

**ICONES
ROXBURGHIANAE
OR
DRAWINGS OF
INDIAN PLANTS**

FASC. IV



BOTANICAL SURVEY OF INDIA

CALCUTTA

1970

(Date of Publication—31st March 1970)

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1970

Price Rs. 20.00 or sh.45 or \$ 5.50

PUBLISHED BY THE DIRECTOR, BOTANICAL SURVEY OF INDIA AND PRINTED
BY S. N. GUHA RAY AT SREE SARASWATY PRESS LTD., CALCUTTA - 9

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1. LEEA INTEGRIFOLIA Roxb.

Sub-arboreous. *Leaves* super-decompound; *leaflets* lanceolar, entire, acuminate. *Corymbs* super-decompound.

Teling. Booradipakai.

A native of the moist vallies among the Circar mountains. It is a large shrub, and flowers during the wet season.

Leaves alternate, super-decompound, about thirty inches long. *Pinnae* as in the last species (*L. staphylea*); the lower pair always bipinnate. *Leaflets* opposite, sub-sessile, linear-lanceolate and lanceolar, sometimes very slightly serrate; smooth above, a little downy underneath, from six to eight inches long, and from two to three broad. *Petioles* and *petiolets* smooth, with an elevated ridge running along the upper side; beyond the lower pair of pinnae the ridge has a groove in it. *Stipules* as in the former (*L. staphylea*). *Corymbs* terminal, &c. as in the last species (*L. staphylea*), but larger. *Calyx* as in the other species. *Corol*; *tube* shorter than the calyx, in other respects as in the last species (*L. staphylea*). *Nectary* composed of five erect, emarginate scales, issuing from the mouth of the tube of the corol. *Filaments* five, alternate with and longer than the nectarial bodies. *Anthers* oblong, pointed. *Pistil*, *pericarp*, and *seeds*, as in the last species (*L. staphylea*); it is rather more common for the capsule to be six-seeded in this species than in the others.

(W. Roxburgh, *Flora Indica* 1: 659, 1832)



LEEA INTEGRIFOLIA Roxb.

2. LEEA MACROPHYLLA Roxb.

Herbaceous. *Leaves* simple.

Sans. Sumoodruka.

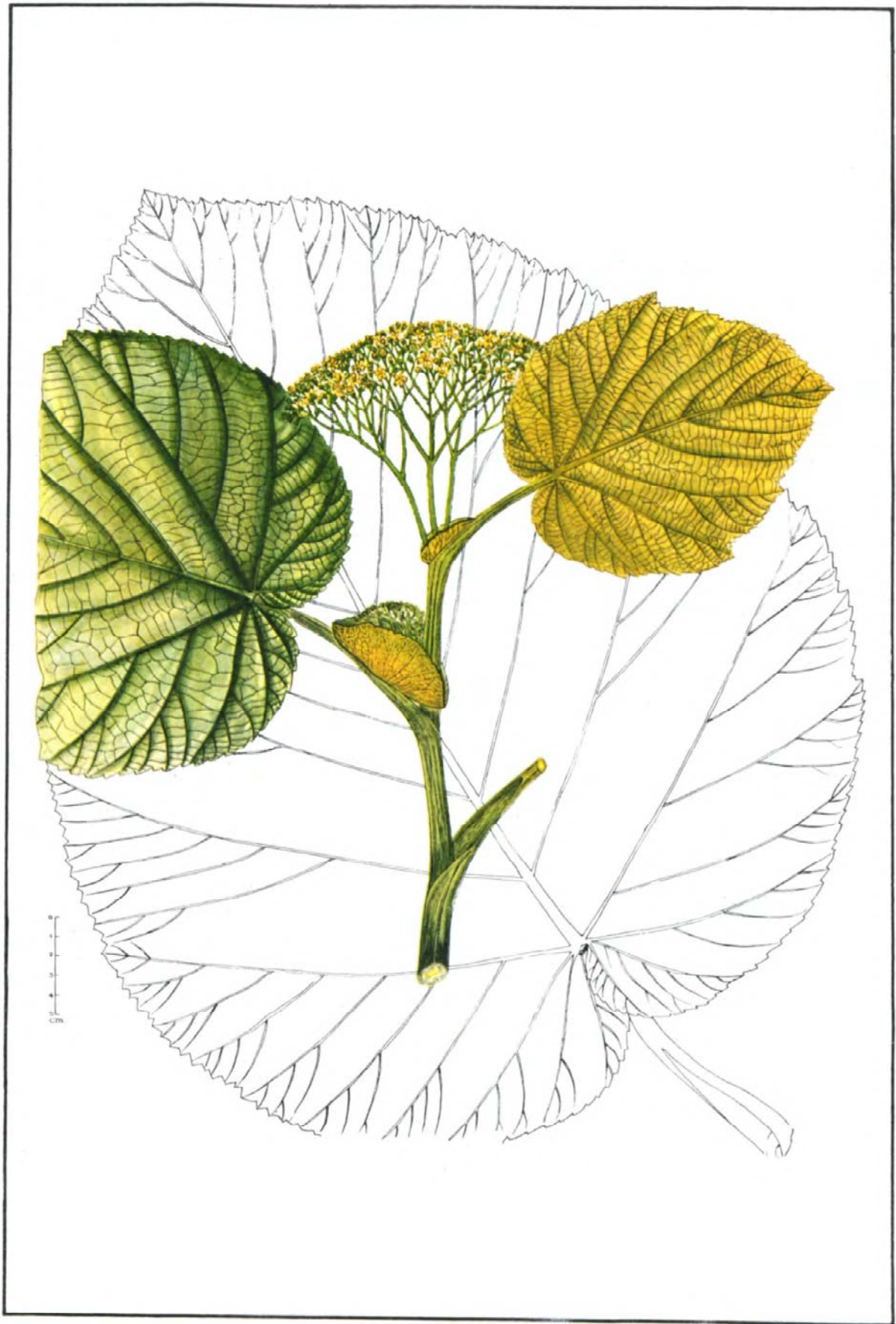
Beng. DhoI-Shumoodra.

Is common throughout Bengal. Flowering time the rainy season.

Root tuberous, perennial, red. *Stem* erect, annual, flexuose, jointed. *Leaves* simple, alternate, petioled, broad-cordate, irregularly serrate, or tooth-lobed; posterior lobes large and overlapping each other; smooth on both sides, except that on the under side the numerous veins are very protuberant, of which the larger are always opposite; from one to two feet long, and nearly as broad. *Petioles* tapering from the base, furrowed below, channelled above, as far as the stipule-like membrane reaches. *Cymes* terminal, large; first division three-parted, or three distinct cymes, superior divisions less regular. *Flowers* very numerous, small, white. *Bracts* small, falling. *Calyx* five-toothed, permanent. *Corol* one-petalled. *Tube* length of the calyx. *Border* five-parted; *divisions* lanceolate, expanding with an incurved apex and there bagged. *Nectary*; in this species the apices of the divisions are entire. *Filaments* five, length of the nectary, and inserted on the bottom of its five fissures. *Anthers* inverted within the mouth of the nectary, with their sides united. *Germ* superior, six-celled, with one ovulum in each, attached to the base of the axis. *Style* cylindric. *Stigma* simple, perforated, lodged about the middle of the inverted anthers. *Berry* much depressed, torose, size of a small cherry, obscurely six or more-lobed, smooth, black, and succulent when ripe, six or more-celled. *Seeds* solitary. *Integuments* two; the *exterior* one somewhat nuciform, pretty thick, and brown; the *inner* one very thin, and lighter coloured, adhering to the perisperm. *Perisperm* conform to the seed, deeply intersected with brown, clammy fissures. *Embryo* small, scarcely half the length of the perisperm, subulate. *Cotyledons* subulate. *Radicle* inferior, pointing to the umbilicus.

Obs. The root promises to yield a colour fit for dyeing; its taste is astringent, and it is mucilaginous.

(W. Roxburgh, *Flora Indica* 1: 653, 1832)



LEEA MACROPHYLLA Roxb.

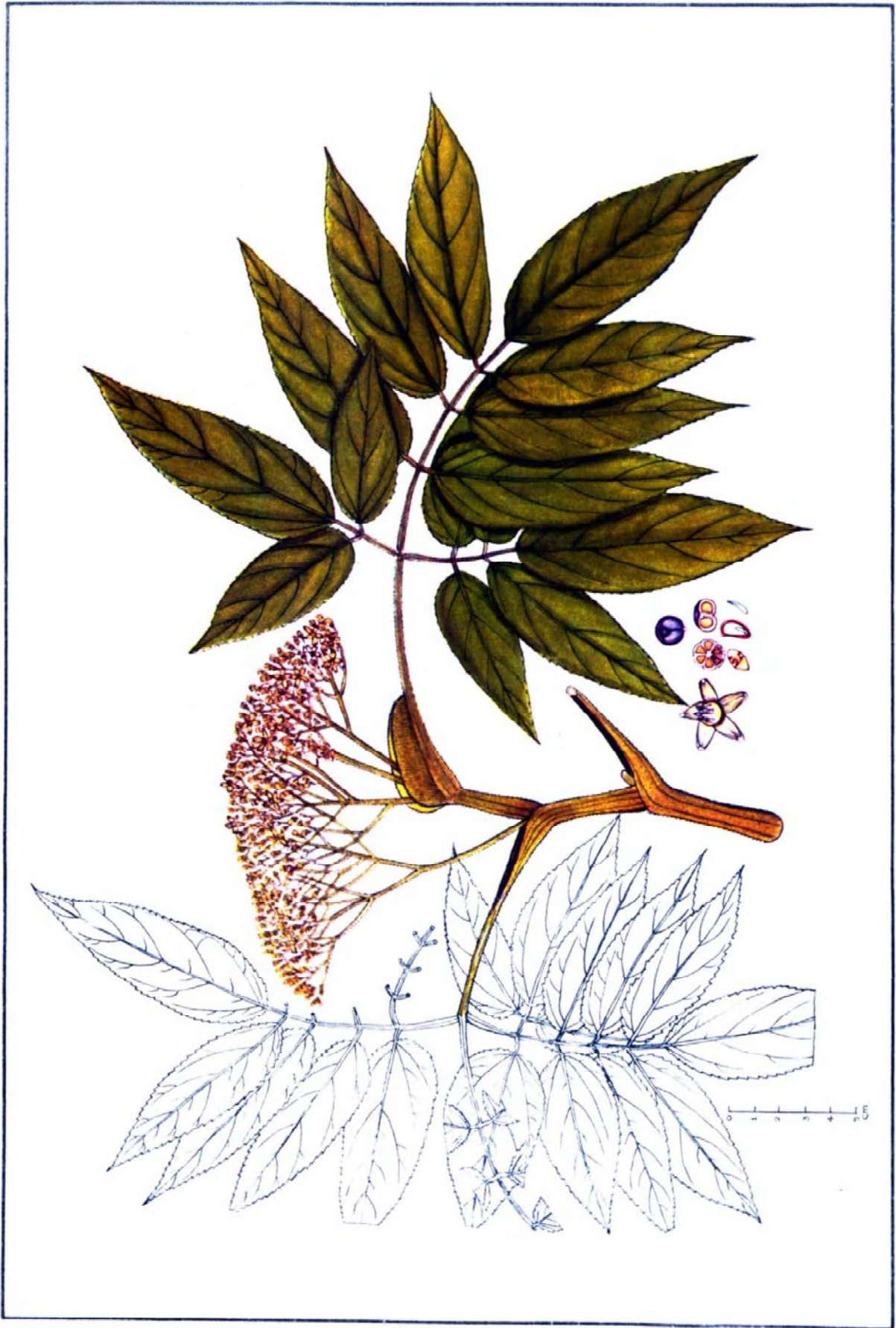
3. LEEA ROBUSTA Roxb.

Shrubby, jointed, pubescent. *Leaves* bi- and tri-pinnate; *leaflets* ovate-lanceolate, serrate, cuspidate. *Nectary* sub-globular.

