goruckpore, Hamilton; Dinajpur, C. B. Clarke.

Glabrous, 6-24 in. subnude upwards. *Bracts* 3-5, $\frac{1}{8}$ in., linear or linear-lanceolate; rays 5-10, 1-2$\frac{1}{2}$ in.; bracteoles 4-8, $\frac{1}{8}$ in. linear; pedicels numerous $\frac{1}{4}$ in. *Flowers* small, yellow. *Calyx-teeth* obsolete. *Styles* somewhat long. *Carpels* greatly compressed, subquadrate, 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; *vitae* nearly as long as the carpel, commissural 6-4.

*Var. Dalzellii*; leaflets shortly oblong or suborbicular. *Pastinaca glauca*, Dalz. *in Hook. Kew Journ.* iv. 293; *Dals. & Gibb. Bomb. Fl.* 107.—Belgaum, Dalzell, Ritchie. Jubbulpore, McLeod. Chota Nagpore, C. B. Clarke.—Leaflets usually 1 by $\frac{1}{8}-\frac{1}{4}$ in., very unlike those of *P. Dhana*, but the plants in every other point agree. There has been considerable confusion between *Pastinaca glauca*, Dalz. *Paezdanum*, sp. Benth.) and *Paezdanum 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 $\frac{1}{4}$-1 in., fruit $\frac{1}{6}$ by $\frac{1}{8}$-1 in. winged commissure evitellate. *Palimbia ramosissima*, *DC. Prodr.* iv. 176.

*Khasia Mrs.*, alt. 4000-6000 ft., common.

Glabrous, 2-5 ft. *Leaves* 2-4-pinnate, much and acutely serrate. *Bracts* 0, or 1-3, $\frac{1}{8}$ in.; rays 4-8, $\frac{1}{8}-\frac{1}{4}$ in., divaricate; bracteoles 0-5, $\frac{1}{8}$ 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; vitæ 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 ½–¾ in., fruit ⅝–⅞ in. broadly winged deeply emarginate at both ends, commissure evittate.

SIKKIM; alt. 3000–7000 ft., frequent; J. D. H. Clarke.

Resembling *P. ramosisissimum* 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 ½–¾ in., fruit ⅝ in. orbicular commissure 6–4-vittate.

ANAMALLAY Mts.; Wight, Beddome.

Resembling *P. ramosisissimum*, but the segments of the leaves narrower, the fruit different. *Umbel* as in *P. ramosisissimum*; bracts 0, or 1–4, ½–¾ in., linear, sometimes narrowly oblong, sub-serrate. *Calyx-teeth* small, lanceolate. *Styles* long. Dorsal and intermediate ridges scarcely excurrent, lateral with a prominent wing as thick as the seed; dorsal furrows 1-vittate, lateral 2–1-vittate; vitæ large usually as long as the carpel, commissural prominent.


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.


NIPAL; Wallich.

Glabrous 2–4 ft. Segments of the cauline leaves 2 by ½ in., entire in most of Wallich's examples, serraté in the only fruiting one. *Bracts* 0; rays 12–16, ½–1½ in.; bracteoles 0, or minute; pedicels 8–16, ½–¾ 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; vitæ solitary, nearly as long as the carpel.

Var. *nagpurensis*; bracteoles 4–7 ½ in. linear, fruit narrowed at the base, margin thicker than the seed, commissure evittate.—Chota Nagpore, alt. 1600–2000 ft.; Ramghur and Bagoda, C. B. Clarke; Behar, at Monghyr, G. Lockwood.—Lower leaves twice 3-partite, leaflets 3 by 1½ in., strongly serraté: 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., serraté; bracts prominent.


BOMBAY GAUTS; 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;
Poecedanum.] LXX. UMBELLIFERAE. (C. B. Clarke.) 711

bracteoles oblong, obtuse; pedicels 10-16, \( \frac{1}{2}-\frac{3}{2} \) in. Petals yellow. Ovary glabrous. Fruit narrowly 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 Heracleum, but the ovary is glabrous.

***** Leaves 3-4-pinnate, ultimate segments \( \frac{1}{3} \) in. ovate or lanceolate.

9. F. Thomsoni, C. B. Clarke; quaternary pinnæ \( \frac{1}{3} \) in. ovate deeply pinnatifid, bracts hardly any, styles long.—Poecedanum sp. 5, Herb. Ind. Or. H. f. & T.

Kashmir; alt. 5000-9000 ft.; Kistwar and Banral, Thomson.

Glabrous, or the leaves sometimes minutely hispidulous, 8-4 ft., stem submude 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 difficult in the absence of ripe fruit, but Dr. Thomson marked it Poecedanum, and it has the appearance of being so.

Doubtful species.

P. ? skardicum, C. B. Clarke; glabrous, leaves twice 3-partite secondary pinnate ovate or elliptic denticulate, bracts 0, bracteoles 4-7 \( \frac{1}{2} \) in. lanceolate-linear scarious, petals yellow.—Baltistan, near Skardo, alt. 12,000 ft., C. B. Clarke.—Stem 3-4 ft., corymbose. Pinnæ \( \frac{1}{3} \) in. diam., shining, yellowish green; nerves prominent, denticate and pinnate, hardly reticulate. Petioles 6-8 in.; rays 10-12, 1-2 \( \frac{1}{2} \) 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. Thomsoni, C. B. Clarke; lower leaves 2-pinnate, bracts small, fruit elliptic \( \frac{1}{3} \) by \( \frac{1}{4} \) in. winged minutely pubescent.—Pastinaca sp. i., Herb. Ind. Or. H. f. & T.

Ladak and Pti.; alt. 11,000-15,000 ft., T. Thomson. Lahul; alt. 10,000 ft., Juxtap. Kashmir; Tilai, alt. 9000 ft., C. B. Clarke.
Stems 12-20 in., grey puberulo-pubescent, naked upwards. Leaves 6-10 in., ovate-lanceolate, ultimate segments 1/2-1 in. pinnatifid. Bracts 4-5, 4-1/2 in.; rays 4-10, 1-2 in.; bracteoles 5-8, 3/4 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 medial line, half as long.—H. tragoides, Benth. in Gen. Pl. i. 924 (Zoximia 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 1/4-1/3 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., sparingly corymbose, little leafy upwards. Leaves 6-10 in., oblong; pinna usually 1/2-1 in. sometimes 2-3 in., sessile, serrate. Bracts 0-4, 1/2-1 in., linear or oblong; rays 8-20, 1-3 in.; bracteoles 5-8, 1/2-1 in., linear or oblong; pedicels 10-30, 1/3 in. Petals white. Ovary hairy. Fruit rather broadly winged, minutely pubescent, whitish; dorsal and intermediate ridges excurrent; vittae broad extending 3/4 the length of the carpel, a minute vittae added in the centre of the wing; commissural 2, near the medial 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 1/4 in. winged.

North-west Himalaya, Jacquemont.

Villous with lax white hairs, 1 ft., nude upwards. Leaves ovate, segments 1/2-3 in., serrate. Rays 7, 1-2 in.; bracteoles 4-8, 3/4-1 in., linear; pedicels 10-12, 1/4 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. cachemericum, C. B. Clarke; lower leaves 2-pinnate pinnae narrowly oblong entire or remotely obtusely toothed, bracts small, fruit 1/2 by 1/4 in. elliptic winged.—Peucedanum glaucum, Herb. Ind. Or. H. f. & T., not of Wall.

Murrueb, Falcornier; Jamt, alt. 5000-6000 ft., Thomson; Kashmir; Nowgunge, alt. 8000 ft., C. B. Clarke.

