2. LUMNITZERA, Willd.

Calyx-tube produced above the ovary but scarcely contracted, the limb campanulate, shortly 5-lobed or 5-toothed. Petals 5, spreading. Stamens 10 or fewer. Ovules 2 to 5; style filiform, with a minute stigma. Fruit ovoid-oblong, crowned by the persistent calyx, narrowed and flattened at the base, hard and almost woody. Seed linear, with convolute cotyledons.—Maritime trees or shrubs. Leaves crowded at the ends of the branches, obovate or cuneate, thick, entire or slightly crenate. Flowers in short racemes. Bracteoles 2, adnate to the base of the calyx-tube, persistent but not enlarged after flowering.

The genus is limited to the two following species, both of them widely dispersed along the seacoasts of tropical Asia, extending from E. Africa to the Pacific Islands.

Flowers scarlet, in terminal racemes. Calyx fully ½ in. long. Stamens twice as long as the petals . . . . . 1. *L. coccinea.*

Flowers white, in axillary racemes. Calyx about 4 lines long. Stamens scarcely exceeding the petals . . . . . 2. *L. racemosa.*

2. **L. racemosa**, *Willd.*; *DC. Prod.* iii. 22. A glabrous tree or tall shrub, with the foliage of *L. coccinea*, but the racemes are all axillary, usually about as long as the leaves, and the flowers are smaller and white. Calyx at the time of flowering about 4 lines long, and not above ½ in. when in fruit, the lobes or teeth very short. Petals about 1½ lines long, and the stamens very little longer.

N. Australia. Islands of the Gulf of Carpentaria, *R. Brown, Henne.*
Queensland. Cairncross Island, Torres' Straits, *M'Gillivray, Henne;* Fitzroy river and near Keppel Bay, *Thozet.*
This appears to be the commonest of the two species on the coasts of tropical Asia.

NIB

COMBRETACEAE

Quisqualis indica

COMBRETACEAE

1. TERMINALIA, Linn.

(Chuncoa, *Ruiz and Pav.*)

Calyx-tube not produced above the ovary; limb campanulate or urceolate, 5-cleft. Petals none. Stamens 10, longer than the calyx. Style filiform. Ovules 2, rarely 3. Fruit ovoid, terete, angular, compressed or with 2 or (in species not Australian) 3 to 5 longitudinal wings. Cotyledons convolute.—Trees or erect shrubs. Leaves alternate or rarely opposite, usually marked with minute pellucid dots, often only visible under a strong lens. Flowers hermaphrodite or polygamous, small, green, white or rarely coloured, sessile in loose spikes, rarely contracted into dense heads, either axillary or clustered on the old nodes. Calyx-tube usually small and narrow, the limb much broader.

The genus extends over nearly the whole range of the Order, but is most abundant in Africa and Asia. The Australian species appear to be all endemic, with the exception of *T. microcarpa*, which is also in Timor. Several of them however are as yet insufficiently known. They are often not to be distinguished without the fruit, which, when succulent and not winged, is rarely perfect in herbarium specimens, and we do not as yet know how far the fruit may vary in the same species. Some with broadly winged fruits have precisely the foliage and flowers of others which have wingless fruits. The circumscription of species here given may therefore require much revision when more perfect materials are obtained.

The subdivision of the genus into sections, or with some botanists into distinct genera, has been founded on the fruit alone, and although the line of demarcation is often very indefinite, no better character has as yet been found. The Australian species are included in *Chuncoa*, with 2 or 3 distinct wings to the fruit, *Catappa* with 2 wings, confluent above and below so as completely to encircle the drupe, and *Myrobalanus* without wings; but in *T. volucris* the wings are often slightly confluent so as to do away with all real distinction between *Chuncoa* and *Catappa*, and even between that and *Myrobalanus*, the acute angles of the fruit of *T. melanocarpa* almost pass into the wings of *Catappa*. The section *Pentaptera* with 4 or 5 wings to the fruit, is as yet unknown in Australia. Among the following species several are only known from very imperfect specimens, and may henceforth require much correction in their circumscription, although I do not think they will be much reduced in number.