A native of the northern Circars. In the Botanic Garden at Calcutta, it flowers during the rains.

Stems in plants five years old erect, about five or six feet high, stout, simple, flexuous, jointed, round, the woody parts pretty smooth, the more tender parts rather harsh, with coarse, short pubescence. *Leaves* alternate, from pinnate to tripinnate, from one to three feet long, and often broader than long. *Leaflets* ovate-lanceolate, the lateral ones with a broad-cordate base, serrate, hairy underneath; from five to ten inches long, and from three to five broad. *Petioles* channelled on the upper edge. *Stipules* petiolar, large, semi-elliptic, villous, caducous. *Cymes* terminal, super-decompound, villous. *Flowers* very numerous, small. *Bracts* linear, villous, caducous. *Calyx* campanulate, five-toothed. *Corol* green, five-cleft. *Nectary* round, urceolate, pearl-coloured, inserted on the mouth of the small tube of the corol, and there contracted by a sharp vein on the inside, deeply five-parted; segments linear-oblong, fleshy, with a thin, rounded apex. *Filaments* inserted into the bottom of the fissures of the nectary, above the middle jointed, and there bent in and down. *Anthers* linear-oblong, inverted, and in that position their margins are firmly united into a ring round the stigma. *Germ* superior, ovate, six-celled, with one ovulum in each, attached to the base of the axis. *Style* short, but thin and six-grooved. *Stigma* rather large, entire, convex. *Berry* much flattened, size of a small cherry, smooth, black, and somewhat succulent, six-lobed, six-celled. *Seed* solitary. *Perisperm* conform to the seed, intersected with some deep brown fissures, as in all the other species examined by me. *Embryo* small, a little curved. *Cotyledons* subulate. *Radicle* inferior, pointing to the umbilicus.

(W. Roxburgh, *Flora Indica* 1: 655, 1832)



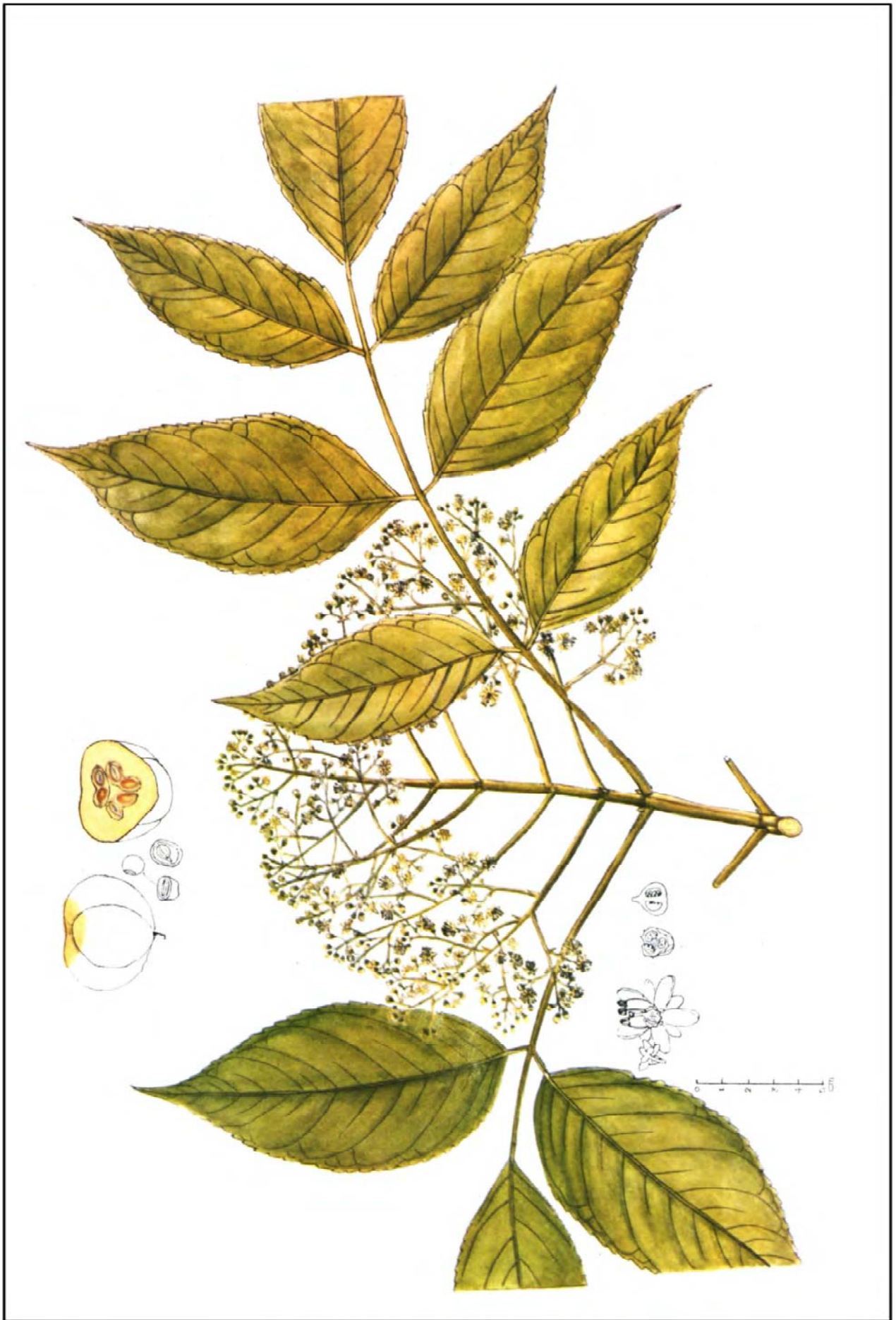
LEEA ROBUSTA Roxb.

4. DALRYMPLEA POMIFERA Roxb.
(*Dalrympelia pomifera* Roxb.)

Junki jam the vernacular name in Silhet where it is a native and grows to be a large tree. Flowering in March, and the seed ripening in September and October.

Young shoots rather succulent, round, and perfectly smooth. *Leaves* opposite, unequally pinnate, some of them ternate; from ten to twenty inches long. *Leaflets* three or four pairs, and a terminal one, the pairs opposite, all more or less petiolate, oblong, obtusely serrate, acuminate, smooth, from five to six inches long, by two or three broad. *Petioles* and *petiolets* round and smooth. *Panicles* terminal, spreading much, more broad than long, primary branches decussate; parietal ones alternate with the small yellowish white flowers, which are crowded round their extremities; every part smooth. *Bracts* to the primary branches of the panicle opposite, as in the Rubiaceae the rest solitary under each division and sub-division. *Calyx* inferior, five-leaved; *leaflets* rather unequal and oval. *Petals* five, oblong, obtuse, spreading. *Nectary* acetabuliform. *Filaments* five, alternate with the petals, and shorter than they, inserted under the nectary. *Anthers* ovate. *Germ* superior, three-lobed, indeed almost separable, three-celled; *ovula* about eight in each cell, widely attached to the axis. *Style* length of the germ, three-grooved. *Stigma* three-lobed. *Berry* drupaceous, having the appearance of a pome, of a roundish, three-lobed form, very fleshy, when ripe yellow, and almost smooth, size of a large medlar, three-celled. *Seeds* several in each cell, shape various, the most common roundish, reniform and considerably compressed, attached to the partition. *Integument* single, thick and of great hardness, in fact a perfect nut, exterior surface brown and highly polished. *Perisperm* conform to the seed. *Embryo* obliquely inferior. *Cotyledons* cordate, three-nerved. *Radicle* oval, obliquely centrifugal.

(W. Roxburgh, *Flora Indica* 1: 633, 1832)



DALRYMPLEA POMIFERA Roxb.
(*Dalrympelia pomifera* Roxb.)

5. CROTALARIA BIALATA Roxb.

Perennial, spreading; *branches* two-winged. *Leaves* sub-sessile, from lanceolar to oblong. *Peduncles* lateral, long and smooth.

A native of Silhet. In the Botanic Garden it grows to be a pretty large bushy spreading shrub, with little or no stem, but many sub-ligneous, naked, spreading branches, which divide into ascending, broad-winged, villous branchlets. Flowers and ripens its seed during the rainy and cool seasons.

(W. Roxburgh, *Flora Indica* 3: 274, 1832)



CROTALARIA BIALATA Roxb.

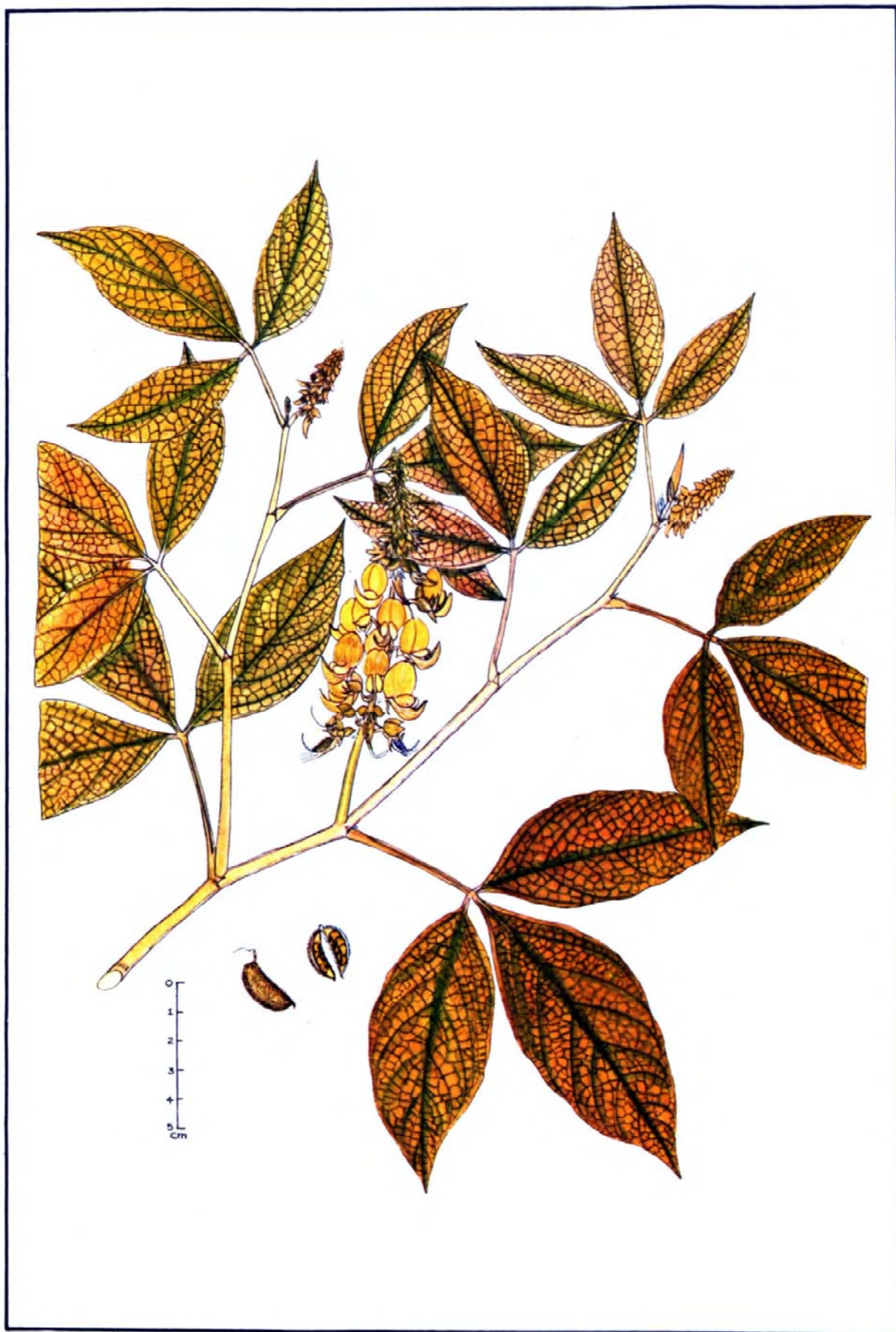
6. CROTALARIA BRACTEATA Roxb.