Minutely pubescent, 2-3 ft., naked, sparingly corymbose upwards. Leaves 6-12 in., ovate, secondary pinna 1-3 by 1/2-3 in., sessile, subobtuse. Bracts 2-4, 1/2-1 in., lanceolate; rays 6-10, 1-2 in.; bracteoles 5-8, 3/4 in., lanceolate; pedicels 8-20, 1/2-3 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 medial 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 3/4 by 1/4 in. obovate, commissure evitrate. H. diversifolium, Wall. Cat. 574.

Nepal; Wallnick. Sikkim; or 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, \( \frac{1}{3} \) in., linear; rays 6–8, 1–2\( \frac{1}{2} \) in., glabrous; bracteoles 0–5, \( \frac{3}{4} \) in, linear; pedicels 8–16, \( \frac{1}{2} \) 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 subclavate below.

Var. atroviridis; more hairy upwards, bracts 4–6, rays 20–30 hairy.—Nepal.—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 Peucedanum; but is not now certain to which of the many plants mixed under the name H. diversifolium he referred. H. Wallichii 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 \( \frac{1}{4} \) in. orbicular emarginate at both ends, commissural subovulate.

**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, \( \frac{1}{2} \) in., linear; rays 30–50, 2–6 in., pubescent; bracteoles 4–10, \( \frac{1}{2} \) in., linear; pedicels 15–30, \( \frac{1}{4} \) 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 *Cortia Hookeri*.

7. **H. Brunonis**, Benth. in Gen. Pl. i. 921; upper leaves pinnate oblong, bracts 5–8 \( \frac{1}{2} \) in. lanceolate hirsute sometimes divided or foliaceous, fruit \( \frac{1}{4} \) by \( \frac{3}{4} \) in. elliptic. Tordylium? Brunonis, Wall. Cat. 590. Tordyliopsis Brunonis, DC. Prodr. iv. 199.

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 subsessile, ovate, lobed or pinnatifid, serrate, sparingly pubescent. Rays 4–8, 1–1\( \frac{1}{2} \) in.; bracteoles 5–6, \( \frac{1}{2} \) 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 \( \frac{3}{4} \) or \( \frac{2}{3} \) 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 \( \frac{1}{6} \) by \( \frac{1}{3} \) 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 pinnate, pinnae often 4 by \( \frac{1}{2} \) in., or 9 by \( \frac{1}{4} \) in. Bracts 1–3, \( \frac{1}{2} \) in., linear, often 0; rays 4–8, 1–1\( \frac{1}{4} \) in., hairy; bracteoles 2–5, \( \frac{1}{4} \) in., linear; pedicels 6–16, \( \frac{1}{4} \). 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 Royle Ill. 232; stem and leaves softly hairy, upper leaves mostly pinnate, bracts small or 0, fruit \( \frac{1}{6} \) by \( \frac{1}{4} \) in. obovate, commissure 2-vittate. H. hirsutum, Edgew. in Trans. Linn. Soc. xx. 57.

? H. cinereum, Lindl. in Royle Ill. 232.
LXX. UMBELLIFERÆ. (C. B. Clarke.)  [Heracleum.]

Northeast Himalaya, alt. 6000–8000 ft.; Kishiwak and Banagal, Royle, Thomson; Simla, Lady Dalhousie, &c.

Stem 1–4 ft., subnude upwards, his rate with white lax hairs at the apex of the peduncles. Leaves 3–12 in., 1–2-pinnate, oblong or ovate; pinnae 1–3 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, 0–¾ in. Calyx-teeth linear, small. Young ovary very hairy, rarely slightly pubescent. Dorsal and intermediate ridges filiform, distinctly elevated; wing broad; dorsal vittae ⅔ the length of the fruit, not clavate below, commissural distinct, near the median line, more than half as long as the carpel.—Easily separated from 

10. H. candicans. Wall. Cat. 573; leaves pinnatifid or pinnate, pinnae obtusely lobed or pinnatifid tomentose or white-villous beneath, bracts small or 0, fruit ½ by ⅜ 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, ½ in., linear, or 0; rays 10–40, 1–4 in.; bracteoles 4–8, ½ in., linear; pedicels 8–16, ⅜ in. Calyx-teeth linear. Dorsal and intermediate ridges filiform slightly excurrent, wing broad with a small distinct median vitta; vitta in Wallich's example ⅔ the length of the fruit, in others (with less elongate-ovovate fruits) ⅔ the length; commissural in the type more than ⅔ the length, or minute near the apex, or 0.

11. H. obtusifolium. Wall. Cat. 577; upper leaves 3-fid or 3-partite lower 3–5-partite, pinnae round crenate white-tomentose beneath, bracts 2–5 ½–1 in. deciduous. DC. Prodr. iv. 192.

Nepal; Wallisch. Sikkim; Lachen, alt. 12,000 ft., J. D. H. Bhutan, Griffith.

Stem 1–3 ft., pubescent or villous. Pinna 1–4 in. diam., sometimes 2–3-lobed, always rounded, scarcely serrate. Rays 10–16, 1–3½ in.; bracteoles 4–8, ½ in.; pedicels 10–20 ⅜ in. Calyx-teeth linear, small. Outer flowers of the umbel moderately or not at all radiant. Fruit (ex DC.) obovate, commissure 4-vittate, dorsal vittae linear, extending ⅔ its length in the unripe fruit.

12. H. nepalense, Don Prodr. 185; upper leaves acutely 3-lobed rarely divided sparsingly pubescent, lower pinnae, bracts 0 or inconspicuous, fruit ⅔ by ⅜ in. obovate, commissure 4-vittate. Wall. Cat. 576; DC. Prodr. iv. 192.

From Nepal 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, ½ in., linear; pedicels 8–20, ½ 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 vittae 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 commissures, 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 ½ in. lanceolate,
fruit ½ by ¼ in. obovate, furrows between the lateral and intermediate ridges 2-vittate, commisurate 2-vittate.—Heracleum sp. 5, Herb. Ind. Or. H. f. & T.


Stem 2-4 ft., villous. Upper leaves 3-fld or 3-partite, pinnae 1-3 in., cordate or ovate-lanceolate, serrate. Rays 6-15, 1½ in.; bracteoles 5-10, 1½-2 in. Calyx-teeth linear, small. Petals white, of the outer flowers radiant or not. Dorsal and intermediate ridges elevated hardly excurrent, vitæ between them rarely 2; wing broad with a narrow marginal vitta; vitæ 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 sheathes, bracts not prominent, fruit 1½-2 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-fld, lobes rounded, crenate, not serrate. Bracts 1-5, 1½ in., lanceolate or oval; rays 4-10, 1-3 in., hairy, unequall, sometimes compound; bracteoles 0-8, 0½ in., lanceolate or linear, very variable; pedicels 4-10, ¼ 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; vitæ 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.


Mts. of the Deccan Peninsula; Heyne; Rottler; Nilghiris and near Courtal- 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.; pinnae 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 vitæ extend only ½ the length of the carpel; commissural vitæ 2-6, usually 4.


16. H. aquilegifolium, C. B. Clarke; glabrous, lower leaves 3-partite or pinnate, pinnae large ovate 3-lobed, fruit 1½-2 in. orbicular or subelliptic, 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., denticulate: upper leaves often undivided, uppermost reduced to sheathes. Umbels often in a nearly naked raceme. Bracts 3-5, 1½-2 in., lanceolate; rays 6-10, 1½-2½ 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. ligusticifolium which has the leaves sometimes nearly glabrous, but the leaves are less serrate, and the vitta are usually 2–3 in the lateral furrows.

17. H. ceylanicum, Gardn. ms.; lower leaves pinnate pinna 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 ¼–½ in., sharply closely serrate or crenate. Outer flowers of the umbel somewhat radiant, with lanceolate acute calyx-teeth. Fruit ¼–½ by ¼ 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.

18. H. Sprengelianum, W. & A. Prodr. 372; lower leaves 1–2 pinnae hairy, pinnae large ovate pinnatifid or lobed, fruit ½ by ½ in. elliptic narrowly winged. Pastinaca Sprengeliana, Wight I. t. 1008.