SECT. I. **Catappa.**—*Fruit with 2 longitudinal membranous or coriaceous wings, or rarely, in the first 3 species, with a third narrow wing or prominent nerve.*

Fruit, including the wings, much broader than long.
- Fruit, including the wings, three times as broad as long; wings quite distinct. Leaves velvety-pubescent underneath . . . . 1. *T. platyptera.*
- Fruit, including the wings, not twice as broad as long; wings often confluent above and below. Leaves nearly glabrous. Spike slender, interrupted.
  - Leaves obovate, much reticulate. Fruit-wings scarcely confluent 2. *T. volucris.*
  - Leaves cuneate-oblong, much reticulate. Fruit-wings shortly confluent . . . . . 3. *T. oblongata.*

Fruit, including the wings, rather longer than broad and quite surrounded by the confluent wings.
- Leaves lanceolate or oblong, silky-pubescent. Spikes elongated, dense. Fruits under ½ in. long . . . . . 4. *T. bursarina.*
- Leaves lanceolate or oblong, mostly silky-pubescent. Spikes short, dense. Fruits ¾ to above 1 in. long . . . . . 5. *T. circumalata.*
- Leaves obovate, glabrous. Spikes short, dense. Fruits ¾ to above 1 in. long . . . . . 6. *T. pterocarpa.*

Fruit orbicular, quite surrounded by a narrow wing. Leaves obovate, much reticulate, glabrous. Spikes slender . . . . . 7. *T. Thozetii.*

SECT. II. **Myrobalanus.**—*Fruit globular or more frequently ovoid, terete or slightly compressed, or surrounded by a prominent acute angle, but not distinctly winged.*

Leaves very obtuse, usually broad. Flowers rather small; stamens not above 3 lines long.
- Leaves quite glabrous.
  - Leaves large, narrowed into a short petiole.
    - Calyx-tube white, with appressed hairs. Drupe glabrous, surrounded by a very prominent angle . . . . . 8. *T. melanocarpa.*
    - Calyx-tube quite glabrous. Drupe ovoid, without any angle . 9. *T. Muelleri.*
  - Leaves large, with a short broad flat petiole. Calyx tomentose. Drupe ovoid, without any angle . . . . . 10. *T. latipes.*
  - Leaves large with a petiole of 2 to 3 in. Drupe acuminate, with 2 slightly prominent angles . . . . . 11. *T. edulis.*
  - Leaves minutely hoary underneath. Drupe ovoid-globular, without angles . . . . . 12. *T. discolor.*
  - Leaves loosely tomentose-pubescent, at least underneath.
    - Drupe ovoid glabrous . . . . . 13. *T. porphyrocarpa.*
    - Drupe ovoid or oblong, often acuminate, tomentose . . . . 14. *T. platyphylla.*

Leaves mostly shortly acuminate. Flowers rather small. Stamens not above 3 lines long.
- Leaves ovate.
  - Leaves three or four times as long as the petiole, the pellucid dots very conspicuous under a lens . . . . . 15 *T. microcarpa.*
  - Leaves not twice as long as the petiole, the pelluoid dots quite microscopic . . . . . 16. *T. petiolaris.*
- Leaves lanceolate or narrow oblong-elliptical. Drupe acuminate . 17. *T. erythrocarpa.*

Leaves narrow, obtuse. Flowers large. Stamens 5 to 6 lines long . 18. *T. grandiflora.*

NID

COMBRETACEAE

Terminalia arostrata

NEB

COMBRETACEAE

Terminalia
biangulat.

4. **T. bursarina,** *F. Muell. Fragm.* ii. 149. A shrub or small tree, the young branches and foliage softly silky-pubescent. Leaves usually crowded, mostly narrow-oblong or lanceolate, obtuse, 1 to 1½ in. long, but occasionally passing into obovate or ovate, narrowed into a short petiole, the primary veins very oblique and reticulate between them. Spikes pedunculate, dense, exceeding the leaves and sometimes 3 to 4 in. long, the rhachis and flowers softly silky. Calyx-tube about 1 line long, the limb about as long, not so broad and more deeply divided into narrower lobes than in the allied species. Drupe, according to F. Mueller, 2- or rarely 3-winged, rather longer than broad, 2½ to 4 lines long.

N. Australia. Dry gravelly banks of Victoria river and frequent in low places round the Gulf of Carpentaria, *F. Mueller*.