Shrubby, erect, with many spreading branches, slightly sericeous. *Leaves* ternate; *leaflets* broad-lanceolar, acute, smooth. *Stipules* minute. *Racemes* axillary or leaf-opposed; a pair of large ovate bracts over the calyx. *Legume* sessile, woolly, many-seeded.

A native of Chittagong. Flowering time the close of the rains; seed ripens in January and February.

Root perennial. *Trunk* short, ligneous. *Branches* numerous, dichotomous, spreading; *young shoots* round, lightly sericeous. *Leaves* alternate, petioled, ternate. *Leaflets* broad-lanceolar, acute, entire, while young slightly sericeous underneath; from three to six inches long, and from one to three broad. *Petioles* about two inches long, slightly channelled. *Stipules* minute acute. *Racemes* solitary, erect, axillary or opposite, shorter than the leaves. *Flowers* numerous, pretty large, yellow. *Bracts* of the pedicels solitary, small, one-flowered; those of the calyx, paired, ovate and projecting over the calyx like a hood, before the flowers expand; their structure and situation make the racemes appear imbricated. *Legumes* sessile, broad, boat-shaped, very woolly, about three quarters of an inch long. *Seed* several, reniform, smooth, pale-coloured.

(W. Roxburgh, *Flora Indica* 3: 278, 1832)



CROTALARIA BRACTEATA Roxb.

7. CROTALARIA FULVA Roxb.

Shrubby, erect. *Leaves* lanceolar, sericeous when young. *Stipules* none. *Racemes* terminal, and from the exterior axils. *Bracts* ovate, recurved, those of the pedicel solitary, those of the calyx paired. *Legume* sessile, oval, hid in the sericeous, permanent calyx, two-seeded.

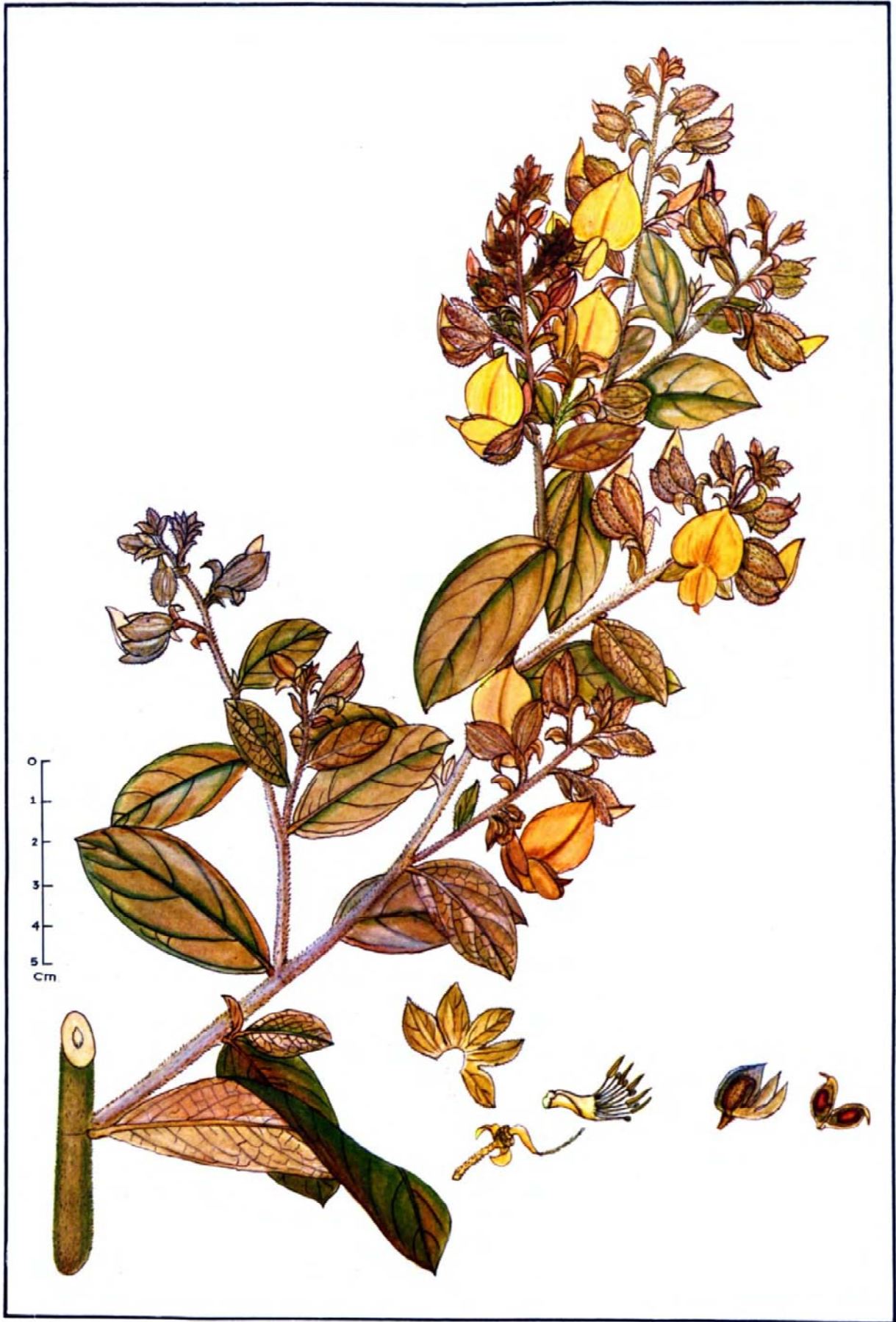
A native of Mysore, from thence Dr. Buchanan sent the seed to the Botanic Garden where in two years the plants blossomed in October and November, and ripened their seed in January. They were then stout, erect shrubs with a single, ligneous trunk and many ascending branches.

Bark of the *young shoots* clothed with much soft, short, white hair. *Leaves* simple, sub-sessile, lanceolate, entire, while young sericeous on both sides, from two to four inches long. *Stipules* none. *Racemes* terminal and from the exterior axils; the whole forming large, elegant, sub-erect, sericeous panicles, bearing numerous, large, yellow flowers. *Bracts* of the petioles solitary, one-flowered, ovate, recurved; those of the calyx rather narrower and recurved; all are permanent. *Calyx* large, yellowish and sericeous on the outside. *Legume* sessile, hid in the calyx, oval, villous, with the villous, dry, permanent style bent downwards. *Seeds* two, reniform, smooth, light brown.

The sericeous extremities and numerous large yellow flowers, give to this stately species, a very charming appearance while in blossom.

It differs from König's *sericea* (see *Retz. Obs. v.p. 29*) in the want of stipules and disposition of the bracts. *C. linifolia* (*Suppl. 322.*) is no doubt *juncea*, a plant totally different in every respect.

(W. Roxburgh, *Flora Indica* 3: 266, 1832)



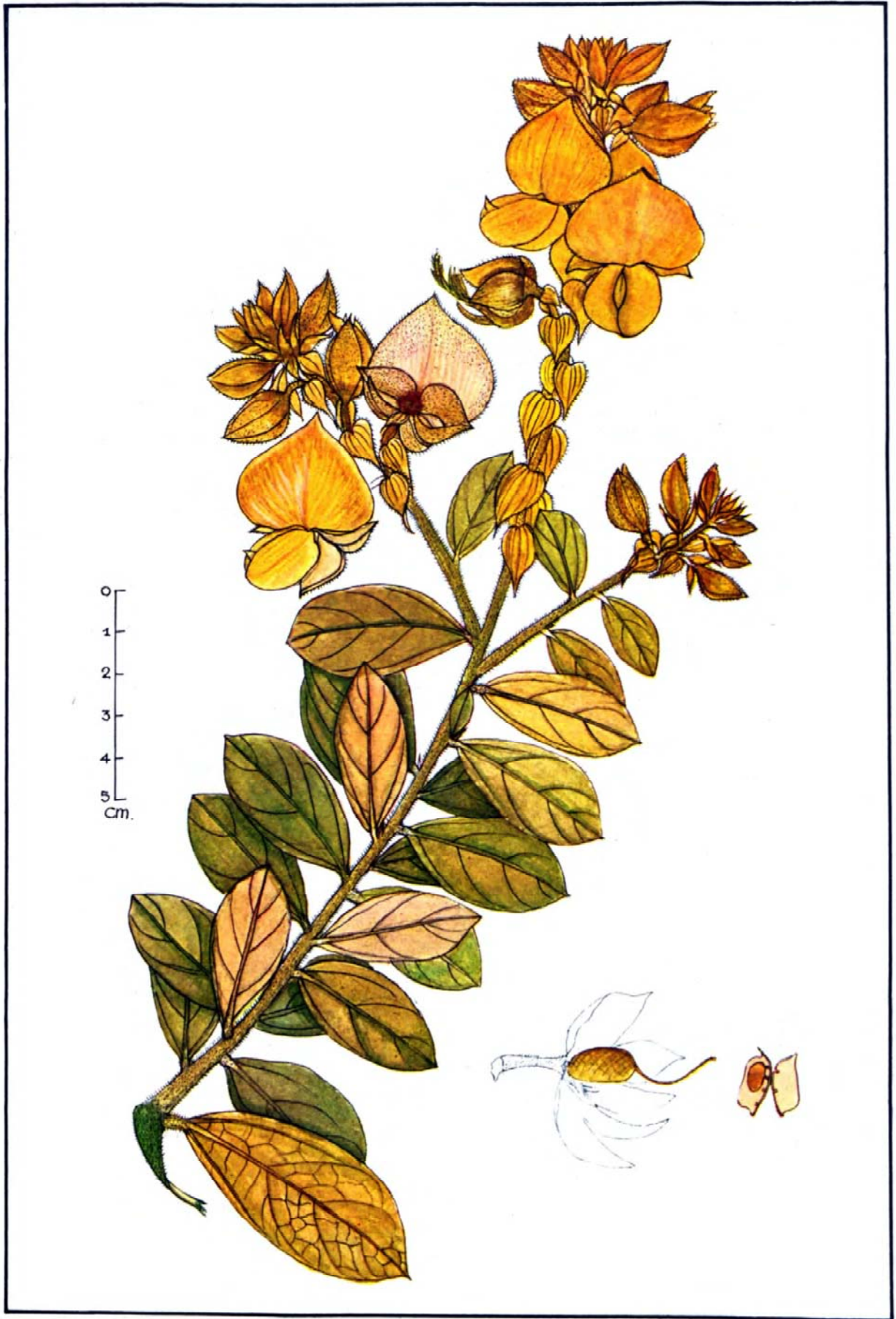
CROTALARIA FULVA Roxb.

8. CROTALARIA PULCHERRIMA Roxb.

Shrubby, erect. *Leaves* obovate-cuneate, villous. *Stipules* none. *Racemes* terminal; *bracts* of the *pedicels* solitary, cordate, acuminate, refracted; those of the calyx lanceolate. *Legume* sessile, oblong, hid in the permanent calyx, *seeds* few.

A native of Mysore, from thence Dr. Buchanan sent the seeds to the Botanic Garden at Calcutta in 1801, and in January 1803 the plants blossomed for the first time and ripened their seed in March. *Trunk* erect, as thick as a walking cane, covered with smooth, ash-coloured bark; *young shoots* round, and downy. *Leaves* simple, sessile, obovate-cuneate, villous; length from one to three inches. *Stipules* none. *Racemes* terminal, sometimes compound. *Bracts* of the pedicel solitary, one-flowered, sessile, cordate, acuminate, refracted, villous and yellow. *Flowers* very large, of a lively bright yellow and of several days duration. *Bracts* of the calyx opposite, lanceolate, expanding, villous, and not of so deep a yellow as the larger cordate bracts. *Calyx* deeply divided into five unequal segments and clothed with fine yellow pubescence, permanent. *Legume* sessile, hid in the permanent calyx, oblong, smooth. *Seeds* a few, frequently not more than one comes to perfect maturity.