NIOHRRMrs., 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, ½ in., lanceolate, caducous; 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; vitta often 2 the length of the carpel, or more; commissural 2–4.—Easily distinguished from the foregoing species by the small fruit.


CONCANN 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, ⅓–½ in., oblong, 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, oblong. 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 vitta 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.


"DECAN; Shevagherry Hills, Wight. BELGAUM; Law.

STEM 12 in., or more, remotely hisrate. Petioles 2–6 in.; leaflets 1–2 by ⅓–½ in. Bracts usually 1, ⅓ in., linear-lanceolate; rays 5–6, 1–1½ in.; bracteoles 0–5, ⅓–½ in., lanceolate; pedicels 8–12, ⅛ in., in young fruit. Outer flowers of the umbel radiant; calyx-teeth linear, prominent; 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. Beluchistan 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, ½-1 in., lanceolate; rays 6-16, 1-3 in., often stout; pedicels 8-20, ½-1 in. Fruit ½ by ½ in., elliptic or somewhat obovate, variable in size and shape, pubescent till fully ripe.

34.** **CORIANDRUM**, Linn.

A herb, annual, branched, glabrous. Leaves deccompound. 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.

1. **C. sativum**, Linn.; DC. Prodr. iv. 250; ultimate segments of the lower leaves ovate or lanceolate of the upper linear. Roxb. Hort. Beng. 21, Fl. Ind. ii. 94; Wight Ill. t. 117, fig. 9; Ic. t. 510; Boiss. Fl. Orient. ii. 920. Cumimum Cynumin, Wall. Cat. 694.

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. **C. Gymnum**, 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.—Distr. 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 briefly, 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 ½-terete, dorsally subcompressed, inner face plane.—Distr. 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, pinnae 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.—Distr. Of the genus.

Stem 1-4 (in the Himalaya often 6) ft. Bracteoles many, 3-fid and simple. Fruit 1 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 tuberules; vittae solitary, under the secondary ridges; carpophore undivided or 2-fid. Seed ½-terete, deeply grooved on the inner face.—Distr. 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 5) ft. Secondary pinnae 1 in., pinnatifid half-way down into lanceolate acute lobes. Umbels long-peduncled, rays 6–12; 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.

2. C. leptophylla, Linn.; DC. Prodr. iv. 216; bracts 0, fruit $\frac{3}{4}$ in., secondary ridges prominent, primary filiform minutely hispid, bristles in 1–3 rows. Boiss. Fl. Orient. ii. 1084.

KASHMIR, alt. 4000–6000 ft., Jacquemont, Thomson. PUNJAB; Falconer.—DISTRIB. W. Asia, S. Europe, N. Africa.

Resembling C. Anthriscus, but the leaves rather more finely cut, ultimate segments narrower, sometimes almost linear; fruit larger, bristles longer, shining, scarcely sesshous, subglochidiate. Umbels often lateral, peduncle 1–2 in., stout; rays usually 2–5.


KASHMIR; Falconer; alt. 5000–8000 ft., frequent, C. B. Clarke.

Hispd, almost prickly, 4–24 in., rigid, erect or divaricate. Leaves 1–2-pinnate, pinnae often 1–2 in., oblong, serrate or pinnatifid half-way to the midrib. Rays 3–4, 1–3 in.; pedicels hardly $\frac{1}{2}$ 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 laciniate. 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; vitell 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. SCIODE.—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, $\frac{1}{2}$–3 in., narrowly lanceolate or linear; rays 5–10, $\frac{1}{2}$–1 in.; bracteoles 4–8, $\frac{1}{2}$ in., lanceolate, sheathing the young umbellule; pedicels 5–16, $\frac{1}{2}$ in. Fruit scarcely $\frac{3}{4}$ 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.—Sciode, 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 Umbelliferae.**

*Sison trinerve*, Ham. in Don *Prodr.* 184; *DC. Prodr.* iv. 111.

*Athamanta gigantea*, Don *Prodr.* 184; *DC. Prodr.* iv. 156.

*Athamanta teres*, Don *Prodr.* 185; *DC. Prodr.* iv. 156.

*Ligusticum nepalense*, Don *Prodr.* 125; *DC. Prodr.* iv. 159. *(An Hymenolepis? *DC.* l. c.)*

**Order LXXI. Araliaceae.** (By C. B. Clarke.)

Trees or shrubs, very rarely herbs, sometimes scandent or scandent 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 truncated, obsolete or with small teeth. Petals 5 rarely 6–7 or many, valvate or sub-imbricate, 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 ruminate; embryo minute, radicle next the hilum.—**Distribs.** Species 340, chiefly tropical and subtropical, a few in the cool temperate zones.

**Sect. I. Araliæ.** Petals imbricated (but only lightly). Pedicels jointed.

Styles 2–5, free. Leaves compound .......................... 1. *Aralia,*
Styles 5, combined. ....................................... 2. *Pentapanax.*

**Sect. II. Panaceæ.** Petals valvate. Albumen uniform.

* Ovary 2-celled.

Pedicels jointed. Leaves decompound .......................... 3.*Panax.*

** Ovary 4–10-celled.

† Umbels sessile on the back of the leaf.

Leaves simple ........................................ 5. *Helwingia.*

†† Pedicels jointed.


††† Pedicels continuous. Leaves not pinnate.

Fruit angular the size of a pea ............................ 7. *Heptaphloerus.*
Fruit more than ½ in. long ................................ 8. *Thevetia.*
Leaves simple (except the lowermost) .................... 10. *Dendropanax.*

* Ovary 1-celled.
Leaves pinnate or undivided

** Ovary 2-celled.
Pedicels continuous. Styles distinct
Pedicels continuous. Styles combined
Pedicels joined. Styles combined

*** Ovary 5–4-celled; styles combined.
† Leaves simple lobed or pinnate.
Pedicels continuous
Pedicels joined

†† Leaves digitate.
Tree. Leaflets ciliate

Petals united, falling off in a cap

1. *Aralia*, 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 joined close under the flower or not. Flowers often polygamomeconious. 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.—Distrih. Species 30; extending from India and Malay to Japan and North America.

Sect. I. Ginseng. Herbs 1–2 feet with a whorl of digitate leaves. Styles 2–3. Fruit red or red and black, shining; globose, subdidious.


*Nepal, Sikkim, and Bhutan, 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 ½–1⅓ in., acuminate often ciliate, rounded or tapering at the base, closely serrate or deeply doubly serrate, glabrous except the scattered bristles; petiole 1–6 in., glabrous; petiololes 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 polygamomeconious; 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. l.c. 524, which differs by having broader, more obvate, 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 petioluled 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 felvous hairs or spines often at the apex of the petiole, umbels simple.—_Aralia_ sp. 4, Herb. Ind. Or., H. f. & T.

_Temperate Himalaya_; Kumaon, Sikkim, and Bhutan.

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; petiole 0-½ in. _Pedicules_ 2-5 in., solitary, pubescent upwards, carrying each one many-flowered umbel; bracteoles among the pedicel 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. 9000-13,000 ft., Lachen, _J. D. H_. Bhutan; _Griffith_ (Kew Distrib. No. 2669).

**Var. 2. scandens, Edgew. in Herb.; scandent (?), without spines, glabrous, leaflets simply serrate._Kumaon_; alt. 9000 ft., Madhari Pass, _Strachey_ & Winterbottom.

**Sect. III. Bu-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, pedicules 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.; panicle-branches and pedicels pubescent.