NIB

COMBRETACEAE

Terminalia canescens

NSB

COMBRETACEAE

Terminalia chlorocarp

5. **T. circumalata,** *F. Muell. Fragm.* iii. 91. Closely allied to *T. pterocarpa*, with the same flowers and fruit, and perhaps a narrow-leaved variety with the foliage and inflorescence more or less clothed with a soft silky pubescence. Leaves oblong-cuneate or elliptical, 1 to 2 or sometimes nearly 3 in. long, with very oblique primary veins, the reticulate veinlets few and scarcely prominent. Flowers very silky, crowded in short pedunculate spikes. Fruits including the wings, obovate, ¾ to above 1 in. long; the drupe entirely surrounded by a continuous wing.

N. Australia. Cape Pond, N.W. coast, *A. Cunningham;* Depuech Island, *Bynoe;* maritime rocks, Nichol Bay, *F. Gregory's Expedition;* in the interior, lat. 18° 35′, *M'Douall Stuart's Expedition.* The latter specimens and some of A. Cunningham's are less pubescent with broader leaves, and seem to connect the species with *T. pterocarpa.* Other specimens from the islands of the Gulf of Carpentaria, *R. Brown*, may belong to *T. circumalata*, but are not in fruit.

NSB

COMBRETACEAE

Terminalia cunningham

12. **T. discolor,** *F. Muell. Fragm.* iii. 92. A tall shrub, the branches and young leaves hoary with a very minute pubescence. Leaves ovate or obovate, obtuse or shortly and obtusely acuminate, mostly 2 to 3 in. long, more narrowed at the base than in *T. Muelleri* and the primary veins less prominent, coriaceous and at length shining above, pale or whitish with a minute tomentum underneath. Flowers not seen, but from the scars on the old rhachis the spikes are probably loose. Fruit only seen imperfect, ovoid-globular, without wings or angles.

N. Australia. Hearson's Island, Nichol Bay, *F. Gregory's Expedition.* The specimens are much too imperfect for a satisfactory diagnosis.

11. **T. edulis,** *F. Muell. Fragm.* ii. 151. A tree, the fruiting specimens quite glabrous. Leaves very broadly ovate, very obtuse at both ends, 4 to 8 in. long, coriaceous with prominent distant primary veins, on petioles of 2 or 3 in. Flowers unknown. Drupes ovoid-oblong, acuminate, sometimes surrounded by a slightly prominent angle and said to be yellowish when fresh.

N. Australia. Victoria, Fitzmaurice, and Alligator rivers, *F. Mueller;* South Goulburn Island, *A. Cunningham.* The specimens are insufficient for distinguishing them satisfactorily from *T. melanocarpa* and several others; the petioles are, however, longer than in any other Australian species except *T. petiolaris*, which has very differently shaped leaves.

NSB

COMBRETACEAE

Terminalia ferdinandiana

NIB

COMBRETACEAE

Terminalia fitzgeraldii

18. **T. grandiflora,** *Benth.* Branches and foliage silky or the leaves at length glabrous. Leaves linear-oblong or cuneate, obtuse or retuse, $1\frac{1}{2}$ to 3 in. long, coriaceous, very obliquely veined and reticulate, narrowed into a short petiole. Spikes usually exceeding the leaves, with flowers much larger than in any other *Terminalia* known to me. Calyx-tube or ovary above 2 lines long, and the limb of the calyx as much in diameter, the lobes acuminate. Stamens 5 to 6 lines long. Drupe nearly globular, about 1 in. long, tapering into a conical beak of about $\frac{1}{4}$ in., smooth and glabrous, without wings or angles.

N. Australia. Islands of the Gulf of Carpentaria and Arnhem S. Bay, *R. Brown;* Port Essington, *Armstrong:* between Fitzmaurice and Victoria rivers, *F. Mueller.* There are two forms, one with long narrow leaves, quite glabrous except when very young, the spikes glabrous or slightly silky, and the stamens fully $\frac{1}{2}$ in. long; the other much more silky, the leaves broader shorter and more cuneate, and the silky flowers rather, but not much, smaller.