(W. Roxburgh, *Flora Indica* 3: 267, 1832)



CROTALARIA PULCHERRIMA Roxb.

9. CROTALARIA RAMOSISSIMA Roxb.

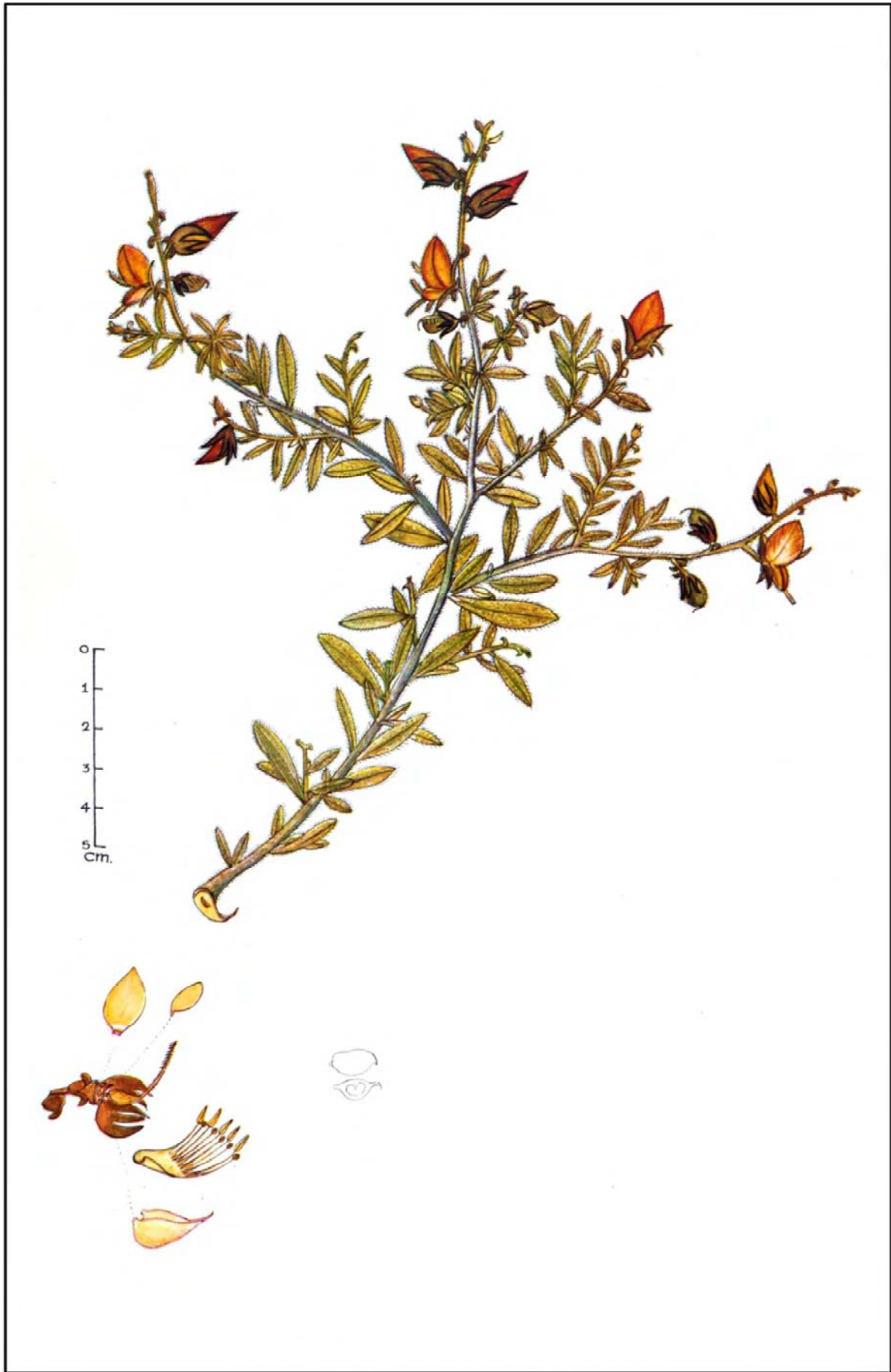
Suffruticose, very ramous, hairy. *Leaves* sessile, lanceolar. *Stipules* none. *Racemes* terminal, few-flowered. *Bracts* callous-margined, and revolute. *Legume* sessile, one-seeded.

A native of the interior parts of Bengal, and in blossom most part of the year.

Root ramous, perennial. *Stem* scarcely any, but numerous sub-ligneous, small, variously bent, alternate, very hairy *branches* and *branchlets*, spread in every direction; general height of the whole plant about two feet and in diameter fully as much. *Leaves* alternate, sessile, simple, approximate, cuneate-lanceolar, entire; very hairy underneath, size of the largest, about an inch long, and scarcely one-fourth of an inch in breadth.

Stipules none. *Racemes* terminal, solitary, few-flowered. *Flowers* pretty large, yellow, tinged with deep purple. *Bracts* of the pedicel solitary; of the calyx paired; all are cordate, with callous, recurved, coloured, smoothish margins and apices. *Calyx; divisions* unequal; the upper two being much larger than the lower three; the margins of all callous, coloured and recurved. *Legume* oval, hairy, sessile, one-seeded.

(W. Roxburgh, *Flora Indica* 3: 268, 1832)



CROTALARIA RAMOSISSIMA Roxb.

10. CROTALARIA TETRAGONA Roxb.

Shrubby, erect; *young shoots* four-cornered, villous. *Leaves* linear, lanceolate, acute. *Stipules* minute, filiform. *Racemes* terminal, drooping. *Legume* sessile, clavate, hairy.

From Nepal Dr. Buchanan sent the seed to this garden in 1802, where the plants grow well, and generally blossom during the hot season; and ripen their seed two months after.

Stem erect, shrubby, with many expanding, drooping, alternate branches; *young shoots* villous, and four-cornered, whole height of the plants four or five feet, and lasting from two to four years. *Leaves* alternate, sub-sessile, linear-lanceolate, acute, slightly villous, entire, from two to six inches long, and less than an inch broad. *Stipules* filiform, minute, villous. *Racemes* terminal, solitary, drooping, few-flowered. *Flowers* remote, drooping, large, yellow. *Bracts* of the pedicel ovate, acute, solitary, one-flowered, those of the calyx, on the opposite sides of its base, and smaller than those of the pedicel. *Calyx* bilabiate; the *upper lip* bipartite, the *under* one three-cleft, but the margins of the segments are united, requiring force to separate them, otherwise it remains entire. *Legume* sessile, clavate, hairy, many-seeded.

(W. Roxburgh, *Flora Indica* 3: 263, 1832)



CROTALARIA TETRAGONA Roxb.

11. INDIGOFERA COERULEA Roxb.

Shrubby, hoary. *Leaves* pinnate; *leaflets* four-paired, obovate, emarginate. *Racemes* rather shorter than the leaves. *Legumes* reflexed, curved, contracted between the seeds, hoary, from three to four-seeded.

Teling. Karneeli.

This is an erect shrubby species; growing on dry, barren, uncultivated ground to the height of three feet and higher in good, garden soil. It flowers during the wet and cold seasons.

Stem erect, woody, as thick as a man's thumb or more biennial or triennial, the length very various, but the whole plant, in its wild state, is generally about three feet high; where cultivated in a good soil it is often five or six feet high. *Branches* many, nearly erect, scattered, striated from the insertion of the leaves, three small ridges running down from each; entirely covered with great numbers of short, depressed, white hairs, which make the plants quite hoary; these may be easily rubbed off, leaving the branches, & c. smooth, clear and green. *Leaves* alternate, somewhat bifarious, numerous, approximated, pinnate with an odd one; about four inches long. *Leaflets* short-petioled, opposite, from three to five pairs, pale green, fleshy, the lower smallest, all obcordate, slightly emarginate with a minute bristle, above pretty smooth, but pale coloured; many short depressed white hairs cover the under side, which make it still of a fainter green than the upper side, but nothing like down on any parts of the plant, from one to two inches long, and about three quarters broad. *Petioles* covered with the same small, depressed, white hairs, channelled. *Stipules* awled, small. *Racemes* axillary, sessile, erect, shorter than the leaves, many-flowered. *Flowers* numerous, small, yellow and red. *Calyx*; *divisions* short, acute, equal. *Banner* and *keel* hairy; of a greenish-yellow, margins of the former involute. *Wings* of a pale rose colour, linear-oblong, processes of the keel remarkably large. *Legumes* numerous, reflexed, falcate, round, short, covered with the same hairs as the branches and contracted a little between the seeds. *Seeds* generally three, smooth, like those of *I. tinctoria*.

This species comes near to *Indigofera argentea* Linn. the chief differences are, that in this plant there is a total want of down; the leaves are never ternate, but always composed of from three to five pair of leaflets, with a larger single terminal one; and the legumes are very numerous on the same racemes.

From the leaves of this plant I have often extracted a most beautiful, light Indigo; more so than I ever could from the common Indigo plant, or even from *Nerium tinctorium*, and in a large proportion. After an enquiry of nearly two years, I have not been able to discover that the natives of any parts of India make use of it. The process by which I obtained the colour from the leaves, was exactly similar to that practised for obtaining the Indigo from the leaves of *Nerium tinctorium*, viz. by committing them while fresh, to cold water and scalding them over a moderate fire, to about one hundred and sixty degrees of Fahrenheit's thermometer, the liquor will then have attained a beautiful deep greenish yellow colour; it is then strained off clear, and while hot, gently agitated in a broad, shallow, open vessel for a few, (twenty to thirty) minutes; during which time it changes its colour, gradually becoming darker and darker and more turbid when sufficiently agitated, if a little of it be viewed in a clean silver spoon, or any other vessel that reflects the light, a muddiness or minute grain may be easily seen, which is rendered large and copious by the addition of a little lime-water; this foecula readily falls to the bottom, the superincumbent liquor is then poured off and will be more or less of a clear brandy colour, according as the operation has been successfully conducted; for the more this liquor is tinged with green, the less perfectly has the colour been separated; and the produce, of course the more deficient and less beautiful. How to effect the most perfect separation and precipitation of the colour, is the grand desideratum with our Indigo manufacturers and well deserves the chemist's most serious attention.

(W. Roxburgh, *Flora Indica* 3: 377, 1832)



INDIGOFERA COERULEA Roxb.