5. **A. malabarica**, Bedd. Fl. Sylv. ii. 121, and _Andal. Gen._ t. 15; aculeate, panicle-branches and pedicels glabrous or sparingly bristly, bracts ⅓ 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-\(\frac{1}{5}\) in.; leaflets 3-5\(\frac{1}{2}\) by 1-\(\frac{1}{4}\) in., 5-9 to each pinna, simply or doubly serrate, ciliate, acuminate, narrowed ovate or cordate (Beddome) at the base, when young weakly acutate, when older nearly glabrous on both surfaces. Umbels in a compound spreading panicle, at least 8 in. Fruit slightly 10-ribbed (Beddome).

6. A. Thomsonii, Seem. Rev. Heder. 91; prickles short strong, stem upwards fulvous villous and woolly, pedicels \(\frac{1}{4}-\frac{3}{4}\) 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-\(\frac{1}{5}\) in.; leaflets 3-4 by 1\(\frac{1}{4}\) in., 5-9 to each ultimate pinnule, elliptic, acuminate, base broad, sparingly often very obscurely serrate. Panicles 1\(\frac{1}{2}\) ft., compound; bracts \(\frac{1}{4}\) in., narrowly-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 Aralias.

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. 500 ft., J. D. H.; Brotan, Griffith. Khasia Mts., Griffith (Kew Distr. No. 2659); alt. 3000-4000 ft.; H. f. & T.

A large lax shrub, glabrous or nearly so; prickles short strongly spreading. Leaves large, 2-3-pinnate, with a pair of leaflets at each division of the rachis; petiolules 0-\(\frac{1}{5}\) in.; leaflets 2-3 by 1-\(\frac{1}{4}\) in., 5-9 to each ultimate pinnule, elliptic, acuminate, usually rounded at the base, sparingly serrate, glabrous or minutely pilose above, pilose on the nerves beneath. Panicle 1 ft., compound; pedicels \(\frac{1}{4}-\frac{3}{4}\) in.

Var. sikkimensis; leaflets more slender more serrate, at their base are often needle-like spines \(\frac{1}{4}-\frac{3}{4}\) 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 petioles and pedicels pubescent, bracts 0 or caducous. Kurz For. Fl. i. 536. Panax armatum, Wall. Cat. 4933; G. Don Gen. Syst. iii. 386.—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 \(\frac{1}{4}\) in.; leaflets 4\(\frac{1}{4}\) by 2 in., 5-9 to each ultimate pinnule, acuminate, or round or cordate at the base, distinctly serrate. Panicle often 1\(\frac{1}{2}\) ft., the lower part of the rachis glabrous; pedicels \(\frac{1}{4}-\frac{3}{4}\) in.—Panax Finlaysoni-um, Wall. Cat. 4933, from Turong Bay, Cochin 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.—DISTR. Species 5, confined to continental India.

* Flowers in panicled racemes.

1. **P. racemosum**, Seem. Rev. Heder, 21; panicles unisexual elongate oblong with racemes diverging from the rachis diversicately to its summit, styles in the perfect flowers half- or more- free recurved.—Araliad sp. 41, Herb. Ind. Or., H. f. & T.

**SiKHIM**; 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-denticate; petiolules often ½ in. Panicles glabrous or villous, often 1 ft. by 4-6 in., 3-9 clustered at the ends of the branchlets; branches 2-3½ in., racemose, flowering from their base; pedicels 0-½ 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.


**KHALSIA** Mtts., alt. 4000-6000 ft.; Wallich, Griffith, &c., not rare.

A small tree. Leaflets 3½-4½ by 2 in., usually 3-5, elliptic, acuminate, often rounded or cordate at the base, sinuate-crenate; petiolules often ½ in. Panicles 8 in., with 3-8 racemose branches ascending from its lower half; panicle-branches 2-4 in., glabrous racemose flowering from their base; pedicels often ½ in. (rarely 0-½ 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 umbellated, umbels simply panicled.


**NIPA**; Hamilton. KUMAO; Wallich, Royle. Binsar, alt. 7,600 ft., Strachey & Winterbottom.

Scandent, glabrous. Leaflets 2½ by 1½ in. (or smaller), scarcely acuminate, base rounded or subacute; petiolules 0-½ in. Panicles 3-4 in., simple with 2-8 umbels; pedicels 1-2½ in., glabrous. Styles long, combined to near the top. Fruit (not ripe) small, subglobose, obscurely 5-angled; disc not elongate-conical.

VAR. 1. *khasiana*; pedicels and rachis of panicle suberosent.—Khasia Mts.; Myurung, alt. 5000 ft., Griffith (Kew Distrib. No. 2680), Simons.


**SIXKIM**, alt. 6000-1000 ft.; J. D. H. *SOUTH DROSHAN* and CEYLON in the mountains. BURMA, Taung-dong; Wallich.
A tree 30–50 ft., or scandent shrub. Leaflets 3½ by 2½ in., 3 (or 5 in Wight's No. 1204), base rounded or cordate; petiololes often 1–2 in. Pediciles 3–6 in., with 3–6 beads; pedicels ½–1½ 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 Nilgherries, 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 (ap); 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 Bhutan, 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.

### 3. ARALIDIIUM, Miq.

Leaves large, simply pinnatifid, glabrous. Panicles male or hermaphrodite, males much larger and more compound; pedicels jointed close under the flowers; flowers small. Calyx-teeth 5, triangular. Petals 5, imbricate. Stamens 5. Ovary 4–3-celled; styles 4–3, separate, linear-cylindric, stigma-tose on all sides. Fruit 1-seeded.—**Distr.** Species 2, Malayan.

1. **A. pinnatifidum**, Miq. Fl. Ind. Bat. i. 763, t. 13; leaves 12–18 in. lobed nearly (sometimes quite) to the rachis, panicles upwards and flowers tawny-pubescent.

MALACCA: Griffith (Kew Distrib. No. 2702); Maingay No. 676.

Lobes of the leaves 4–6 by 1–2 in., oblong-lanceolate. *Malu pinnata* 15 by 12 in., compound, with innumerable minute pubescent flowers. Petals pubescent. Young ovary with 1 pendulous ovule in each cell, Fruit (unripe) ½ 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-teeth 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. Leaflets 2–3 by ½–1 in., but varying greatly in size and often irregular in shape, usually much setose-serrate or incised, sometimes nearly entire. Pedicels 3–6 in.; bracts minute, deciduous; pedicels ½ 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-tooth 5, small. Petals 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.—Distr. Species 6; Japan to Malaya, and E. Bengal.


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 $\frac{3}{4}$–1 in., subacute, dentiulate or serrate, sometimes with a few stiff bristles on the nerves; pediollules usually distinct, $\frac{1}{2}$–1 in. Umbels often solitary; pedicels numerous, $\frac{3}{4}$–1 in. Fruit $\frac{1}{2}$ 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 seem quite sessile and the prickles are less deflexed.

5. **HELWINGIA**, Wild.

Glabrous under-shrubs. Leaves petiolod, 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. Petals 3–6, valvate. Stamens 3–5. Ovary 3–4-celled; styles 3–4, combined at base, rising from a conical disc. Fruit ovoid or ellipsoid, usually 2–3-celled; carpels rounded on the back. Seed compressed; albumen uniform.—Distr. Species 2, an Indian and a Japanese.

1. **H. himalaica**, Hk. f. & T. ms.; leaves lanceolate, fruit $\frac{1}{4}$ in. ellipsoid.

**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 $\frac{4}{5}$–1 in. Phyllodes when present spatulate-oblong, sessile, $\frac{1}{5}$ in., entire below bristle-serrate near the apex, midrib strong, the wing membranous imperfectly herbaceous. Flowers $\frac{1}{4}$ in. diam., greenish. Fruit 1–3 on the leaf; pedicels hardly $\frac{1}{2}$ in. Seeds narrowly-oblong, compressed, more than twice as long as broad.—This hardly differs from *H. rusciniflora*, 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.