NIB

COMBRETACEAE

Terminalia hadleyana

10. **T. latipes,** *Benth.* Branchlets glabrous with a loose bark. Leaves broadly obovate, 3 to 5 in. long, very obtuse, coriaceous, glabrous and glaucous, abruptly narrowed into a very short petiole, which as well as the midrib is very broad and flat, with the primary veins prominent and very divaricate. Spikes rusty-tomentose, about as long as the leaves. Flowers small, rather numerous, tomentose. Drupe ovoid, straight, without wings or angles.

N. Australia. Victoria river, *Bynoe.*

A. Cunningham's herbarium contains specimens of a species apparently allied to the above, but with longer and more slender petioles and slender glabrous spikes. They cannot, however, be determined for want of the fruit.

8. **T. melanocarpa,** *F. Muell. Fragm.* iii. 92. A tree, usually glabrous, except the silky-white young buds and the flowers. Leaves obovate, very obtuse or rarely obscurely and very obtusely acuminate, 3 to 6 or even 8 in. long and sometimes above 6 in. broad, narrowed into a short petiole, coriaceous, the primary veins prominent underneath and rather distant, transversely reticulate between them. Spikes loose, about as long as the leaves, the rhachis nearly glabrous. Flowers numerous but not crowded. Calyx-tube or ovary white with appressed hairs; limb nearly glabrous outside, above 2 lines broad, densely woolly inside. Stamens and style glabrous. Drupes ovoid, somewhat compressed, obtuse or acuminate, about 1 in. long, surrounded usually by a prominent acute angle, which sometimes in the dried state almost assumes the appearance of a narrow thick wing, but in other specimens is scarcely prominent.

N. Australia. Shaded valleys, islands of the N. Coast, *R. Brown.*
Queensland. Snapper Island, *A. Cunningham;* Port Denison and Edgecombe Bay, *Fitzalan, Dallachy.*

15. **T. microcarpa,** *Dcne. Herb. Tim. Descr.* 129. Young shoots minutely pubescent. Leaves broadly ovate-elliptical, rarely slightly obovate, shortly and obtusely acuminate, 3 to 5 in. long, narrowed into a petiole of about 1 in., glabrous or slightly hoary underneath with a minute pubescence, thinly coriaceous, with distant primary veins and copious reticulations, the pellucid dots although small, yet more conspicuous than in most species. Spikes attaining the length of the leaves. Flowers numerous but not densely crowded. Calyx rusty outside with a minute tomentum, densely villous inside, but not seen fully expanded. Drupe, according to Decaisne, olive-shaped, acuminate, glabrous.

N. Australia ?, *Baudin's Expedition.* Also in Timor. I have not seen the Australian specimens mentioned by Decaisne as having been gathered on the S. coast, probably from one of those mistakes in the labels which occur in so many instances in the Australian collections in the Paris Herbarium, owing in a great measure to the illegible handwriting and absurd orthography of the original labels of the gardener who accompanied Baudin's Expedition. The above description is taken from a Timor specimen communicated by Decaisne. The species may possibly prove to be a variety of *T. Belerica*, Roxb., which extends over E. India and the Archipelago. The leaves are ovate, as stated in Decaisne's description, rather than obovate, as they are said to be by some mistake in the diagnosis.

16. **T. petiolaris,** *A. Cunn. Herb.* A tree, closely resembling *T. microcarpa* in foliage and inflorescence, but the petioles are much longer in proportion to the lamina, the pellucid dots are quite microscopic, and the smaller reticulations appear pellucid when seen against the light. Young shoots minutely pubescent. Adult leaves quite glabrous, broadly ovate, shortly and obtusely acuminate, 2 to 3 in. long, narrowed into a petiole of from 1½ to 2 in. Spikes slender, with numerous flowers, only seen in bud. Fruit unknown.

N. Australia. Point Cunningham, Cygnet Bay and York Sound, N.W. coast, *A. Cunningham.*

14. **T. platyphylla,** *F. Muell. Fragm.* ii. 150. A moderate-sized tree, the young branches and petioles more or less hoary or rusty with a short soft tomentum or sometimes densely tomentose and almost woolly. Leaves broadly obovate or ovate, very obtuse, 4 to 6 in. long, 2 to 4 in. broad, shortly narrowed into a petiole never exceeding 1 in. in some specimens, rather longer in others, coriaceous, softly pubescent on both sides or nearly glabrous above. Spikes usually shorter than the leaves, with numerous rather small flowers, loose or crowded. Calyx silky-pubescent or villous outside, densely villous inside. Drupes tomentose, ovoid or oblong, obtuse or acuminate, not winged.