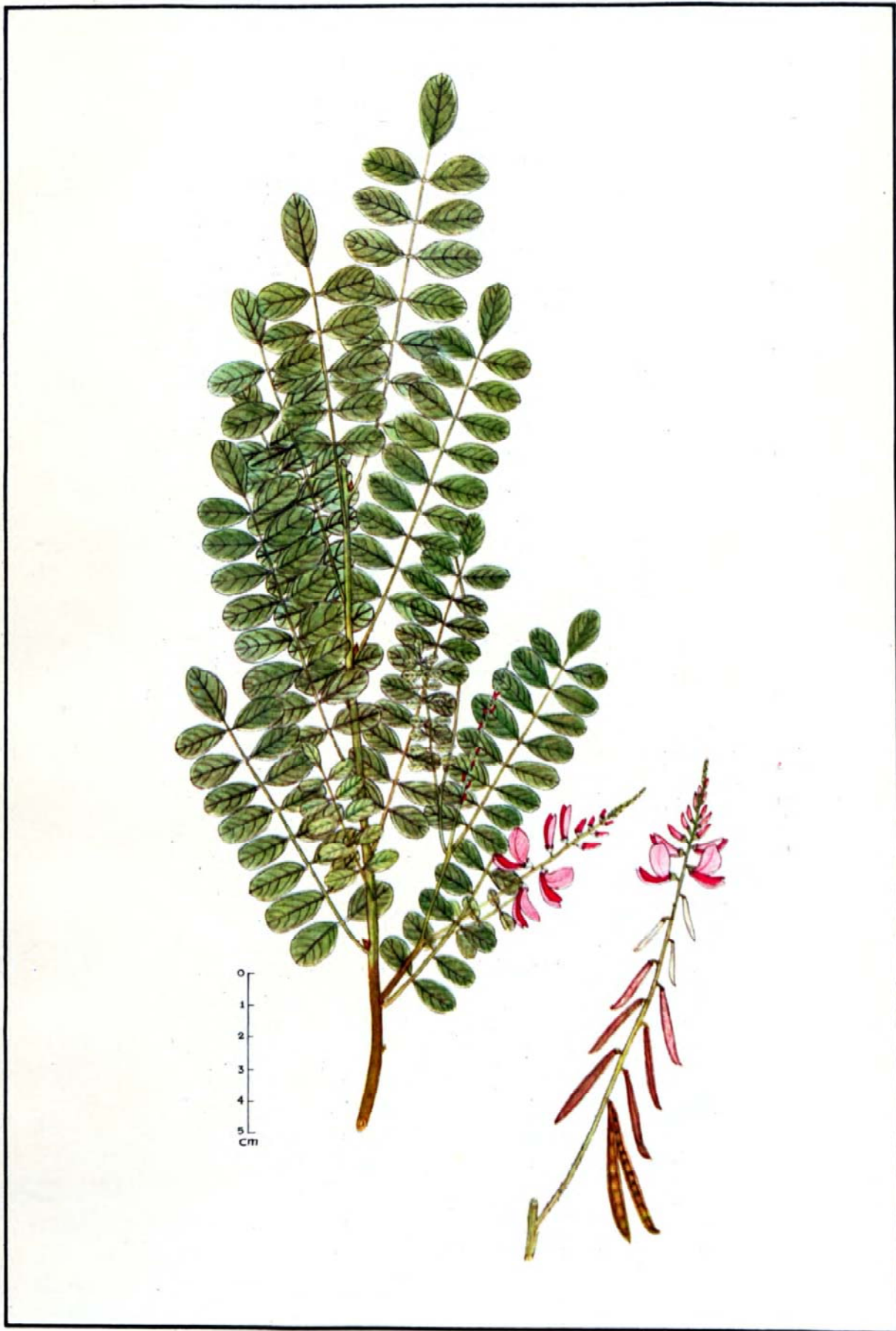
12. INDIGOFERA PULCHELLA Roxb.

Shrubby, erect. *Leaves* pinnate; *leaflets* from eight to ten-paired, obovate. *Racemes* longer than the leaves. *Legumes* reflexed, straight, smooth, from ten to twelve-seeded.

An erect, ramous shrub.

Stem and *branches* round, smooth; *bark* dark rust coloured. *Leaves* scattered, pinnate, with an odd one, from four to six inches long. *Leaflets* from eight to ten-paired, obovate, somewhat emarginate with a little bristle, a little hairy, three-fourths of an inch long, by one half broad. *Stipules* awled, falling off long before the leaves are fully expanded. *Racemes* axillary, longer than the leaves, short-peduncled. *Flowers* numerous, large, rose-coloured. *Bracts* lanceolate, concave, one-flowered, falling. *Legumes* cylindric, smooth, reflexed, an inch or an inch and a quarter long, from ten to twelve-seeded.

(W. Roxburgh, *Flora Indica* 3: 382, 1832)



INDIGOFERA PULCHELLA Roxb.

13. GALEGA INCANA Roxb.

Shrubby, diffuse, flexuose, hoary with white down. *Leaflets* six pairs, obovate, emarginate, hoary. *Stipules* taper-triangular. *Racemes* terminal. *Legumes* reflexed, falcate, very hairy.

A native of Mysore.

Stem scarcely any, but numerous, flexuose *branches*, and *branchlets*, spreading to a considerable extent; *young parts* clothed with erect, soft, white down. *Leaves* alternate, pinnate, from three to four inches long. *Leaflets* from five to eight pairs, obovate, deeply emarginate, hoary, particularly the margins and the lower side. *Stipules* reflexed by age, triangular, acute. *Racemes* terminal, long and downy. *Bracts* three-fold, three-flowered. *Flowers* short-pedicelled, the middle one of the three expanding long after the other two. *Calyx* clothed with much fulvous pubescence. *Legumes* bending back close to the rachis of the racemes, much curved, very hairy, from six to eight-seeded.

(W. Roxburgh, *Flora Indica* 3: 385, 1832)



GALEGA INCANA Roxb.

14. ROBINIA CANDIDA Roxb.

Shrubby, erect, unarmed. *Leaves* unequally pinnate; *leaflets* ten-paired, lanceolate. *Racemes* terminal or axillary, pedicels one-flowered. *Legumes* linear, many-seeded.

This elegant, large shrub, was first reared in the Company's Botanic Garden, from seed collected in the north of Bengal by Dr. Carey. Flowering time the cold season.

Stem erect, ligneous; *branches* expanding; the young parts villous and clouded with dark and brighter green; the woody parts smoother and ash-coloured; the whole height when full-grown from five to eight feet. *Leaves* alternate, unequally pinnate, from six to eight inches long. *Leaflets* opposite, short-petiolated, generally from ten to twelve, linear-lanceolate, entire, dagger-pointed, villous underneath, and on the margins, about two inches long. *Petioles* villous, channelled. *Stipules* tapering to a fine long point. *Racemes* terminal and axillary, short, few-flowered. *Pedicels* one-flowered, nodding. *Bracts* small, caducous, flowers large, pure white, inodorous. *Banner* covered with gray down on the back, pure white and smooth within. *Legume* linear, many-seeded.

(W. Roxburgh, *Flora Indica* 3: 327, 1832)



ROBINIA CANDIDA Roxb.

15. ROBINIA FRUTICOSA Roxb.

Shrubby, ultimately twining. *Leaflets* from three to four pairs with a terminal one, linear oblong. *Racemes* axillary. *Banner* with two callosities at the base. *Legume* flat, from four to six-seeded.

A native of the interior parts of Bengal. From Chupra Mr. Charles Boddam sent seeds to the Botanic Garden in 1803 where the plants blossom during the rains, and ripen their seed in January.

Trunk short. *Branches* erect, the longest shoots began to twine in plants of four and five years of age, when they were not more than from three to six feet high. *Bark* of the older ligneous parts somewhat scabrous, that of the tender shoots villous. *Leaves* alternate, unequally pinnate, from six to twelve inches long. *Leaflets* from three to five pairs, opposite, linear oblong, those nearest the apex and particularly the terminal one, cuneate, all are entire, obtuse, and nearly smooth on both sides, from two to six inches long, and about one and a half broad. *Petioles* common, villous and slightly channelled, much swollen at the base. *Stipules* of the petioles triangular, those of the leaflets subulate. *Racemes* or rather *spikes* axillary, generally single, and simple, much shorter than the leaves. *Flowers* sub-sessile, middle-sized, rose-coloured, always in pairs, from round, elevated glands. *Bracts* tern, a small and cordate one below each gland which is persistent; and two lateral on the gland, which are caducous; besides there are two to each calyx, which press on its base laterally. *Calyx* somewhat gibbous, four-toothed, the upper one broader, shorter and emarginate. *Banner* with two remarkable callosities rising from the base in the inside. *Filaments* one and nine. *Anthers* equal, roundish. *Germ* inserted into a cup-shaped nectary with the filaments. *Stigma* naked. *Legume* linear-lanceolate, thin, from four to six-seeded.

(W. Roxburgh, *Flora Indica* 3: 328, 1832)



ROBINIA FRUTICOSA Roxb.

16. ROBINIA RACEMOSA Roxb.

Shrubby, climbing. *Leaflets* six-paired, with a terminal one; *stipules* subulate. *Racemes* nearly as long as the leaves, many-flowered. *Legume* pendulous. *Seed* from five to six, remote.

Teling. Galuga.

A large climbing shrub; a native of the extensive forests among the Circar mountains.

Stem woody, climbing over trees, &c. *Bark* scabrous with a gray roughness. *Leaves* erect, alternate, pinnate with an odd one, about nine inches long. *Leaflets* opposite, six pairs, oval, acute, entire, smooth; two inches long and one broad. *Petioles* round, smooth. *Stipules* of the petioles and leaflets awled, shorter than the leaves. *Racemes* axillary, erect; many-flowered. *Bracts* awled, one-flowered. *Flowers* numerous, large, rose-coloured. *Calyx* slightly five-toothed. *Banner* emarginate. *Wings* falcate. *Nectary*, a crenulated cup surrounding the base of the germ, as in some species of *Dolichos*. *Legumes* straight, pendulous, from six to nine inches long and as thick as the fore finger, very protuberant at the seeds and perfectly compressed between them. *Seeds* remote, from five to six, oblong.

I do not know of any use to which any part of this plant is put.

(W. Roxburgh, *Flora Indica* 3: 329, 1832)



ROBINIA RACEMOSA Roxb.

17. ROBINIA SUBEROSA Roxb.

Arboreous; *bark* suberous, deeply cracked. *Racemes* terminal; *pedicels* one-flowered. *Leaflets* from five to seven paired, with an odd one. *Legume* linear, many-seeded.

For this beautiful plant we are also indebted to Dr. Carey, who sent the seeds from the district of Dinajpoor, to the Botanic Garden at Calcutta, where it grows well and is in blossom during the rains chiefly.

Trunk erect, soon branching out into a large ramous head, whole height of the plant when full grown eight or nine feet. *Bark* ash-coloured, that of the trunk deeply split and of a corky nature. *Leaves* alternate, abruptly pinnate. *Leaflets* from five to six pairs, opposite, oblong, entire, above smooth, underneath hoary, the largest exterior ones about an inch long. *Stipules* minute, caducous. *Flowers* large, of a deep rose-colour, collected on terminal racemes, each furnished with a long pedicel. *Calyx* four-parted, the upper division more removed and two-pointed. *Legume* about four inches long, linear, compressed, with six or eight flattened reniform seeds.

It is a very ornamental plant, particularly while young.

(W. Roxburgh, *Flora Indica* 3: 327, 1832)



ROBINIA SUBEROSA Roxb.

18. DALBERGIA MARGINATA Roxb.

Scandent, scabrous. *Leaflets* five or seven, lanceolate, glossy, obtusely acuminate. *Panicle* axillary. *Stamina* one and nine. *Legumes* sub-linear, membrane-margined, one-seeded.

Mukree gilla, the vernacular name in Silhet, where it is indigenous; it blossoms in the rains, and the seed ripens during the hot season.

Stem woody, and with its numerous scabrous branches climbing and twining up and over trees, &c. *Leaves* alternate, unequally pinnate, from six to ten inches long. *Leaflets* two or three pairs, and a terminal one, petiolate, lanceolate, entire, points long, narrow, and obtuse, of a firm texture and polished, from four to five inches long, and from one to two broad. *Panicles* axillary, length of the leaves, and its few remote branches spreading as much. *Flowers* remote, long, and slender-pedicelled, white. *Calyx* bowl-shaped, of a deep black purple; mouth obscurely five-toothed. *Banner* long-clawed, obcordate. *Wings* and *keel* long and slender-pedicelled, white. *Filaments* one and nine. *Germ* linear, smooth, three-seeded. *Stigma* rather larger, but smooth. *Legumes* obliquely-lanceolate, sessile, thin, smooth, hard and veined on the surface, without any kind of crack or fissure, one-celled, one-seeded, about four inches long, and one and a half broad. *Seed* solitary, reniform, thin, one inch long by three-fourths of an inch broad.

(W. Roxburgh, *Flora Indica* 3: 230, 1832)

GALEDUPA PISCIDIA Roxb.