6. POLYSCIAS, Forst.

Glabrous trees or large shrubs. Leaves pinnate, leaflets coriaceous entire. Umbels panicked (in Indian species); bracts ½ 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 ellipsoidal or globose, prominently ribbed. Seed compressed; albumen uniform.—Distrib. Species 8; E. African Islands, S. India, and Malaya.


Decan Mts., alt. 5000 ft.; Nilgiris; Wight. Anamalais and Tinnevelly Ghats; Badreme. Ceylon, Adams Peak, alt. 4000-5000 ft.; Thwaites.

A tree. Leaflets 5 by ½ in., attenuated at both ends, margin thickened, petiole ½ in. Panicle 8-10 by 1-3 in., branches stout, umbel at the end of each subcapitate the pedicles 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, ellipsoidal, soon becoming distinctly ribbed. Ripen fruit not seen. [The Andaman leaves distributed by Mr. Kurs as Eupteron sp. nov. Andaman Rep. Suppl. B. 9 appear to be Arthrophyllum diversifolium, Blume.]


India? Wight No. 1213.—Distrib. 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 and lobed, never closely serrate nor ciliate, those near the panicle usually entire; stipules often connate within the petiole and prominent. Umbels (rarely capitate) panicked 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. Fruit subglobose, 5-6-angled. Seeds compressed; albumen uniform.—Distrib. Species 50, in the tropics of the old world.
SUBGEN. I. Agalma. Stigmas connate into a narrow cylindric style.


Temperate Himalaya, alt. 6000-11,000 ft.; from Kumaon to Bhutan, frequent.

A tree, 60 ft. Leaflets often 10 by 2½ in., rugose above from the impressed nerves, lanceolate or oblong-lanceolate, acuminate; petiolules 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 ¼-½ in.—Seeman has applied the name H. tomentosum to a different Malayan plant: hence the new name H. impressum.

2. H. hypoleucum, Kuns For. Fl. i. 539; 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, Martaban, alt. 6000 ft.; Kurs.

A small branched tree. Leaflets 4-8 by 1½-3½ 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; petiolules ¼-3 in. Panicle often 12-15 in., lower branches often elongate with several umbels, stellately woolly; bracts shortly ovate, somewhat persistent; pedicels ¼-½ 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.

3. H. elatum, C. B. Clarke; leaflets near the panicle nearly entire oblong lanceolate glabrous not rugose above, petals glabrous or sparingly stellate woolly. Hedera elata, Ham. in Don Prodr. 187; DC. Prodr. iv. 264; Wall. Cat. 4914. Agalma elatum, Seem. Rev. Heder. 25.—Araliad sp. 6, Herb. Ind. Or. f. & T.

Kumaon to Bhutan, 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; petiolules often 1-2 in. Panicle 12-18 in., lower branches usually compound; bracts very short, ovate, auriculate; pedicels ¼-½ in., glabrous pubescent or stellately woolly; buds usually glabrous.


4. H. glaucum, C. B. Clarke (not of Kurz); leaflets near the panicle nearly entire glabrous obovate-lanceolate with impressed nerves above, petals with minute white stellate tomentum. Agalma glaucum, Seem. Rev. Heder. 25.—Araliad sp. 14, Herb. Ind. Or. H. f. & T.


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. silatum*, nearly glabrous or more or less pubescent or stellatly woolly.


**Nilghiris; Wight; Gardner,** alt. 7000 ft.; C. B. Clarke. (The Sikkim locality given by Seeman is an error.)

A small branched tree. Leaflets $\frac{3}{4}$ by 1$\frac{1}{2}$-2 in., entire or denticulate; petiolules $\frac{1}{4}$-1 in. Panicle 8 in., branches often bearing one umbel each only; bracts shortly ovate, persistent; pedicels $\frac{1}{4}$-$\frac{3}{4}$ in., glabrous or stellatelly 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 1/3 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 $\frac{1}{4}$ in. Flowers at first often umbelled, 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-Heptapleurum.** Styles short, not connate into a narrow cylindrical column.

* Leaves 1- (rarely 1-3-) foliolate.


*Ceylon*, up to 4000 ft.; *Walker*, *Thwaites*.

A climbing glabrous shrub. Leaflets $\frac{1}{2}$-$\frac{3}{4}$ 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 $\frac{1}{4}$ in., spreading; bracts 0 or early fugacious. Flowers very small, white tinged red (*Thwaites*).

** Leaves simply denticate; 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. — Distribution, Malaya and Tropical Australia.

A small glabrous tree or climbing shrub. Leaflets 4 by 2 in., glabrous, entire, acuminate, base subsacute or rounded; petioles 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 3–4 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.


**South Deccan Peninsula;** near Coimbatore, *Wight, Nilghiri Mts.,* *Hohenacker No.* 1472. *Ceylon,* abundant up to 3000 ft. alt.; *Thwaites.*

Altogether resembles *H. venulosum* except as to the obtuse obovate leaflets, and may be merely a South Indian and Ceylon form of it.


*Pinao* and *Malacca;* *Griffith* (Kew Distrib. No. 2690); *Maingay,* No. 681.—

Distrib. Sumatra.

Branchlets glabrous. Leaflets 5½ by 2½ in., narrowed at both ends, glabrös 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 1½ 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.


**South Deccan Peninsula;** *Krug, Wight, Nilghiris,* alt. 4000–6000 ft., near *Canoo, C. B. Clarke.* *Ceylon,* alt. 4000–6000 ft.; *Thwaites.*

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.


*Araliad* sp. 20, *Herb. Ind. Or.* *H.f.* & *T.*


Leaflets attain 11 by 3 in., usually much smaller, narrow-oblong or lanceolate, acuminate, glabrous, the base sometimes almost rounded, very coriaceous, entire; petioles 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-
ING, compound; bracts \( \frac{1}{4} \) in., oblong, acuminate, caducous; pedicels \( \frac{1}{4} \) in. in fruit. Fruit globose, hardly pentagonal, disc depressed conical, not pentagonal.


**Malacca**; Griffith (No. 2700 Kew Distr.).

Apparently a large tree. **Leaves** 14 by \( \frac{1}{4} \) in., oblong-elliptic, acuminate, rounded or little narrowed at the base, coriaceous, entire, shining, glabrous above, with scattered loose woolly hairs that easily wear off beneath; petiolules 3–4 in., stout. **Panicle** 15 in. with stellate pubescence from the base. Heads of fruit globose, close packed without bracteoles. Fruit much longer than broad, 5–8-ribbed, stellately white-tomentose, crowned by the broad short cluster of styles; disc enlarged, somewhat corky.—Very unlike *Paratropia capitata* W. & A. (a *Brassia*), with which, regardless of geography, Dr. Seeman united it.

*** Leaves twice digitate or digitately decompound.


**Phan**; Wallach.—**Distr. Java**.

Branchlets glabrous. **Leaves** digitately 3–4-petioluled, each petiolule bearing 3–4 rarely 5 leaflets; leaflets 4–5 by 1–3 in., oblong or elliptic, acuminate, rounded or somewhat acute at the base, glabrous, entire, membranous; tertiary nerves prominent above, secondary petiolules much varying in length; from \( \frac{1}{4} \) to \( \frac{1}{2} \) in. at the same cluster. **Panicle** 8–12 by 1–3 in., branches slender, little compound; bracts \( \frac{1}{4} \) in., ovate-oblong, stellately white tomentose, caducous or sometimes persistent. **Flowers** small. Fruit pentagonal.

15. **H. biternatum**, C. B. Clarke; leaves digitately decompound or twice pinnate with ternate leaflets at each node of the rachis.