N. Australia. Islands of the Gulf of Carpentaria, *R. Brown, Henne;* Victoria, Fitzmaurice, and Roper rivers, *F. Mueller;* Port Essington, *Armstrong.* The species appears to be chiefly distinguished amongst other large obtuse-leaved ones by its soft pubescence and by the tomentose drupes. From the few specimens seen, the latter appear to be variable in shape. In R. Brown's specimens they are ovoid-oblong, obtuse, often surrounded by a slightly prominent or obscure angle; in one of F. Mueller's from Roper river, they are obliquely acuminate, with a prominent angle, and shortly contracted at the base; in another of F. Mueller's, they are straight, quite terete, oblong, rounded at both ends, but terminating abruptly in a narrow straight beak of about 2 lines.

A specimen from the N.W. coast, *Bynoe,* has the foliage of *T. platyphylla,* but the flowers in long loose glabrous spikes. It cannot, however, be determined for want of the fruit.

1. **T. platyptera,** *F. Muell. Fragm.* ii. 151. A tree, the young branches and petioles hoary-pubescent or almost velvety. Leaves crowded at the ends of the flowering branches, obovate or obovate-oblong, very obtuse, $1\frac{1}{2}$ to $2\frac{1}{2}$ in. long in our specimens, on a rather long petiole, velvety-pubescent on both sides when young, at length nearly glabrous above, the reticulate veins prominent. Spikes tomentose, slender, interrupted, exceeding the leaves. Calyx softly tomentose inside and out, the adnate tube about as long as the broad campanulate limb; lobes short and broad. Filaments glabrous. Style villous. Fruit 2-winged, tomentose-pubescent, about 1 in. long and 3 in. broad, including the horizontally divaricate wings, which are quite distinct, broadly obovate, plicately veined.

N. Australia. Arnhem's Land, *F. Mueller* (in flower); Lynd river, *Leichhardt* (in fruit).

Var. (?) *glabrata.* Minutely hoary or nearly glabrous; leaves more coriaceous and rather larger.—Gilbert river, *F. Mueller.*

NSB

COMBRETACEAE

Terminalia rogersii

NID

COMBRETACEAE

Terminalia

Seriocarpa

2. **T. volucris,** *Herb. R. Br.* Branches divaricate, the young shoots very minutely hoary or silky-pubescent. Leaves from broadly obovate to oval-elliptical, 1½ to 3 in. long, narrowed at the base and often decurrent on the rather long petiole, thin, pale underneath, the primary veins more numerous and less oblique than in *T. pterocarpa*, which this species resembles without the fruit, and much and finely reticulate between them. Spikes slender, interrupted, usually longer than the leaves, especially when the flowers are chiefly males, the more female spikes shorter and denser. Calyx minutely pubescent, the broad limb as long as the ovary. Disk villous. Filaments glabrous. Style glabrous or hairy at the base. Fruit 2-winged, about ¾ in. long, and twice that breadth including the broad wings, which are either distinct or slightly continuous above or below the drupe or both; there are also frequently on one face of the drupe 1 or 2 prominent longitudinal angles.

N. Australia. Port Keats and Cambridge Gulf, N.W. coast, *A. Cunningham;* Victoria river, *F. Mueller;* islands of the Gulf of Carpentaria, *R. Brown;* Sweers Island, *Henne;* in the interior, lat. 18° 35′, *M'Douall Stuart's Expedition.* R. Brown's specimens are the only ones in good fruit, and are those alluded to by him in the Appendix to Flinders's Voyage under the name of *Chuncoa.* I have little doubt of A. Cunningham's and F. Mueller's specimens belonging to the same species; the others are very imperfect.

Queensland? Some specimens from Broad Sound and Endeavour river, *R. Brown,* without fruit, appear to belong to the same species.

Var. (?) *coriacea.* Leaves larger, broader, more coriaceous; spikes long; lowest bracts sometimes leafy.—Upper Victoria river, *F. Mueller.* Specimens not in fruit and therefore doubtful.