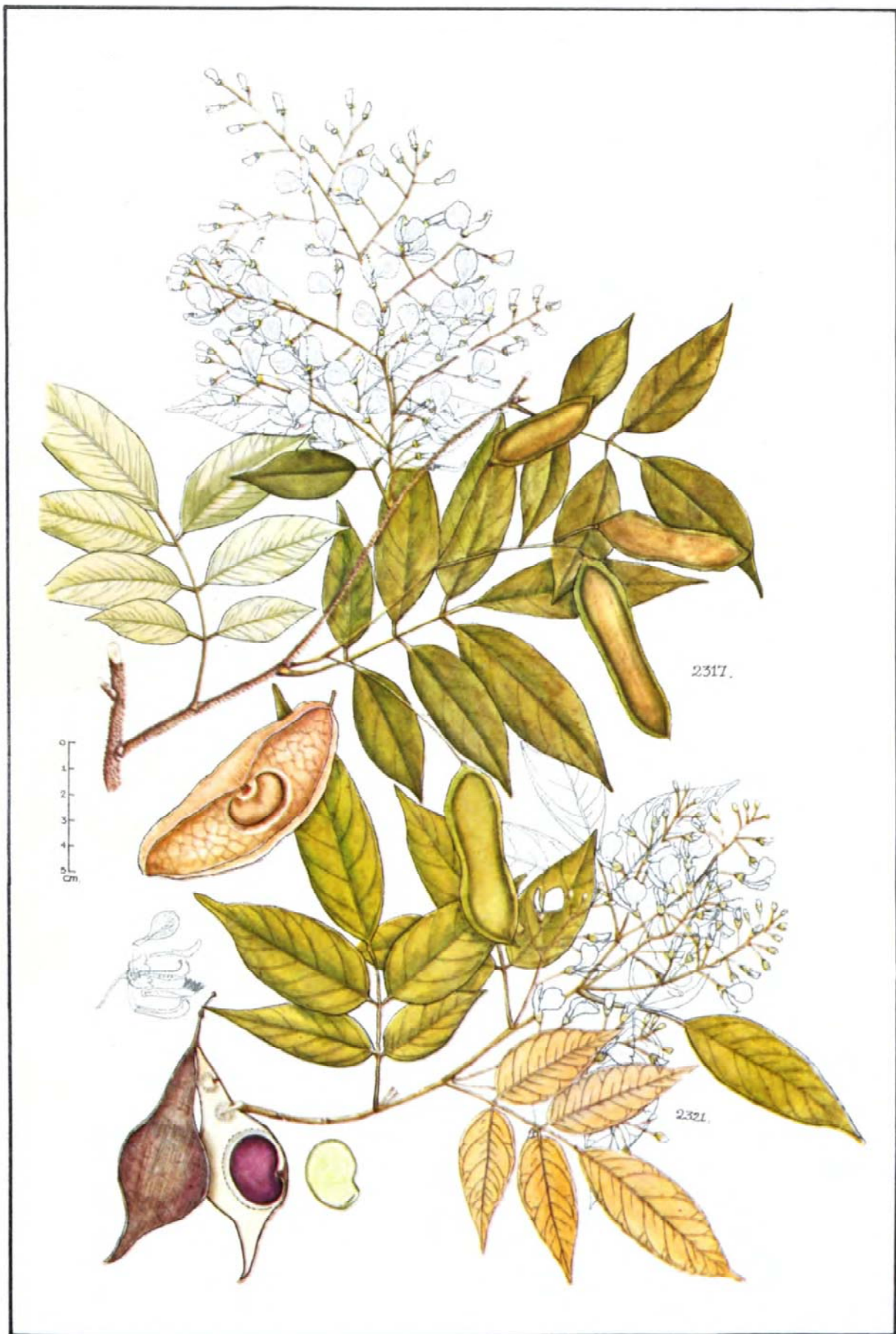
Arboreous, smooth. *Leaflets* three or five, the pairs opposite, lanceolate. *Racemes* axillary and terminal, simple, or ramous. *Filaments* single and nine-cleft.

A small tree, a native of the mountains on the border of Silhet, where it is called *Chundkee* by the natives, who powder the bark and flowers, which they throw into any small body of water, where there are fish they wish to take, by which they are said to be intoxicated and easily caught, and are not reckoned the less wholesome by the effects of the powder.

Flowering time July; seed ripens in the cool seasons.

Twigs slender, and clothed with remarkably white, smooth bark. *Leaves* alternate, quinate-pinnate and ternate from six to eight inches long. *Leaflets* three or five, the pairs opposite or nearly so, petiolate, lanceolate, entire, obtusely acuminate, from two to four inches long, and one or one and a half broad. *Petioles* and *petiolets* round and smooth. *Stipules*. *Racemes* axillary and terminal, frequently ramous near the base, shorter than the leaves, smooth. *Flowers* pretty large, white, long-pedicelled and always in pairs, rather remote from each other. *Calyx* campanulate; the *upper lip* of two rounded segments; the *under* one of three, and more protruded. *Corol* papilionaceous; the *wings* and *keel* remarkably slender. *Filaments* one and nine. *Germ* pedicelled, three or four-seeded. *Style* incurved. *Stigma* single. *Legume* long-pedicelled, differing in shape according to the number of seeds, the most common form is broad-spatulate, or battle-door-shaped with a sharp beak, and then one-seeded; *surface* pretty smooth and reticulate with veins. *Seeds* as large as common garden beans, and much like them. *Embryo* as in the order. *Cotyledons* green.

(W. Roxburgh, *Flora Indica* 3: 240, 1832)



DALBERGIA MARGINATA Roxb.
GALEDUPA PISCIDIA Roxb.

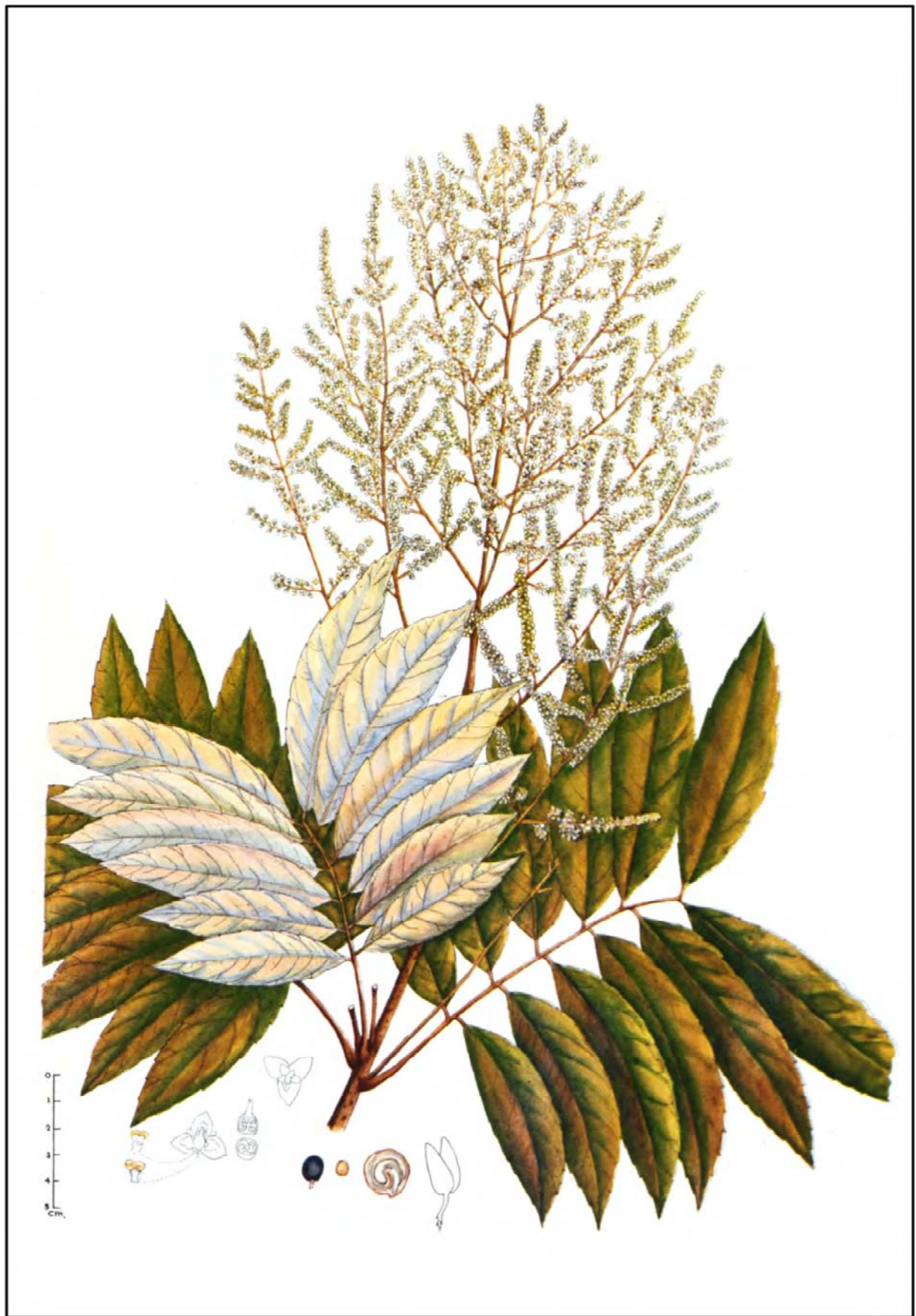
19. MILLINGTONIA PINNATA Roxb.

Leaves alternate, abruptly pinnate; *leaflets* from six to twelve pairs, sub-opposite, lanceolate.

Batiwa, the vernacular name in Silhet, where it is indigenous, growing to be a middling sized tree, the wood of which is employed by the natives in constructing their houses. Flowers in April and May. The seeds ripen in September.

Branchlets smooth. *Leaves* alternate, abruptly-pinnate; from six to eighteen inches long. *Leaflets* from six to twelve pairs, sub-opposite, short-petioled, lanceolate, remotely serrate, acuminate, smooth, three to six inches long, by one or one and a half broad. *Panicles* terminal, very large and very ramous, a little hairy. *Bracts* minute. *Flowers* numerous, small, white. *Calyx* three-leaved, with two smaller ones under them, which may be called bracts or a calycle; or, the calyx may be called five-leaved. *Nectary*, from the inside of the base of each petal arises a variously lobed, ragged leaflet or scale, which is incurved over the germ; besides which round the base of the germ is a small, three-sided cup with bidentate angles. *Filaments* two, opposite, length of the germ, short, broad, with enlarged apex; from the base on the outside, rises a broad, tridentate scale, of about the length of the filament. *Anthers* twin, each lobe globular, opening transversely on the inside. *Germ* superior, cordate, two-celled, with two ovula in each cell, attached to the partition. *Style* short. *Stigma* small, bidentate. *Drupe* size of a pea, smooth, black, succulent, one-celled. *Nut* roundish, thick for its size and very hard, rugose, one-celled, two-valved, with a projection into the cell opposite to the remains of the style on one side near the base, which marks the abortive lobe. *Seed* solitary, conform to the nut. *Integument* single, membranaceous. *Perisperm* none, or in small quantity, and blended with the integument. *Embryo* curved, and folded up nearly as in the *Convolvulaceae*. *Cotyledons* ovate-oblong. *Radicle* inferior, curved.

(W. Roxburgh, *Flora Indica* 1: 104, 1832)



MILLINGTONIA PINNATA Roxb.

20. MILLINGTONIA SIMPLICIFOLIA Roxb.

Leaves alternate, simple, broad-lanceolate.

A large tree, a native of Silhet, where it is called *Dantrungee* by the natives; the timber is used for various purposes. *Flowers* in February and March; seed ripens in July and August.