**Malacca**; Maingay No. 684.

A small tree; trunk about 3 ft. (Maingay). **Leaves** 5 by \( \frac{1}{4} \) in., linears-ellong, acuminate, unequal subacute at the base, entire, the reticulating nerves prominent on both surfaces, with scattered stellate hairs (easily wearing off) beneath; petiolules 9–12 in. **Panicle** 8 by \( \frac{1}{4} \) in., branches hardly divided, with scattered stellate hairs; bracts deciduous; pedicels less than \( \frac{1}{4} \) in. **Flowers** small, altogether of a Eu*-Hepatapleuran.*—May prove a form of *H. heterophyllum*.

**Doubtful Species.**

**Hedera mollis**; Wall. Cat. 4924; the example consists of leaves only; it may be *Hepatapleuran 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 united 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.—**Distr.** 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 Nepal and Sikkim to Pegu, 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 etiolated hairs on both surfaces deeply palmate, in young plants often digitate; petiole often prickly. *Panicle* 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. cheiranthus*; leaves palmate nearly glabrous, lobes serrate, petiolules when present with entire wing. *Hedera ? Aralia.* Jack in *Wall. Cat.* 4925. Chittagong, E. alt. 0—1000 ft.; *H. f. & T.* Finang and Malay Peninsula; *Porter, Sir W. Norris*; *Wall. Cat.* 4910 partly. *Malacea, Griffith* (No. 3661 Kew Distr.).—Distr. of the Philippines.—These are the examples (leaves only) referred in *Gen. Fl.* i. 943 to *T. sundaca,* Regel (Gartenfl. 1864, t. 498, not of Miqul). 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 petiolulated the lateral leaflets continuous. There may be more than one species of *T. palmata* here included, but no species can be founded on imperfectly digitate leaves. One sheet of *Wall. Cat.* 4910, marked *Hedera* confusens, consists of the fruit of *Brassaiopsis* (probably *B. hainali*) mixed with leaves of *Trevesia* and constitutes the *Brassaiopsis* confusens, *Seem. Rev. Hed.* 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-margins* entire or nearly so. *Petal* 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.—Distr. *Species* 2, extending from the Deccan Peninsula to Northern Australia. 

Separated from *Heptapleurum Cephalotes* by the floral bracteoles. 


Niglurry, Mrs., Kotagerry and Vellyangry Hill; *Wight.* 

Leaflets 6—8, 6 by 2½ in., elliptic-oblong pubescent, 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. actinophylula,* *Endl.* (see *Benth. Fl. Austral.* iii. 386) 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. **Petals** 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.

—**Distr.** Species 20, mostly tropical American; four species in China, Japan, and E. India.


Appears to be an erect shrub or very small tree. Leaves (those near the umbel) 4 by 2-3 in., oblong or elliptic, acute, entire, 1-3-5-nerved from the base; petiole ¼-2 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, panicled; pedicels ¼ in. **Fruit** ⅜ by ⅜ in., somewhat pentagonal.


Mount Ophir, Malacca; Griffith (Kew Distriv. No. 2085); Maingay, No. 682.—Distr. Hongkong.

Apparently an erect shrub. Leaves ⅜ by 2¼ in., entire or very obscurely toothed, glands not visible on the young leaves even; petiole ¼-1½ in. **Umbels** mostly solitary; pedicels ⅔ in. **Fruit** ⅜ in. diam.—The branches from Mount Ophir have all entire leaves as they carry umbels; the Hongkong young shoots have polymorphous palmate leaves. **D. propeanum**, Benth. Fl. Hongk. 136; has the upper leaves very narrowly lanceolate, mostly 1-nerved from the base, but is perhaps only a variety of the present species.


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. **Petals** 5, valvate. **Stamens** 5. **Ovary** 1-celled 1-ovuled; style short, simple. **Fruit** (in the Indian species) ovoid, not angular. **Seed** subglobose; albumen ruminated.—**Distr.** 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;

SOUTH ANDAMAN, Kurz. PINANO, Phillips. MALACCA, Griffith, &c.—Distrib. Throughout Malaya.

Lower leaves a yard across, decumbent-pinnate, with pairs of opposite leaflets at the divisions of the main rachis, upper smaller simply pinnate, uppermost 1-3-foliolate; leaflets 3 by 1¼ in., oblong or elliptic, glabrous, entire, reticulations distinct; petiolule 0-½ in. Peduncles 2 in, stout, many in the umbel, with very small acute scattered bracts or naked; pedicels ½ in, quite glabrous even when young, or with more or less rusty stellate wool. Fruit ½ by ¾ in.


PINANO; Wallich, Maingay, No. 679. MALAY PENINSULA, Griffith, Maingay, No. 677.—Distrb. Malay Islands.

Leaves pinnate and 2-pinnate, leaflets sometimes ternate; uppermost often pinnate with 5-17 leaflets, but sometimes with only 3-1 leaflets; leaflets varying greatly in size on the same branchlet, much narrowed to both ends, reticulations obscure, glabrous, entire; petiolule 0-½ in. Peduncles usually much fewer than in A. diversifolium and evidently only pseudo-terminal; pedicels glabrous or with rusty stellate wool. Flowers yellow (Maingay) and fruits nearly as in A. diversifolium.—The fruits are said by Miquel to be sometimes 2-seeded, but all the Kew examples are 1-seeded. Both Rumphius and Maingay note two forms of this plant, which are, however, connected by a series of intermediates:

Var.atifolia, Rumph l. c.; leaflets few 4 by 1¼ in. A. pinnatum, Maingay MS., No. 679.

Var. angustifolia, Rumph l. c.; leaflets many 1½ by ⅛ in. A. alternifolium, Maingay MS., No. 677.

12. HETEROPANAX, Seem.

A small unarmed tree. Leaves glabrous or nearly so, very large, pinnately compound; stipules not prominent. Panicles large; umbels racemose, 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 6, valvate. Stamens 5. Ovary 2-celled; styles 2, distinct from the base, spreading. Fruit much laterally compressed, 2-seeded. Seeds compressed; albumen ruminated.—Distrb. Species 1 or 2; Western Himalaya, Java, China.


From the Sewalik Hills to Burma, alt. 0-4000 ft.; common in BENGAL.—Distrb. Java, China.
Leaflets $\frac{3}{4}$ by 1 $\frac{1}{2}$ in., elliptic, shortly acuminate, little narrowed at the base, glabrous, entire, nerves not very prominent; petiolules 0-4 in. \textit{Panicle} often 12-16 in., branches 4-8 in.; umbel dense subcapitate in flower; pedicels in fruit elongating to $\frac{1}{4}$ in. and more. \textit{Fruit} $\frac{1}{4}$ by $\frac{1}{4}$ in. and $\frac{1}{2}$ in. thick, ultimately glabrous and often glaucous.

**Var. 1. typica;** leaflets elliptic shortly acuminate, base slightly narrowed.

**Var. 2. subcordata;** leaflets ovate shortly acuminate, base rounded or even cordate.

**Var. 3. attenuata;** leaflets 4 by 1 $\frac{1}{2}$ in., attenuate acuminate, much narrowed at base.—Bengal Plain. China.—This may be a distinct species.

13. **BRASSAIOPSIS, Done. & Planch.**

Large shrubs or trees, glabrous or tomentose, armed or not. \textit{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. \textit{Calyx} 5-toothed. \textit{Petals} 5, valvate. \textit{Stamens} 5. \textit{Ovary} 2-celled; styles 2, united, long or short. \textit{Fruit} broadly globose or turbinate, 2- or by abortion 1-seeded. \textit{Seed} not compressed; albumen ruminated.—

**Distin.** Species 10, from Nipal to Java.

* Leaves undivided.

1. **B. simplicifolia, C. B. Clarke**; upper leaves simple lanceolate serrate, adult glabrous.

MISHMEE; \textit{Griffith} (Kew Distrib. No. 2899).

Branchlets prickly, glabrous or with a little hard close tomentum. \textit{Leaves} near the panicles alone seen (the lower may be divided) 9 by 3 $\frac{1}{2}$ in., acute, subacute at the base, sharply serrated, membranous, nerves much elevated; petiole 1 $\frac{1}{2}$ in.; stipules not prominent. Young \textit{panicle} 5 in., nearly glabrous, branches slightly compound; bracts 4 in., lanceolate; pedicel $\frac{1}{4}$ 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 \textit{Brassaiaopsis}.


Temperate Himalaya, alt. 3000-6000 ft., from NIPAL to BHOTAN; \textit{Griffith} (Kew Distrib. No. 2668); J. D. H.; C. E. 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, subspinoso-toothed, finally glabrous above and nearly so beneath the hirsidulous or stellate hairy distantly scattered. Bracts on the panicle-branched ovate, short, densely stellate-tomentose, persistent. \textit{Buds} densely stellate-tomentose. \textit{Pedicels} $\frac{1}{4}$ by $\frac{1}{4}$ in., rising from a dense cluster of bracteoles $\frac{1}{4}$ in. oblong and very tomentose. \textit{Fruit} $\frac{1}{4}$ by $\frac{1}{4}$ in., globose, sub-pedicellate. \textit{Style} $\frac{1}{4}$ 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. Haimia; sparingly prickly. Pedicels springing from a dense cluster of bracteoles ¼ in., oblong and very tomentose. Fruit often 1-seeded, when 2-seeded it is ½ by ¾ in., turbinate-ellipsoid. Style on the fruit ¾ in. or rather more.

-Wallich's plate belongs to this plant, as he mentions the fruit as turbinate (as also does Roxburgh). Aralia palmata, Lour. Fl. Cochinchin. 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 4-6 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 ½ in., very narrow.—Can this be a woolly alpine form of B. Haimia?

5. B. hispida, Seem. Rev. Heder. 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. Mishmar; 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 ½ in., lanceolate, tomentose, persistent; pedicels very many, rising amid numerous bracteoles ¾-1 in. lanceolate closely tomentose. Young calyx-tube closely densely stellate-tomentose. Petals glabrous, appear yellow. Style after the petals have fallen scarcely ¼ 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 ½ in., lanceolate, caducous; pedicels very many, arising amid numerous lanceolate closely-tomentose bracteoles ¾-1 in. Young calyx-tube more or less stellate-tomentose. Petals glabrous. Style after the petals have fallen ½ in.; the disc large, subhemipheric. Ripe fruit not seen.

7. B. Griffithii, C. B. Clarke; leaves very large palmate divided half-way down or more serrate-dentilicate, adult glabrous or the nerves beneath minutely hispidulous.

East Bengal; Namtoo (? 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 ⅜ 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 ⅛ 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; petiololes 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 ⅛ in., rising from a dense cluster of rusty stellately hairy persistent bracteoles ⅛ in. Fruit ⅛ by ⅛ 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 Dcne. & Planchon: the calyx-tube of the young fruit is shortly homorphic, 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. H.

Var. 3. *kirta*; 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 rufoustellate 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. 2689).

9. *E. Hookeri*, C. B. Clarke; petiololes distinct or long, leaflets very large oblong narrowed at each end serratê, mature more or less stellato-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; petiololes ⅛-2 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 ½-1 in., stout, rising from numerous persistent bracts ½ in., less hairy than those of *B. floribunda*. Young fruit much as in *B. floribunda*; calyx-tube campanulate or obconic; disc prominently rayed, not greatly elevated; style ½ in.—Possibly a large form of *B. floribunda*.


A small prickly tree. Leaflets 9 by 2½ in., narrowly lanceolate-obovate, acuminate, herbaceous, soft in texture, rusty stellate-tomentose, apex of the pedicle 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 ½-1 in., springing from a dense cluster of lanceolate hairy persistent bracts ½ in. Fruit ½ in. long and broad, globose, subidiously; disc on the ripe fruit flat; style ½-1 in.—Wallich's *Hedera asculifolia*, in the Linnean 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-foliate, 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 umbellate, 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 1½ 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 ½ in., stout, more or less stellate-hairy, the bracteoles few or deciduous. Fruit ½ in., ovoid, sometimes elongated upwards; disc large, conical, often wider than the top of the fruit, crowned with the permanent style ½-1 in.


**Sikkim**, Bhutan, Assam and Khasia, alt. 500-5000 ft., common. Silhet station. A small tree. Leaflets 3-4 by 1½ in., lanceolate, acuminate, rarely elliptic-
lanceolate, entire rarely minutely denticulate, base narrowed often very acute; pediolules ½-2 in. Panicle 1 ft., compound; bracts ½ in., triangular, caducous; pedicels ½ 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-margins* 5-toothed or sub-entire. *Pistils* 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* Mrs., alt. 4000-6000 ft.; not rare.—**Distria**. From W. Europe to Japan.

Stem glabrous climbing adaxially 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 ½-2 in. *Panicle* often depressed, subaeorymbous, or shortly ovate, never large compound; bracts scarcely ½ in., triangular; pedicels ½-1 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.


Differs technically from *Hedera* in the jointed pedicels; the serrate leaflets and large fruit give to it a widely different aspect.


**MALACCA**; Maingay, No. 683.

Leaflets of the compound leaves 3½ by 1½ in., simple leaves attain 8½ by 4 in., membranous, opaque, base subacute, secondary nerves raised tertiary obscure; petiole 1-2 in. *Panicle* glabrous or obscurely pubescent; pedicels ½-1 in. Young *flowers* small, petals expanding, reflexed. *Fruit* (not quite ripe) more than ½ 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.


3 × 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* ½ by 2½ in., acuminate, hairs on both surfaces harsh in age, or nearly glabrous beneath; petiolules 0½ in., densely rusty villose. *Umbels* in small panicles; pedicels ½-3 in., puberulo-pubescent. **Fruit** ½ 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 umbell 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 (00), sessile, radiating, contiguous but not connate. **Fruit** globose, depressed (not seen ripe).


*Leaflets* 7-9, 7 by 2½ 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 1-1½ in., glabrous, stout. *Buds* ½ 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 ½ by 1 in., 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 capitately 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.—**Distr.** Species 75, chiefly in the northern hemisphere.

* Flowers hermaphrodite.

† Petals narrow much elongate.
Stamens twice or thrice the petals. Cotyledons crumpled... 1. **Alangium**.
Stamens equaling the petals in number. Cotyledons flat... 2. **Marlea**.

†† **Petals short or oblong.**
Ovary 2-celled... 3. **Cornus**.
Ovary 1-celled... 4. **Mastixia**.

**Flowers unisexual.**
† **Leaves opposite.**
Petals 4. Stamens 4... 5. **Aucuba**.

†† **Leaves alternate.**
Ovary 1-celled. Flowers in dense heads... 6. **Nyssa**.
Ovary 4-celled. Flowers in large panicles... 7. **Toricellia**.

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, joined 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 nminated; cotyledons leafy, crumpled; radicles 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 axes of the primary nerves; petiole 1 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, 1⁄4-1⁄2 in. woolly without. **Stamens** about 20-30. **Style** glabrous, uniformly cylindric, stigma large subglobose. **Fruit** black, closely pubescent or finally glabrous; endocarp bony.—The examples of *A. sundanum*
communicated by Miguel 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. sudanum 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. begoniasfolia and ebenaceae) oblong, compressed; cotyledons orbicular, thin, leafy; radicle short.—Distrib. Species 8; India, to Japan, Malaya, Australia, and Polynesia.

SECT. I. PSEUDALANGIUM, F. Muell. Ovule 1. Embryo of Marlea. (RHYTIDANDREA, A. Gray.)