Leaves alternate, petioled, broad-lanceolar, tapering most toward the base, entire or very remotely sub-serrate, in very young plants completely serrate, rather acuminate, smooth; veins simple and paralleled; from six to twelve inches long, by three or four broad. *Panicle* terminal, large, oblong, patent, brown, villous branches. *Flowers* numerous, sessile, very minute, yellow. *Bracts* oblong, clothed with ferruginous pubescence. *Calyx* three-leaved, independently of two or three minute, villous bracts, like a calycle; *leaflets* ovate, smooth, permanent. *Petals* three, broad-ovate, waved, twice the length of the calyx, permanent. *Nectary* a variously lobed, smooth scale from the base of each petal on the inside, they form a dome over the pistillum, and round the base of the germ is found a flat, triangular body, with its angles bidentate. *Filaments* two, opposite, incurved, inserted without the interior, three-angular nectary; bifid, the inner lamina supporting on its apex a patelliform receptacle, on which the two-lobed yellow anther rests. *Exterior lamina* bi-fid, *segments* subulate, rising rather higher than the anther. *Germ* superior, two-celled, with two ovula in each, attached to the thickened middle of the partition. *Style* single, short. *Stigma* obscurely two-lobed. *Drupe* size of a pea, nearly round, succulent, smooth, black, one-celled. *Nut* conform to the drupe, rarely more than one-celled, hard, cell somewhat angular; the second or abortive cell always traceable. *Seed* solitary, concave on the side next the abortive cell of the nut, hemispheric on the other. *Integument* single, membranaceous. *Perisperm* none. *Embryo* curved, and doubled, as in the *Convolvulaceae*, with a curved inferior *radicle*.

(W. Roxburgh, *Flora Indica* 1: 103, 1832)



MILLINGTONIA SIMPLICIFOLIA Roxb.

21. RHUS PARVIFLORUM Roxb.

Subarboreous; all the tender parts very downy. *Leaves* ternate; *leaflets* sessile, obovate, anterior margins serrate-crenate. *Panicles* terminal.

A small bushy tree, a native of Nepal, from thence introduced into the Botanic Garden at Calcutta where it blossoms during the rainy season.

(W. Roxburgh, *Flora Indica* 2: 100, 1832)



RHUS PARVIFLORUM Roxb.

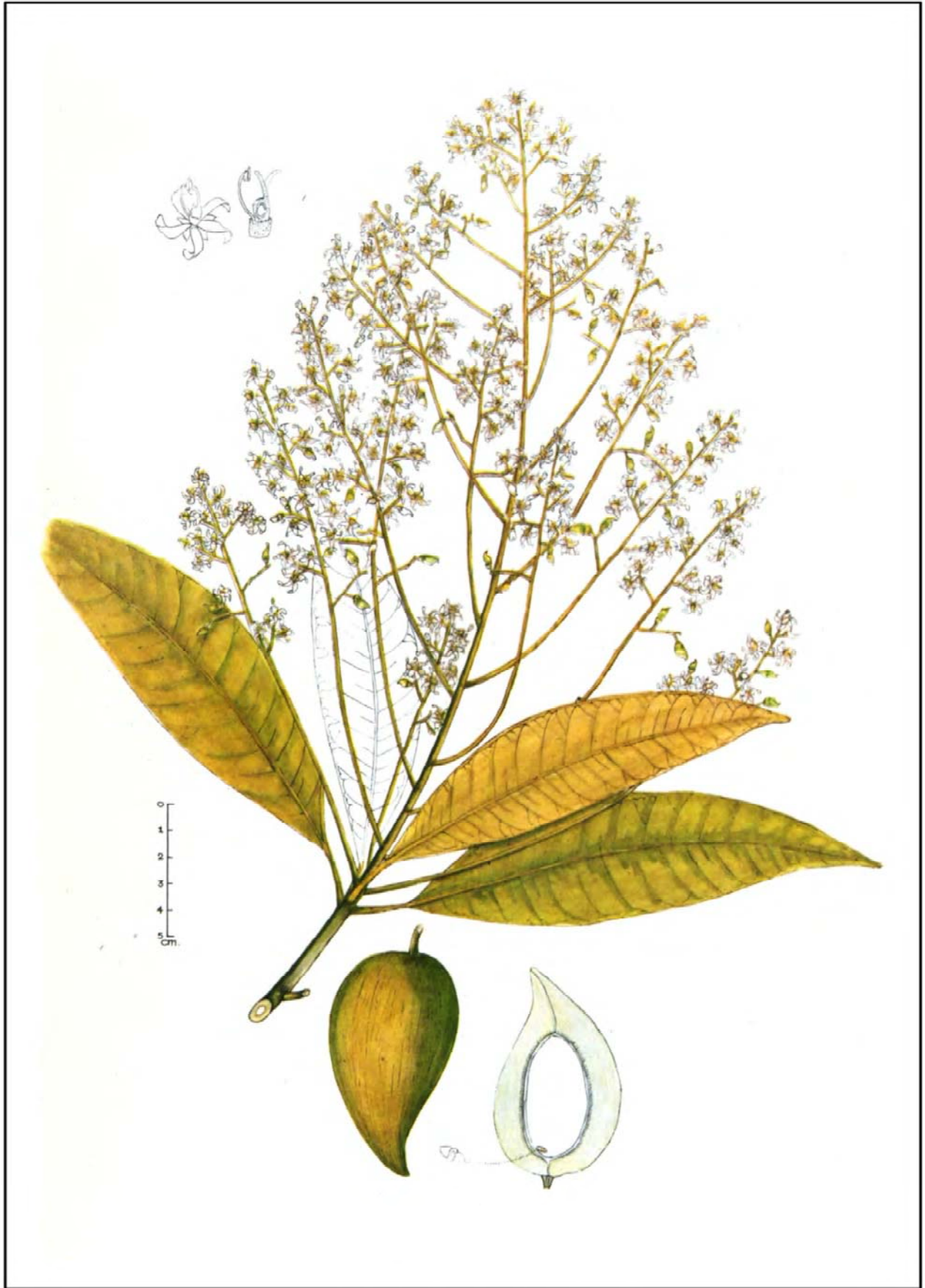
22. MANGIFERA SYLVATICA Roxb.

Leaves alternate, lanceolar, glossy. *Panicles* terminal. *Flowers* monandrous. *Drupe* obliquely conic, with the pointed apex turned one side.

Lukshmee am, the vernacular name in Silhet; on the mountains adjoining to that district it grows to be a tall tree of great size. Flowering time October; the fruit ripens in February and March, and is eaten by the natives, though by no means so palatable as even a bad domestic mango, they also dry them and keep them for medicinal purposes.

Leaves as in the common cultivated sorts, alternate, petioled, lanceolar, entire and smooth; from six to eight inches long, by one and a half or two broad. *Panicles* terminal, much larger than in the domestic sorts, and with the numerous ramifications more erect and slender. *Flowers* very numerous, small, white, with a faint shade of pink; they are more completely monandrous than any of the cultivated sorts. *Calyx* five-leaved, many times shorter than the corols. *Petals* five, linear, spreading, and finally becoming somewhat twisted and revolute. *Nectary* a short, solid, turbinate, slightly grooved, villous receptacle for the germ to rest on. In the domestic sorts it is composed of five distinct glands, which embrace the base of the germ. *Filament* single, inserted into the pot of the nectary, incurved, length of the pistillum. *Anther* oval. *Germ* elevated on the above-mentioned nectary or receptacle, unequally oval, smooth, one-celled; *ovulum* single, attached to that side of the cell from whence the style rises, and most remote from the stamina. *Style* subulate, length of the filament, incurved, after fecundation recurved. *Stigma* simple, acute. *Drupe* ovate, obliquely acuminate, smooth, when ripe yellow, like the common mango and nearly as large, one-celled. *Nut* oblong, less fibrous than in the common sorts, and also less firm, with an even surface. *Seeds* solitary, conform to the nut. *Integument* single. *Perisperm* none. *Embryo* between erect and transverse. *Cotyledons* equal, conform to the seed. *Radicule* lodged between the cotyledons on one side of their base, pointing out, and rather upward.

(W. Roxburgh, *Flora Indica* 1: 644, 1832)



MANGIFERA SYLVATICA Roxb.

23. BUCHANANIA ANGUSTIFOLIA Roxb.

Arboreous. *Leaves* linear-oblong, apex rounded.

A native of the south end of the Peninsula of India. Flowers in June, and the fruit takes nearly one year to come to maturity.

(W. Roxburgh, *Flora Indica* 2: 386, 1832)



BUCHANANIA ANGUSTIFOLIA Roxb.

24. BUCHANANIA LATIFOLIA Roxb.

Arboreous. *Leaves* oval.

Sans. and *Beng.* Piyala, the name of the tree.

Hind. Peeyar, Peeyal, Piyala.

Sans. Chirika, the name of the fruit.

Beng. Chirongi, the name of the fruit, as sold in the Bazars.

Teling. Charoo-mamudee.

Mowdo, or Kati mango-marum of the Tamuls. It must have been the Telinga and Tamul names, which induced Konig to call this tree *Mangifera silvestris*.

Larmzon. *Buch.* in *Asiat. Res.* 5. p. 123.

A large tree, a native of the mountainous parts of the coast. It flowers in January and February.

Trunk straight, thick, and of a great height. *Bark* scabrous. *Branches* numerous, spreading in every direction. *Leaves* alternate, though sometimes three-fold, short-petioled, oval, oblong, or obovate, obtuse, entire, of a hard texture, pretty smooth, above scabrous, below softer, six or seven inches long, and about four broad. *Stipules* none. *Panicles* terminal, and from the exterior axils, erect, branchy, conical. *Bracts* small, caducous. *Flowers* very numerous, small, of a whitish green. *Calyx* inferior, five-toothed, permanent. *Petals* five, oblong, spreading. *Nectary* double; *exterior*, a fleshy, ten-notched yellow ring surrounding the base of the germ; *interior*, consisting of four subulate bodies, placed on one side of the germ, and within the exterior ring; they are about as long as the whole pistil, and look like four additional styles. *Filaments* ten, equal, spreading nearly as long as the petals, inserted into the outside of the base of the exterior nectary. *Anthers* ovate. *Germ* conical, hairy, one-celled, containing, one *ovula*, attached to the bottom of the cell by a long curved cord, which takes nearly a turn round the ovula, and enters it on the middle of the opposite side. *Style* subulate. *Stigma* simple. *Drupe* size of a cherry, a little compressed, smooth, when ripe, black. *Nut* very hard, one-celled, two-valved. *Seed* solitary covered with a double integument. *Perisperm* none. *Embryo* transverse.

The wood of this tree is used for various purposes and the kernels are a very general substitute for almonds, amongst the natives.

(W. Roxburgh, *Flora Indica* 2: 385, 1832)



BUCHANANIA LATIFOLIA Roxb.

25. ODINA WODIER Roxb.

Sans. Jeevula.

Beng. Jiyal.

Teling. Gampina.

Hind. Kushmulla, Kashmulla, Kimul, &c.

It is a very large tree, a native of most mountainous parts of the coast, Bengal, &c. it is also frequently found in a cultivated state, chiefly about Madras where the sides of the roads are lined with them. It grows readily from cuttings, which is I believe, the chief inducement for employing it; for it is without leaves from the beginning of the year, till April or May, a season when shade is particularly wanted; for after that the weather, in general, becomes more clouded. Flowering time March and April, when it is perfectly naked of leaves. Nor could the flowers be any inducement to have it near the houses; in short there is nothing in its favour, but its growing easily and quickly.

The following description is taken from the tree in its wild state amongst the Circar mountains.

Trunk straight to the branches, of no great height but very thick. *Bark* pretty smooth, ash-coloured. *Branches* numerous, the lower spreading, the upper ones disposed in every direction. In a cultivated state it is generally pruned very close once in two or three years, which makes the branches shoot more erect, but takes away from the native beauty of the tree, and renders the shade when in foliage much less extensive, than in its natural state. *Leaves* alternate, about the ends of the branchlets, pinnate with an odd one, from twelve to eighteen inches long. *Leaflets* generally three or four pairs, opposite, sessile, oblong, ovate, pointed, smooth, entire; about five inches long, and two broad, the exterior ones largest. *Racemes* terminal, filiform, pendulous if long, which they generally are, if short spreading. *Bracts* minute, falling. *Flowers* small, purple, inodorous.