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 $5\frac{1}{2}$ by $1\frac{3}{4}$ in., very unequal suricled 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 $\frac{1}{3}$ in., fulvous, villous. Cyme with minute close fulvous pubescent rather longer and softer on the calyx-tube; bracteoles most minute, linear, deciduous. Calyx-tube not furrowed, limb almost truncate. Petals 5, $\frac{3}{8}$ 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 $3\frac{1}{2}$ in., glabrous, entire, thick and somewhat coriaceous, base subacute slightly unequal; petiole $\frac{1}{3}$-$\frac{1}{2}$ in. thick. Cyme short, 4-8-flowered, minutely fulvous-pubescent. Calyx-tube more softly pubescent, not grooved, limb much dilated, truncate. Petals $\frac{1}{2}$-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 ⅕ by ⅔ 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); Mainay No. 707. SINGAPORE, Mainay No. 705.

Branchlets petioles cymes and leaves beneath densely fulvous-villous. Leaves often 8 by 5⅔ in. (sometimes only half these dimensions), not acuminate, from cordate to subacute at the base, firm, at length glabrous above; petiole often ⅔ in. Cyme short, 4–8-flowered. Calyx-tube deeply grooved, teeth prominent rising from the angles. Petals 6–5, ⅔ in., much dilated at the base, very villous. Stamens 6–5; filaments short woolly. Style cylindric densely villous, the very apex narrowed, stigma as in M. ebenacea; ovule 1. Fruit 1 by ⅔ 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.


Sect. II. Eu-Marlea. Ovules 2, rarely 1 or 3. Fruit normally 2-seeded.


Throughout Northern India, alt. 1000–6000 ft., common from the PUNJAB to BENGAL and BURMA.—DISTRAIN. China, Japan.

A tree, often small, but attains 60 ft.; branches horizontal. Leaves 4½ by 3½ 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 axils of the main nerves, which are puberulous, or closely hairy on the nerves; petiole 1–1½ 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 ⅖ by ⅔ in., ovoid, glabrous, obscenely 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 capitate sub-2-lobed; ovule solitary pendulous in each cell. **Drupes** ovoid, 2-celled, 2-seeded; endocarp bony. **Seeds** oblong, compressed, albumen fleshy; cotyledons leafy.—**Distrib.** Species 15, in N. temperate regions, and in Burma and Hongkong.

**Sect. I. Thelycrania, Endl.** **Flowers** cymose, without bracts.

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) 1½ by 1 ¼ 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 ⅜ in. **Fruit** ½ 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 3½ 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** ⅜½ in. diam., globose.

—C. alternifolia, Linn. f., a N. American species differs very little, if at all, from this.

Var. Stracheyi; panicule 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 adult glabrous or minutely hairy beneath.** 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 ¼ in., somewhat coriaceous, nerves much elevated beneath; petiole ⅛ in. **Petioles** and cyme-branches minutely pubescent; bracteoles small. Calyx-tube campanulate, hardly urn-shaped. **Petals** almost glabrous. **Fruit** ⅜ by ½ in., ellipsoid, glabrous or nearly so.
Var. Griffithii; leaves beneath with spreading hairs.—Bhotan; Griffith, No, 2091.

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. Carea & Wall. i. 434; leaves oblong or elliptical adult closely covered above with minute hairs, calyx-teeth distinct reflexed. Don Prodr. 141; Wall. Cat. 487, Fl. As. Rar. 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 bicapitate hairs. Leaves 3½ by 1½ in., narrowed at both ends, hardly acuminate. Heads hemispherical, ½-1 in. wide; bracts 1 by ½ in. Fruiting heads depressed, globose, 1 in. wide, succulent, of numerous coalesced pericarps; endocarp about ½ in., bony, ellipsoid or obvoid, compressed; calyece 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 subtruncate.

4. MASTIXIA, Blume.

Trees, young parts more or less pubescent. Leaves alternate or opposite, petioled, 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; authors corolla 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 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 ½-2 in., minutely pubescent when young. Panicle 2-5 in. diam., branches and calyx-tube with close fulvous pubescence. Calyx-teeth rarely 5. Style 3½ in. Fruit 1 by ½ in., almost cylindric, or ½ by ½ in. ellipsoid.

Var. Thwaitesi; leaves 1½ by ½-¾ 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. arbores, C. B. Clarke; bracts acute persistent till after the petals drop, calyx-teeth in the bud triangular-lanceolate, stamens 5. Bursino-
petalum arboreum, Wight Io. t. 956; Thwaites Enum. 42; Bedd. Fl. Sylv. t. 216.


A large tree, foliage dark green. Leaves 3 by 2 in., elliptic or obovate-oblong, suddenly shortly acuminate, narrowed at the base, glabrous, drying black; petiole ½-1 in., minutely pubescent when young. Panicle 2-5 in. diam., branches and calyx-tube with close fulvous pubescence. Style less than ½ in. Fruit ½ by ½-½ 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 ½-½ in., linear-oblong, obtuse.


MALABAR; Canara, Dharwar and Bellary; Law; Concan; 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, white beneath; petiole ½-1½ in., pubescent when young. Panicle 3-5 in. diam., very pubescent towards the extremities. Some of the lower bracts 1½ in., leaflike though narrow, many of the upper exceeding ½ in. Buds silky. Style less than ½ in. Fruit ½ by ½ 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 3 in., bracteoles and calyx-tube minutely silky or almost glabrous, calyx-teeth 5 short triangular.

MALACCA; Maingay, No. 710.

Branchlets glabrous. Leaves 2-3 by 1-1½ in., elliptic, suddenly and obtusely acuminate, narrowed at the base, glabrous, drying an olive green; petiole ½ in. Panicle 2 in. diam., nearly glabrous. Some of the lower bracts nearly 1 in., leaflike though narrow, many of the upper nearly ½ in. and obtuse. Buds silky. Style less than ½ in. Fruit not seen.

** Leaves subopposite and opposite.

5. M. Junghuhnniana, 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 ½ in., pubescent when young. Panicle 2-5 in. diam., trichotomous; bracteoles ½-1½ in., pubescent. Young petals most minutely silky. Fruit not seen.—Identified with M. Junghuhnniana 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 ½ in., ovoid, much narrower upwards.—A very fine and distinct species.
5. **Aucuba**, Thumb.

Glabrous branching shrubs. Leaves opposite, petioled, ovate or lanceolate, obtusely serrate, leathery, shining, turning black in drying. Flowers small, dicous, 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 Bhutan, alt. 6000–9000 ft.; **Griffith** &c. — **Distrib.** Japan.

A stout shrub, 6–12 ft., branching dichotomously. Leaves 8 by 1½ in., narrowed at the base, denticulate or serrate; petiole ½–1 in. Panicles ⅜ in. diam., terminal on very short lateral branches. Fruit ¼ by ½ 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-dicous, 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.

1. **N. sessiliflora**, Hook f. in Gen. Pl. i. 959; leaves oblong acuminate, flowers sessile. Daphniphyllum capitata, Kurs For. Fl. i. 240; and in Journ. As. Soc. 1875, part ii. 201, with fig. Ilex daphniphyloides, Kurs in Journ. As. Soc. 1870, pt. ii. 72. Agathisantes javanica, Blume Bijd. 645; Miq. Fl. Ind. Bat. i. pt. i. 839. Ceratostachys arborea, Blume Bijd. 644; Miq. l. c.


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 1½ in., more or less pubescent. Calyx-teeth rounded, pubescent and ciliate. Ripe fruit ½ by ¾ 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.

1. **T. tiliæfolia, DC. Prodr. iv. 257; Seem. Journ. Bot. iii. 361, t. 41.**

*Sambucus tiliæfolia, Wall. Cat. 483.*

**NIPAL; Wallich. 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 ¼ in.; fem. sometimes nearly as long as the male, but much less dense and with far fewer more scattered flowers. *Fruit* ⅛ in., ovoid, glabrous.
INDEX OF GENERA, SPECIES AND SYNONYMS.

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