In general the *Hermaphrodite* and *Male* flowers (there are no other sort that ever I saw) are on the same tree and even mixed on the same racemes; the male are by far the most numerous; sometimes but rarely they are on a separate tree.

HERMAPHRODITE. *Calyx* four-toothed, small, permanent. *Petals* four, oblong, concave, spreading. *Filaments* eight, spreading, rather shorter than the petals. *Anthers* ovate. *Germ* superior, oblong, one-celled, containing one *ovula*, attached to the top of the cell. *Styles* four, short, erect. *Stigmas* simple. *Drupe* kidney-form, smooth, the size of a large french bean, when ripe red, one-celled. *Nut* the shape of the berry, one-celled. *Seed* conform to the nut; no perisperm. *Embryo* inverse, curved.

MALE. *Calyx*, *corol* and *stamens* as in the hermaphrodite. *Pistil* the rudiments of a germ, with a short, four-toothed style.

The wood of old trees is close grained, of a deep reddish mahogany colour towards the centre. This coloured part is serviceable for many uses and looks well. The white wood is fit for no use that I know of.

From wounds in the bark there issues a gum, which, when dry, is much like pieces of dry glue; but I know of no use it is put to.

This is the tree Dr. Anderson calls *Wodur* in his miscellanies.

(W. Roxburgh, *Flora Indica* 2: 293, 1832)



ODINA WODIER Roxb.

26. HOLIGARNA LONGIFOLIA Roxb.

Cattu-tsjeru, or Kattou-tjeroc. *Rheed. Mal.* 4. p. 19t. 9.

Leaves alternate, cuneiform, some inoffensive subulate bodies on the inside of the short petiole. *Flowers* paniced.

A large tree, a native of the mountainous parts of Chittagong, where it blossoms in January. *Seed* ripens in May and June.

Dr. Buchanan first found the male tree in Chittagong, and some years after found the female hermaphrodite in Malabar, and gave it the name *Holigarna*, from its appellation in the language of Kurnata. He thinks it is the variety called *Bibo* of the Cattu-tsjeru, *Rheed. Mal.* 4.t.9. And says the natives of Malabar by incision, extract an exceedingly acrid juice, with which they varnish their targets. I am however inclined to consider *Van. Rheed's Cattu-tsjeroc* to be this very tree, and his *Bibo*, or *Tsjeeroo*, vol. 4. p. 20 to be *Semecarpus Anacardium*.

Trunk straight, in a twelve years old male tree ten inches in circumference. *Bark* smooth, ash-coloured. *Branches* patent; height of the whole tree twenty-five feet. In its native soil the trunk attains to the thickness of six feet in circumference; while the total height of the tree is above fifty. *Leaves* alternate, crowded about the ends of the branchlets, short-petioled, narrow, cuneiform, entire, acute, smooth on both sides, but paler underneath; length one or two feet, and the breadth from three to six inches. *Petioles* short and thick, and armed generally with two subulate, inoffensive, incurved, thorn-like bodies on each side of the margin. *Stipules* no other than the last mentioned subulate bodies, on the petioles.

MALE. *Panicles* axillary, single, much shorter than the leaves. *Flowers* numerous, small, dull white. *Bracts* small, ferruginous. *Calyx* five-sided; *angles* somewhat sharp. *Corol* flat, to the base five-parted, or it may be called five-petalled. *Segments* oblong, villous. *Filaments* five, shorter than the corol. *Anthers* incumbent.

FEMALE-HERMAPHRODITE on a separate tree. *Panicles, bracts, calyx* and *corol* as in the male. *Stamina* as in the male, but much smaller, and with minute, seemingly abortive *anthers*. *Germ* inferior, a little hairy, with one compressed cell containing one compressed *ovula*, attached to one side of the top of its cell. *Styles* three, recurved. *Stigmas* crescent-shaped, a little hairy. *Berry* inferior, naked, exactly ovate, a little compressed, size of a large olive, smooth, when ripe yellow, one-celled, evalvular. *Cortex* rather thick, and containing between its soft lamina, numerous cells, filled with a black, rather thick, acrid fluid as in the common marking nut, or *Anacardium*. *Seed* conform to the berry. *Integument* single, membranaceous. *Perisperm* none. *Embryo* conform to the seed, transverse. *Cotyledons* equal, ovate, yellowish. *Corcle* lateral. *Plumula* hairy, acute. *Radicle* oblong, inverse, attached to one edge of the cotyledons, considerably below their apex and corresponding with the attachment of the *ovula* in the germ.

(W. Roxburgh, *Flora Indica* 2: 80, 1832)



HOLIGARNA LONGIFOLIA Roxb.

27. SPONDIAS AXILLARIS Roxb.

Leaflets from six to eight pairs, ovate-lanceolate, gash-serrate cuspidate. *Peduncles* axillary, few-flowered. *Nut* oval, smooth.

A small beautiful *Melia* looking tree, a native of Nepal. In the Botanic Garden at Calcutta it flowers in March, and the seed ripens about the close of the rains.

(W. Roxburgh, *Flora Indica* 2: 453, 1832)



SPONDIAS AXILLARIS Roxb.

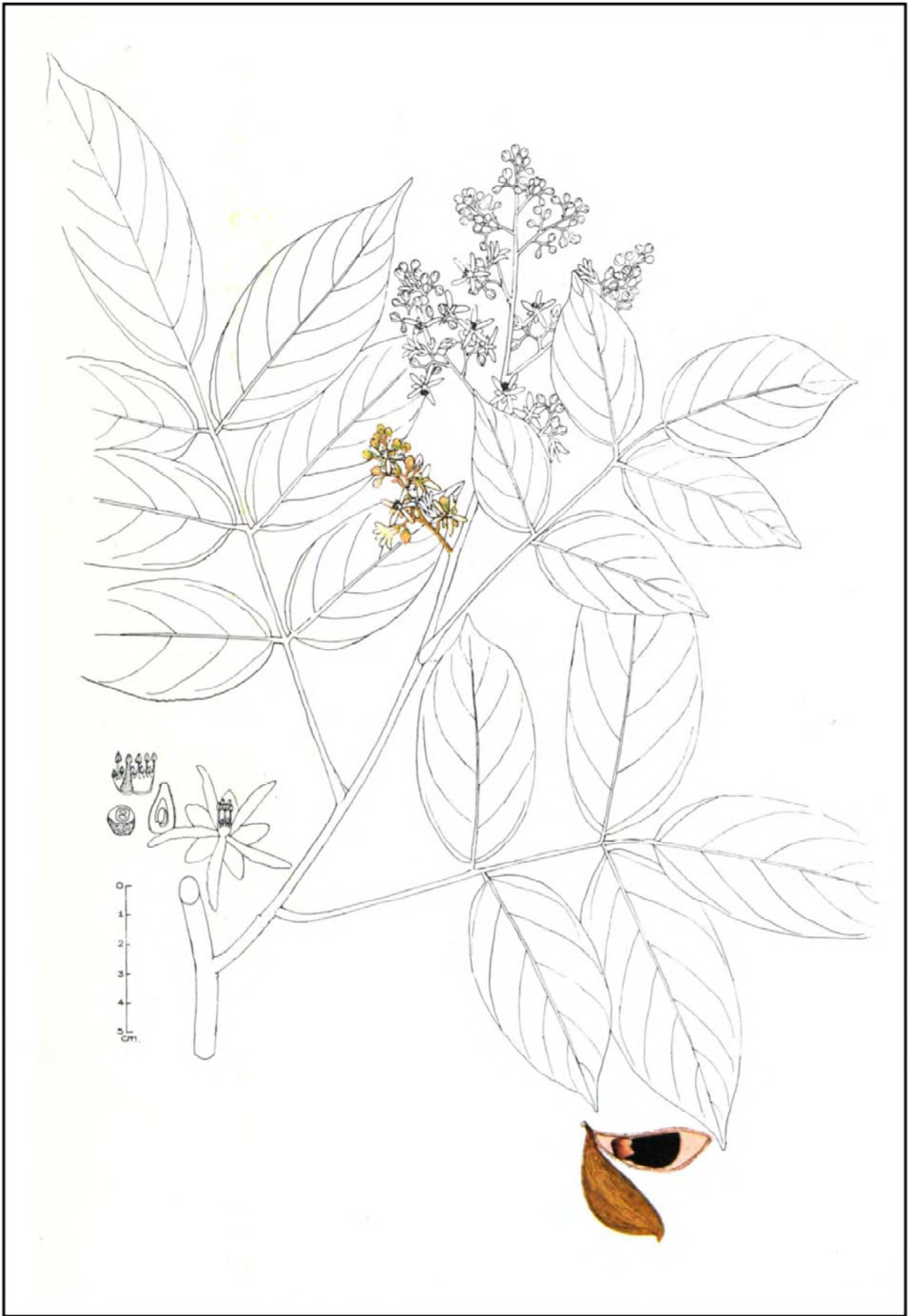
28. CONNARUS PANICULATUS Roxb.

Arboreous. *Leaves* pinnate; *leaflets* five or seven, ovate, oblong, obtusely acuminate, glossy. *Panicles* terminal and axillary; *flowers* decandrous; *petals* linear (without bristles at the base).

A large timber tree, a native of Chittagong, where it blossoms in June.

Young shoots clothed with a little ferruginous down. *Leaves* alternate, unequally-pinnate, about twelve inches long. *Leaflets* five or seven, rarely three, the pairs sub-opposite, ovate-oblong, entire, obtuse-pointed; smooth and glossy, from three to six inches long, and from one to two broad. *Petioles* round and smooth. *Panicles* terminal and generally a smaller one in many of the exterior axils, large, diffuse, and clothed with rust-coloured pubescence. *Bracts* small, caducous, villous, like the rest of the panicle. *Calyx* five-leaved; *leaflets* oblong, concave. *Petals* five, alternate with the leaflets of the calyx, and larger, linearly-lanceolar, yellow, entire, nothing like a bristle or hair from any part, hence I conclude it cannot be Willdenow's *C. pinnatus*. *Filaments* ten, united at the base, alternately as long as the style. *Anthers* cordate. *Germ* superior, conical, hairy; one-celled, containing two ovula, attached a little to one side of the bottom of the cell. *Style* hairy, of the length of the five longest filaments. *Stigma* somewhat headed.

(W. Roxburgh, *Flora Indica* 3: 139, 1832)



CONNARUS PANICULATUS Roxb.

The first part of the document discusses the importance of maintaining accurate records of all transactions. This is particularly crucial for businesses that operate in highly regulated industries, where even the smallest discrepancies can lead to significant legal and financial consequences. The text emphasizes the need for a robust internal control system that can detect and prevent errors or fraud before they become a problem.

One of the key components of an effective internal control system is the separation of duties. This means that no single individual should be responsible for all aspects of a transaction, from authorization to recording to custody of assets. By dividing these responsibilities among different people, the risk of error or fraud is significantly reduced. The document provides several examples of how this principle can be applied in various business contexts.

Another important aspect of internal control is the use of physical controls. This includes measures such as locking up cash, restricting access to inventory, and using tamper-evident seals. These controls help to ensure that assets are protected and that any unauthorized use or loss is immediately apparent. The text also discusses the importance of regular physical counts and reconciliations to verify the accuracy of the accounting records.

The document also touches on the role of management in establishing and maintaining a strong internal control system. It stresses that management is responsible for creating a culture of integrity and ethical behavior within the organization. This involves setting clear expectations, providing ongoing training and supervision, and taking prompt action when control deficiencies are identified. The text provides a checklist of key internal control objectives that management should consider when evaluating their current system.

In conclusion, the document highlights that a well-designed and effectively implemented internal control system is essential for the success and sustainability of any business. It not only helps to protect assets and ensure the accuracy of financial information but also promotes operational efficiency and compliance with applicable laws and regulations. The text provides a comprehensive overview of the various components and principles of internal control, offering practical guidance for businesses of all sizes.